Innervation, Vessels, Growth & Healing of Bones

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Innervation & Vessels

- Periosteum
- nerves
- blood & lymph vessels
- large vessel -> small capillaries
Innervation

- Peripheral
  - Most sympathetic and vasomotor
  - Sensory
- Hilton's Law
  - Muscle nerve innervates underlying bone
- Accompany vessels
Vessels

- nutrient foramina
- perforating (Volkmann) canals
  - connect to central (haversian) canals
  - canaliculi
Ossification

- bone formation
- initial formation
- growth after birth
- remodeling
- fracture repair
- template out of mesenchyme cells
- ossification starts by 6th week
- two different patterns
  - Intramembranous
  - Endochondral
Growth in Thickness and Length

- perichondrium -> osteoblasts -> osteocytes
- lamellae, new osteons formed at surface
- medullary cavity enlargement slower than growth

- Epiphyseal plate
  - thickness stays constant
  - chondrocytes divide
  - on diaphyseal sides, replaced by bone
  - replaced by epiphyseal line
Bone Remodeling

- Bone Resorption (osteoclasts) & Deposition (osteoblasts)
- different rates
- removes injuries
- influenced by exercise, diet change, hormones
1. phagocytes (osteoclasts) remove dead tissue
2. chondroblasts form fibrocartilage
3. osteoblast convert fibrocartilage into spongy bone
4. spongy bone converted into compact bone
Healing

• takes months
  • bone cells slowly divide
  • blood supply disrupted
  • gradual Ca & P deposits
Summary

• Vessels and nerves come from the periosteum through canals

• Epiphyseal plate is in charge of growth in length

• Periosteum differentiation is in charge of growth in width

• Healing involves cartilage formation and its ossification.


