Fractures Healing
2 Types of Bone Formation

- ENDOCHONDRAL
  - Bone formation replaces a cartilage model.
  - Bone (osteoprogenitor) cells arrive via Vascular buds.
  - Examples: Long Bone (physeal) growth & Fracture repair

- INTRAMEMBRANOUS
  - Bone formation without a cartilage model ("flat bones")
  - Bone cells differentiate directly into Osteoblasts.
  - Examples: clavicle, pelvis, skull
Ways of fracture healing

{Depends on amount of movement occurring between fragments}
Primary Bone healing

- Internal fixation
- Fracture compression
- Absolute Rigidity
Stages of fracture healing

(secondary Healing)
Healthy bone
Stage 1

1. TISSUE DESTRUCTION AND HAEMATOMA FORMATION

- Periosteum
- Bone Cortex
- Medullary canal
- Bone Cortex
- Periosteum
Stage 3

3. SOFT CALLUS (WEEKS 2–3)
Stage 4

4. HARD CALLUS & CONSOLIDATION (WEEKS 4–12)
Stage 5
<table>
<thead>
<tr>
<th>Primary (Intramembranous)</th>
<th>Secondary (Endochondral)</th>
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<tbody>
<tr>
<td>Bone heals by haversian remodeling (simultaneous remodeling and direct formation of new bone)</td>
<td>Involves the formation of cartilaginous and fibrous tissue intermediates that are later replaced by bone</td>
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<td>Little to no callus formation</td>
<td>Callus formation (irritation callus)</td>
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<td>Requires good bone opposition and no motion at the fracture or osteotomy site</td>
<td>Occurs when there is motion at the fracture or osteotomy site</td>
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<td>Preferred method of bone healing</td>
<td>Less desirable method of bone healing</td>
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Factors affecting fracture healing

- Poor blood supply
- Poor general health
- Infections
- Age
- Type of break

Things that impair the healing process

Eat nutrient-rich foods
Thank You

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