

BONE FORMATION AND REMODELLING

Bone Formation

- Compact bone begins as cartilage
- **OSTEOBLASTS (bone-forming cells)**
- Osteoblasts release Osteoids
- Inorganic salts are deposited to form bone
- Short bones have a single ossification site
- Long bones have three ossification sites (one at the centre and two on each end)

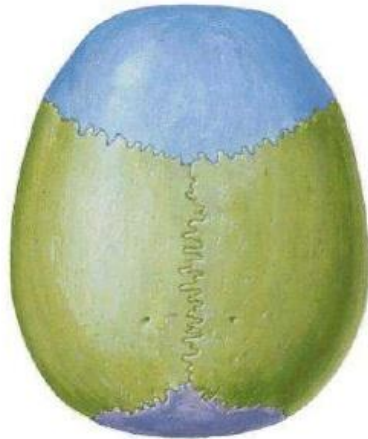
Bone Formation - Skull

- Cancellous bone (flat bones of the skull)
- These begin as fibrous membranes
- Osteoblasts release osteoid into this membrane and forms a “sponge-like” bundle
- Bone formation develops outward
- Several sites of ossification sites and bone formation is incomplete at birth
- Babies have “soft spots”
- These are cranial sutures on adult skulls - sites join

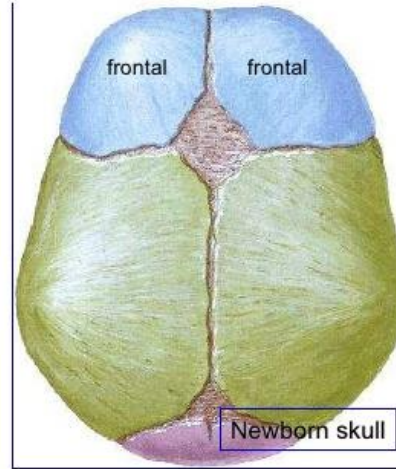
Bone Formation

Frontal bone ossification

- The frontal bone becomes ossified from two centers

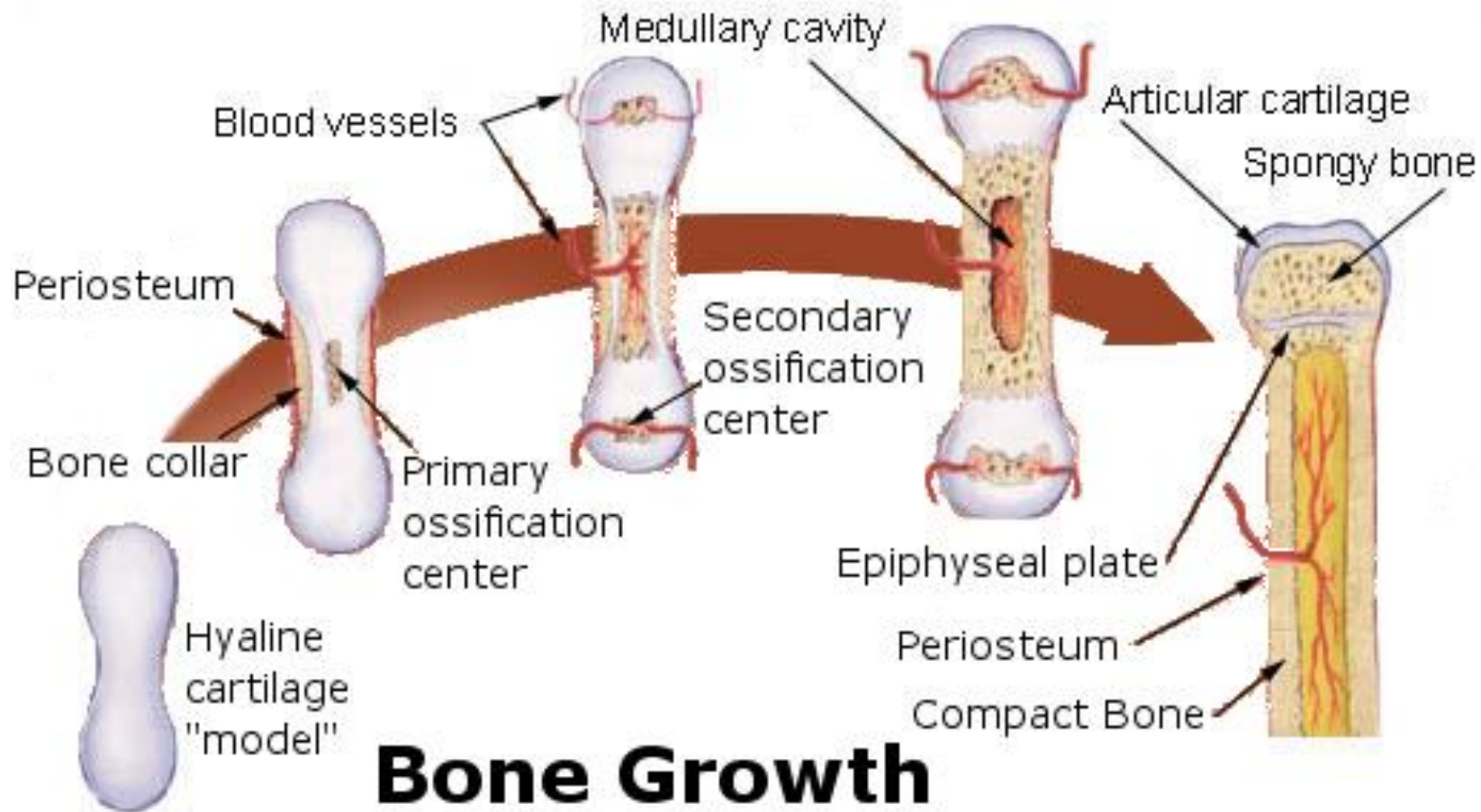


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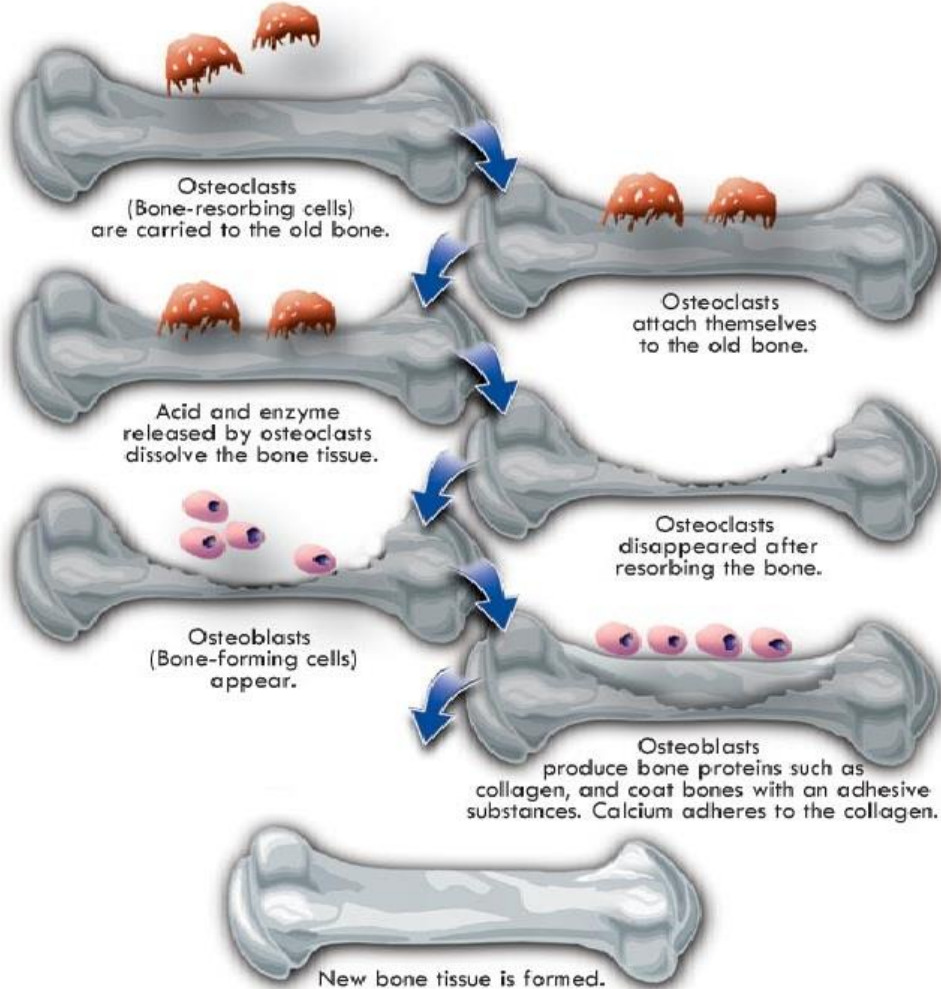


- There are left and right frontal bones at birth but normally they fuse to form a single frontal bone.

OSSIFICATION



BONE REMODELLING



Bone Remodelling

- Not grow through cell division
- **OSTEOCLASTS (bone-resorbing cells)**
- They remove old bone by releasing acids and enzymes
- **OSTEOBLASTS (protein-secreting cells)** deposit new tissue

Bone Remodelling

- This process is most active during the early years of human growth
- When new deposits are prevail the removal of the old bone
- Remodelling gradually declines until age 35
- 40's and onward - the process reverses: resorption exceeds bone reformation
- 5-10 percent loss in bone mass per decade

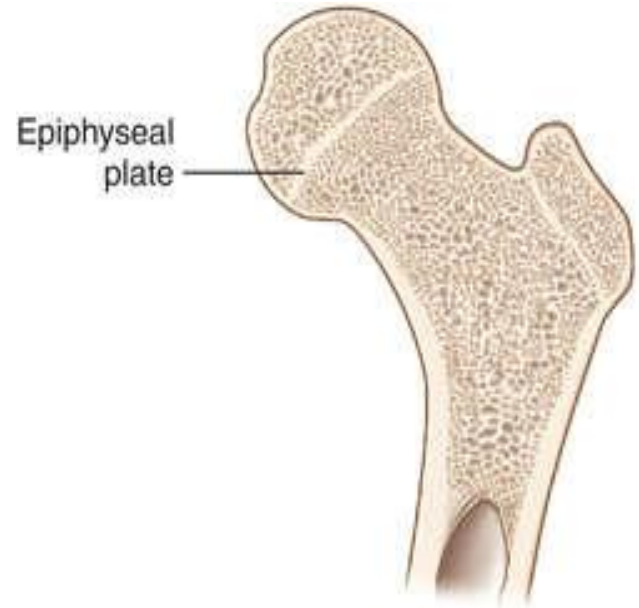
Bone Remodelling

WHAT SHOULD I DO TO DECREASE THE RATE OF BONE LOSS?

1. As you get older, ensure adequate intake of calcium
2. Vitamin D helps the body utilize calcium
3. Weight bearing exercises
4. Resistance training

EPIPHYSEAL PLATES/LINES

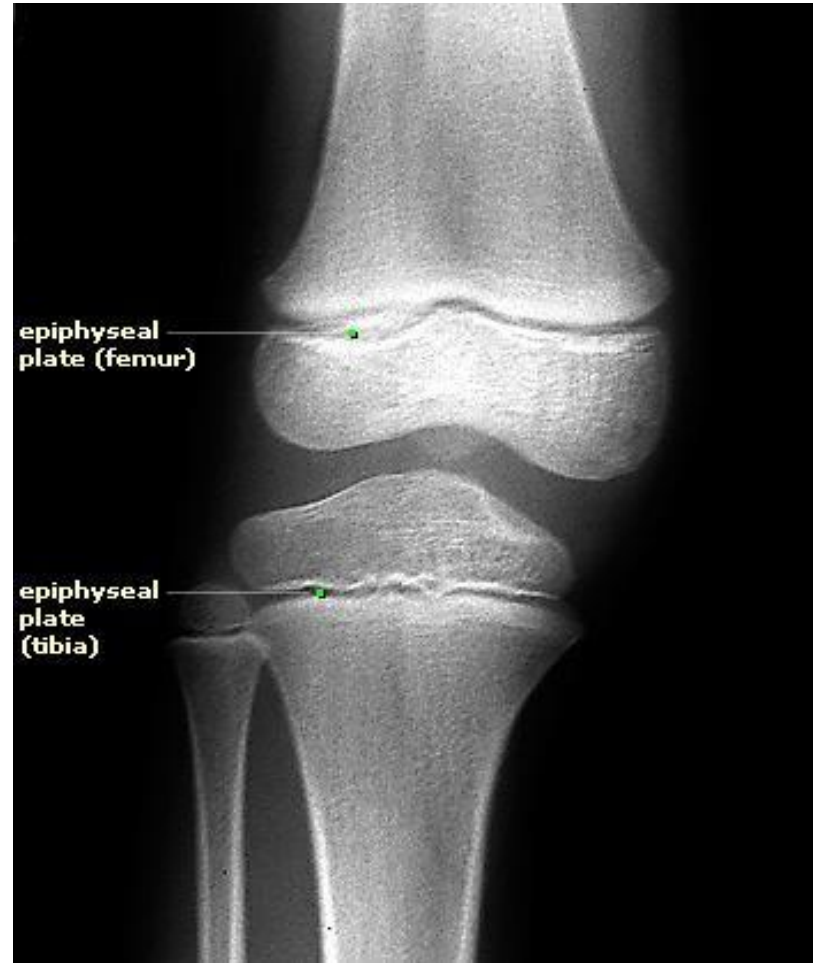
- The plate (growth plate) is found in children and adolescents at the end of each long bone
- Lines are found in adults who have stopped growing



X-Rays

- black space between the diaphysis and epiphyses = growth
- Solid epiphyses = no growth - plates have fused together

Epiphyseal Plate - X-ray



Epiphyseal Line - X-Ray

