Fractures of the Neck of Femur

Learning Outcomes

- To identify the common fractures of the femoral neck and shaft;
- To appreciate the medical and surgical management of such injuries;
- To understand why the Physiotherapeutic management of these injuries is a slow process.

Subcapital Fractures

- Abduction caused by fall on greater trochanter.
- Impacted.
- Weight-bearing increases impaction.
- Little displacement.

Transcervical Fractures

- Not usually impacted.
- May require internal fixation.
- Found in elderly females after a fall.
- Patients cannot weight-bear, limb is externally rotated.

Basal Fractures

- Fracture site lies at base of femoral neck.
- Will require internal fixation.
- Suffered by elderly females following a fall.
- Patient will be unable to weight-bear.
**Inter-Trochanteric Fractures**
- Occurs at base of femoral neck.
- Not associated with Avascular Necrosis.
- Early return to weight-bearing following fixation.

**Pertrochanteric Fractures**
- Lie distal to the intertrochanteric line.
- Variety of patterns seen.
- Usually highly comminuted or continuous with a spiral line fracture of the femoral shaft.

**The Dynamic Hip Screw**

**Development of the DHS**
- Initial IF was by Smith-Peterson nail and later by McLaughlin nail.
- Three flanges to limit rotation of the nail.
- Drift of the proximal fragment.
- Drift of the distal fragment.
- Extrusion of the nail head back out of the insertion site.

**Move From Nails to Screws**
- Changed to trying screws (Howse screws)
- Offered little resistance to rotational forces.
- Two screws resisted rotation.
- Lateral excursion and eventually extrusion.
- Moore (or Knowles) pins were used however they have low overall strength and were confined to use in children.

- Absorption of the bone at the fracture site causing lateral extrusion or penetration of the femoral head.
- Local disturbance to blood supply causing localised avascular necrosis.
**Addition of Plates**

- Nail plates were added. The plate lay along the length of the femur and the screw/nail entered the femoral head.
- McLaughlin nail-plate allowed for varying femoral neck-shaft angles.
- Problems arose when the femoral head slipped down and impacted on the nail.

**Accommodating Slippage**

- The Dynamic Hip Screw was a screw-plate device which allowed the femoral head to slip without losing strength or fixation.
- The plate is screwed to the femoral shaft and the screw grips the femoral head and holds it in place.
- If the femoral neck shortens, the DHS slips back slightly to take up the slack.

**Insertion of a DHS**

- A small incision (4-5 inches) is made at the greater trochanter.

**Lateral Incision Is Made**

- The femoral plate is held in situ by between 2-11 screws.

**Attaching the Femoral Plate**

- The screw is threaded up into the femoral head and tightened into place.

**Inserting the Screw Attachment**
Any traumatic hip dislocation requires immediate treatment, ideally within six hours or less. This is because a traumatic hip dislocation interrupts the normal blood circulation to the top of the femur, depriving the bone of its vital oxygen supply. Unless the dislocated hip is reduced (replaced in its socket) promptly, and normal circulation is restored within the hip joint, there can be permanent damage to the head of the femur. This permanent damage is called avascular necrosis.

January 13, 1991, Bo Jackson partially dislocated his hip, tearing the blood vessels to the neck and head of the femur. X-rays revealed a small fracture to the posterior of the hip socket. Four weeks later, scans of the joint showed the beginning of avascular necrosis and chondrolysis. Eventually Jackson would require a total hip replacement which relieves him of pain and allows him full range of motion.

1. Osteoarthritis is perhaps the most common cause for hip replacement surgery.
2. Avascular necrosis is another cause of degeneration of the hip joint.
3. Abnormalities of hip joint function resulting from fractures of the hip and some types of hip conditions that appear in childhood can also lead to degeneration many years after an injury.

Surgery – Total Hip Replacement
Parts – Basic Components

- Acetabular component – metal shell with plastic inner socket
- Femoral component – metal stem with a metal or ceramic head

Austin Moore Hemi-arthroplasty

Erosion of the Femur

The modern total hip replacement was invented in 1962

- In 1995, 134,000 total hip replacement surgeries were performed.
- In 2009 this was 327,000.
- Almost equal numbers of THR among the 45-64yr age group as the over 65yr age group.

Modern Hip Replacement

Types

- Cemented – epoxy cement holds metal to bone

Types

- Uncemented – mesh allows bone to grow into the prothesis

Operation

Removing the femoral head
- Dislocate the hip joint
- Cut femoral neck with power saw

Reaming the Acetabulum
- Power drill and special reamer remove the cartilage
- Bone is formed to fit the metal shell

Inserting the Acetabular Component
- Cemented
- Uncemented

Preparing Femoral Canal
Thrombophlebitis

- Thrombophlebitis occurs when the blood in the large veins of the leg forms blood clots within the veins.
- This may cause the leg to swell and become warm to the touch and painful.
- If the blood clots in the veins break apart they can travel to the lung.
- Once in the lung they get lodged in the capillaries of the lung and cut off the blood supply to a portion of the lung.

Infection

- Infection can be a very serious complication following an artificial joint replacement.
- The chance of getting an infection following total hip replacement is probably around 1 in 100 total hip replacements.
- An infection can spread into the artificial joint from other infected areas.
- Your surgeon may want to make sure that you take antibiotics when you have dental work, or surgical procedures on your bladder or colon to reduce the risk of spreading germs to your new joint.
Dislocation

- Just like your real hip, an artificial hip can dislocate.
- Dislocation is when the ball comes out of the socket.
- There is a greater risk of dislocation right after surgery, before the muscles and tendons around the new joint have healed. However, there is always a risk of dislocation.
- A hip that dislocates more than once may have to be revised, which means another operation, to make the joint more stable.

Loosening

- The major reason that artificial joints eventually fail continues to be loosening of the joint where the metal or cement meets the bone.
- Most joints will eventually loosen and require a revision.
- Hopefully, you can expect 12-15 years of service from your artificial hip.
- Once the pain becomes unbearable, another operation will probably be required to replace the hip.

OSTEOPOROSIS

- 25 million Americans, 80% of them women
- 1.5 million fractures a year
- 500,000 fractures are in the thoracic and lumbar vertebrae
- 250,000 fractures are hip fractures
- 15-20% of hip fractures are fatal
- $18 billion annually

Hip Fractures and Osteoporosis - AAOS

- Hip fracture disease, one of the most serious consequences of osteoporosis, is occurring at an epidemic rate in North America.
- More than 350,000 Americans fracture a hip each year.
- The current annual cost is more than $9.8 billion.
- Ninety percent of hip fracture patients are 65 years of age or older.
- Accounts for more hospital days, by far, than any other musculoskeletal injury.

How serious is the problem?

- In the United States, one of every three adults 65 years old or older falls each year.¹,²
- Falls are the leading cause of injury deaths among people 65 years and older.³
- In 1998, about 9,600 people over the age of 65 died from fall-related injuries.⁴
- Of all fall deaths, more than 60% involve people who are 75 years or older.³
- Fall-related death rates are higher among men than women and differ by race. White men have the highest death rate, followed by white women, black men and black women.³
Management of painful conditions
- Similar pain could be the result of different diagnoses
- Need to identify the root cause of the symptoms before we begin treatment
- We need to recognize that we cannot treat everything

Management of Hip Fractures
- Pain management
- Increasing range of motion
- Increasing strength
- Improving mobility
- Improving gait and minimizing gait abnormalities

Protocols and Recipes
- Beware the dreaded protocol that does not take into account the root issue you are facing
- Treat the condition with everything that you know will be effective – if it hurts, use pain relief

Fractures of the Shaft of Femur

Femoral Shaft Fractures
- May be caused by direct violence (RTA, gunshot wound, fall from a height, crush injury).

Femur divided into sections:
- Proximal Third
- Junction between proximal and middle third
- Middle third
- Junction between middle and distal third
- Distal third

- Fractures may also occur around either or both femoral condyles as supracondylar or intercondylar fractures.
- With these condylar fractures there is a risk of displacement due to the proximity of the strong leg muscles.
- Furthermore muscle attachments may be disrupted.
Blood loss: large degree of blood loss into surrounding tissue. With mid-shaft fractures there may be as much as 0.5-1 litres of blood loss into the thigh musculature.

Shock: this volume of fluid loss may cause the patient to go into shock.

Weight-bearing: usually impossible with associated shortening.

Fat embolism: potentially fatal.

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Skin traction: conservative management is carried out using skin traction and prolonged bed rest.

Internal fixation: method of choice (usually). A long intramedullary nail is inserted in the medullary cavity of the femur from greater trochanter to knee. Held by proximal and distal locking screws. (see tibia fractures notes)

Overcome FEAR: all help given.

Active exercise: patients are encouraged to regain full RoM of the knee and hip post-surgery. Exercise to quads, hams, gluts, abds, adds, gastrocs and soleus carried out in bed.

Early mobilisation: as soon as surgeon allows the patient is taught crutch walking and mobilises.

Fear: patients fear their leg will not hold.

Pain: patients will be in pain and will not want to move limb.

Swelling: gross swelling in the thigh makes it heavy and painful.

Reflex inhibition: patients resist movement of the joints above or below, especially painful quads stretch.
The labrum of the hip

- Fibrous cartilage (similar to the meniscus in the knee) that runs around the bony rim of the acetabulum
- Deepens the socket adding stability to the hip joint as well as cushioning the joint itself.

Causes of Labral Tears

- May be degenerative or traumatic.
- Degenerative tears occur after years of repetitive minor injuries and are usually associated with arthritis of the hip.

Causes of Labral Tears

- Traumatic injuries can occur with any sporting activity that causes rapid hip motion especially associated with sudden stops and turns on the field, mats, or court.
- Occasionally, a traumatic injury that causes a labral tear is somewhat trivial and is forgotten by the time of the diagnosis.

Common Symptoms

- Pain (usually located on the inner hip, or groin area)
- A “catching” sensation within the joint
- Little-to-no-pain during normal daily activities

Provocative Tests

- Simple hip extension – causes pain
- FABER test
- Anterior tears appear to be more common in the US and Europe
- Posterior tears are more common in Asian countries
Treatment of Acetabular Labral Tears

- Not well defined
- Decrease the stress on the labrum
- Decrease the pain
- Reduce activity
- Symptoms often recur once activity has resumed

Any Questions?

2006 Labral Tear Reference

**ACETABULAR LABRAL TEARS**, Cara L Lewis and Shirley A Sahrmann,

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