Orthopaedic Treatment of Hip Fractures

What Surgery for Which Fracture?

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Anatomy – osteology and blood supply
Hip Capsule - allows movement and stretch but maintains hip in place
- keeps lubricating fluid in joint
- brings **vulnerable blood supply** to femoral head

**Anterior**

**Posterior**

- Iliofemoral ligament
- Pubofemoral ligament
- Ischiofemoral ligament
Orthopaedic Treatment

Governed by:

- circumstances and independence of patient
- age of patient
- site of fracture
  - subcapital - through the neck of the femur
    - displaced, blood supply damaged
    - undisplaced, blood supply preserved
  - basicervical - intracapsular, blood supply preserved
  - intertrochanteric - stable
    - unstable (number of “parts”, reverse oblique)
  - subtrochanteric
Hip Fractures defined broadly there are three sites of fracture:
- fractures of the neck of the femur
- fractures between the trochanters
- fractures below the lesser trochanter
**Hip Fractures defined** in broad terms there are three sorts:

- fractures of the neck of the femur = neck of femur
- fractures between the trochanters = intertrochanteric
- fractures below the lesser trochanter = subtrochanteric

There are **four surgical options:**

- a plate mostly outside the bone with a screw into the femoral neck
- a rod inside the bone with a screw into the femoral neck
- a replacement of the broken head and neck fragment ie hemiarthroplasty
- a replacement of the broken fragment and the hip socket ie total hip replacement
Orthopaedics management greatly influenced by fracture site:

Consider three regions separately:

1. Neck of Femur ie Subcapital region
2. Intertrochanteric region ie below neck of femur
3. Subtrochanteric region ie upper shaft of femur
Subcapital Fractures - may be unstable and have blood supply damage
- stability and blood supply guide treatment
Compression Hip Screw - CHS

sometimes called

Sliding Hip Screw or Dynamic Hip Screw

Hemiarthroplasty

Hip replacement either part or total
Stable neck fractures - capsule intact, blood supply preserved
- Garden1 and 2 can be fixed in place
Unstable neck fractures

- Garden 3 and 4, blood supply damaged (elderly patient)
- Femoral head replaced ie hemiarthroplasty, occasionally total hip replacement
Compression Hip Screw

Stable Neck of Femur Fractures

Compression Hip Screw with antirotational cannulated screw
Hemiarthroplasty
Unstable Neck of Femur Fractures

Total Hip Replacement
Unstable Neck of Femur Fractures
Intertrochanteric Fractures – Classification – “parts” ie pieces of bone – 1234

Parts Comprise:
1 head of femur
2 shaft of femur
3 greater trochanter
4 lesser trochanter

![Diagram of femur with regions marked]

- Subtrochanteric region
- Greater trochanter
- Intertrochanteric region
- Femoral neck

![X-ray image of hip]


Intertrochanteric Fractures – Classification

Stable

definition
- intact posteromedial cortex

clinical significance
- will resist medial compressive loads once reduced

Unstable

definition
- comminution of the posteromedial cortex

clinical significance
- fracture will collapse into varus and retroversion when loaded
Intertrochanteric Fractures – Classification in practice

**Stable**
intact posteromedial cortex
will resist medial compressive loads once reduced

**Compression/Sliding Hip Screw** (Intramedullary Nail)

**Unstable**
comminution of the posteromedial cortex
fracture will collapse into varus and retroversion when loaded

**Intramedullary Nail** (Compression/Sliding Hip Screw)
Intertrochanteric Fracture Fixation - unstable vs stable
- IM nail vs CHS
Subtrochanteric Fractures Intramedullary Nail

(Fracture specific plate and screws)
Conclusion:

Fracture management based on the patient’s circumstance.

Tend to stabilize fracture if any doubt – pain relief, mobility.

Select technique based on patient age, bone quality and fracture site.

Overall aim is immediate pain free mobilization.
Hip Fractures – conclusion.
ASBMR Task Force Case Definition of Atypical Femur Fractures (AFFs)

Four of five major features should be present to designate a fracture as atypical; minor features may or may not be present in individual cases.

To satisfy the case definition of AFF, the fracture must be located along the femoral diaphysis from just distal to the lesser trochanter to just proximal to the supracondylar flare.

**Major features:**
- The fracture is associated with minimal or no trauma, as in a fall from a standing height or less.
- The fracture line originates at the lateral cortex and is substantially transverse in its orientation, although it may become oblique as it progresses medially across the femur.
- Complete fractures extend through both cortices and may be associated with a medial spike; incomplete fractures involve only the lateral cortex.
- The fracture is noncomminuted or minimally comminuted.
- Localized periosteal or endosteal thickening of the lateral cortex is present at the fracture site (‘beaking’ or ‘flaring’).

**Minor features:**
- Generalized increase in cortical thickness of the femoral diaphyses.
- Unilateral or bilateral prodromal symptoms such as dull or aching pain in the groin or thigh.
- Bilateral incomplete or complete femoral diaphysis fractures.
- Delayed fracture healing.
Hip Fractures defined:
- patients > 50 years of age
- low velocity fall/injury
- from head of femur to 5cm below the lesser trochanter