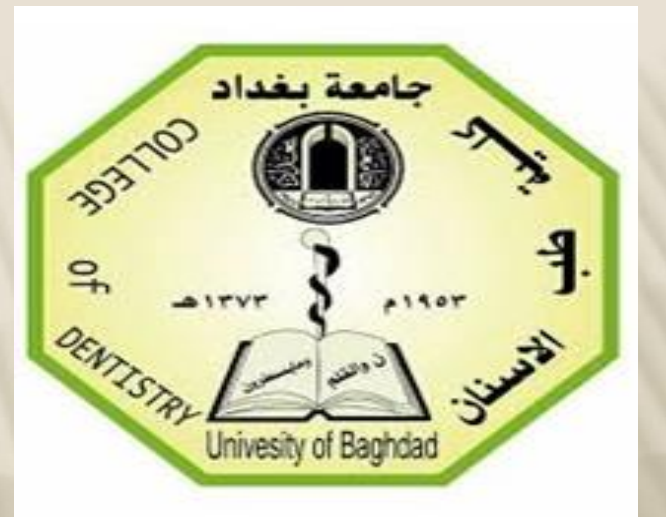


College of Dentistry
University of Baghdad
Department Of Oral Diagnosis



PULP STONE

BY: ASSIST. LEC. RUSSUL JAFFAR HADI

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DENTAL PULP

❖ Dental pulp: richly vascularized

Innervated and unmineralized connective tissue enclosed by dentin with communication to the periodontal ligament by apical foramen and accessory canal.

❖ Dental pulp has four unique zones:

- I. Odontoblastic zone
- II. Cell-free zone
- III. Cell-rich zone
- IV. Pulp core

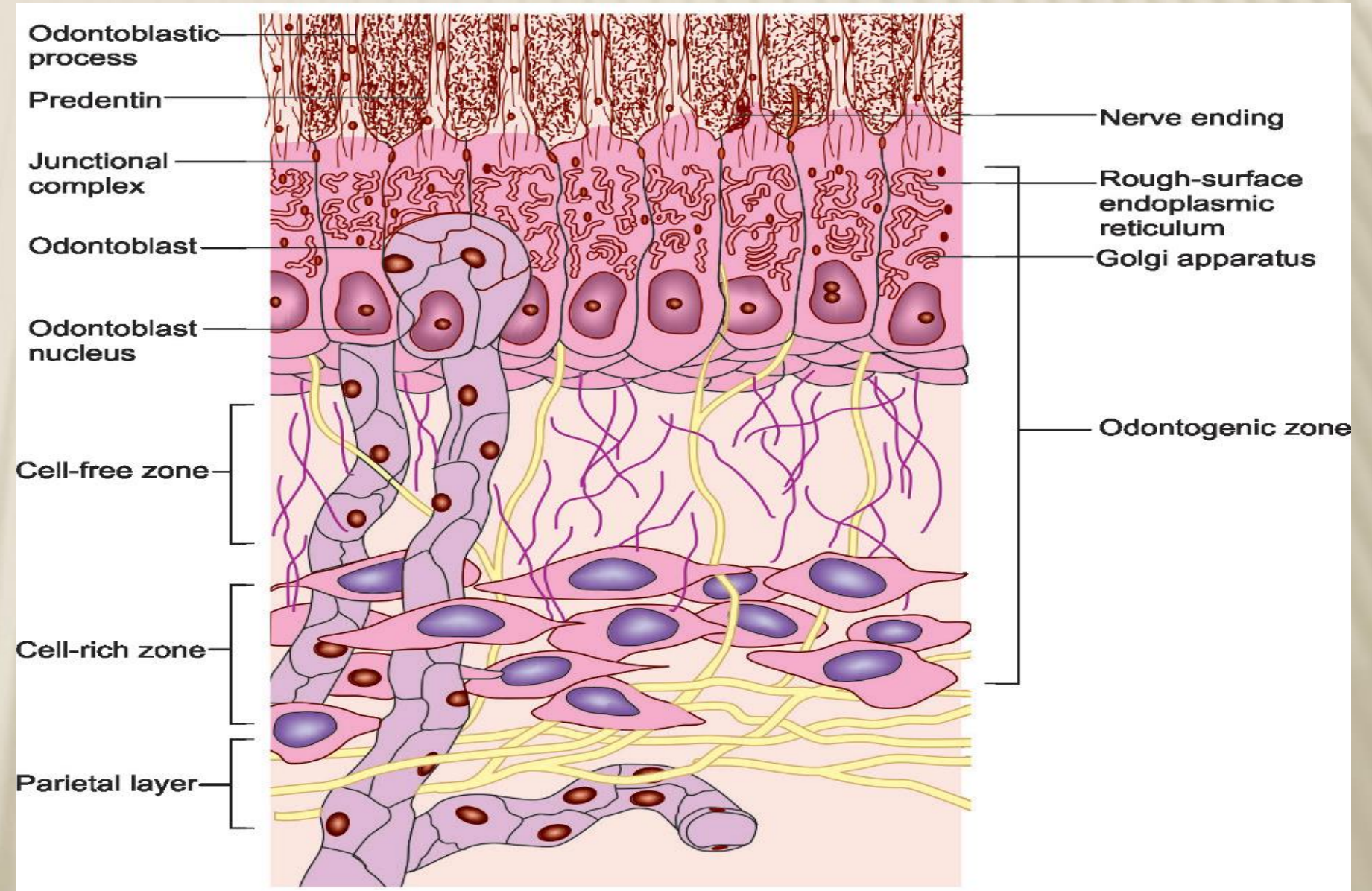
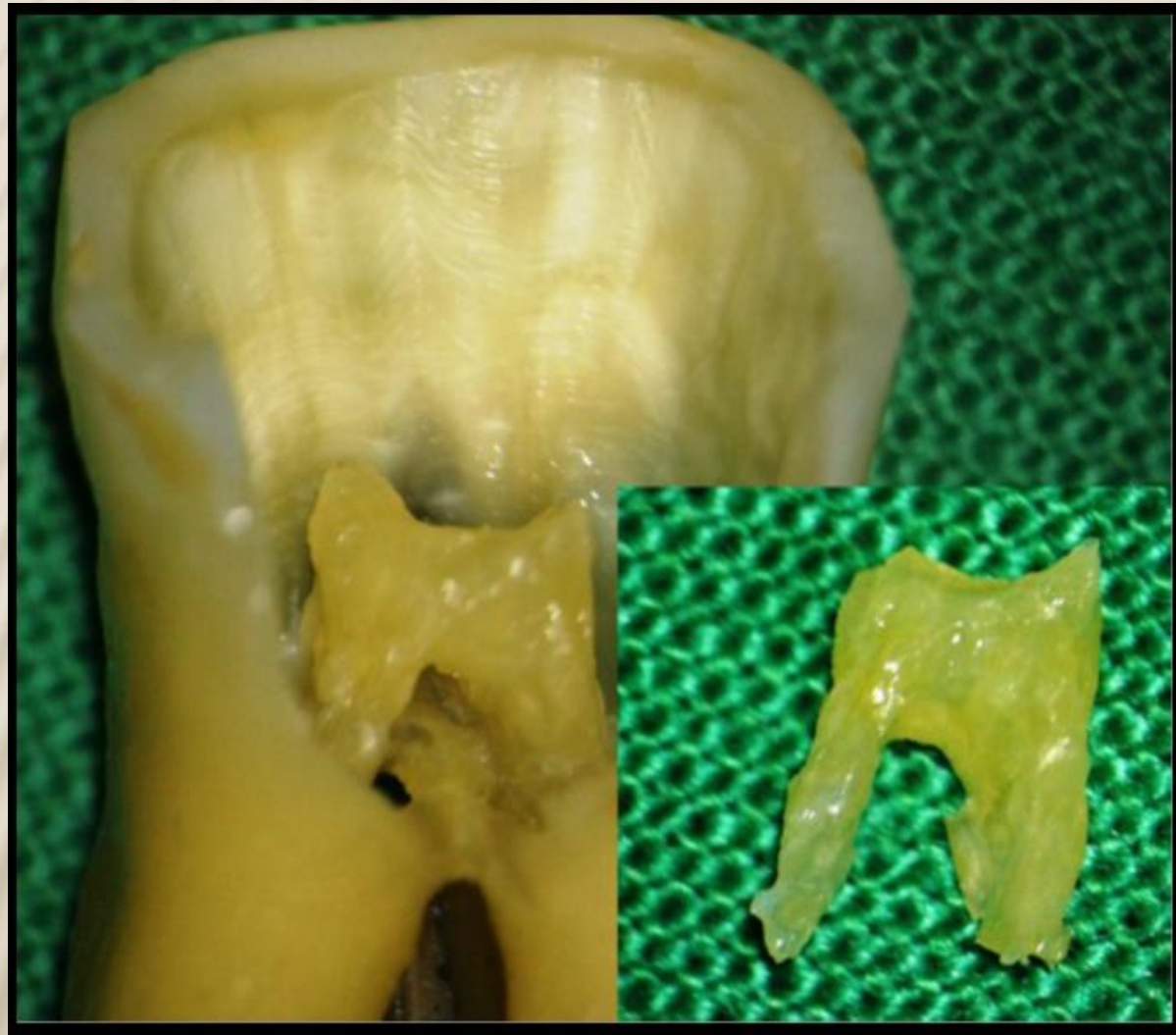
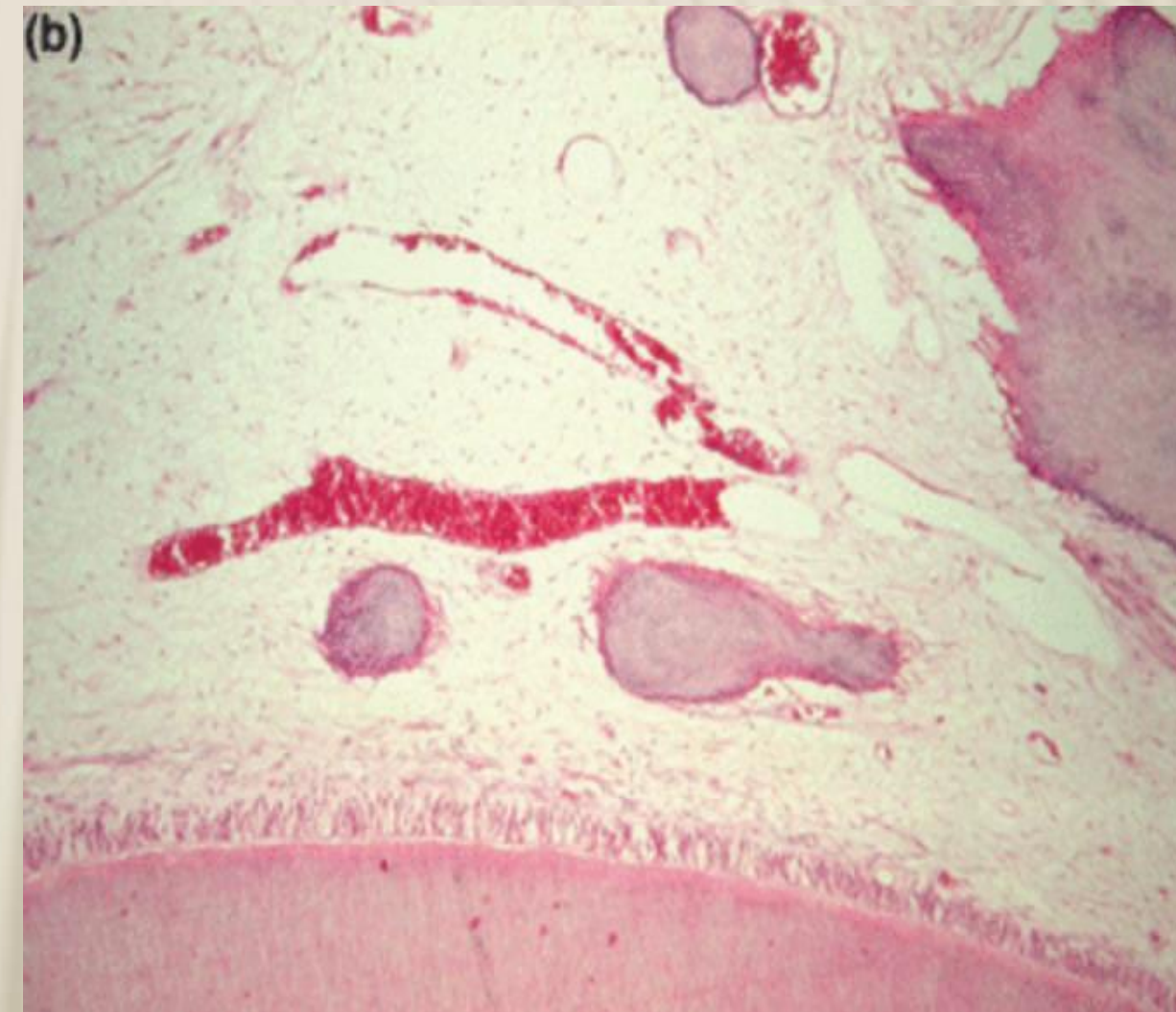


Diagram illustrating odontoblast, cell-free zone, cell-rich zone, and parietal layer (pulp core) with blood vessels and nonmyelinated nerves among odontoblasts

Pulp stone: are discrete calcified masses that have calcium-phosphorus ratios comparable to that of dentin. They maybe single or multiple.

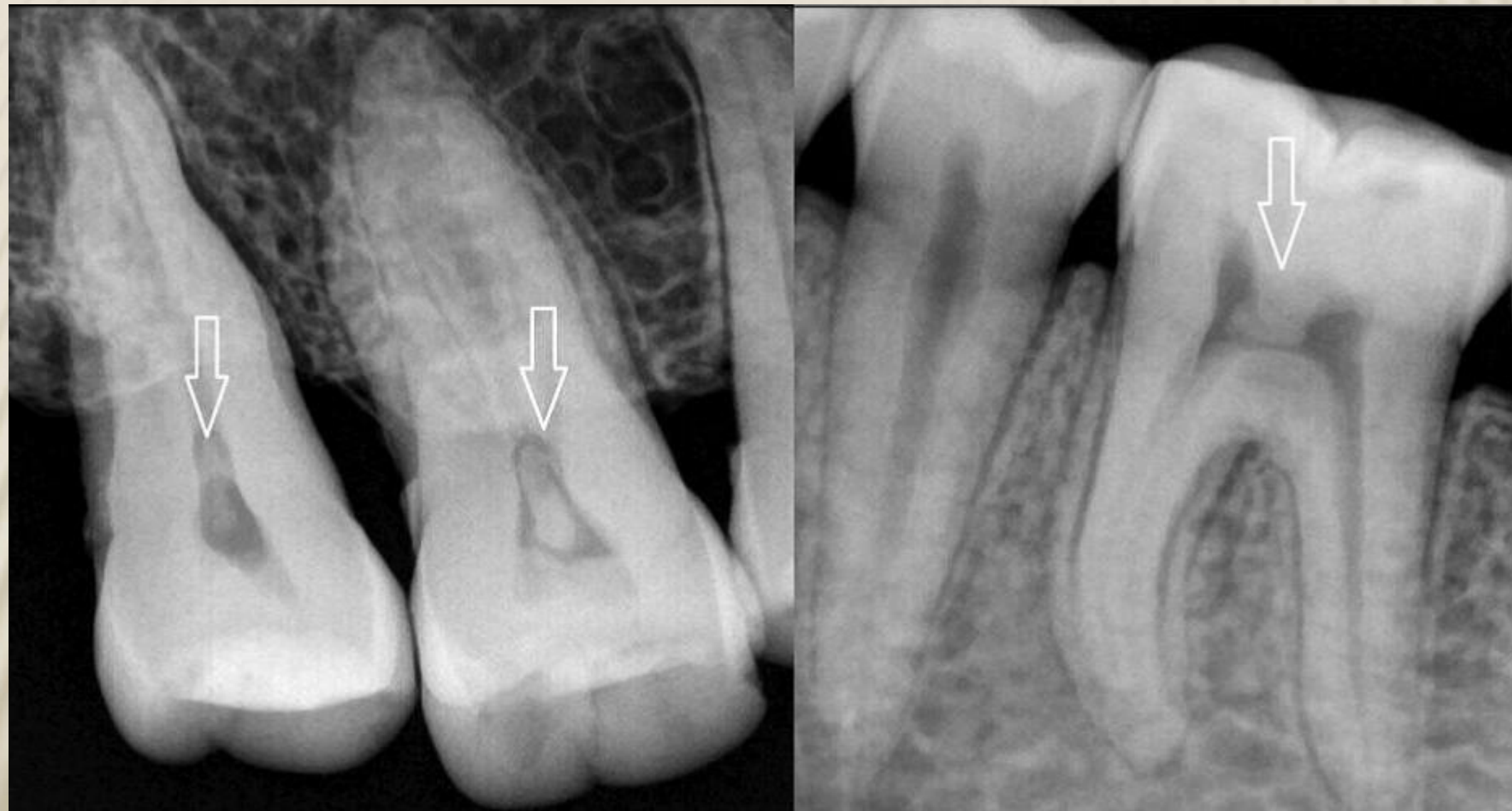


First left lower molar with visible pulp stone



Histological views of Pulp stones of variable size within the dental pulp

RADIOGRAPHICAL FEATURES OF PULP STONE



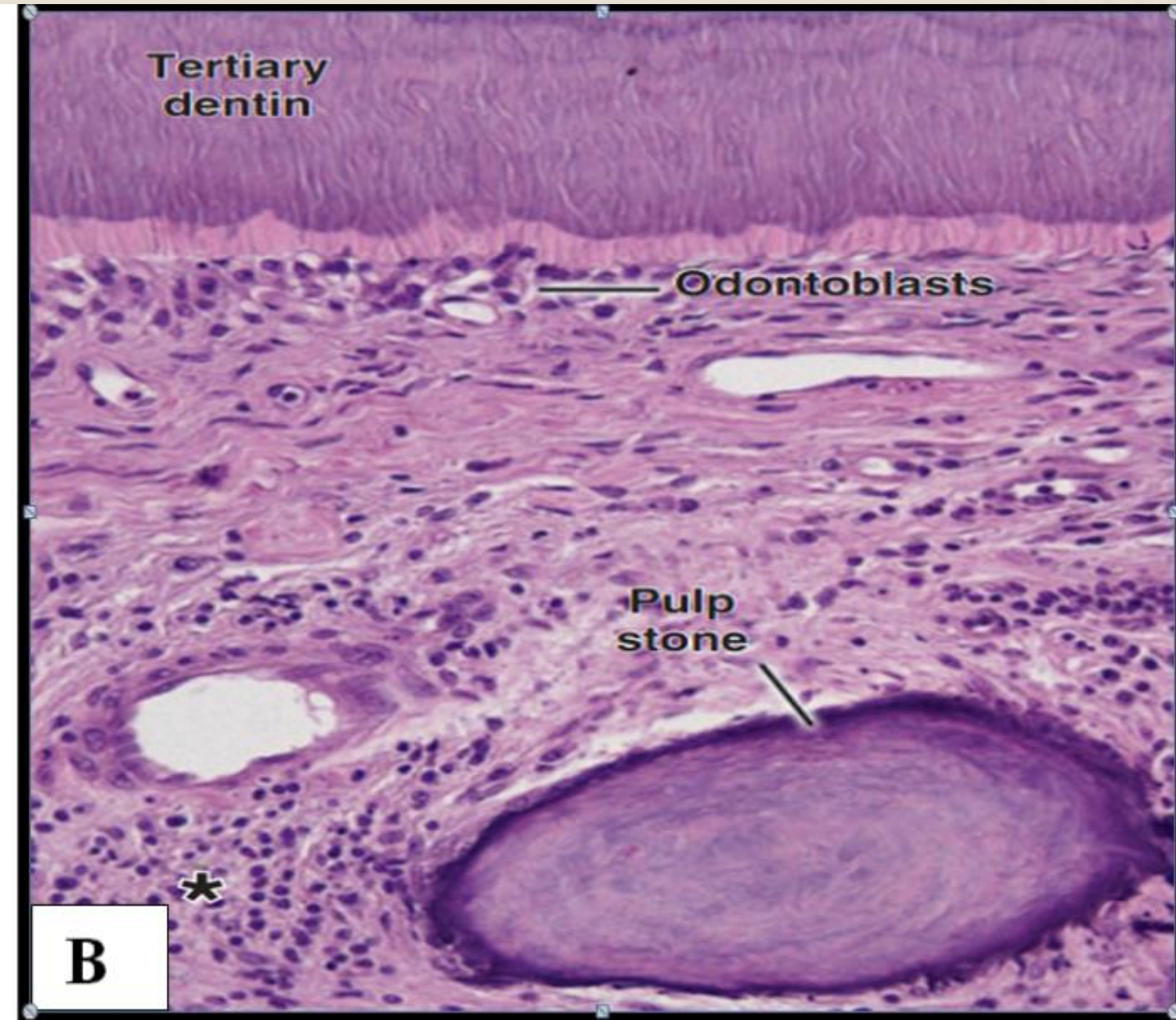
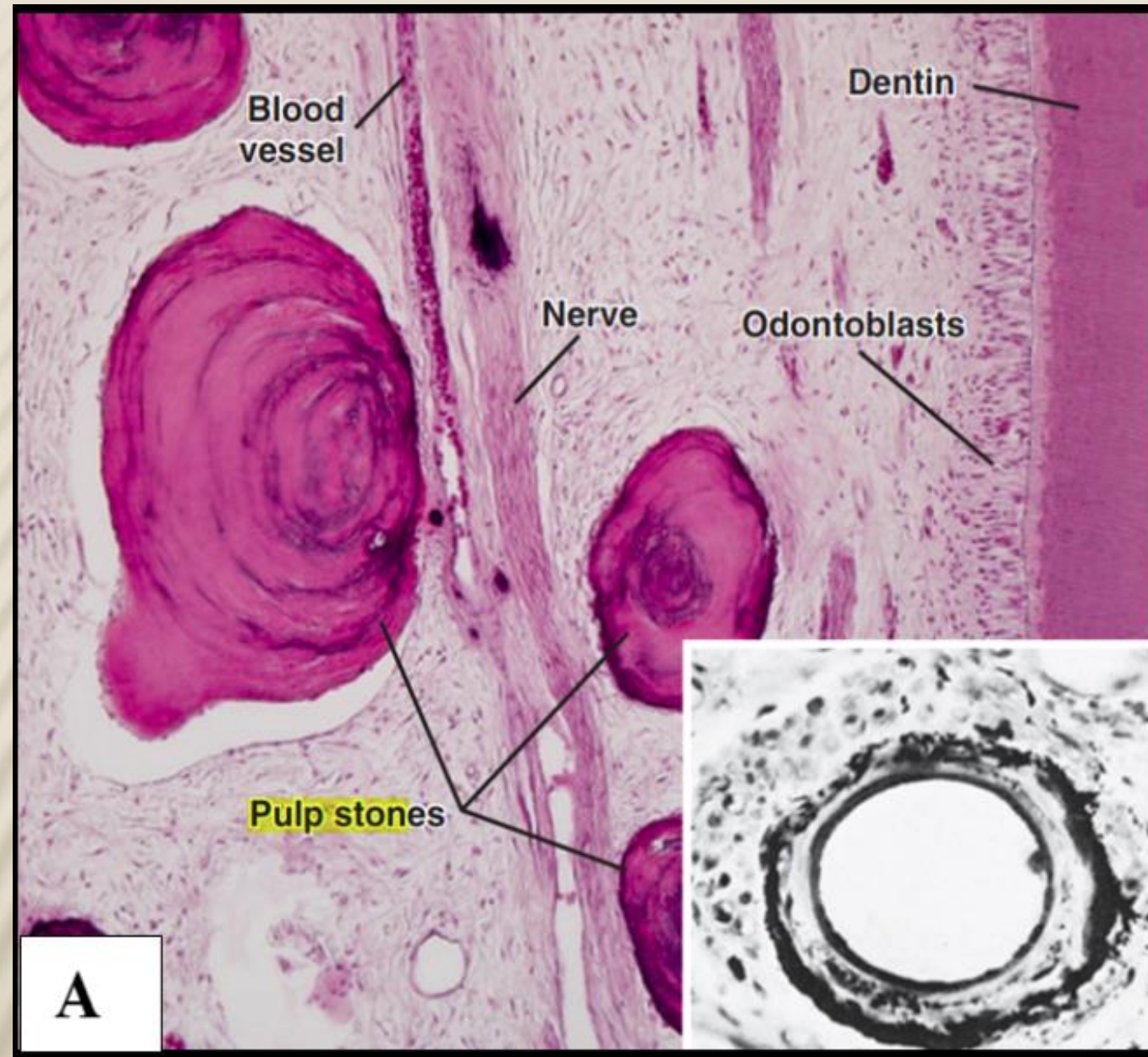
Posterior teeth with visible pulp stones

PREVALENCE OF PULP STONE

- In General, Senile Changes In The Dental Structure Is Predictable Which Occurs Following Second Dentin Deposition, Atherosclerotic Changes, And Pulp Destruction During Ageing.
- Pulp Stones In First Molars Was Higher Than Other Teeth . The Early Eruption Of The First Molar, Which Leads To Its Exposure For Long Periods Of Time And Also High Masticatory Forces, Can Be Possible Explanations For It .
- Considering Gender, More Than Half Of The Primary Studies Reported Higher Prevalences Of Pulp Stones Among Women
- Higher Frequency Of Bruxism Among Women Is Responsible For The Higher Rate Of Pulp Stones.

ETIOLOGY OF PULP STONE

- × Aging
- × Irritants and trauma
- × Orthodontic tooth movement
- × Epithelial rest in pulp tissue
- × Pulp degeneration
- × Genetic predisposition
- × Surgical procedure
- × Calcifying nanoparticles(CNPs)

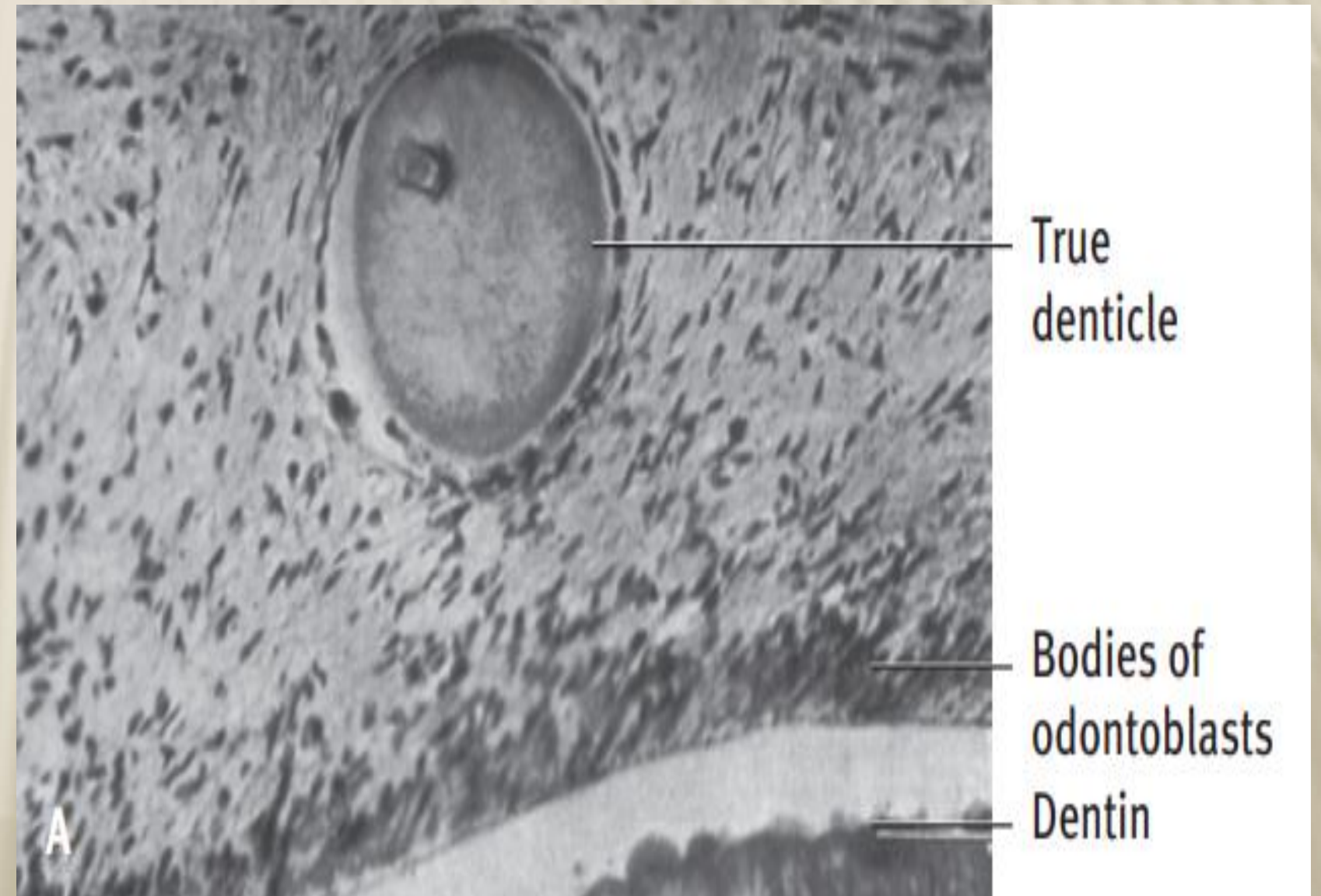


A- Multiple stones in an aged pulp. Dystrophic calcification is beginning in a vessel wall (inset). B-The presence of tertiary dentin and a strong mononuclear inflammatory cell infiltrate are indicative of a carious lesion

CLASSIFICATION OF PULP STONE

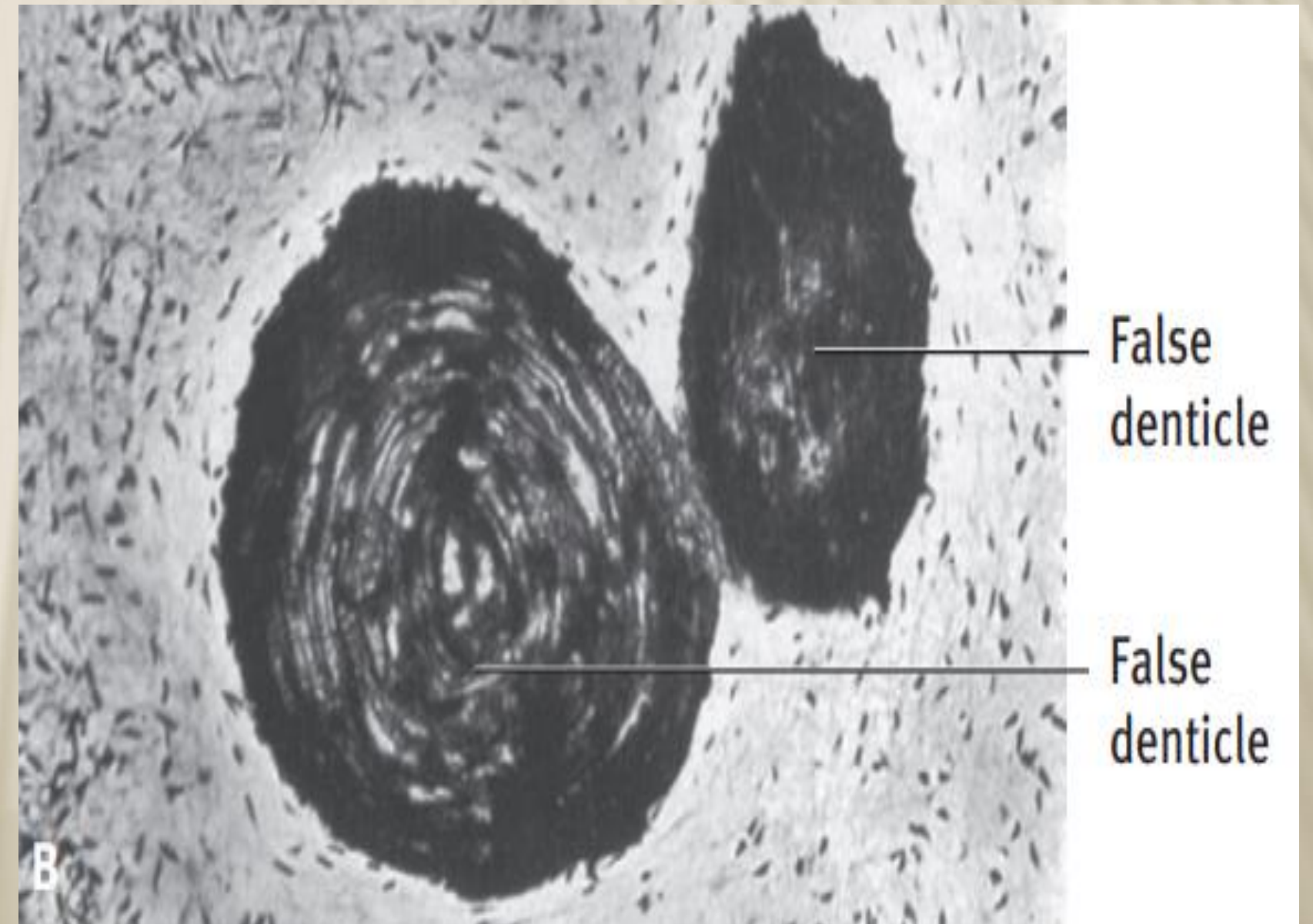
Based on their structure :

- ✘ **True pulp stone:** they are similar to dentin in that they have dental tubules and surrounded by odontoblasts.



CLASSIFICATION OF PULP STONE

- ✘ **False pulp stone:** These stones do not exhibit dentinal tubules but appear instead as concentric layers of calcified tissue. In some cases these calcification sites appear within a bundle of collagen fibers.



CLASSIFICATION OF PULP STONE

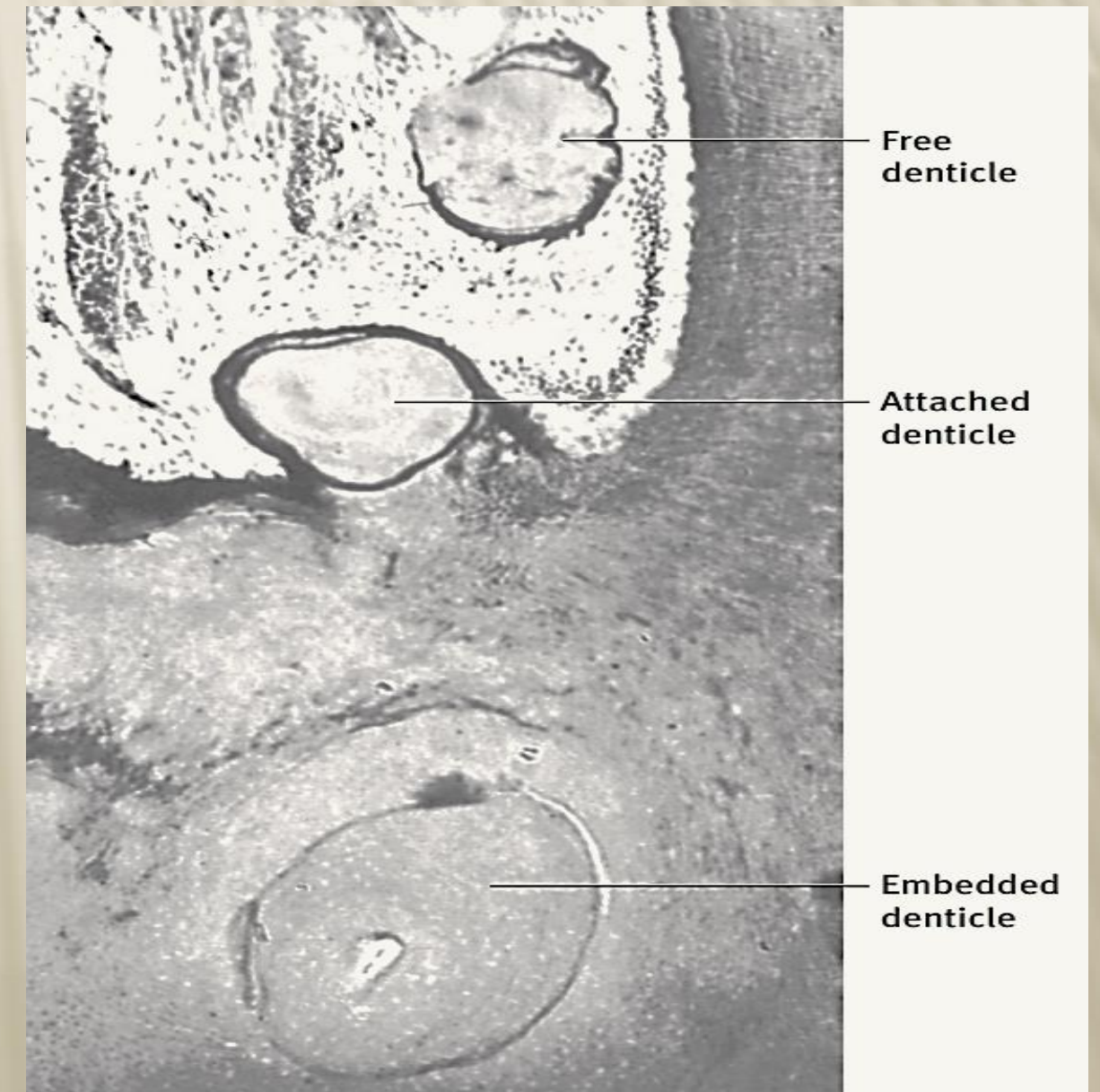
- × **Diffuse calcification:** They appear as an irregular calcific deposits in the pulp tissue, usually following collagenous fiber bundles or blood vessels. Sometimes they develop into larger masses but usually persist as fine calcified spicules.



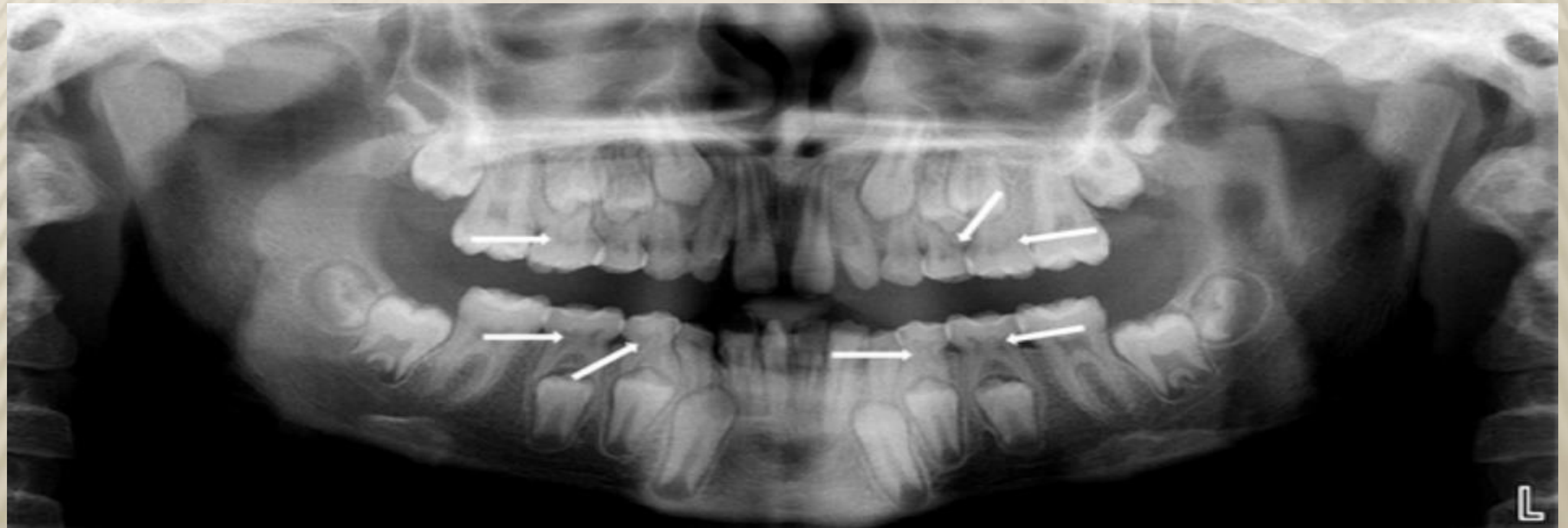
CLASSIFICATION OF PULP STONE

based on their location:

- ✘ **Free pulp stones:** are found within the pulp tissue proper and are the most commonly seen type on radiographs.
- ✘ **Attached pulp stone:** are in intimacy with dentine walls,
- ✘ **Embedded pulp stone:** are formed in the pulp but with ongoing physiological dentine formation they become enclosed within the canal walls

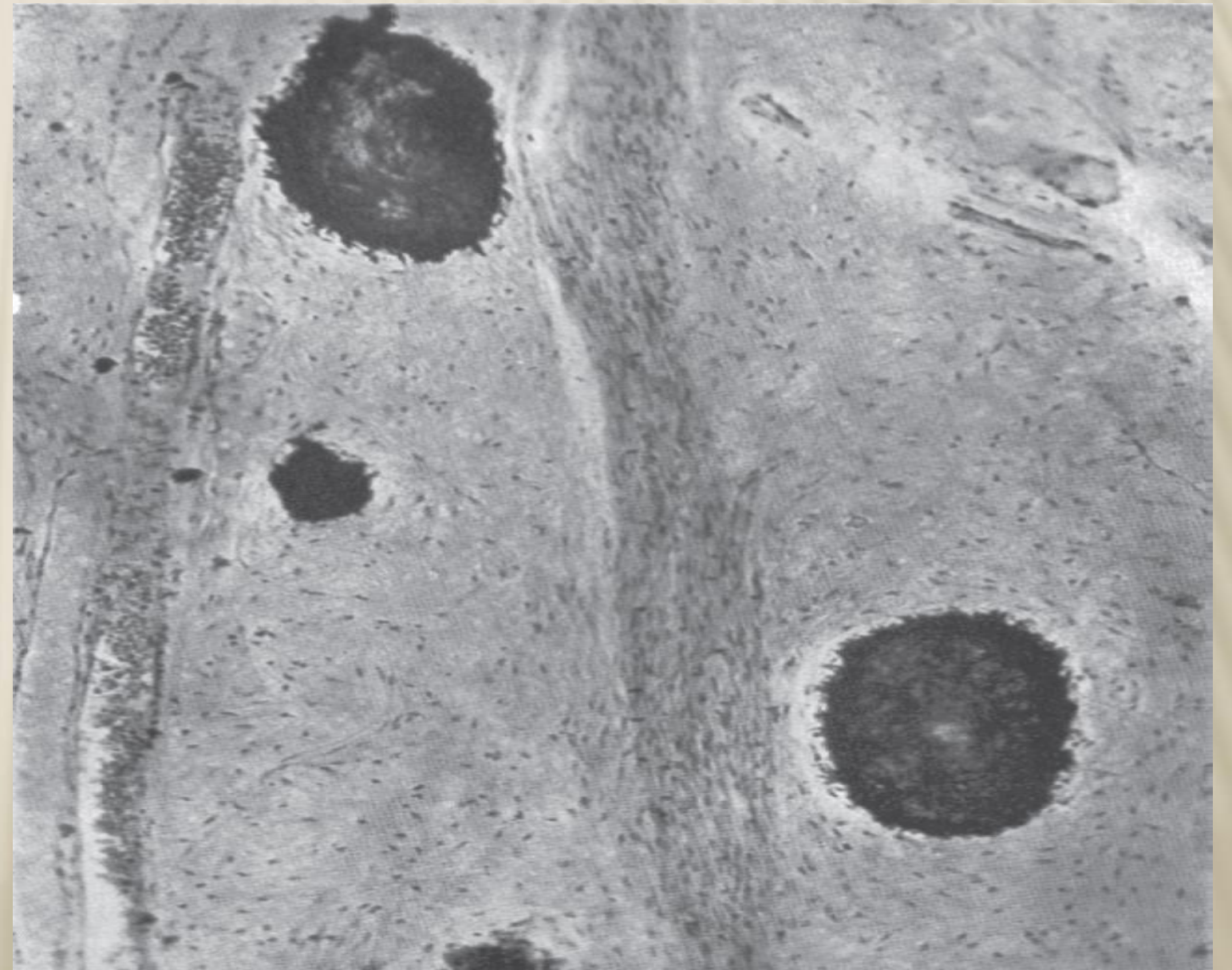


PULP STONE IN PRIMARY TEETH



CLINICAL CONSIDERATION

- ✘ Pulp stone may cause pain, The consensus is that though denticles may seem to impinge on the nerves of the pulp
- ✘ Pulp stones usually grow as layers of mineralized tissue, formed by accumulation around dead or degenerating cells, collagen fibers, or blood thrombi.

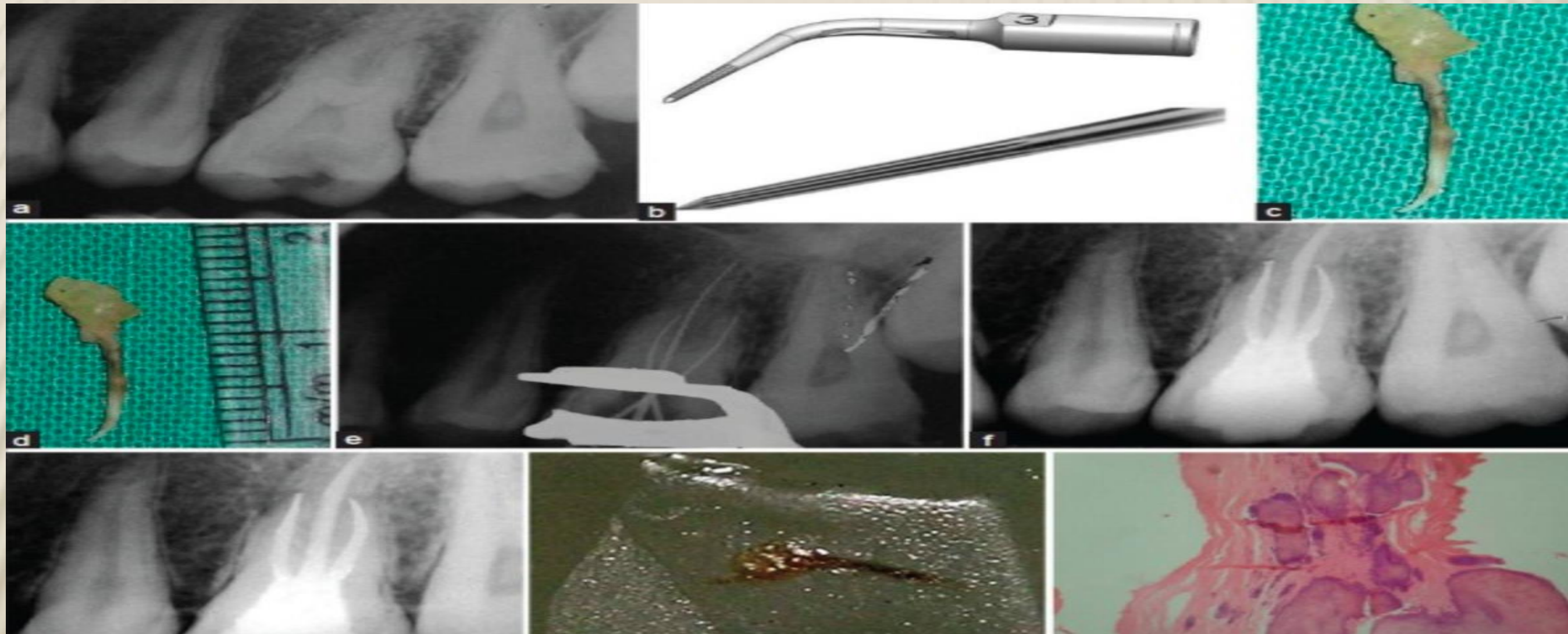


Pulp stones in proximity to nerve

ENDODONTIC TREATMENT AND PULP STONE

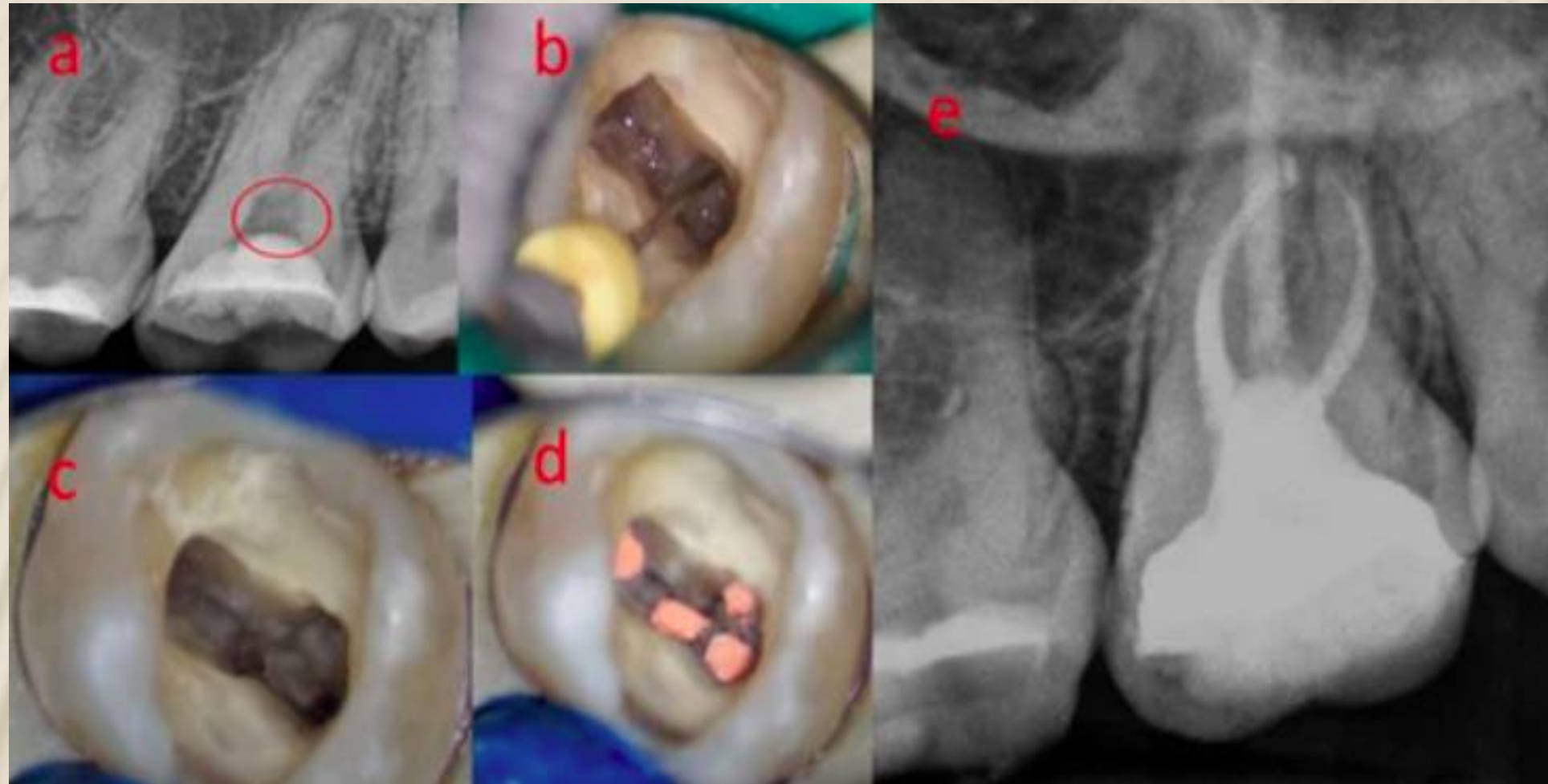
- ✘ The best treatment for tooth with pulp stone is the combination of magnification and ultrasonic tips.
- ✘ The presence of pulp stone may alter the internal anatomy but not totally blocking the orifice of the canal.
- ✘ In case of large pulp stone, the use of ultrasonic instrumentation with the use of special burs makes their removal easier.
- ✘ Proper instrumentation, access opening, and magnification are necessary to overcome the hindrance posed by pulp stones while performing root canal treatment

ENDODONTIC TREATMENT AND PULP STONE



(a) Preoperative radiograph showing diffused radio opacities throughout the pulp chamber and in the palatal root canal. (b) ultrasonic tip for calcified canal scouting. (c) Photograph of partially calcified pulp tissue. (d) Length of the partially calcified pulp tissue was measured to be 16 mm long. (e) Working length radiograph (f) Post-obturation radiograph

ENDODONTIC TREATMENT AND PULP STONE



**Removal of pulp mineralization followed by endodontic treatment:
(a) Preoperative radiograph; (b) Identification of canal orifices; (c)
The pulp chamber after the pulp stone removal; (d) Tooth after the
endodontic treatment; (e) Postoperative radiograph**

ASSOCIATED SYSTEMIC DISEASE

- ✘ A higher than normal association has been made between pulp stones and several systemic conditions including cardiovascular disorders, Diabetes mellitus and renal stones.
- ✘ Previous study indicated that a significant higher number of patients with pre-existing cardiovascular disorders had detectable pulp stones compared to a control group.
- ✘ The patients with coronary artery disease (CAD) have high chance of being affected with pulp stones.

ASSOCIATED SYSTEMIC DISEASE

- ✘ Some studies suggest that the presence of pulp stone may leads to other pathologic calcification like kidney stones.
- ✘ While other studies reported that CNPs (calcifying nanoparticles) can produce nucleate hydroxyapatite; therefore, they can be considered an etiologic factor for calcifications, including kidney stones, gall stones, atherosclerosis and pulp stones.
- ✘ In recent immunohistochemical study showed that osteopontin is localized in pulp stones and also in atherosclerotic plaques and urinary stones,, in which a correlation was found between the presence of pulp stones, kidney stones and cardiovascular disorders

ASSOCIATED SYSTEMIC DISEASE

- ✘ Previous study found that type II diabetics and pulp stones were have a higher than usual prevalence. The dental pulp of diabetics tends to age readily due to obliterative endarteritis and because of its limited or no collateral blood circulation in fully developed teeth .
- ✘ Other study concluded that patients with diabetes mellitus were found to be more prone to form chamber calcifications, due to the increase in glucose present in the blood which activates osteopontin



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