

Fracture Healing

Life in Orthopaedics Resource Hub

What is Fracture Healing?

Fracture healing is the biological process through which bone restores continuity and strength after injury.

Primary (Direct) Bone Healing

Occurs with anatomical reduction and absolute stability. Minimal callus forms and healing occurs through direct remodeling.

Secondary (Indirect) Bone Healing

The most common mechanism of healing and occurs through callus formation.

Stages of Fracture Healing

1. Hematoma Formation (0–7 days)
2. Soft Callus Formation (1–3 weeks)
3. Hard Callus Formation (3–8 weeks)
4. Remodeling Phase (months to years)

Factors Promoting Healing

- Good blood supply
- Adequate stability
- Proper reduction
- Good nutrition
- Controlled rehabilitation

Factors Delaying Healing

- Smoking
- Infection
- Diabetes
- Poor fixation
- Severe soft-tissue injury

Definitions

Delayed Union: Slower-than-expected healing.

Non-Union: Failure of progression toward union.

Malunion: Healing in an unacceptable position.

High-Yield Viva Questions

1. Stages of fracture healing?

2. Primary vs secondary healing?
3. Define non-union.
4. Factors affecting fracture healing?
5. What is Wolff's Law?

Life in Orthopaedics Take Home Message

Successful fracture healing requires both biology and biomechanics. Blood supply and stability must coexist for predictable union.

Dr Arnav Kadian | Life in Orthopaedics | Where Healing Meets Movement