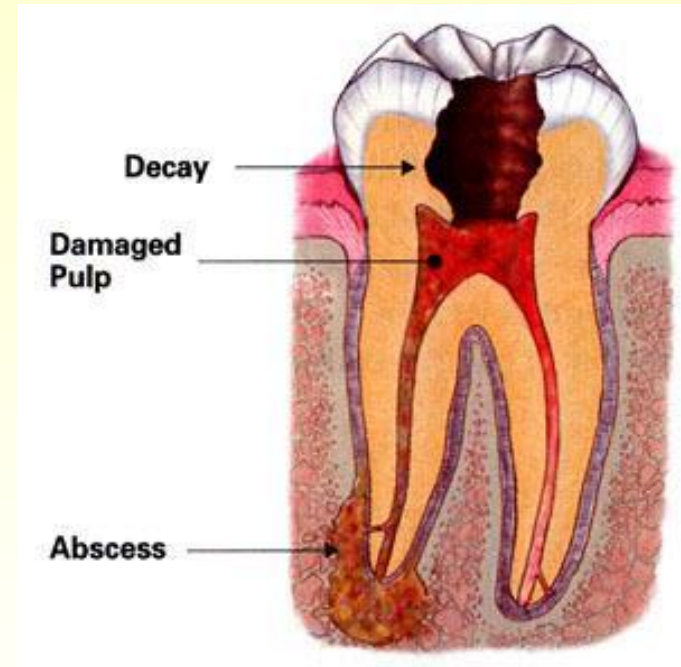
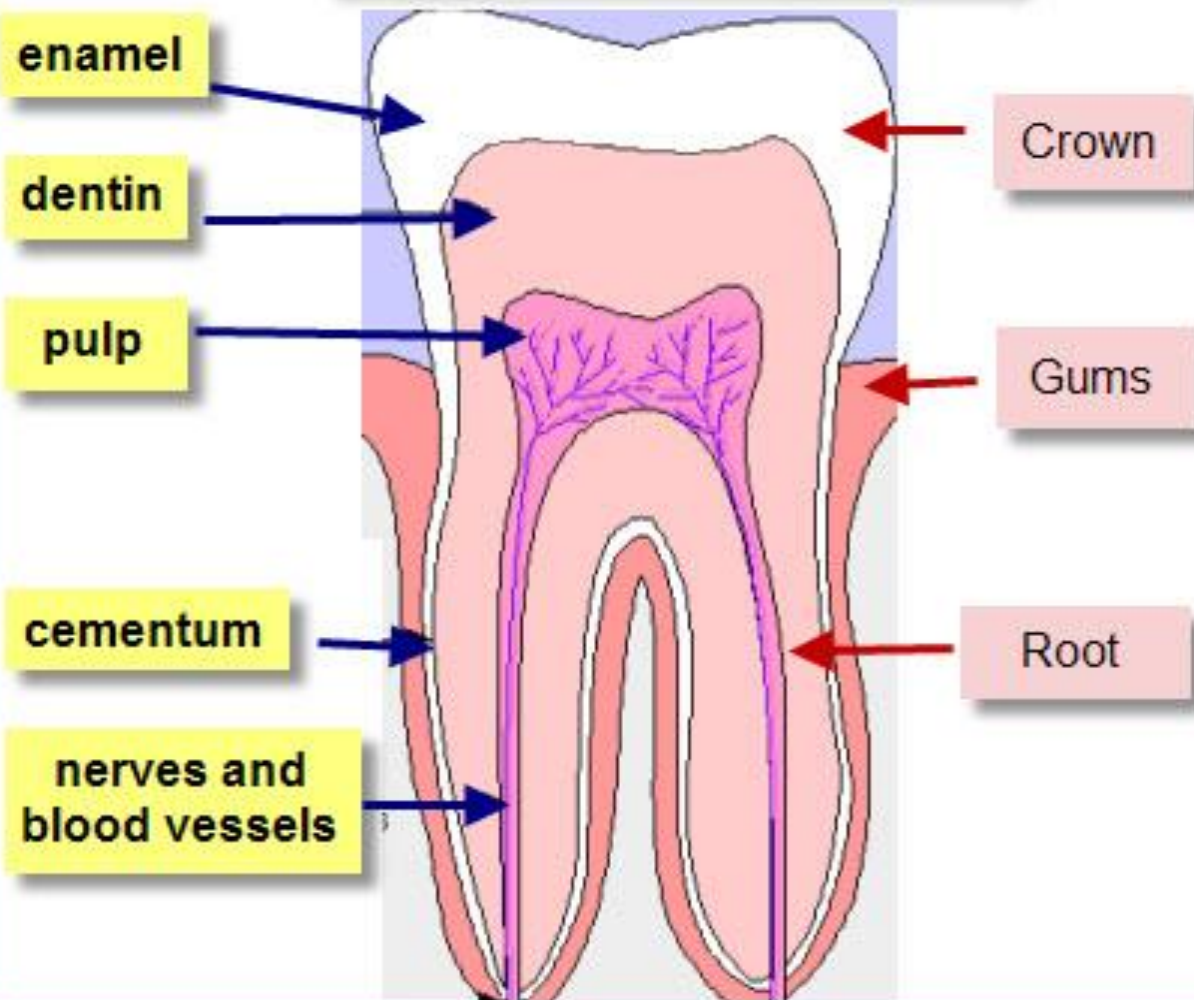


# PEDIATRIC ENDODONTICS



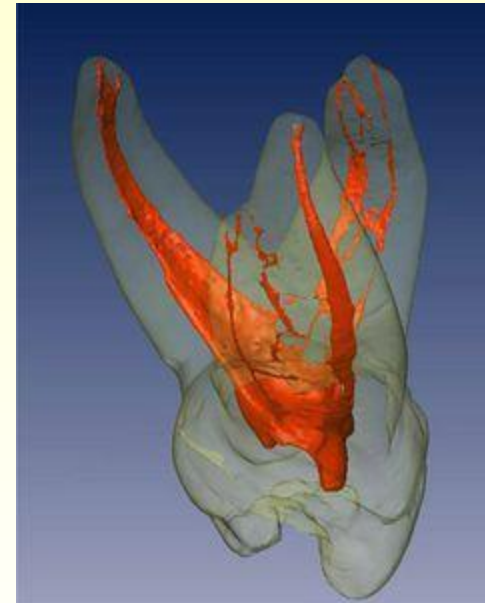
**PRESENTED BY:**  
**Dr. RAJEEV KUMAR SINGH**

# Tooth Anatomy



# Dental Pulp

**The Pulp is a soft mesenchymal connective tissue that occupies pulp cavity in the central part of the teeth.**

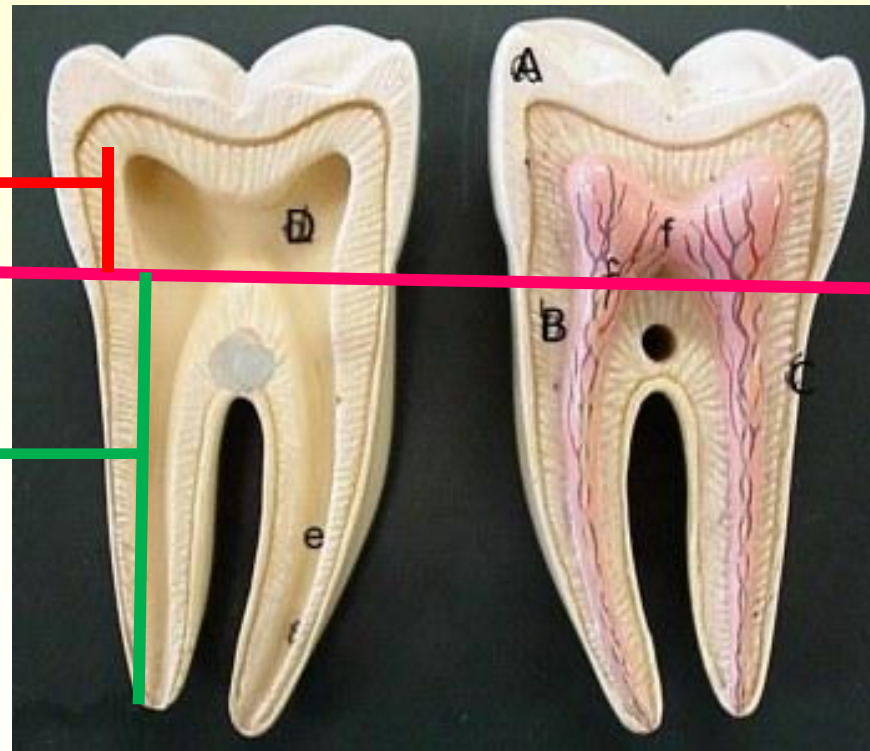


# Pulp Cavity

The entire space occupied by pulp, composed of the pulp chamber and root canal

Pulp chamber

Root canal



# Dental Pulp

The pulp cavity is divided into:

1. Coronal pulp

2. Radicular pulp



# Coronal Pulp

- It is the pulp occupying the pulp chamber of the crown of the tooth
- In young teeth, it resembles the shape of the outer dentin
- It has six surfaces: occlusal, mesial, distal, buccal, lingual and floor.
- Pulp horns are projections into the cusp.
- This pulp constricts at the cervical region where it continues as the radicular pulp



Pulp horns

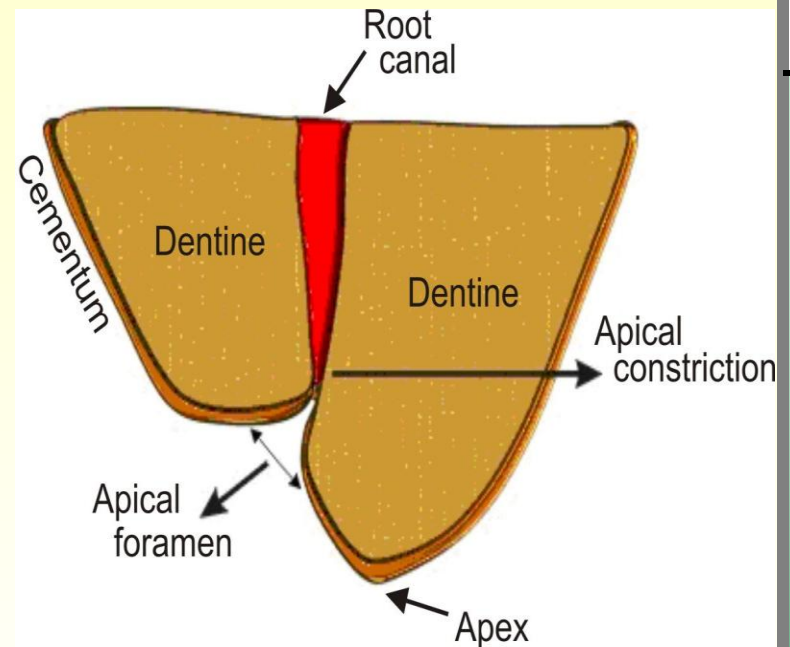
# Radicular Pulp

- **It is the pulp occupying the pulp canals of the root of the tooth**
- **In the anterior tooth it is single and in the posterior teeth it is multiple**
- **The radicular portions of the pulp is continuous with the periapical tissues through apical foramen**
- **As age advances the width of the radicular pulp is reduced.**



# Apical Foramen

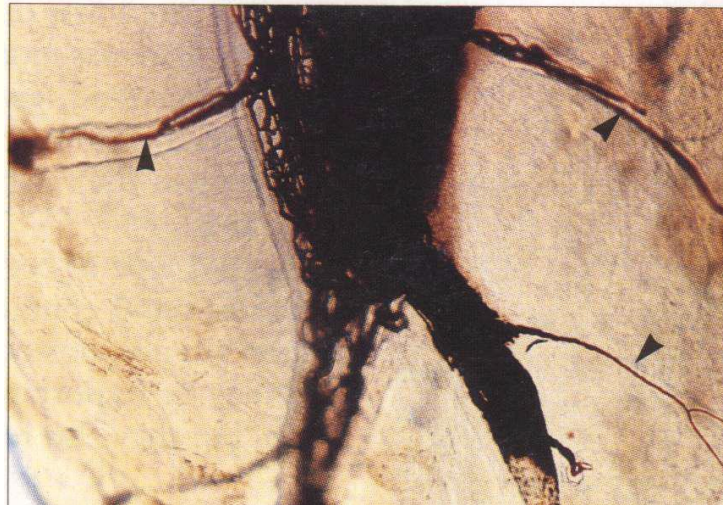
- **Pulp cavity terminates at root apex as small opening called apical foramen**
- **Radicular pulp continuous with connective tissue of the periodontium through this foramen.**
- **Wide open during development of root**





# Accessory Canals

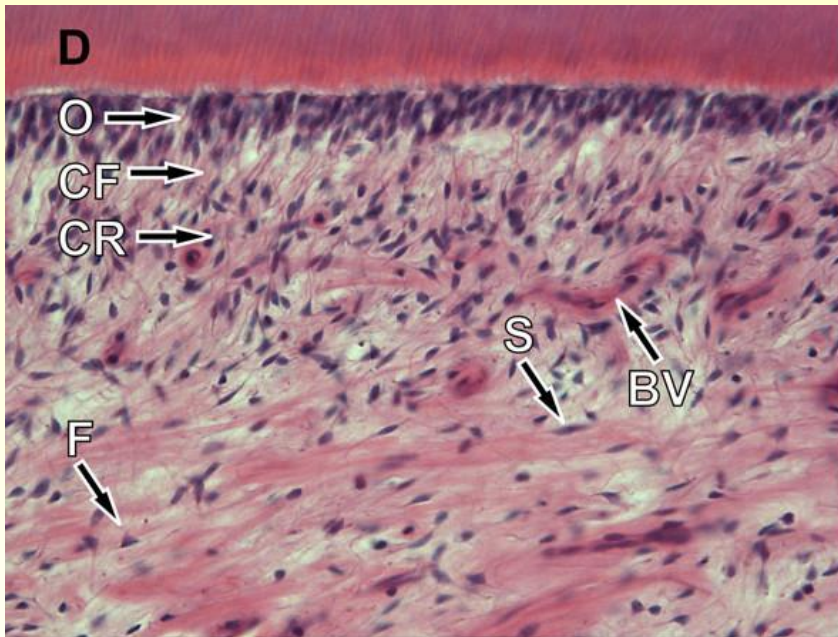
- **Leading laterally from the radicular pulp into the periodontal tissue.**
- **Present in the apical third of the root sheath cells**
- **May also be present at the furcation region**



# Histological zones of pulp

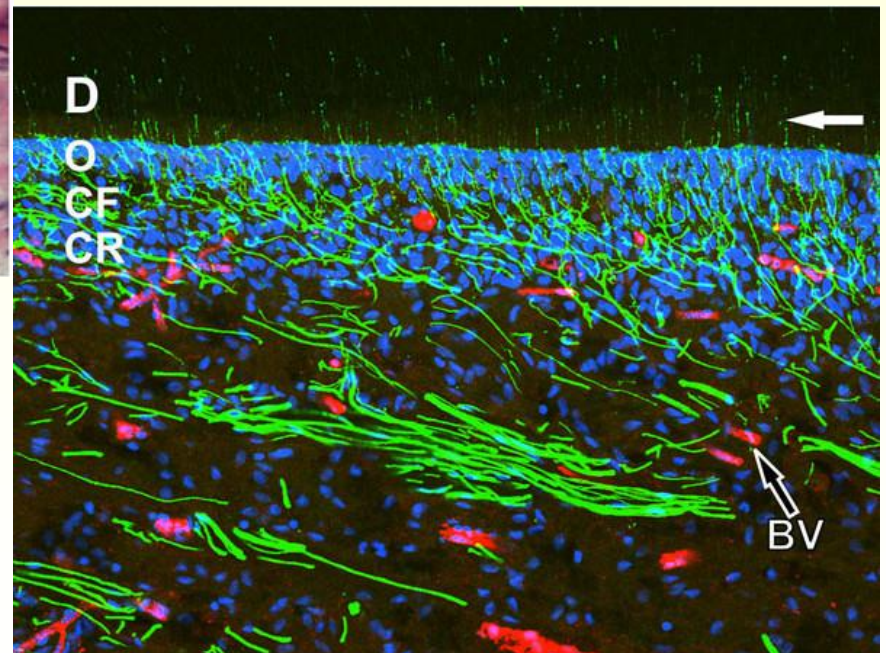
Zones-from outer to inner zone	Description
Odontoblastic layer	Lines the outer pulpal wall and consists of the cell bodies of odontoblast. Secondary dentin may form in this area from the apposition of odontoblast.
Cell-free zone ( <b>Zone of Weil</b> )	Fewer cells than odontoblastic layer. Nerve and capillary plexus located here
Cell-rich zone	Increased density of cells as compared to cell-free zone and also a more extensive vascular system
Pulpal-core	Located in the center of the pulp chamber, which has many cells and an extensive vascular supply, similar to cell-rich zone

# Histological zones of pulp



Light micrograph

Confocal micrograph



# Cells of the pulp

- **ODONTOBLASTS**
- **FIBROBLASTS**
- **UNDIFFERENTIATED CELLS**
- **DEFENSE CELLS**

# FUNCTIONS OF DENTAL PULP

Inductive - oral epithelial differentiation  
into dental lamina and enamel organ

Formative - dentin formation

Nutritive - maintains the vitality of dentin by  
providing O<sub>2</sub> and nutrients to the odontoblasts

Defense - responds to irritation by producing reparative  
dentin

Protective - recognition of stimuli like heat, cold, pressure  
chemicals way of sensory nerve fibers

# **Pediatric Endodontics**

**endodontics** → **Greek words endo- "inside"  
& odont- "tooth"**

**dental specialty concerned with the study and treatment of  
the dental pulp in children**

# Reaction of dental pulp to injuries/caries

Physical/Chemical/Thermal injuries

Dental caries

Pulpal irritation

Inflammation

Reversible

No treatment

Irreversible

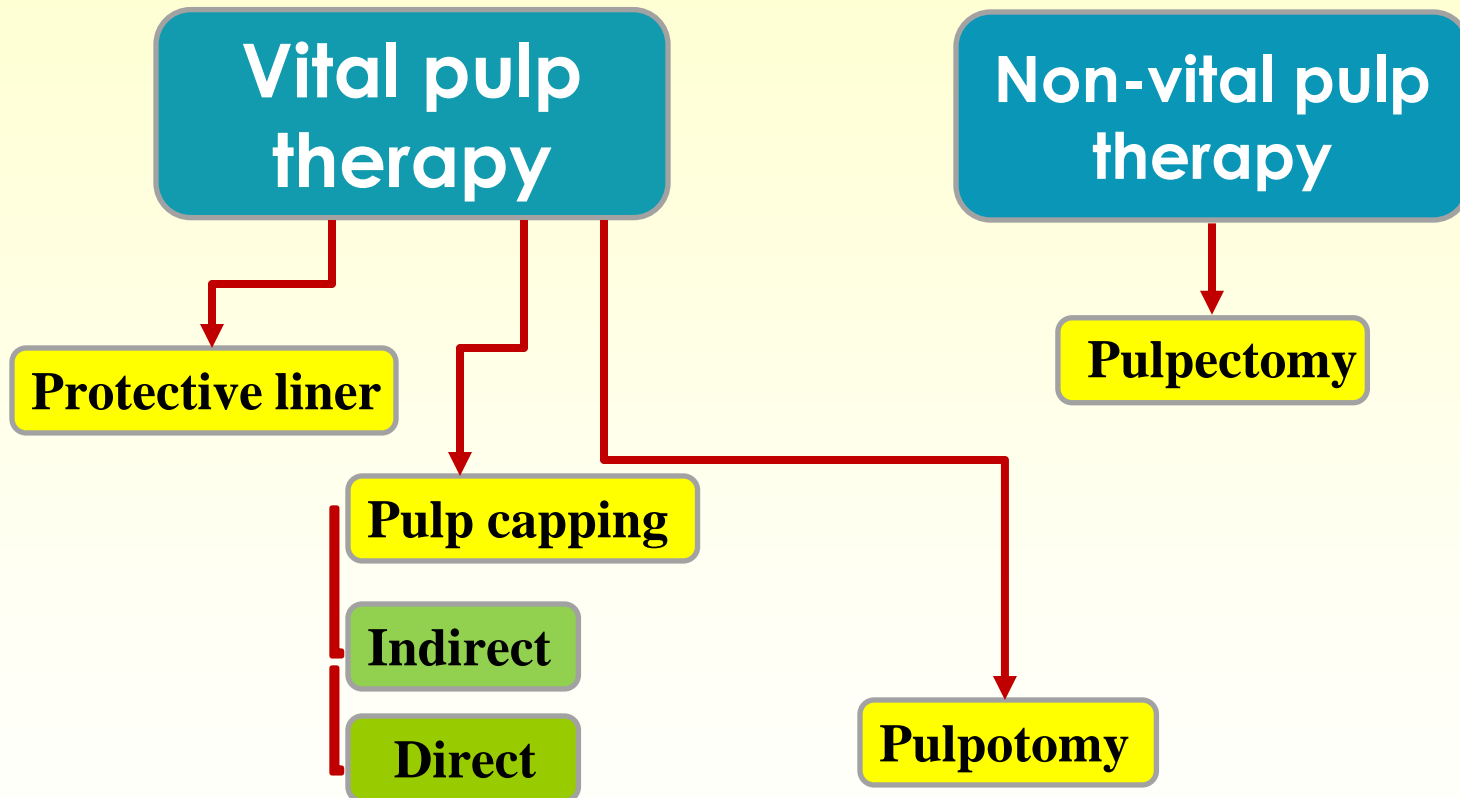
Vital pulp therapy

Repair

Pulp Necrosis

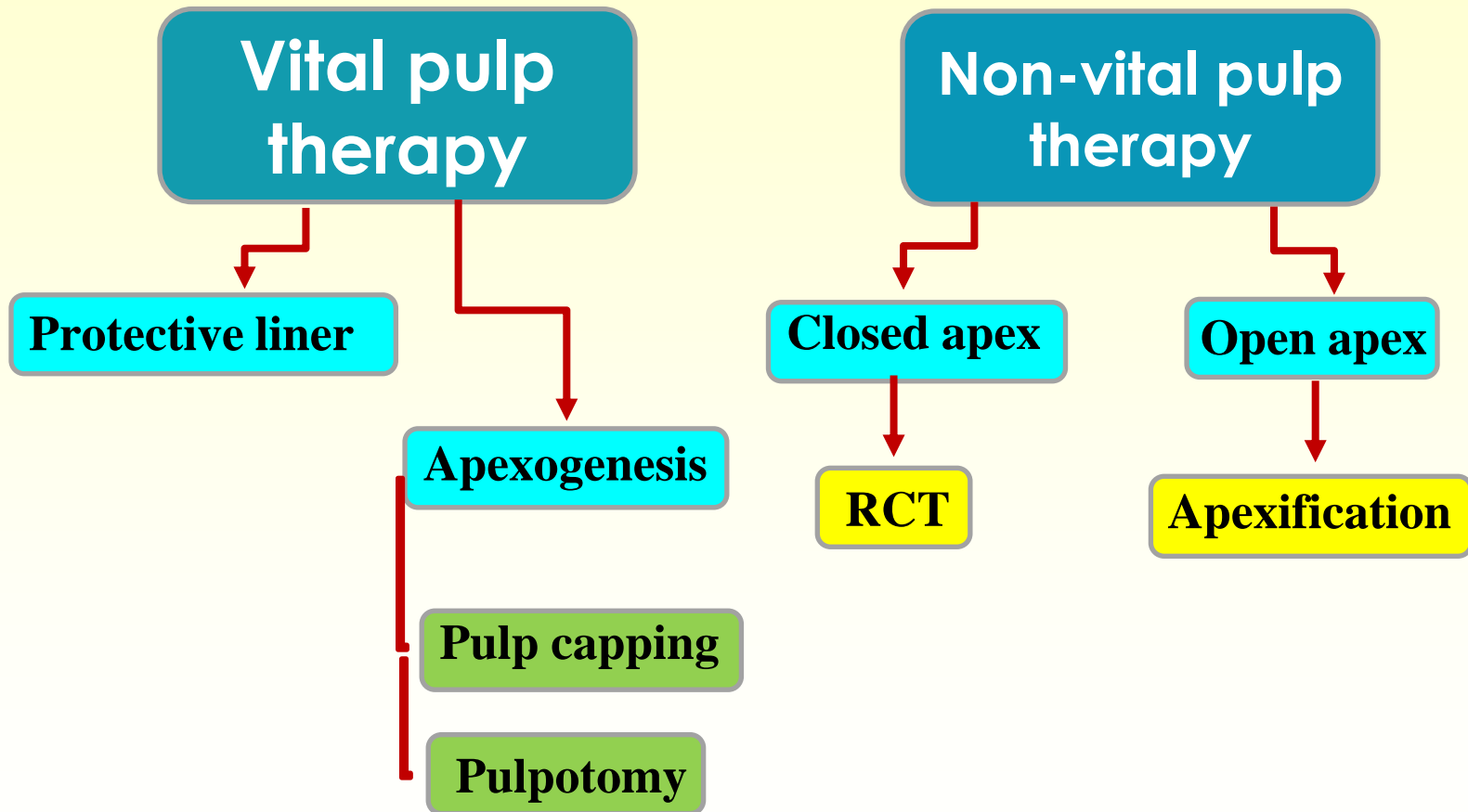
Non-vital pulp therapy

# PULP THERAPY IN PRIMARY TEETH





# PULP THERAPY IN YOUNG PERMANENT TEETH



# Vital pulp therapy

- **Defined as a treatment initiated to preserve and maintain pulp tissue in a healthy state**
- **Stimulate the formation of reparative dentin to retain the tooth as a function unit**
- **Dentin bridge formation and continuation of root development are primary goals of vital pulp therapy**

# Protective liners/base

A protective liner is a thinly-applied liquid placed on the pulpal surface of a deep cavity preparation, covering exposed dentin tubules to act as a protective barrier between the restorative material or cement and the pulp.

## Materials Used:

- calcium hydroxide
- dentin bonding agent
- glass ionomer cement

# Protective liners/base

## Indications:

**In a tooth with a normal pulp, when all caries is removed for a restoration, a protective liner may be placed in the deep areas of the preparation to minimize injury to the pulp, promote pulp tissue healing, and/or minimize post-operative sensitivity.**

# Protective liners/base

## Objectives:

**The placement of a liner in a deep area of the preparation is utilized to preserve:**

- **tooth's vitality**
- **promote pulp tissue healing**
- **tertiary dentin formation**
- **minimize bacterial microleakage**

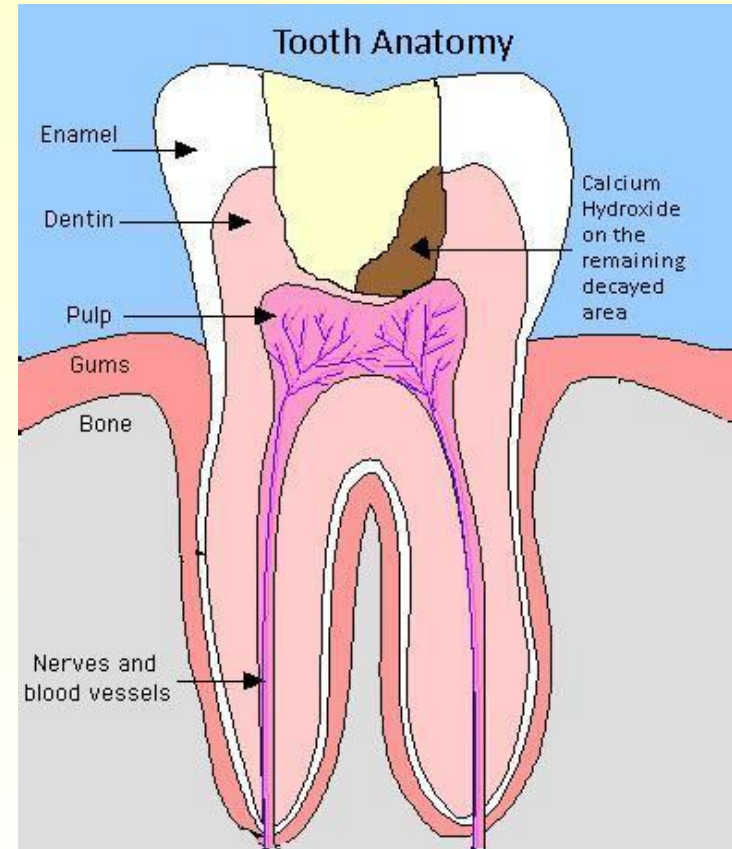
# Indirect Pulp Capping (IPC)

**Indirect pulp treatment is a procedure performed in a tooth with a deep carious lesion approximating the pulp but without signs or symptoms of pulp degeneration**



# Indirect Pulp Capping

The caries surrounding the pulp is left in place to avoid pulp exposure and is covered with a biocompatible material



# Infected Vs affected dentin

## Infected dentin

- Superficial layer which is soft and leathery in consistency and dark brown in colour
- It has a high concentration of bacteria and collagen is irreversibly denatured
- It is not remineralizable and must be removed

## Affected dentin

- Deeper layer which is hard in consistency and light brown in colour.
- It does not contain bacteria and is reversibly denatured.
- Therefore this layer is preserved



# Indirect Pulp Capping

## Indications:

- **Tooth with minimal reversible pulpitis**
- **Signs/symptoms of tooth vitality**
- **Deep caries, which if removed, will cause pulp exposure**

# Indirect Pulp Capping

## Contra indications:

- **Tooth with irreversible pulpitis**
- **Clinical and radiographic signs/symptoms of non vitality of pulp**
- **Soft leathery dentin in a very large area in a non restorable tooth**

# Indirect Pulp Capping

## Materials used:

- **Calcium hydroxide**
- **Zinc oxide eugenol (ZOE)**

# Indirect Pulp Capping

**Technique:**

**Two appointment technique**

**One appointment technique**

## **One Appointment technique -First appointment**

**Use local anesthesia and isolation with rubber dam**



**Establish cavity outline with high speed hand piece**



**Remove the superficial debris and majority of the soft necrotic dentin with slow speed hand piece using large round bur**



**Soft carious dentin is removed with a sharp spoon excavator**



**Stop the excavation as soon as the firm resistance of sound dentin is felt**



**Cavity flushed with saline and dried with cotton pellet**



**Site is covered with pulp capping agent**



**Rest of the cavity is filled with reinforced ZOE cement**

## **Second appointment (6-8 weeks later)**

**Between the appointment history must be negative and temporary restoration should be intact.**



**Take a radiograph and observe for sclerotic dentin.**



**Carefully remove all temporary filling material.**



**Previous remaining carious dentin will have become dried out, flaky and easily removed.**



**The area around the potential exposure will appear whitish and may be soft; which is predentin. Do not disturb this area.**



**The cavity preparation is washed out and dried gently.**



**Cover the entire floor with calcium hydroxide.**



**Base is built up with reinforced ZOE cement or GIC.**



**Final restoration placed**

# One Appointment technique

## Re-Entry..is it necessary....?

- **May not be necessary if the tooth is asymptomatic.**
- **If the tooth is within 2 yrs of exfoliation, re-entry is not needed.**
- **It depends on the experience of the clinician**
- **If the clinician had left considerable amount of carious dentin, re-entry is advised.**

# Indirect Pulp Capping

## Objectives:

- **Complete sealing of the involved dentin from the oral environment.**
- **The tooth's vitality should be preserved.**
- **No post-treatment signs or symptoms such as sensitivity, pain, or swelling should be evident.**
- **There should be no radiographic evidence of pathologic external or internal root resorption or other pathologic changes.**
- **There should be no harm to the succedaneous tooth.**



# Indirect Pulp Capping- step wise excavation

## First step

- Removal of carious dentin along the dentin-enamel junction (DEJ) and excavation of only the outermost infected dentin, leaving a carious mass over the pulp.
- The objective is to change the cariogenic environment in order to decrease the number of bacteria and slow or arrest the caries development.

## **Second step**

- **The second step is the removal of the remaining caries and placement of a final restoration.**
- **The most common recommendation for the interval between steps is three to six months, allowing sufficient time for the formation of tertiary dentin and a definitive pulpal diagnosis.**
- **Critical to both steps of excavation is the placement of a well-sealed restoration.**

**Thank you!**

