Knee and Hip Pain

Presentation by :

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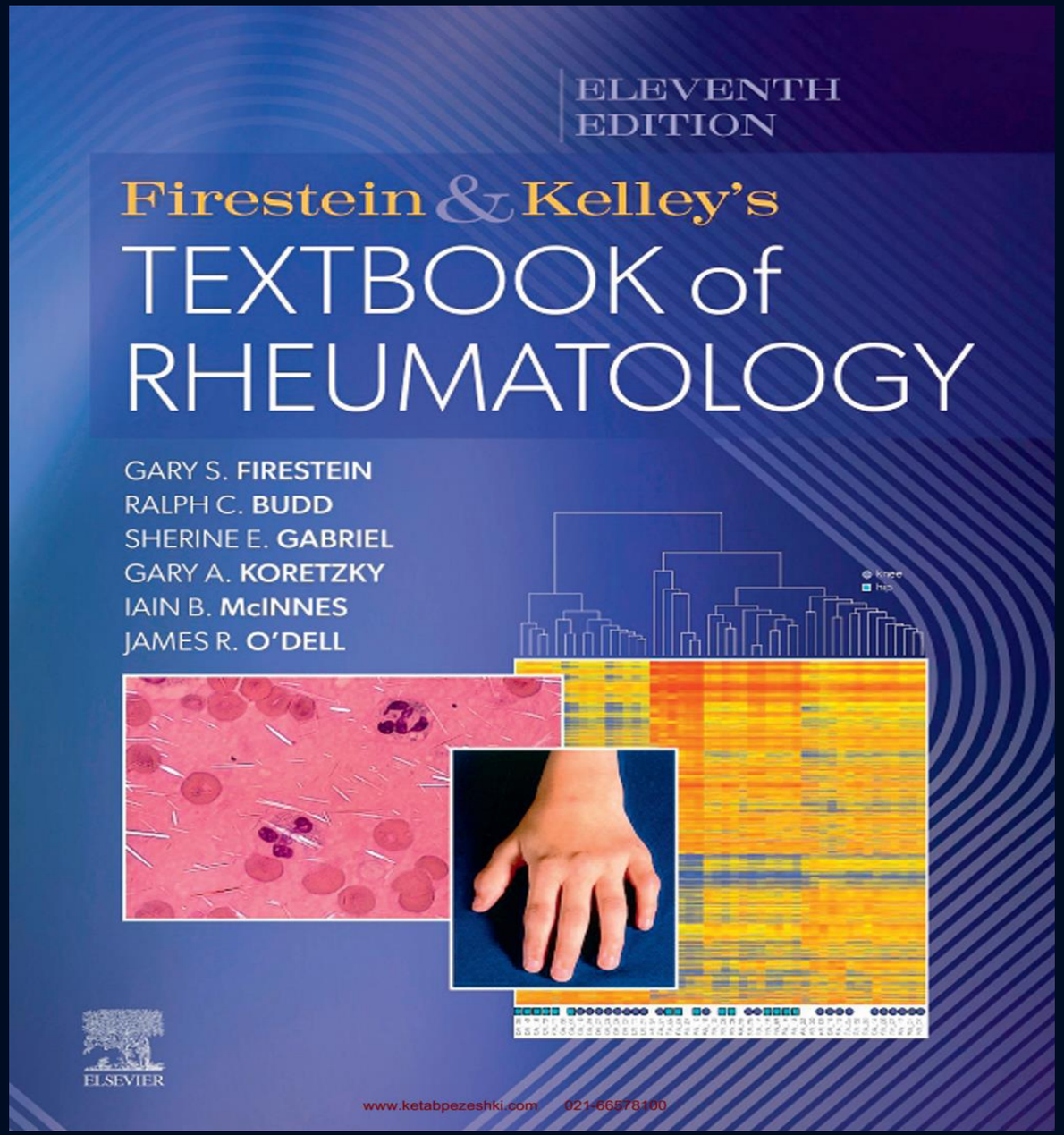
Loghman hospital_ SBMU

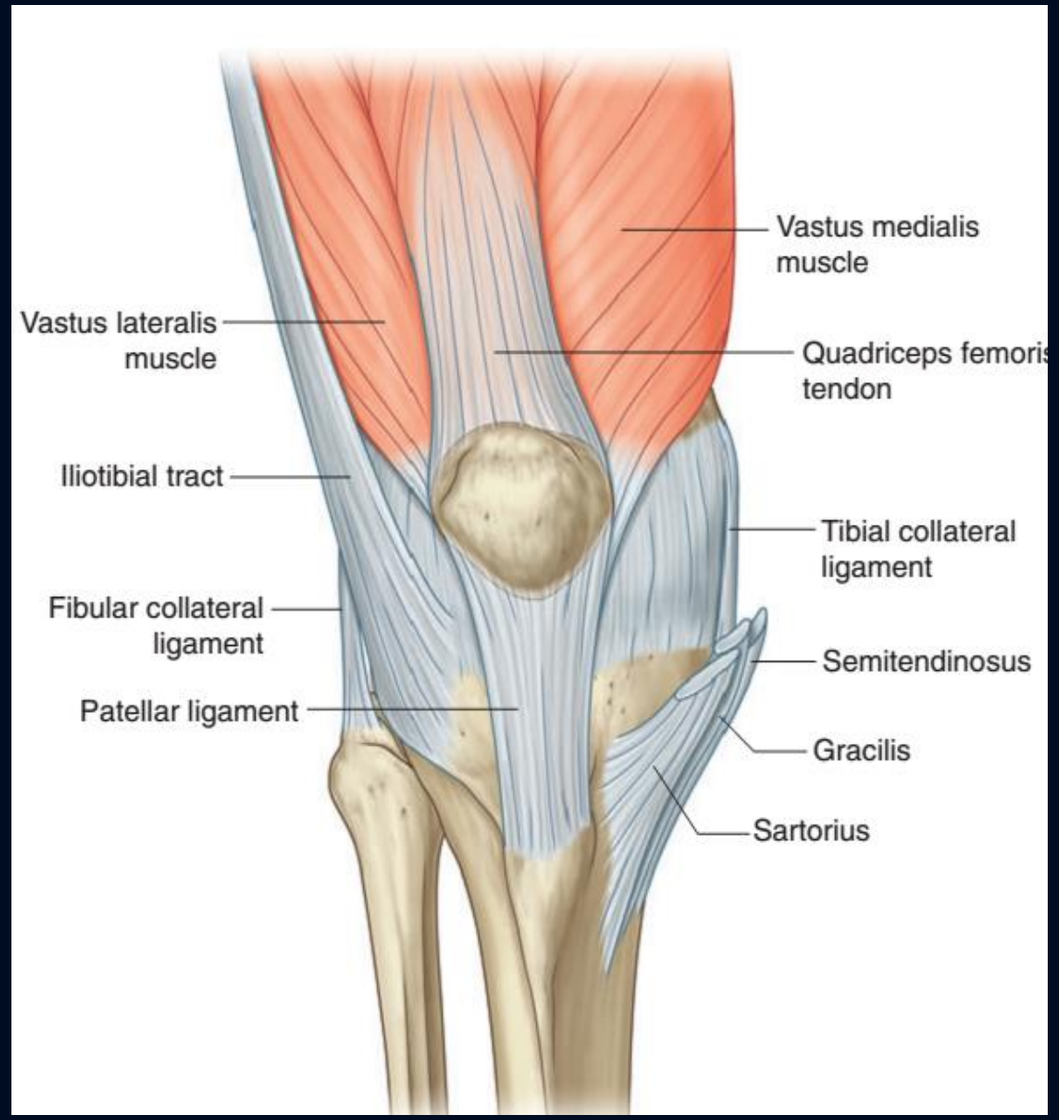


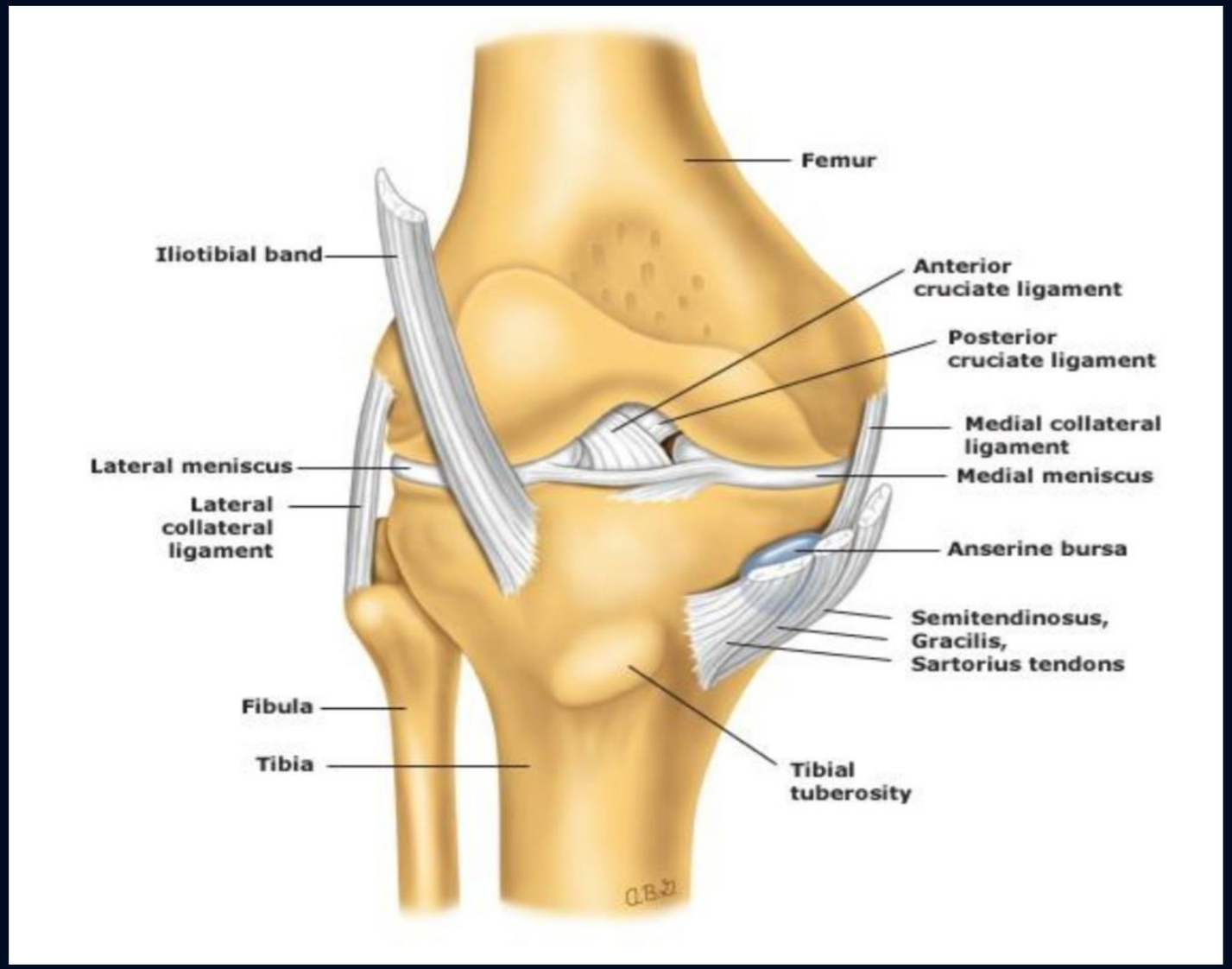
Introduction

- hip and knee joints : two of the most commonly affected sites of musculoskeletal pain
- Geographic and ethnic variations
- knowledge of the anatomy and basic biomechanics of these joints


Knee Pain

Knee anatomy





History

➢ Pain :

- articular surfaces , torn menisci ,quadriceps and patella tendon tears, bursitis , nerve damage, fractures, neoplasia, or infection
- Referred pain : less common

➢ Instability :

- usually episodic
- injuries to the quadriceps-patellar extensor mechanism , collateral ligaments , or cruciate ligaments
- distinguish true instability from the common complaint of “giving way”

History

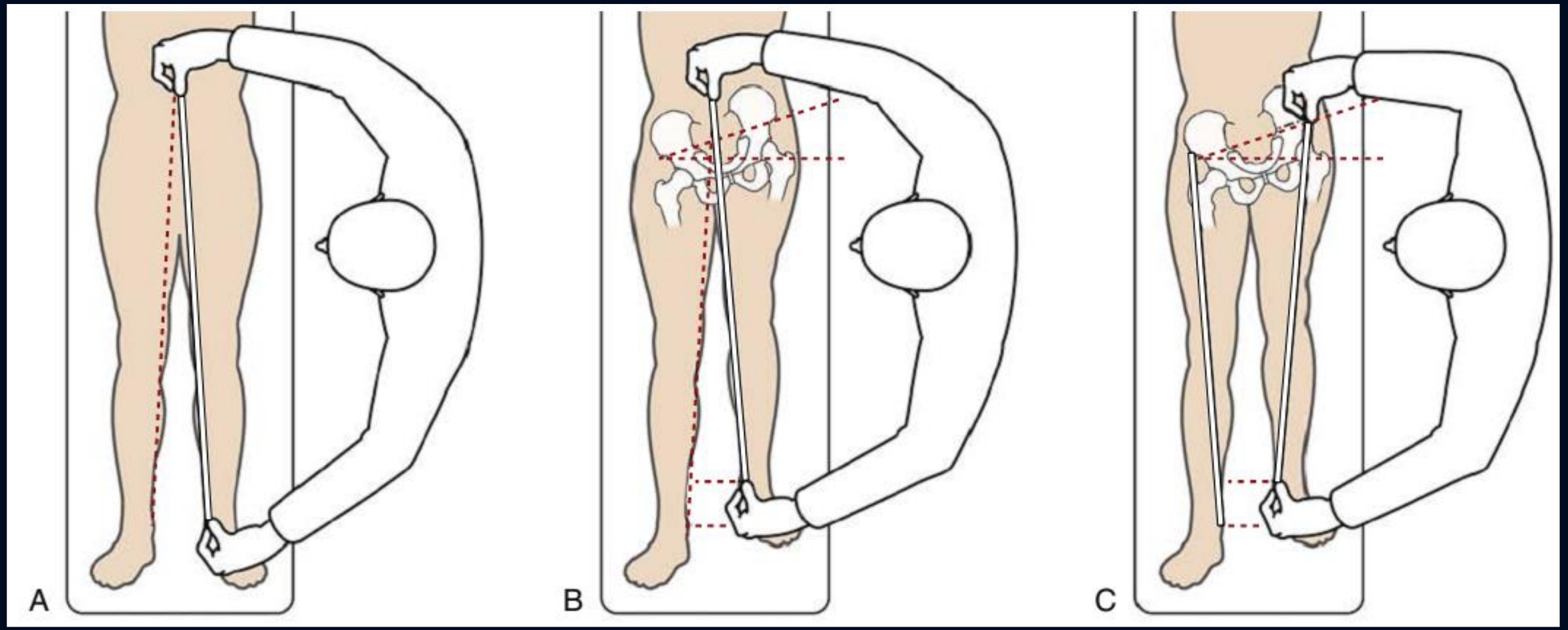
- People in certain age groups : similar injuries
- location and character of the pain
- onset of pain
- the details of a traumatic event
- Swelling and onset of the swelling

History

- locking and pseudolocking
- Timing of the pain with activity
- patient’s exercise tolerance , ability to perform activities of daily living,use of ambulatory assist devices, walking tolerance
- any previous treatments

Physical Examination : general

Assessment of coronal alignment



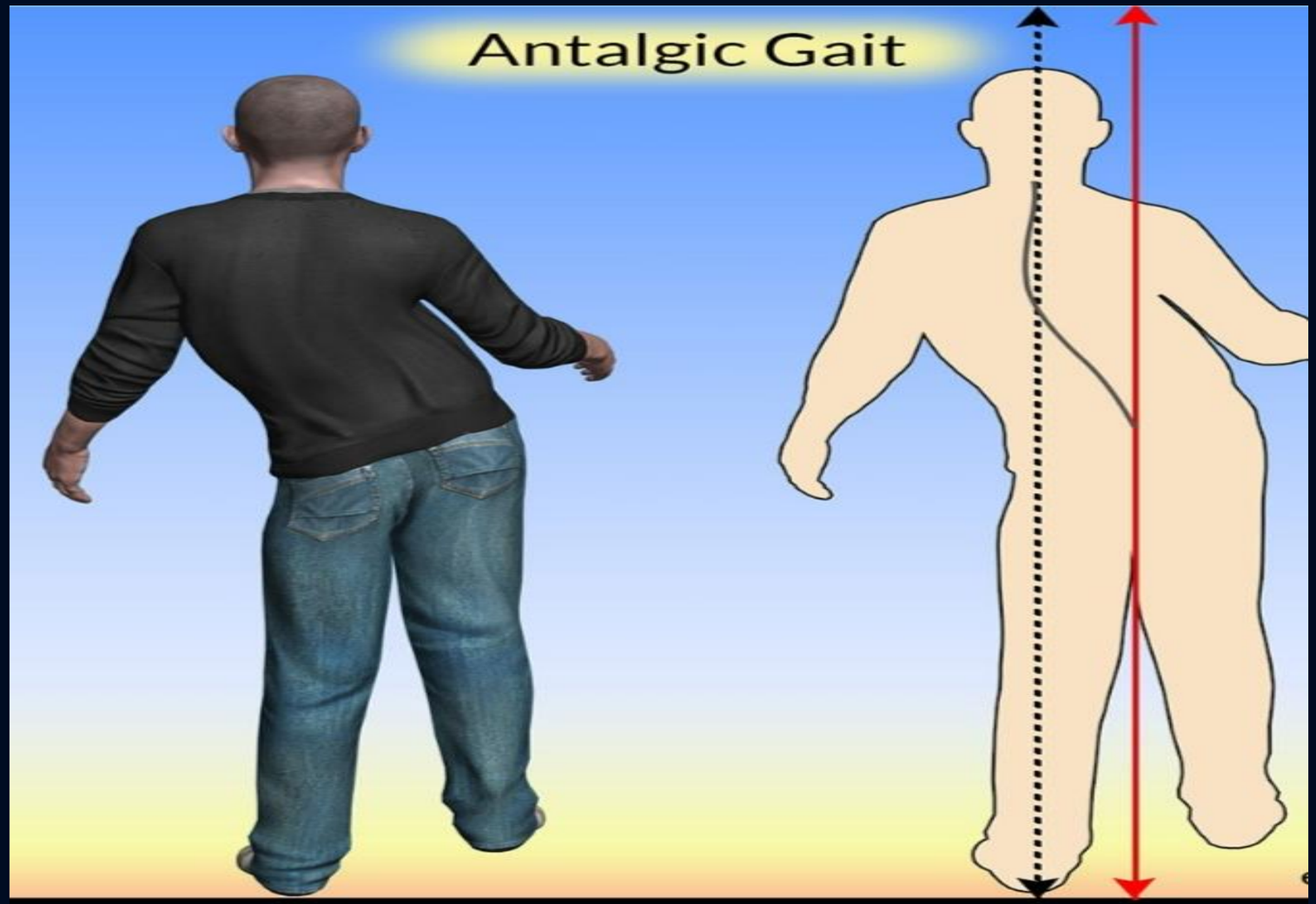
Measurement of leg lengths. (A) The **apparent leg length** is the distance from the umbilicus to the medial malleolus. (B) Pelvic obliquity causing an apparent leg-length discrepancy. (C) The **true leg length** is the distance from the anterior superior iliac spine to the medial malleolus.

Evaluation of leg lengths

Physical Examination : General

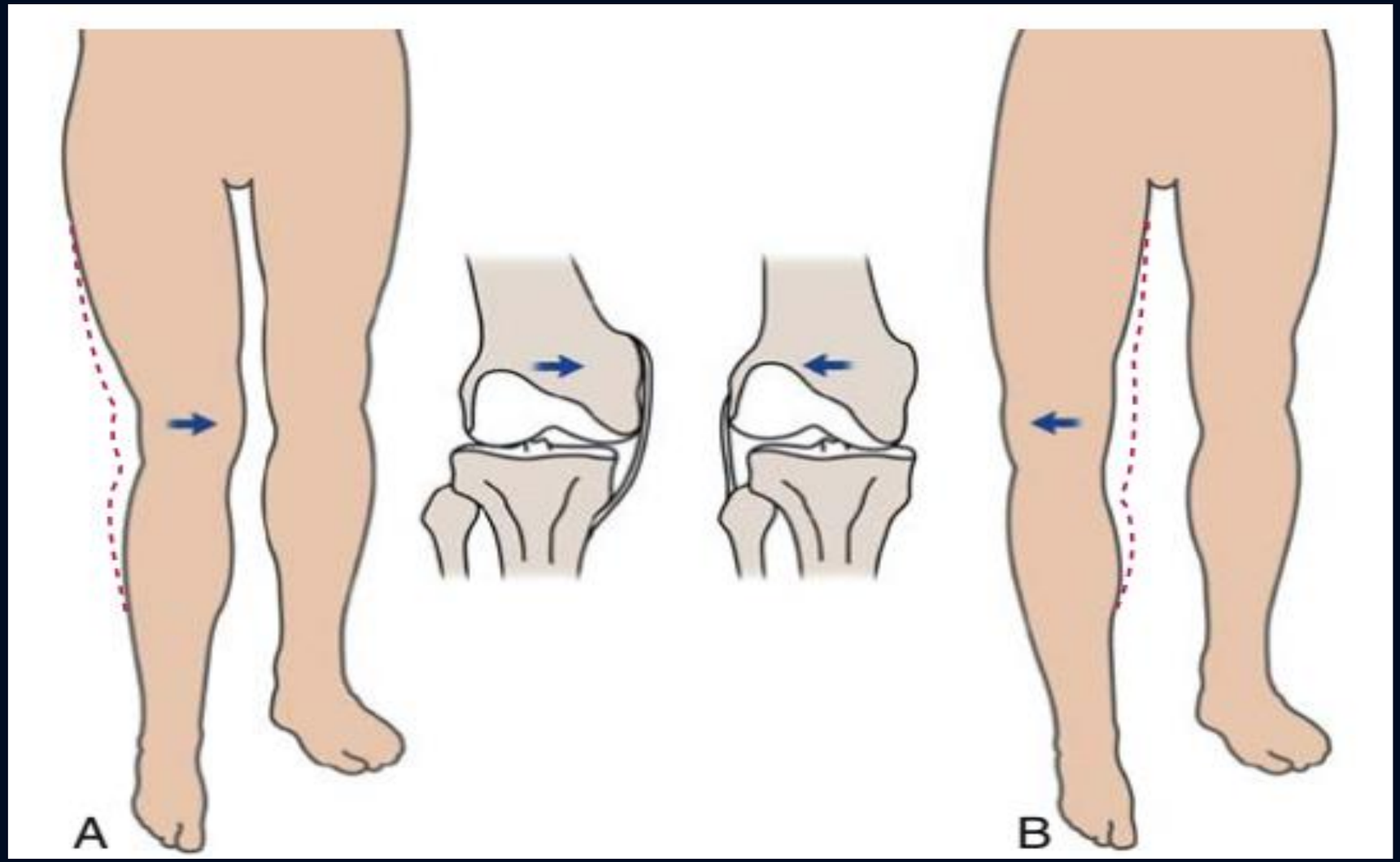
➢Gait

- **Antalgic gaits**



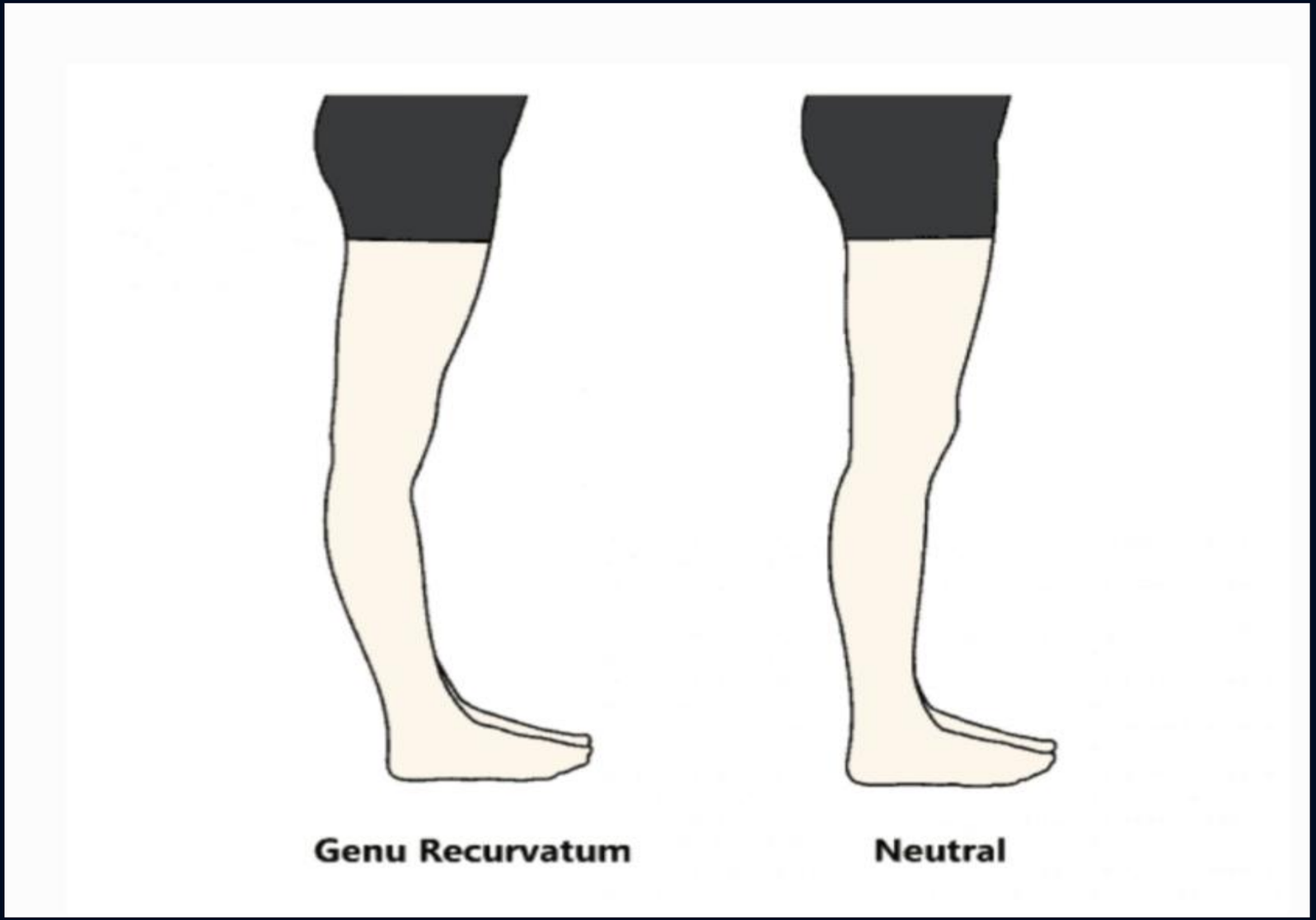
Physical Examination : General

- **Medial thrusts and Lateral thrusts**



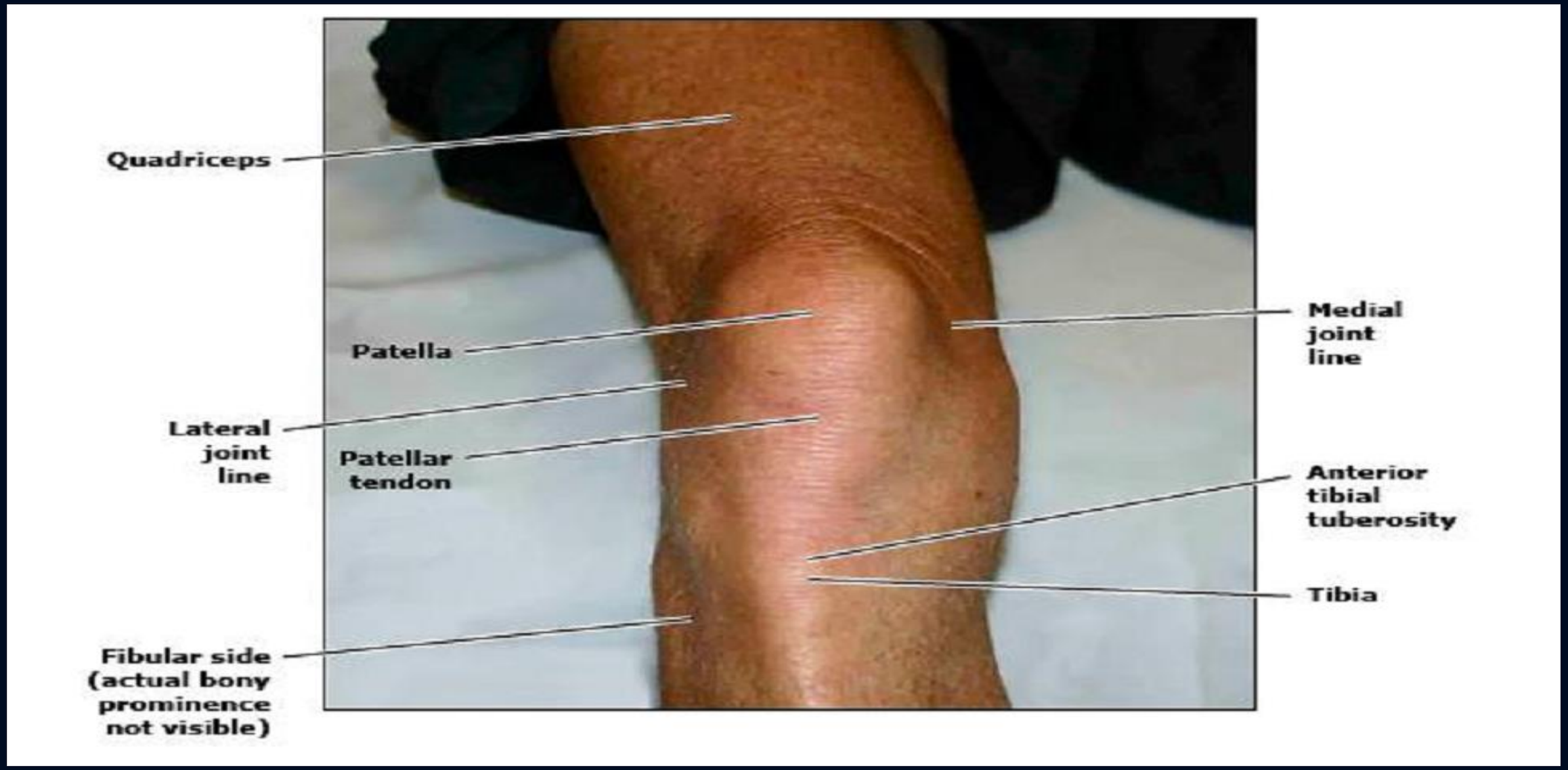
Physical Examination : General

- thrust into recurvatum (back-knee deformity)

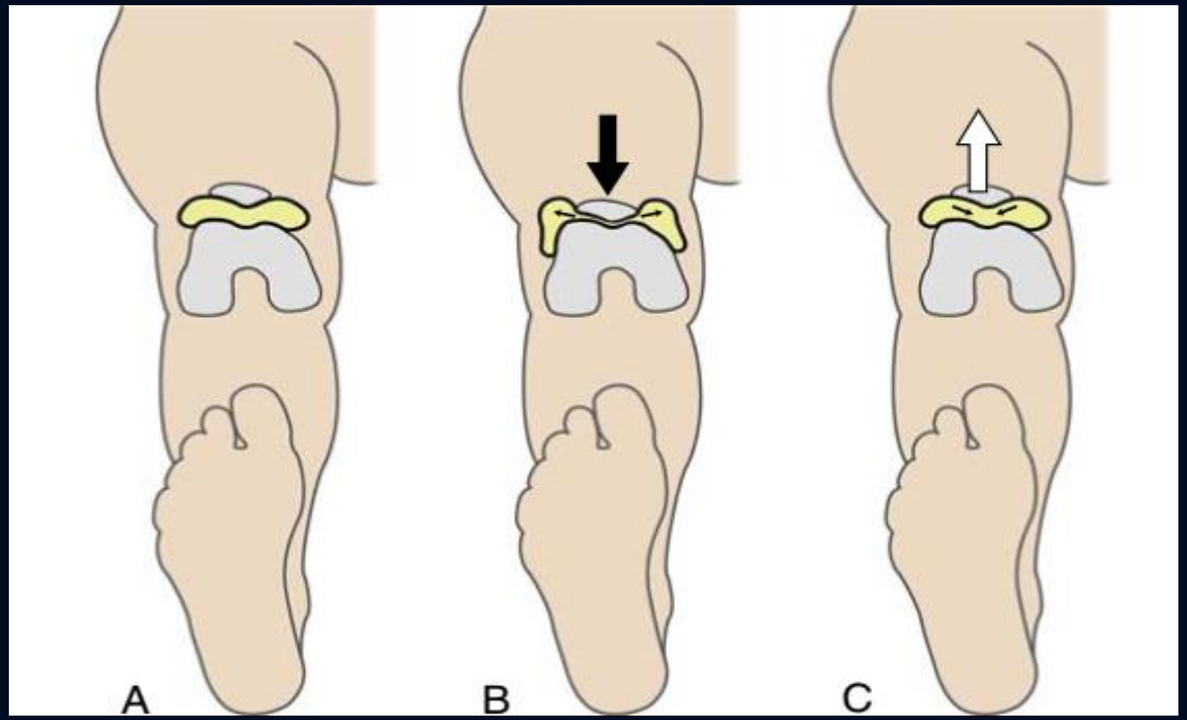


Physical Examination

- Inspection
- palpation
- ROM
- Special testes



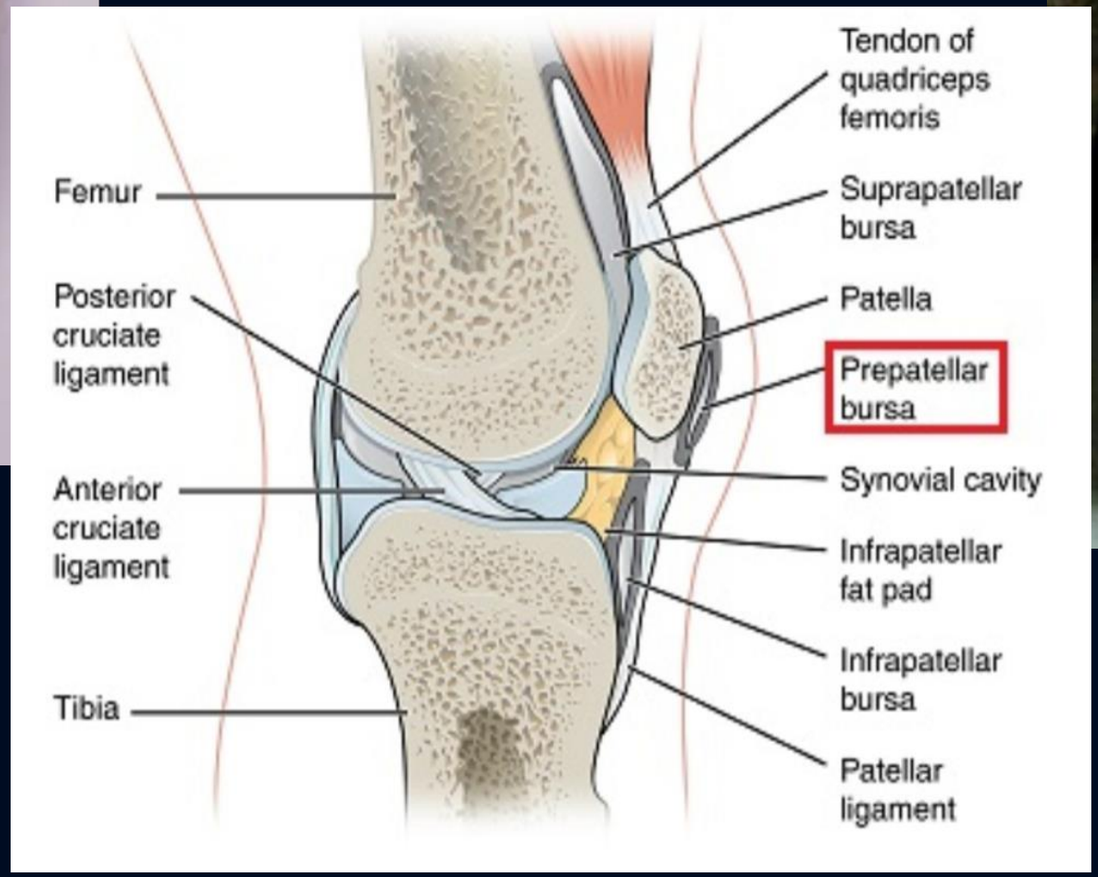
Surface anatomy of anterior knee

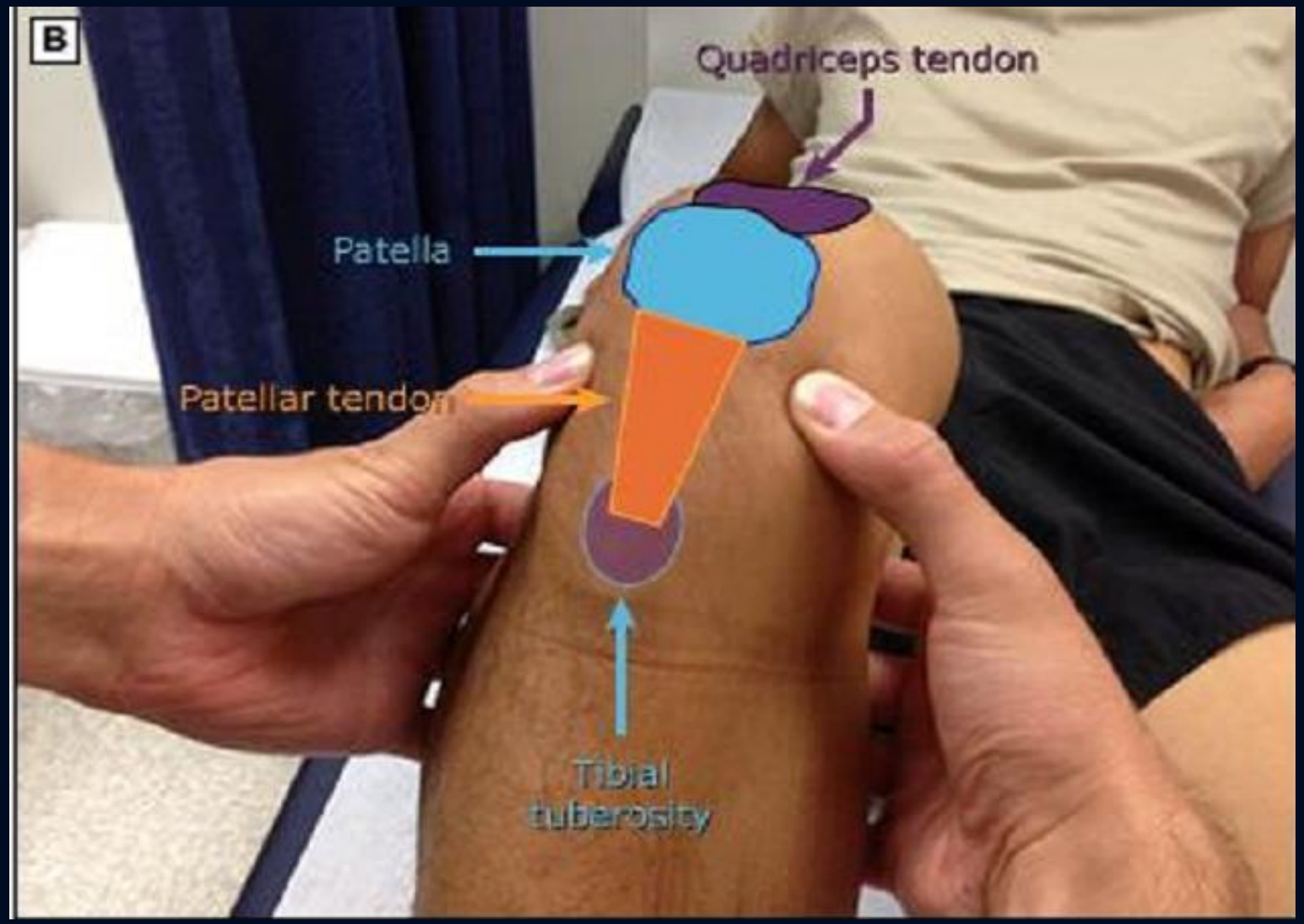


balloting

milking

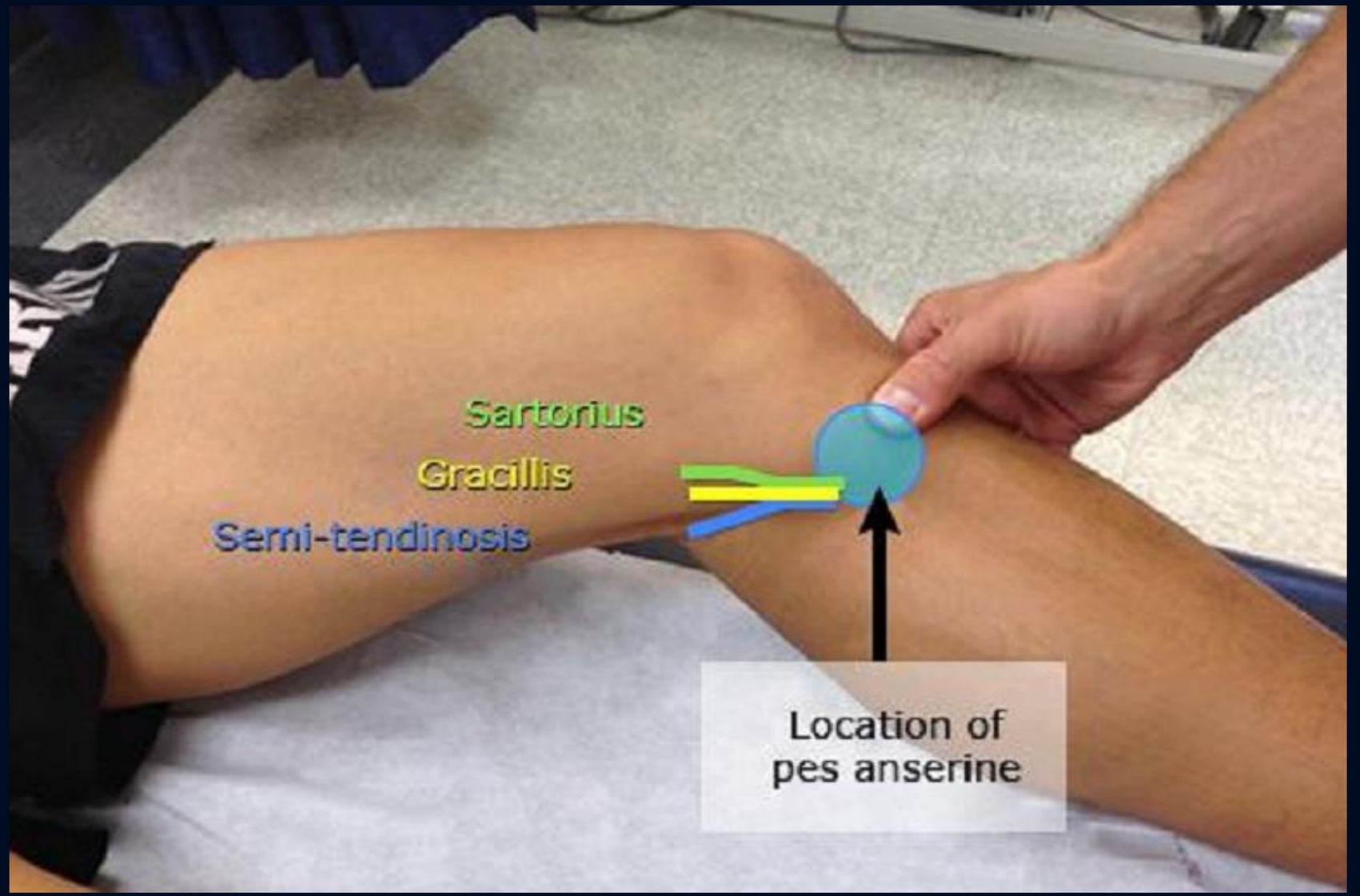
prepatellar bursitis

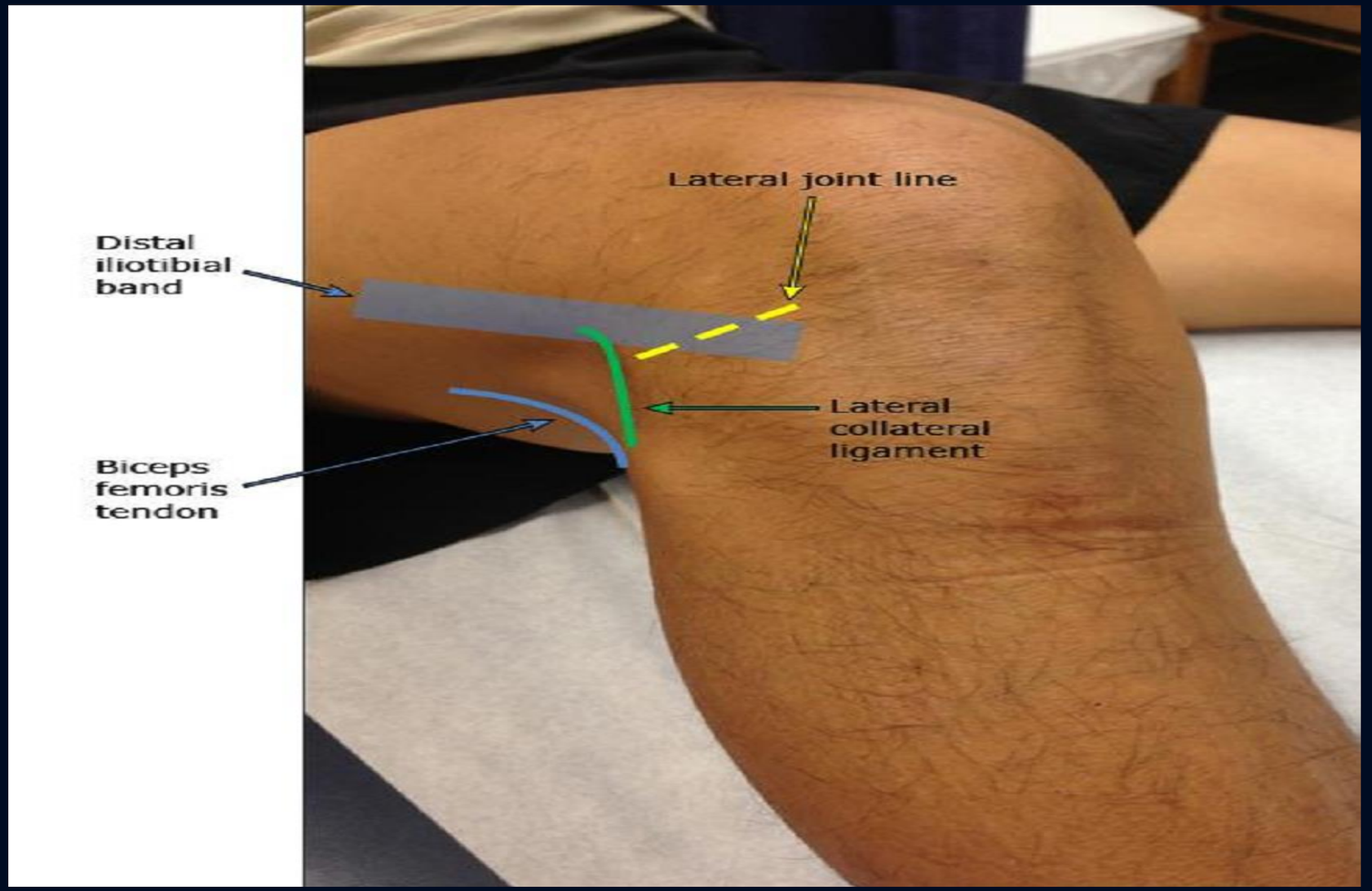




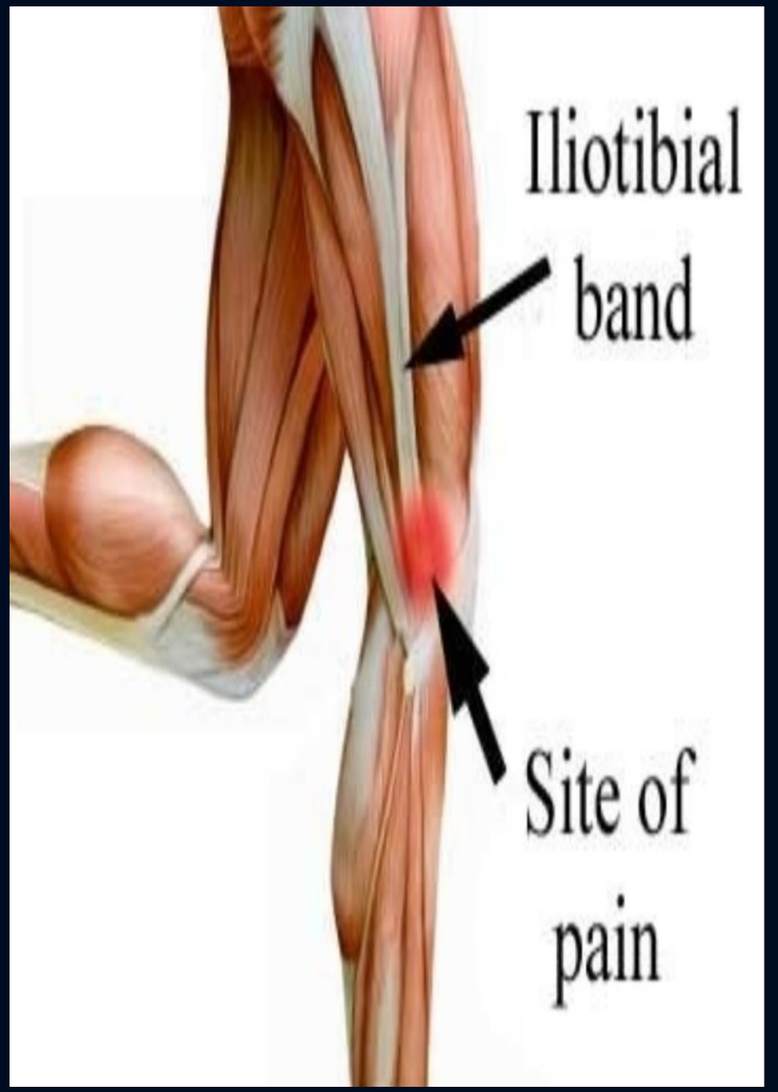
Palpation of the medial and lateral joint lines

- The **pes anserine** is the insertion of the medial hamstring muscle tendons and is locate approximately 6 cm distal to the knee joint line along the anteromedial tibial shaft.

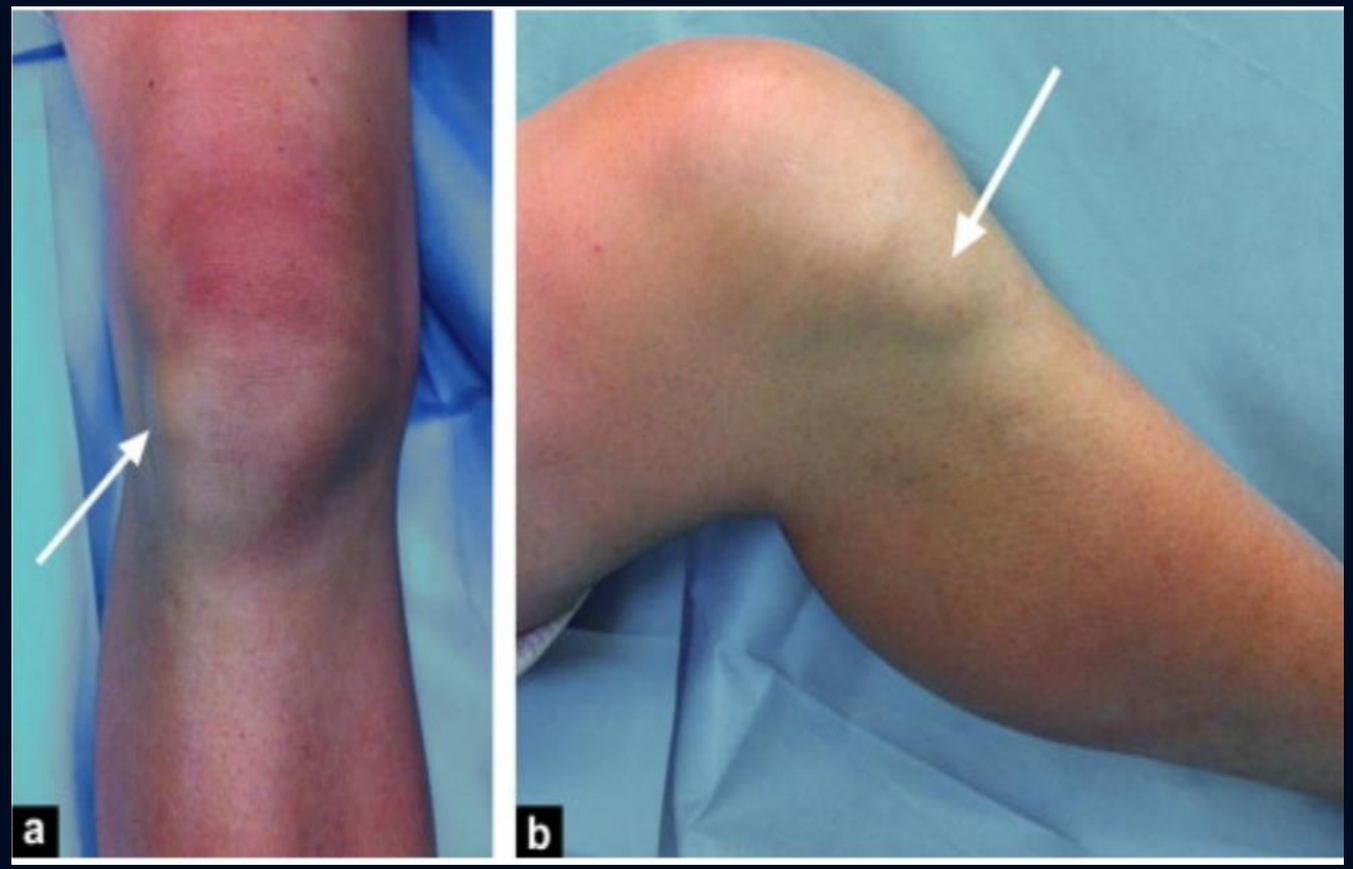




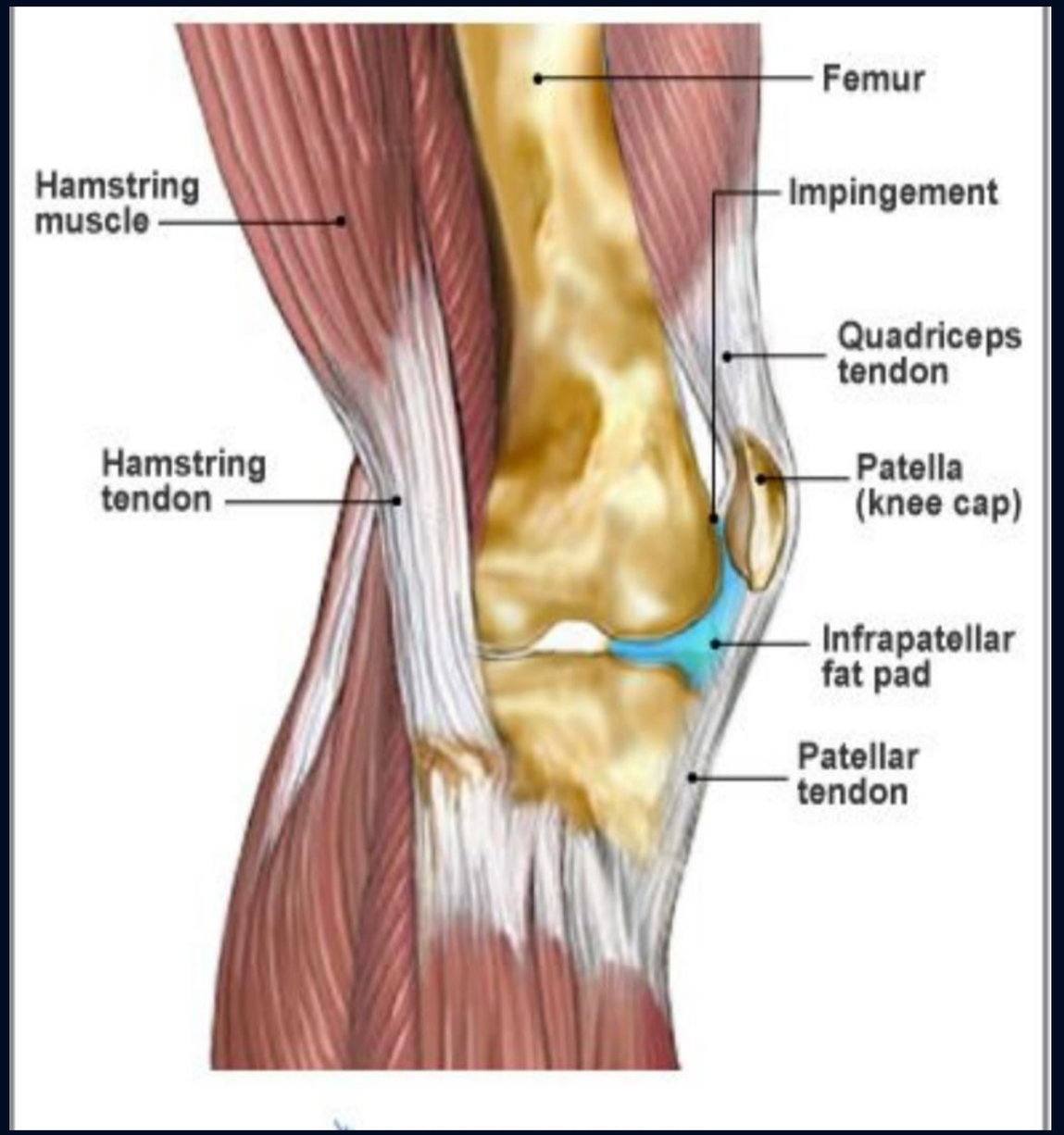
Lateral knee structures to palpate



iliotibial band syndrome



Hoffa’s disease



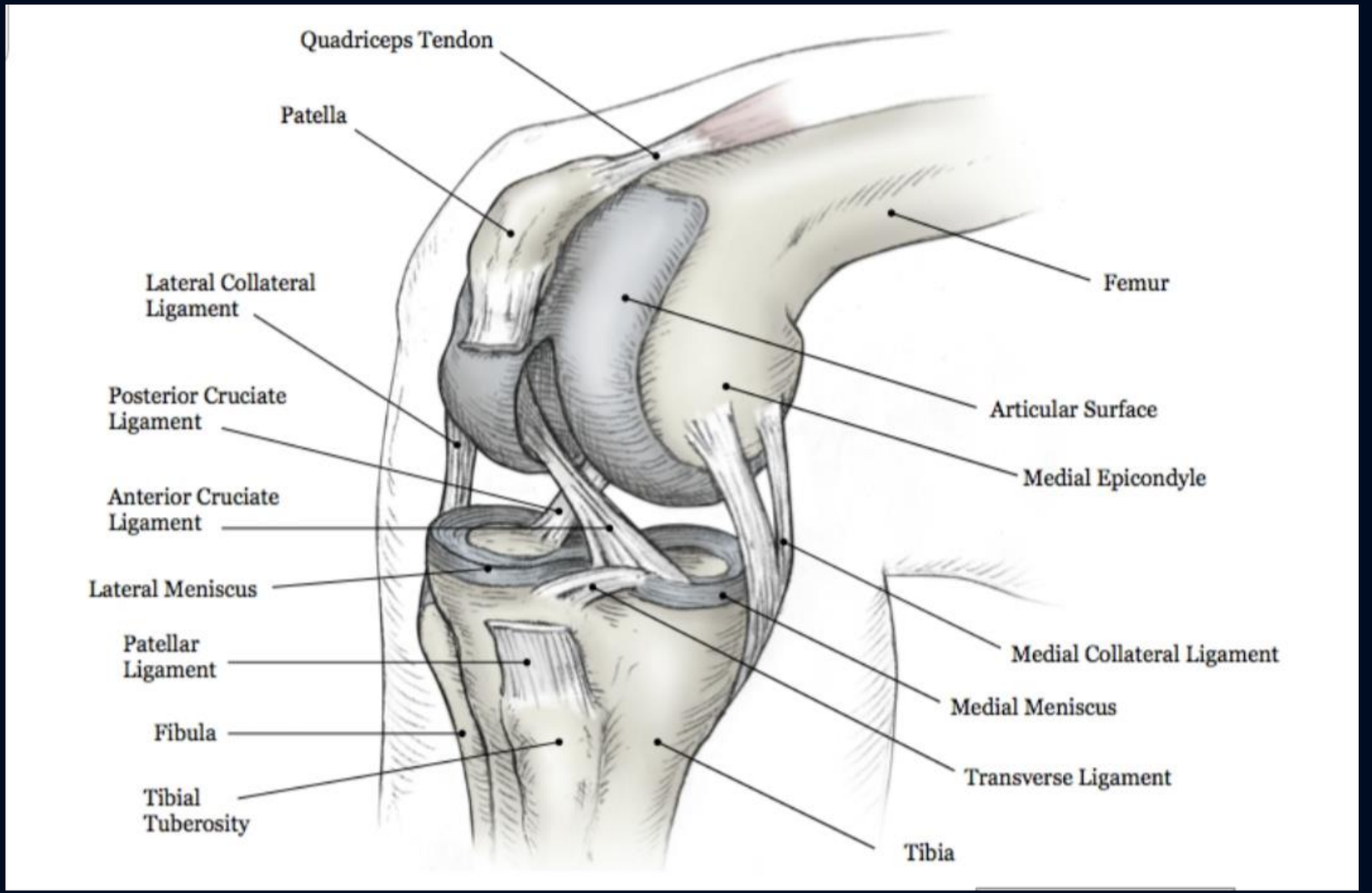
Baker cyst

Physical Examination

- Inspection
- palpation
- ROM
- Special testes

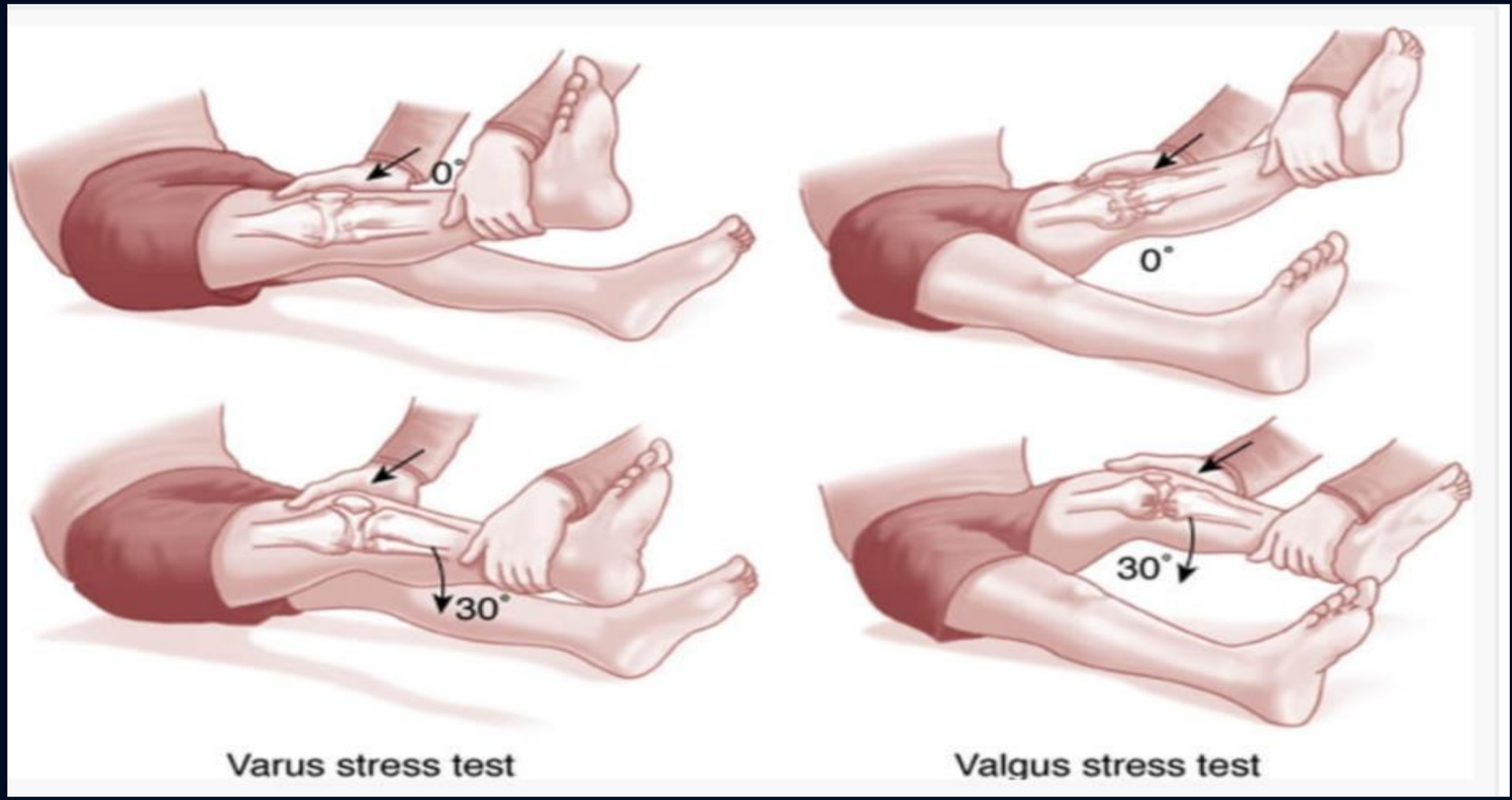
Physical Examination : Ligaments

- for each translational and rotational motion of the knee, both primary and secondary restraints exist.
- When a primary restraint is disrupted, motion will be limited by the secondary restraint.



Physical Examination : Ligaments

- The **collateral ligaments** can be examined with stress applied in the coronal plane.
- They should be examined both in full extension and in 30 degrees of flexion


0°
30°
0°
30°
Varus stress test
Valgus stress test

Physical Examination : Ligaments

- The **ACL** is one of the most frequently injured structures in the knee.

- ACL insufficiency is also common in patients with **advanced osteoarthritis**.

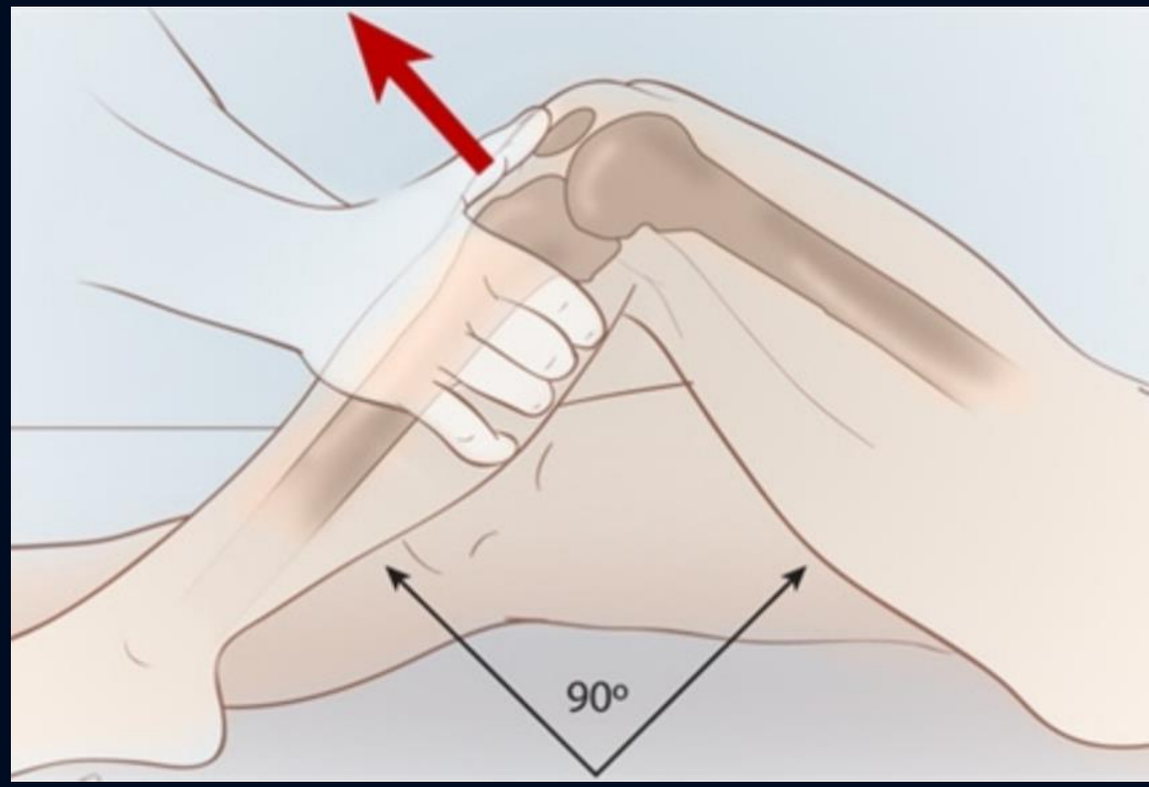
- Common mechanisms of injury include :
  - a direct blow to the lateral side of the knee (the **"clipping" injury** in football)
  - noncontact injuries that occur during **cutting, pivoting, and jumping**.

Physical Examination : Ligaments

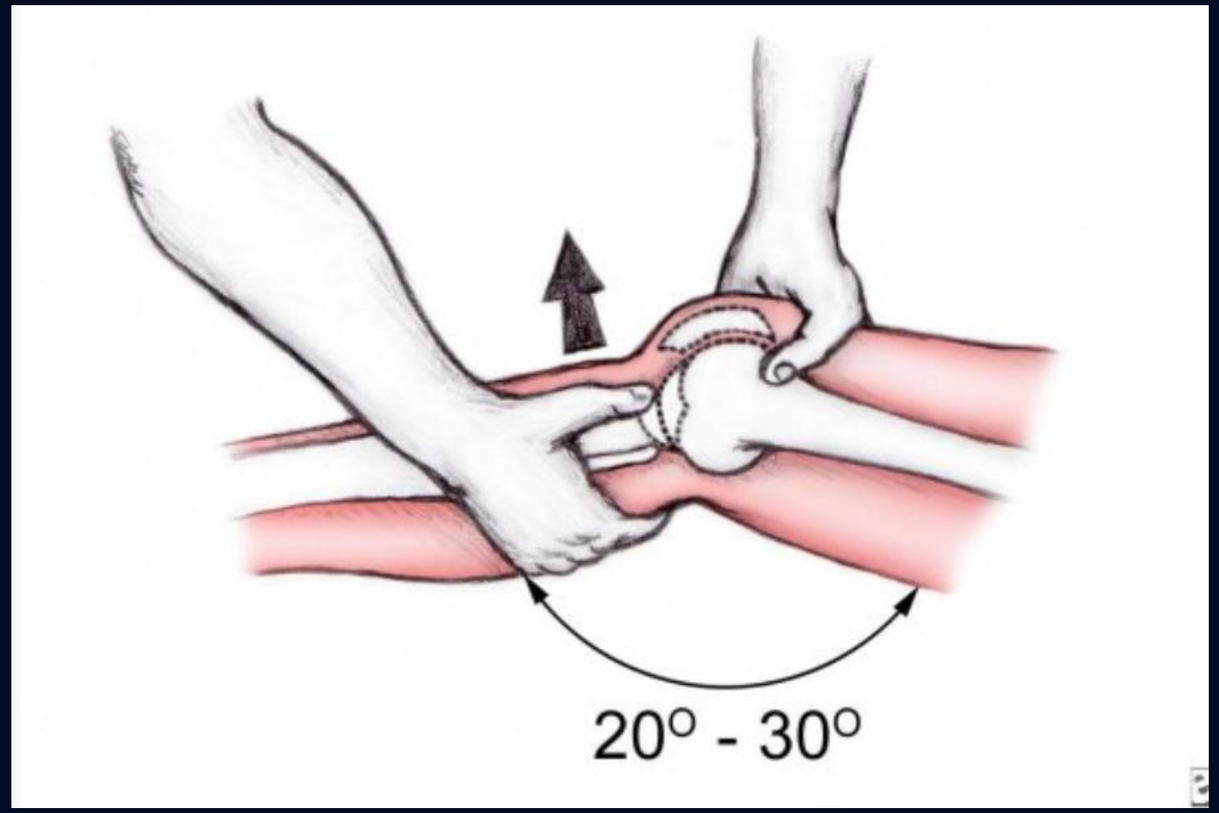
- Patients often report an audible **“pop”** accompanied by the acute onset of knee swelling.

- The most sensitive tests for diagnosis of an ACL injury :

- **anterior drawer**
- **Lachman test**
- **pivot-shift tests**

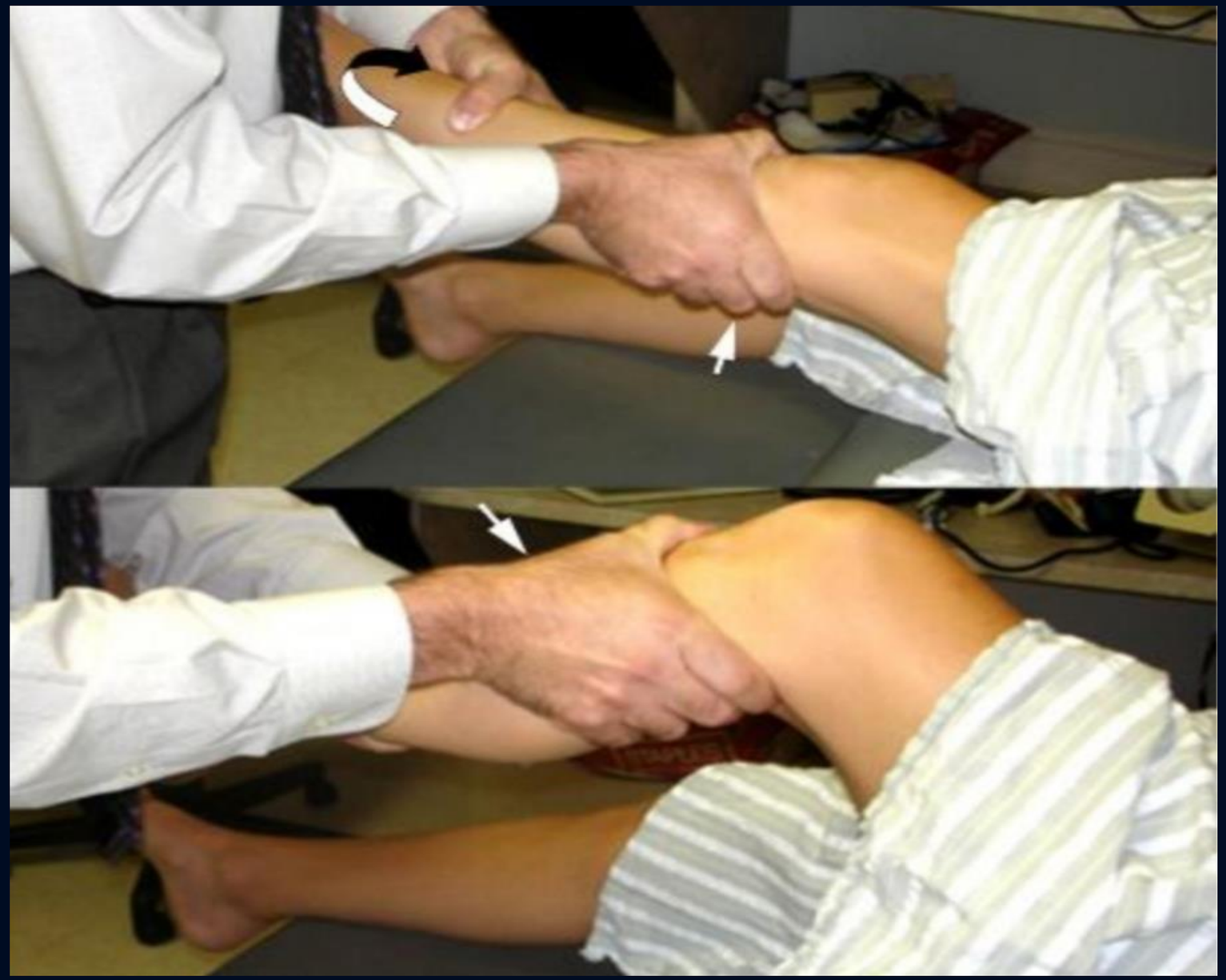


anterior drawer test



Lachman test

- The **pivot shift test** is positive if the tibia reduces with a “clunk” or a “glide” at 20 to 40 degrees of flexion.



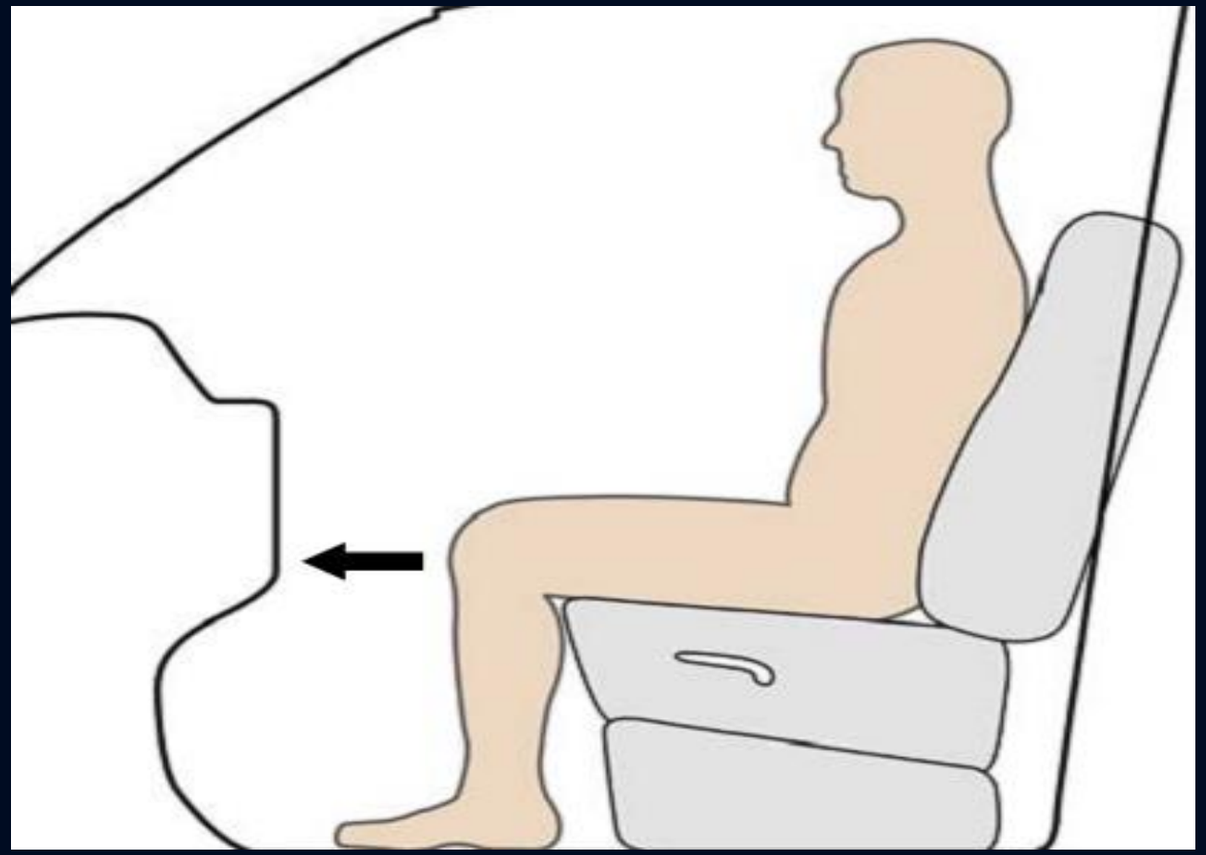
Physical Examination : Ligaments

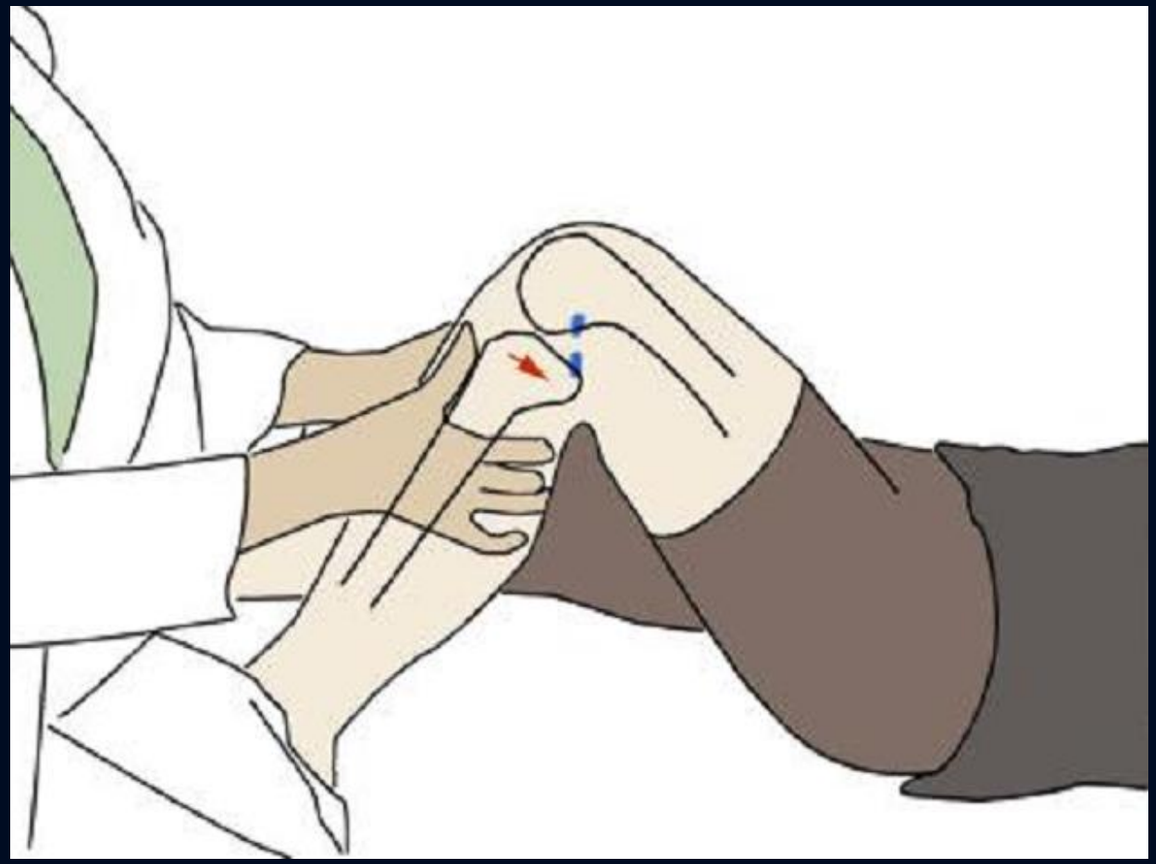
- The **PCL** is the strongest ligament in the knee

- The **“dashboard” injury**

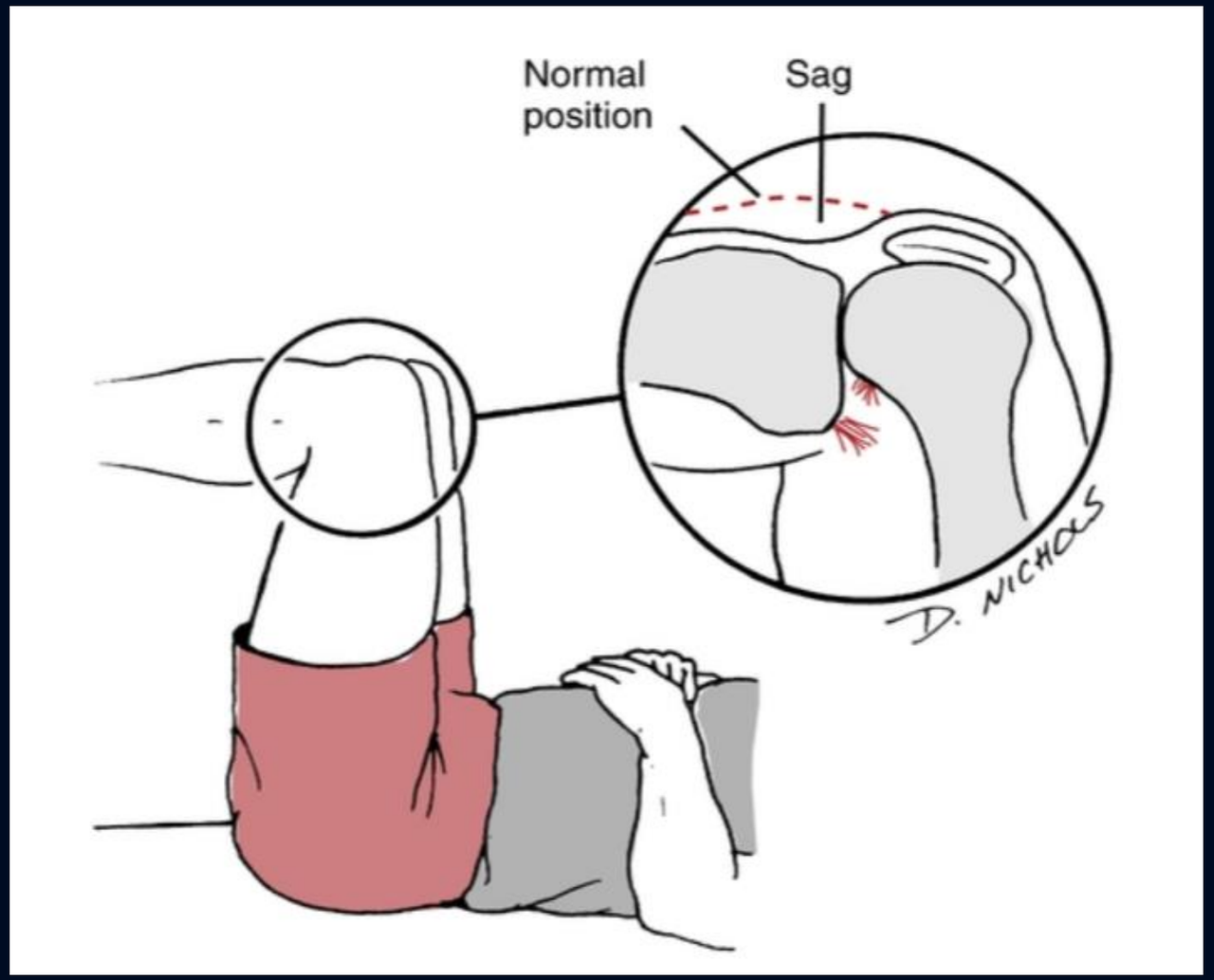
- The PCL can be evaluated with :

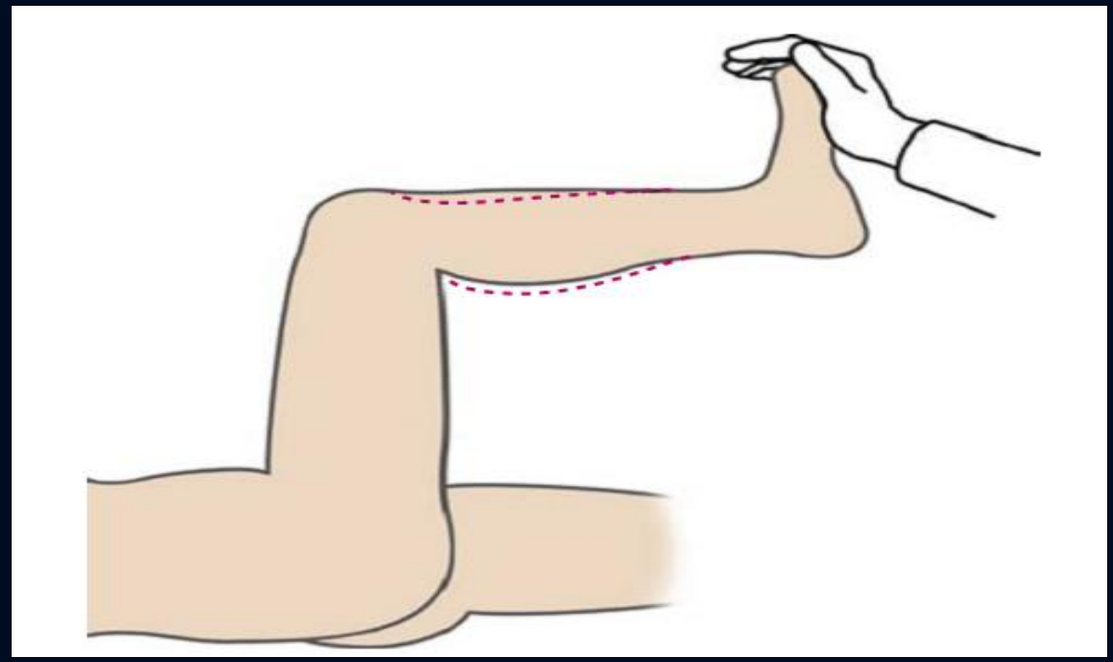
- **posterior drawer test**
- **posterior sag test**
- **quadriceps active test**



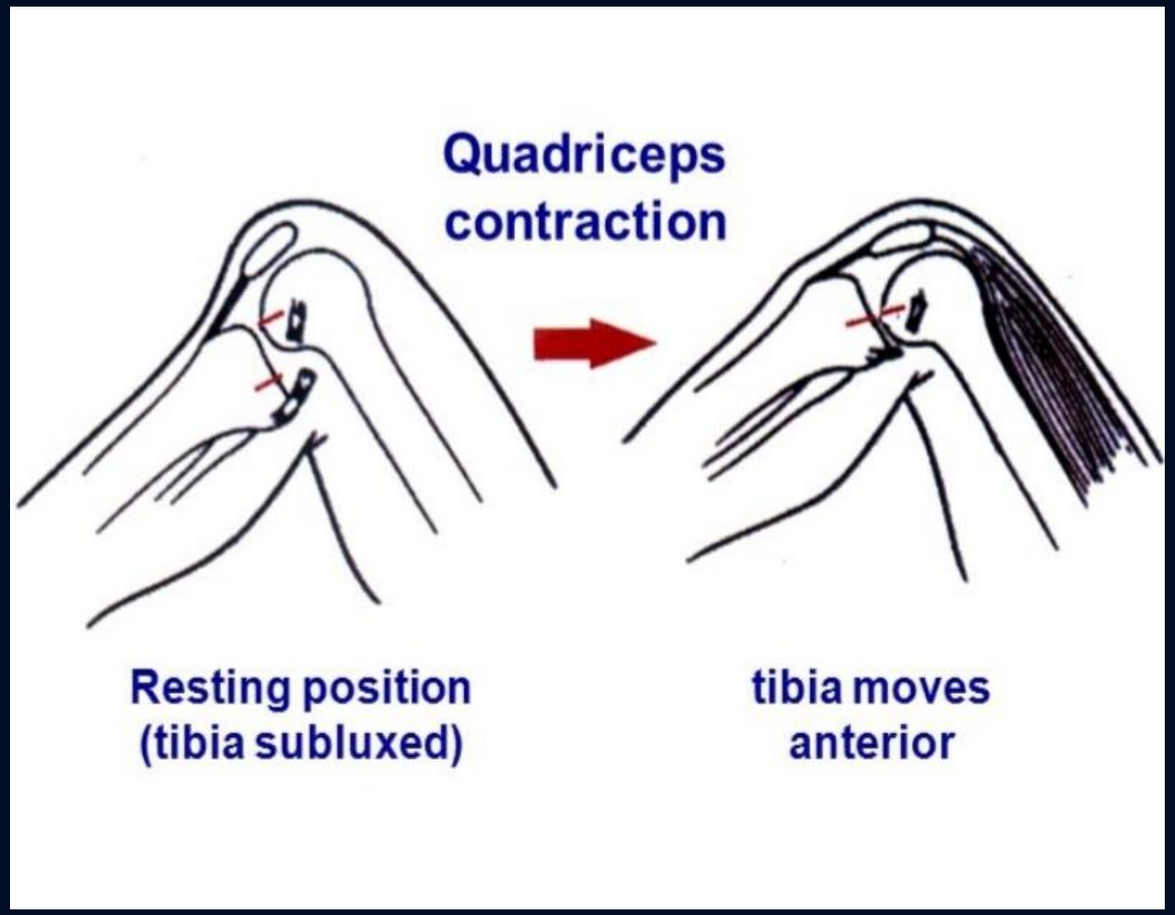


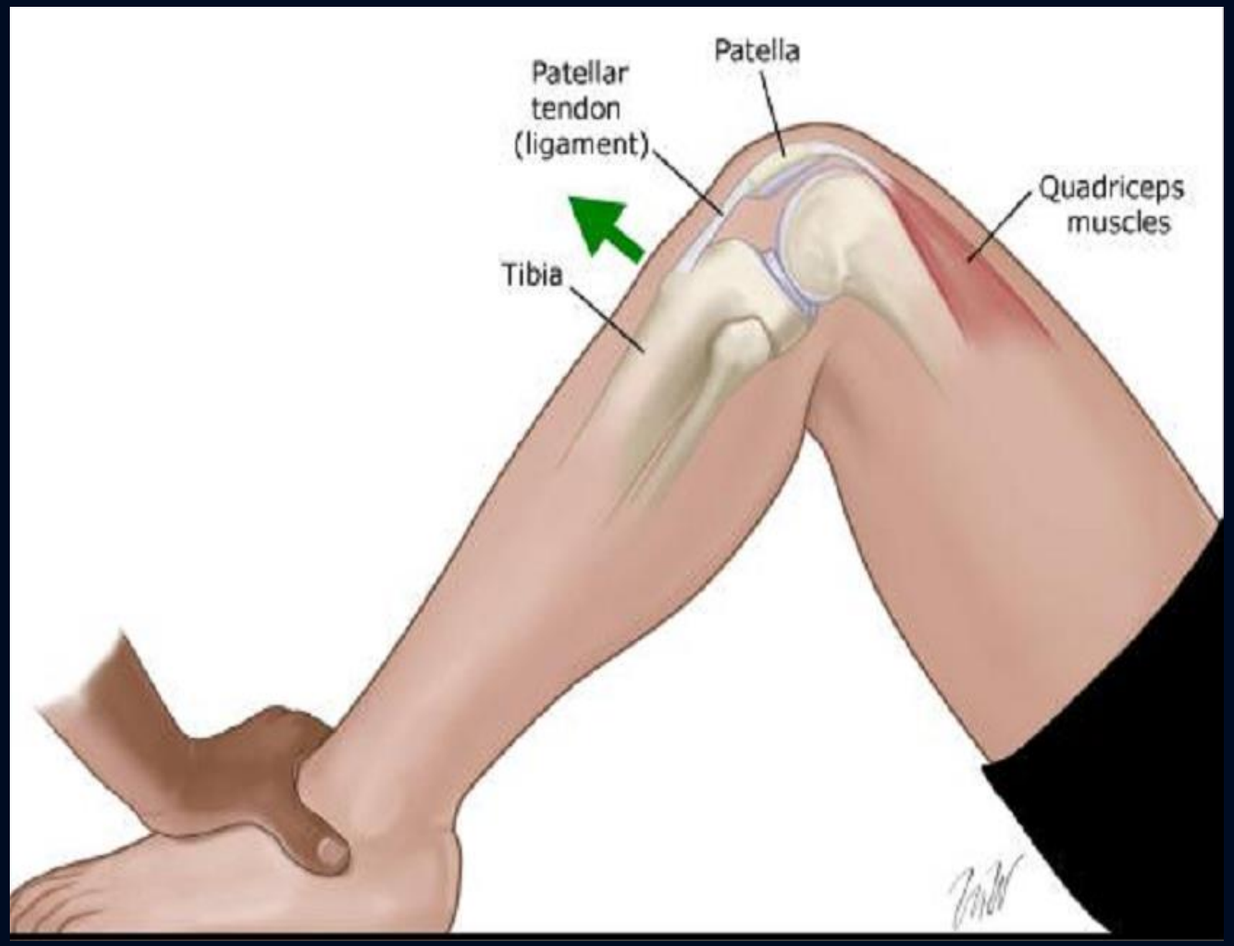
posterior drawer test





posterior sag test





quadriceps active test

Physical Examination : Ligaments

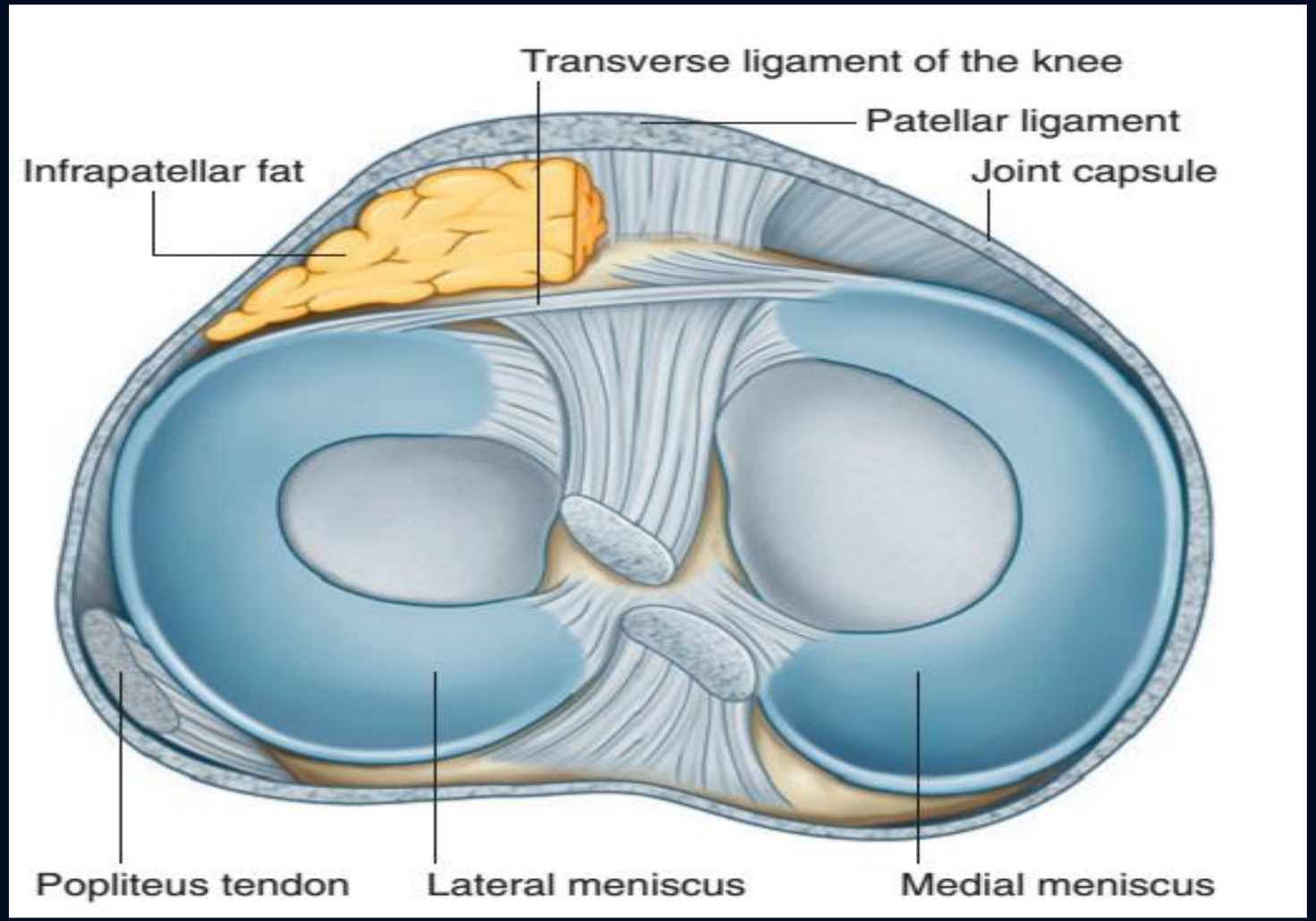
- Injuries to the PCL are often accompanied by injuries to the posterolateral corner.

- **posterolateral corner :** lateral collateral ligament, the popliteofiular ligament, the popliteomeniscal attachment, the arcuate ligament, and the popliteus tendon and muscle

dial test

Physical Examination : Menisci

- The menisci are considered the **shock absorbing cartilages** of the knee and also provide rotational and translational restraint
- Meniscal tears usually occur with rotation of the flexed knee as it moves into extension.
- Tears of the medial meniscus are more common than tears of the lateral meniscus



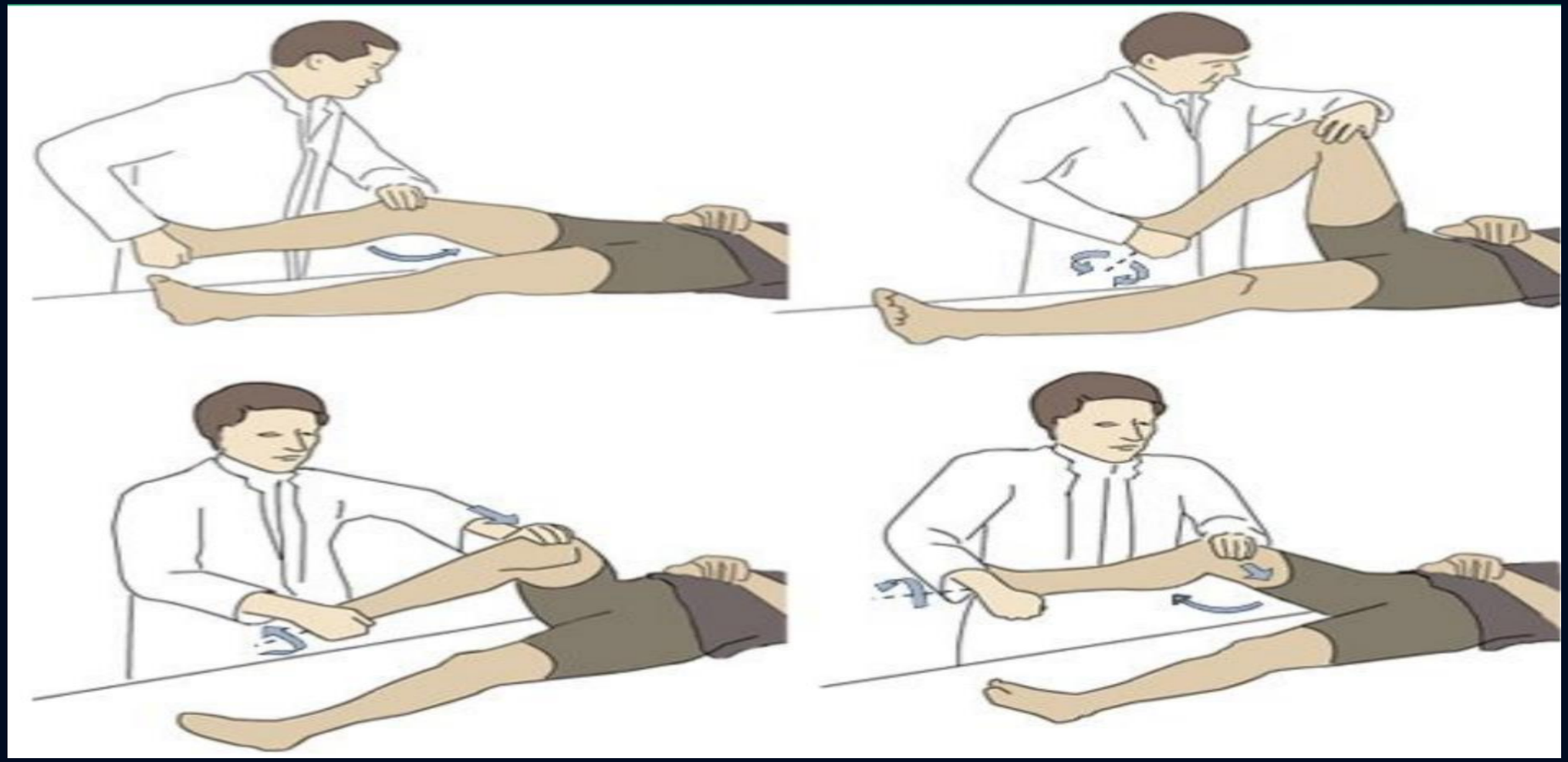
Physical Examination : Menisci

- "locking" and "clicking" or a sense of something not being right with the knee

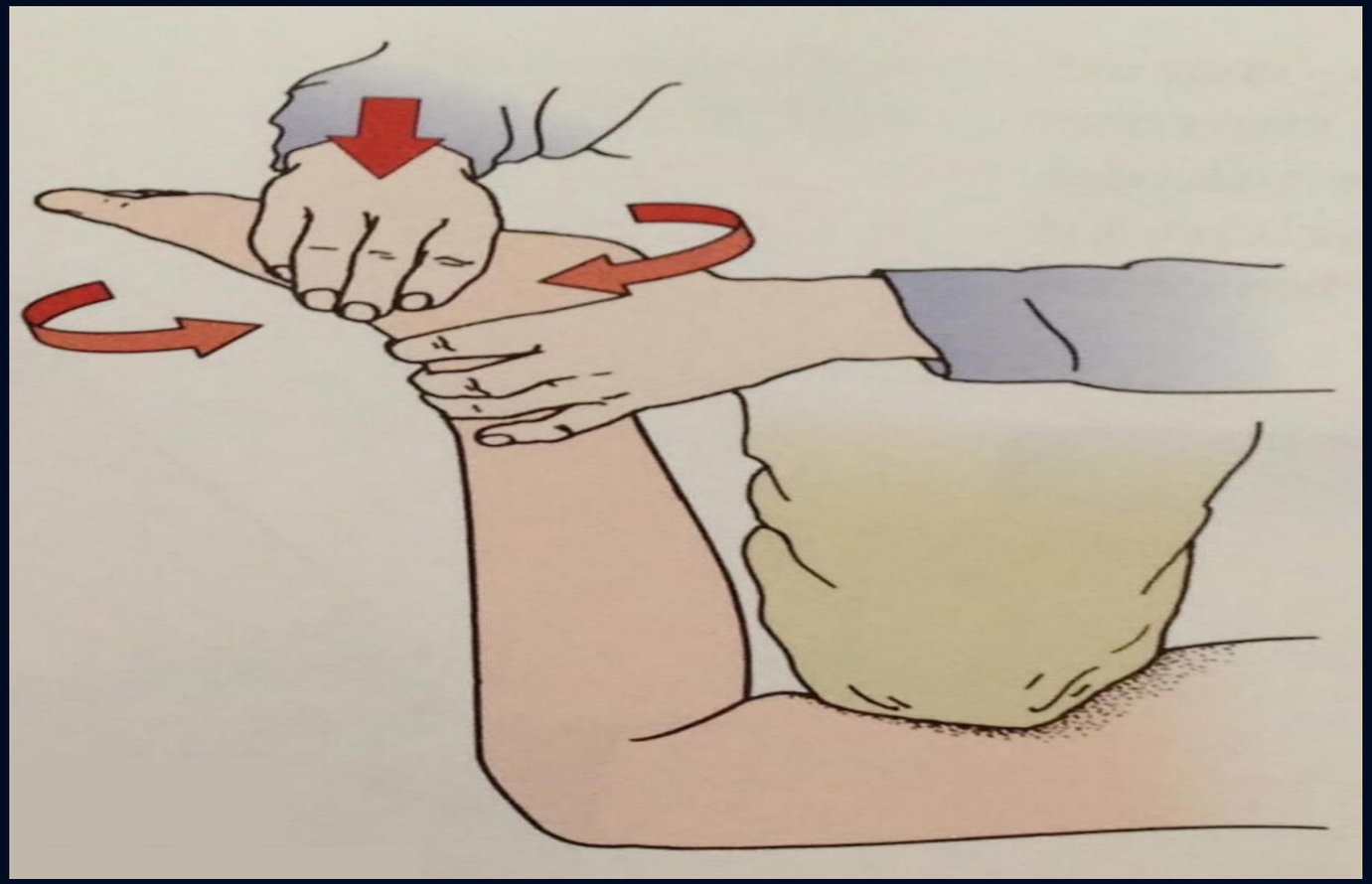
- **physical findings** : pain with hyperflexion and with hyperextension, joint line tenderness, effusion

- **provocative tests :**

  - McMurray test
  - Apley compression test



McMurray test



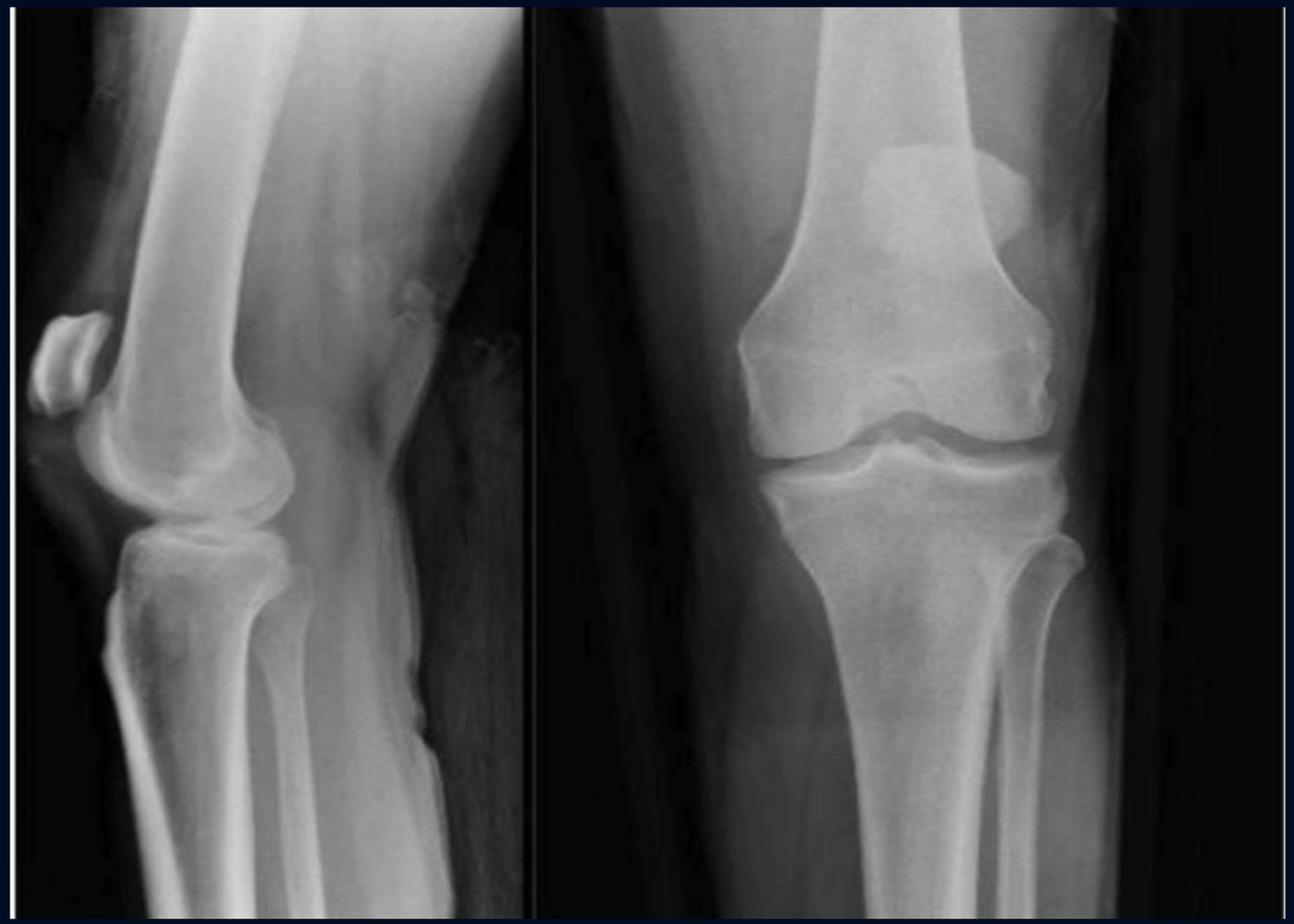
Apley compression test

Physical Examination : Quadriceps Tendon

- Injuries to the quadriceps tendon : most common in the sixth and seventh decades of life.
- Patients with SLE , renal failure, endocrinopathies , diabetes,…
- quadriceps tendon rupture after total knee arthroplasty

Physical Examination : Patella Tendon

- **tendonitis :** an overuse injury
- **Rupture of the patella tendon :** in patients younger than 40 years and is associated with chronic patella tendonitis



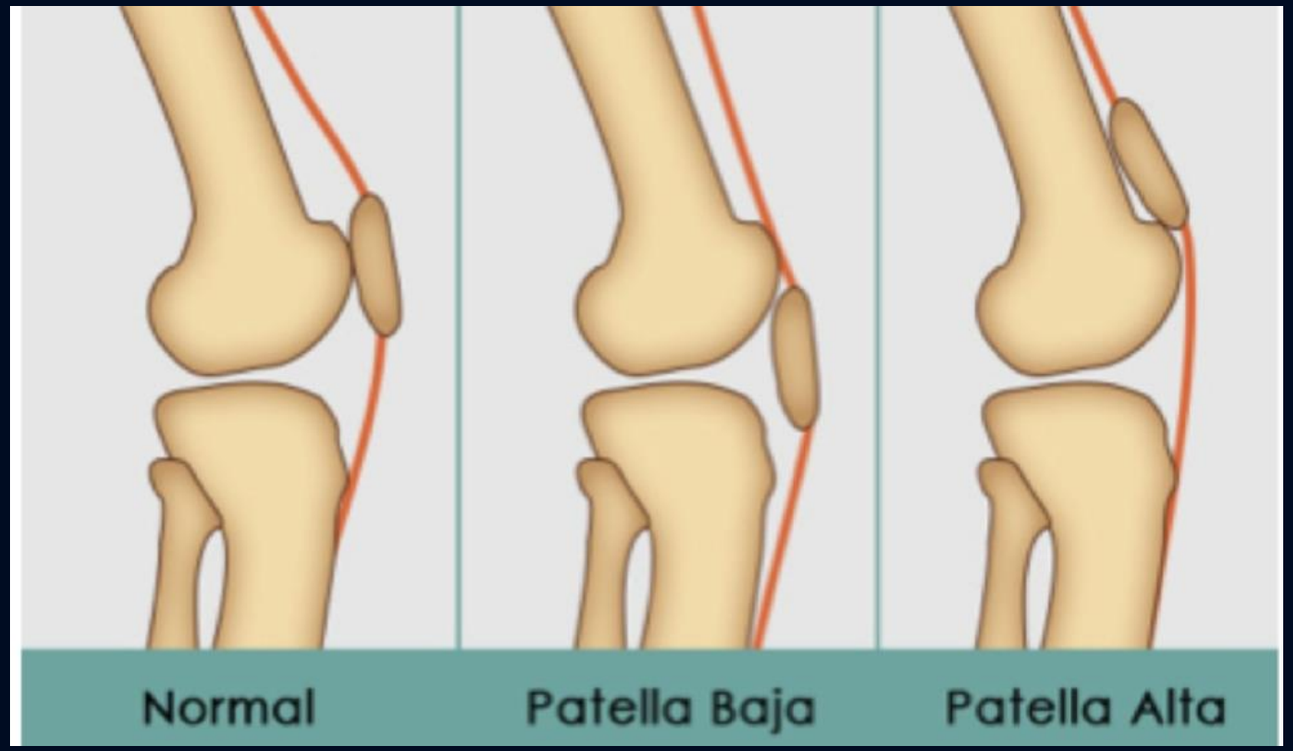
Physical Examination : Patellofemoral Pain

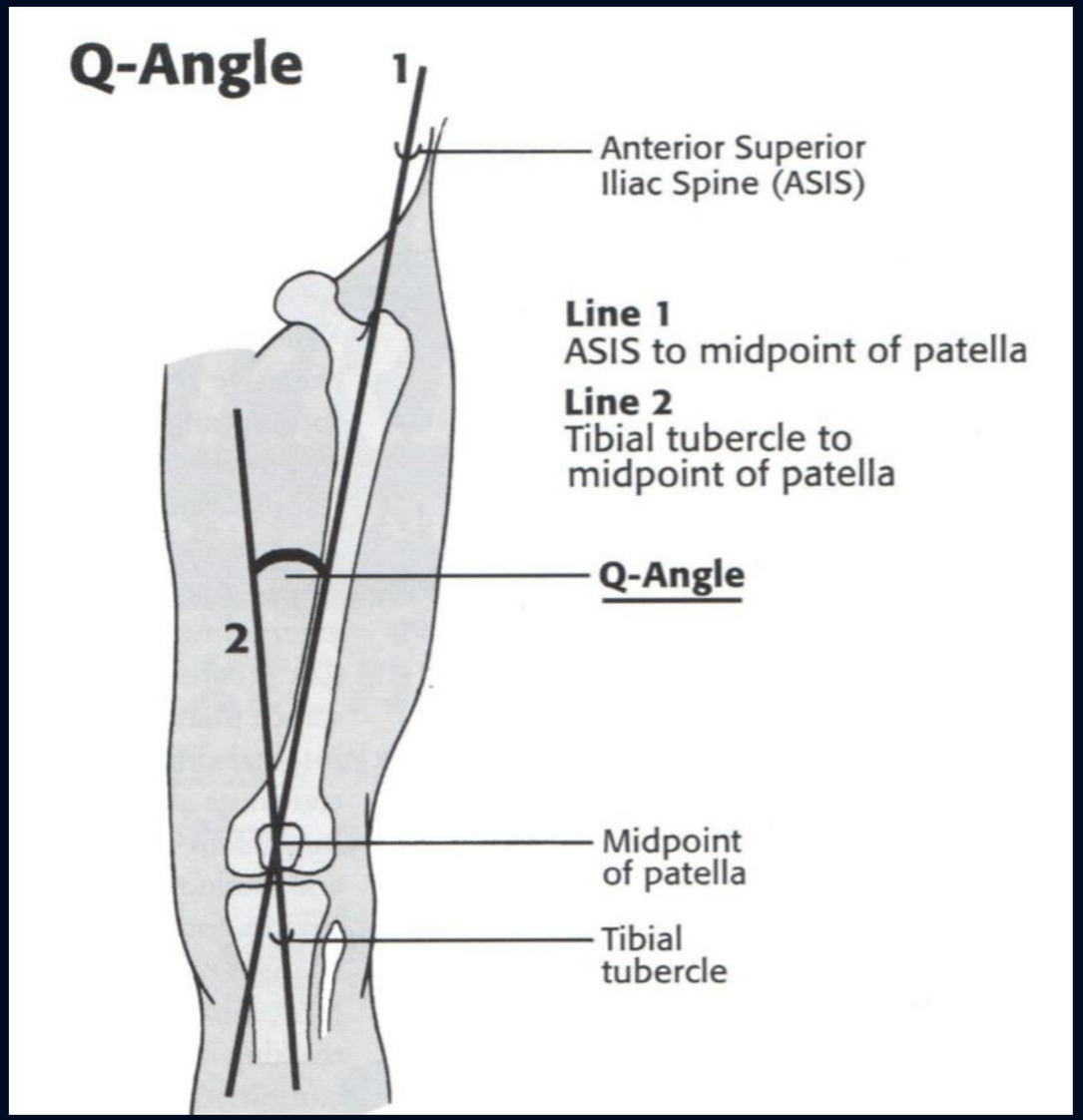
- A variety of factors contribute to the biomechanics of the patellofemoral joint :

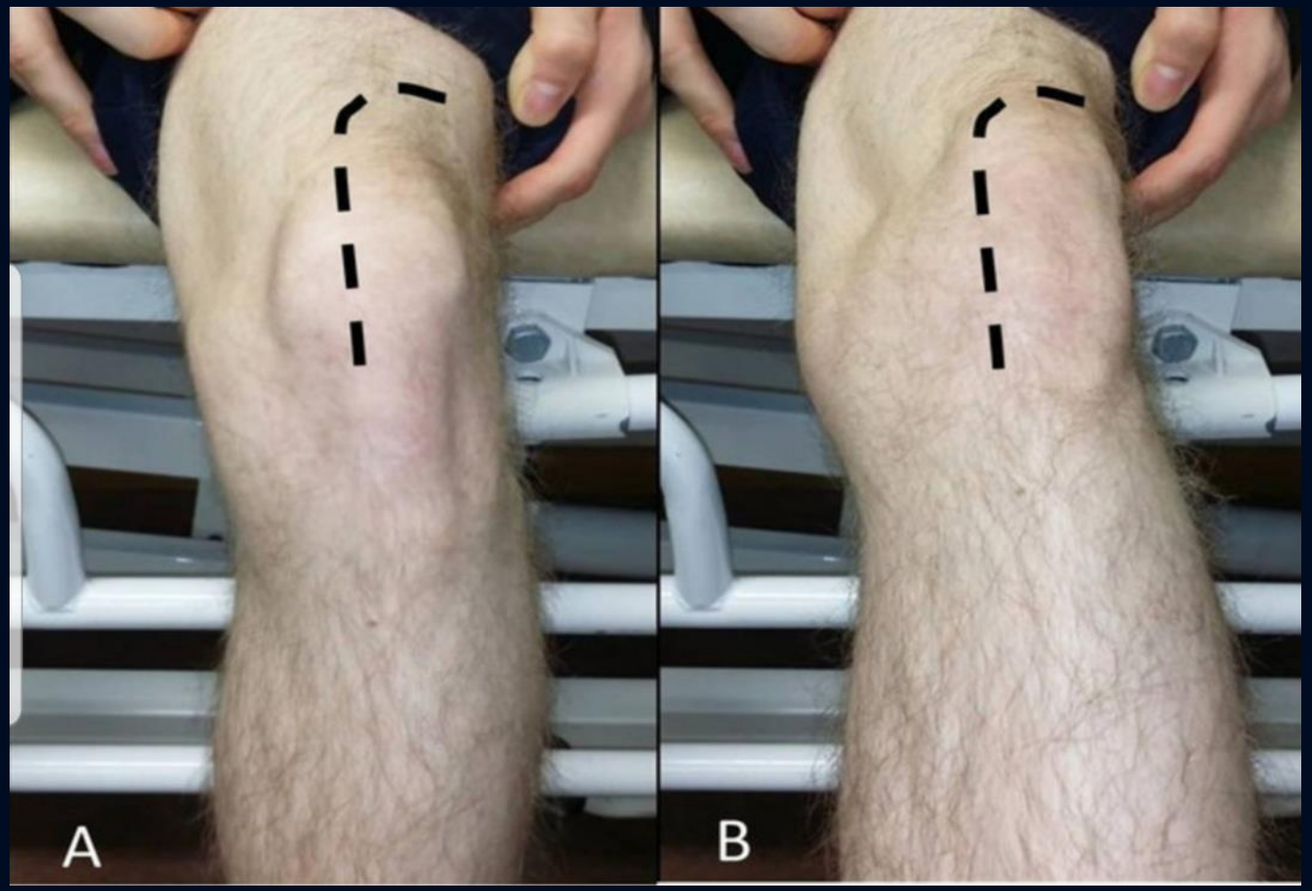
- overuse
- the depth of the trochlea
- the shape of the patella
- quadriceps strength
- Q angle
- the length of the patella tendon
- the shape of the femoral condyles
- and the articular cartilage

- analysis of coronal alignment
- height of the patella relative to the tibial tubercle (patella alta or baja)
- J sign
- patellar tilt
- crepitus

Physical Examination : Patellofemoral Pain





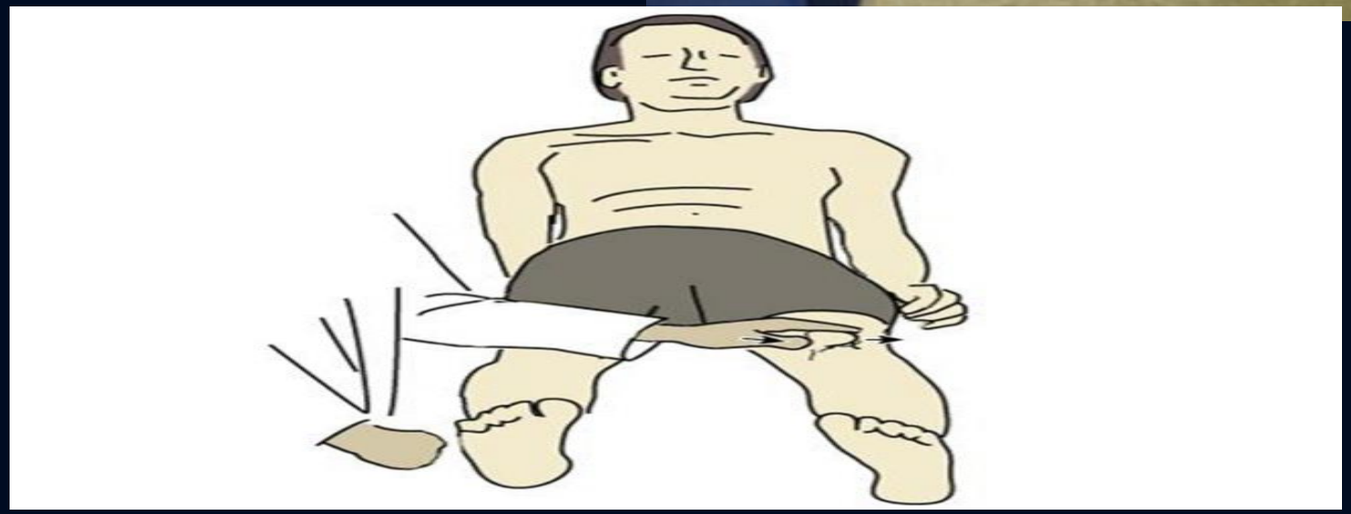


J sign

Physical Examination : Patellofemoral Pain

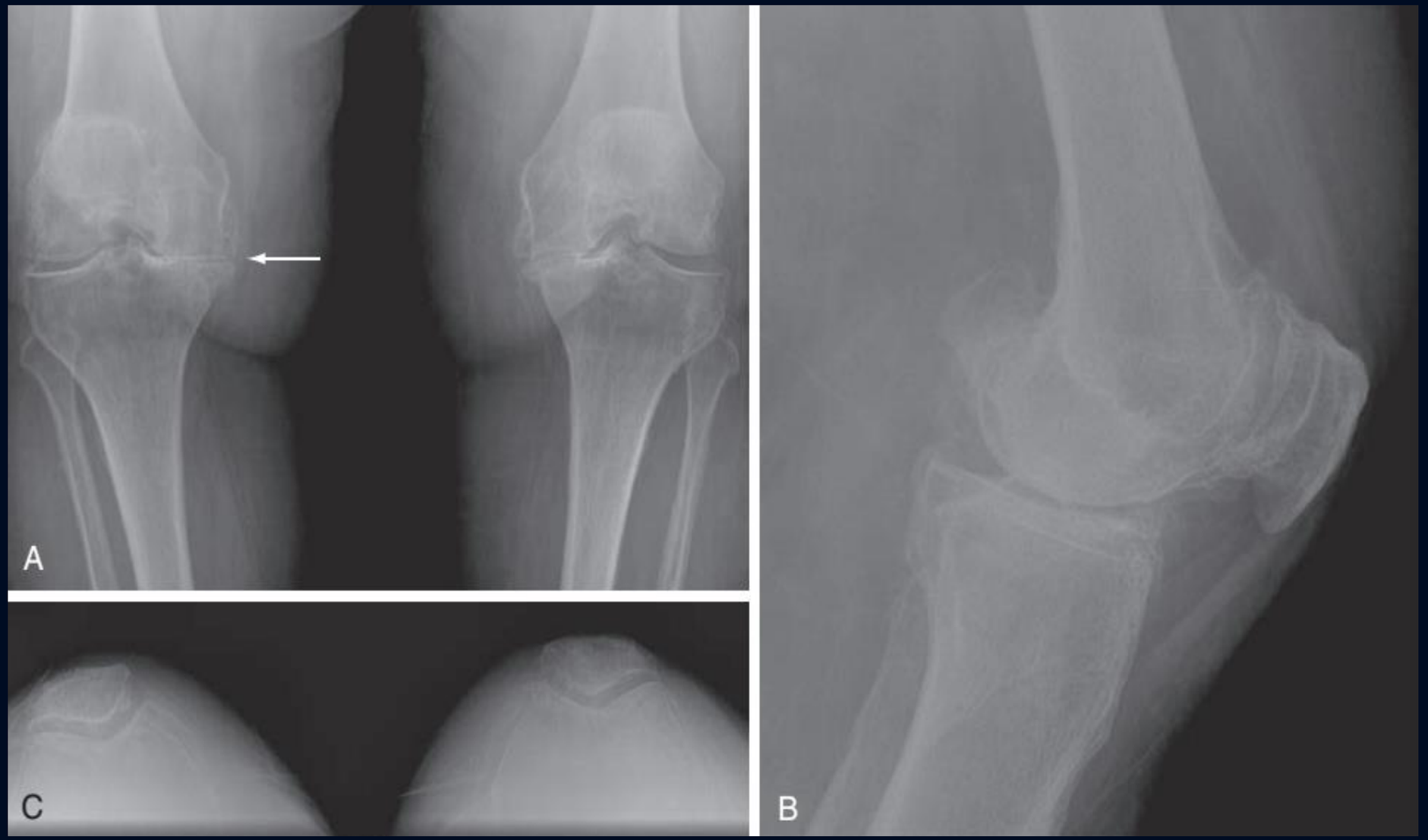
- **Patellar mobility** should be assessed using a quadrant system for passive mediolateral displacement of the patella relative to the trochlear groove

- **Apprehension test**



Imaging :Conventional Radiographs

- Standing AP (A), lateral (B), and Merchant's (C) views : OA

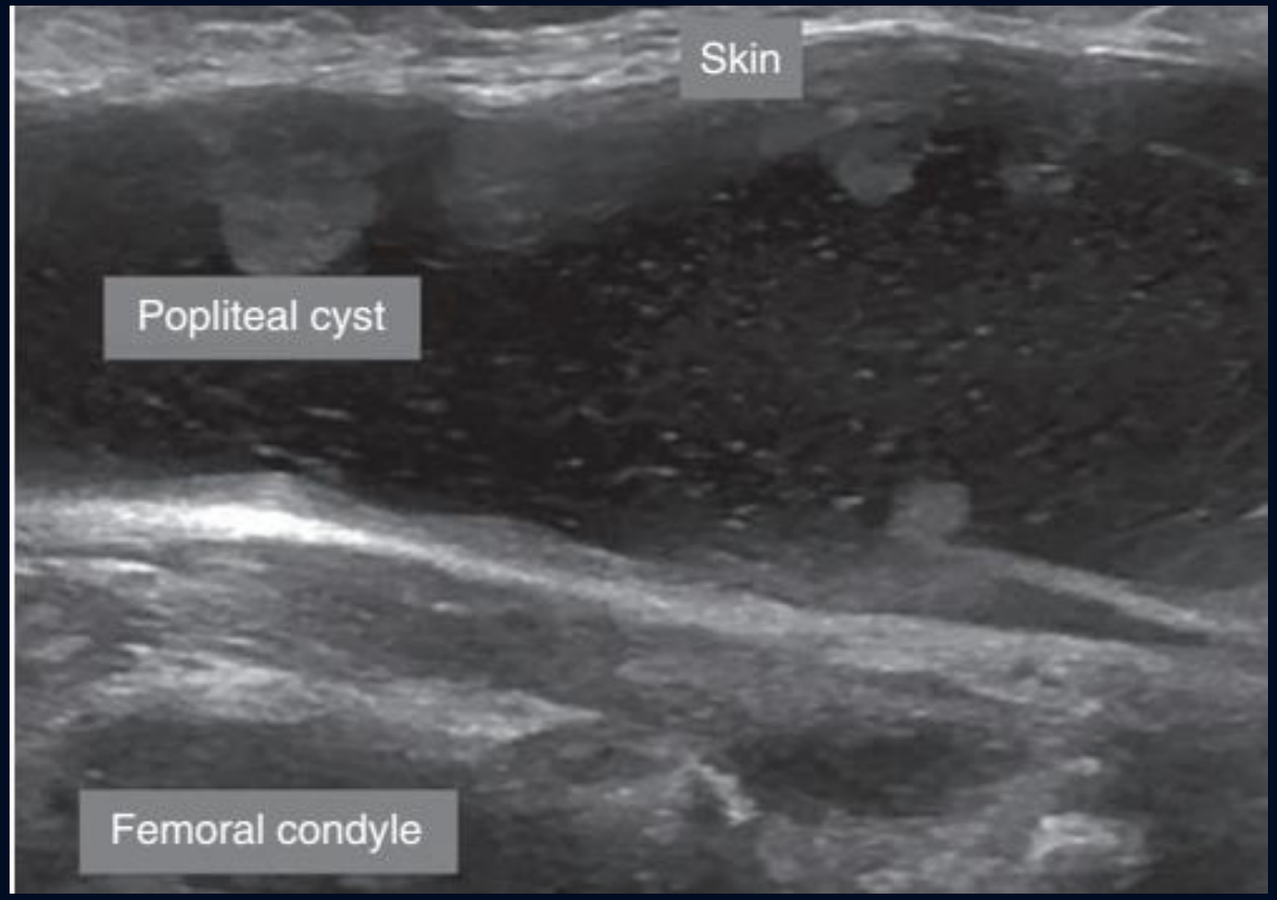


Imaging : CT

- **bony tumors**
- in the **trauma setting** for detection of subtle fractures and evaluation of intra-articular fractures.
- In cases of distal femoral or proximal tibia fractures, CT is used to help the surgeon plan **operative treatment**.
- CT is also used to assess **axial alignment** of the femoral and tibial components in cases of painful total knee arthroplasty

Imaging : Ultrasound

- in arthrocentesis
- joint effusions and popliteal cysts
- quadriceps and patella tendon disruptions



Imaging : Nuclear Scintigraphy

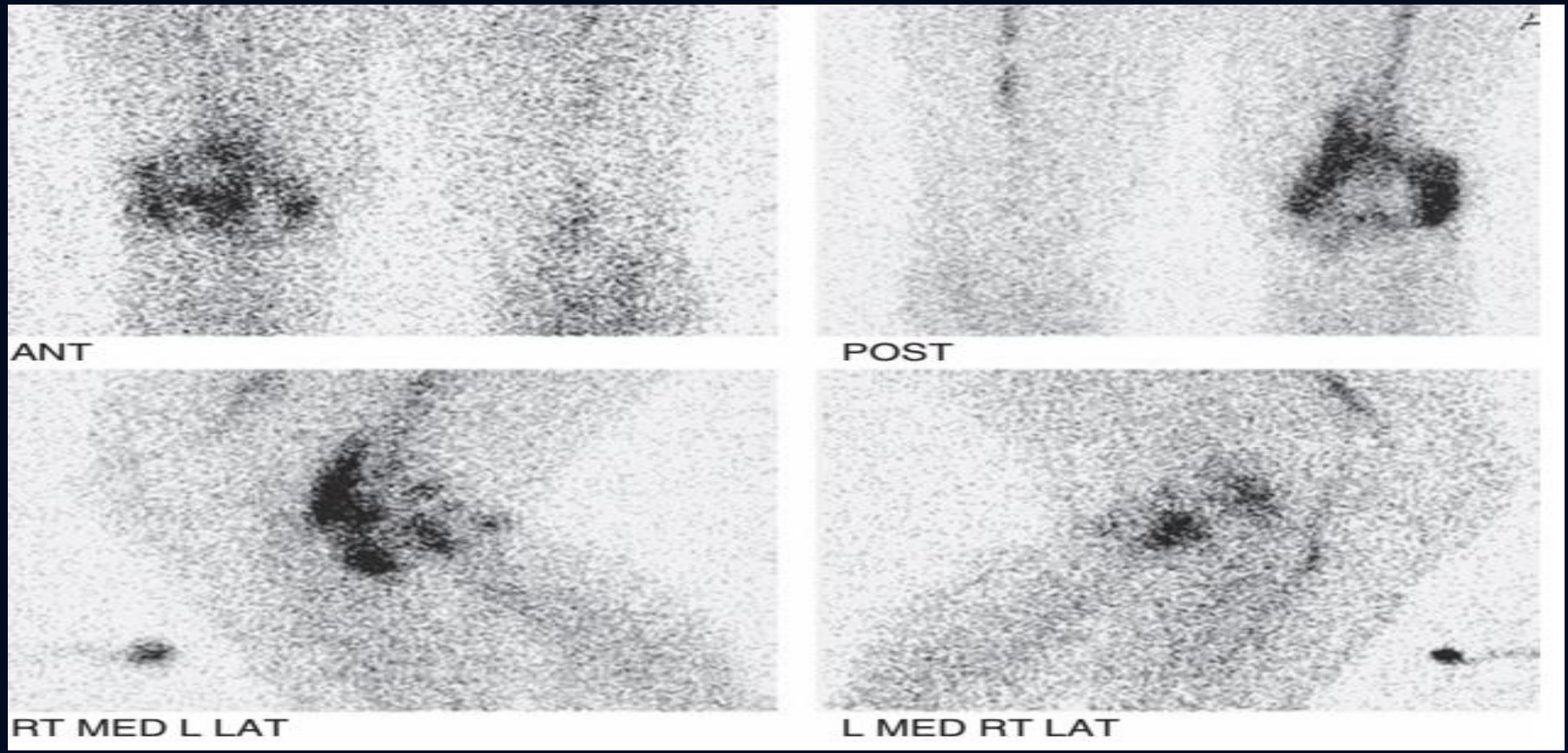
- very sensitive but not specific

- It requires **clinical correlation** and should be used in conjunction with **other imaging modalities.**

- Thee-phase bone scanning :

- greater specificity
- in cases of suspected osteomyelitis , osteonecrosis , stress fracture, and implant loosening
- Increased radionuclide uptake can be seen for up to 12 to 18 months after total knee arthroplasty . Asymmetric uptake in one area around the prosthesis should raise the question of loosening or periprosthetic fracture

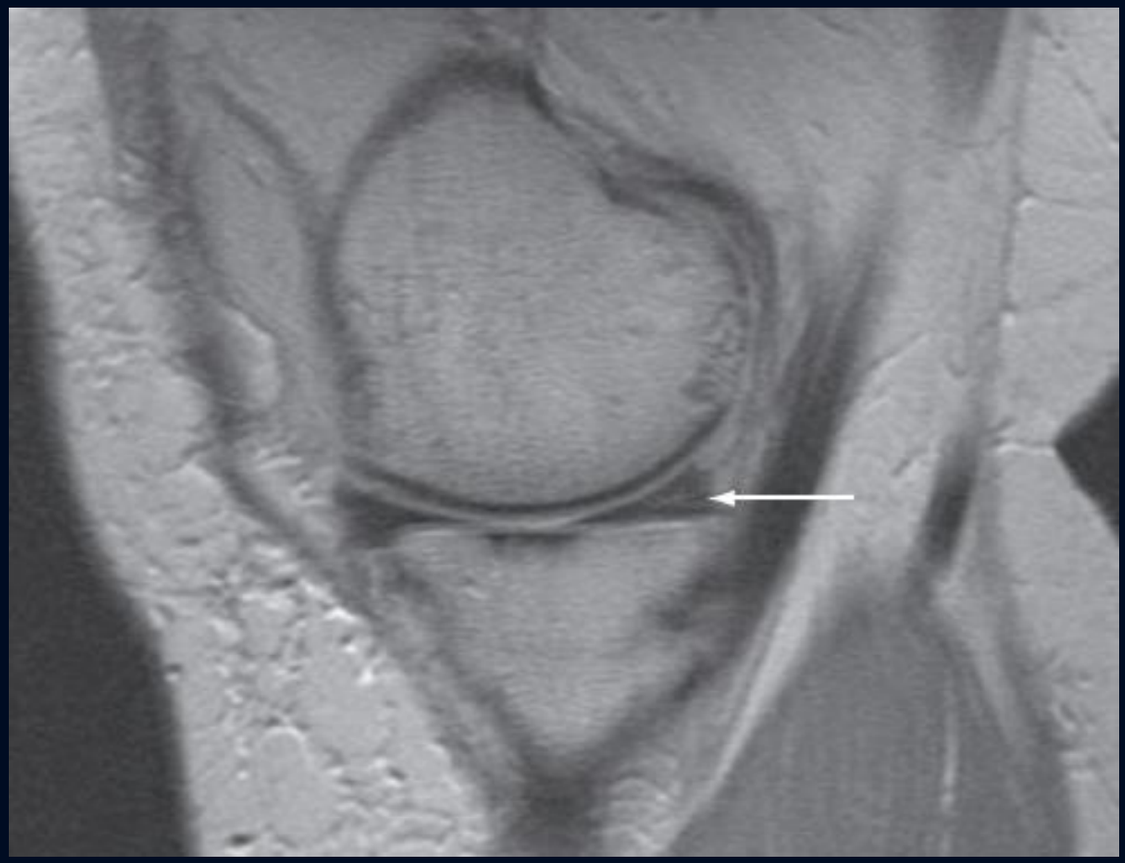
Imaging : Nuclear Scintigraphy



Imaging : MRI

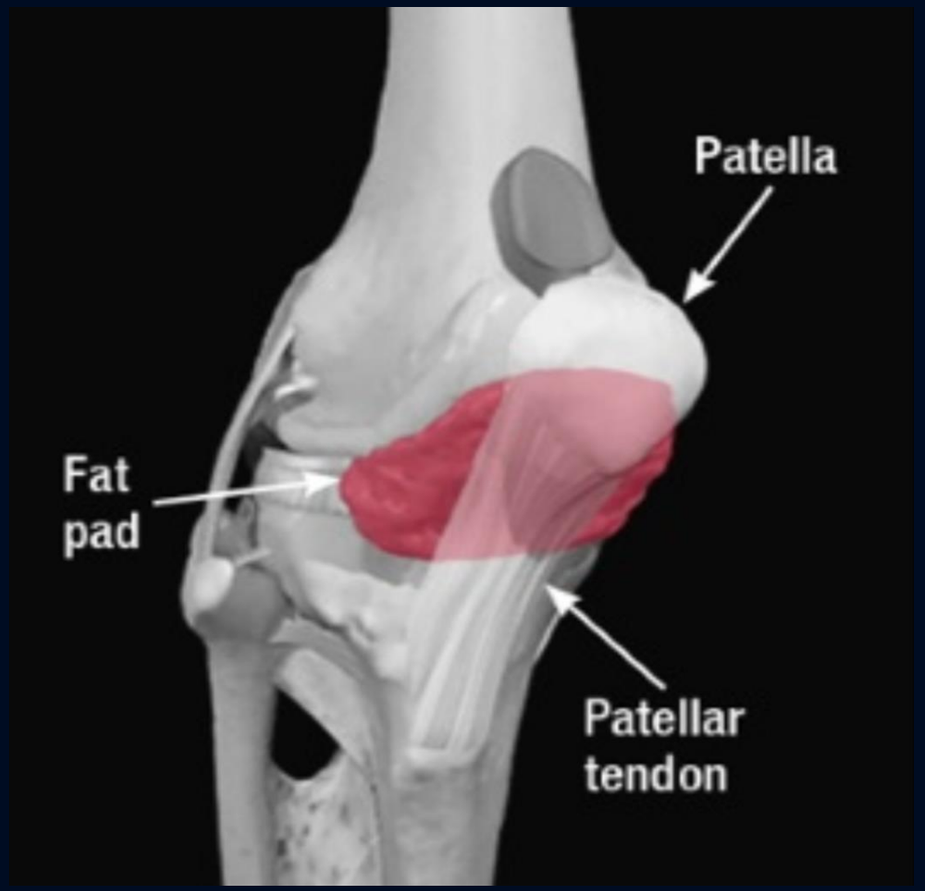
- excellent visualization of :
- articular cartilage,
- cruciate ligaments, collateral ligaments,
- patella tendon, quadriceps tendon,
- Menisci
- bone marrow edema (contusion),
- stress fractures
- mass lesions

- “two-slice touch” rule



a tear (arrow) in the posterior horn of the medial meniscus.

Imaging : MRI



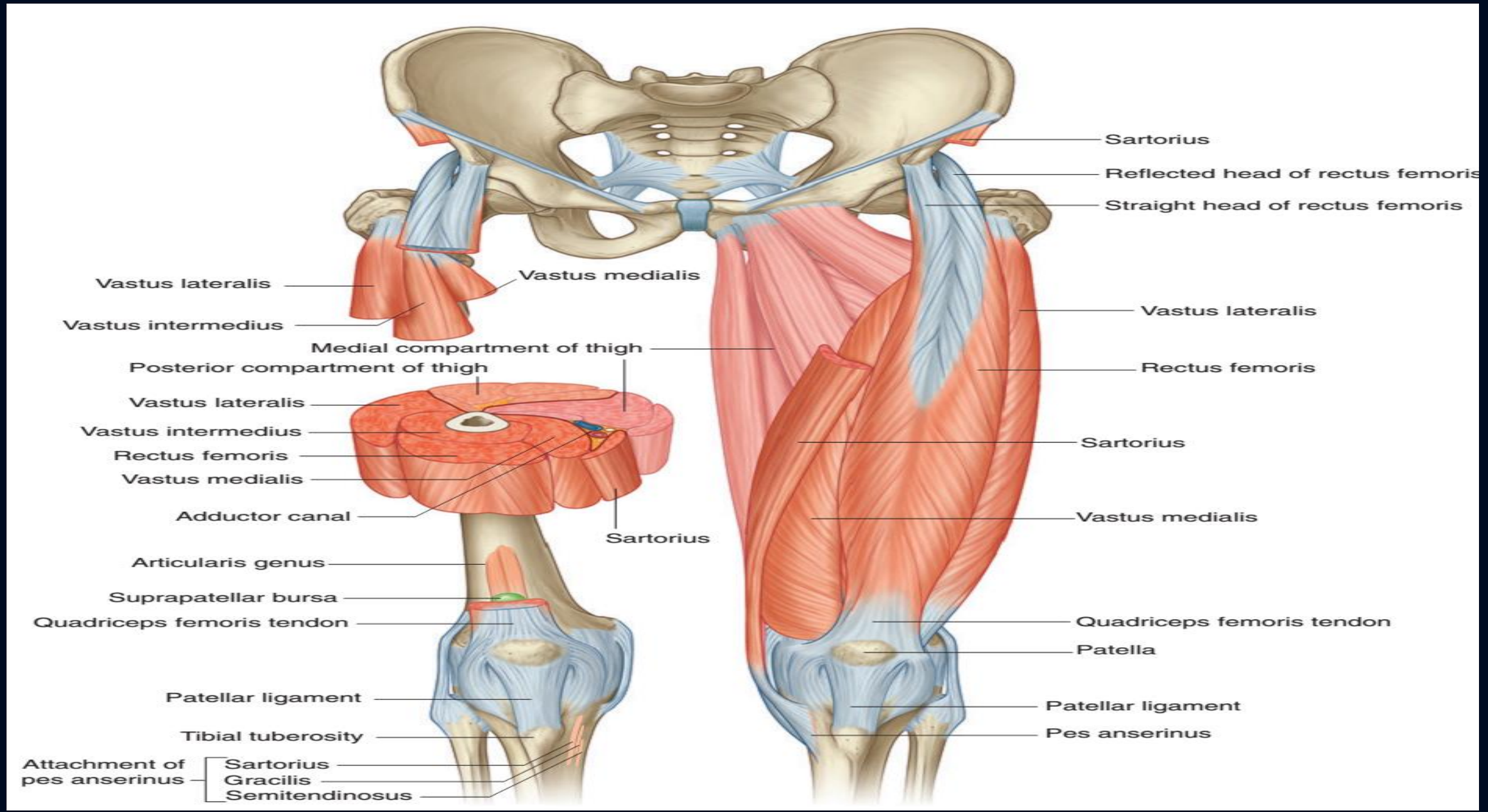
Hoffa’s disease

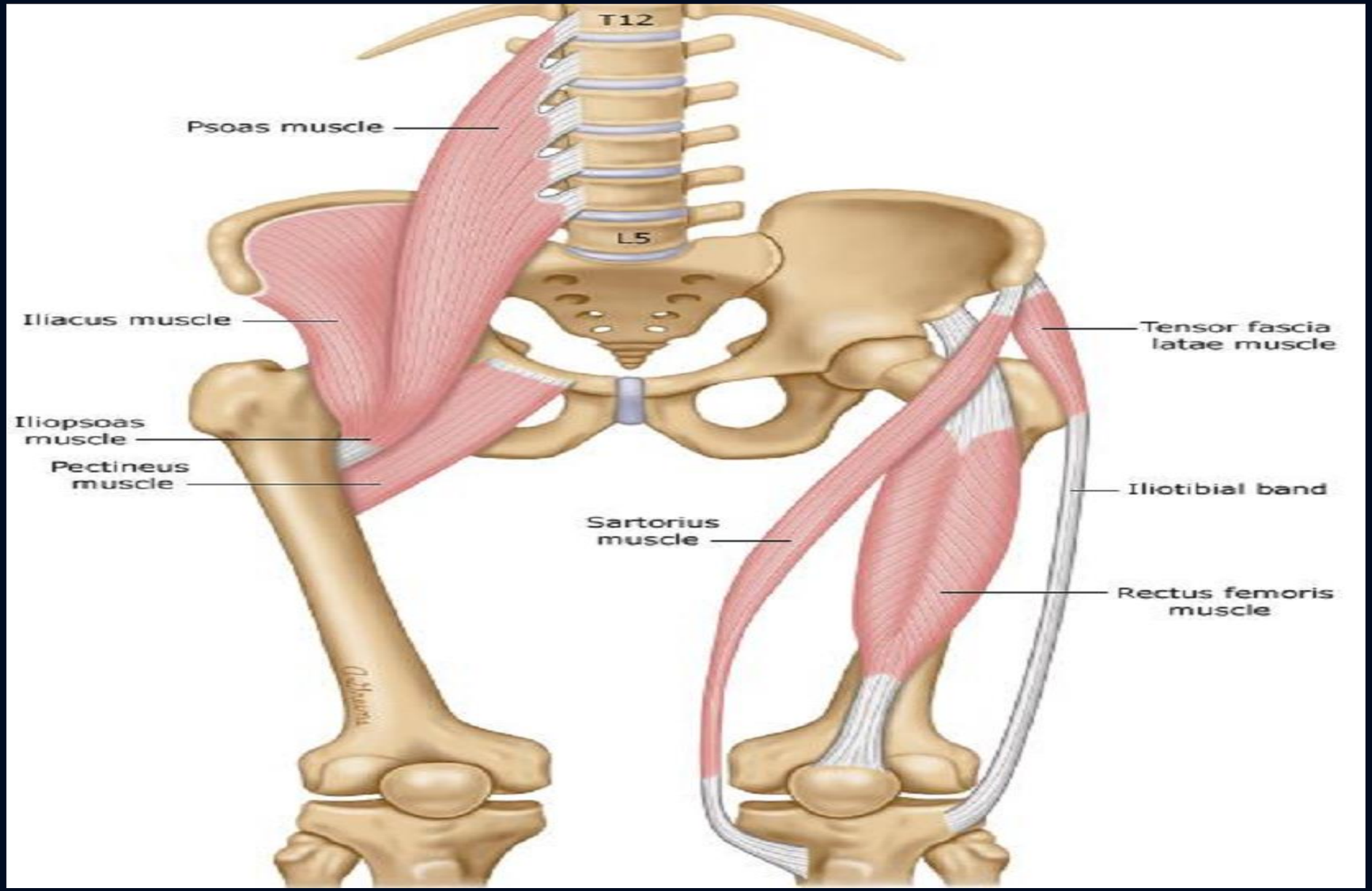
Common Disorders in the Differential Diagnosis of Knee Pain

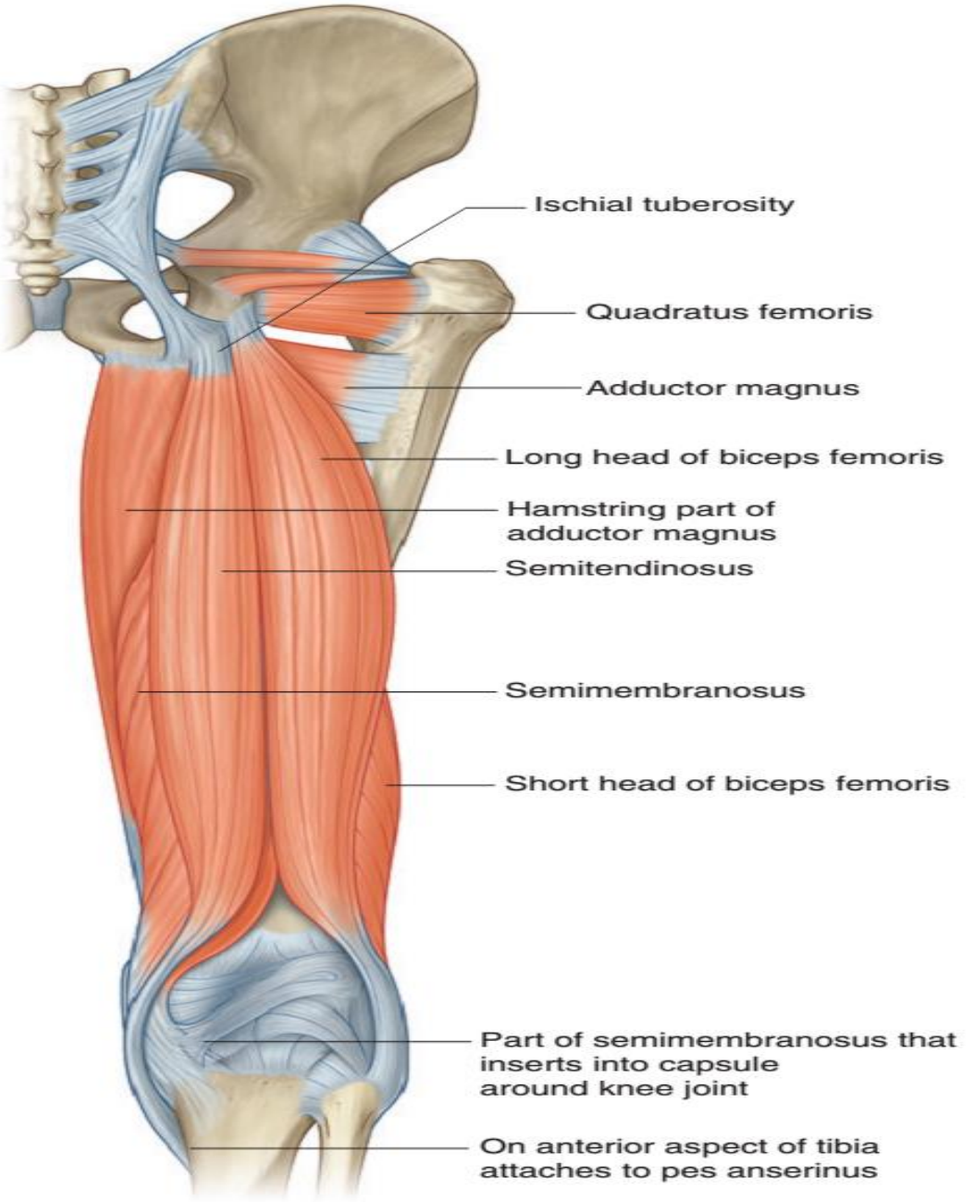
- OA
- RA-SPA
- tears of the menisci, ligaments
- Bursitis
- Popliteal Cysts
- osteochondritis desiccans
- osteochondral fractures

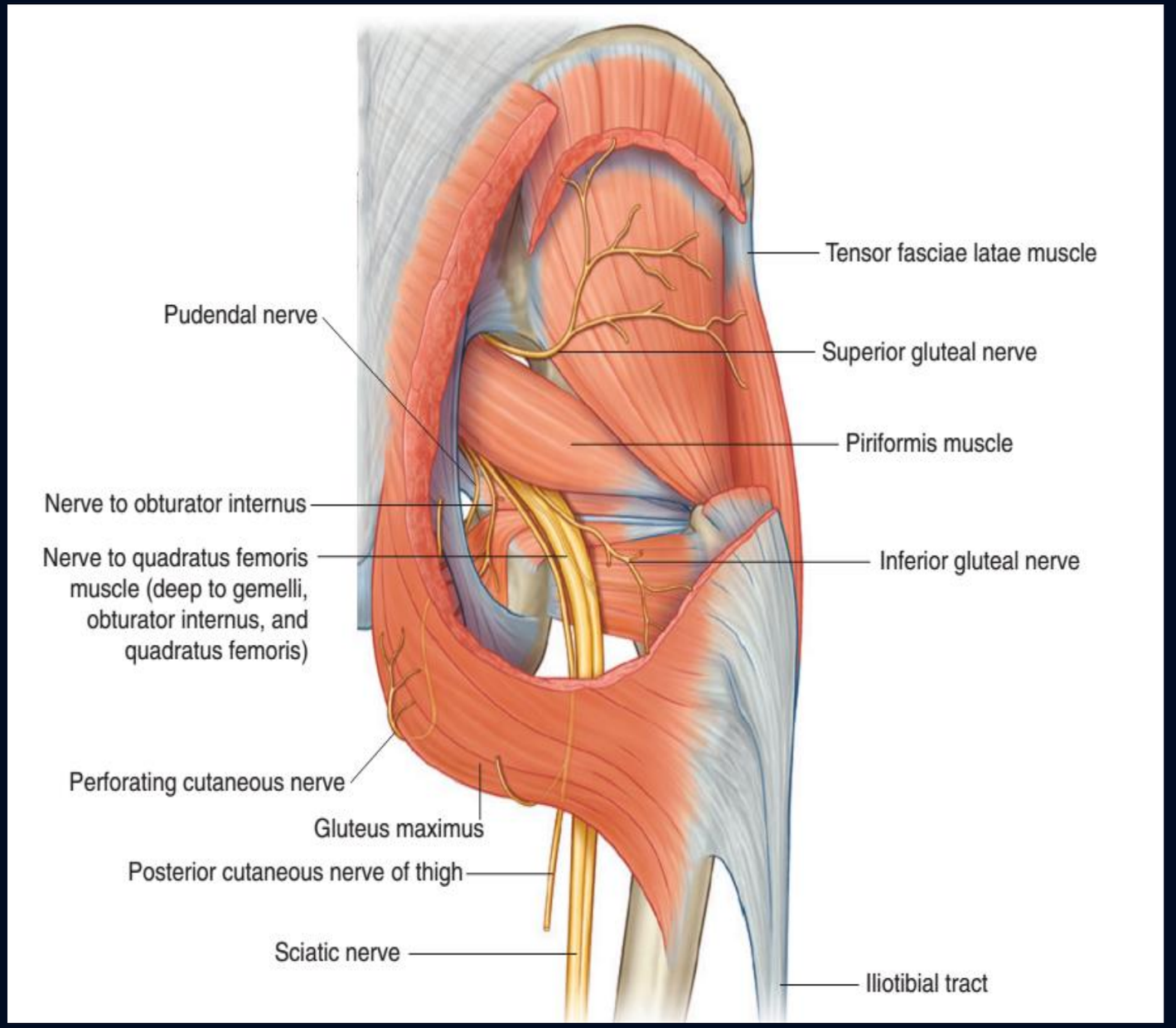
- referred pain from the hip
- vascular claudication , neurogenic claudication
- complex regional pain syndrome
- Neoplasia
- Infection


Hip Pain


Sartorius
Reflected head of rectus femoris
Straight head of rectus femoris
Vastus lateralis
Vastus medialis
Vastus intermedius
Medial compartment of thigh
Posterior compartment of thigh
Vastus lateralis
Vastus intermedius
Rectus femoris
Vastus medialis
Adductor canal
Sartorius
Articularis genus
Suprapatellar bursa
Quadriceps femoris tendon
Patellar ligament
Tibial tuberosity
Attachment of pes anserinus
Sartorius
Gracilis
Semitendinosus
Vastus lateralis
Rectus femoris
Sartorius
Vastus medialis
Quadriceps femoris tendon
Patella
Patellar ligament
Pes anserinus


T12
Psoas muscle
L5
Iliacus muscle
Tensor fascia latae muscle
Iliopsoas muscle
Pectineus muscle
Iliotibial band
Sartorius muscle
Rectus femoris muscle


Ischial tuberosity
Quadratus femoris
Adductor magnus
Long head of biceps femoris
Hamstring part of adductor magnus
Semitendinosus
Semimembranosus
Short head of biceps femoris
Part of semimembranosus that inserts into capsule around knee joint
On anterior aspect of tibia attaches to pes anserinus


Tensor fasciae latae muscle
Pudendal nerve
Superior gluteal nerve
Piriformis muscle
Nerve to obturator internus
Nerve to quadratus femoris muscle (deep to gemelli, obturator internus, and quadratus femoris)
Inferior gluteal nerve
Perforating cutaneous nerve
Gluteus maximus
Posterior cutaneous nerve of thigh
Sciatic nerve
Iliotibial tract

History

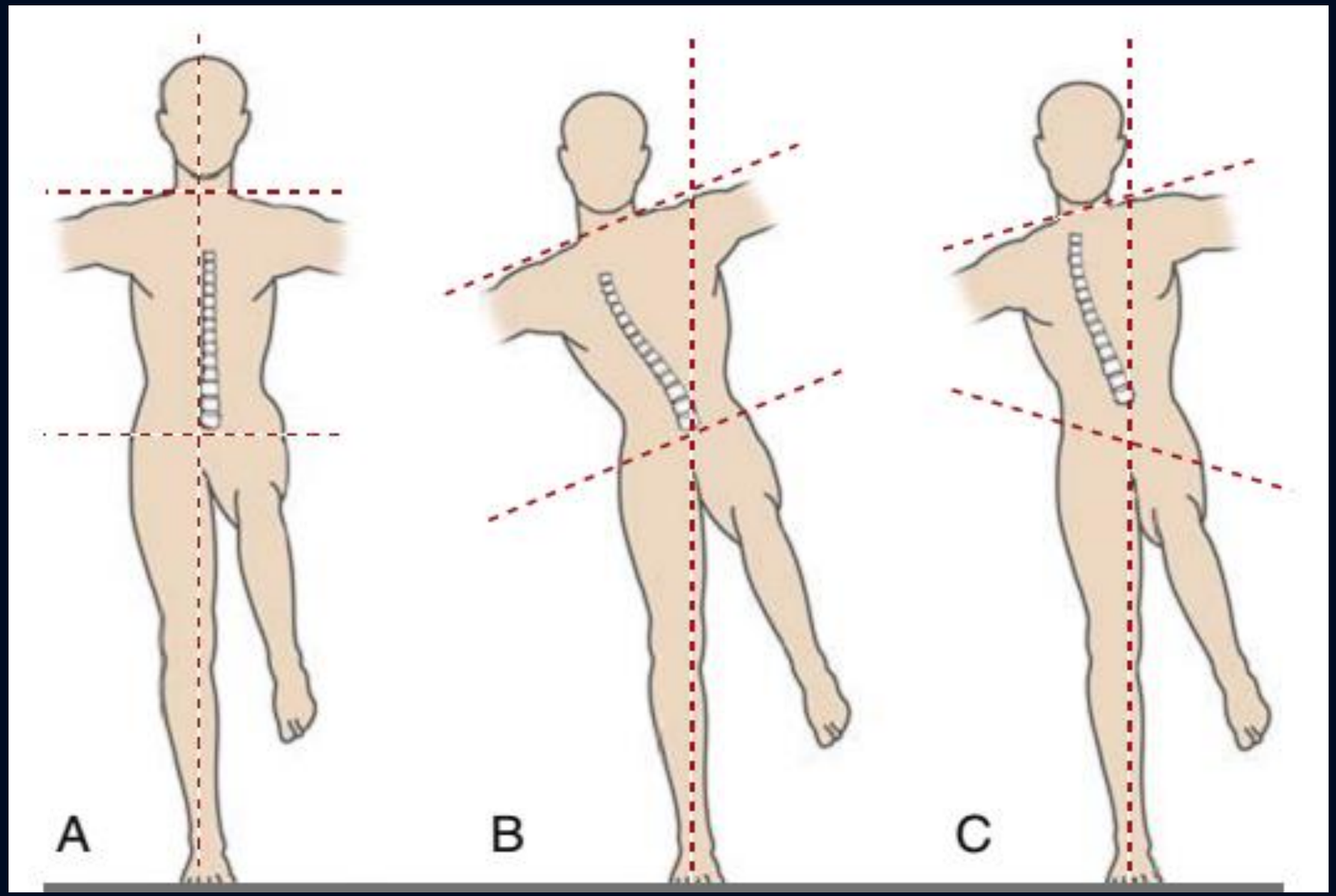
- the hip is a common site for **referred pain** from lumbosacral and intrapelvic disease.
- It is important to define the **exact location** of the pain.
- Activities or positions that aggravate and relieve the pain should be explored. The severity, frequency, and patterns of radiation of the pain also should be evaluated.

- Knowledge of the patient's **general level of functioning** is important
- The patient should be asked about any hip problems in **childhood**.
- Any **previous treatments** for hip pain should be discussed

- Osteoarthritis and inflammatory arthritis are two common causes of hip pain

Physical Examination

- Ease of rising from a chair, **postures**, and **walking** speed all provide insight into the extent of a patient's disability.
- A general evaluation of the patient's **spine**, **lower extremity alignment**, and **leg lengths** is performed.
- Evaluation of **gait**
- Common causes of a **limp** include **pain** and abductor **weakness**.



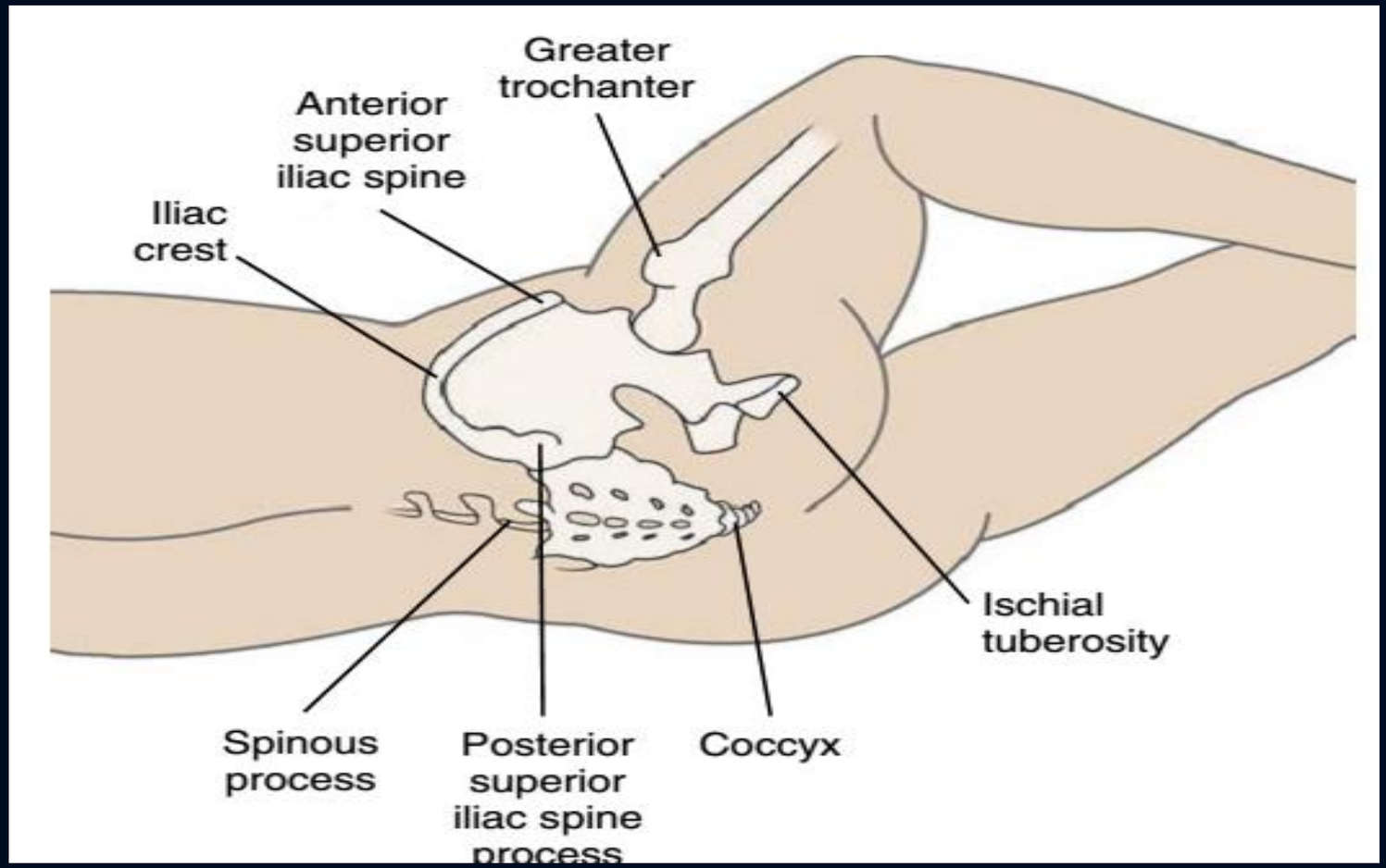
- A) Normal single legged stance
- (B) Positive Trendelenburg lurch and negative Trendelenburg’s sign
- (C) Positive Trendelenburg lurch with pelvic obliquity

➢ Causes of abductor weakness :

- contracted or shortened gluteus medius
- coxa vara
- fracture
- dysplasia
- neurologic conditions
- aslipped capital femoral epiphysis

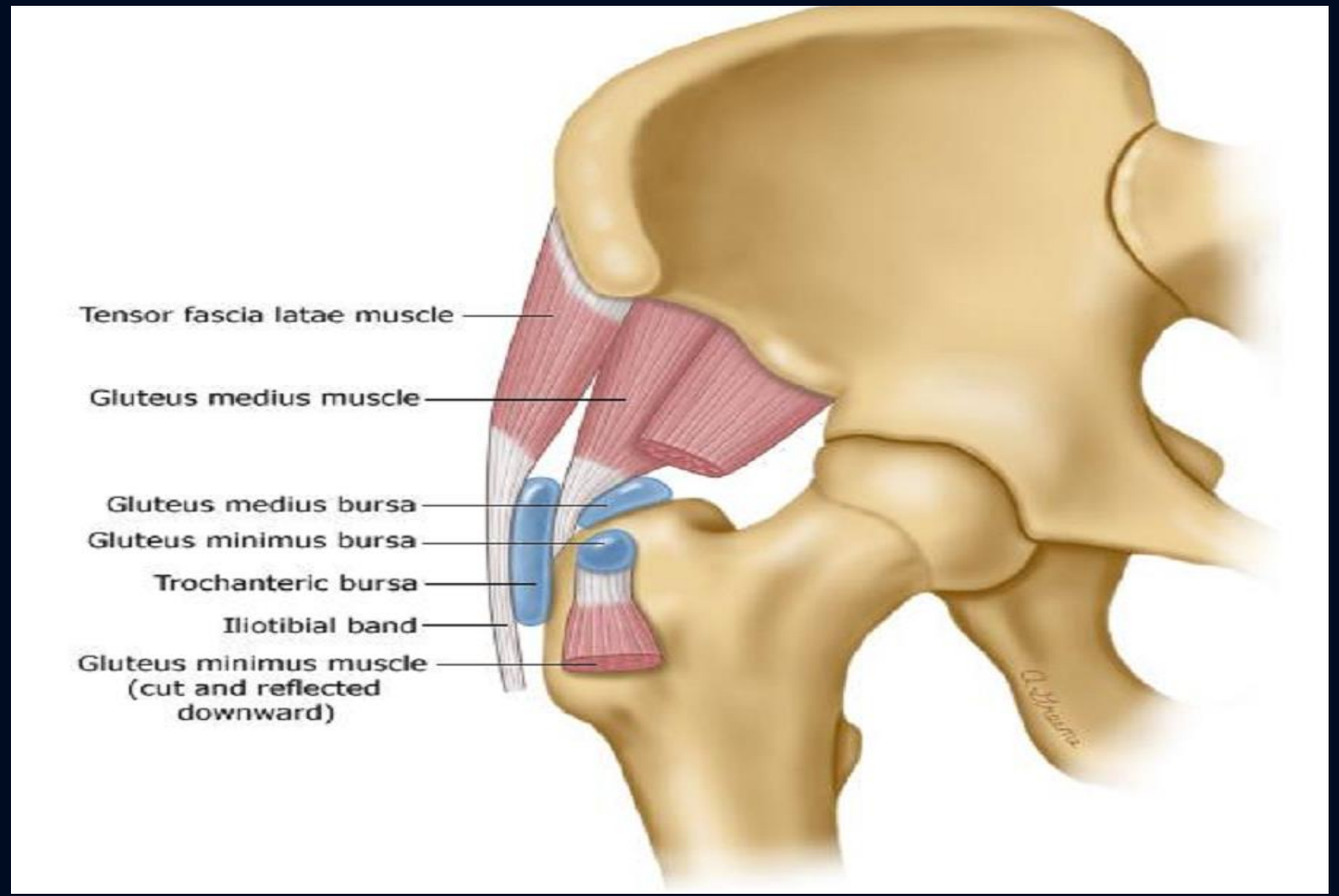
Physical Examination

- **Inspection :** Previous surgical scars ,deformities, muscle atrophy
- **Palpation** of the **bony landmarks** should be performed (femoral neck?)



Physical Examination

- Areas that are painful should be **palpated**

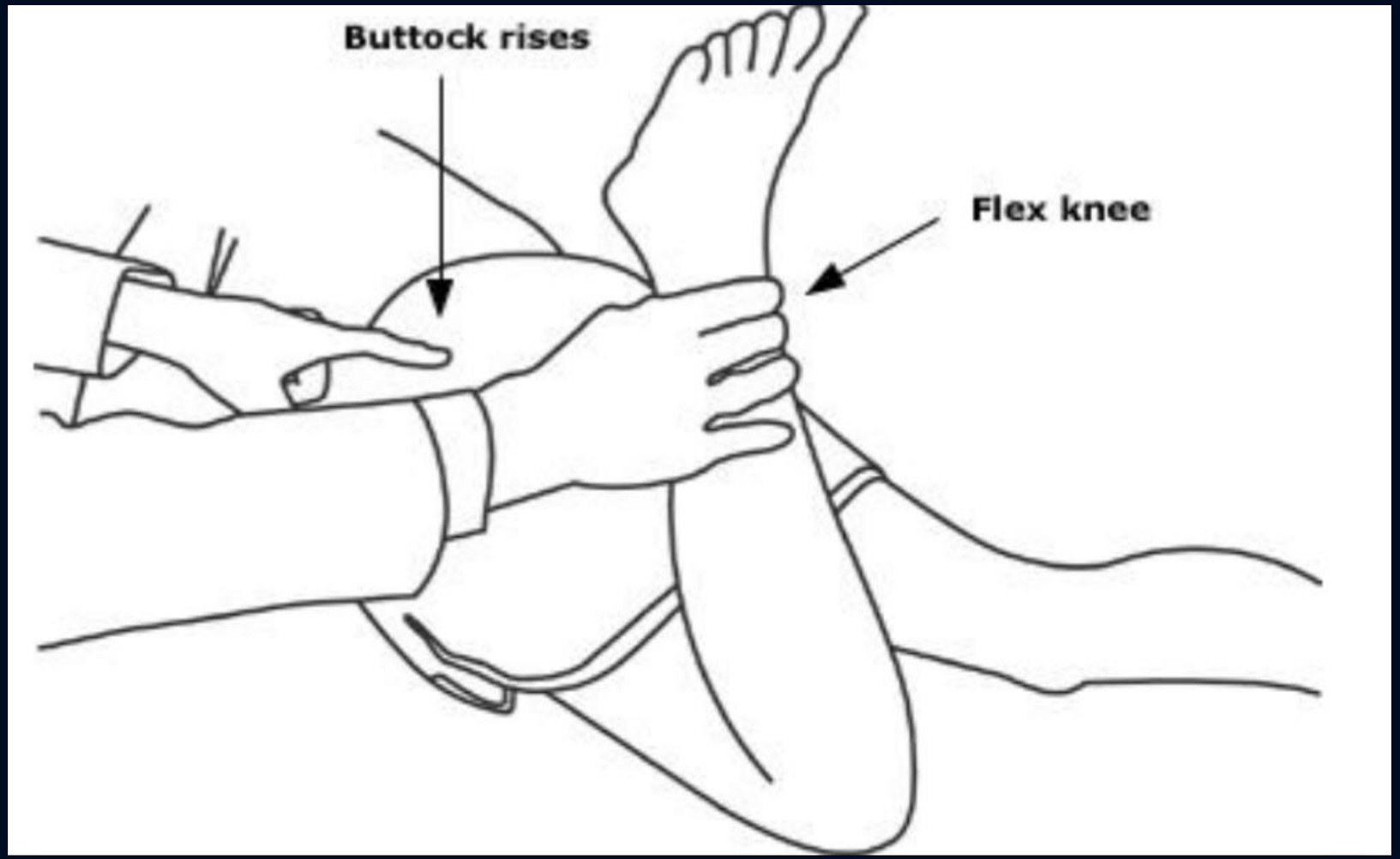


Physical Examination

- Inspection
- Palpation
- ROM
- Special test

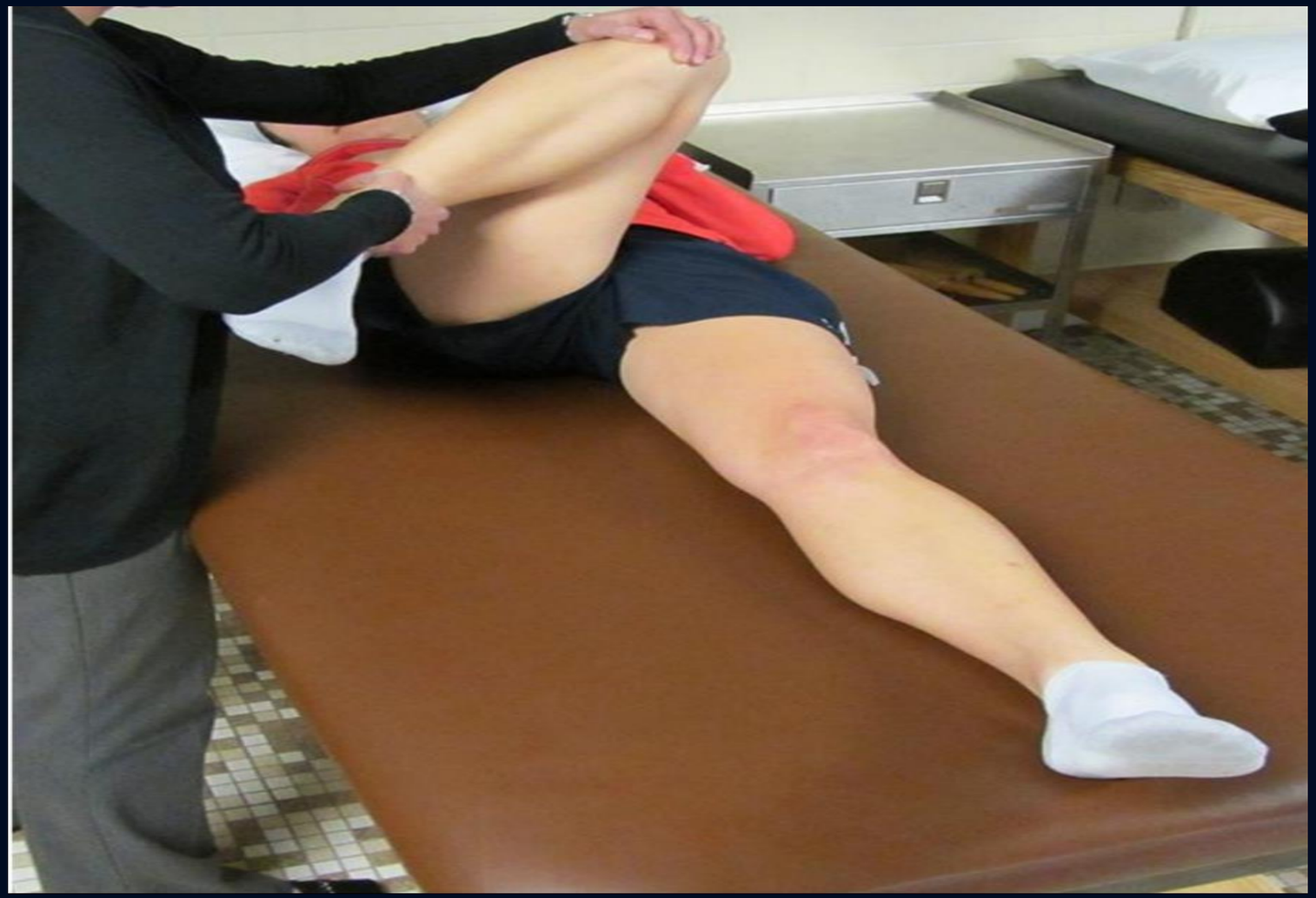
Thomas test : hip flexion contracture

Ober test : tightness of the iliotibial band



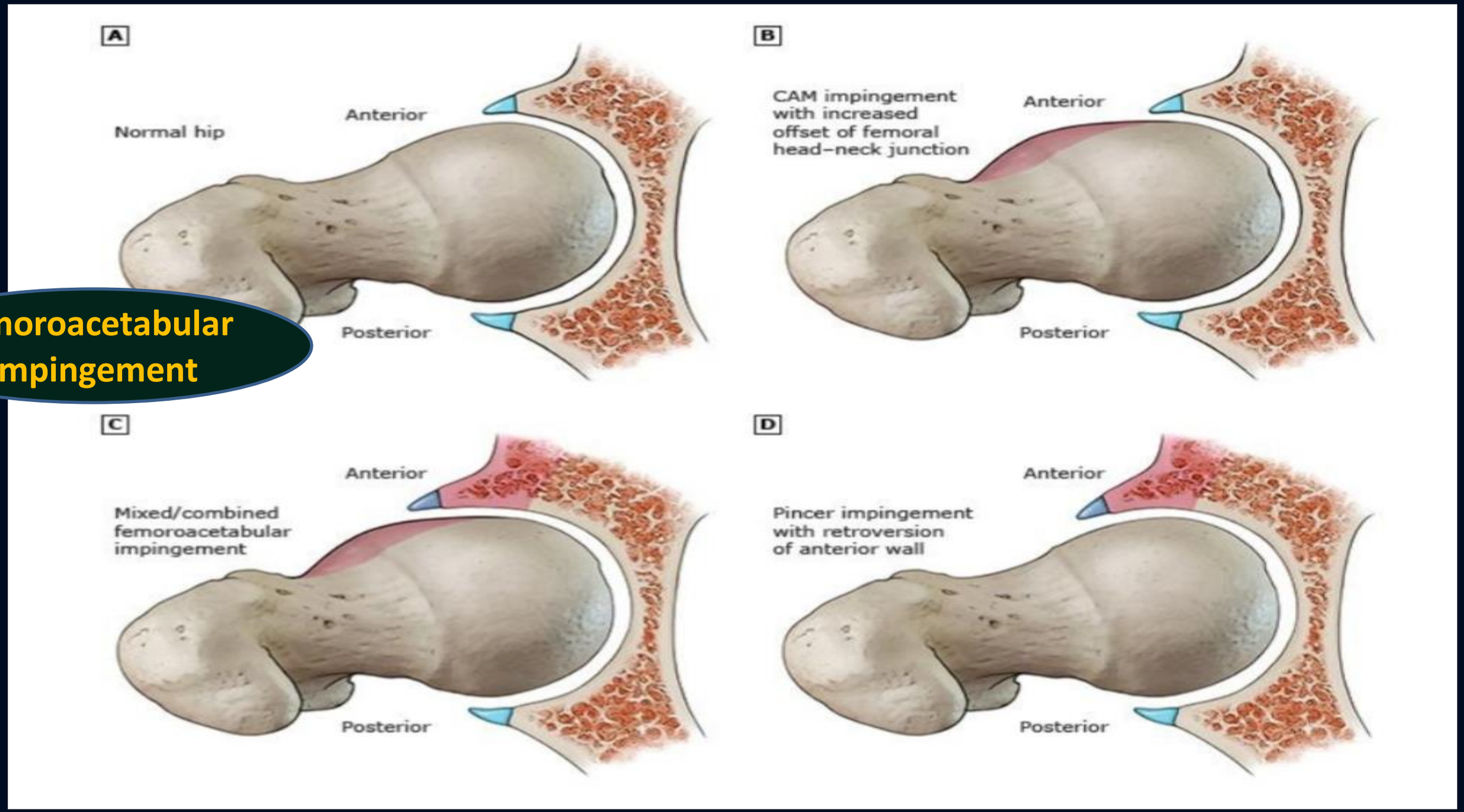
Ely's test : tight rectus femoris

piriformis test



FADIR (impingement test)

femoroacetabular impingement



➢ Tests for SI joint :

- **FABER tests**
- Gaenslen’s test
- Compression test
- Distraction test
- thigh thrust test
- sacral thrust

FABER

Physical Examination : Tests for SI joint

Physical Examination : Tests for SI joint

Gaenslen’s test

snapping hip syndrome

- **Extra-articular causes** of hip snapping include a **thickened iliotibial band** snapping over the greater trochanter , the **iliopsoas tendon** gliding over the iliopectineal eminence, the **long head of the biceps tendon** rubbing on the ischial tuberosity, and the **iliofemoral ligament** rubbing on the femoral head.

- **Intra-articular causes** of snapping hip syndrome include loose bodies and large labral tears

Imaging : Conventional Radiographs

low AP pelvis view

AP hip view

Imaging : Conventional Radiographs

frog-lateral view

Imaging

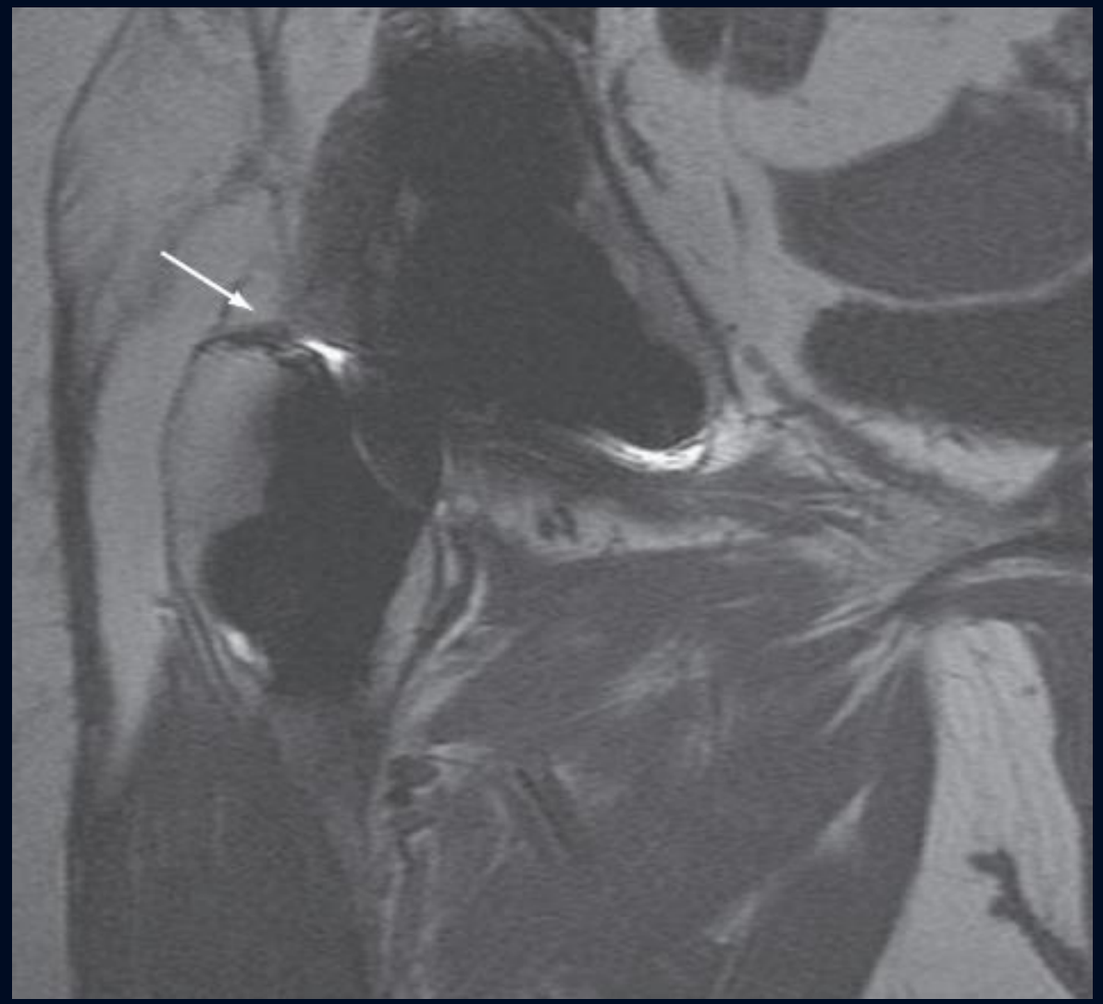
- **CT** is used for assessment of :

  - acetabular fractures
  - femoral head fractures
  - subtle femoral neck fractures
  - acetabular nonunion
  - Neoplasia

- **Nuclear Scintigraphy**
- **Ultrasound**
- **Hip Arthrography**
- **MRI**

Imaging

- **MRI** is now commonly used for diagnosis of
  - osteonecrosis
  - Labral disease
  - neoplasia
  - effusion
  - synovitis , tendonitis , bone edema
  - gluteus medius tendon avulsions
  - loose bodies
  - transient osteoporosis of the hip
  - occult femoral neck fractures
  - nerve injury



a complete avulsion of the gluteus medius tendon

osteonecrosis

Common Disorders in the Differential Diagnosis of Hip Pain

- osteoarthrosis
- inflammatory arthritis
- osteonecrosis
- fractures
- trochanteric bursitis
- femoroacetabular impingement
- tears of the acetabular labrum

- transient osteoporosis of the proximal femur
- infection
- snapping hip syndrome
- osteitis pubis
- neoplasia
- inguinal hernia
- referred pain