

Definition

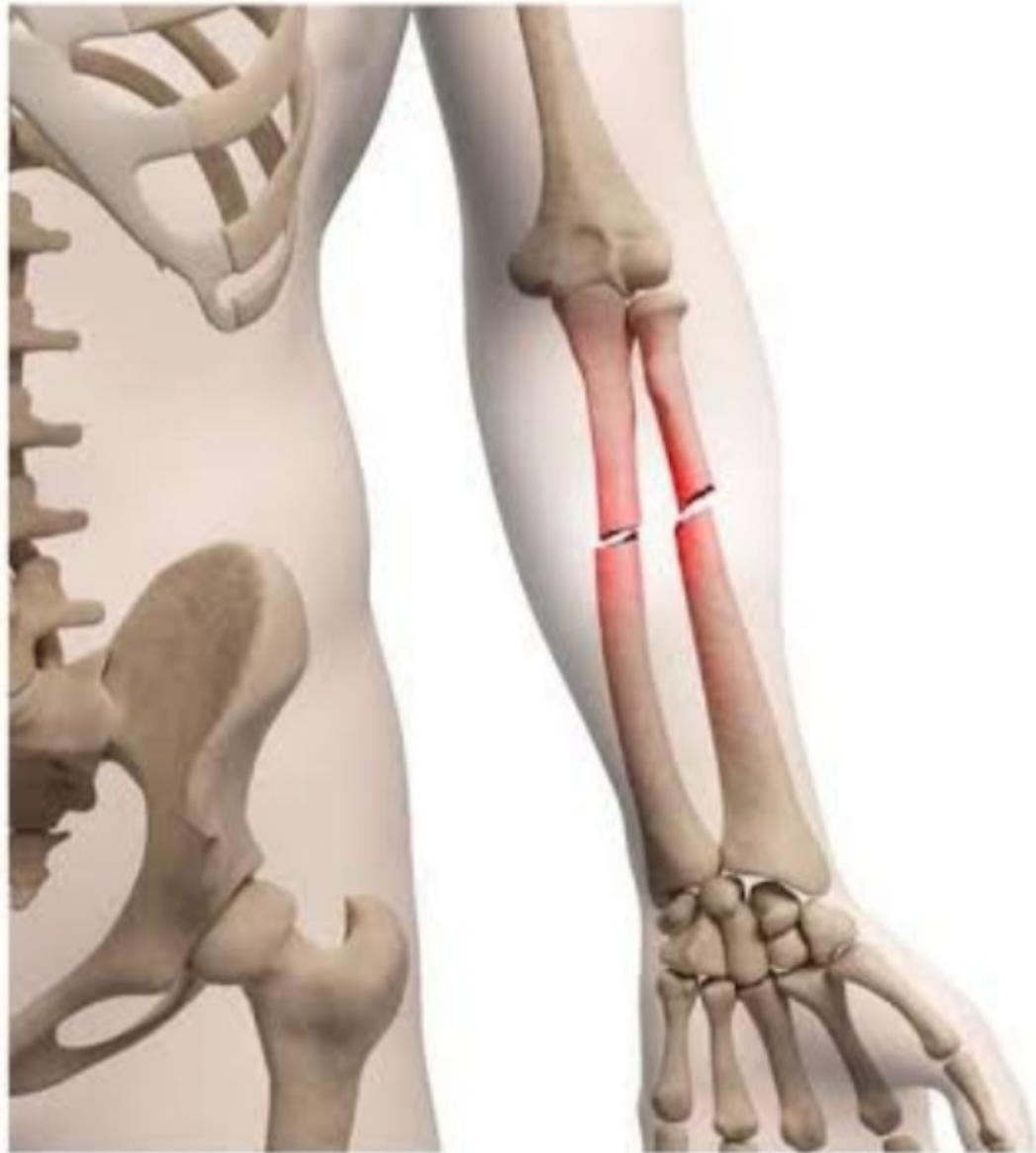
A complete or partial break in a bone.

Causes of bone fractures include trauma, overuse and diseases that weaken bones.





A **fracture** -
is a partial or
complete
break in the
bone.



Types

Avulsion fracture – a muscle or ligament pulls on the bone, fracturing it.

Comminuted fracture – the bone is shattered into many pieces.

Compression (crush) fracture – generally occurs in the spongy bone in the spine. For example, the front portion of a vertebra in the spine may collapse due to osteoporosis.

Fracture dislocation – a joint becomes dislocated, and one of the bones of the joint has a fracture.

Greenstick fracture – the bone partly fractures on one side, but does not break completely because the rest of the bone can bend. This is more common among children, whose bones are softer and more elastic.



Hairline fracture – a partial fracture of the bone. Sometimes this type of fracture is harder to detect with routine xrays.

Impacted fracture – when the bone is fractured, one fragment of bone goes into another.

Intraarticular fracture – where the break extends into the surface of a joint

Longitudinal fracture – the break is along the length of the bone.



Oblique fracture – a fracture that is diagonal to a bone's long axis.

Pathological fracture – when an underlying disease or condition has already weakened the bone, resulting in a fracture (bone fracture caused by an underlying disease/condition that weakened the bone).

Spiral fracture – a fracture where at least one part of the bone has been twisted.

Stress fracture – more common among athletes. A bone breaks because of repeated stresses and strains.

Torus (buckle) fracture – bone deforms but does not crack. More common in children. It is painful but stable.

Transverse fracture – a straight break right across a bone.

Symptom

- pain
- swelling
- bruising
- discolored skin around the affected area
- angulation – the affected area may be bent at an unusual angle
- the patient is unable to put weight on the injured area
- the patient cannot move the affected area
- the affected bone or joint may have a grating sensation
- if it is an open fracture, there may be bleeding

- pain
- loss of function
- deformity
- shortening
- crepitus
- swelling and discoloration



When a large bone is affected, such as the pelvis or femur:
the sufferer may look pale and clammy
there may be dizziness (feeling faint)
feelings of sickness and nausea.



Treatment

Immobilization – as soon as the bones are aligned they must stay aligned while they heal. This may include:

Plaster casts or plastic functional braces – these hold the bone in position until it has healed.

Metal plates and screws – current procedures may use minimally invasive techniques.

Intra-medullary nails – internal metal rods are placed down the center of long bones. Flexible wires may be used in children.

External fixators – these may be made of metal or carbon fiber; they have steel pins that go into the bone directly through the skin. They are a type of scaffolding outside the body.



Healing – if a broken bone has been aligned properly and kept immobile, the healing process is usually straightforward.

Osteoclasts (bone cells) absorb old and damaged bone while osteoblasts (other bone cells) are used to create new bone.



Physical therapy – after the bone has healed, it may be necessary to restore muscle strength as well as mobility to the affected area. If the fracture occurred near or through a joint, there is a risk of permanent stiffness or arthritis – the individual may not be able to bend that joint as well as before.

Surgery – if there was damage to the skin and soft tissue around the affected bone or joint, plastic surgery may be required.

Ultrasound therapy – low-intensity ultrasound is applied to the affected area daily. This has been found to help the fracture heal. Studies in this area are still ongoing.

Bone graft – if the fracture does not heal, a natural or synthetic bone is transplanted to stimulate the broken bone.

Stem cell therapy – studies are currently underway to see whether stem cells can be used to treat fractures that do not heal.



✕ Fracture Prevention

•Diet

- 5 a day fruit and veg
- 1200 mg calcium
- 800iu Vitamin D
- Avoid fizzy drinks, caffeine and excess alcohol

•Exercise

- Bone loading
- Strength training
- Site specific (hip/wrist/spine)

•Avoid smoking

•Plus falls prevention strategies



Nutrition and sunlight – the human body needs adequate supplies of calcium for healthy bones. Milk, cheese, yoghurt, and dark green leafy vegetables are good sources of calcium.

Our body needs vitamin D to absorb calcium – exposure to sunlight, as well as eating eggs and oily fish are good ways of getting vitamin D.

Vitamin D plays a role in maintaining healthy bones.

Physical activity – the more weight-bearing exercises you do, the stronger and denser your bones will be.

Examples include skipping, walking, running, and dancing – any exercise where the body pulls on the skeleton.



Menopause – estrogen, which regulates a woman's calcium, drops during menopause, making calcium regulation much more difficult. Consequently, women need to be especially careful about the density and strength of their bones during and after the menopause.

The following steps may help reduce post-menopausal osteoporosis risk:

Do several short weight-bearing exercise sessions each week.

Do not smoke.

Consume only moderate quantities of alcohol, or don't drink it.

Get adequate exposure to daylight.

Make sure your diet has plenty of calcium-rich foods. For those who find this difficult, a doctor may recommend calcium supplements.



Management of Fracture

- The goal of fracture management is to restore the anatomy back to its normal or near to normal as possible.
- The responsibility of the doctor is to ensure that there is no functional disability to the patient following the treatment of fracture.



MEDICAL /SURGICAL MANAGEMENT OF FRACTURES:

1. Reduction

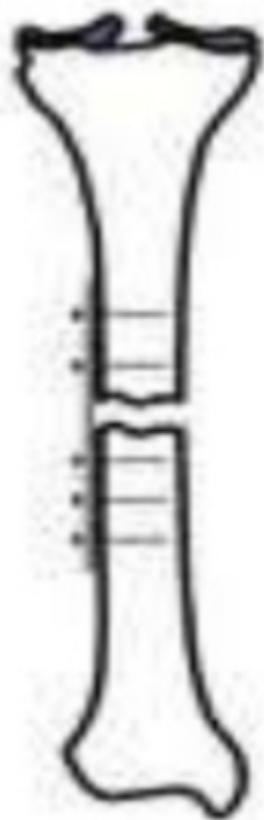
Reduction of a fracture ("setting" the bone) refers to restoration of the fracture fragments to anatomic alignment and rotation.

Open reduction

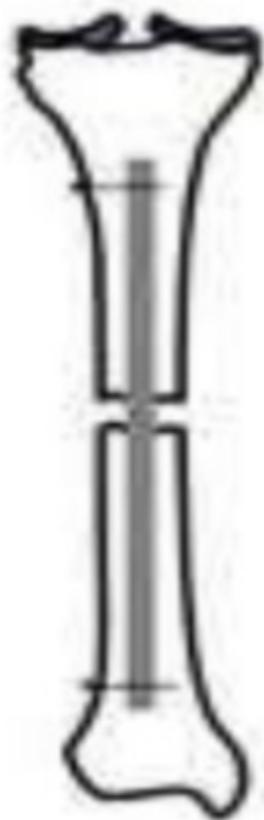
It's a surgical approach, the fracture fragments are reduced.

External/Internal fixation devices (metallic pins, wires, screws, plates, nails, or rods) may be used to hold the bone fragments in position until solid bone healing occurs.

Internal Fixation



(a)



(b)

External Fixation



(c)



(d)



Internal fracture(fixation)



The advent of sterile surgical procedures reduced the risk of infection, allowing doctors to **internally** set and stabilize **fractured** bones. During a surgical procedure to set a **fracture**, the bone fragments are first repositioned (reduced) into their normal alignment.



External fracture(fixation)

External Fixation to Repair Broken Bone

External fixation is accomplished by placing pins or screws into the bone on both sides of the **fracture**. The pins are secured together outside of the skin using a series of clamps and rods known as the **external** frame.



Closed reduction

- closed reduction is accomplished by bringing the bone fragments into apposition (ie, placing the ends in contact) through manipulation and manual traction.
- Extremity is held in the desired position while the physician applies a cast, splint, or other device.
- X - rays are obtained to verify that the bone fragments are correctly aligned.
- Traction (skin or skeletal) may be used to effect fracture reduction and immobilization.



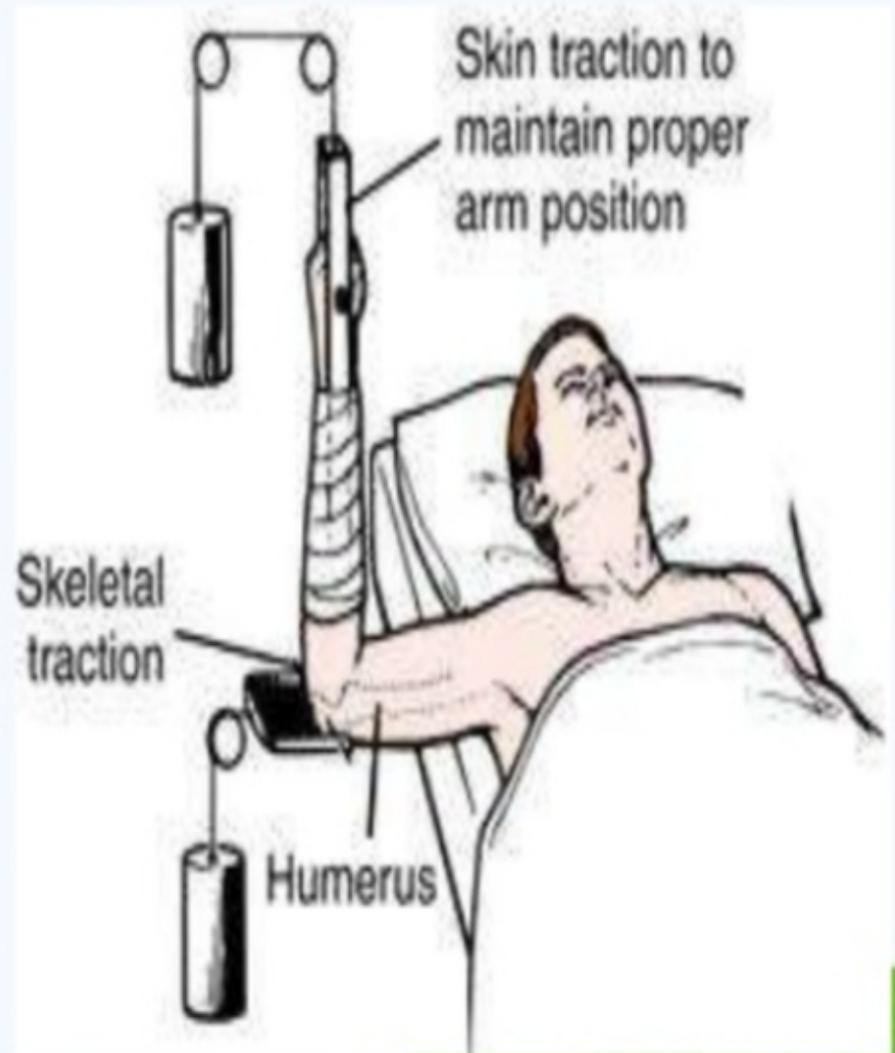
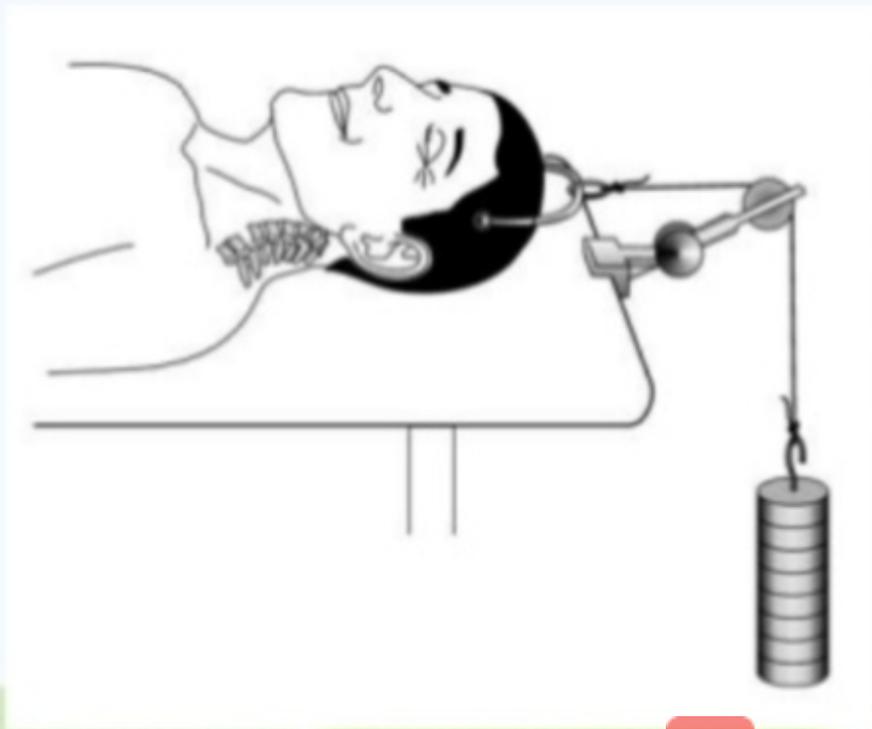
2. Immobilization

- Immobilization may be accomplished by external or internal fixation.
- Methods of external fixation include bandages, casts, splints, continuous traction, and external fixators.
- Metal implants used for internal fixation serve as internal splints to immobilize the fracture.



Traction

Traction is the use of weights, ropes and pulleys to apply force to tissues surrounding a broken bone.



Traction

1. Skin traction-

- Bucks traction used for knee, hip bone fracture
- Weight usually 5-7 pounds attach to skin

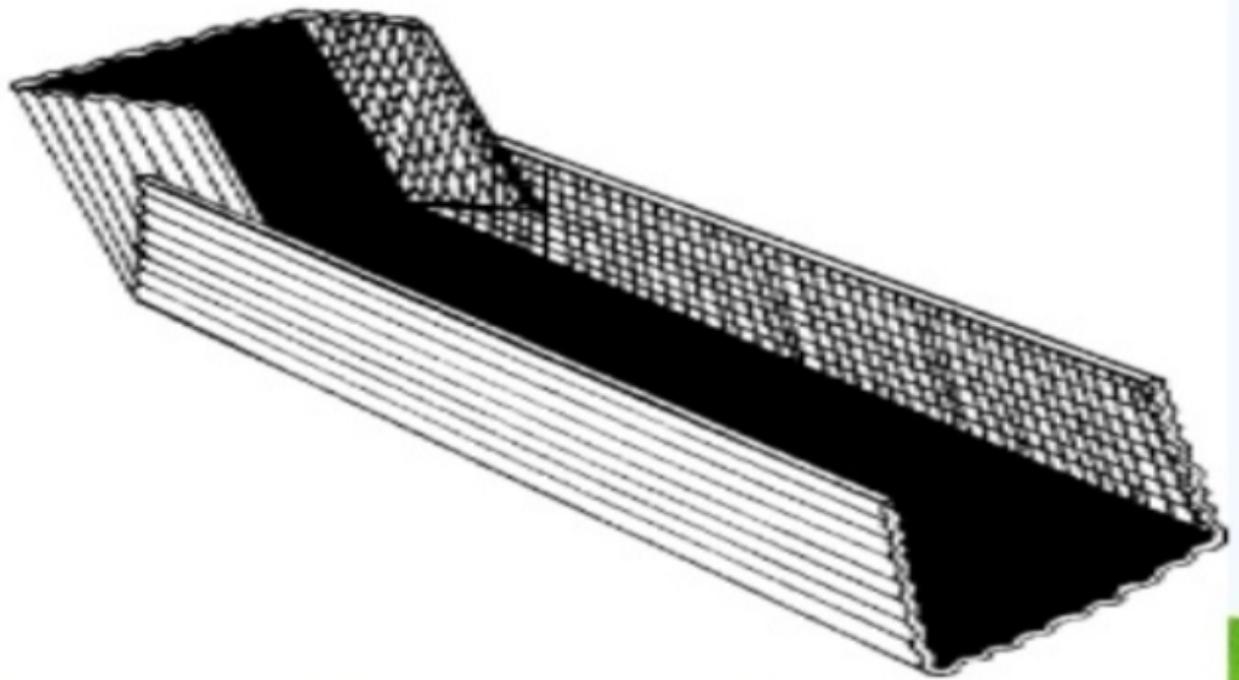
2. Skeletal traction -

- Needs invasive procedure
- Weight is upto 10 kg attached to bone



Splinting

- Splinting is the most common procedure for immobilizing an injury.



Possible items for Splinting

- Soft materials. Towels, blankets, or pillows, tied with bandaging materials or soft cloths.
- Rigid materials. A board, metal strip, folded magazine or newspaper, or other rigid item.



Guidelines for Splinting

1. Support the injured area.
2. Splint injury in the position that you find it.
3. Don't try to realign bones.
4. Check for color, warmth, and sensation.
5. Immobilize above and below the injury.



The splint should go beyond the joints above and below the fractured or dislocated bone to prevent these from moving



3. Maintaining and restoring function

- Restlessness, anxiety, and discomfort are controlled with a variety of approaches, such as reassurance, position changes, and pain relief strategies, including use of analgesics.
- exercises are encouraged to minimize disuse atrophy and to promote circulation.
- Participation in activities of daily living (ADLs) is encouraged to promote independent functioning and self-esteem.



Nursing Management

Nursing management for close and open fractures should be differentiated.

Nursing Assessment: Assessment of the fractured area includes the following:

- **Close fracture.** The patient with close fracture is assessed for absence of opening in the skin at the fracture site.
- **Open fracture.** The patient with open fracture is assessed for risk for osteomyelitis, tetanus, and gas gangrene.

The fractured site is assessed for signs and symptoms of infection.

✘ Patients with open fractures:

- administers tetanus prophylaxis if indicated.
- wound irrigation and debridement in the operating room are necessary.
- Intravenous antibiotics are prescribed to prevent or treat infection.
- wound is cultured.



- fracture is carefully reduced and stabilized by external fixation or intramedullary nails.
- Any damage to blood vessels, soft tissue, muscles, nerves, and tendons is treated.
- Heavily contaminated wounds are left unsutured and dressed with sterile gauze to permit swelling and wound drainage.



Patients with closed fractures:

- Encourage patient not to mobilize fracture site.
- exercises to maintain the health of unaffected muscles for using assistive devices (eg, crutches, walker).



- *teach patients how to use assistive devices safely.*
- *Patient teaching includes self-care, medication information, monitoring for potential complications, and the need for continuing health care supervision.*

