

# Methods of managing trauma

# Managing trauma divided into:

1- Fracture.

2- Soft tissue injury.

# Fractures

## Fractures principle of management:

- 1- Reduction.
- 2- Holding the reduction.
- 3- Maintaining fixation.
- 4- Rehabilitation.

# Reduction

That's achieving by:

- 1- Manipulation, usually with anaesthesia.
- 2- Traction.
- 3- Open reduction.

# Holding the reduction

By:

- 1- Intrinsic stability.
- 2- External fixation:
  - (a) Splintage.
  - (b) Traction.
- 3- Internal fixation.

# Traction

Pulling on a broken limb draws the bones into line just as a string of beads straightens when it is pulled at each end .

Traction can be applied to the limb in a variety of ways:

- 1- Skeletal traction.
- 2- Skin traction.

# Skeletal traction

**Traction** is applied to pins passed through the bone.

Two types of pin are in common use :

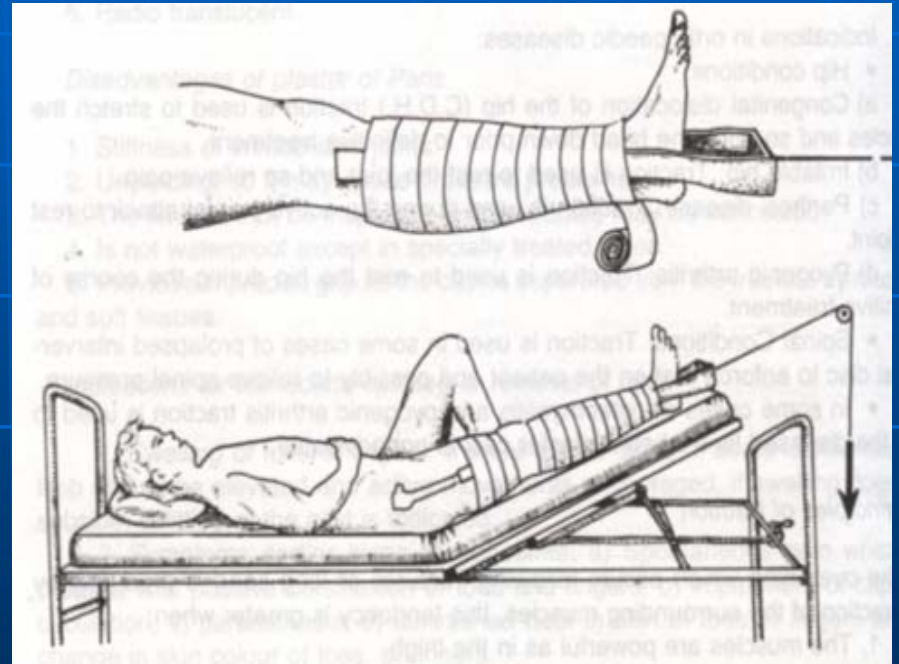
a- Steinmann pin

b- Threaded



# Skin traction

**Skin traction** is applied by means of adhesive strapping stuck directly onto the skin and has many practical problems.





# Mechanics of traction

The mechanics of traction are straightforward.

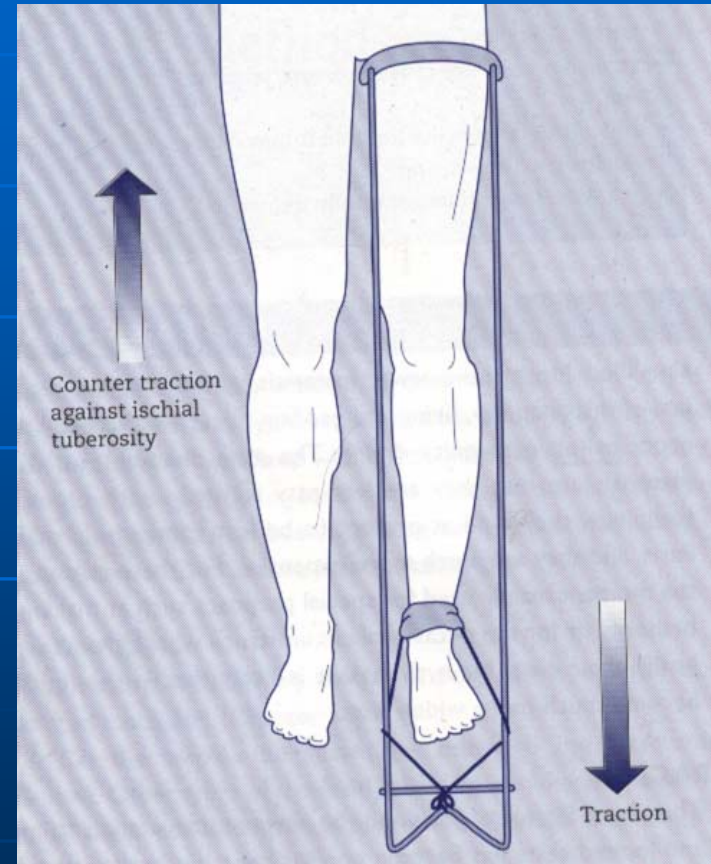
Every force has an equal and opposite force, traction is no exception.

The opposite force to traction can be applied in four ways:

- 1- Fixed traction with a splint.
- 2- Fixed traction using gravity.
- 3- Sliding traction.
- 4- Balanced traction.

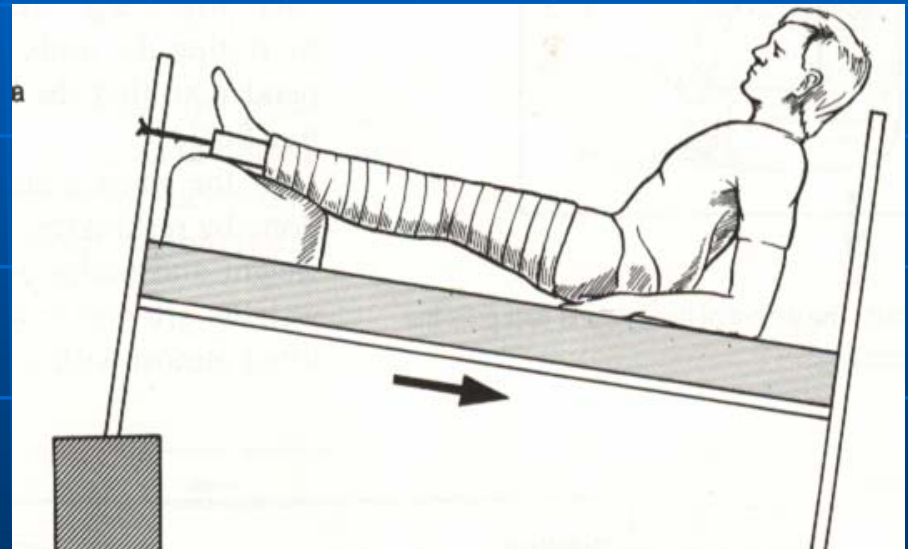
# Fixed traction with a splint

In the simplest form of fixed traction the limb is rested on a splint such as the Thomas splint.



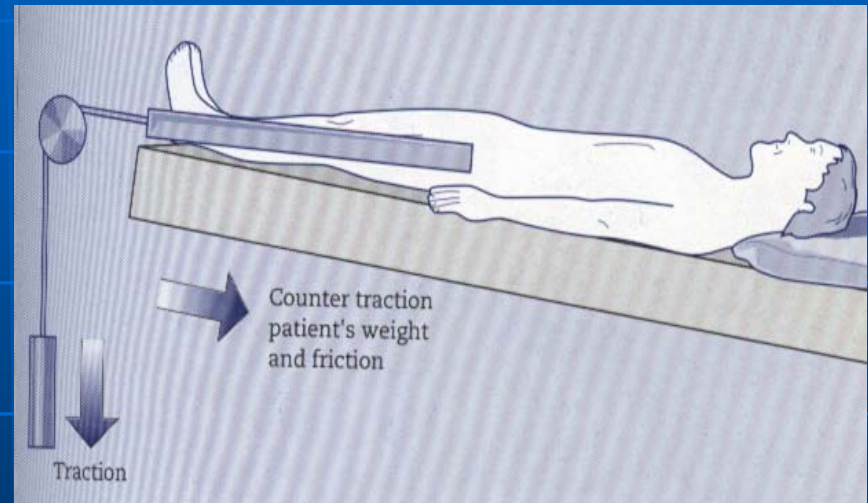
# Fixed traction using gravity

Gravity can also be applied to the limb by fixing the patient's leg to the foot of the bed which is then raised so that the patient slides down towards the pillow.



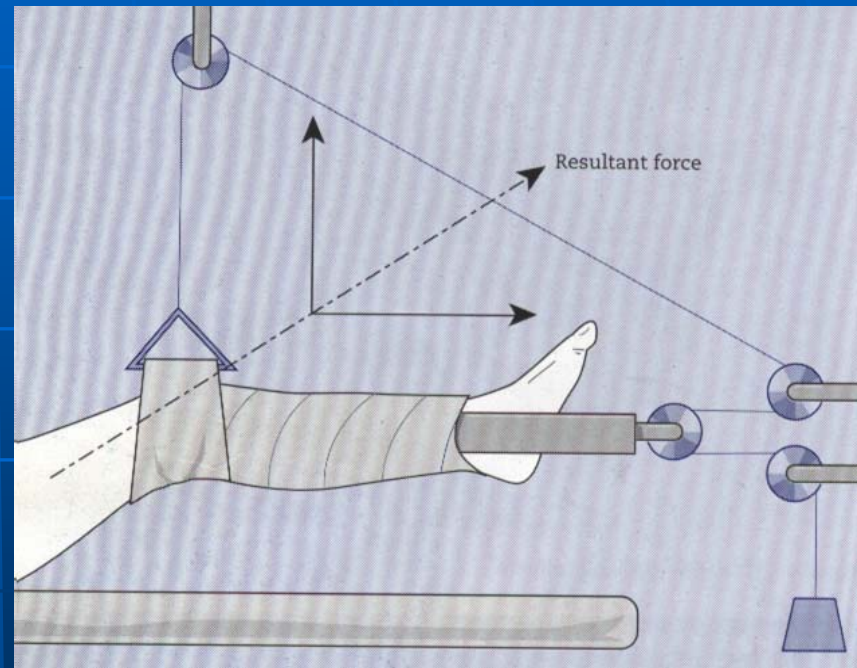
# Sliding traction

Sliding traction is little different from fixed traction except that the patient can move freely in his bed, but more complex arrangements are possible.



# Balanced traction

It is uncomfortable to leave a broken limb lying on a bed so that fragments rub against each other whenever the patient turns over.



# Splints, slings and casts

Any device which hold a fracture steady is a splint and those which set hard around the limb are casts.

# Plaster of Paris

A high quality gypsum which originally came from Montmartre.

## Advantages of Plaster of Paris:

- 1- Cheap and easily available
- 2- Reasonably comfortable
- 3- Absorbs secretion to some extent
- 4- Fairly strong
- 5- Easy to remove

# Disadvantage of Plaster of Paris:

- 1- Rather heavy and warm.
- 2- May cause pressure problems, or uncertain immobilization.
- 3- Not waterproof unless specially treated.



# Applying a plaster of Paris

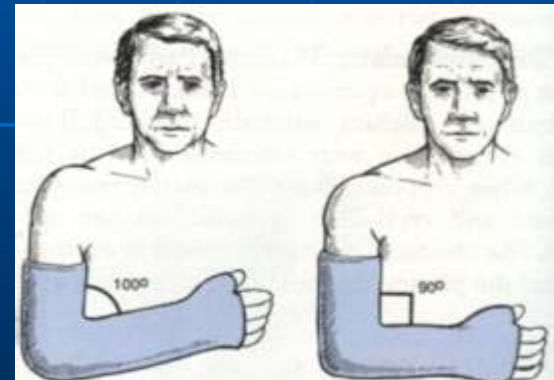
- 1- **Padding:** apply light padding of soft wool or cotton over bony areas to avoid pressure sores.
- 2- **Water temperature:** the hotter water faster the plaster sets cold water gives more time to apply the cast.
- 3- **Dipping:** when dipping a plaster bandage hold it lightly so that water can penetrate to its centre



4- **Application**: lay the bandage carefully over the limb and not pull it tight.



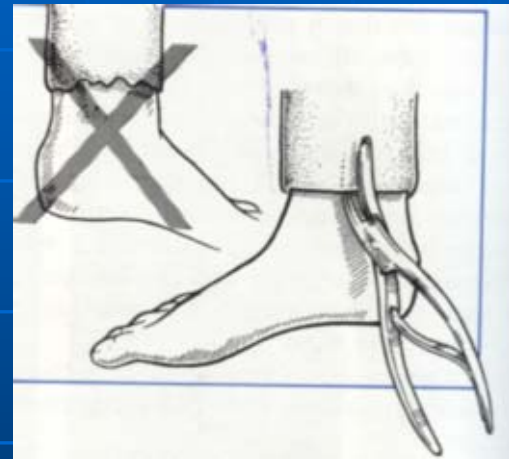
5- **The “100-90 trick”**: if a joint has to be held flexed to 90 degrees flex it 10 degrees more apply the plaster and then put limb in the correct position.



6- **Splitting the cast**: split the cast and padding down to skin so that it can be spread or removed quickly.

# Once the plaster is applied and set

1- **Edges:** check that edges are not too sharp and do not press on the skin.

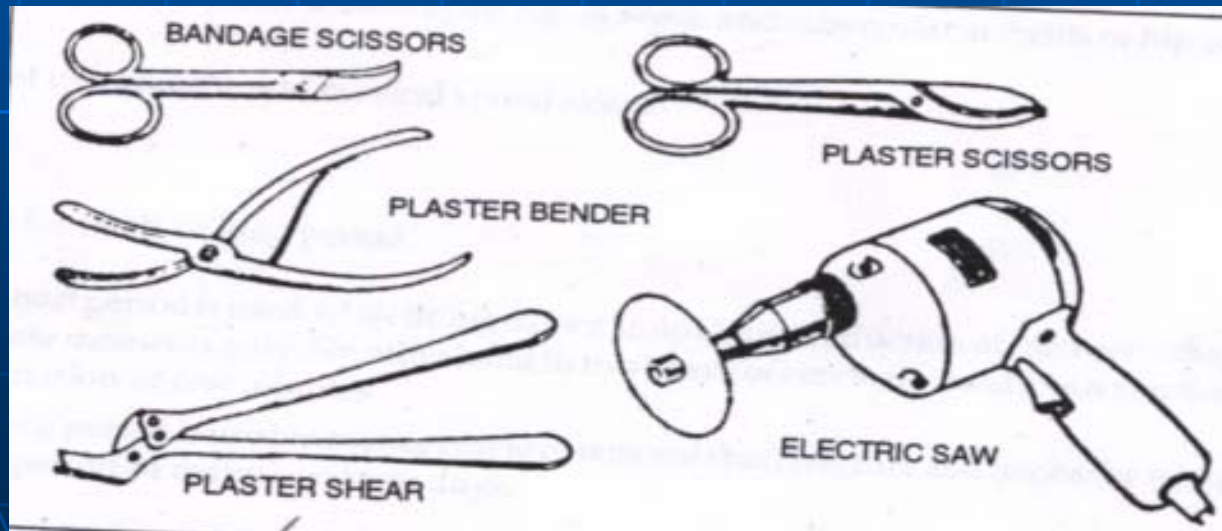


2- **Circulation:** check that peripheral circulation is good.

3- **Advice:** tell the patient that if limb is painful.

# Removing plaster

- 1- **Saws:** used to cut the plaster it must only be pressed “up and down”.
- 2- **Shears:** used to cut plaster only and do not bruise skin.
- 3- **Advice:** will needed to restore normal function .



# Instruction for patients in plaster of Paris:

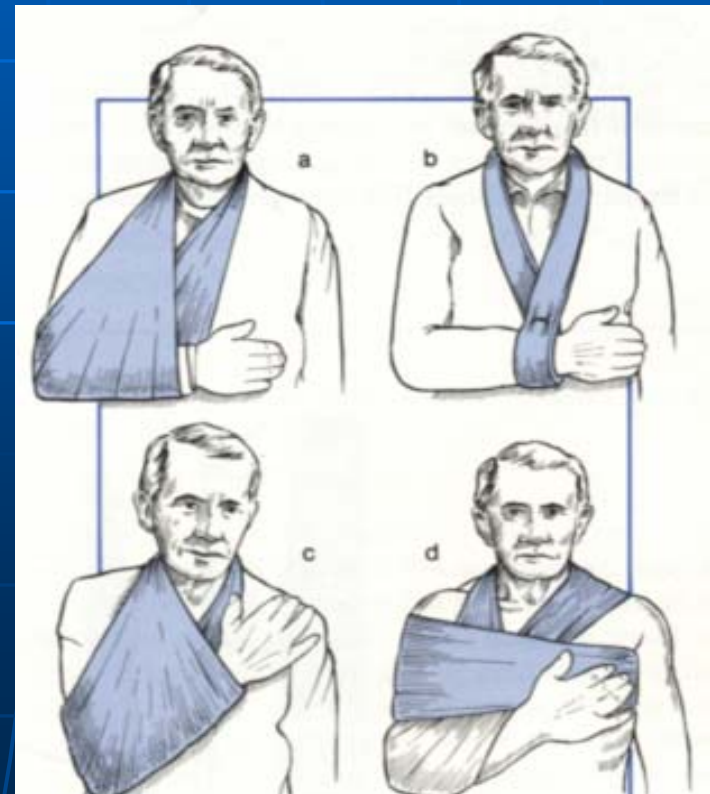
- 1- If fingers or toes become swollen, blue, painful or stiff, raise limb. If not improvement called in doctor.
- 2- Exercise all joint not included in Plaster.
- 3- If Plaster become loose or cracked report to hospital as soon as possible.

# Slings

Slings are used to support an injured arm or shoulder.

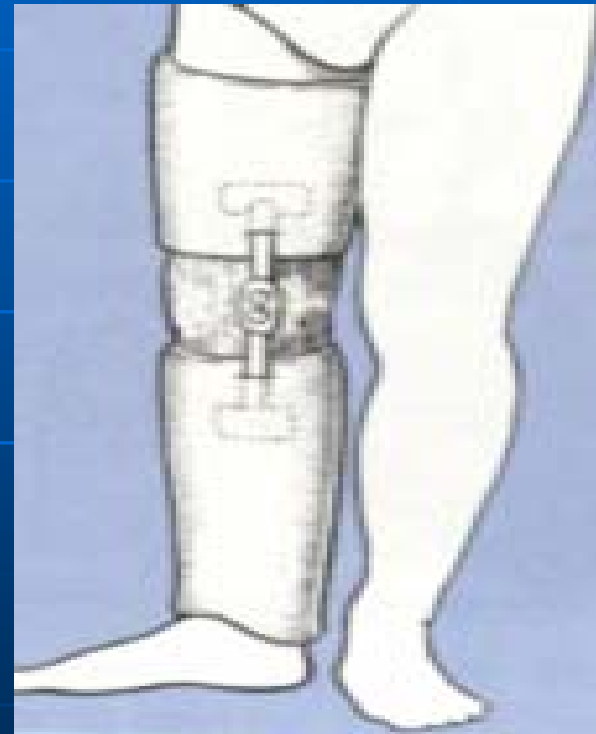
There are four main types

- a- Broad arm sling
- b- Collar and cuff
- c- High sling
- d- Sling and swathe  
(body bandage)



# Cast braces

**Cast braces** are applied very closely to the limb and fitted with hinges to allow joint movement, which is important for articular cartilage nutrition.



# External fixation

Fractures which cannot be held reduced on traction or in a cast need to be fixed, either internally or externally.





# Advantages of external fixation

- 1- It can be used in patients with skin loss or infection.
- 2- The position of the fragments can be easily adjusted.

# Internal fixation

Bone fragments can be reassembled and held in perfect position with screws, plates, wires and nails.



# Advantage of internal fixation:

- 1- It allow accurate reduction and maintenance of position.
- 2- It allow the patient and his joints more mobility.
- 3- It may encourage union, but only if sufficiently strong.

# Disadvantages of internal fixation

- 1- The risk of infection at the time of operation.
- 2- The additional of operation.
- 3- Excessively rigid fixation may delay union.

# Indication for internal fixation

- 1- Fractures that cannot be controlled in any other way.
- 2- Patients with fractures of more than one bone.
- 3- Fractures in which the blood supply to the limb is jeopardized and the vessels must be protected.

# Internal fixation devices are in common use

## 1- Screws:

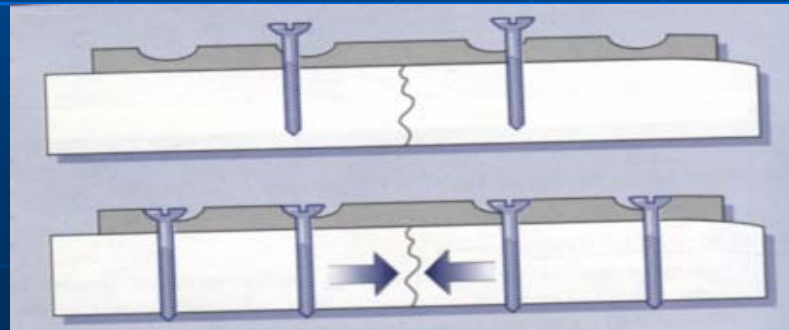
Two types of bone screws commonly used:

- a- Cortical screws.
- b- Cancellous screws.



# Plates

Plates are used not only to hold bones in the correct position but to compress the two bone ends together. The plates should always be applied on the tension side of the fracture with compression whenever possible.



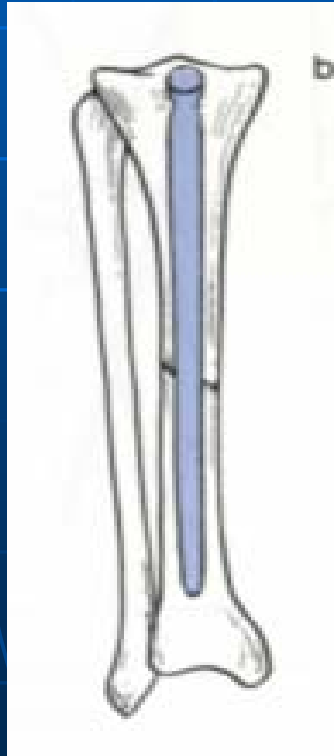
# Disadvantages of plates

- 1- Wide exposure is needed to give access to the fracture.
- 2- The plate may be so large that it is difficult to close the skin over it.
- 3- The plate is so rigid that it causes a stress riser at each end.



# Intramedullary nails

Used for fractures at the middle of long bones and are excellent for maintaining length and alignment.



# Disadvantages of intramedullary nails

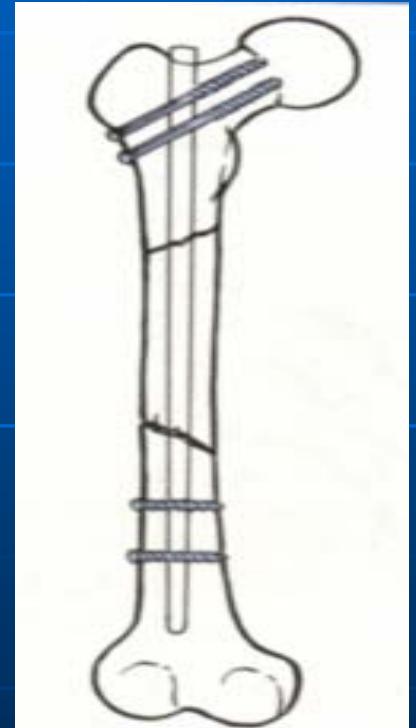
- 1- Although nails hold length and alignment they are less effective for controlling rotation.
- 2- There is a risk of devitalizing the bone by exposing the bone and reaming the medullary cavity of each fragment.

# Locking nails

It is possible to insert an intermedullary nail and fix the fragments of bone to the nail itself.

**Main disadvantage of locking nail:**

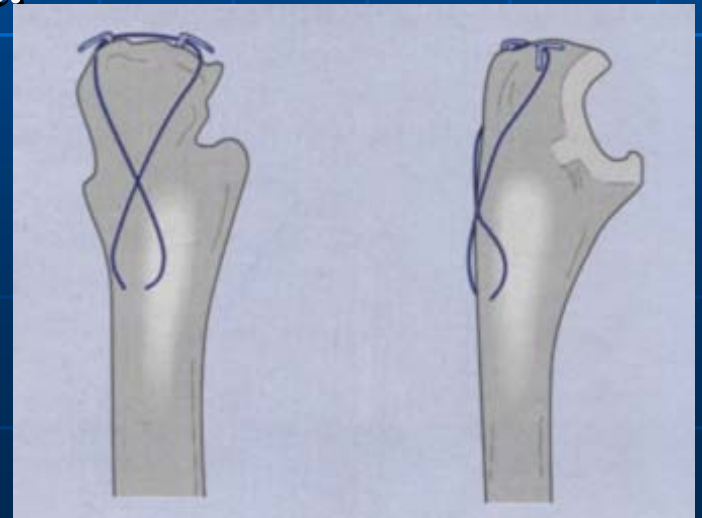
Difficulty in inserting them and the length of the operation required.



# Wires

Wires can be used to fix fractures in two ways:

- 1- **Tension band wiring:** The technique is particularly useful for fractures of the patella and olecranon.
- 2- **Cerclage wiring:** Useful in spiral fractures with minimal displacement.



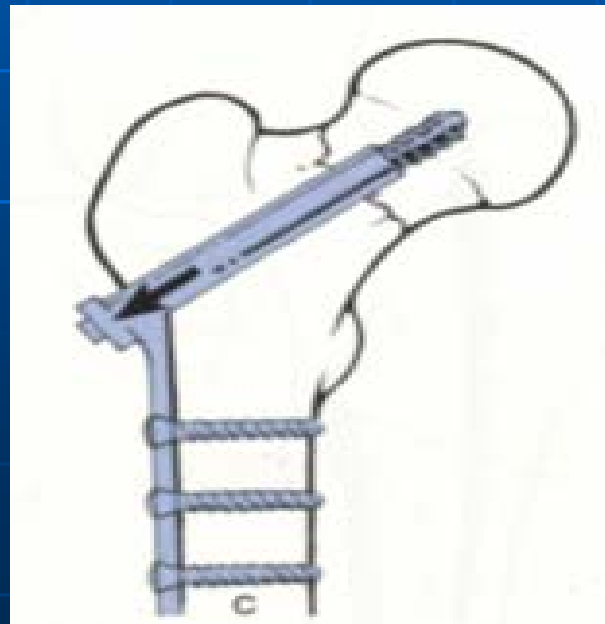
# Disadvantage of wires

1- Tension band wiring can slip the wires may break

2- Cerclage wiring does not provide rigid fixation.

# Nail-plates

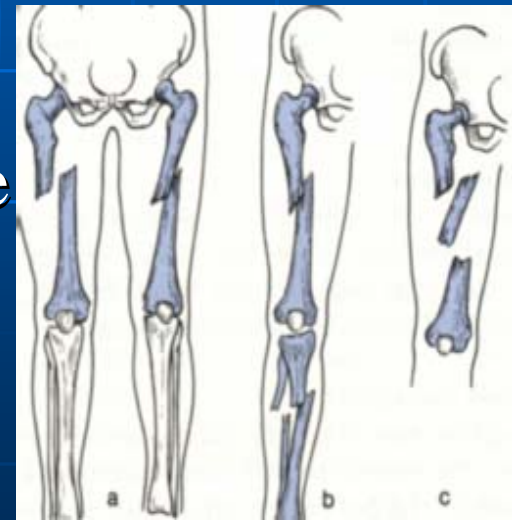
Some fractures particularly the very common trochanteric fracture of the femur can be treated with a nail and plate.



# Selecting treatment

Multiple fractures need special thought:

- 1- Fractures involving both bone of one limb.
- 2- Fractures of the same bone in both limbs.
- 3- Segmental fractures in which one bone is broken in more than one place.



# Complications of treatment

## Complication of traction:

- 1- Overdistraction.
- 2- Loss of position.
- 3- Pressure sores.
- 4- Pin track infection.



# Complication of casts:

- 1- Circulatory embarrassment.
- 2- Pressure sores.
- 3- Undiagnosed wound infection.
- 4- Joint stiffness.

# Complication of internal fixation:

1- Infection.

2- Skin necrosis.

3- Neurovascular damage.

# Soft tissue injuries

1- Nerves injuries.

2- Blood vessels.

# Nerves injuries

Nerve injuries may be treated by one of the following:

- 1- Immediate primary suture.
- 2- Secondary primary suture.
- 3- Cable grafts.

# Blood vessels injuries

Cut arteries can be resutured accurately but those which are torn or crushed can be repaired only by excising the damage segment and eliminating the gape by shortening the limb, re-routing the artery, or inserting a graft.

جميع الحقوق محفوظة

جميع الحقوق محفوظة

جميع الحقوق محفوظة