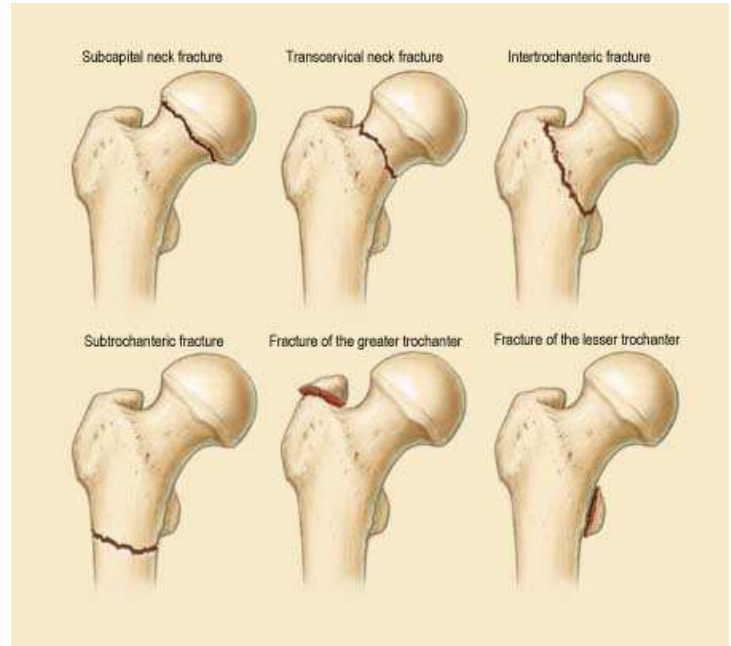


## Features

- Common in elderly: risk from falls, osteoporosis, osteomalacia and Ca.
- F>M if >60y, otherwise M>F
- May follow relatively minor trauma in the elderly. Fractures in younger patients imply a violent, high energy injury. Pathological # may occur on walking.
- Pain usually in hip/groin but may only have referred pain of knee.
- The affected leg may be shortened, adducted and externally rotated if extracapsular #.
- Pain over the hip may be aggravated by rotation of the leg or axial compression.
- Important co-morbidities: UTI, anaemia, cardiac dysrhythmias, anticoagulated, Ca, hypothermia, pressure areas, other injuries (#, SDH)



## X-rays

- Plain AP pelvis and lateral hip x-rays 95% sensitive.
- May show trabeculae or cortical disruption, Shenton's line, neck-shaft angle changed from norm (135°)
- If not visible consider Ddx (# pelvis esp pubic rami, acetabulum; greater trochanter #; femoral shaft #; or invisible undisplaced #NOF), or more inv: MRI>bone scan>CT>USS

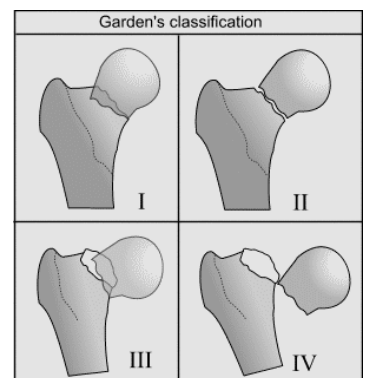
## Classification

*Intracapsular fractures* (subcapital (42%) or transcervical)

Higher risk Cx (poor vascularity, ↓quality bone for ORIF, non-union)

### Garden system:

- *Garden I:* Trabeculae angulated (impacted), partial # as inferior cortex intact. No significant displacement.
- *Garden II:* Trabeculae in line but a complete fracture line is visible. No significant displacement.
- *Garden III:* Complete # line, rotation/abduction of femoral head. Slight displacement
- *Garden IV:* Gross ± complete, displacement of the femoral head.



*Extracapsular fractures* (intertrochanteric (43%) or pertrochanteric - through trochanters)

Less risk AVN, easier to internally fixate

### Intertrochanteric fracture types:

- *Type 1:* Single #. Minimal displacement.
- *Type 2:* Lesser trochanter fractures off separately.
- *Type 3:* Highly comminuted: separate greater trochanter, lesser trochanter & neck #s.
- *Type 4:* Fracture spirals into femoral shaft

## Management

- ABCs, O<sub>2</sub> & IVC
- IV analgesia, consider femoral nerve/iliaca block
- Inv: FBC, UEC, XM, ECG, AP/Lat of hip, CXR, ± CT-brain (if indicated for Cx/inv of fal).
- Seek reason for fall & treat it & any other injuries as necessary
- Seek any malignancy
- Avoid in-dwelling urinary catheter, if possible

## Surgery:

- *Internal fixation (3 screws or dynamic hip screw):* Garden I / II or intertrochanteric #
- *Austin-Moore hemiarthroplasty:* if Garden III or IV (as high risk AVN)
- *Total hip replacement:* Younger pats or active >70y & displaced #. Not trochanteric #
- Early mobilisation post-surgery.

## Complications

- Surgical (15%) - Infection, implant failure, malpositioning.
- Medical (30%) - UTI, pneumonia, CCF, MI, CVA, DVT, PE, pressure sores.
- There is a high risk of AVN (intracapsular), non-union and mal-union.
- Osteoarthritis, dislocation of THR prosthesis.
- Only ~50% return to pre-morbid level of functioning. Mort 20-35% @ 1yr, 50% @ 3yr.
- There is a high risk of post-operative complications in the elderly,

## Isolated trochanteric avulsion fracture

- Direct blow or sudden violent force may avulse the insertion of gluteus medius from the greater trochanter, or iliopsoas from the lesser trochanter.
- Initial management: adequate analgesia.
- If displacement <1cm then gradual mobilisation and symptomatic treatment.
- If displacement >1cm usually need ORIF

# Femoral shaft fractures

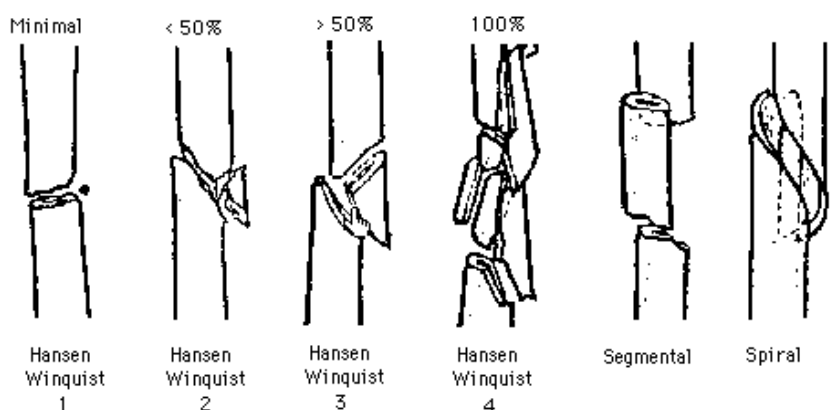
## Shaft of femur fractures

- Caused by a high-energy injury, such as road traffic accidents, or fall from height unless pathological fracture in patient with osteoporosis or metastatic disease. Consider NAI.
- May be open/closed, full variety of fracture types.
- Closely monitor peripheral sensation and pulses.

## Classification

- *Winqist Type I:* No or minimal comminution
- *Winqist Type II:* Comminution. <50% cortical circumferential contact of 2 major # frags lost
- *Winqist Type III:* >50% cortical circumferential contact of 2 major # frags lost
- *Winqist Type IV:* All cortical contact lost as cortex is circumferentially comminuted.

### Femur Diaphyseal Fx



## Management

### Initial management

- ABCs, O<sub>2</sub> & IVC
- Aggressive fluid replacement, XM blood, XR of femur incl hip/knee jts.
- IV analgesia, femoral nerve/iliaca block
- Reduce & immobilise: (Thomas splint+skin traction, Donway splint).
- Gallows traction in infants. Rule out NAI.

### Surgery

- Adults: Usually by intramedullary (IM) nail (I & II). IM nail+screws (III). Difficult (IV)
- Early immobilisation and treatment reduces the risk of complications.

## Complications

- Fractures may be associated with a large haemorrhage (2L).
- Later Cx include fat embolism, DVT, PE, infection, shortening, angulation and non-union.

## Subtrochanteric fractures

- Involve the proximal femoral shaft, at or just distal to the trochanters.
- Usually caused by high-energy multi-trauma in younger patients. May follow relatively minor trauma in patients with osteoporosis or metastatic disease.
- Mx essentially the same as for femoral shaft #; analgesia, splint and orthopaedic r/v.

## Supracondylar fractures

- Fractures of the distal 1/3 of femur usually occur from axial loading to flexed knee.
- Low energy in elderly osteoporotic F or high energy in young M
- Often comminuted and intra-articular with associated damage to the knee joint.
- Distal fragment of the femur tends to pulled backwards endangering popliteal artery.
- Mx: Initially as for femoral shaft # but femoral nerve block not as effective.
- Treatment for undisplaced fractures or if not fit for surgery: often conservative with skeletal traction with the knee in 30 degrees of flexion.
- More often comminuted displaced intra-articular fractures → ORIF.

## Classification

- *Muller A*: extra-articular, transverse
- *Muller B*: unicondylar
- *Muller C*: bicondylar → displacement, post angulation & rotation.