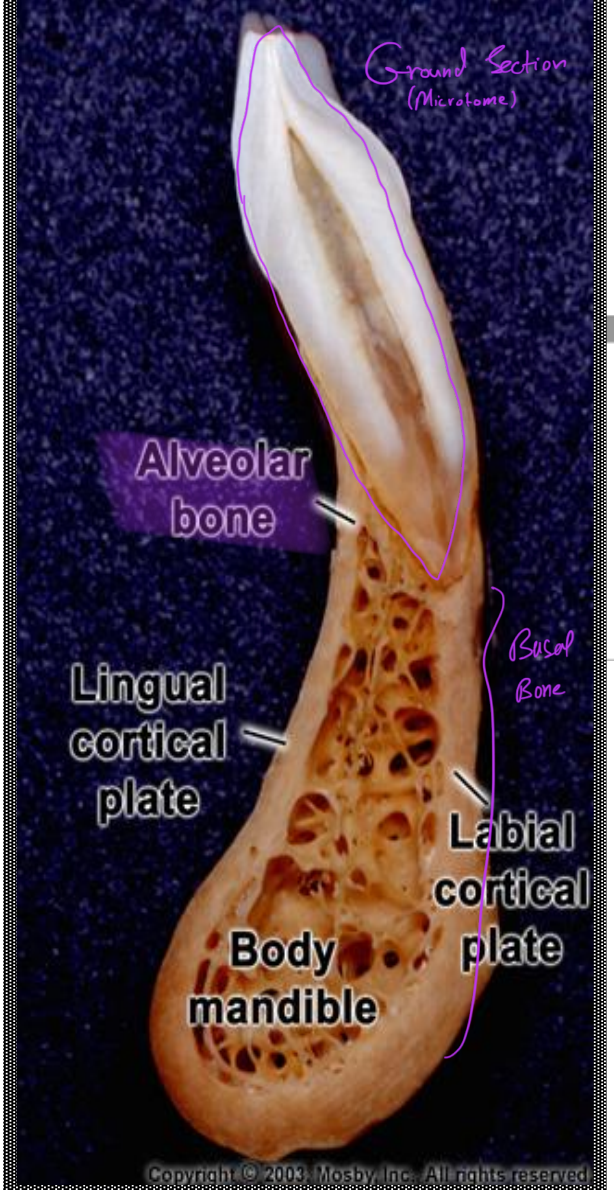
بسم الله الرحمن الرحيم



Bone & ALVEOLAR PROCESS

Associated with the tooth
*Tooth extraction → No alveolar process
*Healing to the socket after extraction
by woven bone (Transient)
by Modeling replacement by lamellar

(part 2)

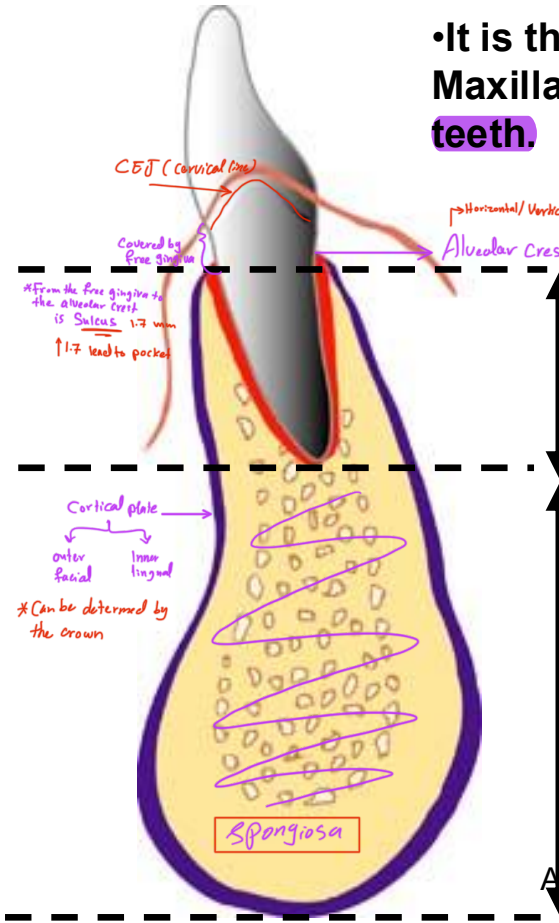
After tooth extraction
1- Socket is replaced by woven
it is a (transient state)
2- Resorption and lamellar
bone formation

Ass.Prof. Noura Bakr

Basic items

- *Bone structure & cells*
- *Bone types & histologic structure for each types*
- *Incremental lines of bone & its indication*
- *Alveolar bone process micro and macro structure*
- *Bundle bone & clinical , histological, functional and radiographical name*
- *Cortical plate and its clinical significance*
- *Central spongiosa, histological & radiographic*

ALVEOLAR PROCESS



•It is that part of the bone of the Jaw (Mandible or Maxilla) That Forms and Supports the sockets of the teeth.

ALVEOLAR PROCESS

NO LINE OF DEMARCATION

BASAL BONE

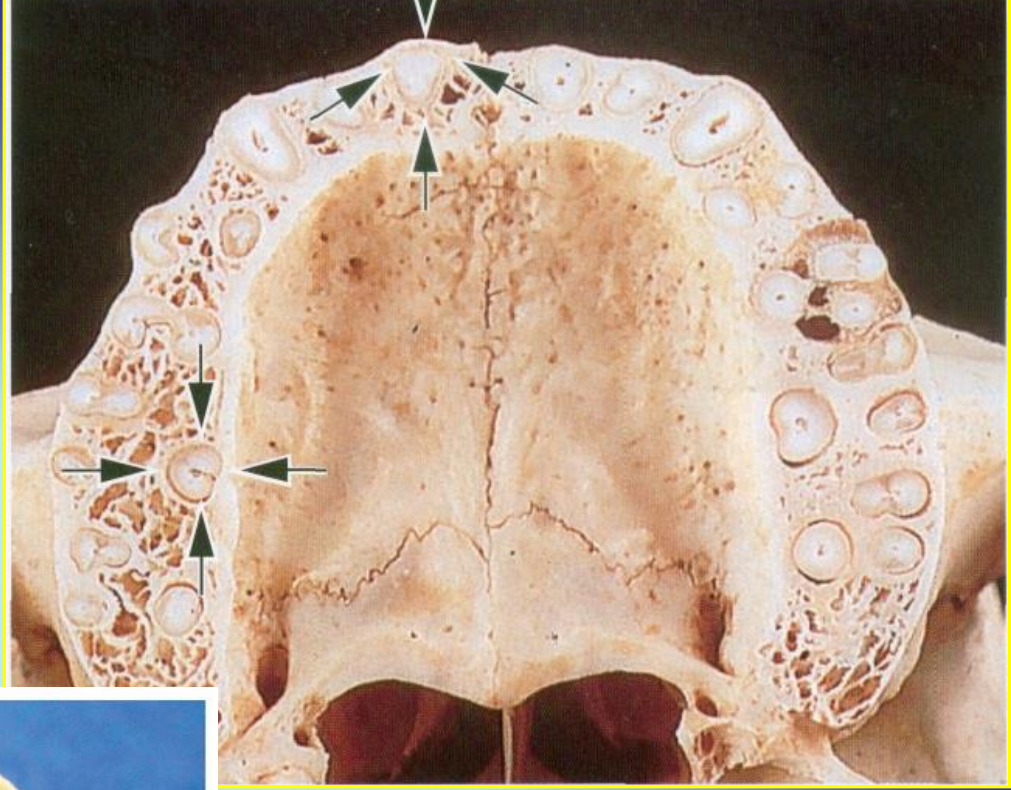
- Morphology determined by size, shape, function and location of teeth

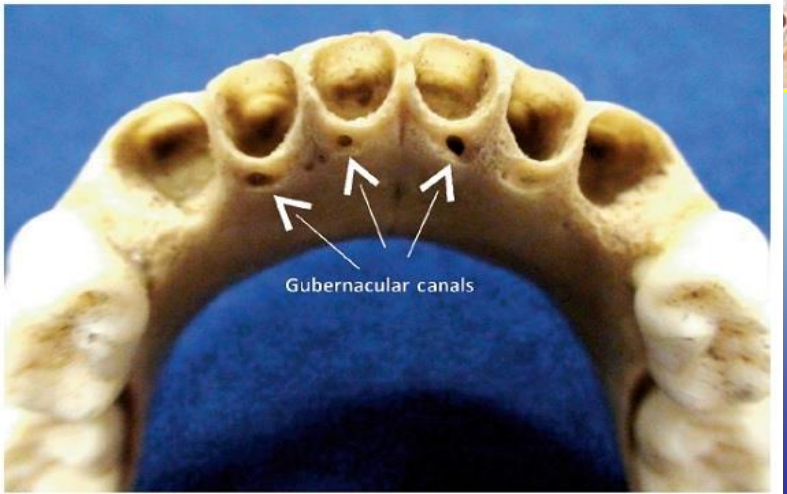
Alveolar bone Process

Alveolar bone proper

- Not directly attached to the tooth (PDL is direct attachment)
- Sharpey's fibers which is partially mineralized
- It is bundle bone supported by Compact bone then spongiosa the compact (cortical plate).

Basal Bone

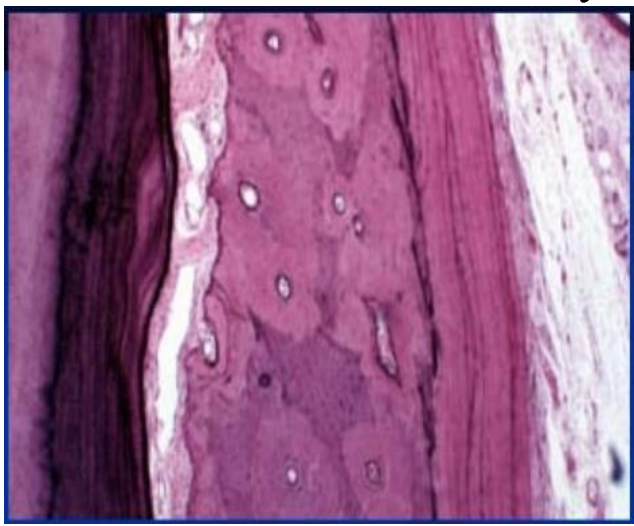




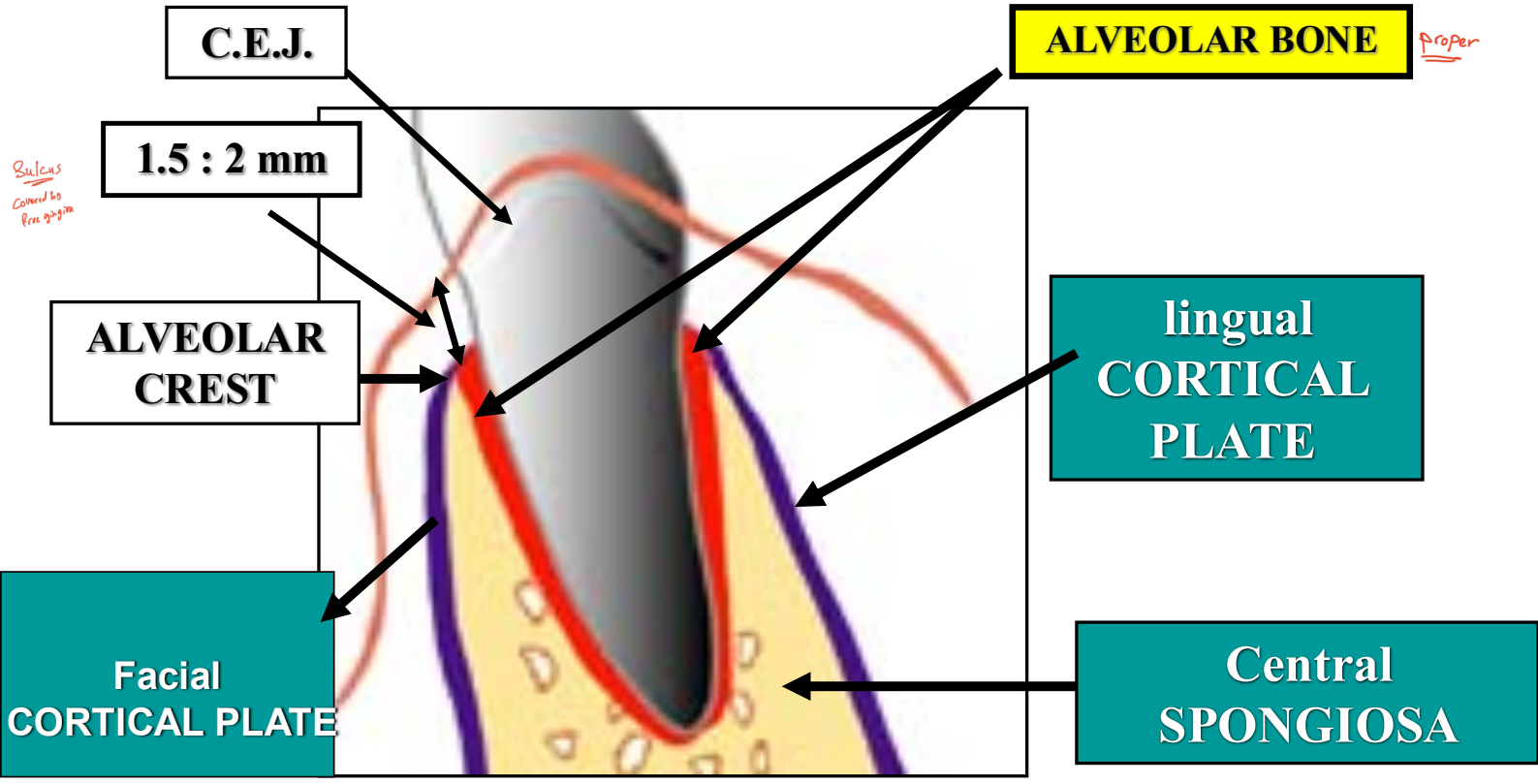
Alveolar Process

Macro-anatomy

Micro-anatomy

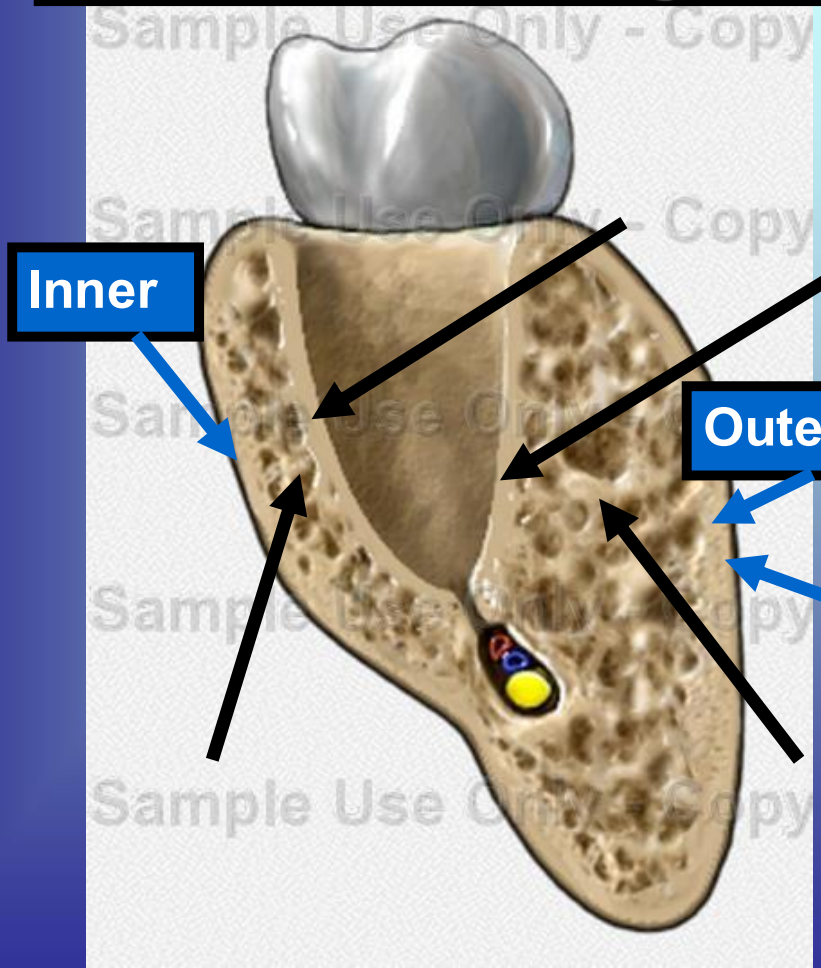


MACRO-ANATOMY
ACCORDING TO FUNCTION



Macro-anatomy

According To Function



1 - ALVEOLAR BONE PROPER

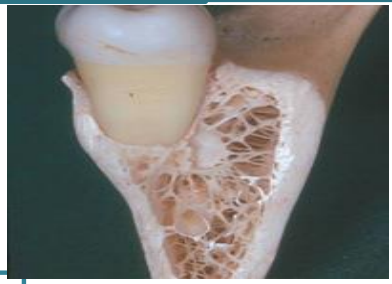
2 -SUPPORTING ALVEOLAR BONE

A -CORTICAL PLATE

B -SUPPORTING SPONGIOSA

Alveolar process

Alveolar bone proper



Supporting alveolar bone

Bundle bone

Lamellar bone

Spongiosa (spongy bone)

Cortical plates (outer&inner)

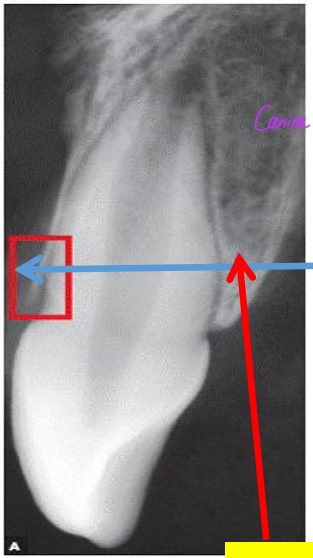
Recently the components of alveolar process described as follow:

- Facial and lingual cortical plates.
- A central Spongiosa.
- From inner side facing periodontal ligament, the alveolar bone
- The alveolar bone and the cortical plates merge at the alveolar process crest (usually 1.5 to 2mm below the level of the cemento-enamel junction).

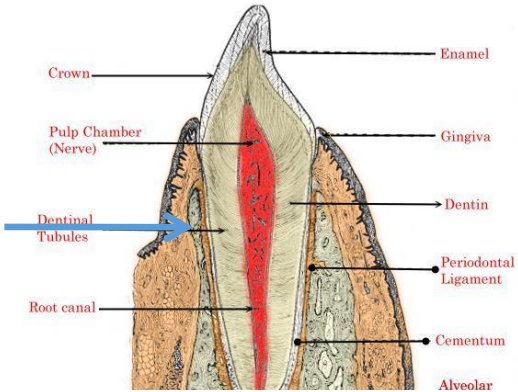
Sulcus

Cortical Plate

During implantation in Anterior teeth,
I know the CEJ > Crest by 1.5–2 mm
During drilling I take this measurement to be in the middle of cortical plate (lingual)
Usually will lead to fracture CBCT it is true)
And the Drill entered to the perpendicular plate in the floor of the nose.
↳ upper portion will enter to the maxillary sinus (more dangerous)

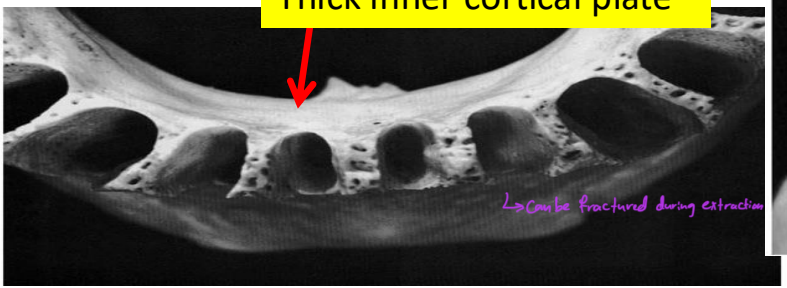


Thin outer cortical plate facial /labial

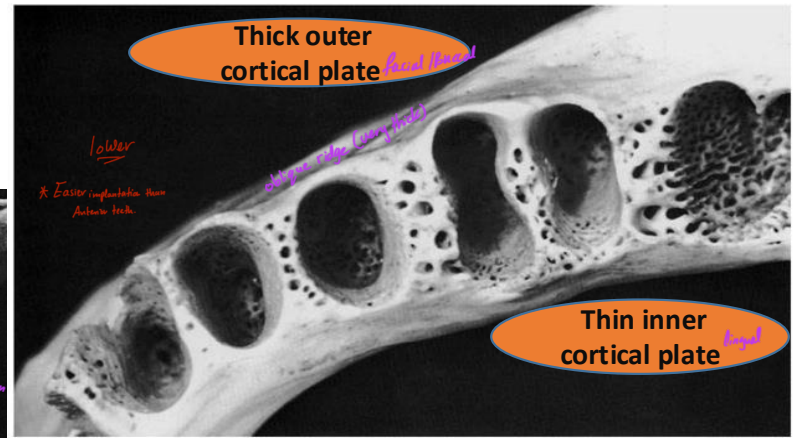


lingual

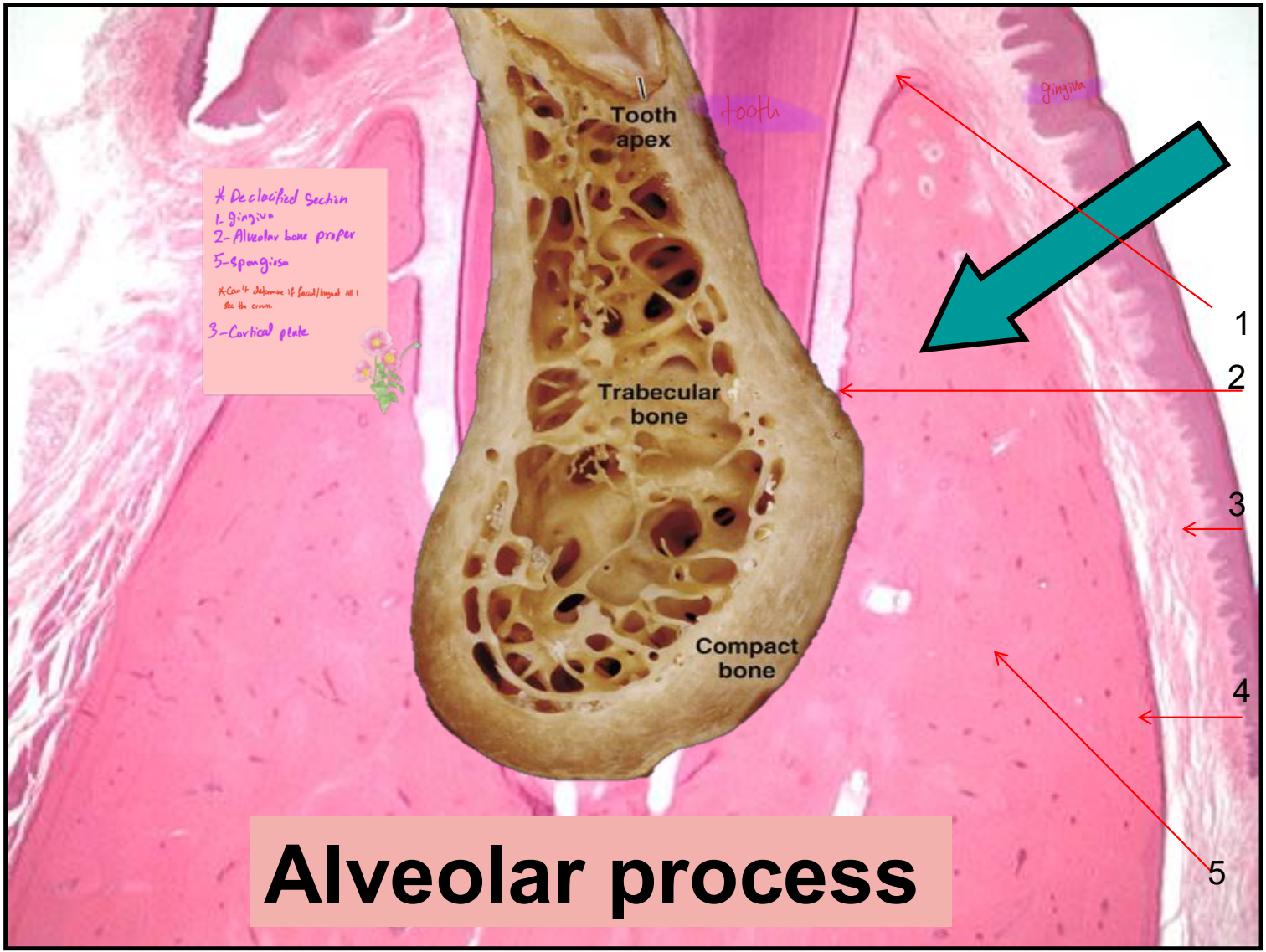
Thick inner cortical plate



Anterior teeth



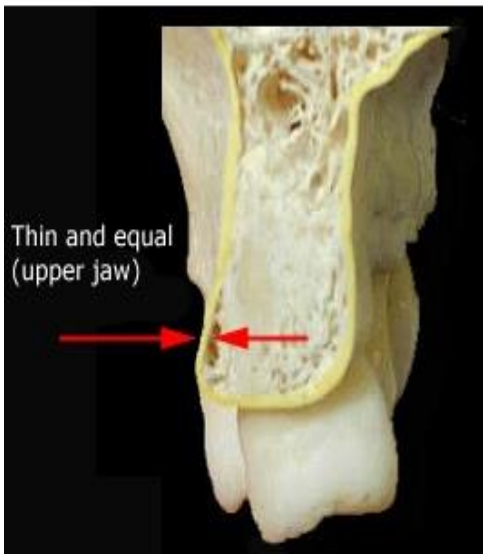
Posterior teeth

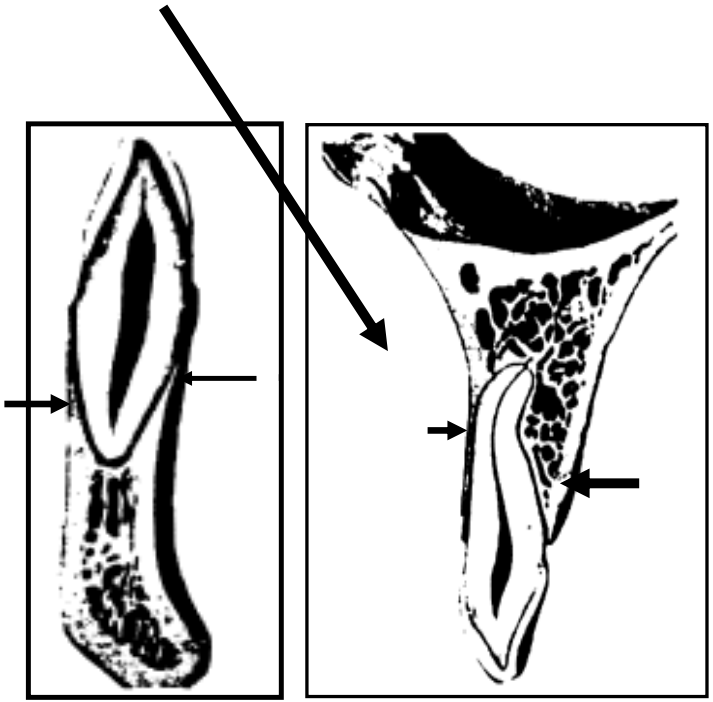


Alveolar process

CORTICAL PLATE

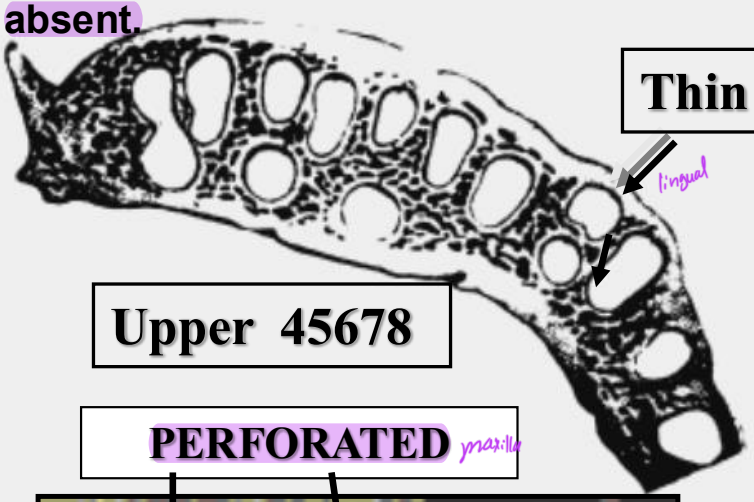
•All upper and lower anterior teeth, their CP.(outer, inner).....Thin+ No central spongiosa (near the crest)+ Outer is thinner esp. in maxilla.





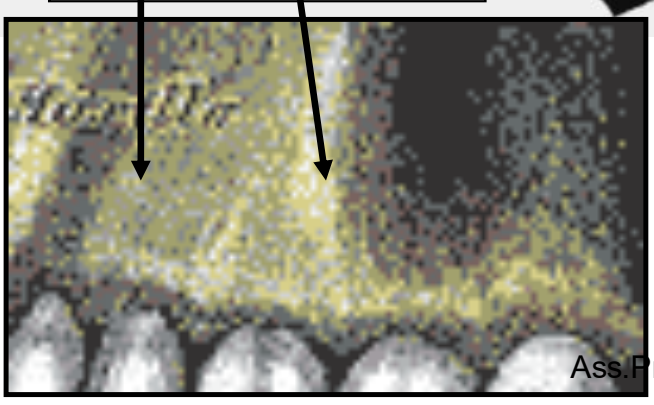
CORTICAL PLATE

In premolars and molars region(Buccal CP)….*Mandible……Thick+ dense
*Maxilla……..Thin, Perforated by many opening, may be completely absent.

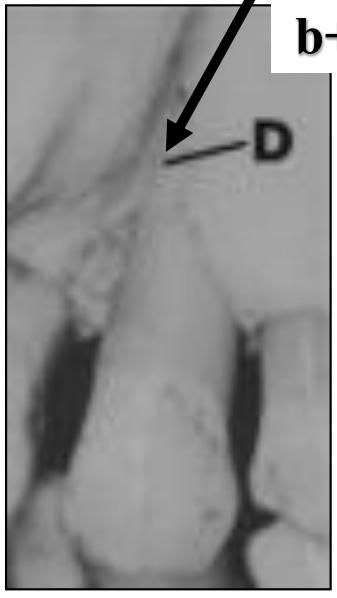


Upper 45678

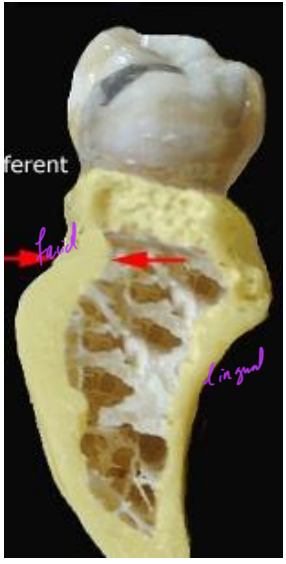
PERFORATED



45678



b++



Lower 45678

Clinical consideration for the di outer cortical plate thickness:

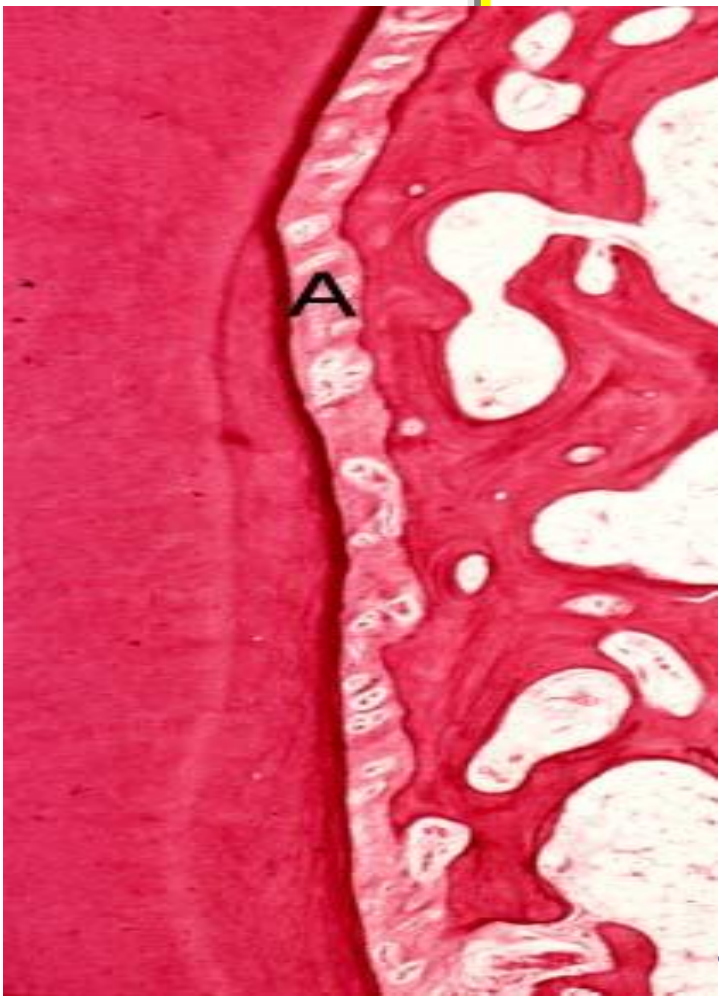
- Outer cortical plate of maxilla is thinner than the mandible which allows direct insertion of the anesthesia beside the target tooth.
- In mandible due to thick cortical plate ,the mandibular nerve is anaesthetized on its entrance to the mandibular foramen. so half the mandible is anaesthetized with the soft tissue .

Nerve block

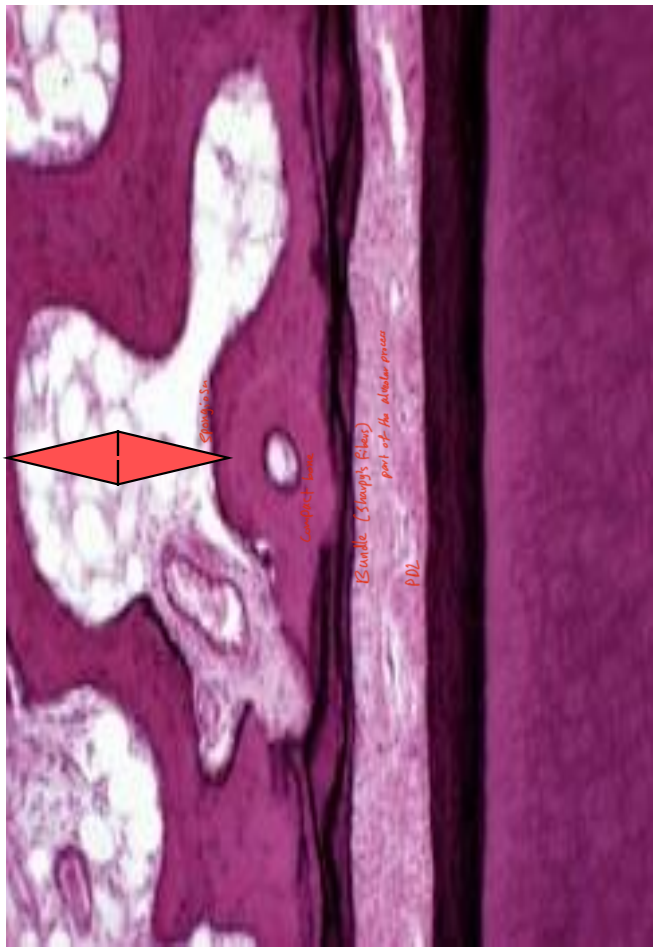
Infiltration

Nerve block

Central spongiosa (trabecular bone



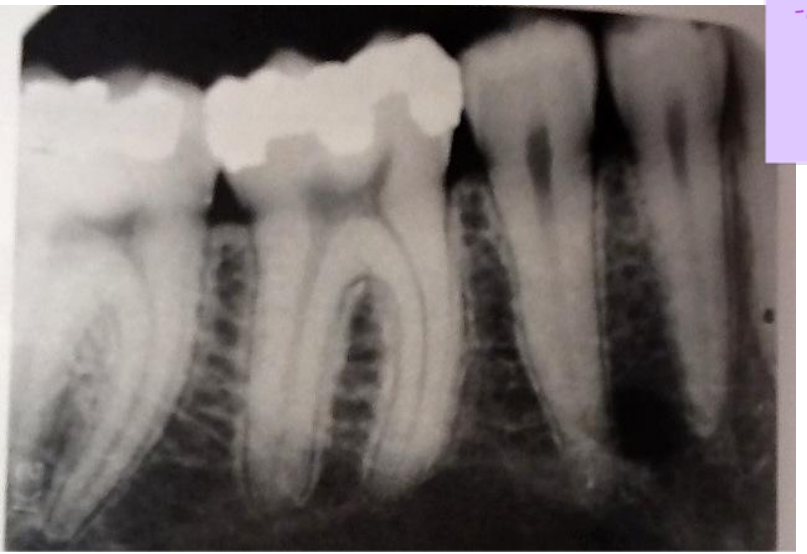
a

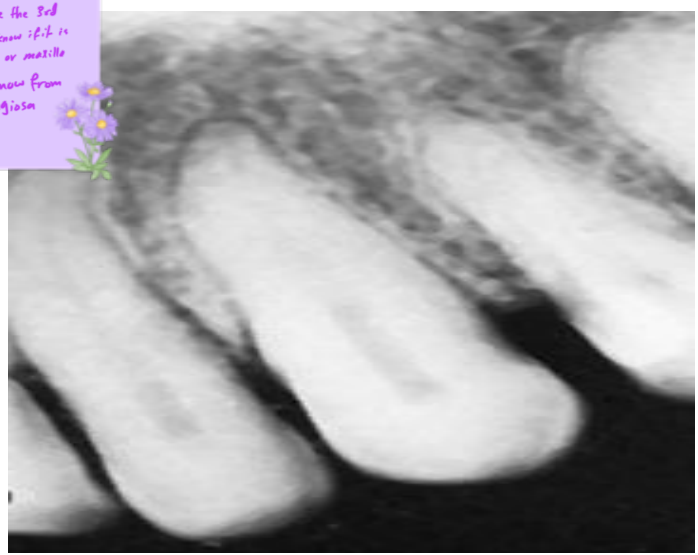


Radiographic picture of spongiosa in alveolar process

There are two main patterns seen in radiographs which are either:

(2D)
- Can't see the 3rd root to know if it is mandible or maxilla
- Can know from Spongiosa





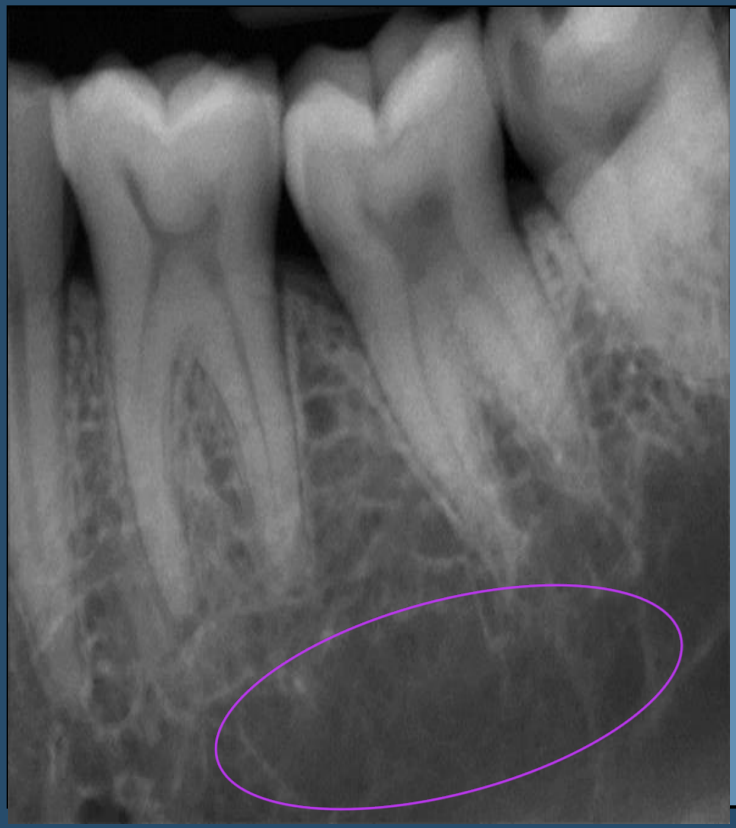
•Thick bone trabeculae arranged in a ladder like.
(Type 1)

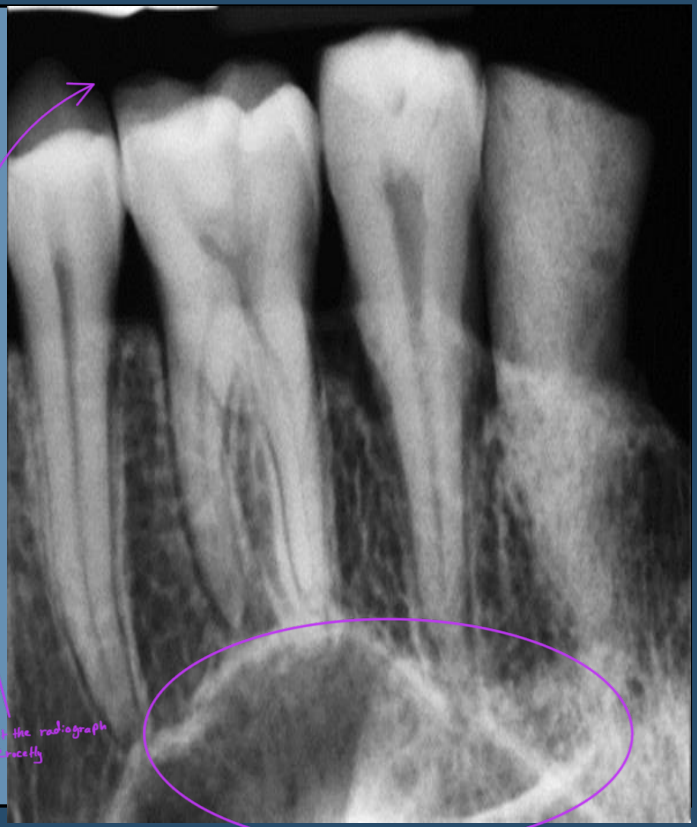
•Thin numerous bone trabeculae arranged in an irregular manner. (Type 2)

A

- Ladder like is not obvious

B



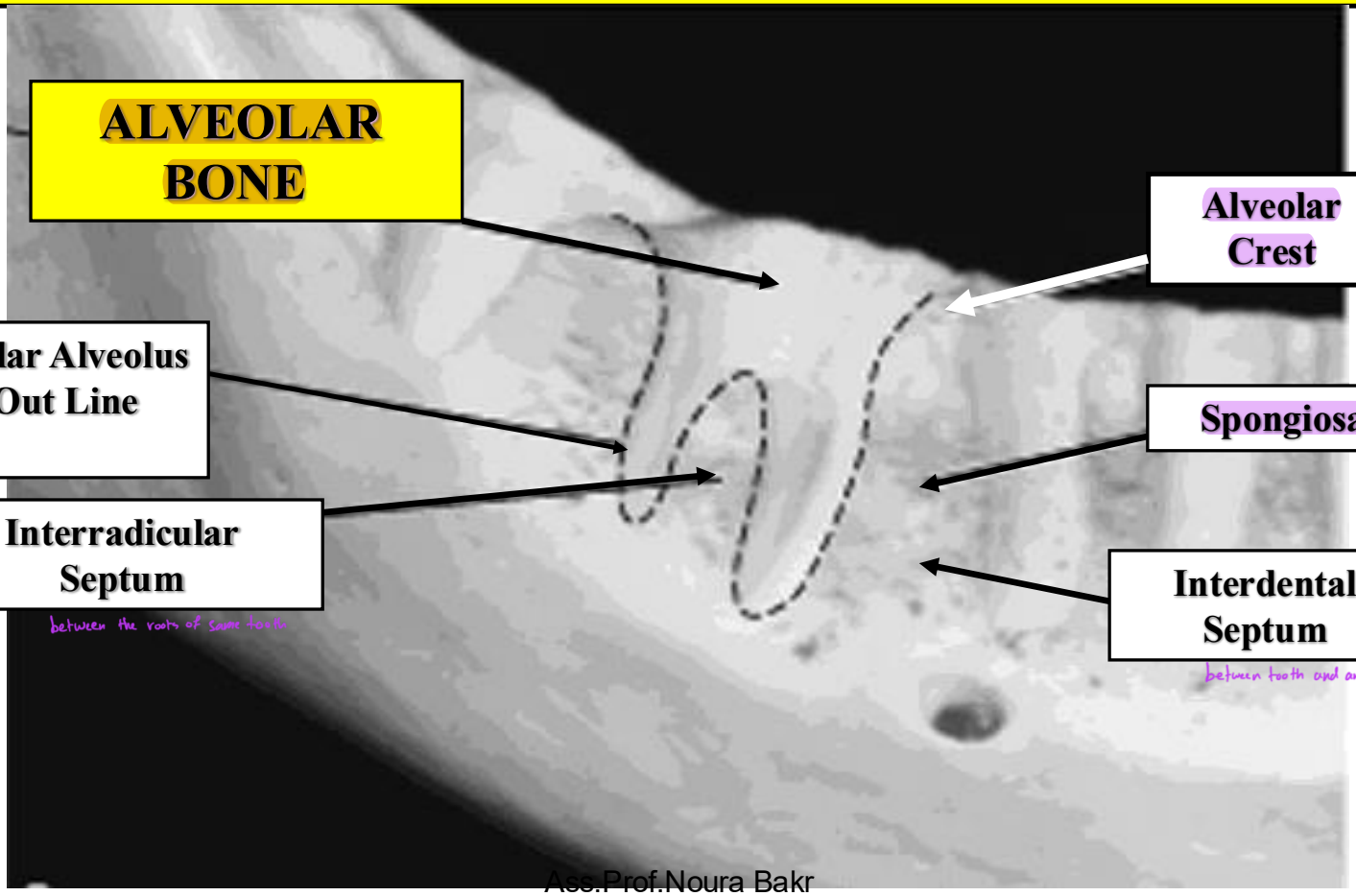


- No canals (mandible)

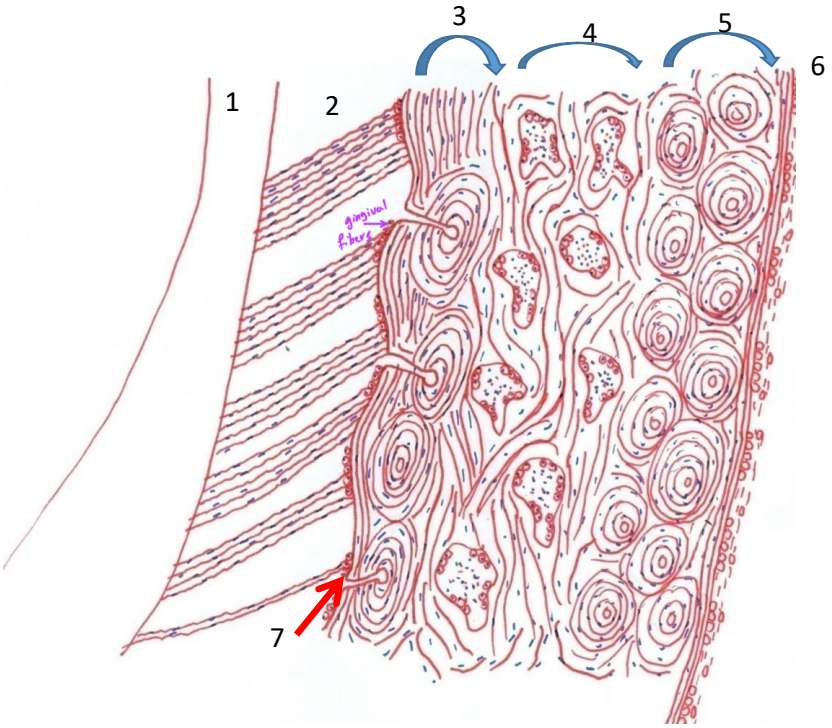
- Canals (maxilla)

sinus

ALVEOLAR BONE



Micro-anatomy of Alveolar Process



1. Cementum
2. PDL
3. Alveolar bone proper
   a)Bundle bone
   b)Lamellar bone
4. Spongiosa
5. Cortical plate
   c) Haversian system
   d) Longitudinal lamellae

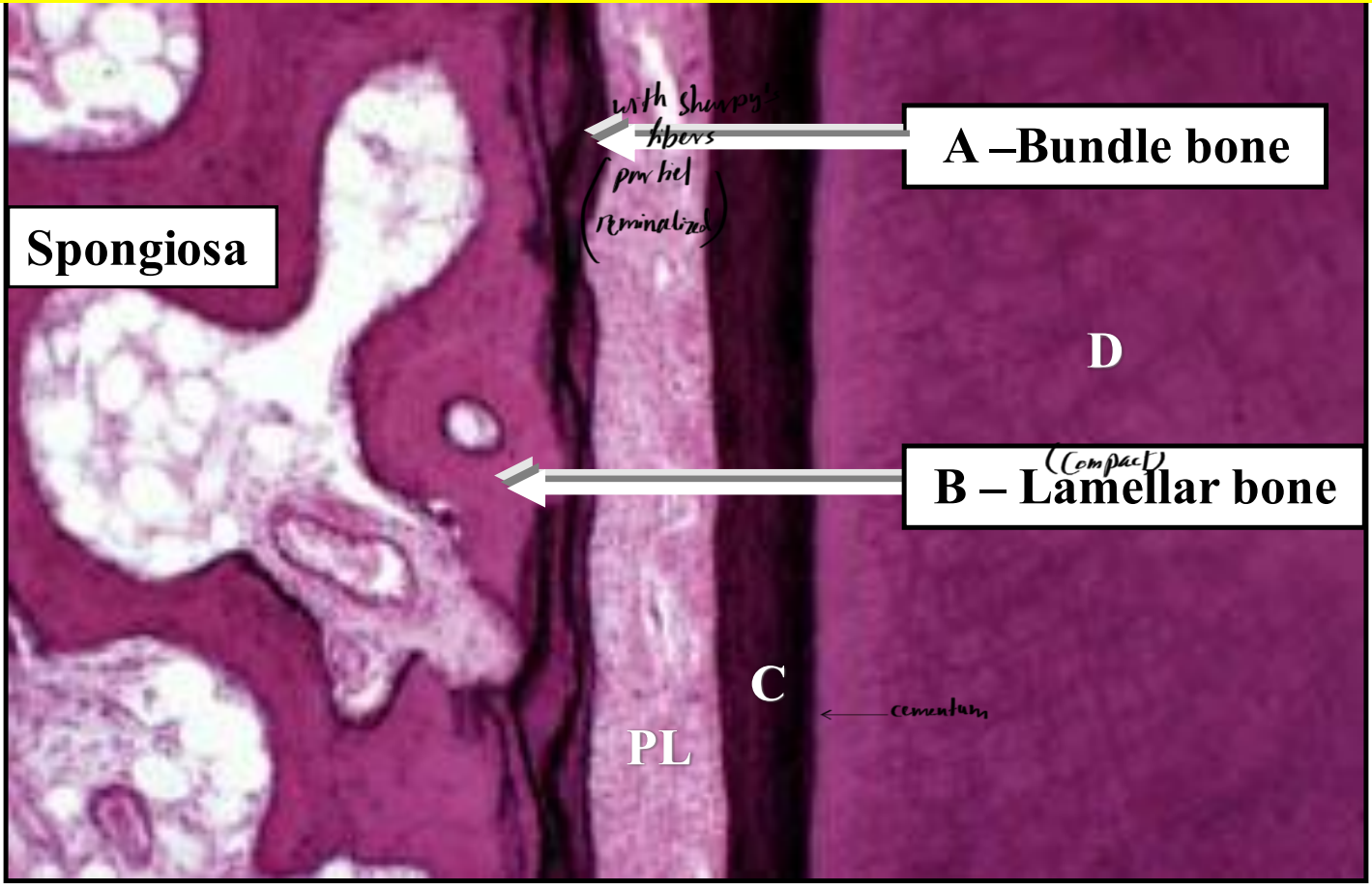
Ligament → PDL
Haversian, Volkmann, Canals

6. Periosteum

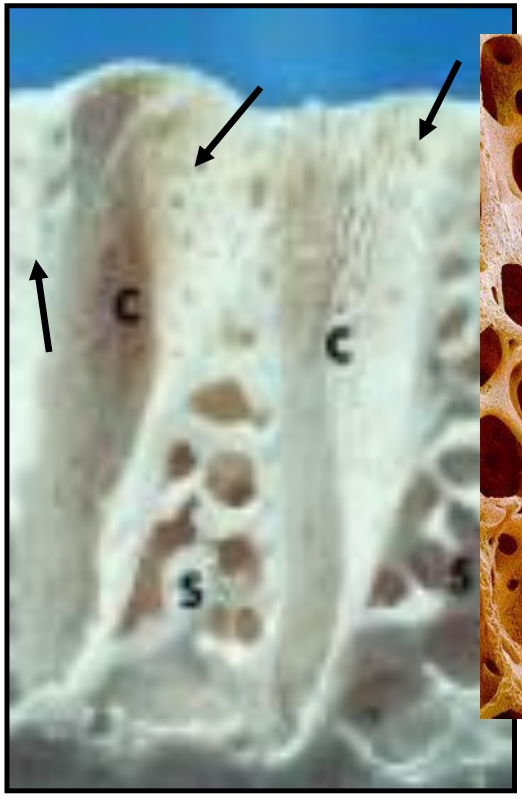
7. Nutrient canal

Volkmann's canal
Between Haversian-Haversian

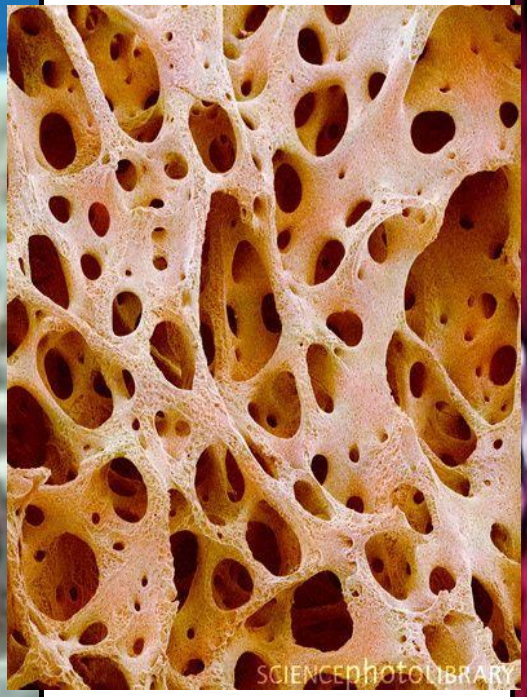
Histologically
ALVEOLAR BONE

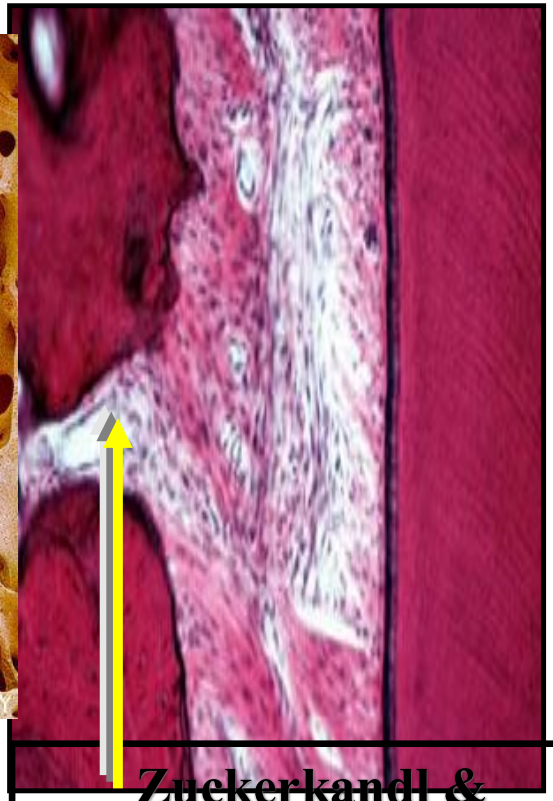


Alveolar Bone (Cribriform plate)



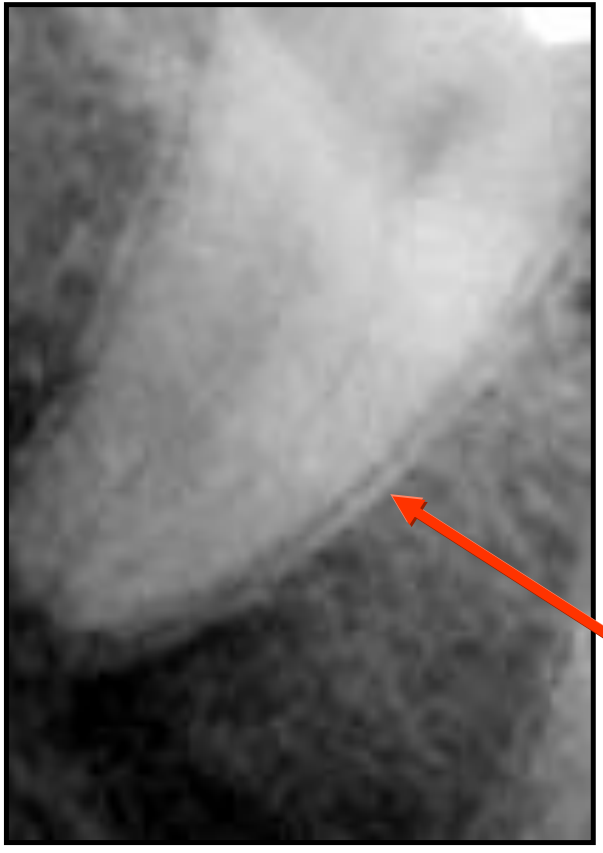
Cribriform plate



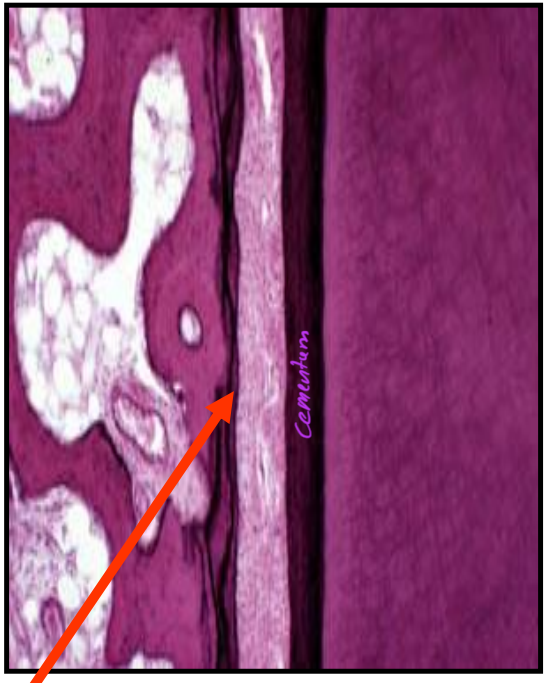


Zuckerkandl & Hirschfeld canals

Alveolar Bone



Is Also Called



Ankylosis

- Need surgery to extract the root
- Insert file to remove the bundle during extraction → if upper → Apical 1/3 → close it
  → To avoid the sinus and Nasal
- ∴ Resorption will happen and bone will be formed

LAMINA DURA (no periodontal space)

- Alveolar bone + compact
  Should be thin
  - If wide → there was previous abuse (chronic, recurrence)
  - should be treated first
  - ★ Not real → Direct contact between the tooth and the bone (Ankylosis)

alveolar bone proper

– Is the part of alveolus which immediately is surrounds the root

Why the following ???????????

–Cribriform plate (anatomical term)
– Lamina dura (X -ray term)
– Bundle bone (Histological term) Can't be seen grossly
–Attachment bone (functional term).

↳ Direct attachment with sharpey's fibers (PDL)
↳ not found in cement
–Bundle resorption → teeth will be loose.

AGE CHANGES OF THE BONE

1 - **DECREASE IN THE WATER CONTENT**

↓

BRITTLE BONE.

2 –**SPONGIOSA**

↓

THIN TRABECULAE AND WIDE MARROW SPACES.

* Topical anesthesia if the root is loose in child to extract the tooth (during resorption)

AGE CHANGES

3 - **SPONGIOSA**

↓

RED B.M. Transformed

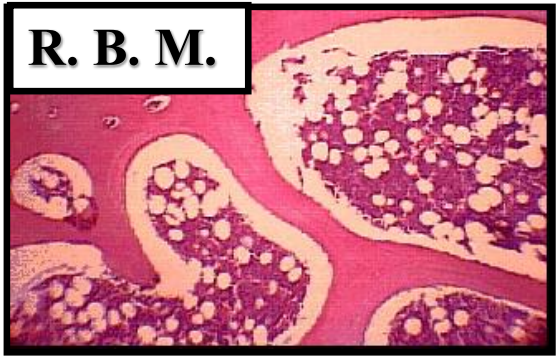
Into FATTY B. M. Fragile and easy to extract

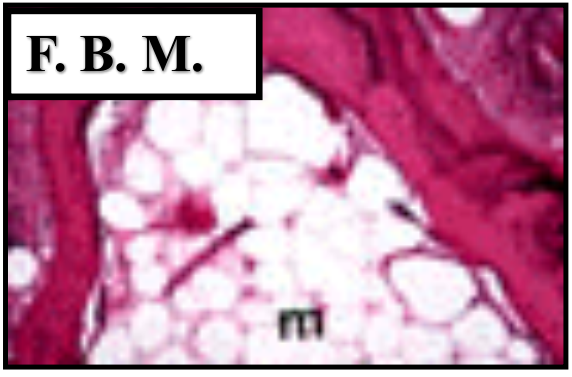
- In protrusion cases (type II), parts can be corrected by force and resorption of spongiosa

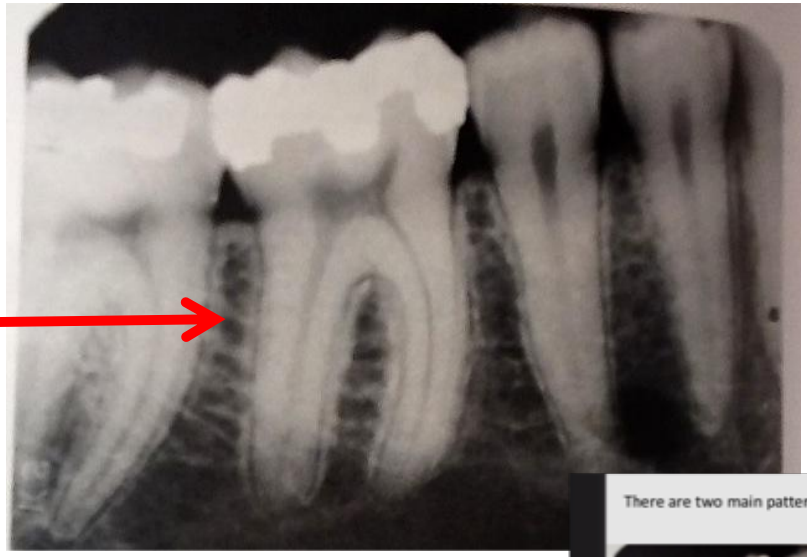
WHILE IT PERSISTS RED IN:

- **THE CHONDYLAR HEAD**
- **ANGLE OF THE MANDIBLE**
- **MAXILLAR TUBEROSITY.**

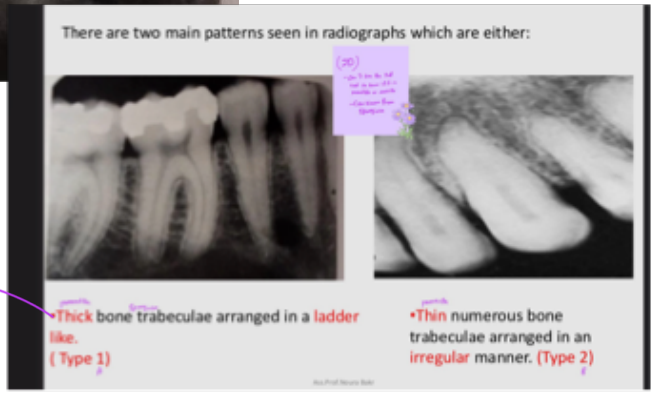
↳ During 3rd molar extraction, can get extracted with the tooth and the posterior part of the M.P. is loose, Not Normal, should be corrected







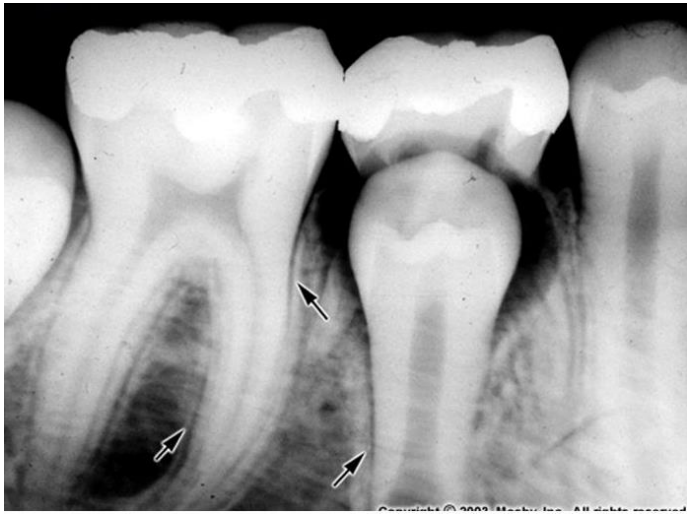
What's the pointed structure?
Describe its different radiographic patterns.

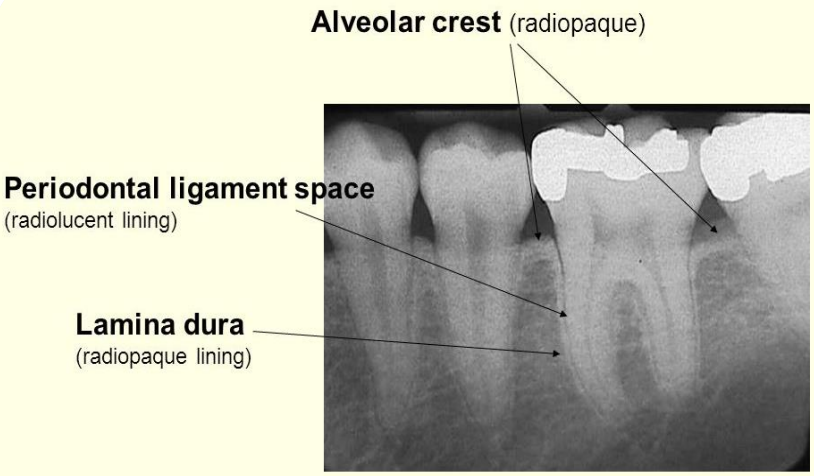


Radiographic appearance of Bundle bone

- Appears more radiopaque than adjacent bone….**WHY???**

  Bundle bone has a higher degree of mineralization and is organized in a very dense, compact pattern.





THINK