

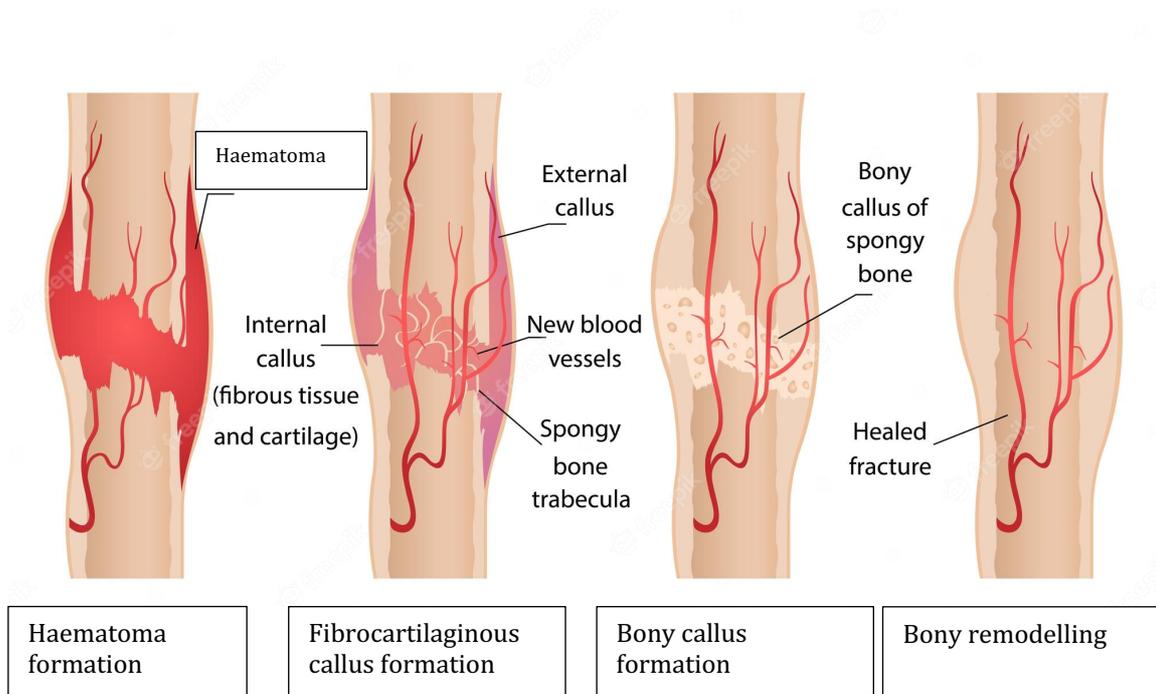
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Orthopaedic Surgeon

## FRACTURE HEALING



A fracture is a breach in the structural continuity of the bone cortex, with a degree of injury to the surrounding soft tissues. This is the same thing as a 'broken' bone. Following the fracture, secondary healing begins, which consists of four steps:

1. Haematoma formation (Days 1 to 5)
2. Fibrocartilaginous callus formation (Days 5 to 11)
3. Bony callus formation (Days 11 to 28)
4. Bone remodelling (Day 18 onwards, lasting months to years)

Most fractures heal in 6-8 weeks, but this varies tremendously from bone to bone and in each person based on many of the factors including age, frailty, smoking, diabetes, and activity levels. Hand and wrist fractures often heal in 4-6 weeks whereas a tibia fracture may take 20 weeks or more.

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## Healing time for fractures are divided into four phases:

1. **Inflammatory Phase:** starts at the time of injury and lasts 1-2 weeks. Bleeding around the fracture organizes into a fracture haematoma or clot on the bone ends. Damage to the tissues results in cell death which is cleaned up by an inflammatory response. The blood clot organizes into a protein mesh where the bone begins to “knit”.

2. **Repair Phase** (fibrocartilaginous callus and bony callus formation): lasting the next 2-3 weeks where actual tissue repair occurs and new living cells of bone, cartilage and fibrous tissue occur at the fracture site. This leads to the formation of a rubbery tissue called “fracture callus”. Calcium is deposited into the callus and can be seen on x-ray at 2-3 weeks after injury.

3. **Remodelling:** occurs as the fracture callus is replaced with strong organized bone. Remodelling goes on for months after the fracture is no longer painful and appears to be healed on x-rays.



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