Bone Repair & Calcification

> WHAT BIOMEDICAL ENGINEERS NEED TO KNOW <
Phases of Fracture Healing

- Hematoma
- Internal callus
- Spongy bone trabecula
- New blood vessels
- External callus
- Bony callus of spongy bone
- Healed fracture
Healing Times & Calcification

![Radiographs showing healing times and calcification progression from postop 1 to 8 weeks.](image-url)
Bone Fracture Types
Transverse Fracture

A fracture straight across the bone, usually the result of sharp, direct blows or stress fractures caused by prolonged running.

The break occurs at a right angle to the bone’s long axis.
A bone fracture caused by a twisting force.
Also called torsion fracture.
Impacted Bone
Compound/Open Fracture
Comminuted Fracture
Joint Fractures
Treatment Options

Fracture treatment depends on:

- Location, fracture type and its characteristics
- The person’s age
- The person’s activity level
- Bone quality
Nonsurgical Treatment Options
Surgical Treatment: External Fixation
Internal vs. External Fixation
Location of Fracture

- Which bones are more likely to break?
  Ribs, wrists, fingers, toes, collarbones
- Why are certain bones more likely to fracture?
  The body is designed to withstand forces.
  Legs receive impact while walking and jumping.
  Thus, leg bones require a significant amount of force to break.
How Does Treatment Depend on Location?

- Certain treatments cannot be used on some fractures due to the location.

  For example:
  - Casts cannot be used on all parts of the body, such as moving joints.
  - Finger or toes are often treated by using a nearby finger or toe as splint.

- The forces the body withstands at certain locations allows some treatments.