

Fracture of The Femoral Head, Neck & Shaft



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FRACTURE OF THE FEMORAL HEAD

- The fracture usually results from a fall directly onto the greater trochanter.
- In younger individuals, the usual cause is a fall from a height or a blow sustained in a road accident; these patients often have multiple injuries and in 20% there is an associated fracture of the femoral shaft.
- However, this injury is most commonly seen in elderly osteoporotic people; here less force is required.



FRACTURE OF THE FEMORAL HEAD

- In Garden's classification, **Stage I** is an incomplete impacted fracture, **Stage II** is a complete but undisplaced fracture, **Stage III** is a complete fracture with moderate displacement and **Stage IV** is a severely displaced fracture. Left untreated, a comparatively benign-looking Stage I fracture may rapidly disintegrate to Stage IV.
- With displaced fractures there is an increased risk of damage to the femoral head blood supply and thus a significant incidence of avascular necrosis.

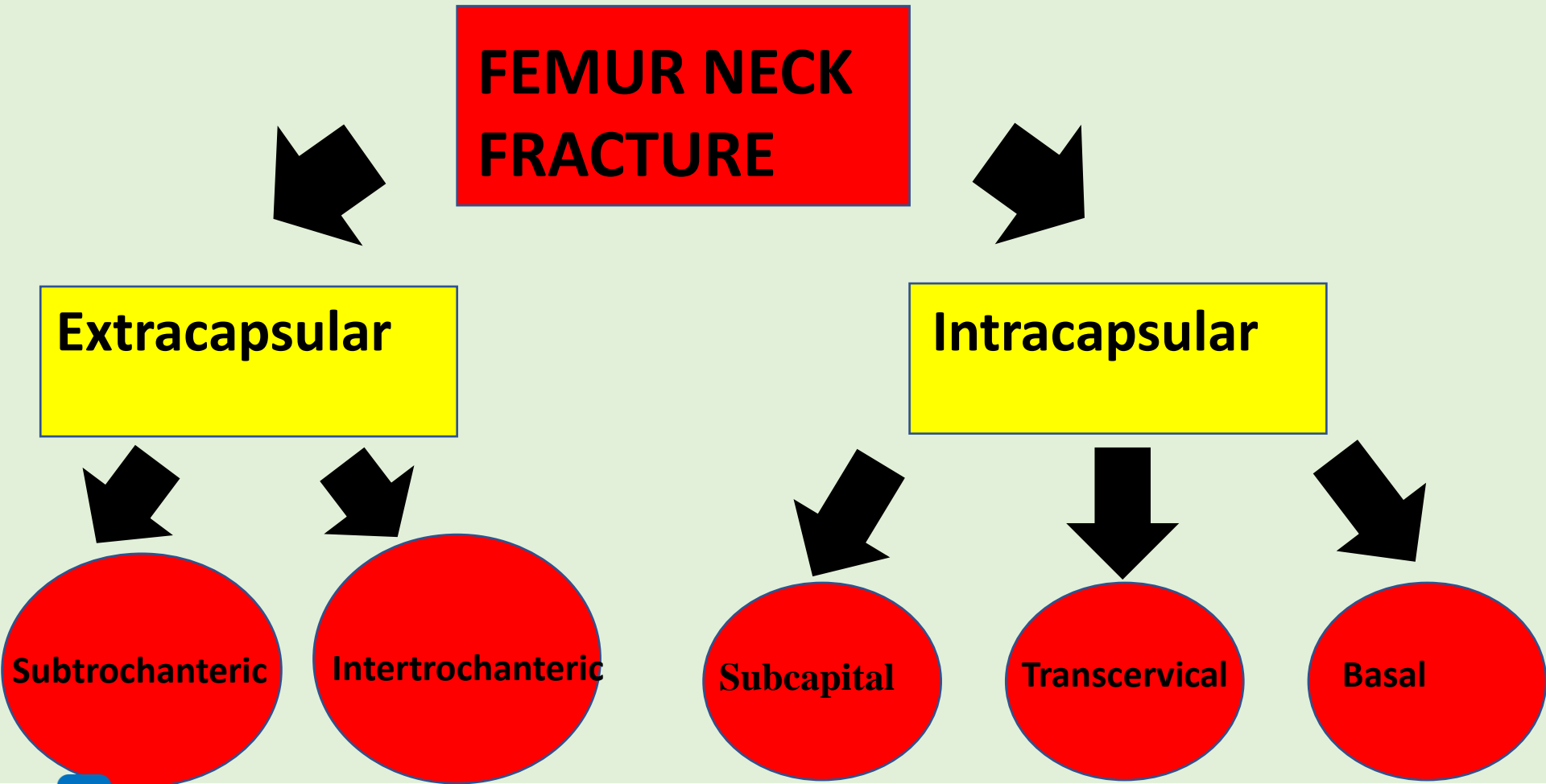


SPECIAL FEATURES

- There is usually a history of a fall, followed by pain in the hip. If the fracture is displaced, the patient lies with the limb in lateral rotation and the leg looks short.



CLASSIFICATION



X-RAYS

Two questions must be answered:

- is there a fracture, and is it displaced? Usually the break is obvious, but an impacted fracture can be missed by the unwary.
- Displacement is judged by the abnormal shape of the bone images and the degree of mismatch of the trabecular lines in the femoral head and neck and the innominate (supraacetabular) bone.



X-RAYS

- This assessment is important because impacted or undisplaced fractures do well after internal fixation, whereas displaced fractures have a high rate of nonunion and avascular necrosis.



TREATMENT

- Operative treatment is almost mandatory.
- Displaced fractures will not unite without internal fixation, and in any case elderly people should be got up and kept active without delay if pulmonary complications and bed sores are to be prevented.
- Impacted fractures can be left to unite, but there is always a risk that they may become displaced, even while lying in bed, so fixation is safer.



TREATMENT

When should the operation be performed?

- In young patients operation is urgent: interruption of the blood supply will produce irreversible cellular changes after 12 hours and the way to prevent this is to obtain accurate reduction and internal fixation as soon as possible.
- In older patients also the longer the delay the greater is the likelihood of complications.



Treatment

What if operation is considered too dangerous?

- Lying in bed on traction may be even more dangerous! And leaving the fracture untreated too painful. The patient least fit for operation may need it most. Prophylaxis against thromboembolism is very important.
- The principles are **accurate reduction, secure fixation and early activity.**
- Under anaesthesia the fracture is manipulated and reduction is checked by x-ray.



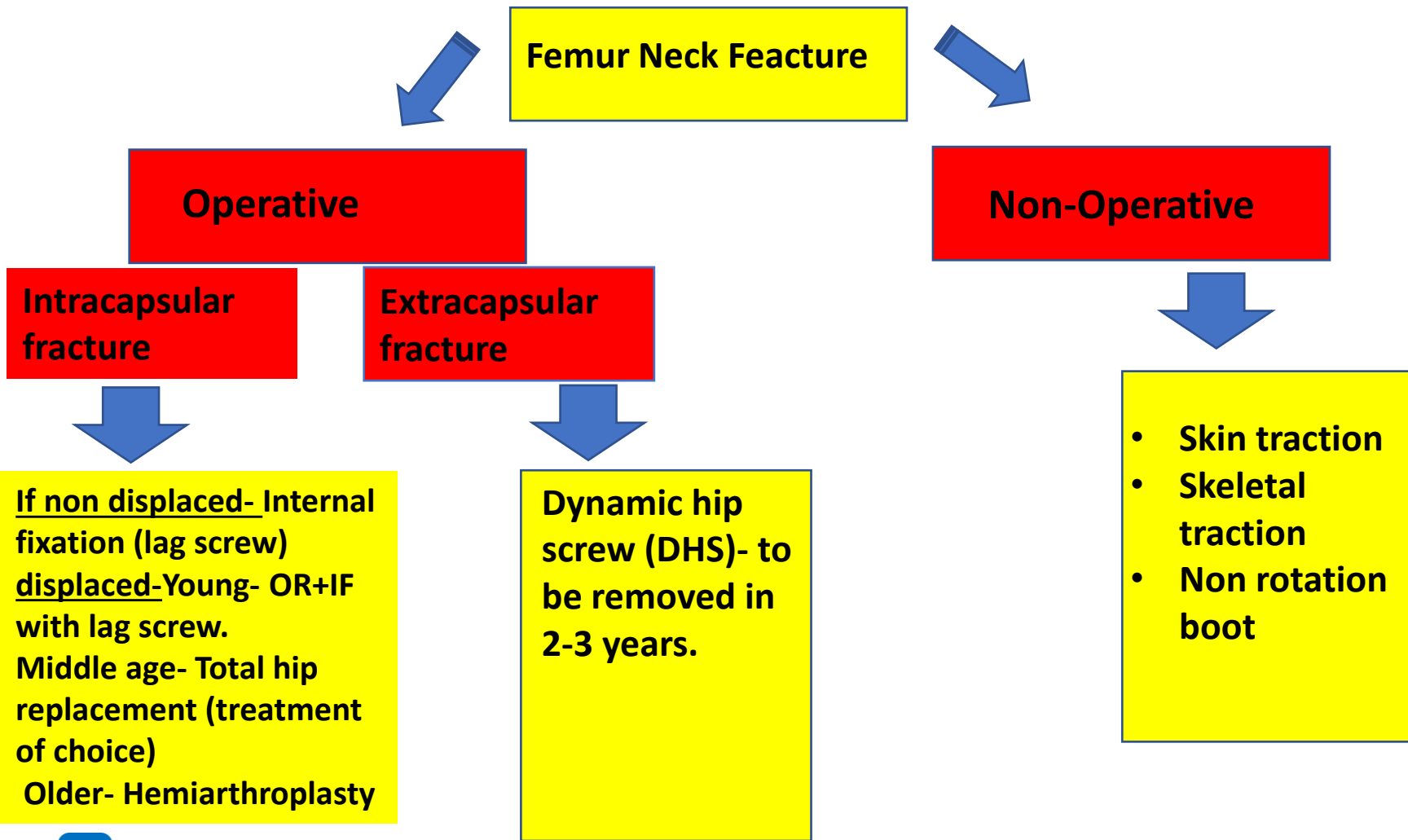
TREATMENT

What if the fracture cannot be accurately reduced?

- In patients over 60 years old partial or total hip replacement should be seriously considered. In patients under 60 years it is worth trying open reduction rather than sacrificing the joint.
- From the first day the patient should sit up in bed or in a chair. Walking with crutches is encouraged as soon as possible.



TREATMENT -SUMMMERY



COMPLICATIONS

General

- There is a high incidence of general complications in these elderly and often frail patients. Thromboembolism, pneumonia and bed sores are constant dangers, not to mention the disorders that might have been present before the fracture.

Osteoarthritis

- Subarticular bone necrosis or femoral head collapse may lead, after several years, to secondary osteoarthritis. If the symptoms warrant it, the joint should be replaced.



COMPLICATIONS

Avascular necrosis

- The reason is simple. The femoral head derives its blood supply from three sources: the **nutrient artery, vessels reflected from the capsule, and vessels in the ligamentum teres**.
- When the femoral neck is fractured and severely displaced, the branches from the nutrient artery are severed, the retinacular vessels from the capsule are torn, and the **remaining blood supply via the ligamentum teres may be insufficient** to prevent ischaemia of the femoral head.



COMPLICATIONS

Avascular necrosis

- In patients over 45 years of age, treatment is by total joint replacement. In younger patients re-alignment osteotomy may be suitable.

Non-union

- More than one-third of all femoral neck fractures fail to unite, and the risk is particularly high in those that are severely displaced.
- There are many causes: poor blood supply, imperfect reduction, inadequate fixation, and the tardy healing that is characteristic of intra-articular fractures.



COMPLICATIONS

Non-union

- Treatment of non-union depends on the age of the patient. In those under 50 years an attempt may be made to secure union by placing a bone graft across the fracture and reinserting a fixation device.
- In older patients, prosthetic replacement of the femoral head, or total replacement of the joint, must be considered.



FEMORAL SHAFT FRACTURES

- The femoral shaft is well padded with muscles – an advantage in protecting the bone from all but the most powerful forces, but a disadvantage in that fractures are often severely displaced by muscle pull, making reduction difficult.



SPECIAL FEATURES

- This is essentially a fracture of **young adults** and usually results from a **high-energy injury**.
- **Diaphyseal fractures** in elderly patients should be considered 'pathological' until proved otherwise.
- In children under 4 years of age the possibility of **physical abuse** must be kept in mind.



X-RAYS

- Most fractures of the femoral shaft have some degree of comminution, although it is not always apparent on x-ray; it is a reflection of the amount of force involved in these injuries.
- Displacement may be in any direction. Sometimes there are two fracture lines separated by an unbroken length of bone – the ‘segmental fracture’. The pelvis and knee must always be x-rayed to avoid missing an associated injury.



TREATMENT

FEMORAL SHAFT FRACTURES

Operative management

- Kuntscher Nail / Intra medullary nail- for mid shaft #
- Plating and screws- for lower shaft #

Non operative management

- Traction
- Gallow's traction in children



COMPLICATIONS

General

- Complications such as blood loss, shock, fat embolism and acute respiratory distress are common in high-energy injuries such as this.

Vascular injury

- The vascular lesion takes priority and the vessel must be repaired or grafted without delay. At the same operation the fracture is secured by internal fixation.



COMPLICATIONS

Thromboembolism

- Prolonged traction in bed predisposes to thrombosis. Movement and exercise are important in preventing this; they can be supplemented by foot compression devices or prophylactic doses of anticoagulants.
- Constant vigilance is needed and full anticoagulant treatment is started immediately if thigh vein or pelvic vein thrombosis is diagnosed.



COMPLICATIONS

Infection

- In open injuries, and following internal fixation, there is always a risk of infection. Prophylactic antibiotics, and careful attention to the principles of fracture surgery, should keep the incidence below 2%.

Delayed union and non-union

- A fractured femur may take 3–6 months to unite. If union is delayed beyond this time, an exchange nailing is performed using a slightly larger nail; in addition the fracture may need bone grafting.



COMPLICATIONS

Malunion

- Fractures treated by traction and bracing often develop some deformity; no more than 15 degrees of angulation should be accepted.
- Until the x-ray shows solid union, the fracture is too insecure to permit weightbearing; the bone will bend and what previously seemed a satisfactory reduction may end up with lateral or anterior bowing.
- Shortening is seldom a major problem; if it occurs, and is not too marked, the shoe can be built up.



OPEN FRACTURES

- Open femoral fractures should be carefully assessed for:
(1) skin loss; (2) wound contamination; (3) muscle ischaemia;
and (4) injury to vessels and nerves.
- The immediate treatment is similar to that of closed fractures. Antibiotics are started and wound cleansing and debridement are carried out with as little delay as possible.

