Groin strain

Groin pain

- Groin pain is a broad, general term that means different things to different people. Patients may describe “I pulled my groin” (groin strain), or “I got kicked in the groin” (testicle), or “I have a lump in my groin” (lower abdominal wall). It is estimated that 5% to 18% of athletes experience activity-restricting groin pain. This groin pain is common in sports involving repetitive kicking, twisting, or turning at high speeds.

Epidemiology

- Groin strains are common amongst athletes who compete in sports that involve repetitive twisting, turning, sprinting and kicking such as football, ice hokey, Australian and Gaelic football·
- Groin injuries are reported more in males compared to female football athletes. Injuries in men accounted for 4–19% of all injuries and 2–14% in women

Pathophysiology

- Groin pain syndromes are characterized as pain located in the inguinal region of an athlete without an actual hernia and can be caused by a range of pathologies, many of which are poorly understood. It is associated with a number of pathologic findings, including attenuation or tearing of the transversalis fascia or conjoined tendon, abnormalities at the insertion of the rectus abdominis muscle, avulsion of part of the internal oblique muscle fibers at the pubic tubercle, tearing within the internal oblique musculature, or abnormality in the external oblique muscle and aponeurosis. These injuries alone or in combination may predispose an individual to a dilated and weakened internal inguinal ring, leading to development of athletic pubalgia

Grades of groin strain

- Grade 1: no loss of function or strength. Muscle tears can show normal appearances or a small area of focal disruption (<5% of the muscle volume), with hematoma and perifascial fluid relatively common on imaging with US and MRI.
- Grade 2: severe, with some weakness. Injury corresponds to a partial tear, with muscle fibre disruption seen (>5% of the muscle volume) but not affecting the whole muscle belly.

Grade 3: complete muscle tear and complete functional loss. Injuries are complete muscle tears with frayed margins and bunching and/or retraction of the torn muscle fibres. Complete muscle tears or grade 3 strains are most often found in the distal musculotendinous junction located toward the insertion on the femur.

Groin pain

- Hip flexor strain
- Labral tear

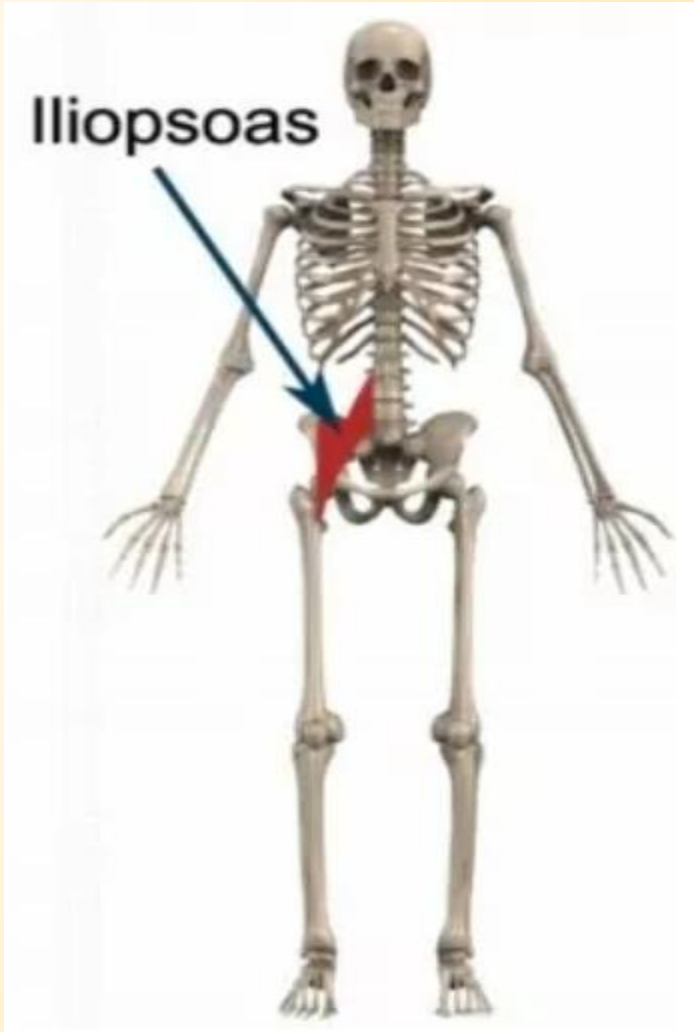
Hip flexor strain

- A hip flexor strain is an injury characterized by tearing of one or more of the hip flexor muscles and typically causes pain in the front of the hip or groin.
- The hip flexors comprise of 3 major muscles:

a. The iliacus and psoas muscles, collectively known as the iliopsoas.

b. The rectus femoris which is part of the quadriceps muscle.

- The most commonly involved muscle in a hip flexor strain is the iliopsoas.



Mechanism of injury

- A groin strain can develop from

a. overextending and externally rotating the hip

b. forcefully contracting the muscles into flexion and internal rotation as involved in running, jumping, twisting, and kicking.

Clinical presentation

- deep groin pain, sometimes radiating to the anterior hip or thigh, often accompanied by a snapping sensation.
- If severe enough, it may be accompanied by a limp

Risk factors

- people who have muscle imbalances, people who have weak muscles
- Sports where this is common include:
  - Soccer
  - Football (kickers)
  - Cyclists

classification

- **With a grade 1:** the patient may complain of mild discomfort with no loss of function and full ROM and strength. minimal tenderness, no swelling. normal gait.

- **With a grade 2:** palpation may reproduce pain. Swelling, an abnormal gait cycle. Limited ROM, and resistance could cause an increase in pain.

- **With a grade 3** groin strain may need crutches to ambulate. severe tenderness, with swelling. Limited ROM, especially if the iliopsoas is involved. Resistance might not be tolerated.

examination

- Palpation of the symphysis joint

Palpation of the psoas muscle

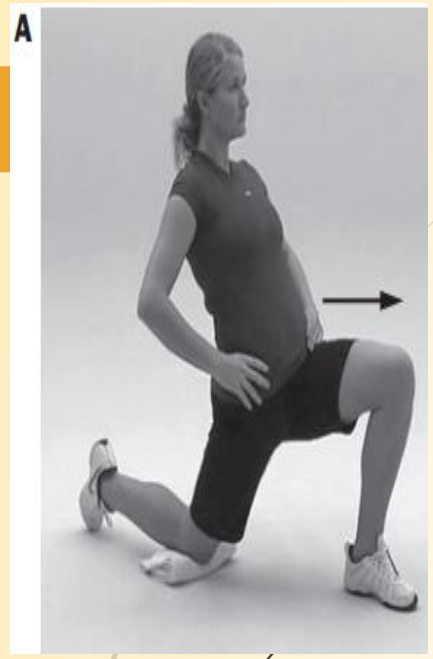
Functional testing of the iliopsoas muscle

The Thomas test (modified) for the iliopsoas

rehabilitation

With a grade 1 strain,

- modalities and pain-free hip stretching exercises can begin immediately
- Pain-free progressive strengthening exercises may also be performed
- progressing to flexion with knee straight, flexed, and adducted
- The slide board exercise
- plyometrics
- sport-specific functional drills as soon as pain allows.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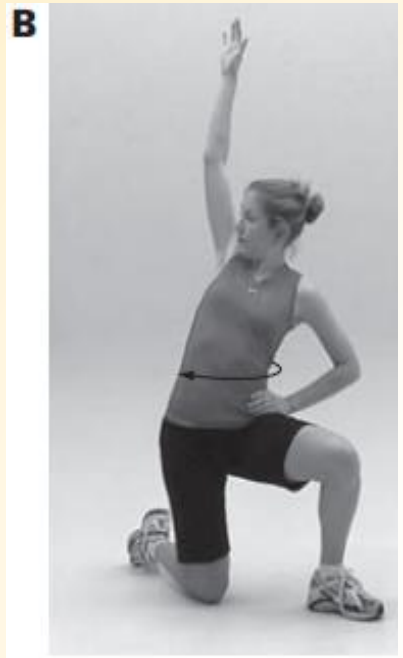
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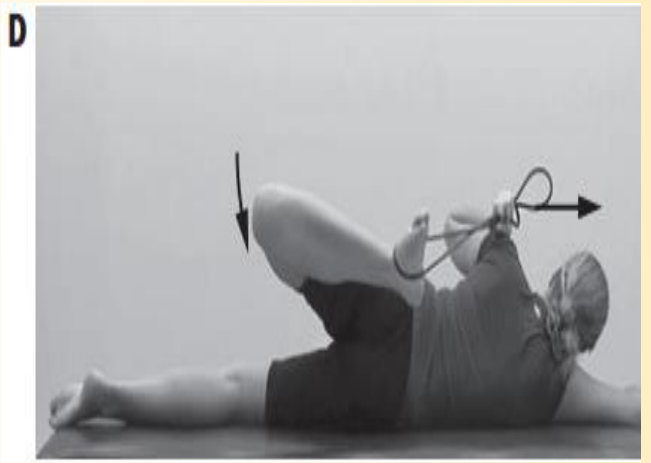
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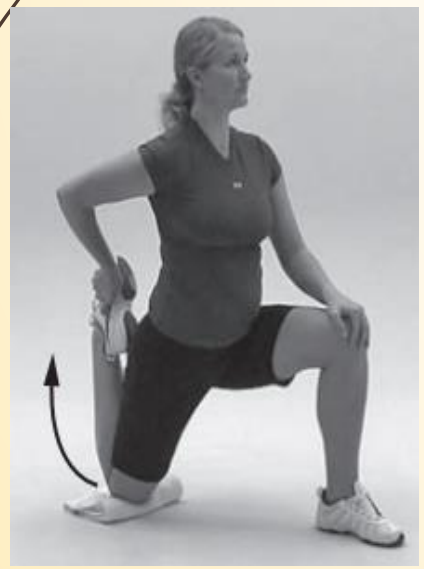

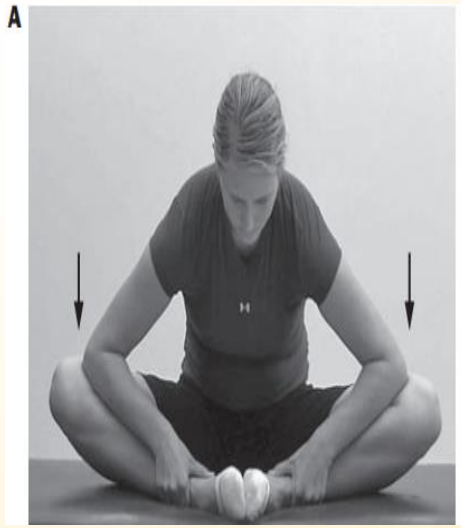
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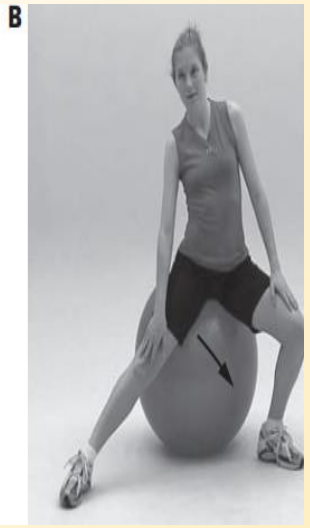
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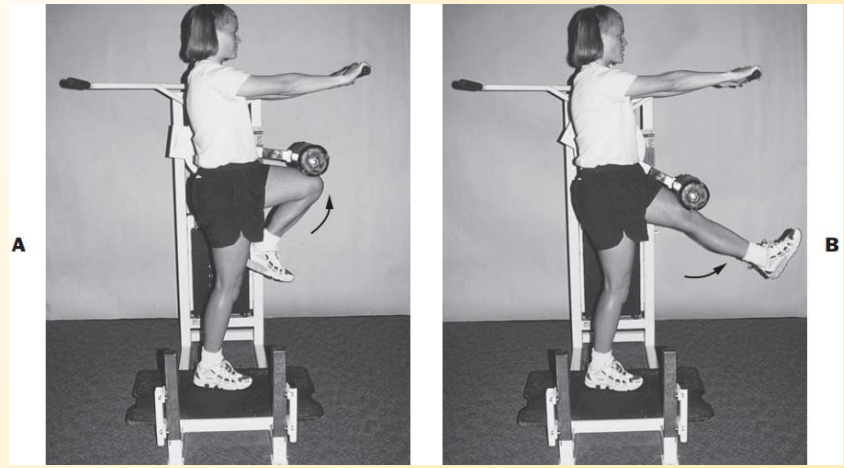
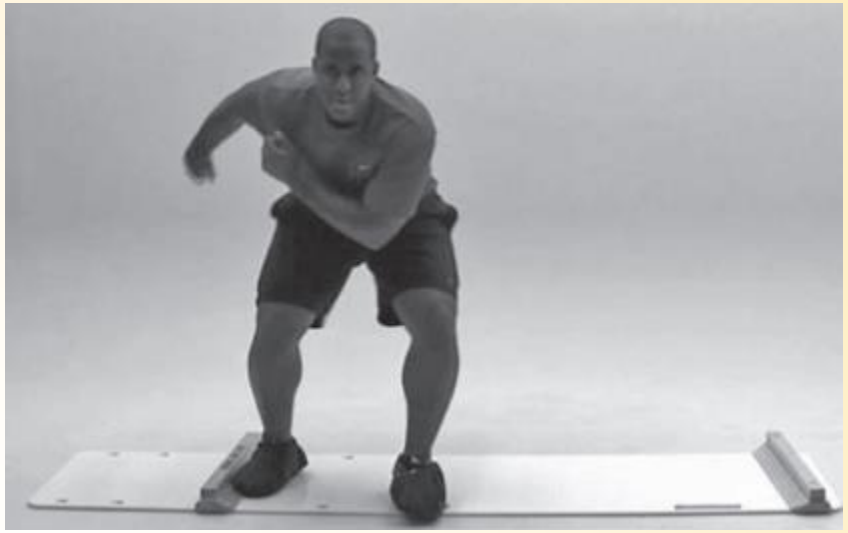
- begin progressive resistive strengthening exercises



slide board exercises



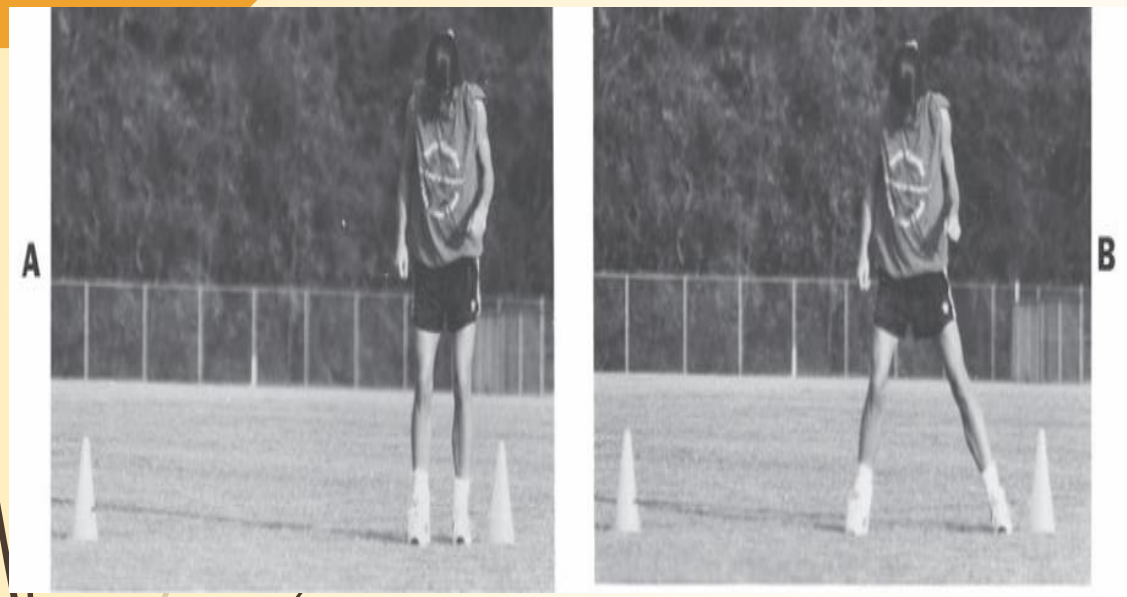
Plyometric

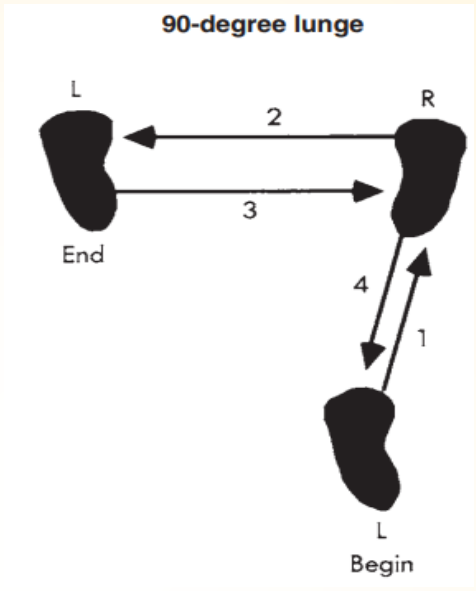
Plyometric jump-down exercises

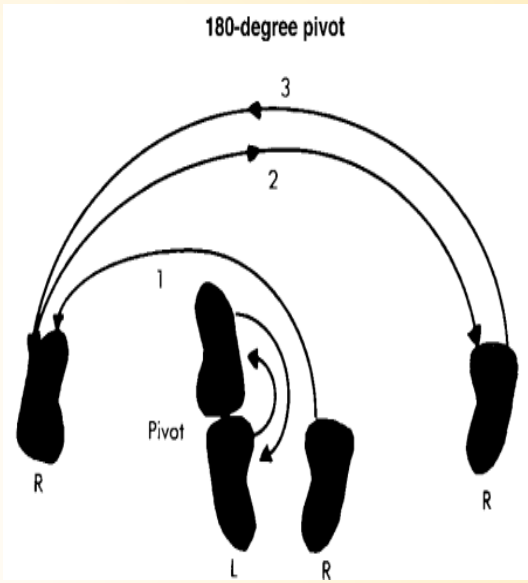
Lateral bounding.

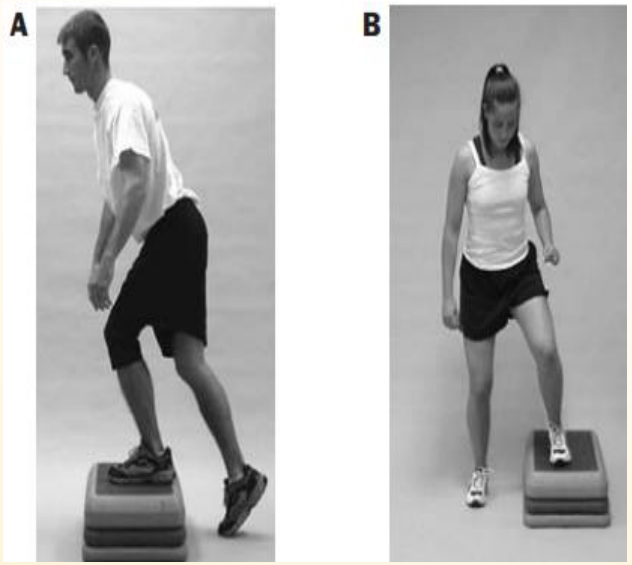
Lateral sliding

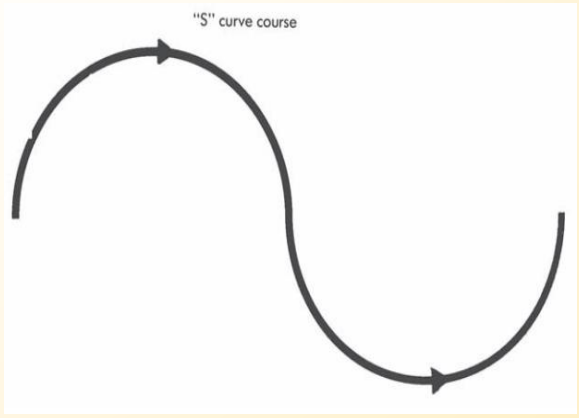
- sport-specific functional activities.

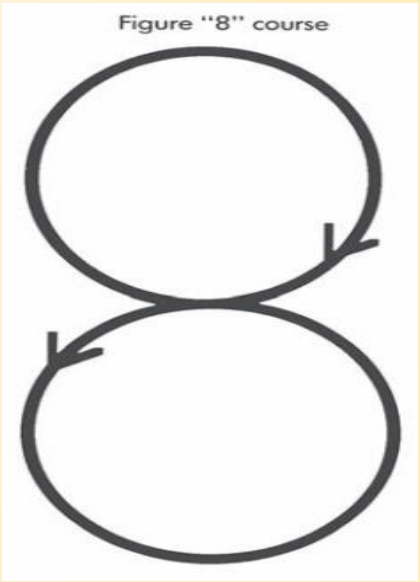




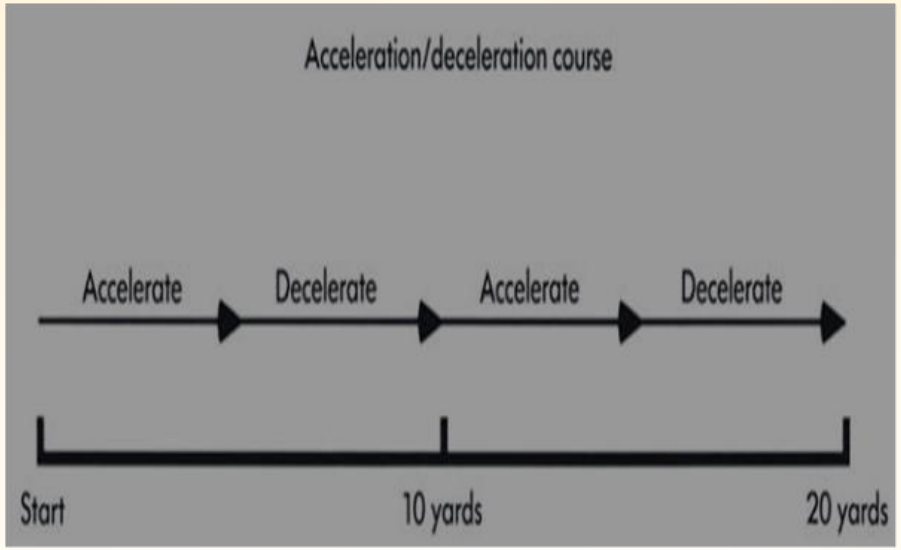


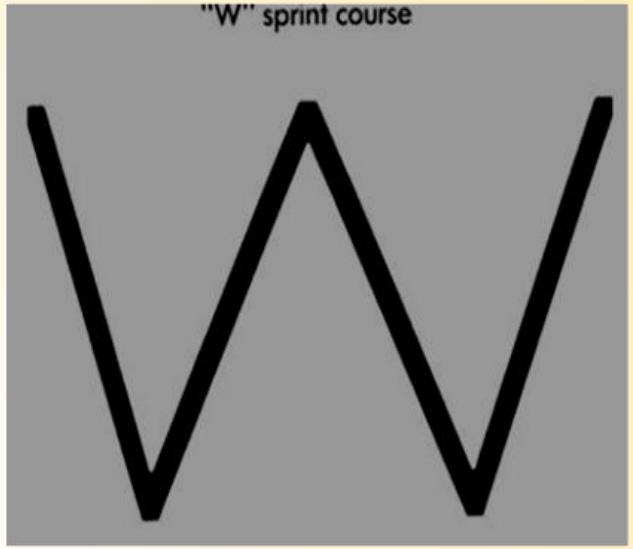


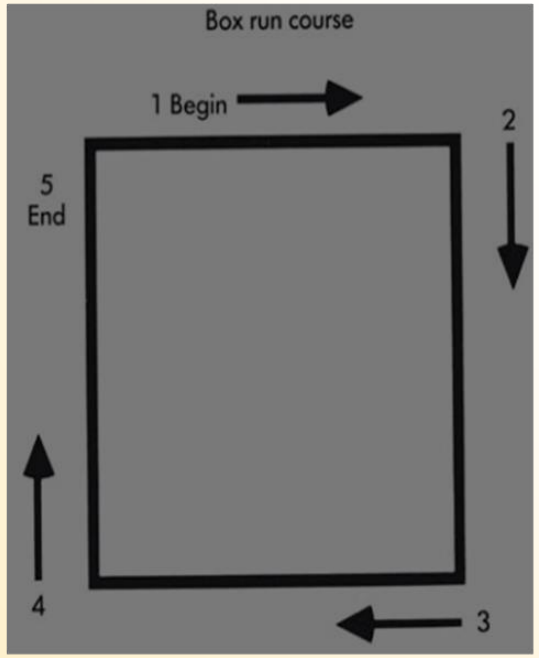


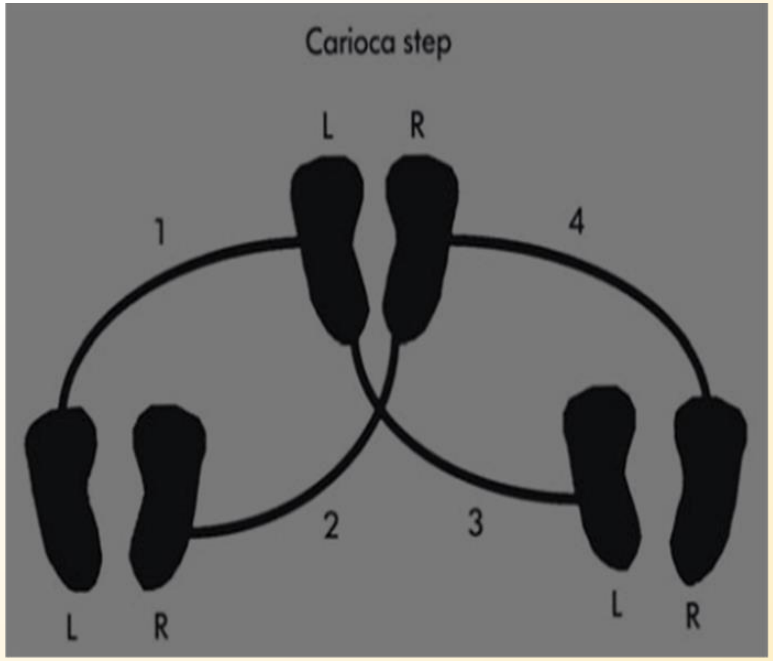



"Z" course (zigzag)


Acceleration/deceleration course
Accelerate
Decelerate
Accelerate
Decelerate
Start
10 yards
20 yards


"W" sprint course


Box run course
1 Begin
2
3
4
5
End


Carioca step
L
R
1
2
3
4
L
R
L
R

<u>A patient with a grade 2 strain should be started immediately,</u>
with gentle, pain-free, AROM exercises of the hip.
Electrical muscle stimulation modalities
Isometrics should also be performed as soon as they can be managed without pain. If crutches are used, a normal gait cycle is taught.
pain-free stretching as soon as possible
As soon as pain allows, pain-free strengthening exercise, (flexion and adduction strengthening exercises).

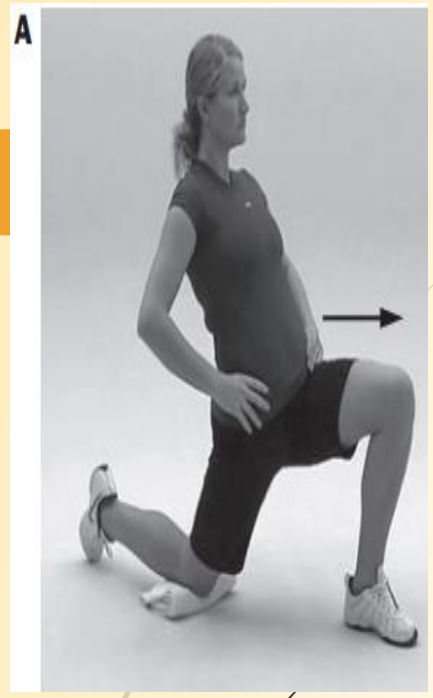




- After approximately 1 week, pain free slide board exercises
- plyometrics
- sport-specific functional drills.

A patient with a grade 3 strain should be

- iced, immobilized, and NWB.
- Electrical muscle stimulation modalities are useful in the acute stage to decrease inflammation and pain and to promote ROM.
- If the iliopsoas is involved, passive stretching with ice can be started after the third day.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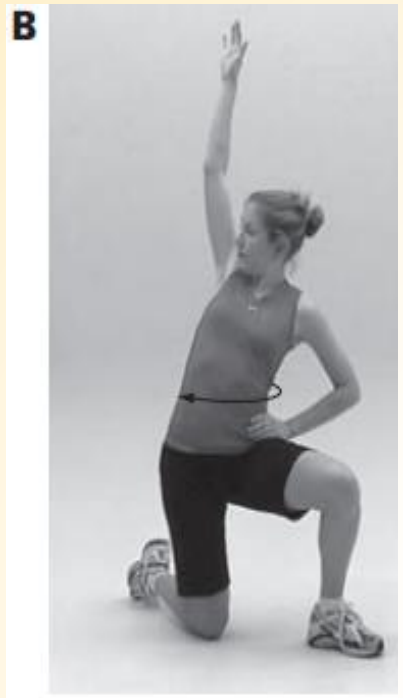
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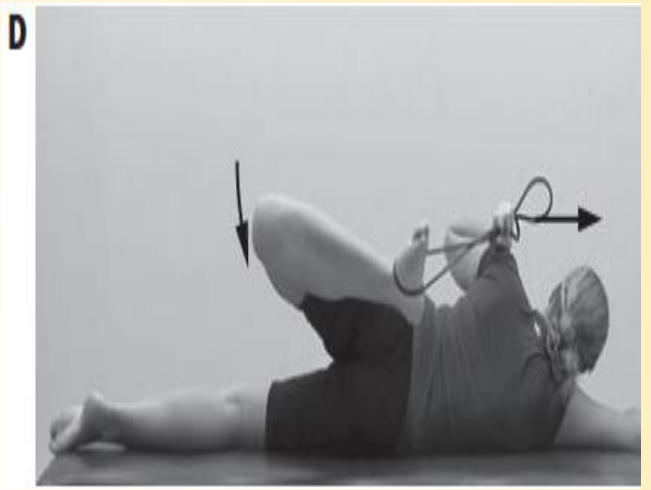
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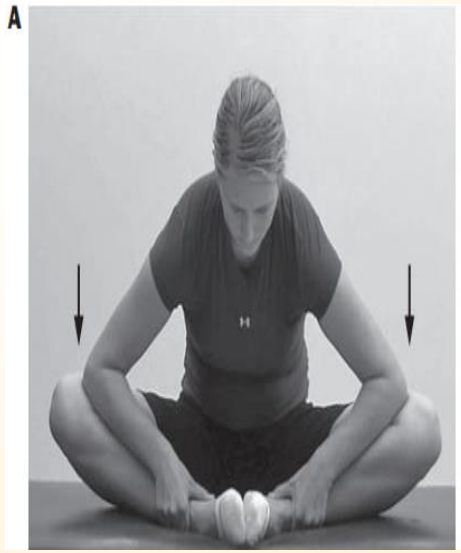
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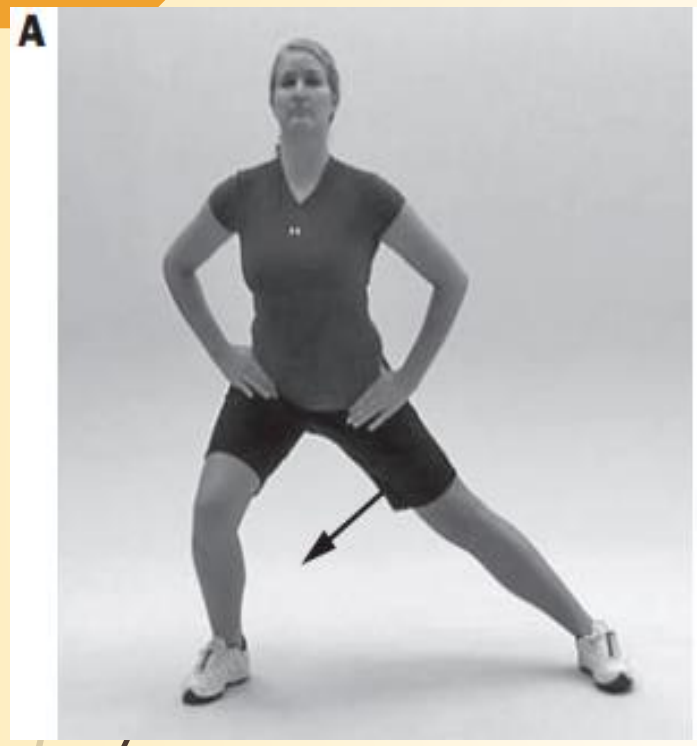
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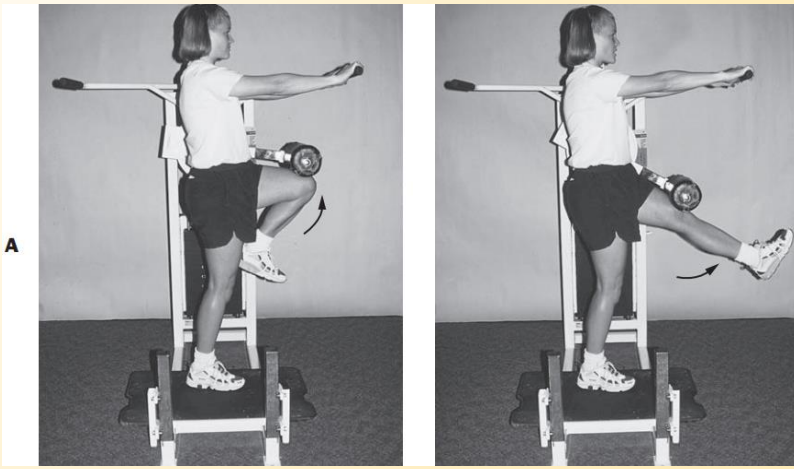
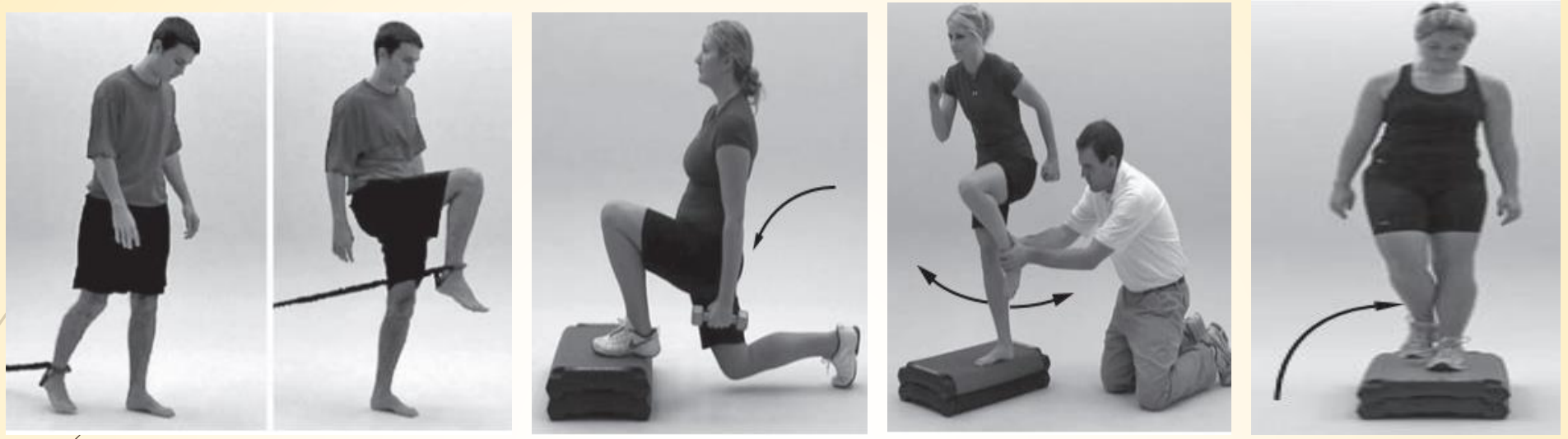
B

- pain free isometric exercises between days 3 and 5.
- Slow, pain-free, AROM exercises may also be performed between days 3 and 5.
- Between days 7 and 10, the patient may perform pain-free stretching exercises
- progressive resistive strengthening exercises without pain, progressing in weight and motion,



- flexion and adduction



- usually within 10 days after starting progressive resistive strengthening exercises, to perform pain-free slide board exercises
- Plyometric
- Sport-specific functional activities

Acetabular Labral Tears

- The acetabular labrum is a fibro-cartilaginous structure that extends from the osseous rim of the acetabulum and serves

Function

- The labrum structure deepens the socket of the hip joint and acts as a buffer, decreasing forces transmitted to the articular cartilage.
- Hip stability.
- The labrum also contains free nerve endings that have been suggested to play a potential role in proprioception and potential sources of pain.

signs

- Acetabular labral tears have recently been identified as a potential source of hip pain and a possible precursor to hip OA.

prevalence

- In patients with mechanical hip pain, the prevalence of labral tears has been reported to be as high as 90%.
- An increased incidence of acetabular labral tears in those individuals who subject the hip joint to specific repetitive stress
- Increasing age may be associated with the prevalence of labral tears. Tears have been observed in up to 96% of older individuals.

Mechanism of injury

Acetabular labral tears may occur as the result of acute trauma or of insidious onset.

- Traumatic mechanisms described involve rapid twisting, pivoting, or falling motions.
- A common mechanism in the athletic population includes forceful rotation with the hip in a hyperextended position.

Risk factors

- Overuse — people who play sports that require repetitive twisting and pivoting are at a higher risk of suffering from a labral tear or strain.
- Structural abnormalities — people who were born with hip abnormalities are at higher risk for a hip labral tear or strain.
- Pre-existing hip conditions — people who have other hip issues, such as femoroacetabular impingement, are at higher risk from suffering from a labral tear.

diagnosis

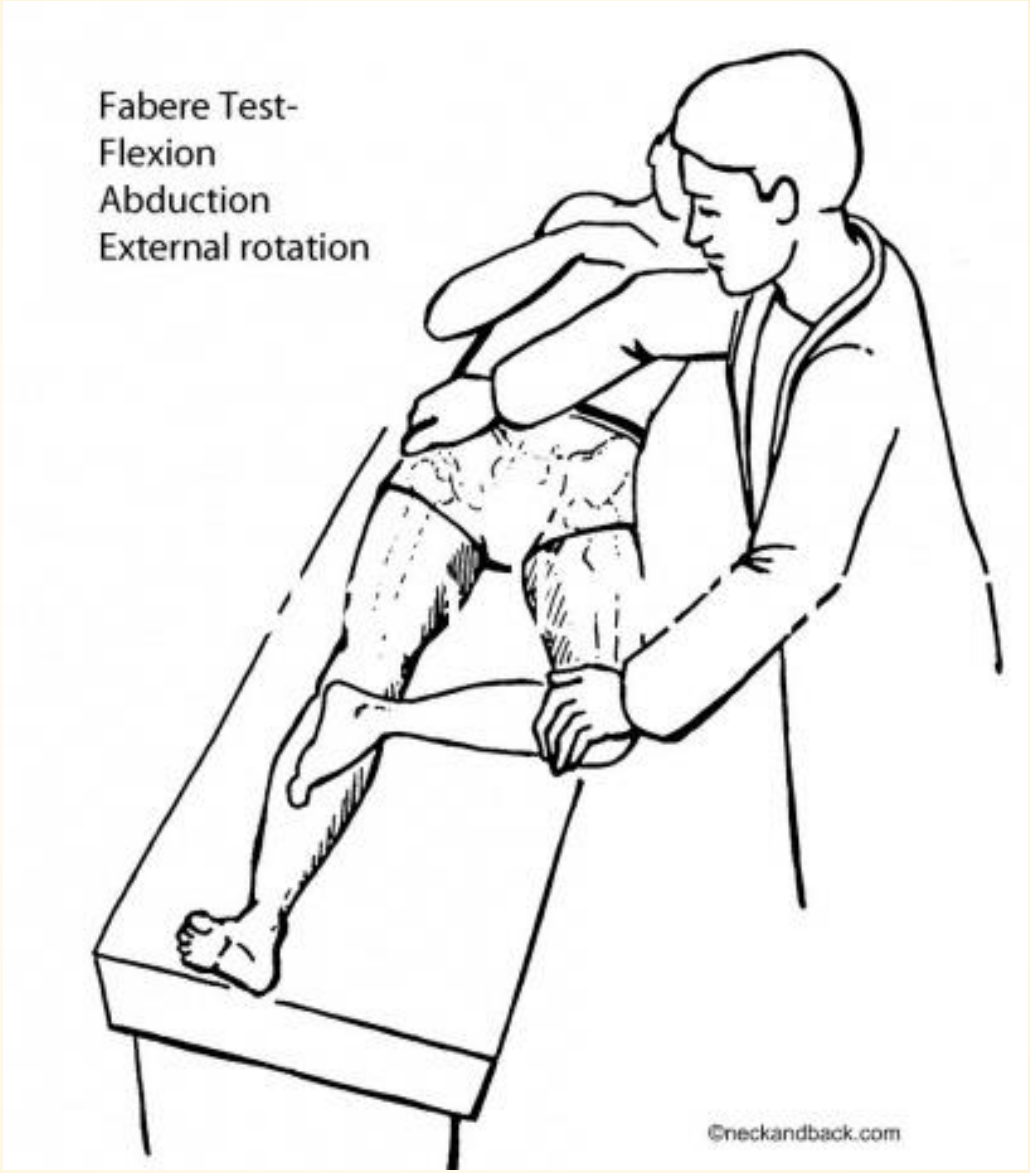
- **The diagnosis** of a labral tear is often delayed, and it is often misdiagnosed.
- The diagnosis of labral tear when the *patient presents with the following clinical and imaging findings:*

a. The patient will complain of increased pain with **sitting** and **climbing stairs,** along with possible clicking, locking, and/or giving way during WB activities.

b. The pain will be located in the groin, buttock, trochanteric region, thigh, or any possible combination of these areas.

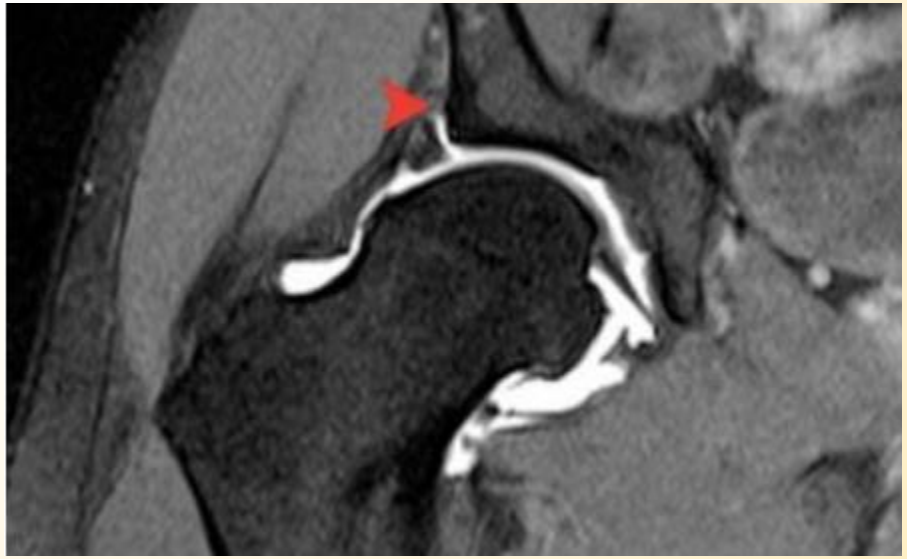
c. the patient will present with pain and possible limitation during passive internal rotation with the hip flexed.

d. the pain will increase with the modified circumduction test.

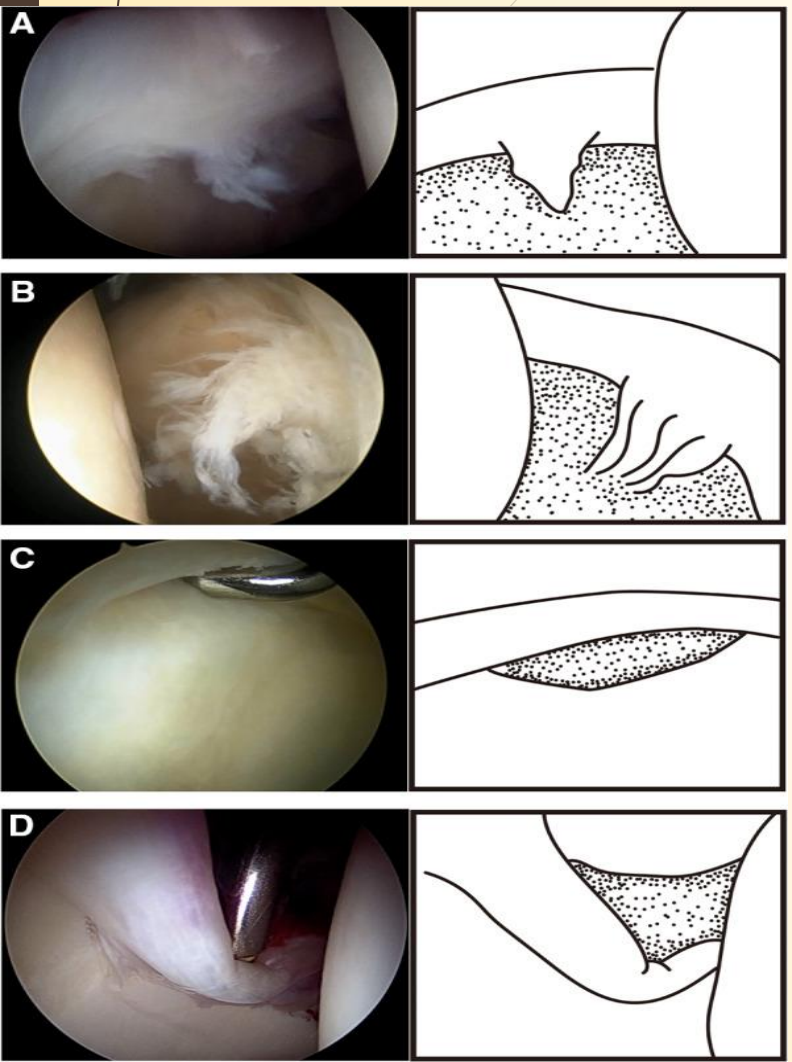

Fabere Test-
Flexion
Abduction
External rotation
©neckandback.com

Imaging studies

- MRI arthrogram of the hip – the arrow is showing Contrast behind the labrum; this can only happen if the labrum is torn



classifications



an arthroscopic labral classification that included four types of tears:

a. Radial flap labral tears are related to damage to the free margin of the labrum (Fig. A).
b. Radial fibrillated labral tears are caused by the degeneration of the labrum, and the damaged labrum forms the shape of a shaving brush (Fig. B).
c. Longitudinal peripheral labral tears refer to longitudinal tears along the junction of the labrum and acetabulum (Fig. C).
d. Unstable labral tears are caused by subluxation and dysfunction of the labrum (Fig. D)

Differential diagnosis

- Potential differential diagnoses for nonarthritic hip joint pain are:
  - **Hip osteoarthrosis**
  - **Legg-Calvé-Perthes disease**
  - **Rheumatoid arthritis**

Referred pain from lumbar disc disorders

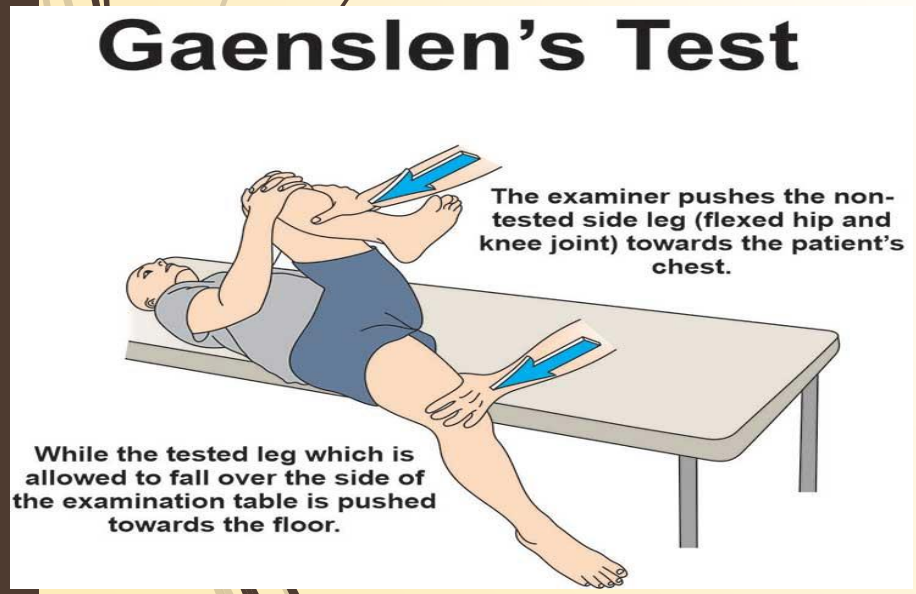
- The lumbar spine can be screened with active movements in standing (flexion, extension, and lateral flexion) to attempt to provoke the patient's symptoms.

- Straight leg raise distal initiation (SLRDI).

Slump distal initiation (SDI)

SIJ dysfunction: These tests include

- Gaenslen tests in supine
- thigh thrust test
- sacral thrust test in prone.



Adductor strain

- Adductor longus and brevis tendinopathy are most painful during resisted hip adduction with the hip positioned in neutral (no flexion or extension).

- Gracilis tendinopathy will be most painful with resisted hip adduction in the same position, along with painful resisted knee flexion. This is due to the gracilis being a biarticular muscle that crosses the hip and the knee.

- Pectineus tendinopathy presents with greatest pain provocation during resisted hip flexion and resisted hip adduction with the hip positioned in 90° of flexion

Physical Therapy Management

The rehabilitation protocol following acetabular labral debridement or repair are divided into four phases.

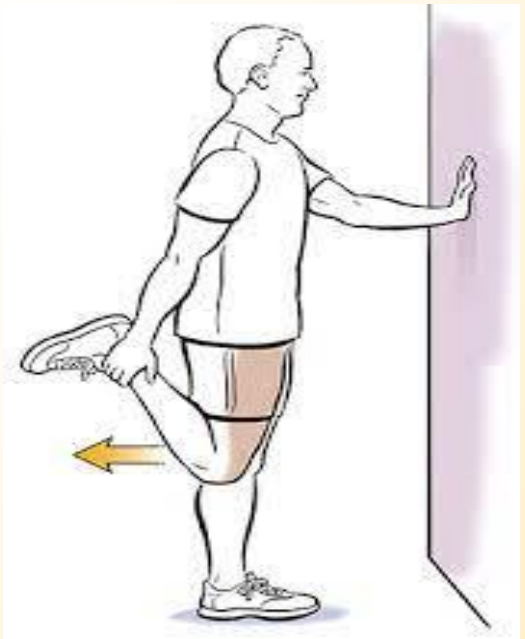
Phase 1. Initial exercise (week 1-4)

Goals:

1. To the minimize pain and the inflammation.
2. To initiate early motion exercises.

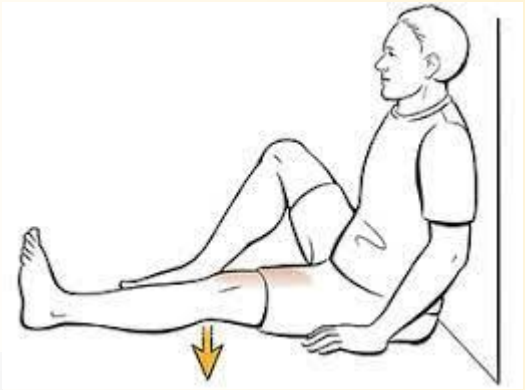
Phase 1(1-4w)

- **Gentle stretching** of hip muscle groups including piriformis, psoas, quadriceps, hamstring muscles with PROM.
- **Stationary bike** without resistance, with seat height that limits the hip to less than 90°

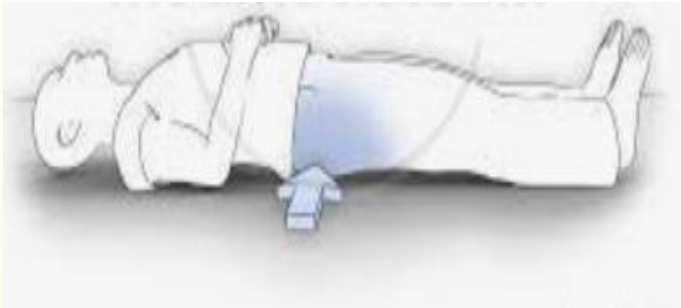


- Exercises such as: water walking, ankle pumps.

- Quadriceps set



- Gluteal set



- Weight shift exercise

- Balance exercise

Initial Exercises

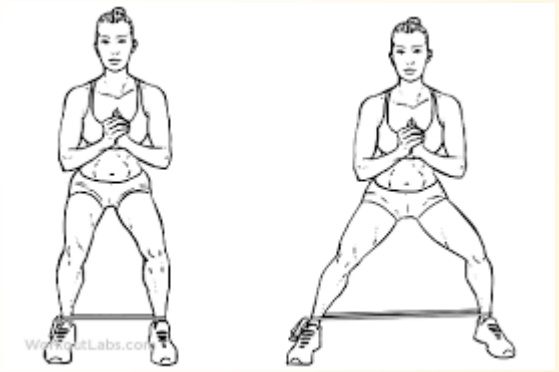
- Isometric contraction exercises for the hip adductors, abductors, transverse abdominals and extensor muscles.
- **Weight bearing protocol** following a debridement is 50% for 7 to 10 days.
- **Non-weight bearing** or toe-touch weight bearing for 3 to 6 weeks in case of a labral repair.

Phase 2. Intermediate exercise (week 5-7)

- To progress to phase 2, ROM has to be greater or equal to 75%.
- The goal of this phase is to continue to improve ROM and soft tissue flexibility .

Phase 2. Intermediate exercise (week 5-7)

1. Flexibility exercises involving the piriformis, adductor group, psoas/rectus femoris should continue
2. Stationary bike with resistance
3. Sidestepping with an abductor band
4. Core strengthening such as bridging
5. Non-competitive swimming
6. Exercises such as wall sits with abductor band, two leg b

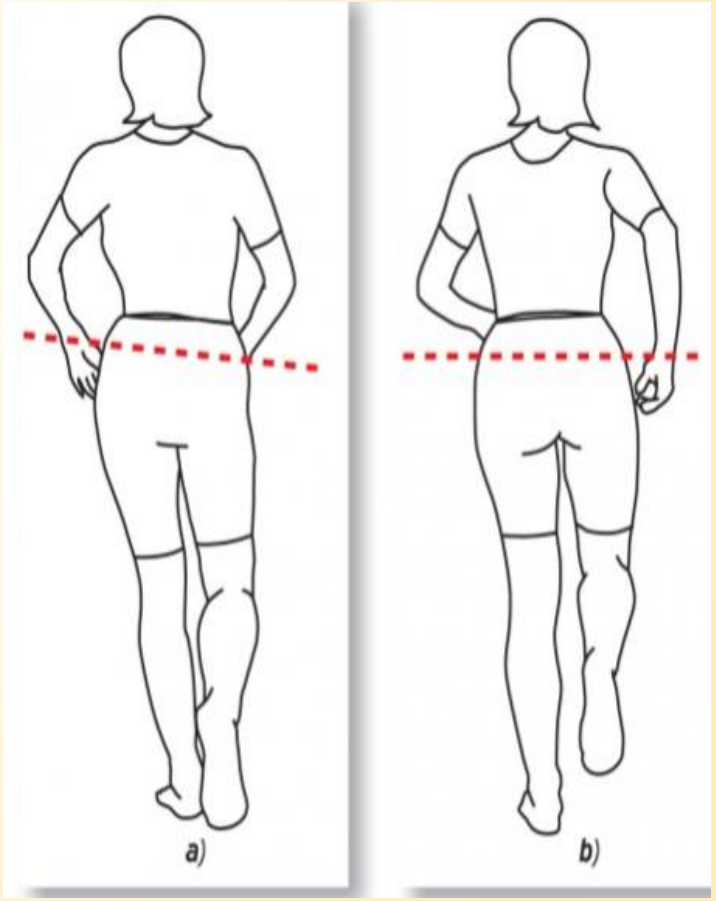


Phase 3. Advanced Exercise (week 8-12)

To progress to the third phase:

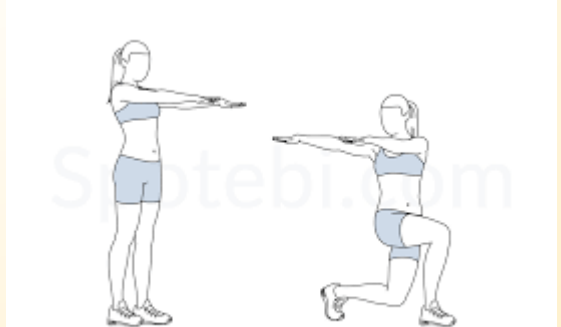
1. It is important that the patient has a normal gait pattern with no **trendlenburg sign**.

2. The patient should have symmetrical and passive ROM measurement with minimal complaints of pain.



Exercises For 3rd Phase

1. Flexibility and PROM interventions should become slightly more aggressive if the limitations persist (if the patient has reached his FROM or flexibility, terminal stretches should be initiated)
2. Strengthening exercises: walking lunges, lunges with trunk rotations, walking forward/backwards, plyometric bounding in the water.
3. core ball stabilization
4. Manual therapy such as soft tissue or joint mobilizati



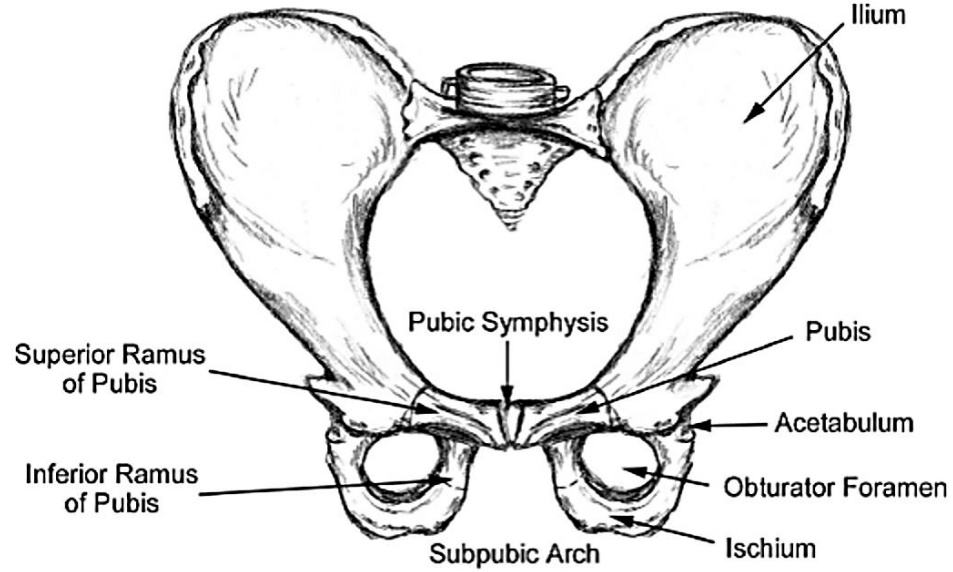
Phase 4. Sport specific training week (12-16)

- To progress to the forth phases it is important that there is symmetrical ROM and flexibility of the psoas and piriformis.
- It is important the patient has good muscular endurance, good eccentric muscle control, and the ability to generate power.
- The patient can be given sport specific exercises and has to have the ability to demonstrate a good neuromuscular control of the lower extremity during the activities.

Osteitis Pubis

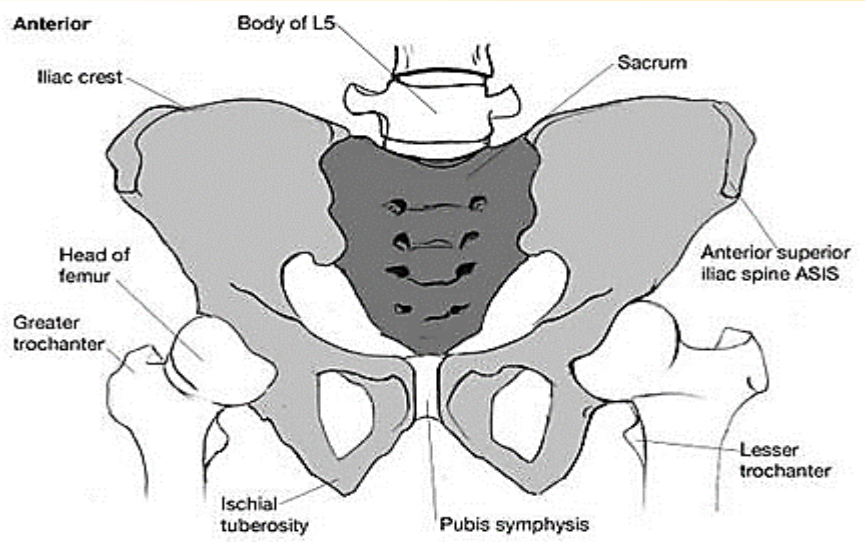
Anatomy

- The pubic symphysis is a thin joint which under normal circumstances has very minimal motion. In osteitis pubis, or with other types of groin pain, the pubic symphysis can be slightly out of line, with one side higher or lower, or further forward or back than the other. Pain in this area can inhibit the muscles around the pelvis, altering the stability of the pelvic ring, resulting in more torsional forces through the pubic symphysis during movement and walking. It is this malalignment and excess movement that can result in inflammation and pain.



Definition

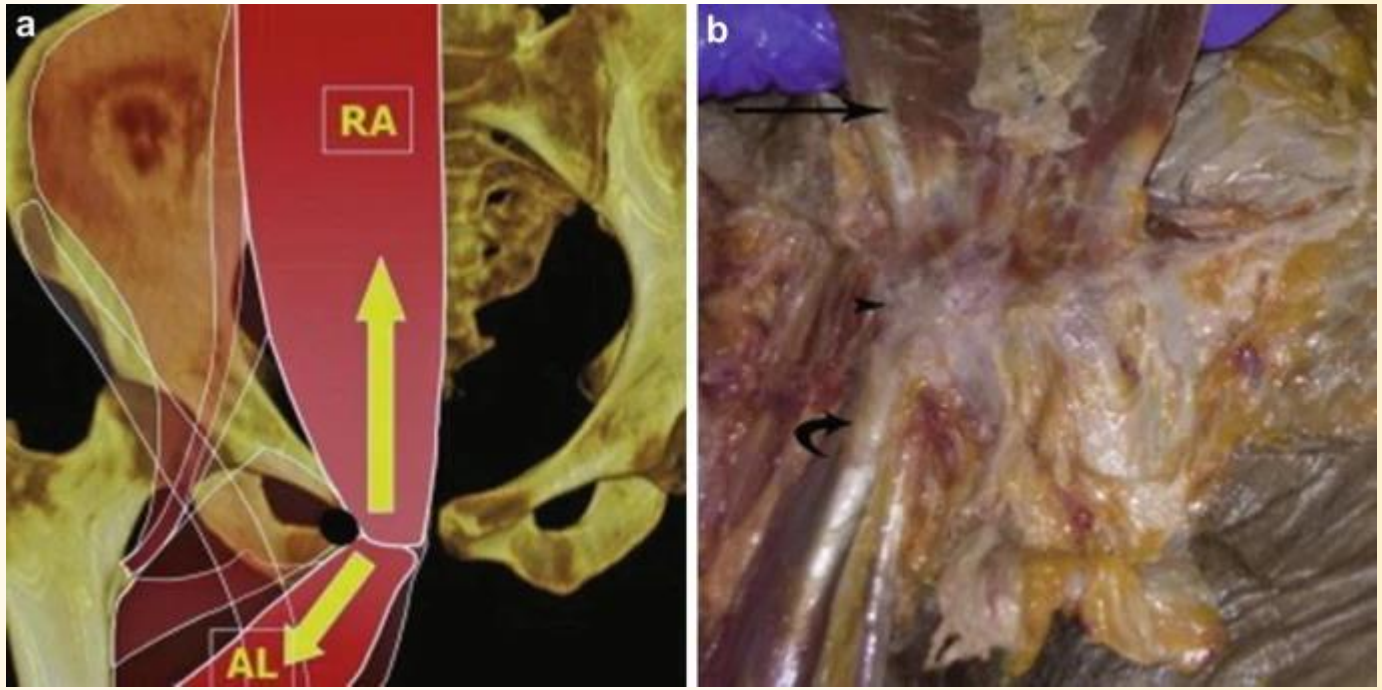
- Osteitis pubis is a chronic groin pain that has been reported in runners and soccer players
- Osteitis pubis (OP) is a non-infectious, chronic inflammatory state of the pubic symphysis and surrounding soft tissues with multiple etiologies, resulting in groin or lower abdominal pain.



Epidemiology

- The incidence in athletes has been reported as 0.5% to 8%, with a higher incidence in distance runners and athletes in kicking sports, in particular, male soccer players who account for 10% to 18% of injuries per year. However, it is commonly accepted to be of higher incidence in previously mentioned athletic activities.

patholomechanics



Etiology

- Result from overuse stress injury of the pubic symphysis. The pubic symphysis is a fulcrum for muscles inserting and originating from the anterior pelvis, such as the rectus abdominis and adductor muscle complex, which are antagonistic.
- Repetitive use causing microtrauma or injury of anterior pelvic musculature results in muscle imbalance between the two. This imbalance disrupts the force distribution across the pubic symphysis altering the joint's
- Other, less commonly cited reasons for the development of osteitis pubis are rheumatologic disorders, prior urologic and gynecologic procedures, or pregnancy.

Clinical presentation

- Pain localized over the symphysis and radiating outward
- Patients with osteitis pubis often present with anterior and medial groin pain.
- Adductor pain or lower abdominal pain that then localizes to the pubic area
- Pain is worsened by activities such as turning, walking, coughing, sneezing, lying on one side, and walking up or down stairs.
- In severe cases a waddling antalgic gait and crepitus may be present in individuals with osteitis pubis or while doing daily activities.
- Commonly experience tenderness around the pubic symphysis and pubic ramus, along with painful muscle spasms in the adductor region.

Stages of osteitis pubis

Stages	Side of pain	Site of pain	Characteristics of pain
1	Unilateral, dominant	Inguinal, with radiation to adductors	Pain alleviation after warm-up, pain exacerbation after training
2	Bilateral	Inguinal and adductors	Pain exacerbation after training
3	Bilateral	Groin, adductor region, suprapubic, abdominal	During training, kicking, sprinting, turning. Cannot achieve training goals, forced to withdraw
4	Generalized	Generalized, radiation to lumbar region	Walking, getting up, straining at stool, simple activities of daily living

Risk factors

- Poor posture
  - Muscle weakness
  - Rapid increase in exercise intensity
  - Exercising on hard surfaces
  - Flat feet
  - Wearing inappropriate shoes when exercising
  - Tight muscles in the hip, groin, and buttocks

Physical examination

- The entire kinetic chain of the lower extremity can be involved requiring evaluation of the sacroiliac joint, hip labrum, femoroacetabular impingement, adductors, and abdominal muscles.
- Pathology at any of these locations can result in osteitis pubis for the reasons mentioned earlier.
- Patients with osteitis pubis often present with anterior and medial groin pain.

1. The spring test

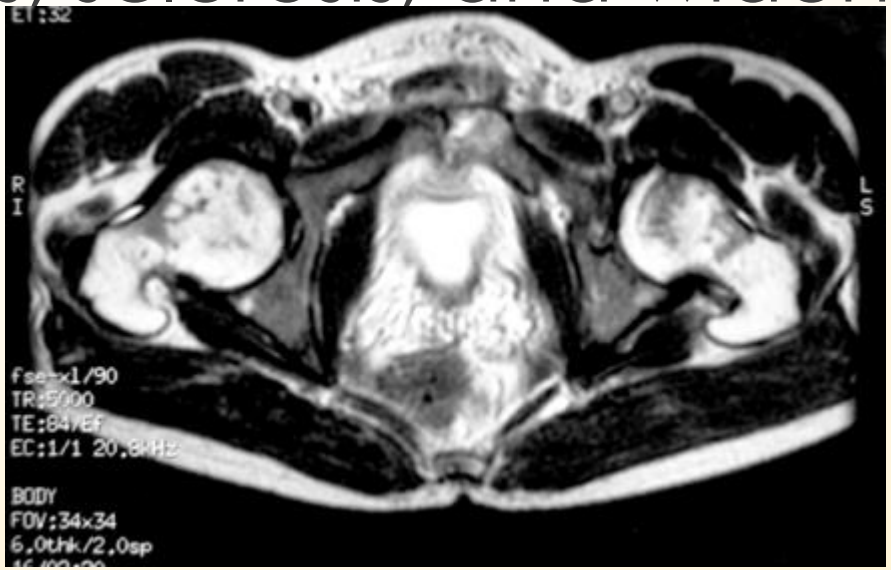
2. Single adductor, squeeze, and bilateral adductor tests.

3. Osteitis pubis’s common association with FAI, the hip joint must be evaluated.

- Patients with limited flexion, extension, or internal and external rotation of the hip should undergo evaluation.
- Patients presenting with either sacroiliac pathology or with FAI may have pain with the FABER test, which is flexion, abduction, and external rotation of the hip.

Radiograph

- Both radiographs and MRI aid in the diagnosis of osteitis pubis. In the early stage, plain radiographs might appear normal. In chronic osteitis pubis, the pubic symphysis demonstrates lytic changes, sclerosis, and widening.



Differential Diagnosis

- Athletic pubalgia
- Osteomyelitis
- Adductor strain
- Rectus Abdominus strain

	Osteomyelitis of the symphysis pubis	Osteitis pubis
Other synonyms	Infectious osteitis pubis Osteitis pubis purulenta	Non-infectious osteitis pubis Inflammatory osteitis pubis
Past history	Recent pelvic surgery (Urologic, gynaecologic, or general surgery) Spontaneous trauma (athletics) TRUS guided prostate biopsy IV Drug users Ankylosing spondylitis and rheumatic diseases	
Presentation	Suprapubic or groin pain Limitation of movements with classic waddling gait	
Constitutional symptoms	High grade fever Toxic look and generalised malaise and fatiguability	Low grade fever (occasional) Generally well patients
Examination	Tenderness over suprapubic area Special tests: Spring test and FABER test can reproduce the symptoms	

Intra-articular pathologies	Extra-articular pathologies	Non-musculoskeletal disorders
Femoroacetabular Impingement Syndrome (FAI)	Insertional adductors and rectus abdominis tendinopathy	**Genitourinary**
Acetabular labral tears	Groin pain disruption	Adnexa torsion
Chondral lesions	Osteitis pubis	Nephrolithiasis
Femoral neck stress fractures	Adductor muscles injuries	Orchitis
Osteoarthrosis	Lumbar radiculopathy	Ovarian cystis
Transitory synovitis	Pubic ramus stress fracture	Pelvic inflammatory disease
Osteonecrosis of the femoral head	Apophyseal avulsion fractures	Urinary tract infections
Osteochondritis dissecans	Internal snapping hip syndrome	Endometriosis
Legg–Calvè–Perthes disease	Greater trochanter pain syndrome	Prostatitis
Epiphysiolysis of the femoral head	Sacroiliac joint disorders	Testicular cancer
Septic arthritis	Nerve entrapment	Testicular torsion
Oncologic process		**Intra-abdominal pathologies**
		Sports hernia
		Inguinal hernia
		Appendicitis
		Diverticulitis/Diverticulosis
		Lymphadenitis
		Inflammatory bowel disease

Rehabilitation

Phase I… (First 48 to 72 hours)

- This involves the application of R.I.C.E.R. **(R)** rest, **(I)** ice, **(C)** compression, **(E)** elevation and obtaining a **(R)** referral for appropriate medical treatment. The following two points are of most importance.
- Education and advice regarding activity modification, gradual return to activity when appropriate and correction of technique.
- Rest from aggravating activities
- Core stabilization

- Gentle prolonged stretching, except for the adductors and ischiopubic muscles, is started.
- Cycling on an exercise bike is introduced as cardiovascular training.

Phase II… (After the first 72 hours)

- applying **heat**,
- **very gentle stretching exercises**

1. ***Squatting Adductor and Groin Stretch***
2. ***Sitting Adductor and Groin Stretch***

- Manual techniques, including massage, dry needling and joint mobilisation to restore range of movement in the hip, lower back and sacral joints.

- Swiss balls and other aids are indicated for performing resistance and strengthening exercises of the pelvis, abdominal and gluteal muscles.

- Abdominal core isometrics targeting the transversus abdominis, abdominal crunches, gluteal bridges with and without resistance bands, Swiss ball exercises for abdominal core, manual hip strengthening and resistance hip strengthening with band are indicated

Phase III from 3 months to 12 months.

- Women generally take longer to recover than men.
- Very rarely, surgery may be required if the usual treatment is not effective.

- Eccentric abdominal wall strengthening exercises are started.
- eccentric hip exercises, side stepping with bands, lunge and squat exercises and progressive sport-specific training.
- Running is gradually increased, and changes of pace and direction are introduced.

Prognosis

- The prognosis of those with osteitis pubis is very good. Those treated conservatively return to sports in approximately 3 months with a low chance of recurrence. Only 5% to 10% of patients with osteitis pubis require surgery. Surgical outcomes are also very favorable, with an overwhelming return to sport at approximately 3 to 4 months

Preventing Recurrence

- If osteitis pubis and groin pain are treated by addressing all of the causes and not just the symptoms, there is a greater chance that the injury will not return, or if it does, it will not be as bad as it was initially. Most of the resistant cases are caused by problems with technique, biomechanics, visceral issues, surgeries, accidents and breathing issues, and by being thorough and addressing as many of the issues as possible, the sportsperson should be able to return to high level sport, often performing at a higher level, as many of these issues have been present for years, causing other minor injuries, until they result in this major injury, which then needs to be fully addressed and rehabilitated.

- Wear appropriate footwear when exercising. This will keep the hips stable and support them during physical activity.
- Warm up before exercising. This will prepare the muscles and joints of the body for activity.
- Strengthen the muscles around the pelvis. Abdominal and flexibility exercises are helpful in keeping this area in good condition.
- Drink water during and after exercise. This can prevent the muscles from cramping.

Thank you