CLINICAL EXAMINATION OF THE HIP

- Anatomy
- History
- Clinical Examination

ANATOMY.

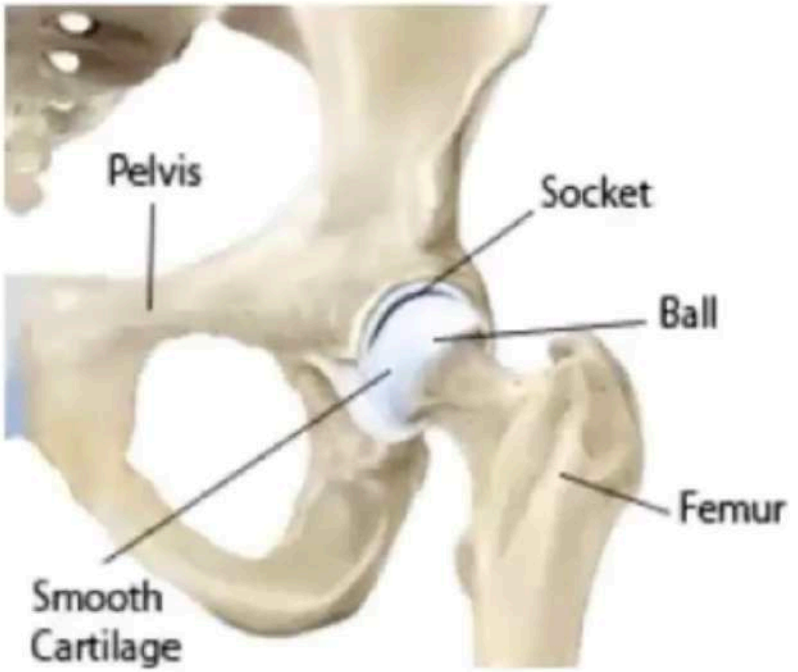
Ball and socket type of synovial joint.

Connects the pelvic girdle to the lower limb

Made up of femoral head and acetabulum

Designed for stability and wide range of movement

Covered with a thin layer of hyaline cartilage



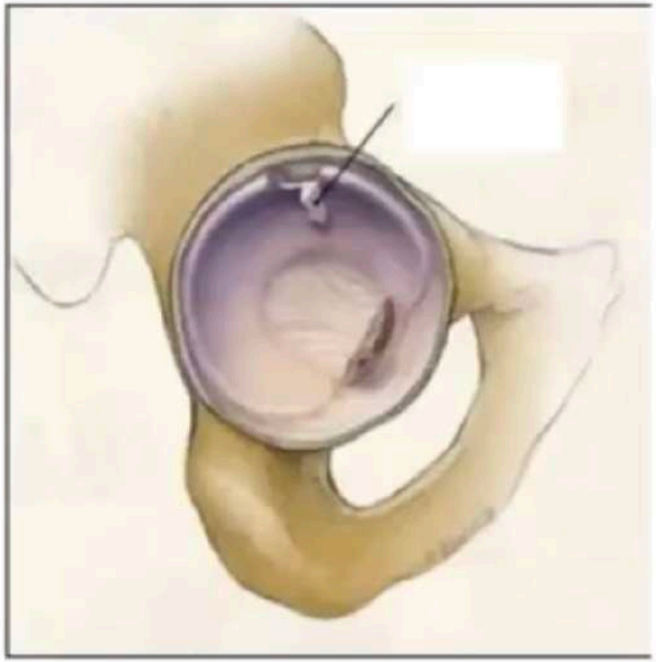
Anatomy

The articular surface of is horse-shoe shaped and is deficient inferiorly- acetabular notch

Has a labrum

is a circular layer of cartilage which surrounds the outer part of the acetabulum making the socket deeper and so helping provide more stability

Capsule

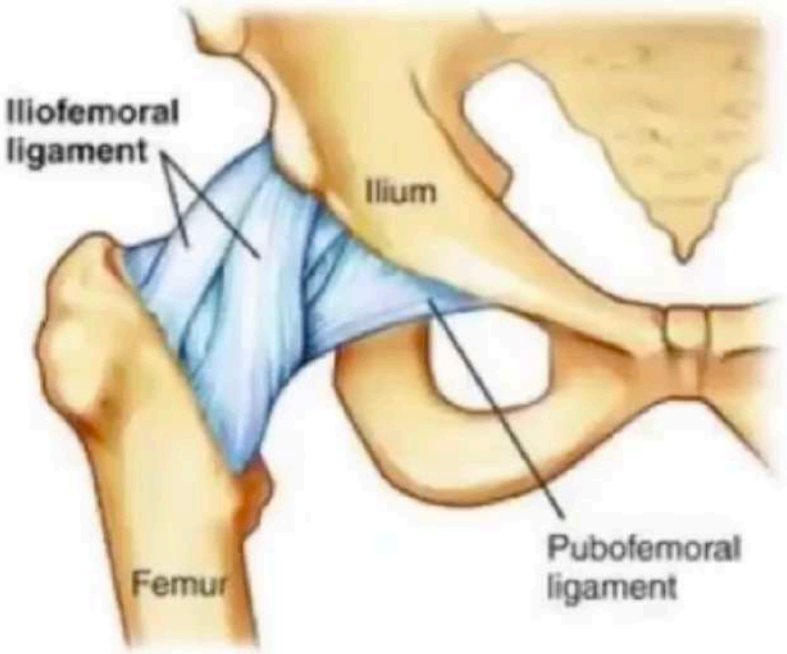


Iliofemoral Ligament

This is a strong ligament which connects the pelvis to the femur at the front of the joint

It resembles a Y in shape

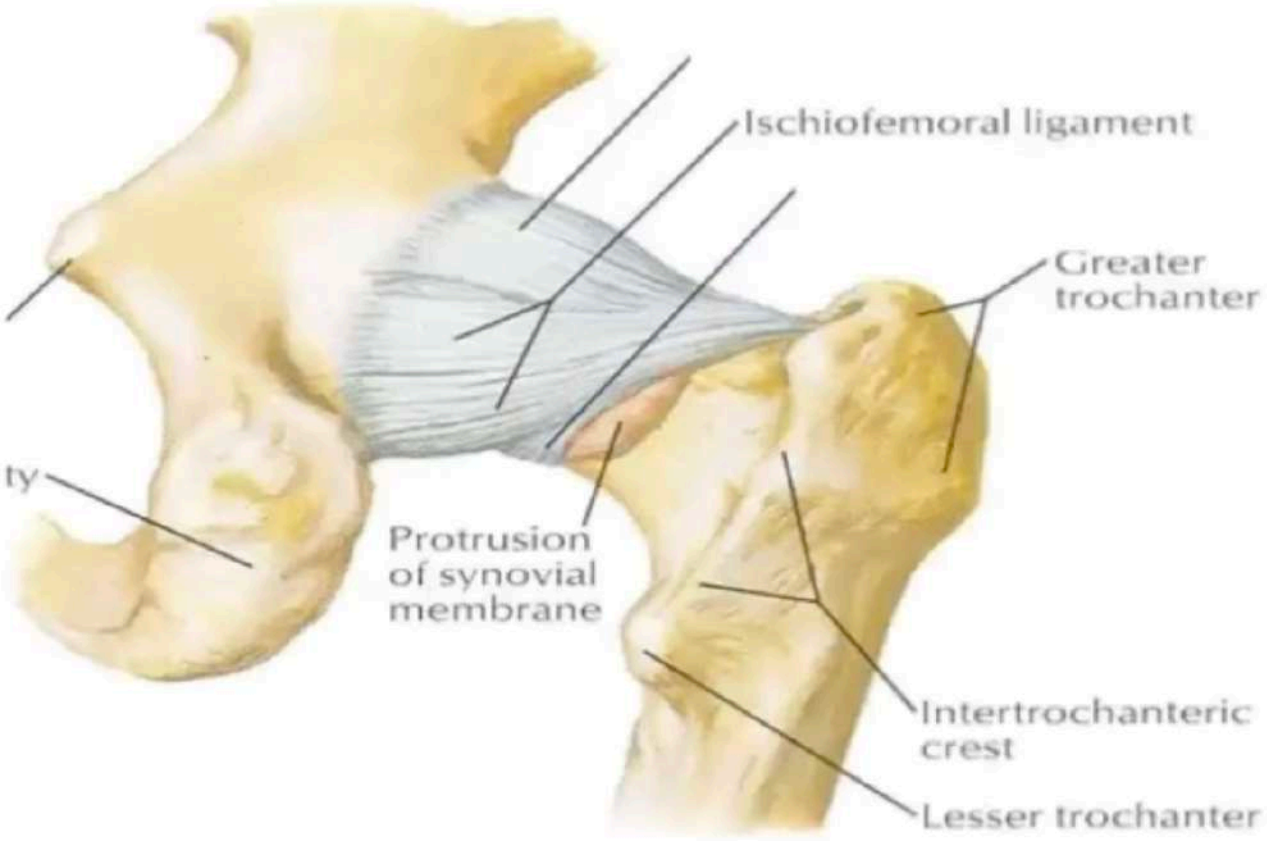
Stabilises the hip by limiting hyperextension



Ischiofemoral ligament:

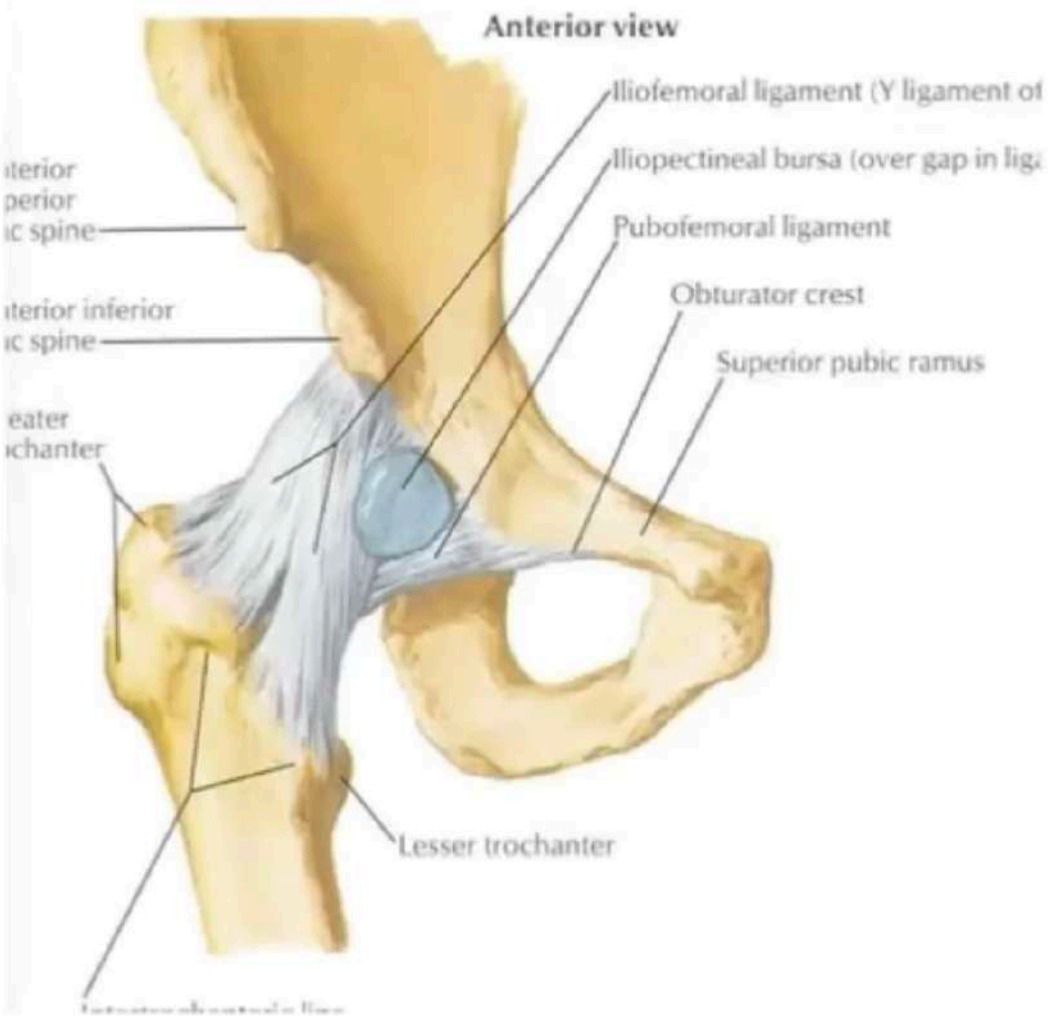
This is a ligament which reinforces the posterior aspect of the capsule

attaches the ischium to the two trochanters of the femur.



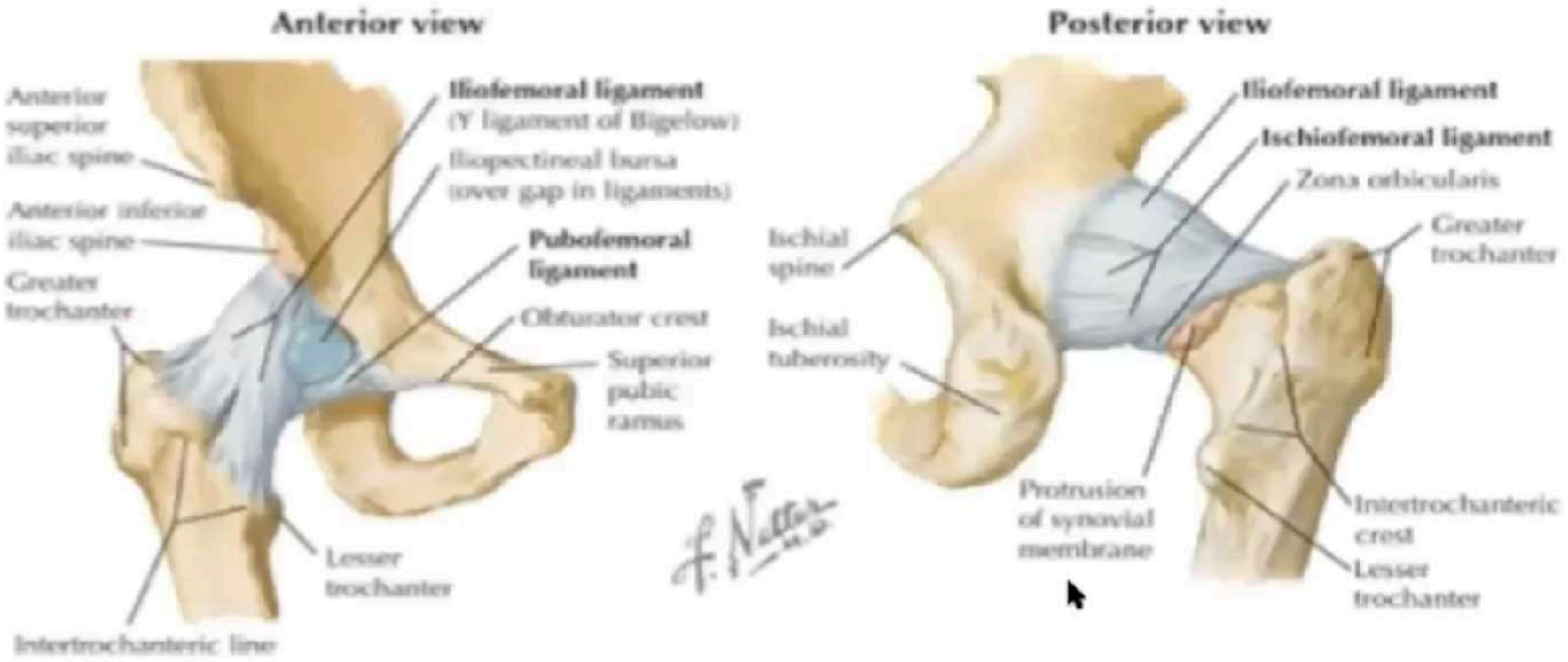
Pubofemoral ligament

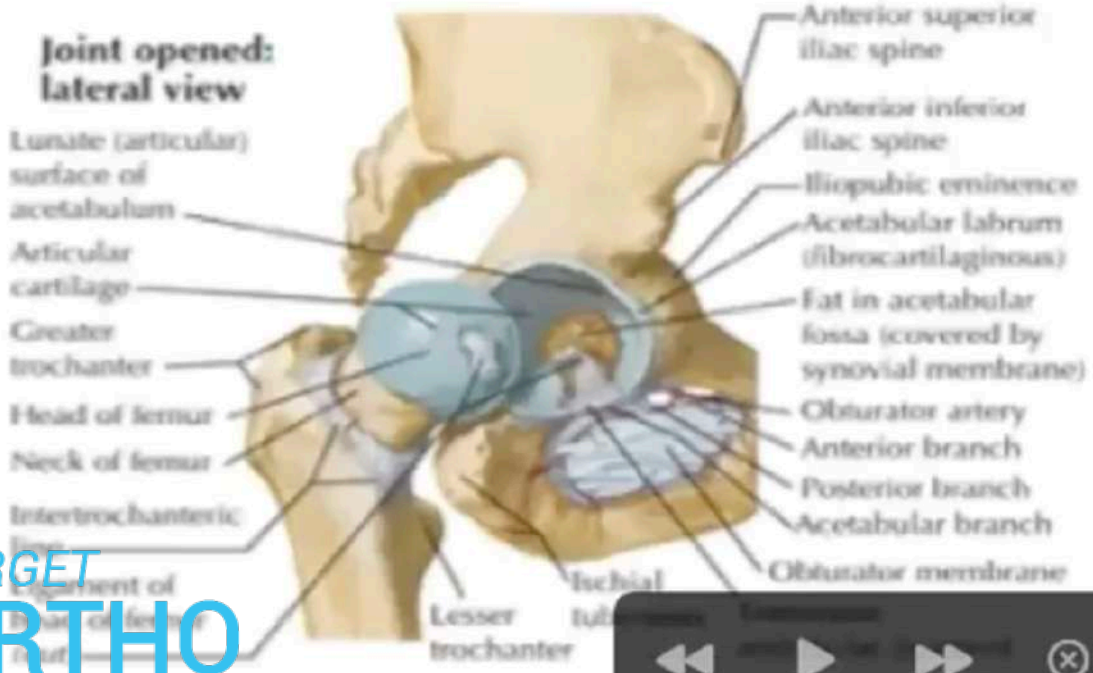
The pubofemoral ligament attaches the pubis to the femur

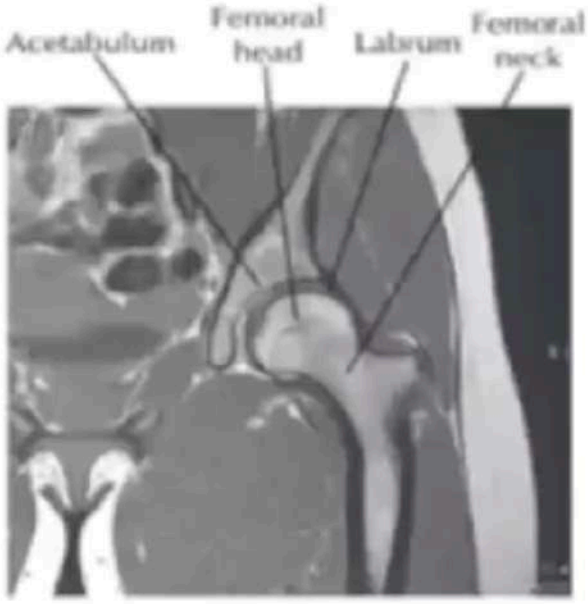


- **Transverse acetabular Ligament:**
  - Bridges acetabular notch.

- **Ligament of head of femur:** flat and triangular in shape
  - Lies within joint, ensheathed by synovium

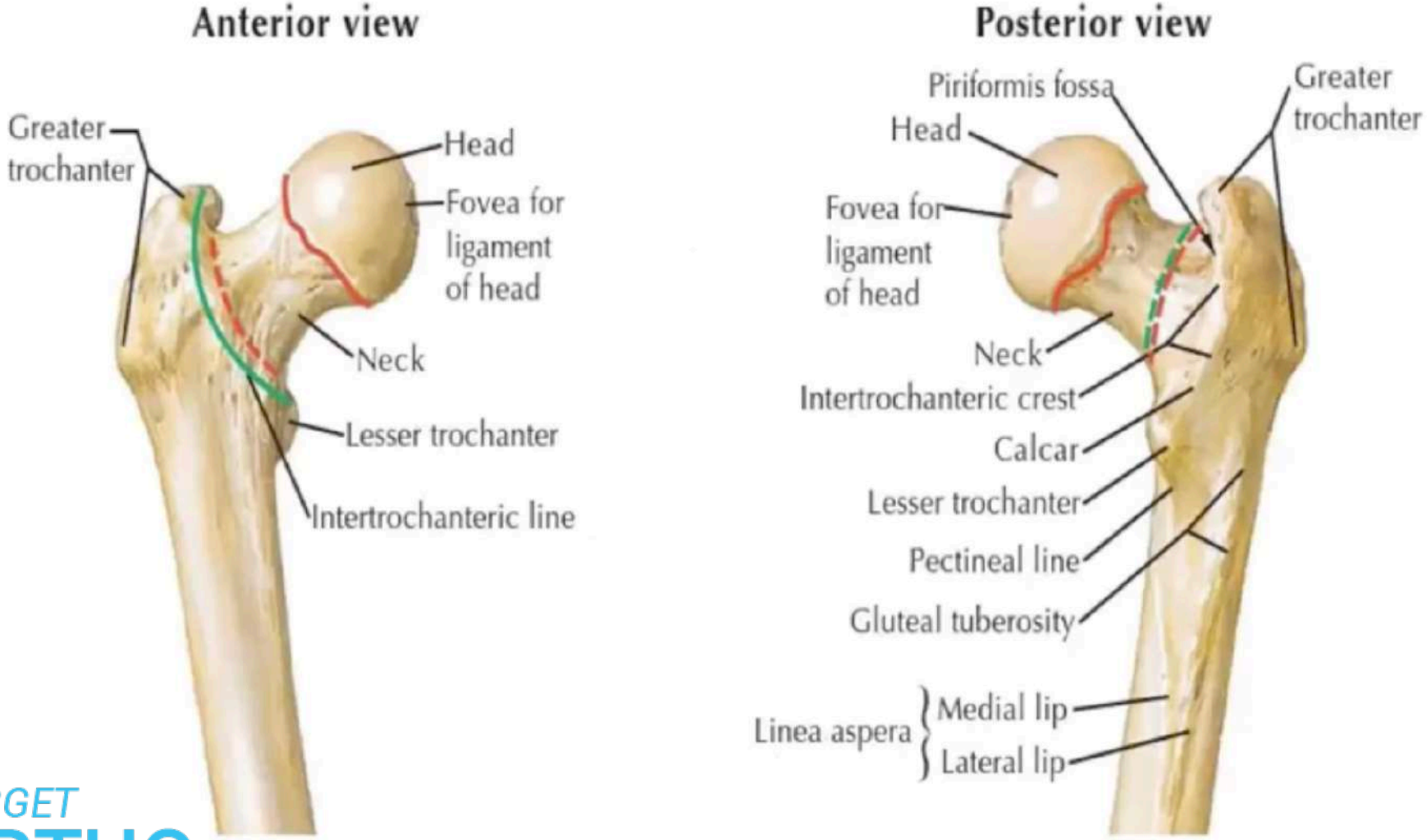


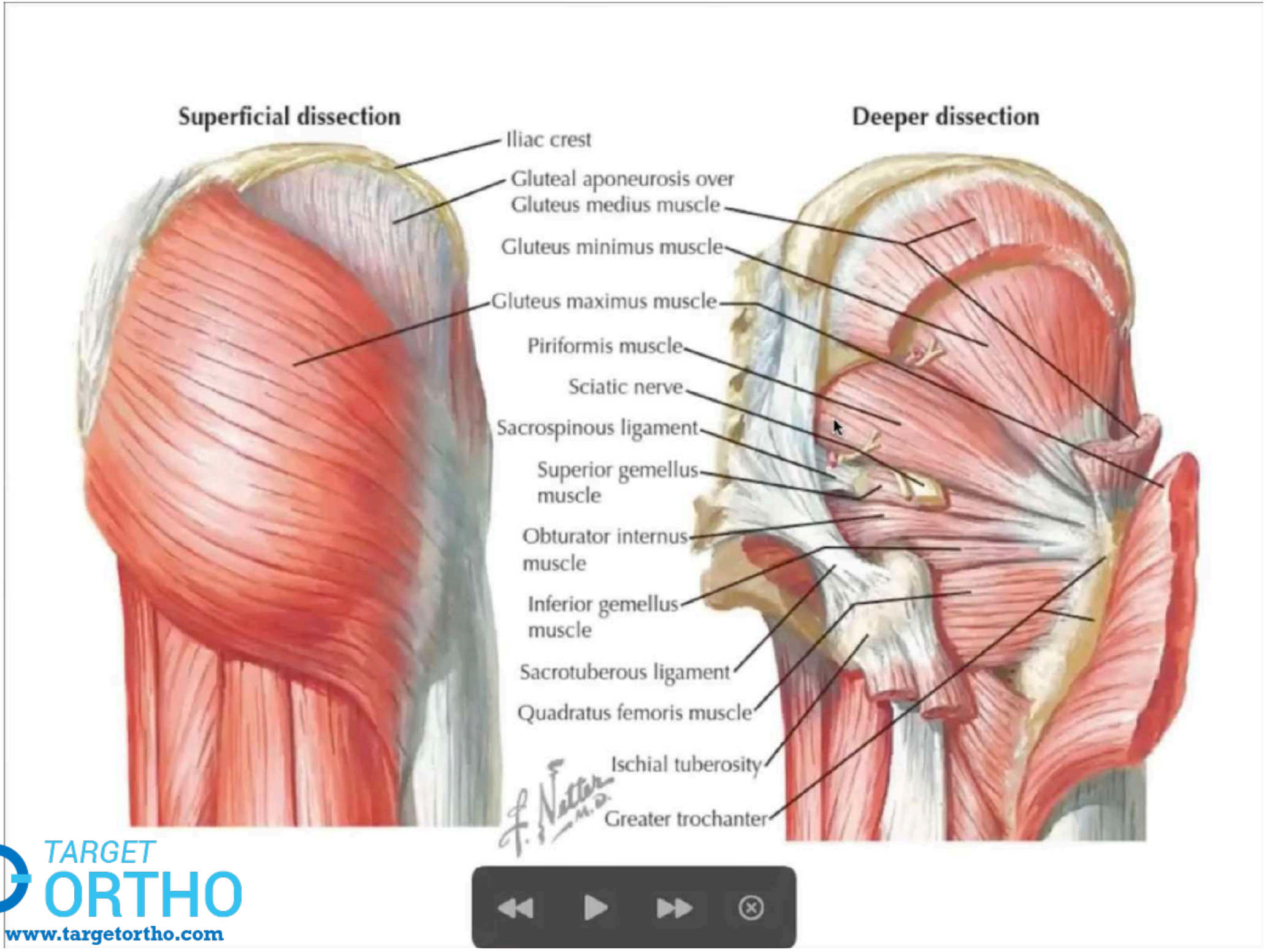




MRI, Hip: coronal

Osteology





Functional Group of Muscles Acting on the Hip

Flexors:

- Iliopsoas, sartorius, tensor fascia lata, rectus femorus,

Extensors:

- hamstrings, addcutor magnus, gluteus maximus

Adductors:

- adductor longus, brevis, and magnus, gracilis, pectineus

Abductors:

- gluteus medius, minimus, tensor fascia lata
- gamelli, obturators, piriformis in sitting

External rotators:

- obturator externus, internus, piriformis, quadratus femoris, gluteus maximus

Internal Rotators:

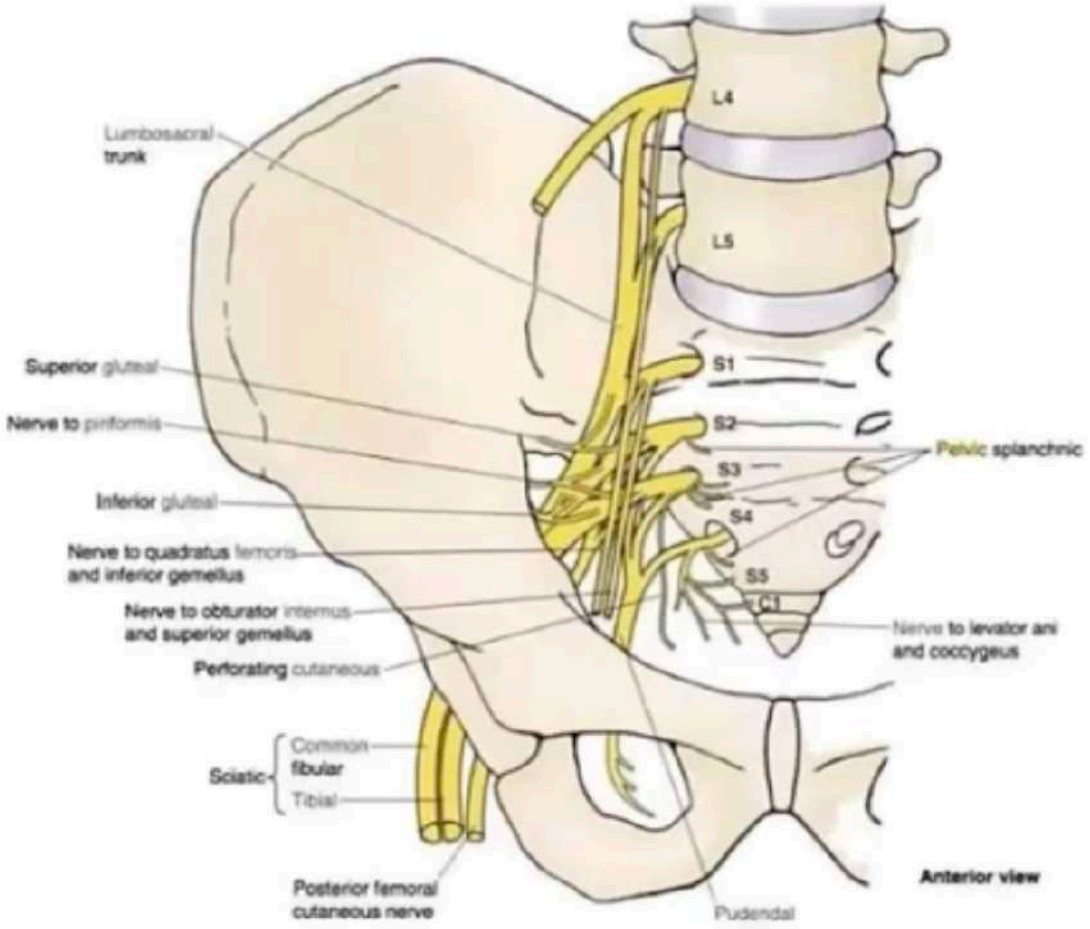
- gluteus medius, minimus, tensor fascia lata.

Nerves

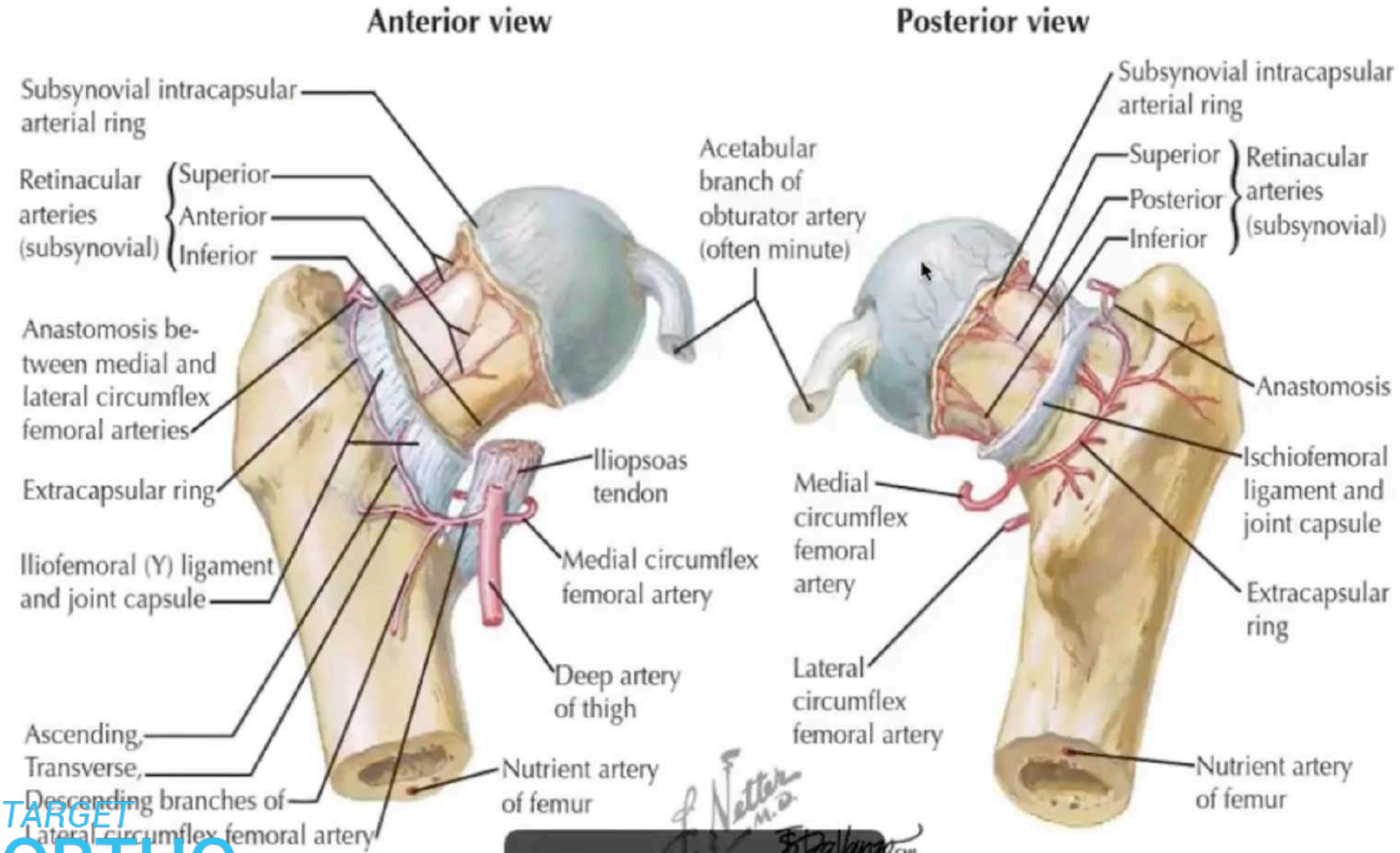
Femoral (L2,3,4)

Obturator (L2, 3, 4)

Sciatic (L4,5, S1, 2,)



Blood supply



EXAMINATION OF HIP

- History
- General examination
- Gait
- Inspection
- Palpation
- Movements
- Measurements
- Special tests

Clinical complain of patient

1. Pain
2. Swelling
3. Loss of function
4. Limp
5. Stiffness
6. Deformity(SHORTENING)

Pain

1. Onset: ACUTE (trauma ,infection ,reactive , muscular)
   INSIDIOUS (degeneration ,arthriti s,osteonecrosis , tb)
2. Duration
3. Character SHARP / DULL ACHING
4. Diurnal variation
5. Progression over time
6. Undulating course
7. Localisation
8. Radiation
9. Aggravating /relieving factor
10. Daily life affect
11. Medication

SWELLING

NORMALLY MASKED BY BULK OF MUSCLES
Progressive swelling like acute pyogenic infection and active TB (APPRICIABLE)
IF PRESENT LOOK FOR
1.SITE
2.ONSET
3.DURATION
4.ASSOCIATION WITH PAIN
5.PROGRESSION OVER TIME

LIMP

1.ONSET
2.DURATION
3.PROGRESSION
4.ASSISTANCE IN WALKING
5.RELATION TO PAIN
6.PRESENT AMBULATORY STATUS

STIFFNESS

LIMITATION OF MOVEMENTS

SPASM SECONDARY TO ONGOING PATHOLOGY

DEFORMITY

ASK PATIENT WHEN HE FIRST NOTICE SHORTENING

ASSOCIATION WITH PAIN AND PROGRESSION.

PAST HISTORY

- Trauma
- Tuberculosis
- Surgery around hip
- Skin /hematological disorders
- Neurological disorders
- Connective tissue disorders
- Steroid intake
- Any other significant medical /surgical illness

PERSONAL HISTORY

- Occupation and work tolerance
- Diet
- Smoking/alcohol
- Sexual history
- Menopausal history

FAMILY HISTORY

- TB in close relative
- Dysplasia
- Metabolic storage disorders
- Inflammatory arthritis

TRAUMA

1. MODE
2. SITE OF INJURY
3. POST INJURY MOBILITY OR DAILY ACTIVITY
4. INJURY TO OTHER PART
5. TREARMENT RECEIVED

ENDING OF HISTORY TAKING

1.CURRENT DISABILITY EXPERIENCED

2.MOBILITY STATUS OF PATIENT

3.NEGATIVE HISTORY

GENERAL EXMINATION

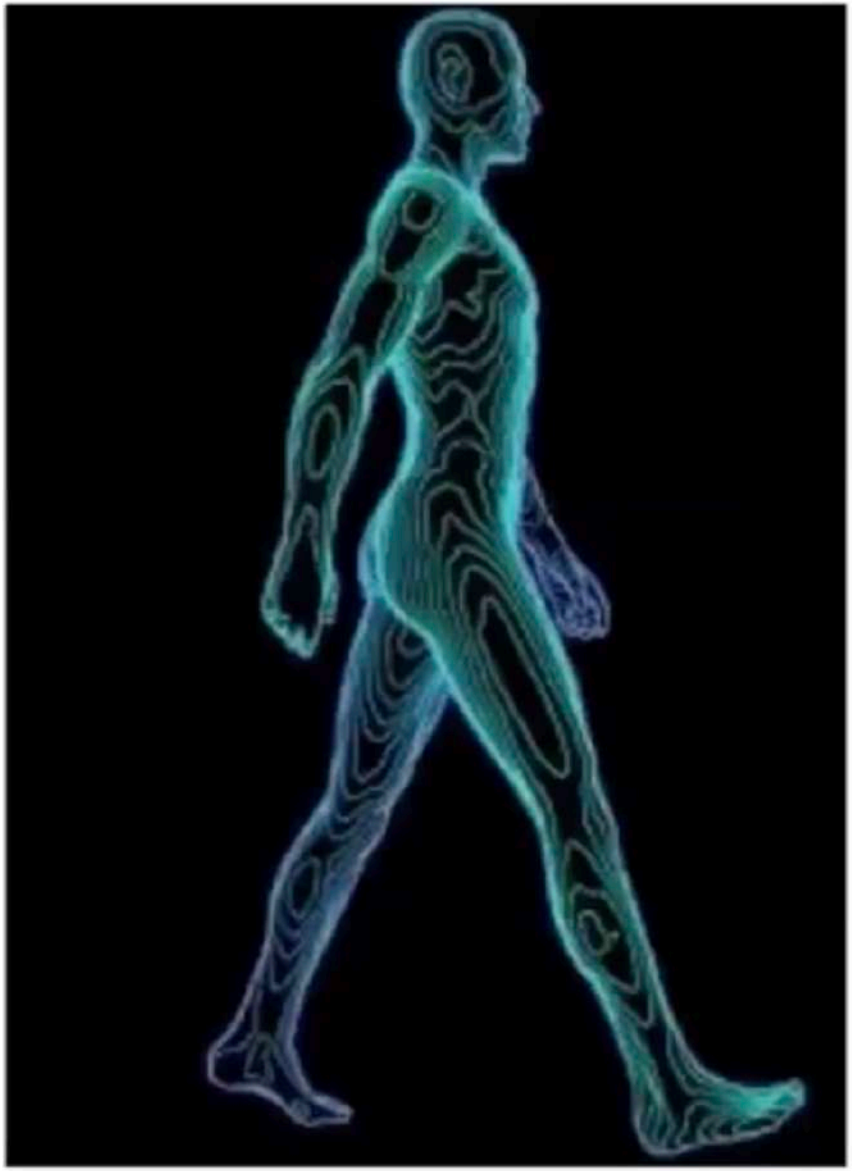
FEVER
HEIGHT/WEIGHT/BMI
CLUBBING
PALLOR
ICTERUS
LYMPHADENOPATHY(EXT&INT ILIAC AND PARAAPRTIC)
ABDOMEN FOR PSOAS ABSCESS
VITAL SIGNS
STIGMA OF RA AND TB
HEMOPHILIA
DYSPLASIA
HYPERMOBILITY SYNDROME
CHEST EXPANSION
GENERAL ATTITUDE OF PATIENT

LOCAL EXAMINATION

- Inspection
- Palpation
- Movements
- Measurements
- Special tests

GAIT

- Simplest of all definitions "mode of walking"
- Normal gait is rhythmical bipedal biphasic walking in which the lumbar spine, hip and legs move in unison
- Limping is the most common abnormality
- Can be defined as any abnormality of normal rhythmic biphasic walking



INVOLVES COMPLEX NEUROMUSCULAR COORDINATION OF LUMBAR SPINE,PELVIS,HIPS AND STRUCTURE DISTAL TO THEM.TYPES:

Walking; bipedal, unsupported,any time one foot at ground.

Running; same as walking but in quick succession.

Jumping; any point of time both feet touching ground or at air.

PREREQUISITE

1.SEEN IN 3 PLANES WITH OR W/O SHOES

2.ONLY PRIVATE PART COVERED

3.WALKWAY 1.1 M WIDE AND 6 M LONG

GAIT CYCLE

SWING PHASE (40%) acceleration>mid swing>deceleration

STANCE PHASE (60%)heel strike>foot flat>mid stance >heal off>toe off

Two periods of double support (after initiation of stance and end of stance)

TYPES OF GAIT

ANTALGIC GAIT

pt walks with short stance phase eg infection and trauma

TRENDELENBERG GAIT(ABDUCTION LURCH GAIT)

It is due to failure of abductor lever arm mechanism .

Here pt lurches to affected side and pelvis drop in opposite side(sound side) .

Opposite shoulder is up .

SHORT LIMB GAIT

PATIENT LURCHES ON AFFECTED SIDE AND PELVIS DROP ON SAME SIDE .

Typically seen in true shortening >=4 cm

STUMBLING GAIT

SEEN IN B/L CTEV

WADDLING GAIT (DUCK WALK)

WIDE BASE,INCREASED LUMBAR LORDOSIS

PT SWAYS TO SAME SIDE AFTER PUTTING WT ON AFFECTED SIDE.

Eg.b/l ddh, osteomalacia,myopathies,pregnancy.

CIRCUMDUCTION GAIT /SCISSORS GAIT

Seen in fixed abduction deformity or cva pt,cp child.

Quadriceps gait /hand to knee /five finger quadriceps gait

Weakness of quadriceps>trunk goes for anterior bending to shift the vertical vector anterior.

Typically seen in pprp polio

GLUTEUS MAXIMUS GAIT/EXTENSION LURCH GAIT

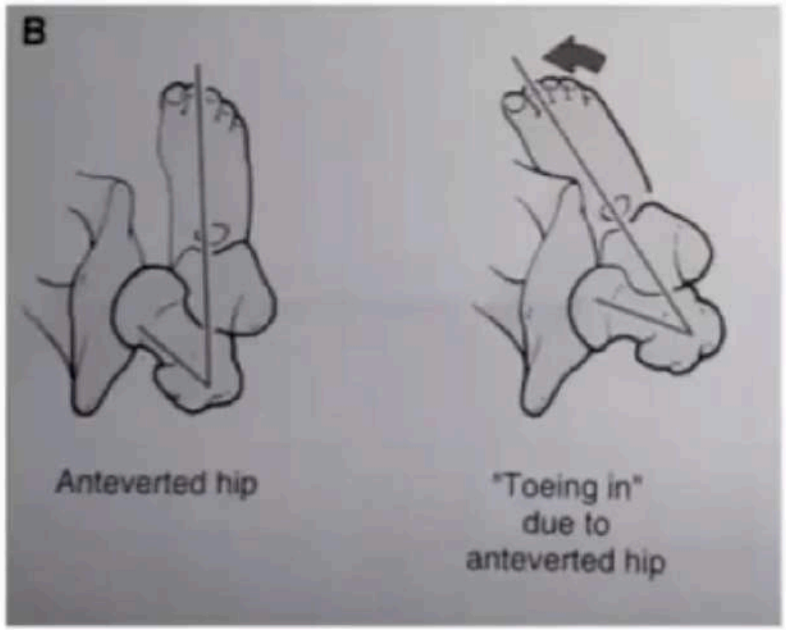
Patient lurches backward during stance phase .

Paralysis of gluteus maximus

Eg. pprp

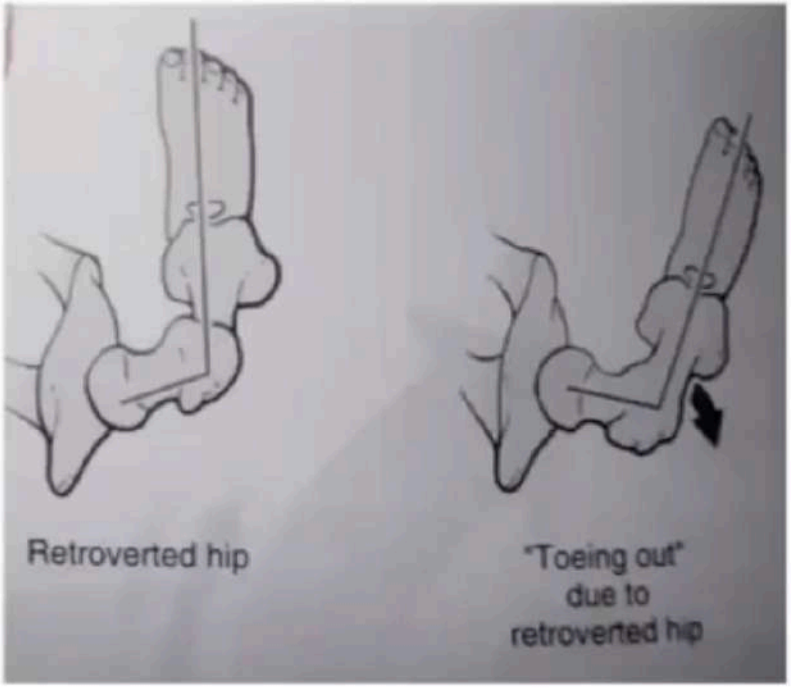
- Toe ingait

Pt walks with both feet turned inwards-
seen in femoral anteversion



- Toe outgait

Pt walks with both feet turned outwards- seen in femoral retroversion



KNOCK KNEE GAIT
STIFF HIP GAIT
HIGH STEPPING GAIT(FOOT DROP)
STAMPING GAIT
SHORT SHUFFING/FESTINATING GAIT
CHARLIE CHAPLIN GAIT
DRUNKARD OR REELING GAIT

INSPECTION

ATTITUDE OF THE LIMB

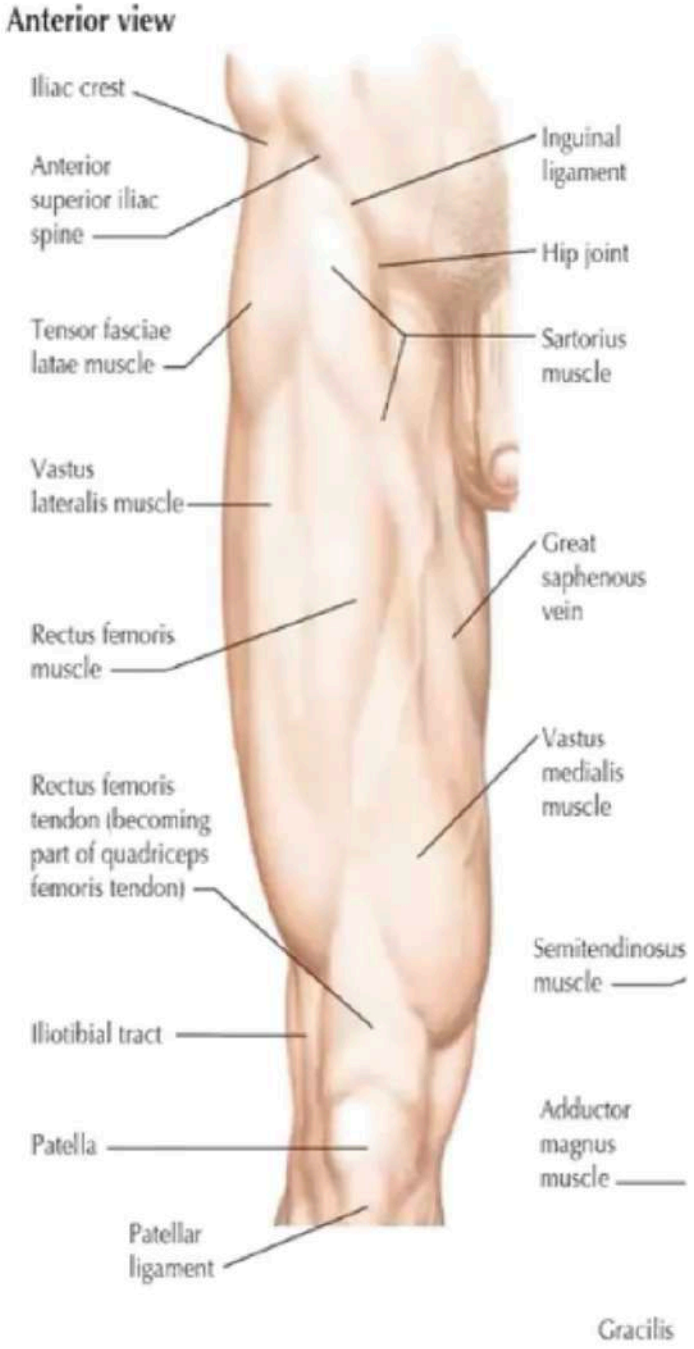
- *Standing* : position of the head

  level of scapulae and nipples

  curvature of the spine

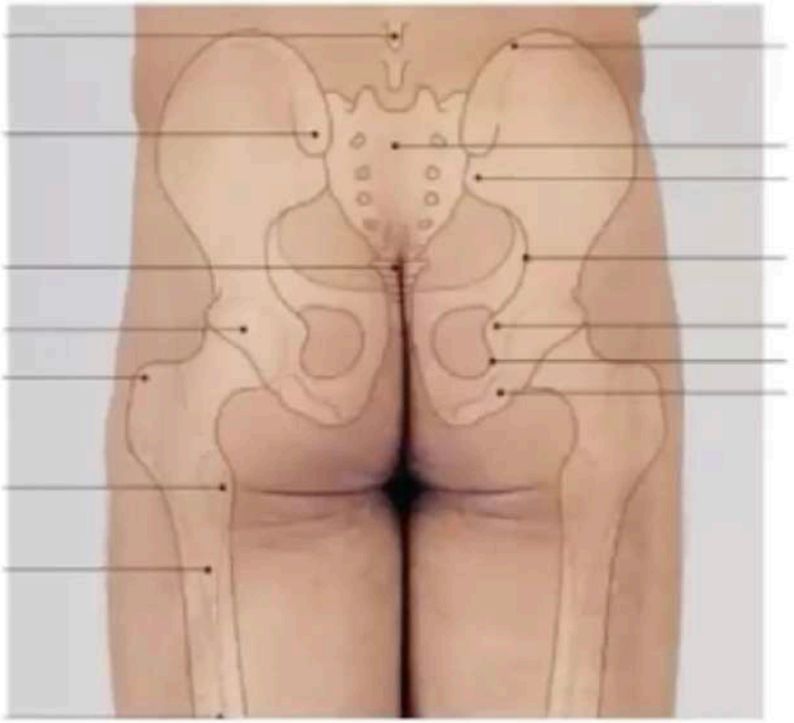
  attitude of hip, knee & ankle

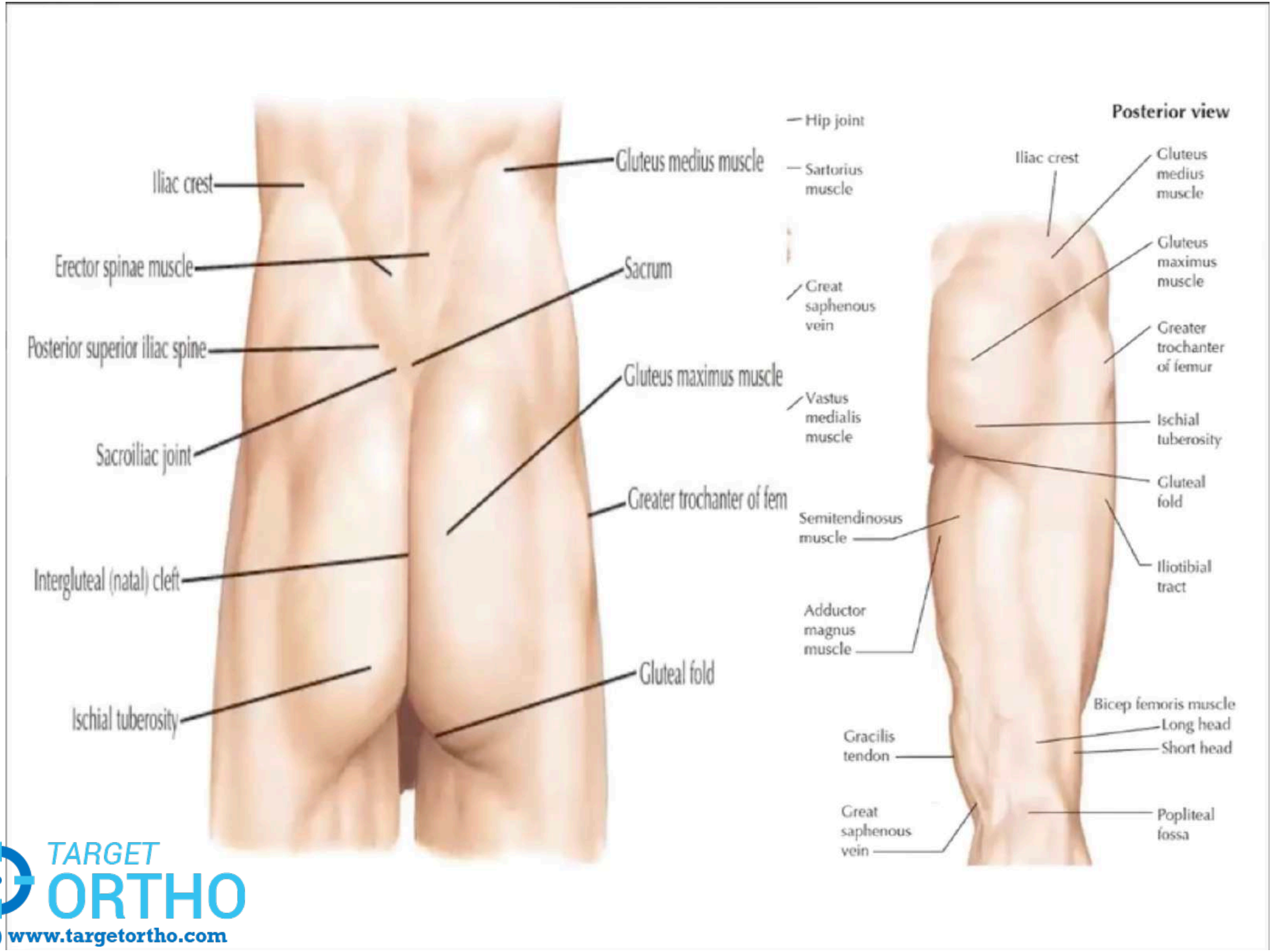
  position of the ASIS-square or oblique



INSPECTION FROM BACK

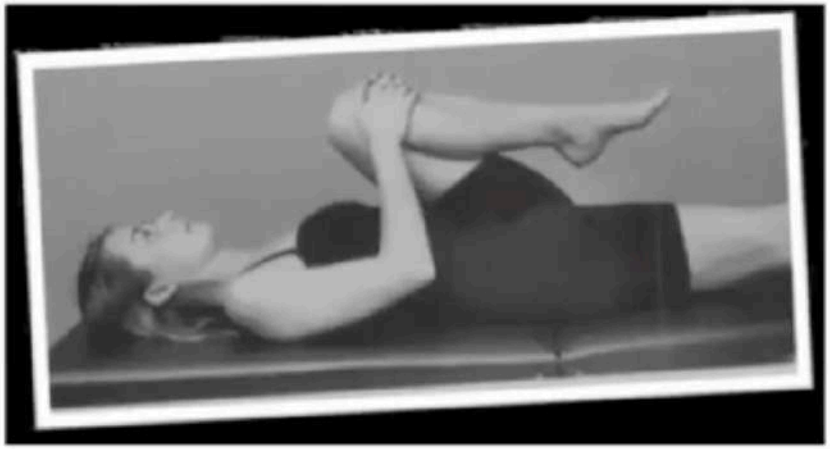
- Scoliosis
- Gluteal muscle wasting
- PSIS
- Back of iliac crest
- Scars and sinuses





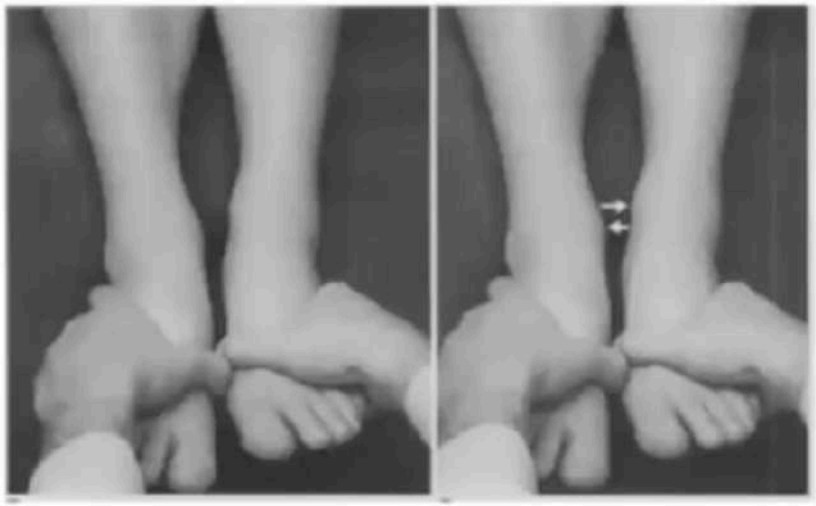
ATTITUDE OF THE LIMB

- *Supine:* Position of the upper limbs



- lower limbs parallel/rotated
- Patella facing up/in/out
- exaggerated lumbar lordosis

LOOK FOR LIMB LENGTH DESCREPANCY



PALPATION

FINDING OF BONY PROMINENCE

GT

ADDUCTOR LONGUS TENDON>PUBIC TUBERCLE>PUBIC SYMPHYSIS>INGUINAL LIGAMENT>**ASIS** >HIGHEST POINT ILIAC TUBERCLE>ILIAC CREAST>PALPATING DOWNWARD>GT

ISCHIAL TUBERSITY

PSIS

STERNAL NOTCH

PALPATION

"Confirms the findings of inspection"

Local temperature

Increased in acute arthritis

Joint tenderness

Anteriorly-2cms below and lateral to mid- inguinal point

Posteriorly- junction of medial 2/3rd and lateral 1/3rd of a line joiningGT & PSIS

PALPATION

"Confirms the findings of inspection"

Local temperature

Increased in acute arthritis

Joint tenderness

Anteriorly-2cms below and lateral to mid- inguinal point

Posteriorly- junction of medial 2/3rd and lateral 1/3rd of a line joiningGT & PSIS

DIRECT; ANTERIOR HIP POINT

INDIRECT;VIA MORRIS BITROCHANTRIC COMPRESSION TEST

- Tenderness

  ASIS

  GT

  PSIS

  pubic symphysis

  SI joint

  ischial tuberosity

PALPATION(Contd)

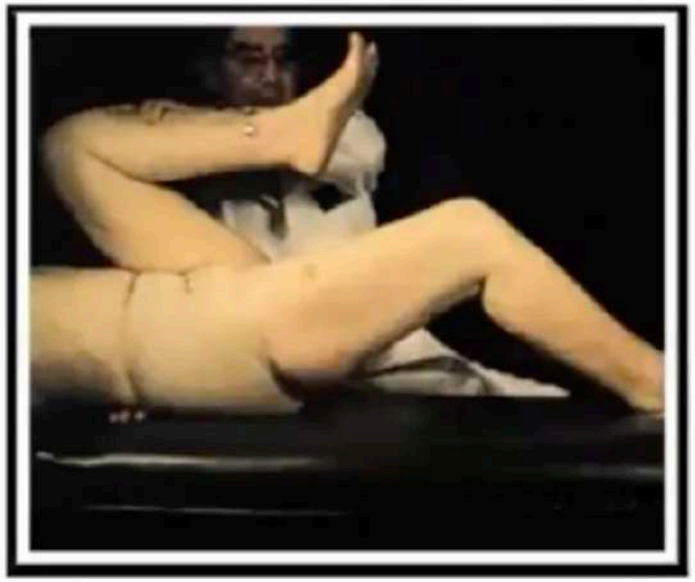
- Femoral artery pulsation at midinguinal pont
- Palpation of GT: smooth/irregular proximal migration
- Digital Bryant's Test : supratrochanteric shortening

MEASUREMENT OF DEFORMITY

- Fixed Flexion Deformity

  unilateral - ***Thomas Test***

- The examiner blocks the pelvis by bringing the contralateral sound hip into maximal flexion. This eliminates lumbar lordosis that can be used to compensate for the hip flexion contracture of the affected hip. The leg to be examined is then brought into maximal extension with the hip in neutral adduction and rotation.

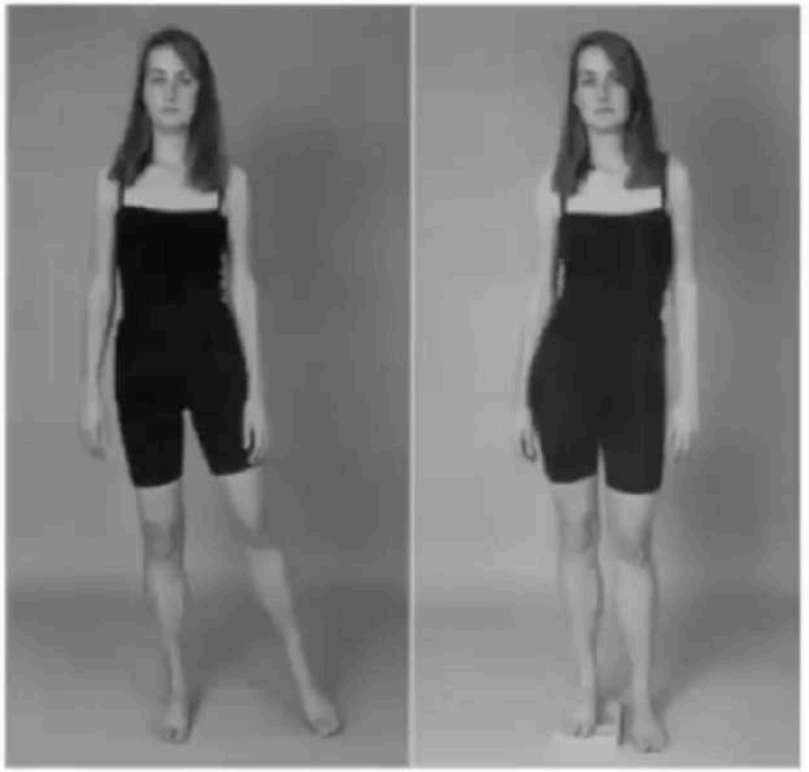


BILATERAL FFD

- **Patient in prone position with lower limbs hangigng out from the edge of the table**
- Patient should be able to kep both thighs extended
- Measure the angle between thigh and bed for ffd

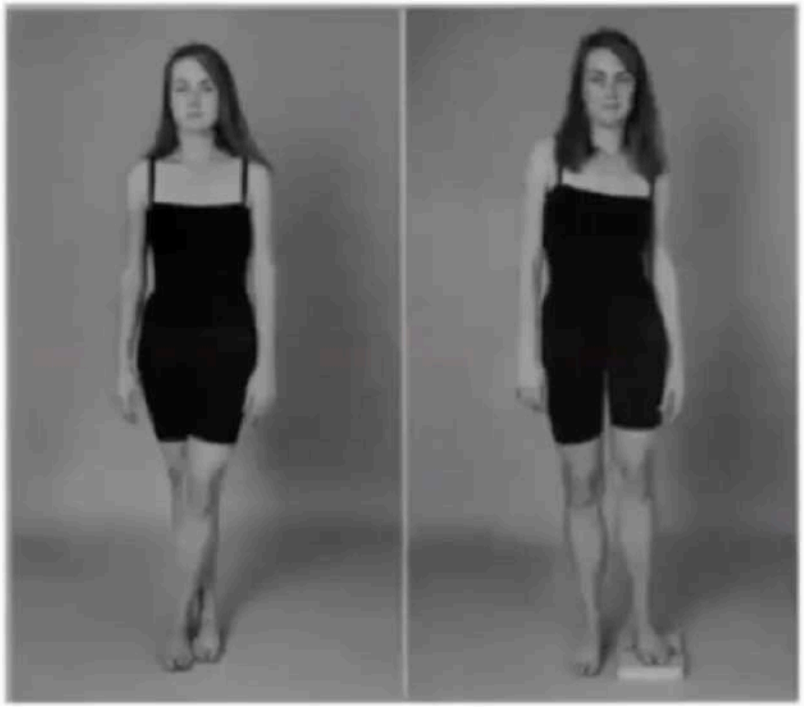
- Fixed Abduction Deformity

  It is compensated by scoliosis with convexity towards the affected side & by the pelvis being tilted down causing apparent lengthening of limb



- Fixed adduction deformity

  It is compensated by scoliosis with convexity towards the normal side & by the pelvis being tilted up causing apparent shortening of limb



Fixed external & internal rotation deformity

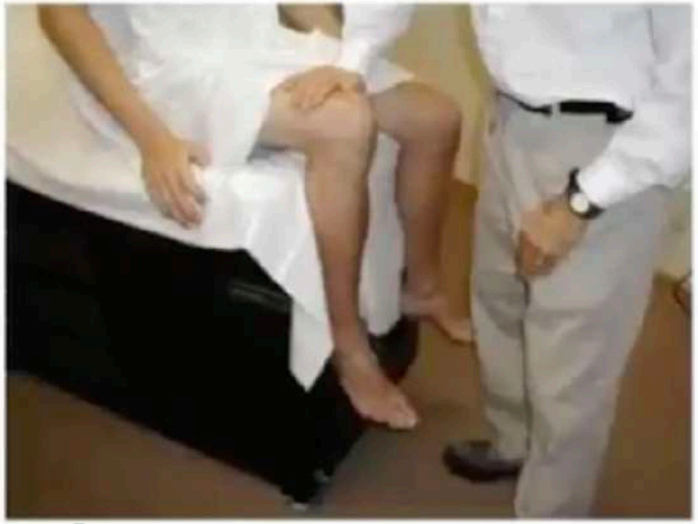
- Always remains revealed

Determined by noting the direction of anterior surface of patella or the toes when the foot is held at right angle to the leg

Movements

- **Flexion (135 deg)**:sitting
- For ilio psoas contribution:

  Flex knee and move it towards the chest without moving the opposite leg when patient sits with the legs hanging on the edge of the examination couch



- Active SLRT against resistance(supine)

Movements

- **Extension (0 to 20 deg)**
  - For gluteus maximus contribution:
  - Hamstring contribution

Movements

- Abduction (0 to 45 deg)

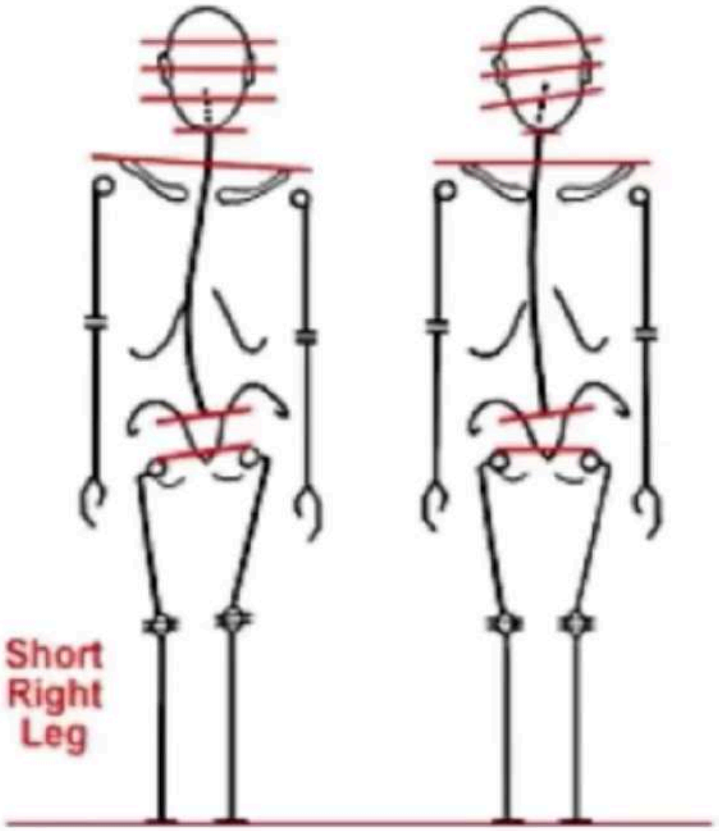
- Adduction(0 to 45 deg)

Movements

- Internal rotation
  - Internal rotation in 90 deg flexion(45 deg)

  - Internal Rotation in full extension(45 deg)

LIMB LENGTH MEASUREMENTS

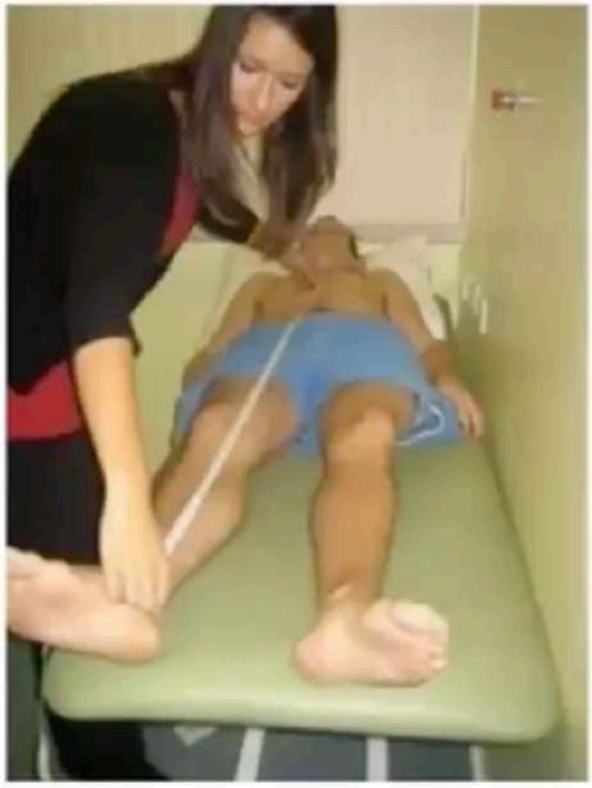


MEASUREMENT- Muscle bulk

- Muscle wasting

LIMB LENGTH:APPARENT

- functional length
- patient in straight line and limbs parellel, defromities not corrected
- from the fixed midpoint to the medial malleolus
- shows the compensation that the pt has developed to conceal any fixed deformity
- here both limbs should be kept parallel to each other
- measured from xiphisternum or umbilicus to medial **malleolus**



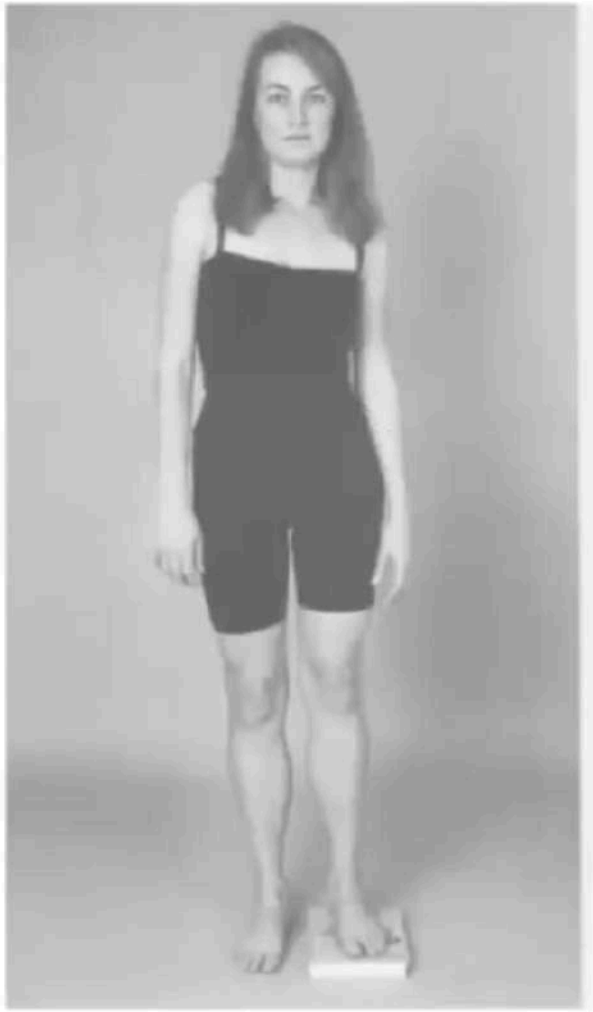
TRUE LENGTH

- *anatomical length*

- patient in straighat line and deformities corrected and the limbs are kept in identical position

- measured from the ASIS to medial malleolus

BLOCK METHOD

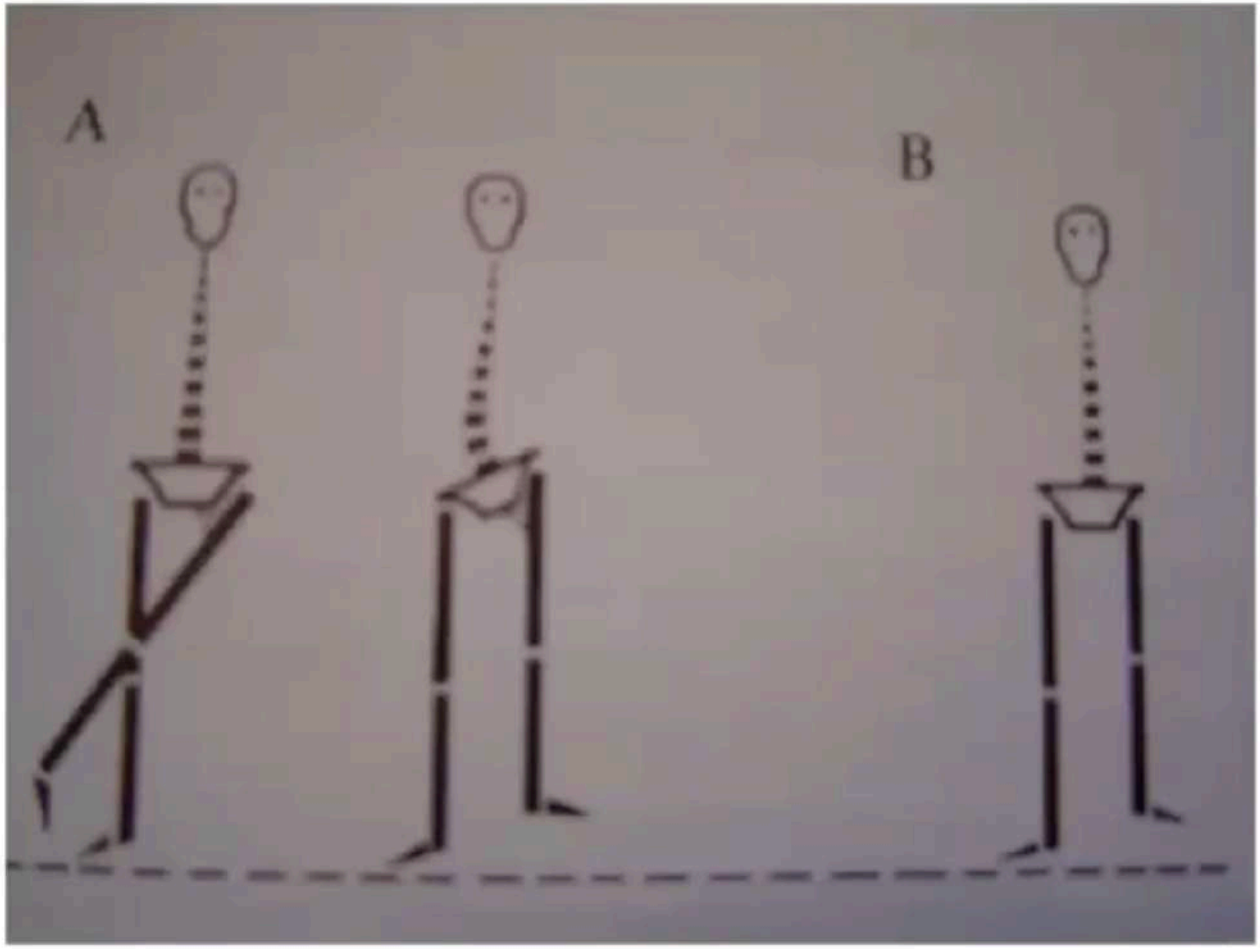


MEASUREMENTS

- If True Shortening = Apparent Shortening: No compensation

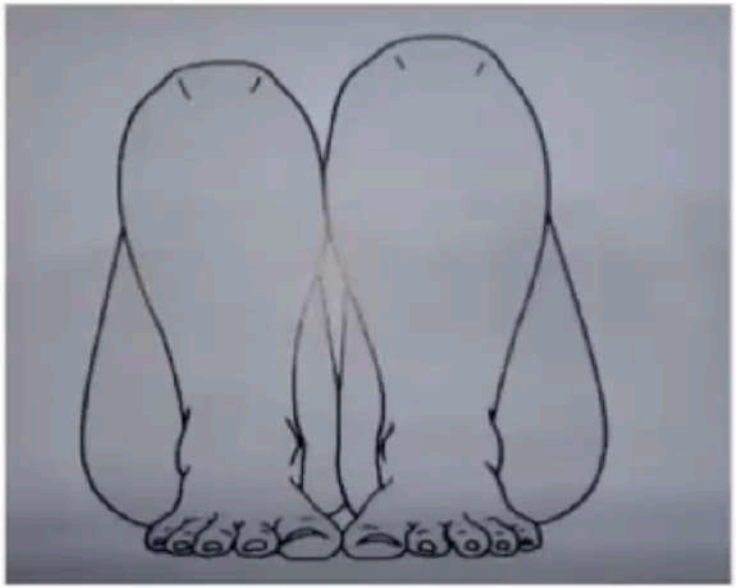
- True Shortening >apparent shortening: only part of the deformity is compensated by tilting the pelvis(fixed abduction deformity)
- True Shortening<apparent Shortening:fixed adduction deformity with no compensation
- Every 10 degree of deformity : 01 cm

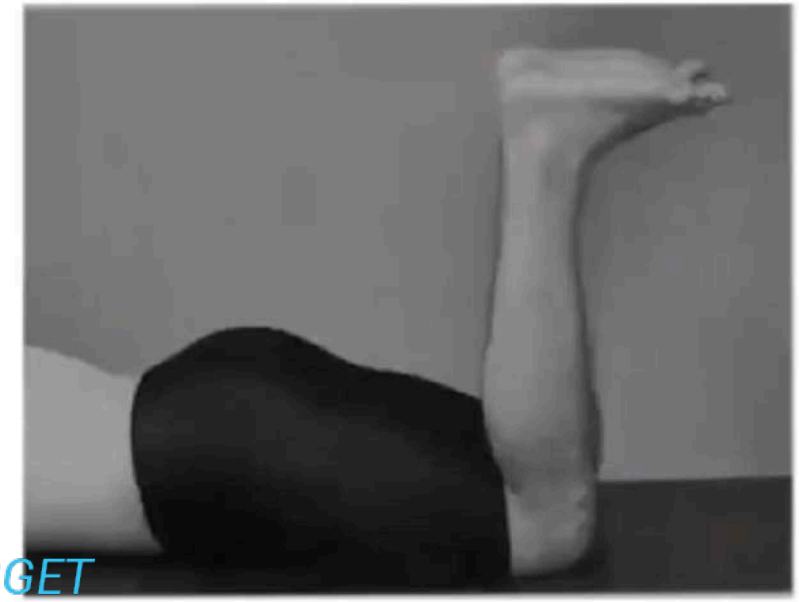
APPARENT SHORTENING & LENGTHENING

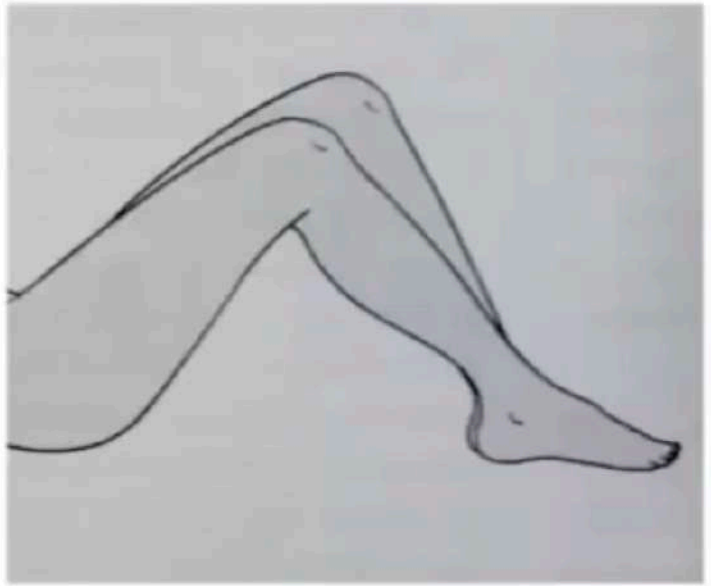


ADDUCTION :APPARENT SHORTENING
ABDUCTION :APPARENT LENGTHENING

SEGMENT OF TRUE SHORTENING

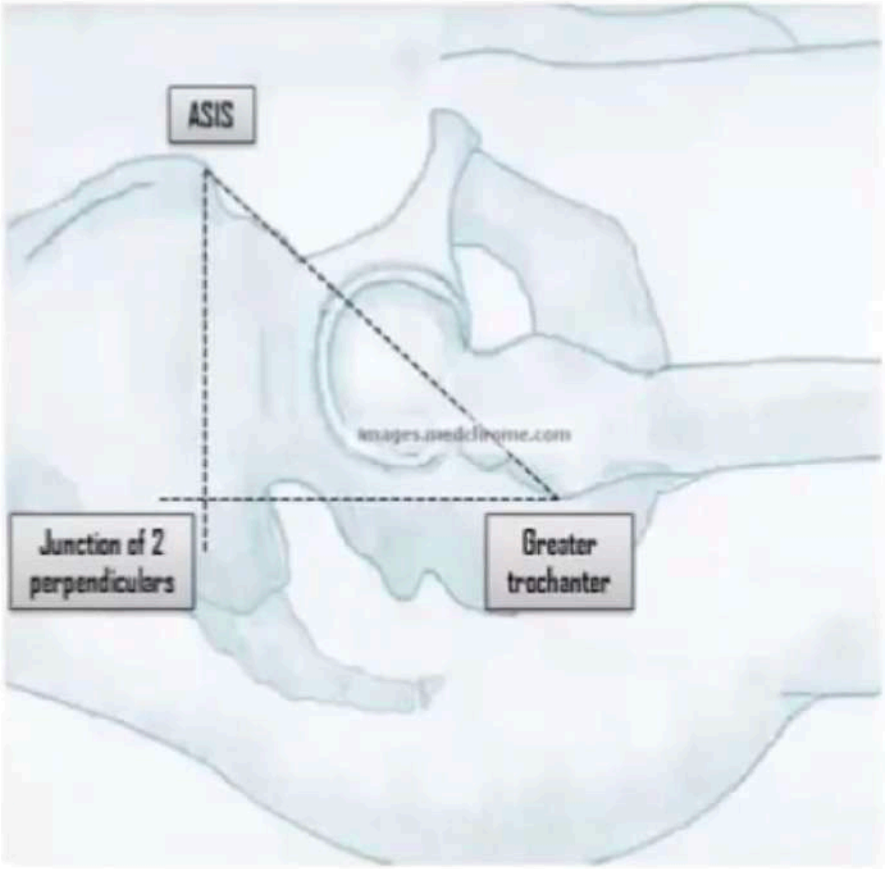




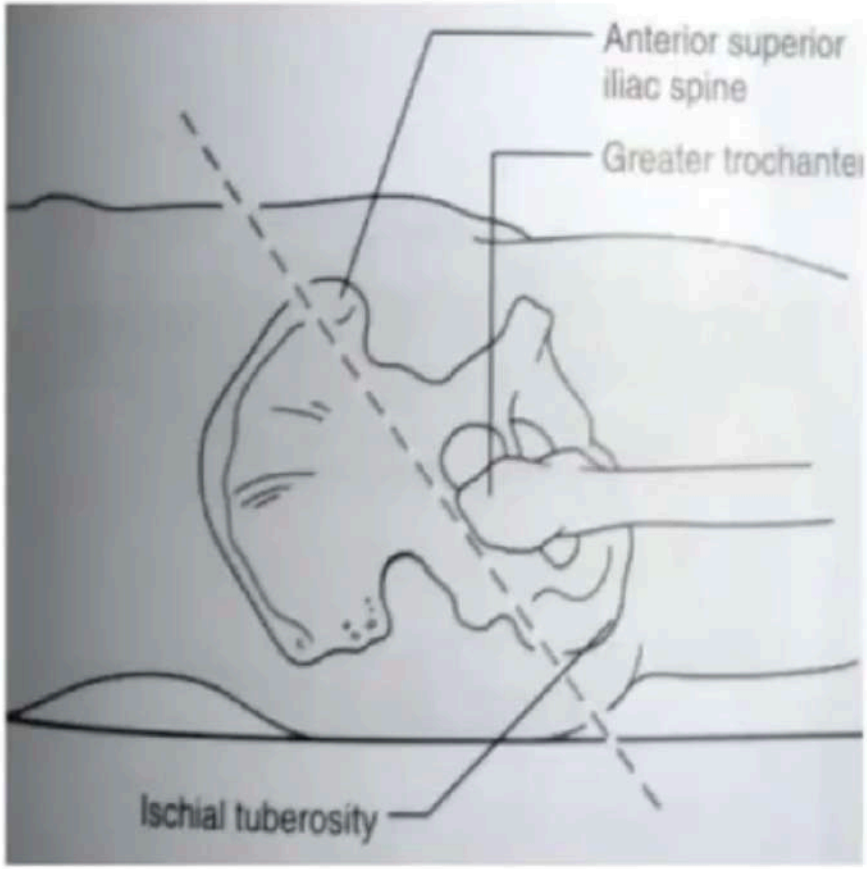


SEGMENTAL SHORTENING:SUPRATROCHANTERIC

BRYANT'S TRINGLE



NELATON'S LINE



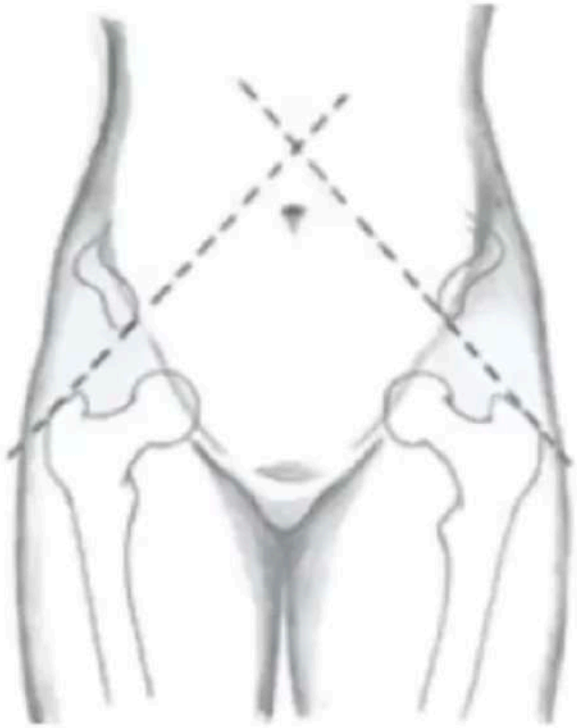
MEASUREMENTS

- Chiene's lines

The lines joining the two ASIS and the two GTs are parallel to each other

Disturbed in supratrochanteric shortening

- Shoemaker's lines



True shortening

Supra trochanteric

- Coxa Vara
- Perthes
- SCFE
- Malunited basal # NOF
- Congenital Coxa Vara
- Arthritis
- Dislocation

Infra trochanteric

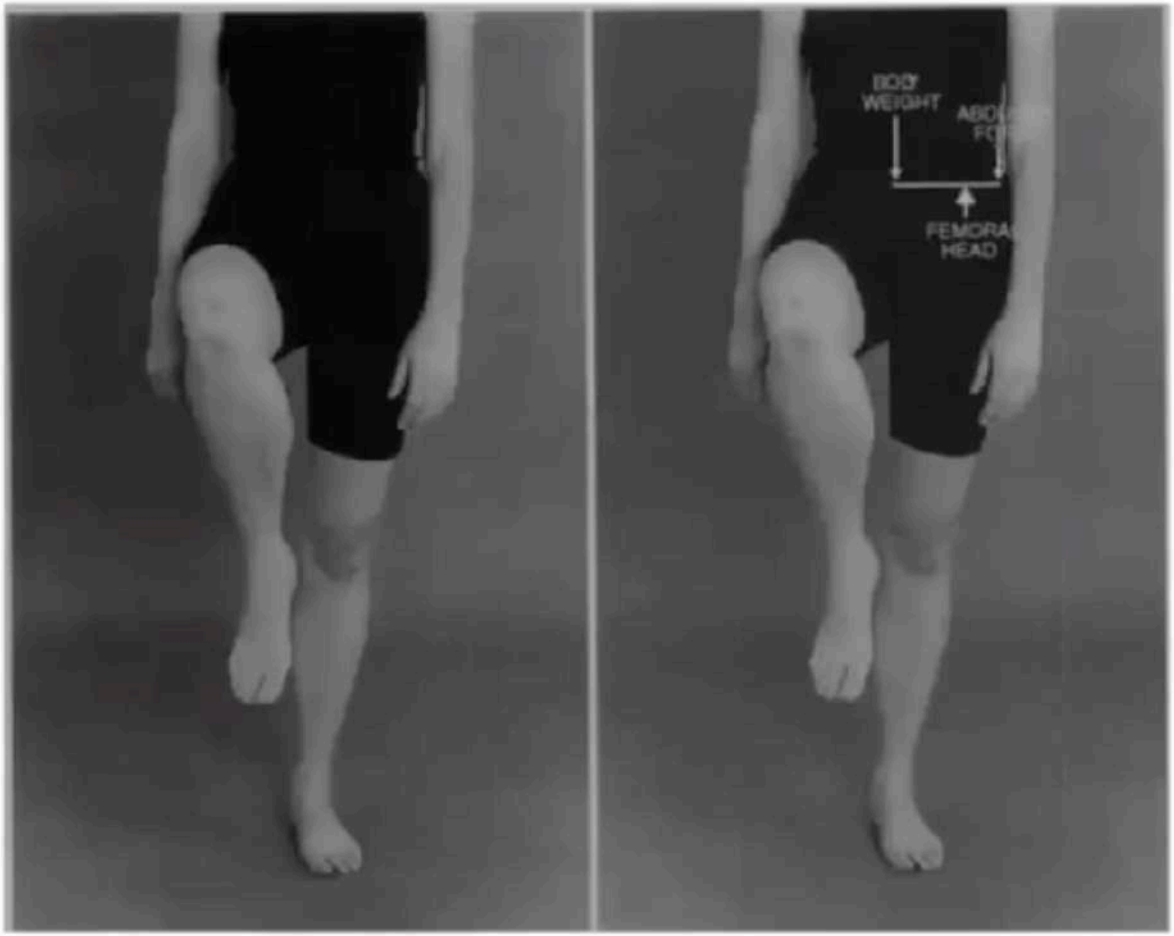
- Malunion
- Fracture femur & tibia
- Growth arrest from polio
- Trauma and infective sequale

TELESCOPY

- Flex the hip to 90 deg
  - one hand with the thumb on asis and the remaining fingers over the soft tissue proximal to femur
  - other hand at the distal femur
  - push and pull the femur

VASCULAR SIGN OF NARATH

TRENDELENBURG TEST



- This test examine the strength of the abductor mechanism of the hip.
- *Fulcrum*: head of femur

  Load arm:weight of the body

  Power arm: abductors

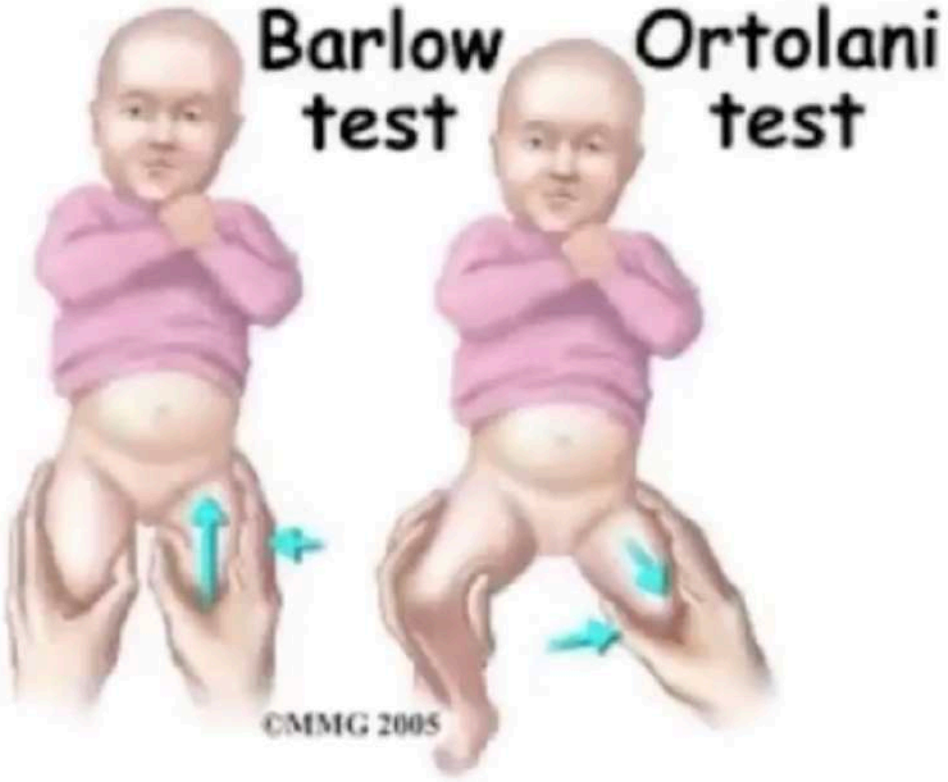
  Lever: neck and trochanters of the femur
- Normally, in a one legged stance, the pelvis is raised up on the unsupported side. If the weight bearing hip is unstable, the pelvis drops on the unsupported side, to avoid falling the patient has to throw his or her body towards the loaded side.
- •In the classic test, the examiner stands behind the patient. If the patient stands on a healthy hip the gluteal fold on this side drops.
- •If the patient stands on a diseased leg the gluteal fold on the opposite side drops (the sound side sags).
- 1.. Weakness of the hip abductors e.g. poliomyelitis
- 2.. Shortening of femoral neck e.g. coxa vara.
- 3. Dislocation or subluxation of the hip

TESTS FOR DDH

- **BARLOW'S MANOUVRE**

  The maneuver is easily performed by adducting the hip while applying light pressure on the knee, directing the force posteriorly.[1] If the hip is dislocatable - that is, if the hip can be popped out of socket with this maneuver - the test is considered positive

- **ORTOLANI TEST**
- It is performed by an examiner first flexing the hips and knees of a supine infant to 90 degrees, then with the examiner's index fingers placing anterior pressure on the greater trochanters, gently and smoothly abducting the infant's legs using the examiner's thumbs.
- A positive sign is a distinctive 'clunk' which can be heard and felt as the femoral head relocates anteriorly into the acetabulum:[2]
- hip



TESTS FOR JOINT CONTRACTURES

- FLEXION:THOMAS TEST

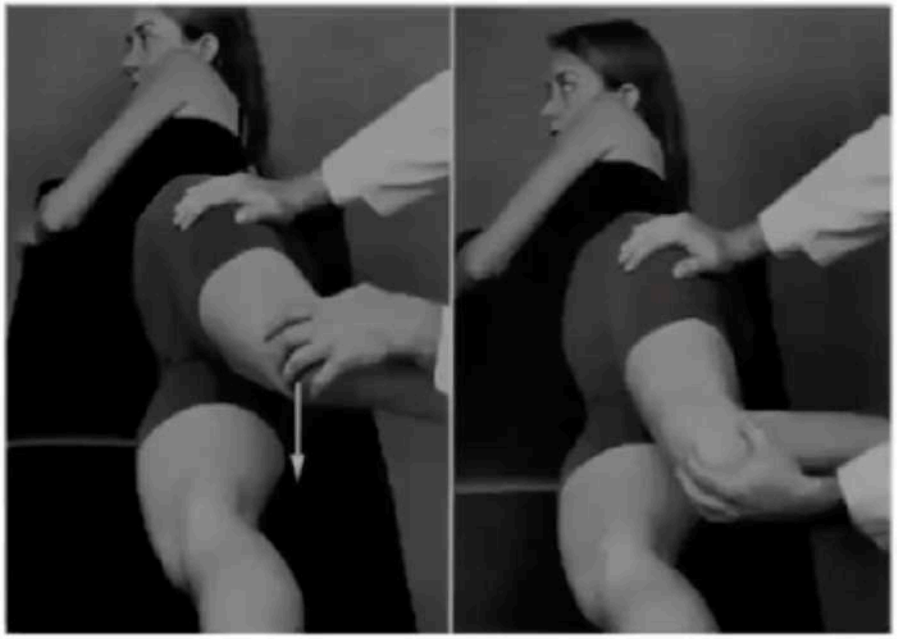
CONTRACTURES

- OBER'S TEST:

  Test for ileo-tibial tract contracture.

  In lateral decubitus position knee is flexed to 90 degree hip is abducted to 40 degree and pelvis is stabilised.

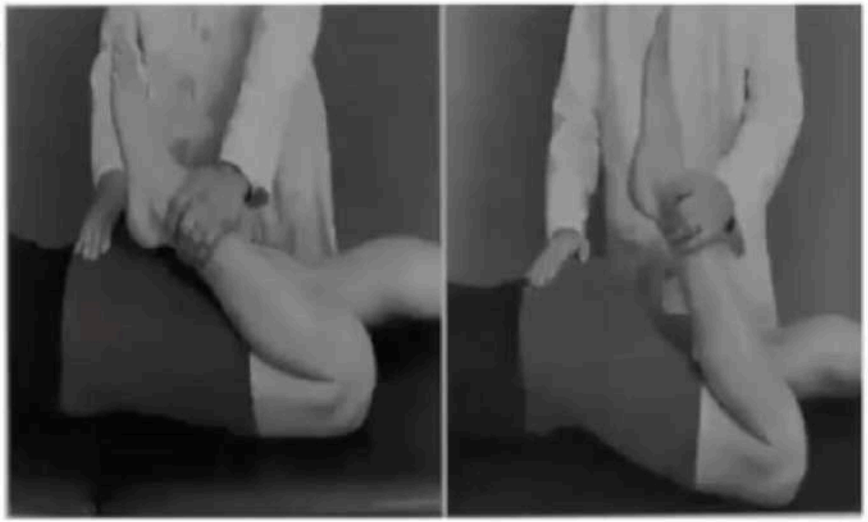
  limb is gently adducted towards the examining table normally the hip adducts and the limb crosses the midline



TESTS FOR JOINT CONTRACTURES

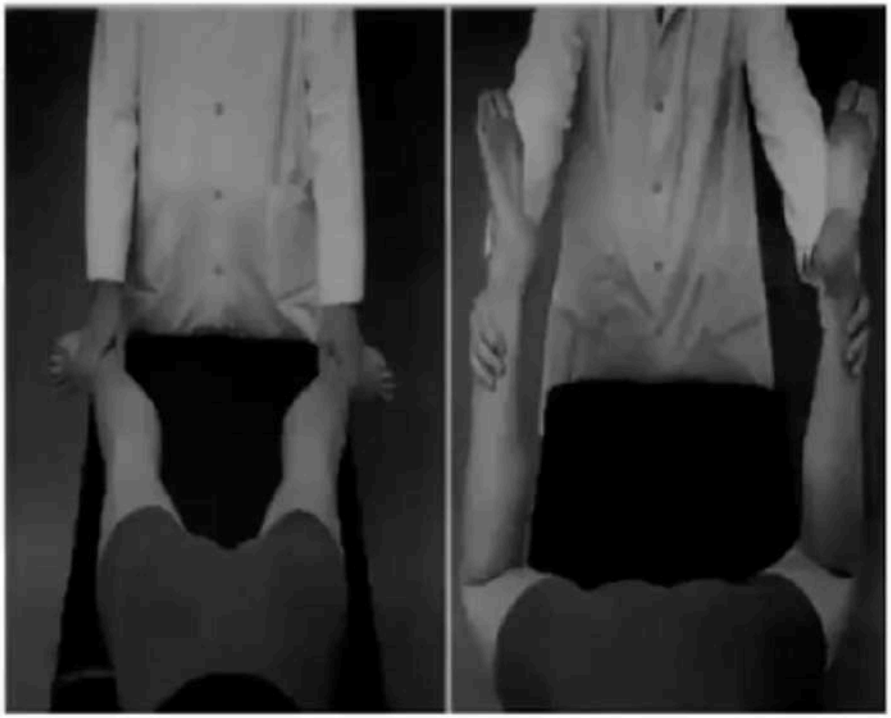
ELY'S TEST

- for the contracture of the rectus femoris
- prone position with the knees extended
- passively flex one knee to be tested
- normally knee can be flexed fully
- in contracted rectus full flexion of the knee forces the hip into flexion causing the rise of buttocks



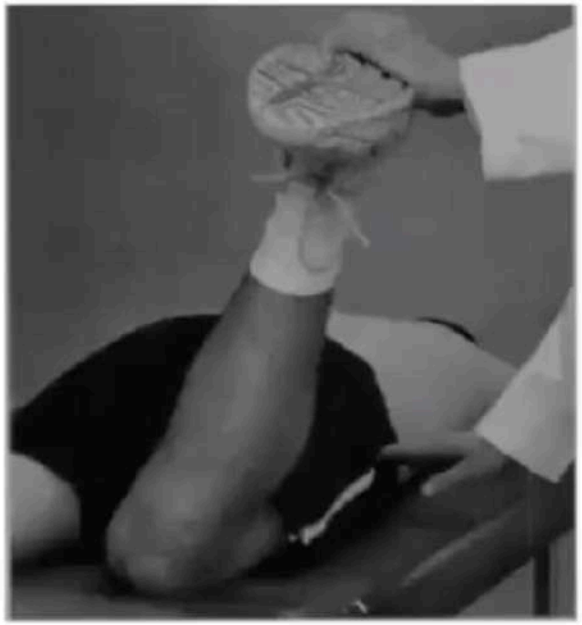
PHELP'S TEST:

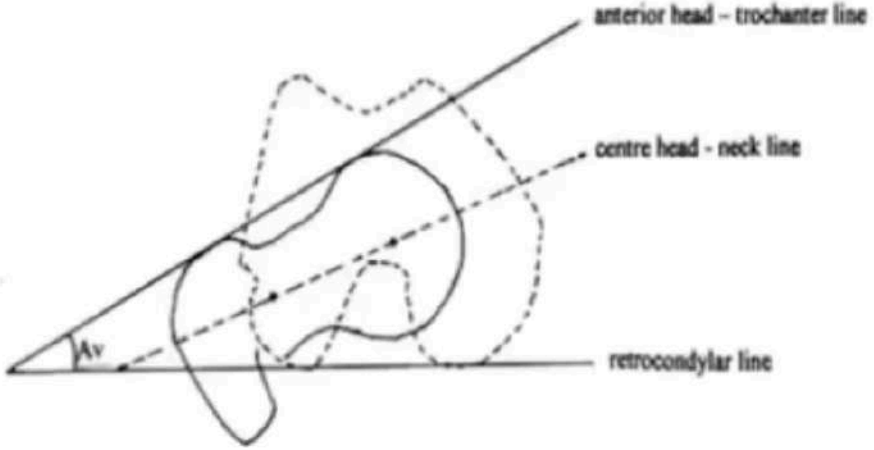
- To detect the contracture of gracilis muscle
- Prone position with the knee extended
- Passive abduction to the maximum with the extended knee
- Knees are then flexed to relax gracilis
- Attempt to further abduct the hip with knee in flexion
- Further abduction is possible in gracilis contracture



TEST FOR FEMORAL ANTEVERSION:CRAIG'S TEST

1. Positioned prone
2. Knee flexed 90 deg
3. One hand over trochanter
4. Other hand is rotating the leg till the trocanter felt prominent
5. Angle subtended between the imaginary vertical to the long axis of the leg





PIRIFORMIS TEST(FADIR)

Lateral decubitus position

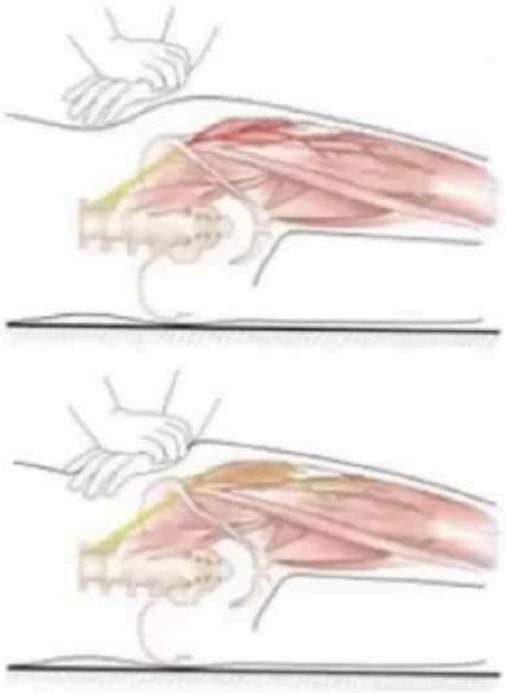
- hip is flexed to 45 degree
- knee is flexed to 90 degree
- one hand stabilises the pelvis
- other hand pushes the knee to the floor causing the internal rotation
- pain locally-piriformis tendinitis
- pain radiates down-piriformis syndrome

PATRICK'S TEST(FABER)

- Tend to stress the ipsilateral s-i joint
- •pain is posterior in s-i arthritis
- •pain is anterior in hip arthritis

PELVIC STRESS TESTS

- LATERAL PELVIC COMPRESSION TEST



- ANTERIOR PELVIC COMPRESSION TEST

PELVIC STRESS TESTS

- PUBIC SYMPHYSIS STRESS TEST
- STINCHFIELD TEST

IMPINGEMENT TEST

- FLEXION
- ADDUCTION
- INTERNAL ROTATION

FULCRUM TEST

- It tests for the stress fractures of the shaft of femur

OTHER SPECIAL TEST

GAUVAIN SIGN
YEOMANS TEST
TRIPOD SIGN
NOBLE COMPRESSION TEST
GAENSLEN TEST(SACROILITIS)
DESAULTS SIGN
ALLIS SIGN
GILLS SIGN
LUDLOFFS TEST
SECTORAL SIGN
GEAR STICK SIGN
FIGURE OF 4 SIGN
SCHOBERS TEST
MCFARLANDS TEST