

ENDODONTIC DIAGNOSIS



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INTRODUCTION

- ✘ The pulp is the formative organ of the tooth.
- ✘ The pulp has been described as highly resistant organ and as organ with little resistance or recuperating ability.
- ✘ Its resistance depends on cellular activity, nutritional supply, age and other metabolic and physiologic parameters.

✘ Causes of pulp disease:

The causes of pulp disease are Physical, Chemical and Bacterial.

1. Physical

-Mechanical

- Trauma: Accidental, Iatrogenic dental procedures

- Pathological wear

- Crack through body of tooth.

-Thermal

- Heat from cavity preparation

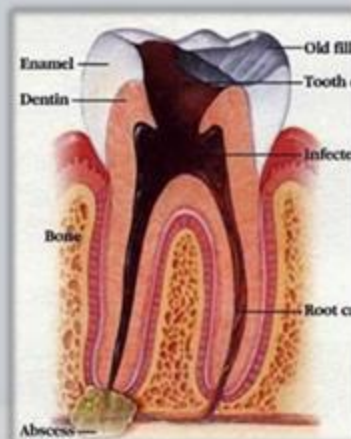
- Exothermic heat from setting of cements

- Electrical (galvanic current from dissimilar metallic filling)

Endodontics is the specialty of dentistry that manages the prevention, diagnosis, and treatment of the dental pulp and the **periradicular** tissues that surround the root of the tooth. As an investigation, pulp testing can have several aims

PERIRADICULAR TISSUE

The periradicular tissue comprises of surroundin Alveolar bone, periodontal ligament & cementum.



PULP

The dental pulp is a delicate soft connective tissue interspersed with tiny blood vessels, lymphatics, myelinated & unmyelinated nerves & undifferentiated connective tissue cells that supports the dentin.



✘ **Assessment of pulp health based on qualitative sensory response.**

-This is commonly done:

-prior to restorative , endodontic, and orthodontic procedure.

-as a follow up and monitoring the pulp after trauma to the teeth.

-in differential diagnosis such as excluding periapical pathosis of pulp origin.

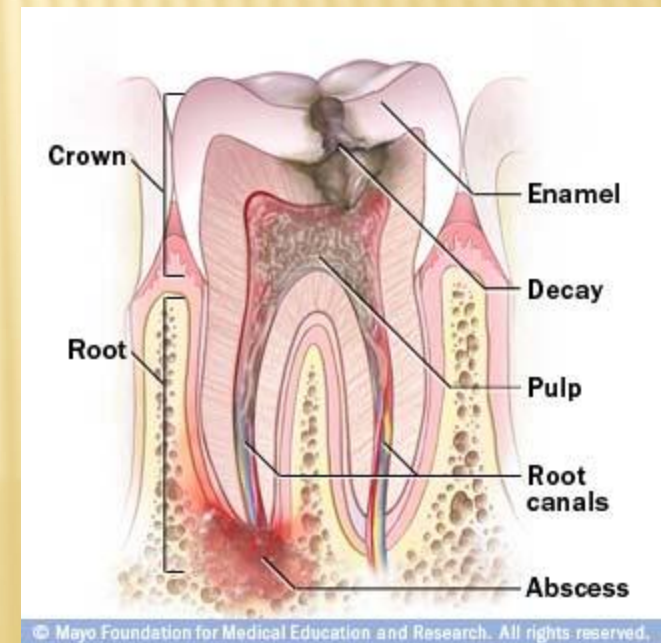
CAUSES OF PULPAL NERVE DAMAGE

- × **Physical irritation**

 - + Most generally brought on by extensive decay.

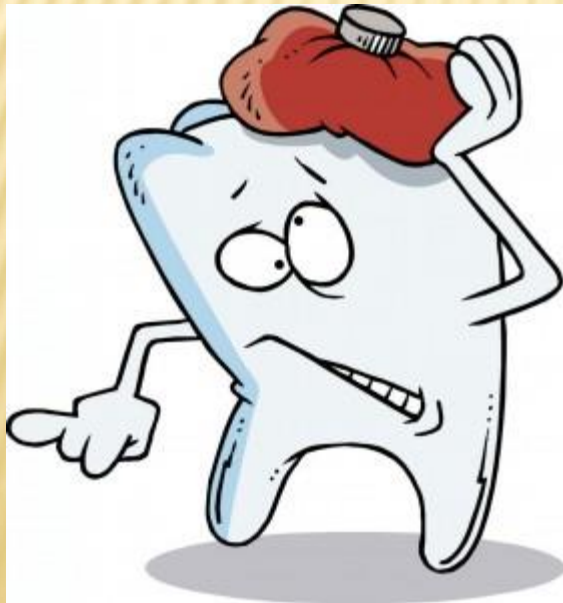
- × **Trauma**

 - + Blow to a tooth or the jaw.



SIGNS AND SYMPTOMS OF PULPAL NERVE DAMAGE

- ✘ Pain when biting down.
- ✘ Pain when chewing.
- ✘ Sensitivity with hot or cold beverages.
- ✘ Facial swelling.



ENDODONTIC DIAGNOSIS

× **Subjective examination**

- + Chief complaint
- + Character and duration of pain
- + Painful stimuli
- + Sensitivity to biting and pressure

ENDODONTIC DIAGNOSIS– CONT'D

× **Objective examination**

- + Extent of decay
- + Periodontal conditions surrounding the tooth
- + Presence of an extensive restoration
- + Tooth mobility
- + Swelling or discoloration
- + Pulp exposure



- ✘ Endodontic diagnosis often presents challenges to the practitioner.
- ✘ Most oro-facial pain is of pulpal or periradicular origin.
- ✘ Specific diagnostic steps have to be followed in order to reach to a definitive diagnosis and formulate a treatment plan.

THE CHIEF COMPLAINT

- ✘ To be properly documented using patients *own words*.
- ✘ Practitioner has to listen carefully, it is usually the first clue to solve the diagnosis riddle.
- ✘ Many different dental pathosis might be identified. Treat first the one that is causing the chief complaint.

DETAILED MEDICAL AND DENTAL HISTORY

- ✘ A must for every patient seeking treatment.
- ✘ A medical condition can alter the manner the dental care is provided or might have oral manifestations or mimic dental pathosis.

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- ✘ The chronology of events leading up to the chief complaint.
 - ✘ Five areas to be investigated; location of pain, commencement of pain, intensity of pain, provocation and relief of pain, duration of pain.

EXAMINATIONS AND TESTING

- ✘ Extraoral examination; facial swellings, sinus tracts, lymph nodes enlargement, ...etc.



- ✘ Intraoral examination, swellings, sinus tracts...etc.



✘ Palpation test.



DIAGNOSTIC TESTING – CONT'D

× **Palpation tests**

- + Used to determine whether the inflammatory process has extended into the periapical tissues.
- + The dentist applies firm pressure to the mucosa above the apex of the root.

✘ Percussion test.

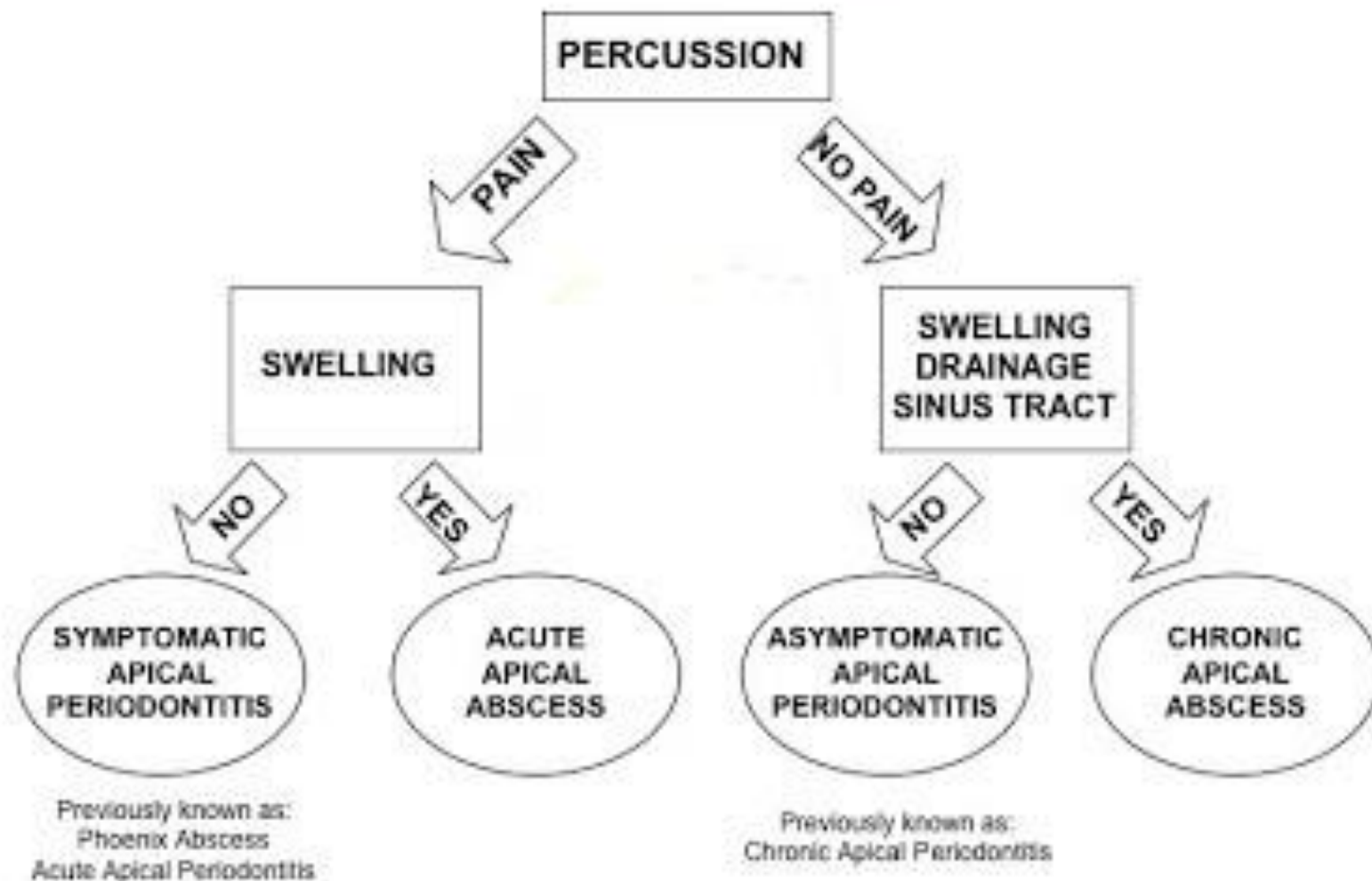


DIAGNOSTIC TESTING

× **Percussion tests**

- + Used to determine whether the inflammatory process has extended into the periapical tissues.
- + Completed by the dentist tapping on the incisal or occlusal surface of the tooth in question with the end of the mouth mirror handle held parallel to the long axis of the tooth.

Periapical Diagnosis



DIAGNOSTIC TESTING

- ✘ Mobility test.



DIAGNOSTIC TESTING

- ✘ Periodontal examination for diagnosis and prognosis.



DIAGNOSTIC TESTING

PULP TESTING

- × **Electric pulp testing**
 - × Delivers a small electrical stimulus to the pulp.
- × Factors that may influence readings:
 - × Teeth with extensive restorations.
 - × Teeth with more than one canal.
 - × Failing pulp can produce a variety of responses.
 - × Control teeth may not respond as anticipated.
 - × Moisture on the tooth during testing.
 - × Batteries in the tester may be weak.

✘ Electric pulp test.



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- ✘ The response of the pulp to electric testing is not reflecting the histologic health status of the pulp.
 - ✘ A response by the pulp to the electric current only denotes that some viable nerve fibres are present in the pulp and are capable of responding.
 - ✘ The lack of response has been found most frequently when an electric pulp is present.
 - ✘ The electric pulp tester will not work unless the probe can be placed in contact with the natural tooth.
 - ✘ With the advent of universal precautions for infection control, the patient may be required to place a finger on the tester probe to complete the electric circuit for the models, however lip clips are an alternative to having patients hold the tester.

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- ✘ proper use of the electric pulp tester requires that the tooth to be evaluated be isolated and dried.
 - ✘ A control tooth of similar tooth type and location in the arch should be tested first in order to establish a base line response and to inform the patients with a normal sensations.
 - ✘ The suspected tooth should be tested at least twice to confirm the results.

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- ✘ The tip of the testing probe that will be placed in contact with the tooth structure must be coated with the electric conducting based media.
 - ✘ The most commonly used media is toothpaste.
 - ✘ The coated probe tip is placed in the incisal third of buccal or facial area of the tooth to be tested.
 - ✘ This completes the circuit and initiates the delivery of electric current to the tooth. in contact with the natural tooth.

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- ✘ The patient is instructed to remove his or her finger from the probe when a tingling or warming sensation is felt in the tooth.
 - ✘ The readings from the pulp tester are recorded and will be evaluated once all the appropriate teeth have been tested and the result obtained from other pulp testing methods.
 - ✘ The tip of the endodontic explorer is coated with tooth paste or other appropriate media and placed.

PLACEMENT OF A PULP TESTER.



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DIAGNOSTIC TESTING

PULP TESTING

× **Thermal sensitivity**

- × Necrotic pulp will not respond to cold or hot.
- × Heat testing is most useful when a patient's complaint is intense dental pain upon contact with any hot liquid or food in instances where a patient is unable to identify which tooth is sensitive, a heat test is appropriate.
- × Starting with the most posterior tooth in that area of the mouth, each tooth is individually isolated with the rubber dam.
- × An irrigating syringe is filled with a liquid that has a temperature similar to that which would cause the painful sensation. 42 C.
- × The liquid is then expressed from the syringe onto the isolated tooth to determine whether the response is normal or abnormal.

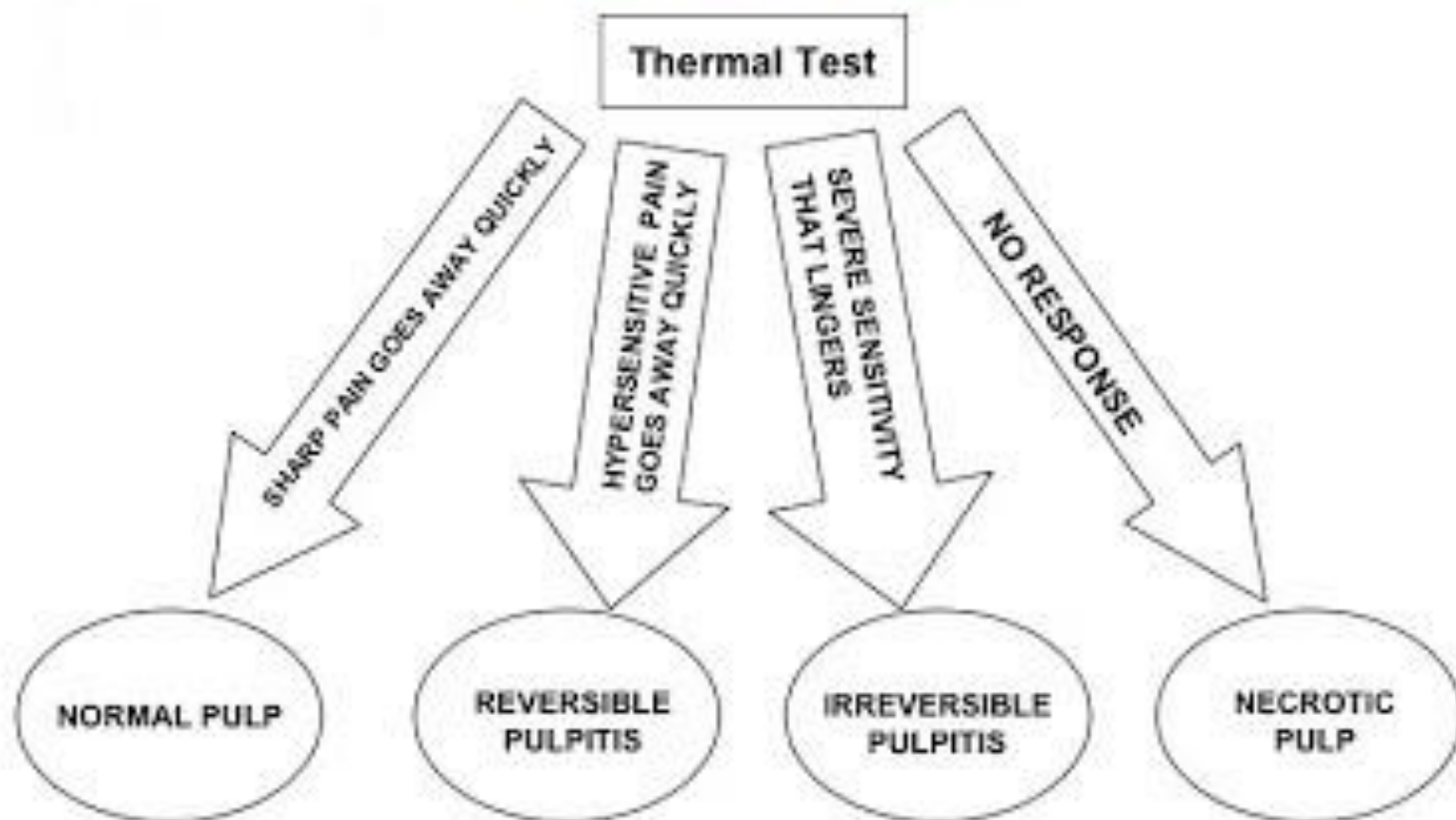
× Heat test

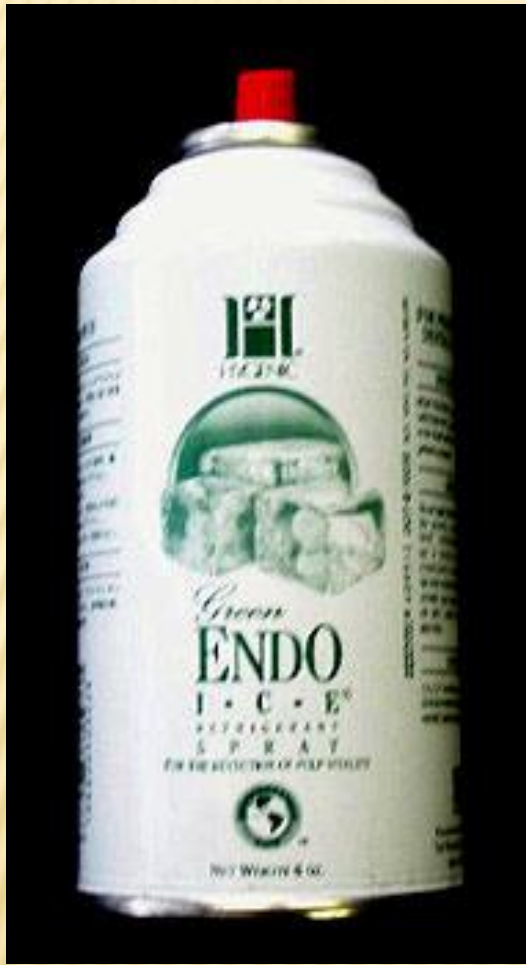
- × Piece of gutta-percha or instrument handle heated and applied to the facial surface of the tooth.
- × The tooth will exhibit an immediate, intense painful response to the heat. With the heat testing a delayed response may occur, so waiting 10 seconds between each heat test will allow sufficient time for any onset or symptoms. Another method for heat testing is applied heated gutta-percha or compound stick to the surface of the tooth.
- × If this method is used, a light layer of lubricant should be placed onto the tooth surface prior to applying the heated material to prevent the hot gutta-percha 78 C TO 150 C or compound from adhering to the dry tooth surface.

× Cold test

- × Ice, dry ice, or ethyl chloride used to determine the response of a tooth to cold. Cold testing should be used in conjunction with the electric pulp tester so that results from one test will verify the findings of the other test.
- × It can be accomplished similarly to heat testing by individually teeth with a rubber dam. Recommended use of ¼” ice cone Placed against the tooth for 5 sec to quantify cold test.
- × -Max of 15 sec can be used for detection of pulpal vitality.

Pulpal Diagnosis





SPECIAL TESTS

✘ Bite test.

For the bite test to be meaningful a device should be used that will allow practitioners to apply pressure to individual cusp or areas of tooth. • Variety of devices have been used for the bite test including cotton applicators , tooth picks, orange wood sticks, rubber polishing wheels. • As with all the pulp test, adjacent teeth should be use as controls so that the patient is aware of the normal response to these test. • The small cupped out areas on the instruments is placed in contact with the cusp to be tested.



- ✘ The patient is then asked to apply biting pressure with opposing teeth to the flat surface on the opposing side of the device.
- ✘ The biting pressure should be applied slowly until full closure is achieved.
- ✘ The firm pressure should be applied for few seconds, the patient is then asked to release the pressure quickly.
- ✘ Each individual pressure on a tooth can be tested in a like manner.
- ✘ The practitioner should note if the pain is elicited during the pressure phase or upon quick release of pressure.
- ✘ A common finding is with fractured cusp or cracked tooth is frequent presence pain upon release of biting pressure





- ✘ Test Cavity.
- ✘ Selective anesthesia.
- ✘ Radiographs

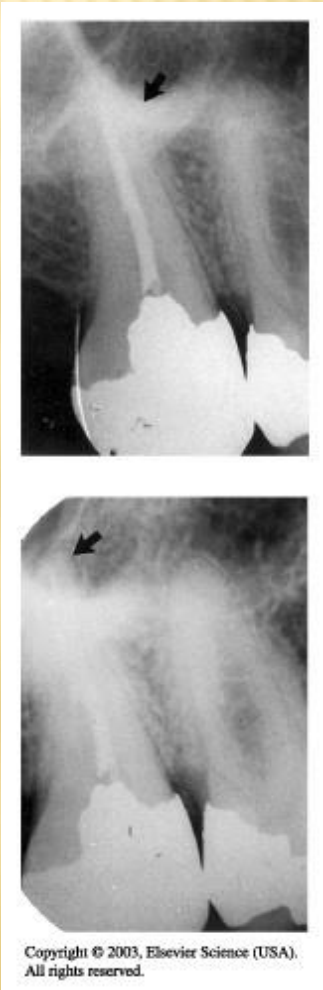


RADIOGRAPHS IN ENDODONTICS

- × **Initial radiograph**
 - + Diagnosis.
- × **Working length film**
 - + Used to determine the length of the canal.
- × **Final instrumentation film**
 - + Taken with the final size files in all canals.
- × **Root canal completion film**
 - + Taken after the tooth as been temporized.
- × **Recall films**
 - + Taken at evaluations.

REQUIREMENTS OF ENDODONTIC FILMS

- ✘ Show 4-5 mm beyond the apex of the tooth and the surrounding bone or pathologic condition.
- ✘ Present an accurate image of the tooth without elongation or fore-shortening.
- ✘ Exhibit good contrast so all pertinent structures are readily identifiable.



CLINICAL CLASSIFICATION OF PULPAL AND PERIAPICAL DISEASE

× Pulpal:

- 1) Healthy pulp.
- 2) Reversible pulpitis.
- 3) Irreversible pulpitis; symptomatic and asymptomatic.
- 4) Necrotic pulp.

CLINICAL CLASSIFICATION OF PULPAL AND PERIAPICAL DISEASE

× Periapical:

- 1) Periapical periodontitis; Acute or chronic.
- 2) Periapical abscess; acute or chronic.

-
- ✘ Periodontal and restorative evaluation should be carried out.
 - ✘ If tooth is not restorable or periodontally un-savable then the tooth should be extracted, even though RCT can be performed!

DIAGNOSTIC CONCLUSIONS

- × **Normal pulp**

- + There are no subjective symptoms or objective signs. The tooth responds normally to sensory stimuli, and a healthy layer of dentin surrounds the pulp.

DIAGNOSTIC CONCLUSIONS

× Pulpitis

+ The pulp tissues have become inflamed.

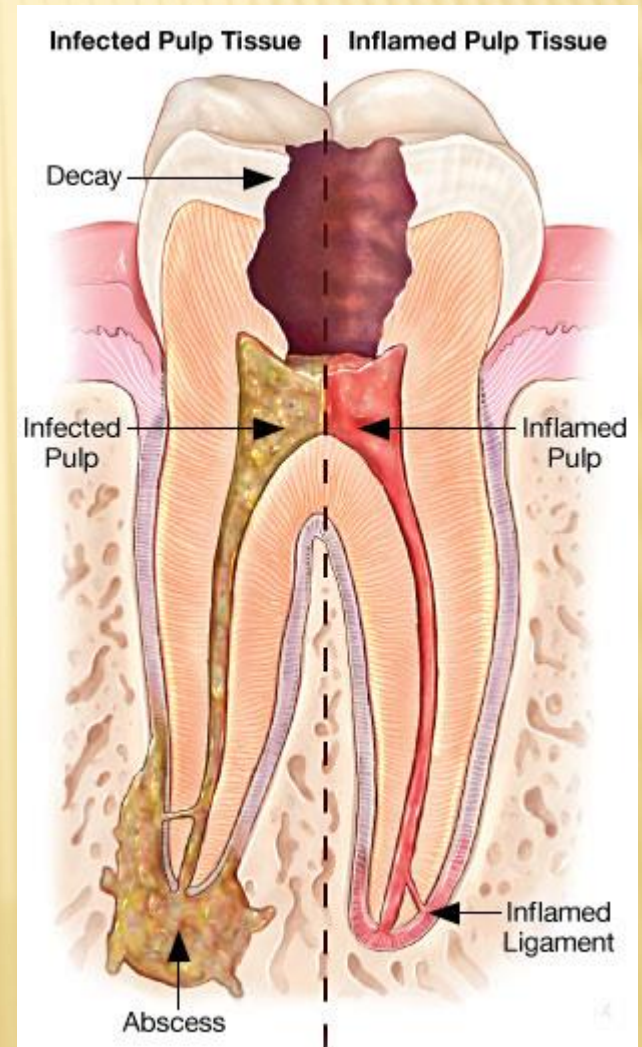


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REVERSIBLE PULPITIS (PULP HYPEREMIA) CLINICAL FEATURES:

× **Reversible pulpitis**

- + The pulp is irritated, and the patient is experiencing pain to thermal stimuli.
- × 1. It is a level of inflammation in which the pulp is capable to return to normal condition after removal of stimuli.
- × 2. Early, mild & transient pulp inflammation.
- × 3. Localized to the pulpal end of dentinal tubules.
- × 4. Sensitivity to thermal changes especially cold.
- × 5. Pain is temporary & disappear within seconds after removal of stimulus.

REVERSIBLE PULPITIS (PULP HYPEREMIA) CLINICAL FEATURES:

- ✘ 7. Response to low level of electric current than normal.
- ✘ 8. Teeth usually show deep carious lesions, large metallic restorations without adequate isolation, or restorations with defective margins.
- ✘ 9. No sensitivity to percussion.
- ✘ 10. The pain can be easily localized.
- ✘ 11. The tooth remains without symptoms until it is stimulated again .
The pain does not affected by changes of body position.
- ✘ 12. Reactionary dentine is laid down to protect the pulp from further injury.

IRREVERSIBLE PULPITIS CLINICAL FEATURES:

× Irreversible pulpitis

- + The tooth will display symptoms of lingering pain.
- + 1. Frank invasion by bacteria is often the cross – over point from reversible to irreversible pulpitis.
- + 2. It exhibits a wide spectrum of acute & chronic inflammatory change.
- + 3. Pain is spontaneously initiated, or precipitated by cold, but it persists after removal of the stimulus.
- + 4. Heat increases the pain, cold may relieve the pain.
- + 5. Pain lasts for a prolonged period of time.
- + 6. Duration of pain is increased when the patient is lying down (recumbent position) keeping the patient awake at night.

DIAGNOSTIC CONCLUSIONS

- × **Periradicular abscess**

- + An inflammatory reaction to pulpal infection that can be chronic or have rapid onset with pain, tenderness of the tooth to pressure, pus formation, and swelling of the tissues.

DIAGNOSTIC CONCLUSIONS

× **Periodontal abscess**

- + An inflammatory reaction frequently caused by bacteria entrapped in the periodontal sulcus. A patient will experience rapid onset, pain, tenderness of the tooth to pressure, pus formation, and swelling.

DIAGNOSTIC CONCLUSIONS

- × **Periradicular cyst**

- + A cyst that develops at or near the root of a necrotic tooth. These types of cysts develop as an inflammatory response to pulpal infection and necrosis of the pulp.

DIAGNOSTIC CONCLUSIONS

× **Pulp fibrosis**

- + The decrease of living cells within the pulp causing fibrous tissue to take over the pulpal canal.

PULP NECROSIS CLINICAL FEATURES:

× **Necrotic tooth**

- + Also referred to as **nonvital**. Used to describe a tooth that does not respond to sensory stimulus.
- + 1. Stoppage of pain: the patient loose the acute and chronic symptoms because the nerve fibers degenerate. However, pulp death following pulpitis may occur with no previous history of pain.
- + 2. Discoloration: due to break down products of RBC's that enter the dental tubules. (loss of translucency) (darker).
- + Brittleness: leads to cracks & fracture: due to dehydration of dentine.

CHRONIC OPEN HYPERPLASTIC PULPITIS (PULP POLYP) CLINICAL FEATURES:

- ✘ 1. It affects children & young adult (high resistance).
- ✘ 2. It affects deciduous molars & first permanent molar (wide apical foramen).
- ✘ 3. It affects teeth with large open cavity & with low grade infection.
- ✘ 4. It appears as Reddish rounded mass or pink globule protruded from pulp chamber & fills the cavity.
- ✘ 5. On gentle probing, it is insensitive due to degeneration of nerves.
- 6. It may or may not bleed.



Pain in cold drinks, getting worse with time!



Pain when chewing getting worse with time!



Accidental finding, no complaint



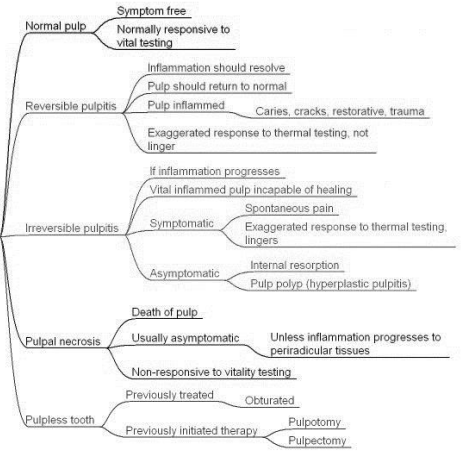
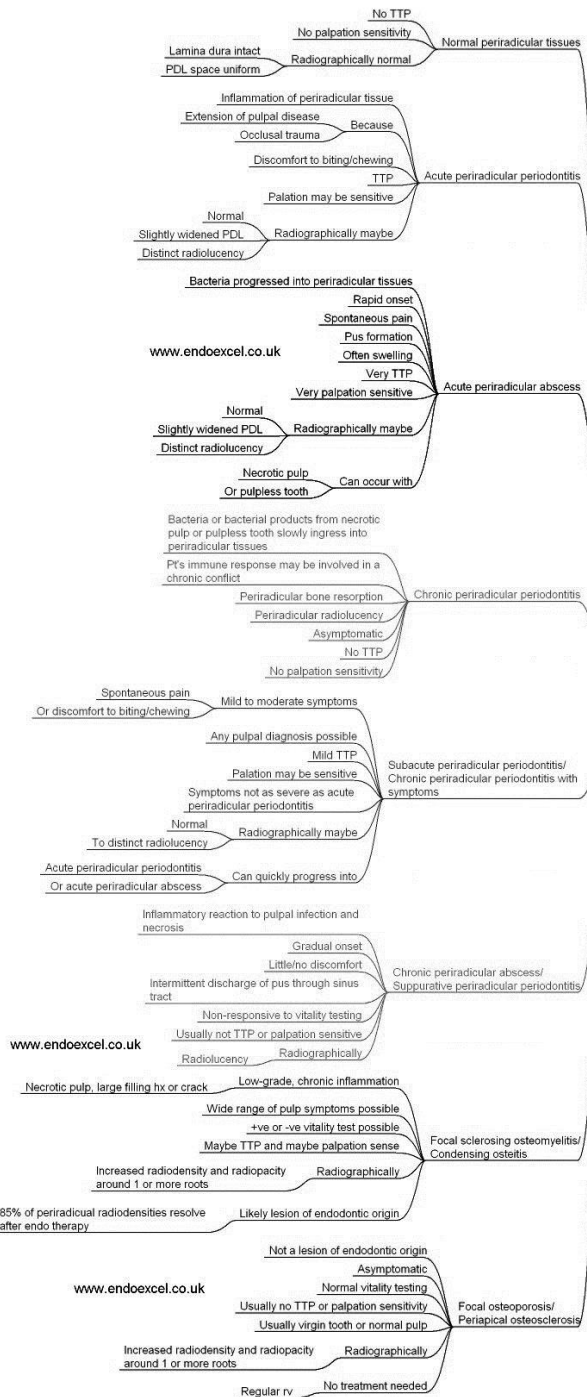
Pain on chewing on the lower right
second molar

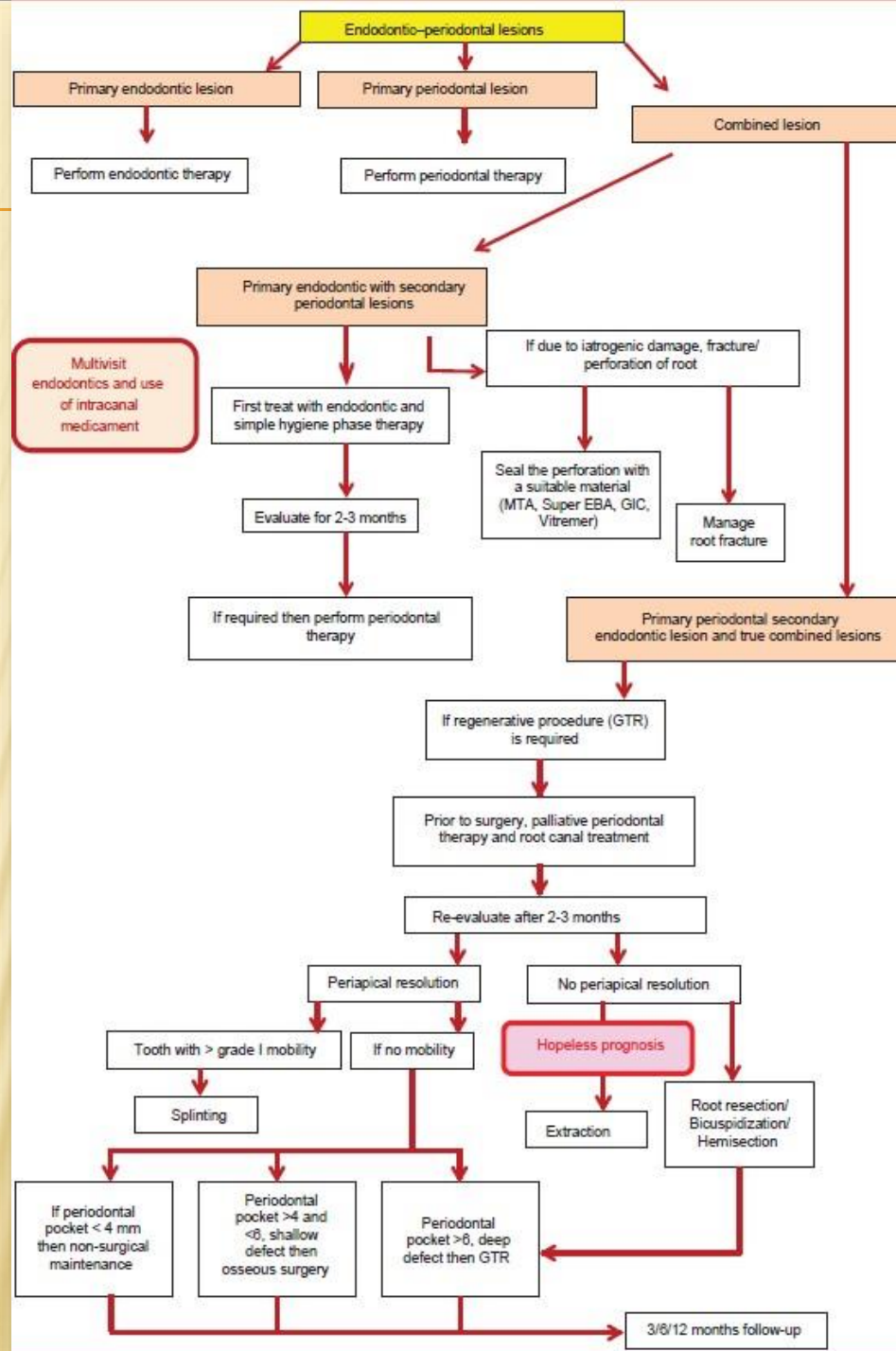
Periapical Diagnosis

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Pulpal Diagnosis





Thank you
Any questions?