FEMORO-ACETABULAR IMPINGEMENT

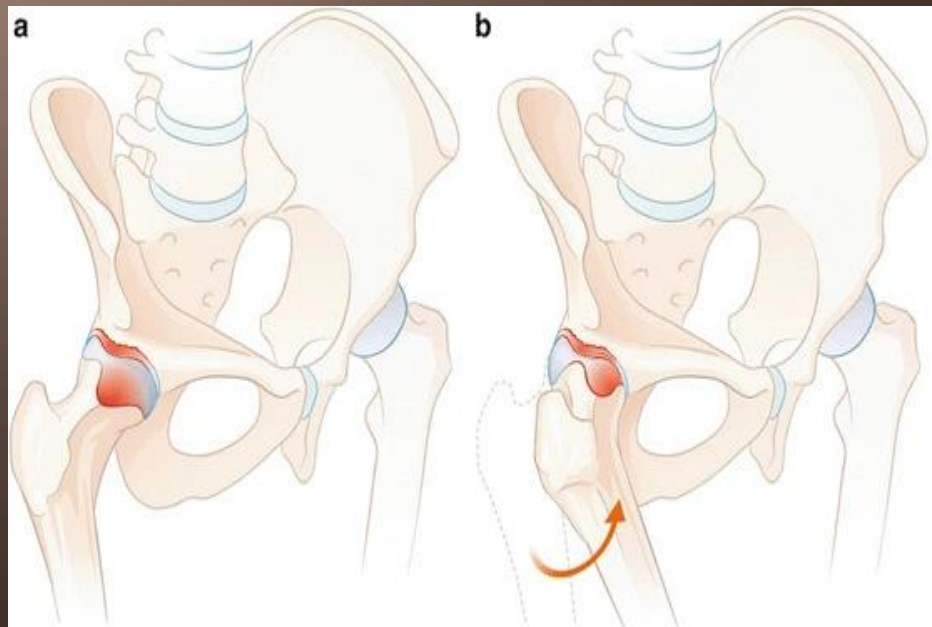
DEFINITION

- Structural variations of the proximal femur or acetabulum may result in a FAI, which is described as abnormal contact between the femoral head/ neck and the acetabular margin and has been associated with labral and chondral damage.

- Osseous abnormalities proposed to contribute to labral tears due to FAI include bony malformations in the proximal femur or the acetabulum, resulting in premature abutment of the femoral neck into the acetabulum during the motion of hip flexion with internal rotation

PATHOMECHANICS

- The concept of femoroacetabular impingement (FAI) was originally described as a femoral head-neck deformity and a major cause of hip osteoarthritis.
- The abnormal contact between the proximal femur and the acetabulum causes progressive chondrolabral injury potentially leading to osteoarthritis.
- Excessive osteochondral extension at the anterolateral femoral neck, referred to as a cam lesion, or overcoverage of the acetabulum called a pincer lesion



PREVALENCE

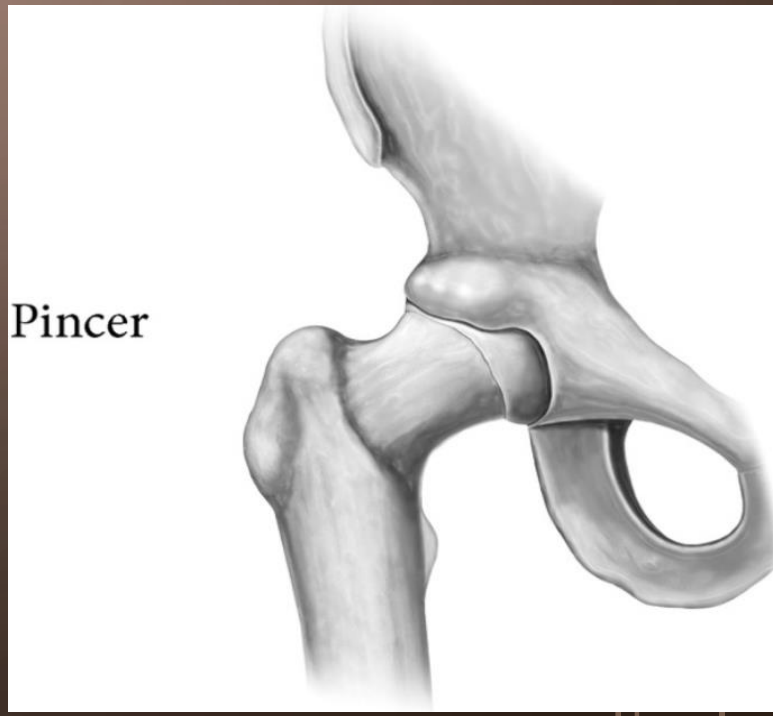
Gender differences have been described in individuals with labral tears secondary to osseous abnormalities.

- Cam impingement morphology is twice as prevalent in males than in females.
- Pincer lesions are more common in middle-aged, active women.

CLASSIFICATION

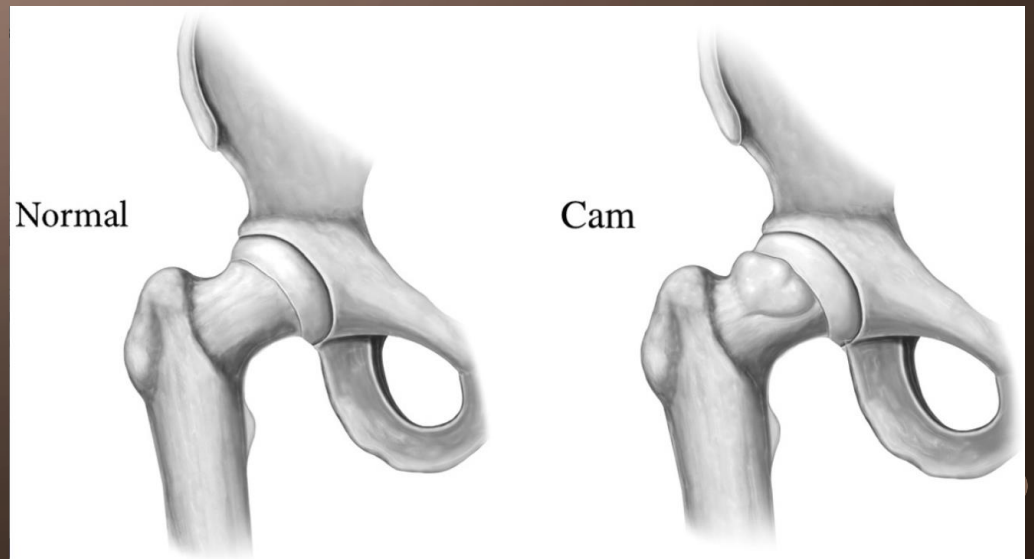
Pincer-type FAI is caused by an acetabular cavity change.

- The normal acetabulum is anteverted and it covers the femoral head within a narrow normality range. Both the lack of coverage associated with dysplasia and the excess coverage observed in pincer-type
- FAI cause joint pain and degeneration. As such, the labrum in pincer-type FAI is degenerated and it can present intrasubstantial cysts.



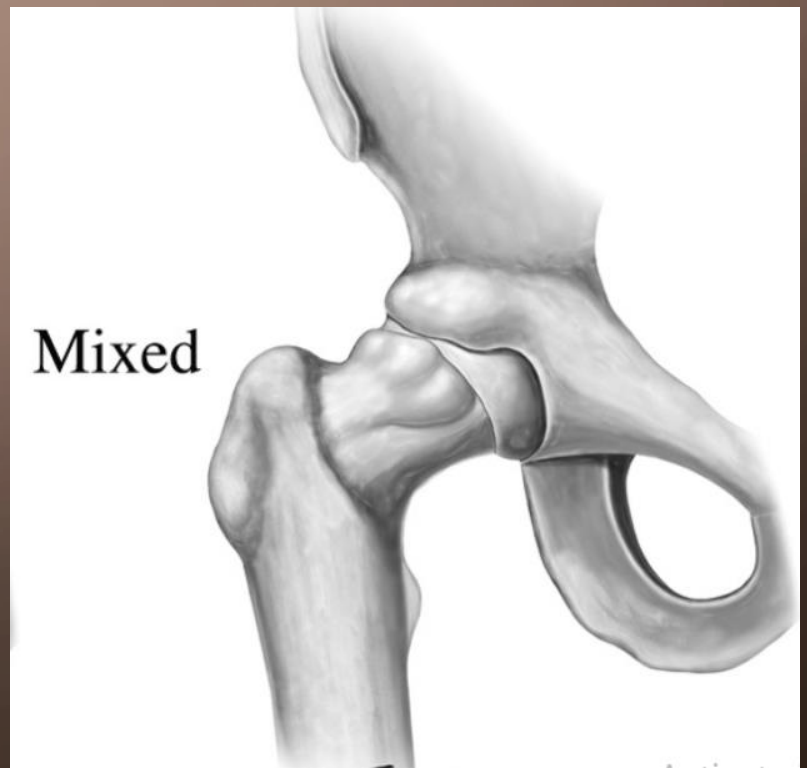
Cam-type FAI is caused by a femoral abnormality.

- The abnormal morphology of the femoral head-neck junction can be due to an asphericity of the femoral head and neck



The third FAI type is referred to as mixed

- it presents an association of pincer and cam changes.
- Mixed FAI is the most common type, with an incidence of up to 77%.
- mixed-type FAI, the patient usually presents more predominant characteristics of cam- or pincer-type morphologies.



ETIOLOGY

- The association between genetic polymorphism and acetabular over-coverage and demonstrated that genetic variations are significantly associated with acetabular coverage.
- Associated congenital anatomy

SYMPTOMS AND SIGNS

- They feel pain and the function of the limb is affected.
- Local signs are usually present such as swelling or discoloration of the skin in the case of a haematoma, a palpable gap in the tendon
- In the case of a partial or total rupture, or provoked pain when testing the various muscle groups, nerves or the hip joint.
- Mechanical symptoms such as popping, locking, or snapping of the hip are present.

RISK FACTOR

- **Genetics:** Previous investigation has established the genetic influence on severe osseous abnormalities, such as slipped capital femoral epiphysis and acetabula protrusion
- **Sex:** The individual's sex may influence the type of osseous abnormalities.
- the prevalence of cam deformities was higher in men (25%) than in women (5.4%). More women (19%) demonstrated a deep acetabular socket (pincer deformity) than men (15%).

EXAMINATION AND DIAGNOSIS

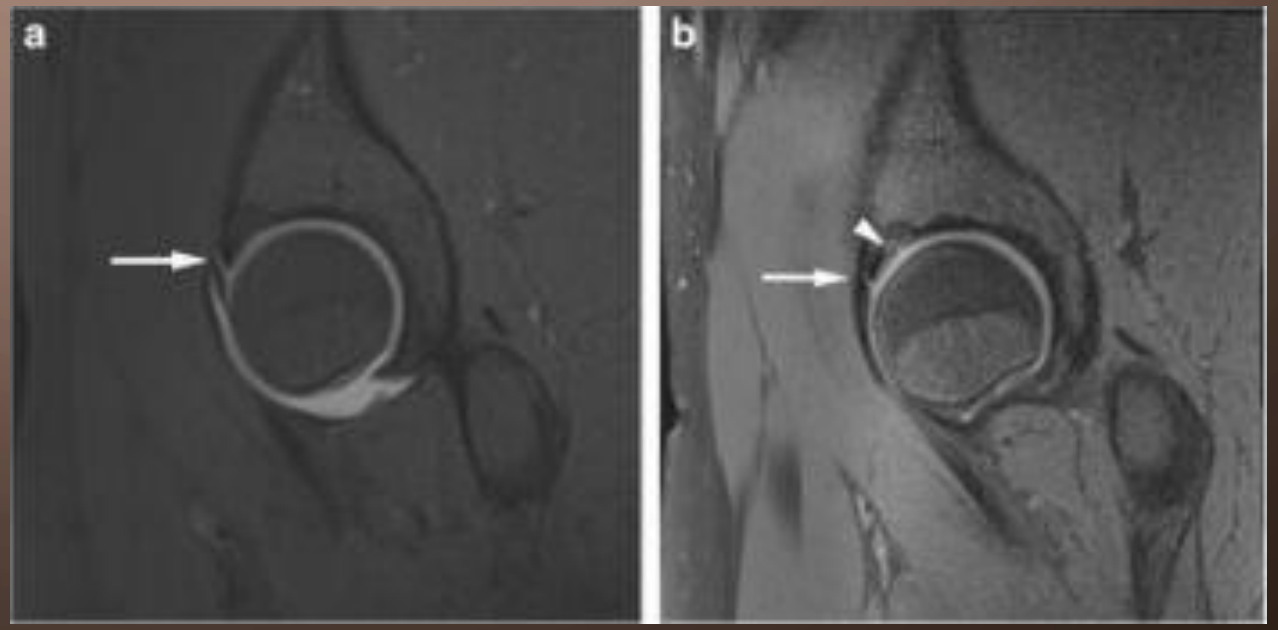
- The examination includes a systematic hip examination (be aware of pain in internal rotation and flexion = anterior labrum tear), a lumbar and sacral spine examination, distinct palpation of the major tendon insertion sites and muscles and finally a regular hernia examination.
- Depending on the history, palpation of the prostate or a gynaecological examination may be necessary, as may urine culture and microscopy.

- ***<u>The patient presents with the following clinical findings:</u>***

1. Pain in the anterior hip/groin and/or lateral hip/trochanter region is reported
2. aching or sharp pain
3. The reported hip pain is aggravated by sitting
4. The reported pain is reproduced with the hip flexion, adduction, internal rotation (FADIR) test
5. Hip internal rotation is less than 20° with the hip at 90° of flexion
6. Hip flexion and hip abduction are also limited

Radiographic findings:

MR arthrogram has typically been preferred over MRI because it has shown greater accuracy in identifying defects in the labrum and cartilage.



- **Differential Diagnosis** Potential differential diagnoses for nonarthritic hip joint pain are:
  - Referred pain from lumbar facet disorder and lumbar disc disorders
  - Sacroiliac joint dysfunction
  - Pubic symphysis dysfunction
  - Lumbar spinal stenosis
  - Nerve entrapment (lateral femoral cutaneous, obturator)
  - Hip osteoarthrosis
  - Iliopsoas tendinitis/bursitis
  - Adductor strain
  - Athletic pubalgia (sports hernia

TREATMENT

Surgical Management

Arthroscopy is the most common surgical procedure for FAI discussed in the literature and typically involves:

- Acetabuloplasty (trimming and reshaping the acetabular rim)
- Labral repair/debridement
- femoroplasty (reshaping the femoral head-neck junction).

PRECAUTIONS FOR ACETABULAR LABRAL DEBRIDEMENT

- Weight bearing as tolerated
- Limit ROM to 90° of flexion for the first 2 weeks.
- Do not push into other directions more than tolerated for the first 2 weeks.
- No AROM for the first 2 weeks. No active flexion for the first 6 weeks.

PRECAUTIONS FOR ACETABULAR LABRAL REPAIR

- 50% PWB for first 2 weeks.
- Limit ROM to 90° of flexion for the first 2 weeks.
- Do not push into other directions more than tolerated for the first 2 weeks.
- No AROM for the first 2 weeks. No active flexion for the first 6 weeks.
- No impact loading (jumping, running, swinging a racquet / club / bat, etc.) until at least 12 weeks post

PRECAUTIONS FOR FEMOROPLASTY

- 50% PWB for the first 2 weeks.
- Limit ROM to 90° of flexion for the first 2 weeks.
- Do not push into other directions more than tolerated for the first 2 weeks.
- No AROM for the first 2 weeks. No active flexion for the first 6 weeks

Phase 1: Initial Exercises (Initiated Postoperative Week 1)

Goals during the initial phase of rehabilitation following hip arthroscopy are as follows:

- Protection of the operative hip (adherence to WB and ROM restrictions, avoiding prolonged hip flexion, patient education)
- Mobilization of the operative hip to prevent adhesions

- Stationary bicycle for 15 to 20 minutes daily with appropriate precautions
- Isometric muscle contractions including abdominals, gluteals, quadriceps, hamstrings
- Ankle pumps

- Gentle PROM may also start as early as postoperative day two, though the patient should be careful to avoid extremes of motion as this may stress involved structures . Passive flexion is usually limited to 90°.

Week 2 exercise progression.

All exercises do not have to be added at once and again therapists should use observation and clinical judgment in deciding how much and when to progress.

- Scar tissue mobilization (portal sites) and muscular mobilization are useful in preventing adhesions and restoring mobility between muscle and soft tissue layers.

- Quadruped rocking

- Standing hip internal rotation
- Isometric hip abduction
- Prone hip internal and external rotation with Theraband resistance
- Uninvolved knee to chest stretch

During week 3, controlled open and closed chain exercises are introduced. These activities should not produce pain and ROM limitations should continue to be observed.

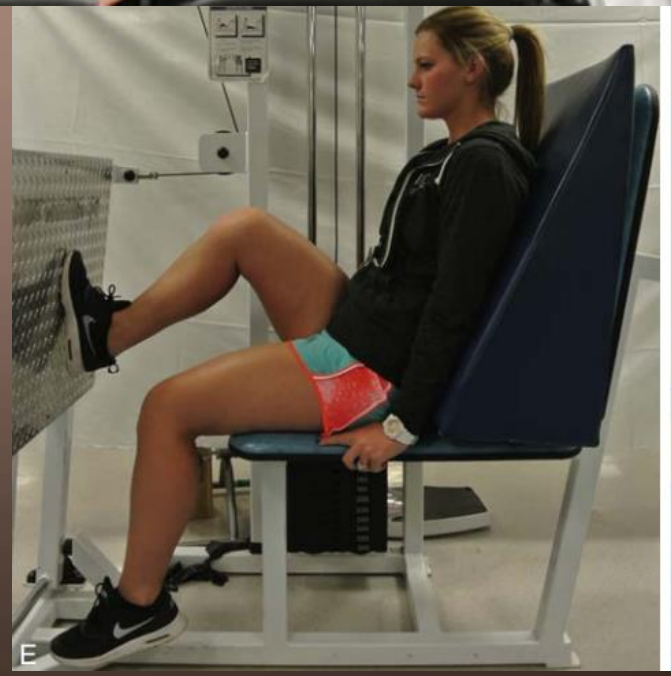
- Two-way leg raises (abduction and extension)
- Water jogging
- Clam shell exercise
- Double-leg bridges with tubing
- Leg press (light weight)
- Kneeling hip flexor stretch


A


B


C


D


E


F

Phase 2: Intermediate Exercises (Initiated Postoperative Week 4) Phase 2 is begun when phase 1 exercises are pain free.

Goals for this stage are the following:

- Regain muscular strength
- Establish trunk stability and pelvic control
- Progress WB if appropriate
- Restore normal gait pattern
- Achieve stable single-leg stance on the operative leg

Week 4 exercise additions include:

- Double 1/3 knee bends or partial squat
- Side supports or side plank
- Stationary bicycle with progressive resistance
- Swimming (no breaststroke)

In week 5, careful hip joint mobilizations are introduced along with 2 exercises:

- Dyna-Disc single-leg stance
- Advanced bridging—single leg or Swiss ball
- Manual long axis distraction and Manual A/P mobilizations

Week 6 activities grow more functional and include the following:

- Standing resisted IR/ER
- Pilates skaters
- Side-stepping
- Single-leg knee bends/lateral step-downs
- Elliptical machine/stair climber

Phase 3: Advanced Exercises (Initiated Postoperative Week 7) Phase 3 is begun when phase 2 exercises are pain free.

Goals for this stage are the following:

- Running progression
- Lateral mobility
- Plyometrics and conditioning

Weeks 7 to 9 include early sport-specific activities when appropriate, along with the following advanced exercises:

- Lunges
- Water bounding/plyometrics (if available)
- Side-to-side lateral agility
- Forward/backward running with cord
- Running progression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B


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F

Phase 4: Sport-Specific Training (Initiated Postoperative Week 9) Phase 4 is begun when phase 3 exercises are pain free.

Goals for this stage are the following:

- Back pedaling
- Side shuffles
- Z cuts
- W cuts
- Cariocas
- Ghiardellis
- Sport-specific drills


A
B
C
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There are a number of tests available for determining when an athlete is ready to return to sport, and it is important to select a sport-appropriate assessment tool.

1. hop/jump test
2. T-test
3. the lower extremity functional test (LEFT) have been used to determine safe return to play after lower extremity rehabilitation but have not been validated for patients with hip pathology.

More important than meeting established testing norms is that the patient performs the evaluations, as well as the specific activities to which he or she intends to return, without pain, apprehension, or compensation due to weakness.

Subtle signs of compensation may include:

- Pelvic asymmetry (Trendelenburg sign)
- Valgus collapse (knee collapsing into medial rotation and adduction)
- Knee locking in extension during gait (quadriceps weakness)
- Patella extending past the toe during squats (core weakness)
- General form degradation

PROGNOSIS AND RETURN TO PLAY

- In acute cases, healing will take place within two to four weeks and training is begun and gradually increased if the player is asymptomatic.
- Return to play is usually possible within one to three months but may take longer in chronic cases.
- When rehabilitation fails over more than six months, surgical treatment may need to be considered.

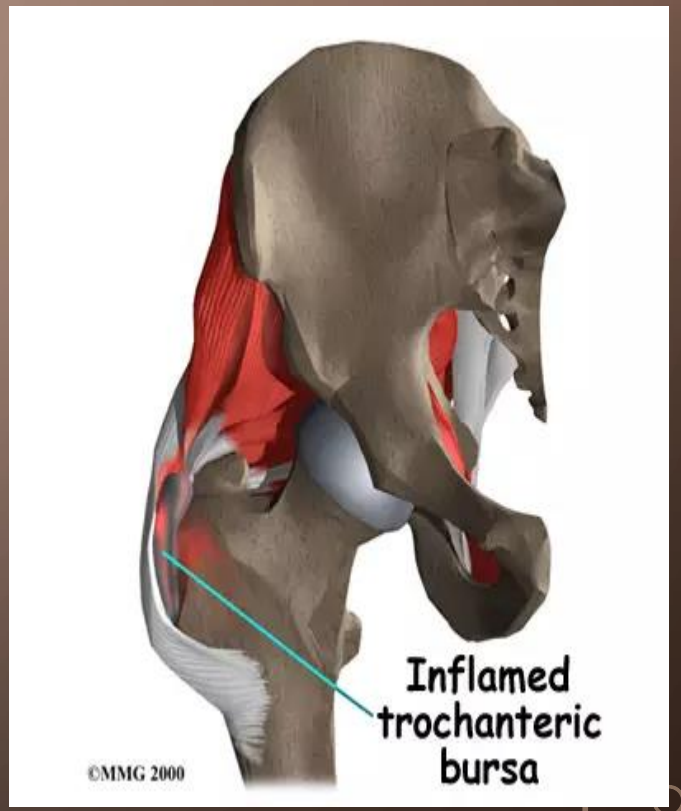
TROCHANTERIC BURSITIS

ANATOMY

- A bursa is a sac that usually contains a small amount of fluid and functions as a friction-reducing structure between two anatomical structures, e.g. bone and tendon.
- The trochanteric bursa covers the posterior facet and lies deep to the gluteus maximus muscle. It also lies over the trochanter attachments of gluteus medius, gluteus minimus and vastus lateralis.
- The subgluteus medius bursa is situated at the lateral and superolateral facets deep to the gluteus medius tendon insertion while the subgluteus minimus bursa is located between the anterior facet and gluteus minimus tendon

DEFINITION

- Trochanteric bursitis (TB), (greater trochanteric bursitis (GTB) or greater trochanteric pain syndrome (GTPS),) is a common disorder and frequent cause of lateral hip pain. Bursitis is characterised by soft-tissue swelling, localised pain, synovial thickening and increased fluid in the bursa



EPIDEMIOLOGY

- Trochanteric bursitis is transmodal in distribution affecting those of all ages.
- GTB is common and thought to affect roughly 15% of women and 8% of men.
- Middle-aged women are most commonly affected, although young female athletes are also prone to developing GTB.

ETIOLOGY

- Older patients who sustain falls directly over the bursa can initiate an inflammatory cascade within the tissue.

- Sedentary or bed-bound patients are also prone to trochanteric bursitis, as constant pressure over the greater trochanter of the proximal femur can also initiate the inflammatory response of the bursa.

- External coxa saltans, or external snapping hip, is characterized by palpable snapping of the ITB or gluteus maximus as it moves from posterior to anterior over the greater trochanter with hip flexion and anterior to posterior with extension. This is often attributed to thickening of the posterior aspect of the ITB or anterior border of the gluteus maximus, and repeated snapping can lead to trochanteric bursa irritation, gluteal tendinopathy, and consequently, lateral hip pain.

- Less commonly, GTPS can result from blunt trauma to the hip or iatrogenic injury during hip arthroplasty

CLINICAL PRESENTATION

- Pain to the lateral hip, thigh and knee
- Local tenderness over the greater trochanter
- Pain with side-lying on the affected side Pain with WB activities
- Pain with sitting crossed-legged
- Pain with prolonged sitting

RISK FACTORS

- Several risk factors have been associated with GTPS, including increased age, sex, obesity, osteoarthritis of the knee or hip, lower back pain, and leg length discrepancy.-These findings suggest that altered limb mechanics and abnormal force vectors across the hip likely contribute to the development of GTPS.

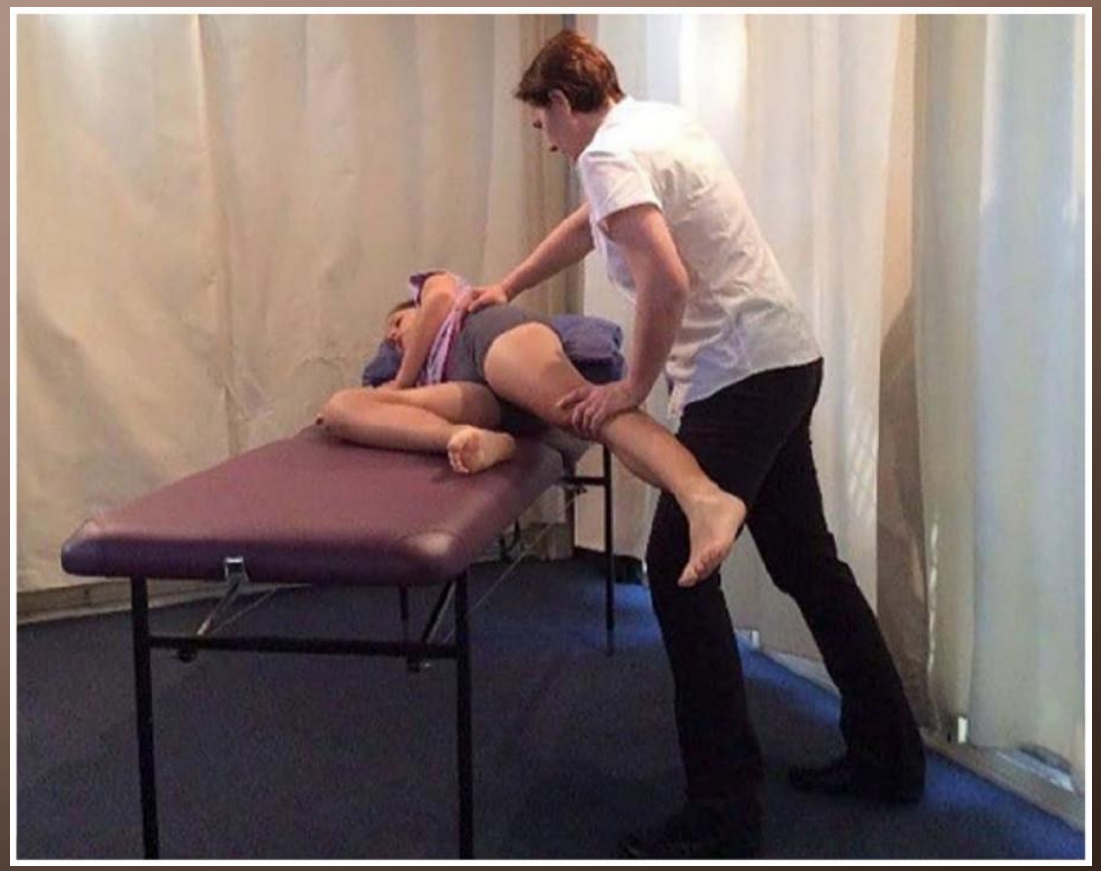
PHYSICAL EXAMINATION

- Patients should maintain their ability to SLR without pain, and a log roll (internal and external rotation of the leg at the hip joint with the hip flexed to 90 degrees) will also not elicit pain in the hip joint.
- Pain often worsens with prolonged activity or maneuvers involving stabilization of the pelvis, such as standing on one leg
- Pain is often elicited with adduction of the femur and relieved with abduction as this tensions and relieves tension on the overlying iliotibial band (ITB), respectively.

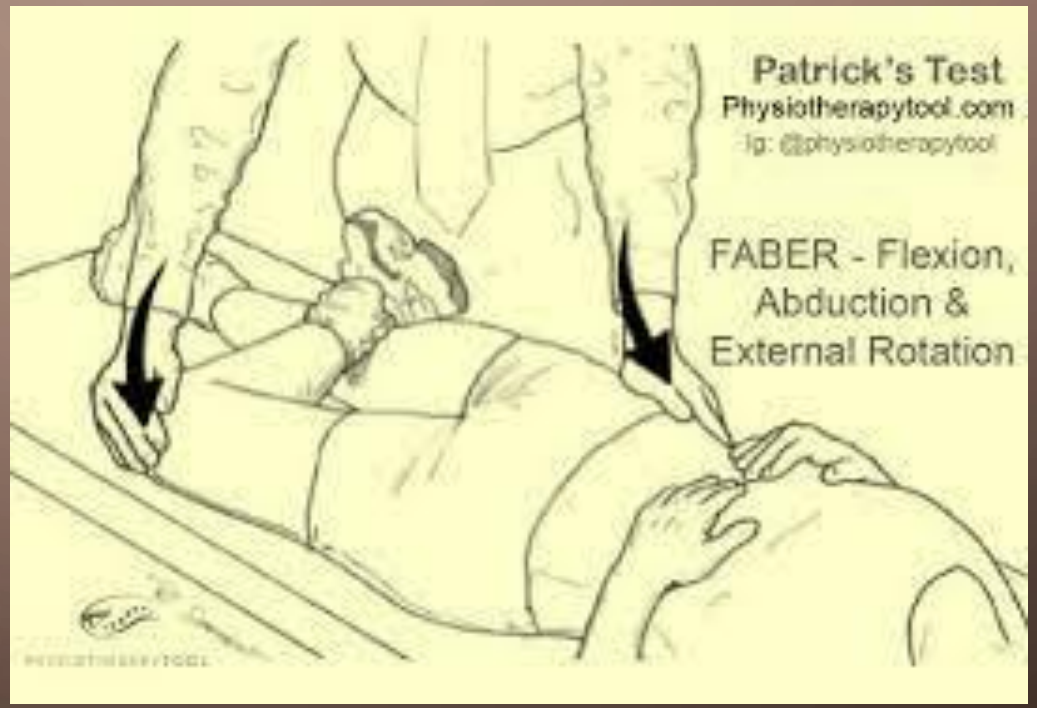
- Patients will have localized pain with deep palpation over the greater trochanter on the lateral aspect of the proximal femur.
- It is often characterised by the ‘jump’ sign where palpation of the greater trochanter causes the patient to nearly jump off the bed
- Hip ROM is often not affected in GTPS patients
- Examination of the skin is often normal, without erythema or increased warmth, as the etiology is non-infectious.

The single leg stance test

Resisted hip medial rotation, lateral rotation and abduction



FABER test


Patrick's Test
Physiotherapytool.com
ig: @physiotherapytool
FABER - Flexion, Abduction & External Rotation

The Trendelenburg sign

IMAGING EVALUATION

- X-ray
- MRI
- ultrasound

DIFFERENTIAL DIAGNOSIS

1. Femoroacetabular impingement, fracture of the greater trochanter, femoral neck, or intertrochanteric hip fracture, a hamstring avulsion injury, or simple muscle strain or sprain.

- 2. Gluteal medius tear presents as lateral hip pain that exacerbates with prolonged sitting, climbing stairs, and walking. The pain is usually associated with Trendelenburg gait. Trochanter bursitis pain increases while sitting with the cross legs. Both conditions are painful while lying on the affected site.

3. Snapping hip syndrome

Snapping hip syndrome is associated with pain on the lateral side of the trochanter and the feeling of catching and "giving way" while climbing stairs and running. Palpation of the snapping over the greater trochanter while flexing the hip joint confirms the diagnosis. Pyriformis syndrome leads to retrotrochanteric pain that exacerbates with prolonged sitting and getting to bed at night. The piriformis stretch test differentiates it from other peritrochateric painful entities. A positive test presents as a re-creation of deep gluteal pain.

Differential diagnosis	Important signs and symptoms
Hip OA, labral tear, AV, FAI	• Pain in 1 or more of the following regions: deep gluteal region, anterior thigh, knee, groin. • Positive FADDIR test • Hip locking, giving way • Lateral hip, groin pain and/or deep buttock pain with passive hip medial rotation • Decreased hip range of motion
Lumbar referral	• Dermatome and sclerotome pain pattern will be present, rather than pain over ITB specifically. • L2, L3 and L5 in particular[14]
Inflammatory joint disease	• Obvious inflammatory symptoms with stiffness that lasts more than 1 hour. • Symmetrical symptoms. • Hand symptoms often involved.
Neck-of-femur fracture	• Pain around hip joint area and aggravated by weight-bearing activity

COMPLICATION

- Complications of trochanteric bursitis are rare.
- Complications are more closely associated with NSAID use
- Gastrointestinal (GI) bleeding can be occult, and patients should be counseled regarding signs or symptoms of anemia.
- Complications associated with corticosteroid injections include elevated blood glucose levels (especially in those with poorly controlled diabetes), injection site irritation, or injected site bleeding

REHABILITATION

Phase 1 management of pain and inflammation includes

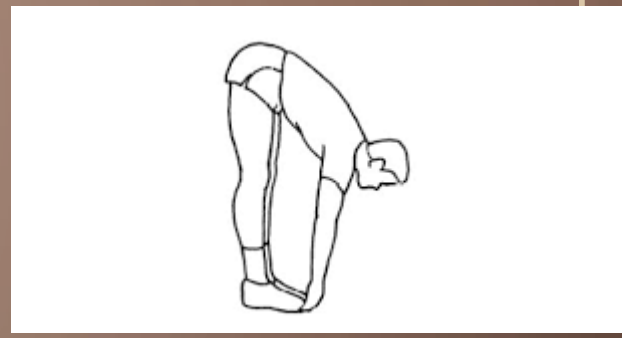
- Ice therapy,
- NSAIDS
- acupuncture, topical massage,
- Side-lying leg raises,
- standing hamstring stretching exercises,
- Clamshells
- proprioception, balancing.

Patient education

- While proper stretching, form, and training technique can help prevent trochanteric bursitis in the young athlete, many cases are secondary to trauma or are idiopathic and, therefore, not preventable.
- it is important to educate patients on the positive prognosis and success of non-operative management.
- It is essential that clinicians counsel patients on the potential side effects of NSAIDs and corticosteroid injections before initiating treatment.
- Patients should understand the risk: benefit ratio before proceeding with treatment.

Phase 2 rehabilitation

- Side-lying leg raises,
- standing hamstring stretching exercises,
- piriformis stretching exercise



- Clamshells,
- proprioception, balancing,

The 3rd phase includes

- End-range stretching to ITB and piriformis
- training of core muscles, gait, and biomechanics analysis.
- Patient education.
- postural awareness, and return to sports activity are the last rehabilitation phase's main goals.

RETURN TO SPORT

- For patients wanting to achieve a high level of function or return to sport, we would encourage a consultation with a physiotherapist as you will likely require further progression beyond the advanced rehabilitation stage.
- Before returning to the sport, a rehabilitation programme should incorporate plyometric based exercises; this might include things like bounding, cutting, and sprinting exercises

PREVENTION

- Learn proper posture or technique for sports or work activities
- Maintain healthy weight
- Regular exercise (flexibility and strength)
- Warm up activities for athlrtes
- Avoid lying on one side for too long
- Take breaks if you are doing a repitive task.

PROGNOSIS

- The prognosis is promising with trochanteric bursitis, as patients can expect complete resolution of symptoms with conservative management without any long-term sequelae.
- Resolution with NSAIDs and/or corticosteroid injection can be expected within just several days of initiation of treatment.
- Refractory bursitis is rare, although some patients do report a return of symptoms with re-irritation or repetitive trauma.

THANK YOU