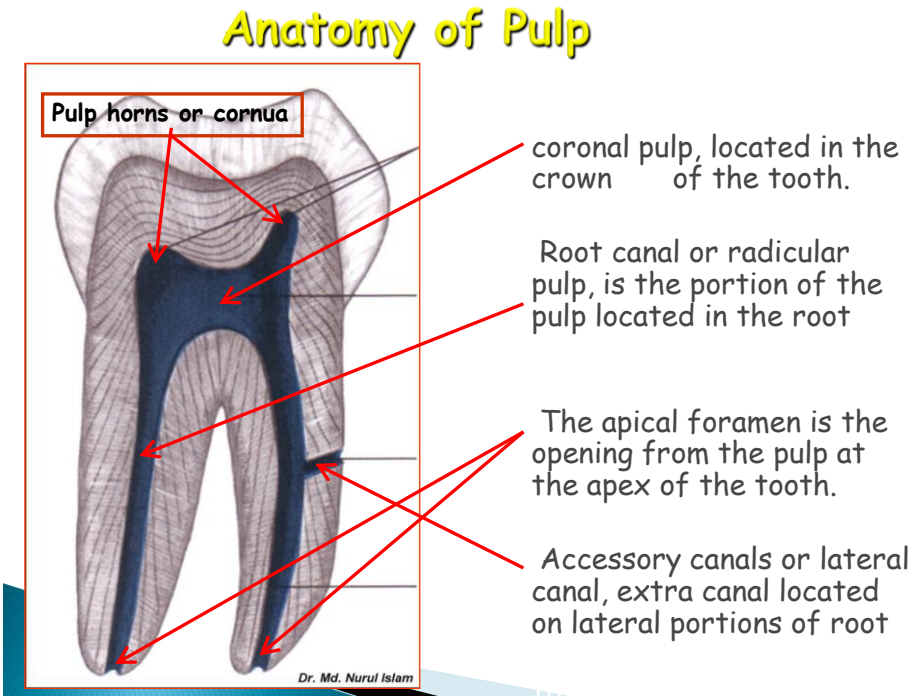
Oral Histology Lect.11 أ.د.عذراء

Dental Pulp is vascular mesenchymal connective tissue ,occupies the cavity in the center of the tooth within rigid dentinal WALLS. The pulp organ can *be* distinguished into the coronal pulp and radicular pulp. It is surrounded by dentin *on* all sides except at the apical foramen and accessory pulp canal opening, where it communicate with periodontal soft tissue

Functions of the Dental Pulp

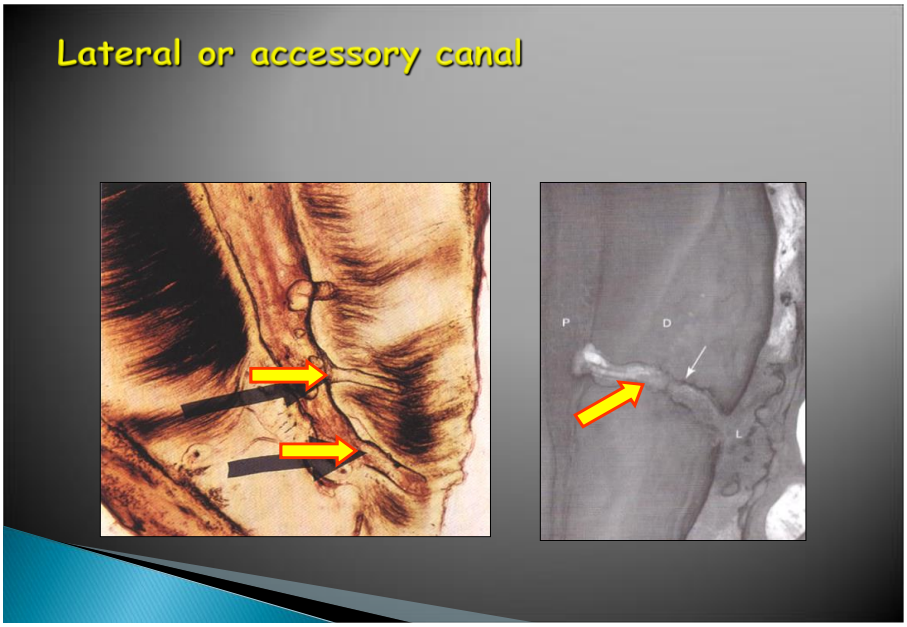
- Nutrition: blood supply for pulp and dentin.
- Sensory: changes in temp., vibration and chemical that affect the dentin and pulp.
- Formative: the pulp involve in the support, maintenance and continued formation of dentin.
- Defensive: triggering of inflammatory and immune response.
- Protective: Development and formation of secondary and tertiary dentin which increase the coverage of the pulp.

Anatomy (structures)of Pulp



Lateral canals(accessory canals) developed due to

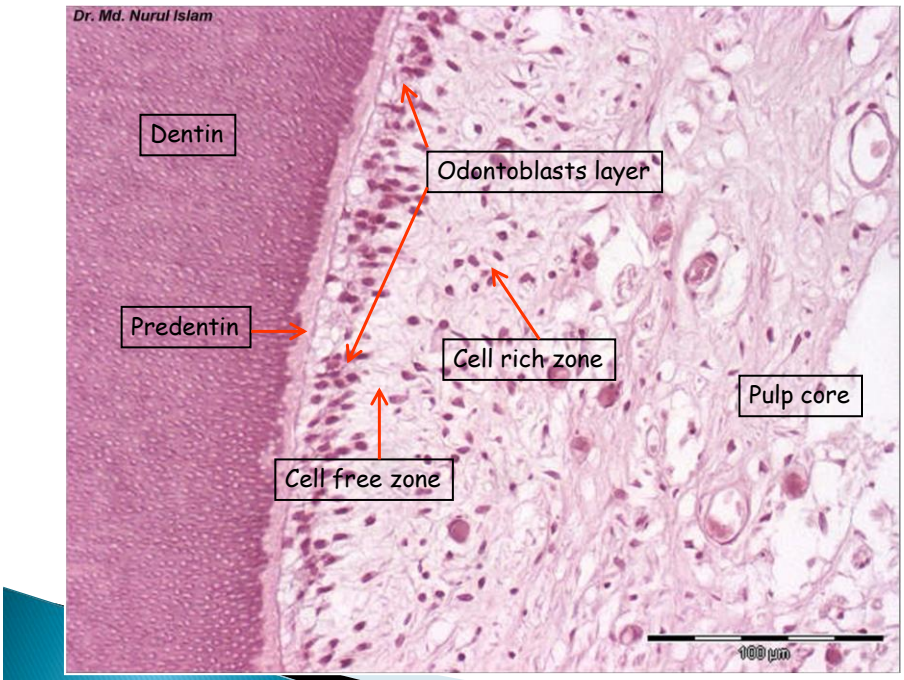
- **1.It may be an areas of premature loss of cells of root sheath** (which initiated formation of odontoblast that form dentin.
- 2. if the developing root comes in contact with **a blood vessel as the dentin encircles the blood vessel** and a lateral or accessory canal is formed.



Microscopic zones in pulp

Microscopic Zones in 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	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 extensice vascular supply, similar to cell-rich zone



Contents of the Pulp

- **Cells: Odontoblast, Fibroblast, white-blood cells, Undifferentiated mesenchymal cells, Macrophages and Lymphocytes**. **No fat cell.**
- Fibrous Matrix: Mostly reticular fibres and **collagen fibres (Type I and Type III).**
- Ground substance: transport nutrients to cells ,it is composed **of mucopoly-saccharides,glycosaminoglycans**

Vascularity and Nerves of the Pulp

- ➜ The pulp organ is extensively vascular with vessels arising from the external carotids to the superior or inferior alveolar arteries. It drain by the same vein.
- ➜ Blood flow is more rapid in the pulp than in most area of the body, and the blood pressure is quite high.

Nerves : Branches of the inferior and superior alveolar nerves and sympathetic nerves enter the apices of the teeth as, **Myelinated fibers and non Myelinated fibers.**

Myelinated fibers represent the majority of N. fiber and associated with **(pain)**,it form plexus called **Rashkow** as it have trunk reach the subodontoblastic region.

➜ Blood and vessels enter and exit the dental pulp by way of the apical and accessory foramina. Pulp is richly innervated; nerves enter the pulp through the apical foramen, along with afferent blood vessels and together form the neuro-vascular bundle.

Clinically Importance features of the Dental Pulp

- **With age the pulp becomes less cellular**. The number of cells in the dental pulp decreases as cell death occurs with age.
- **The volume of the pulp chamber with continued deposition of dentine. In older teeth, the pulp chamber decreases in size**; in some cases the pulp chamber can be obliterated. An increase in calcification in the pulp occurs with age.
- **An increase in calcification (pulp stone)**in the pulp occurs with age.

Pulp Stones (denticles)

Pulp stones (also **denticles**) are nodular, calcified masses appearing in either or both the coronal and root portion of the pulp organ in teeth.

They are classified

A) On the basis of structure

1) True pulp stones: formed of **dentin by odontoblasts**

2) False pulp stones: formed by **mineralization of degenerating pulp cells**, often in a concentric pattern

B) On the basis of location

1) Free: entirely surrounded by pulp tissue

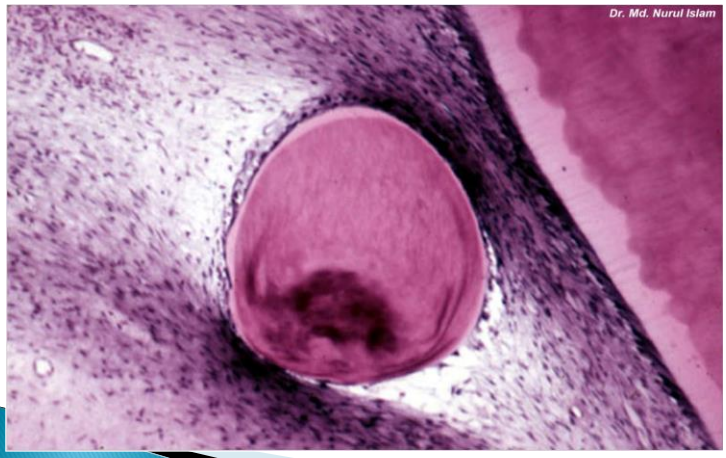
2) Adherent(attached): partly fused with dentin

3) Embedded: entirely surrounded by dentin

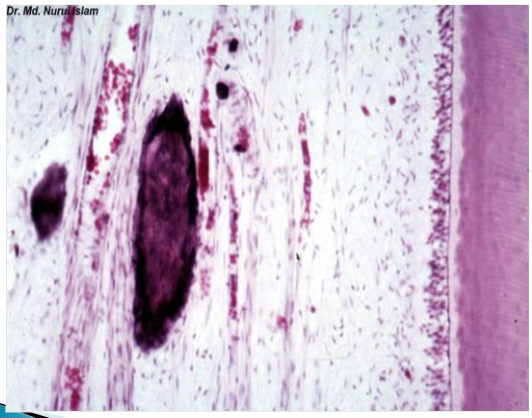
Diffuse Calcifications

They are irregular areas of calcification in the pulp tissue, that can be seen as a large mass or fine spicules of calcified tissue .They follow collagen fiber bundle and blood vessels. The diffuse **found in the root canal** and are **rarely** seen in **coronal** pulp, whereas pulp stones are mostly seen in the coronal pulp .

Free True Denticle



Free False Denticle



Diffuse Pulp Calcification