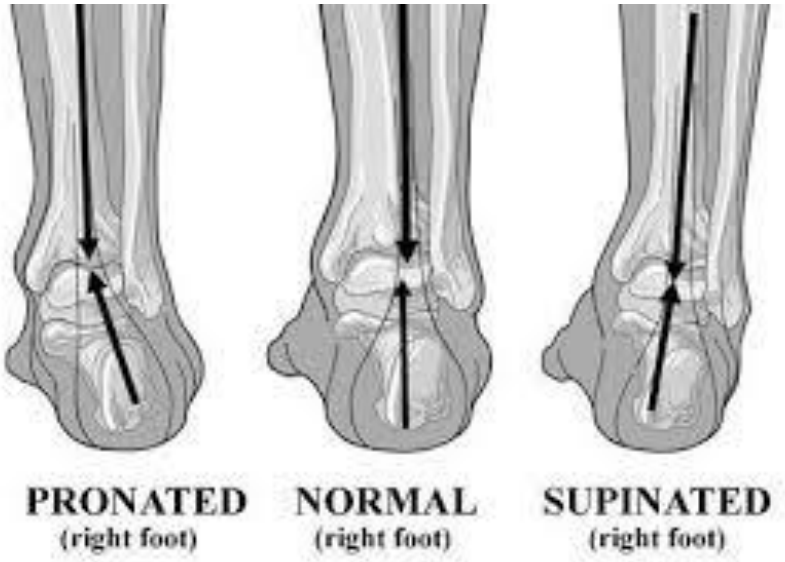
Pelvic, Hip and Knee

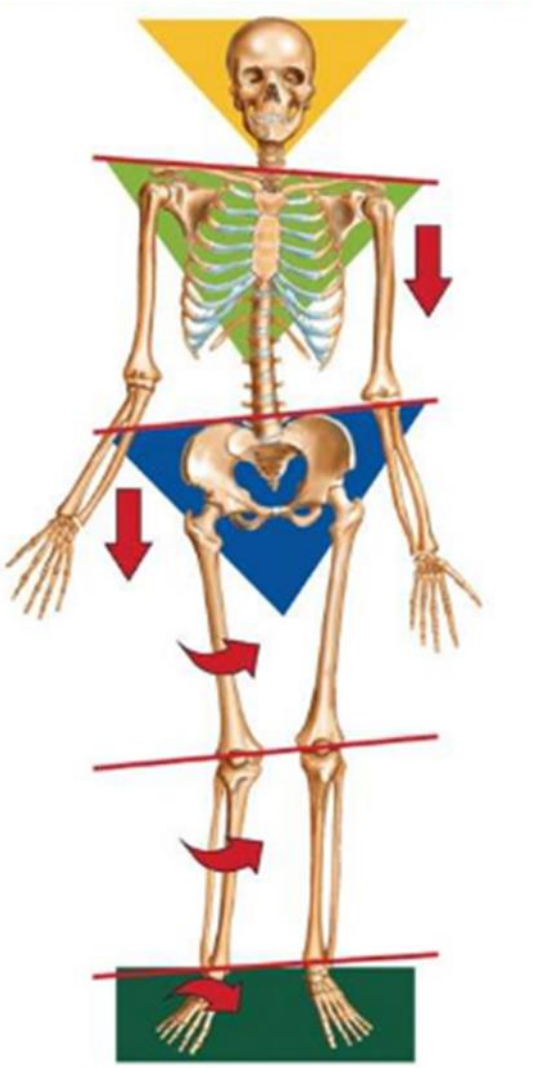
MMT mod 3

Foot Positions



Pes Planus

Pes Cavus



Knee Anatomy

- The Knee Joint is the largest & most complicated joint in the body .

- It consists of 3 Joints within a single synovial cavity :

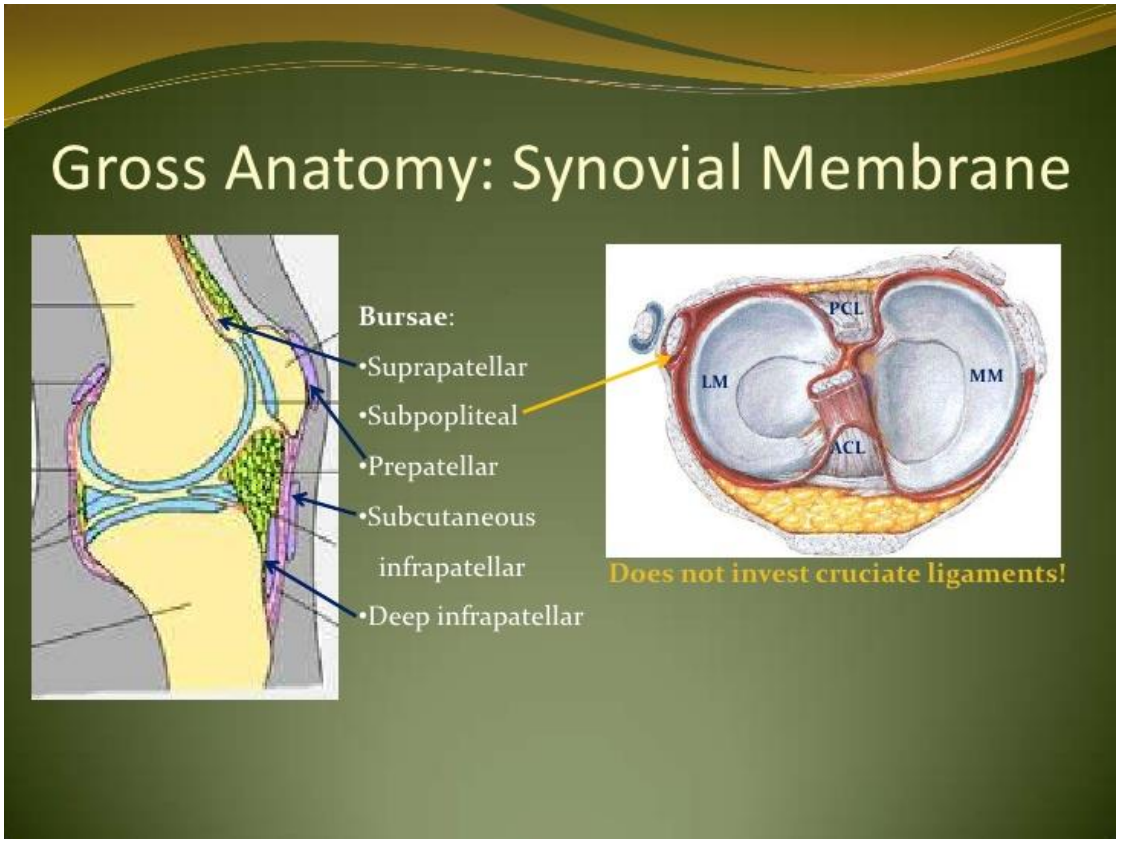
1) Medial Condylar Joint : Between the medial condyle "of the femur" & the medial condyle "of the tibia" .
2) Lateral Condylar Joint : Between the lateral condyle "of the femur" & the lateral condyle "of the tibia" .
3) Patellofemoral Joint : Between the patella & the patellar surface of the femur .

- The fibula is NOT directly involved in the joint .

Knee Injuries

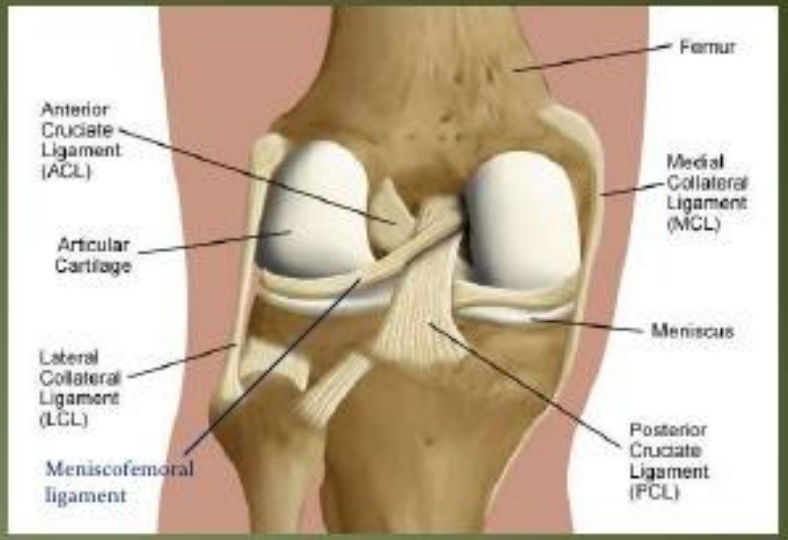
Synovial Fluid

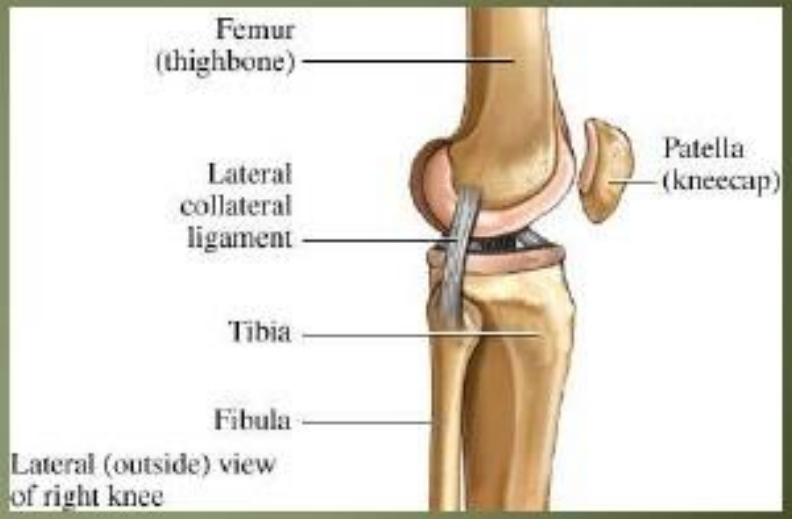
Synovial fluid is necessary for normal joint function. Synovial fluid moves into the cartilage when a joint is resting, and moves out into the joint space when the joint is active, particularly when the joint is engaged in a weight-bearing activity such as exercise. Synovial fluid lubricates the joints and permits smooth movement. It also provides important nutrients to them



Gross Anatomy: Ligaments

- Medial Collateral (MCL)
- Lateral Collateral (LCL)
- Anterior Cruciate (ACL)
- Posterior Cruciate (PCL)
- Meniscofemoral (MFL)

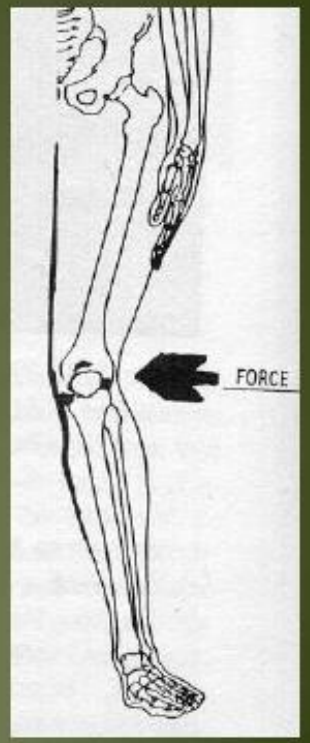




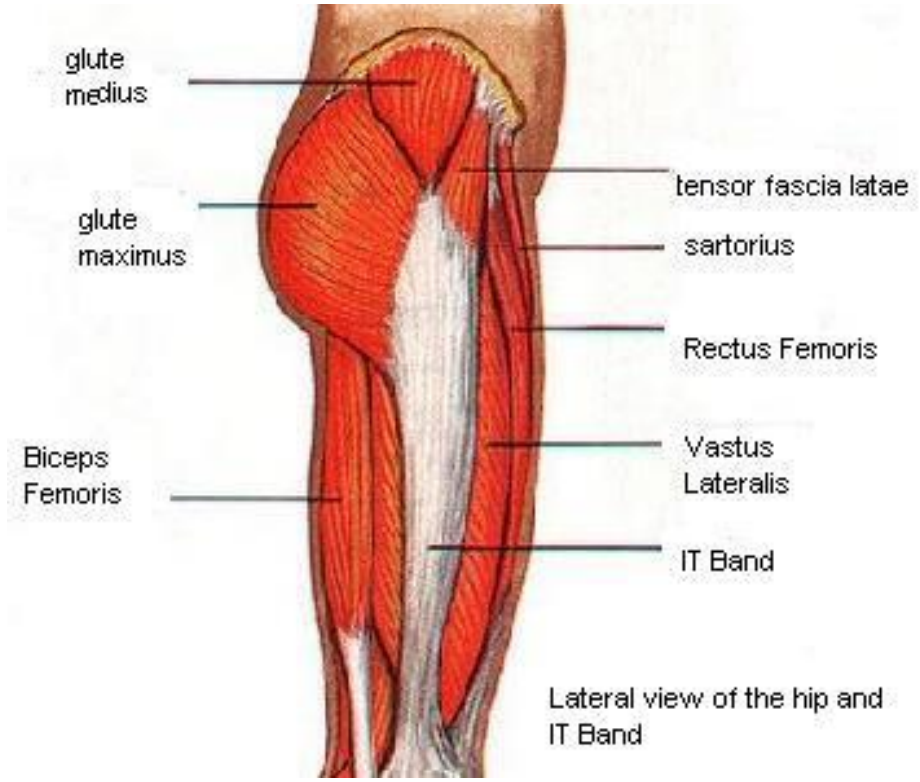
The **unhappy triad**/O'Donoghue **triad** is an injury to the anterior cruciate ligament (ACL), medial collateral ligament (MCL) and medial meniscus (MM)caused by a force on the outside of the knee, pushing the knee joint in (valgus force).

Medial Collateral Ligament

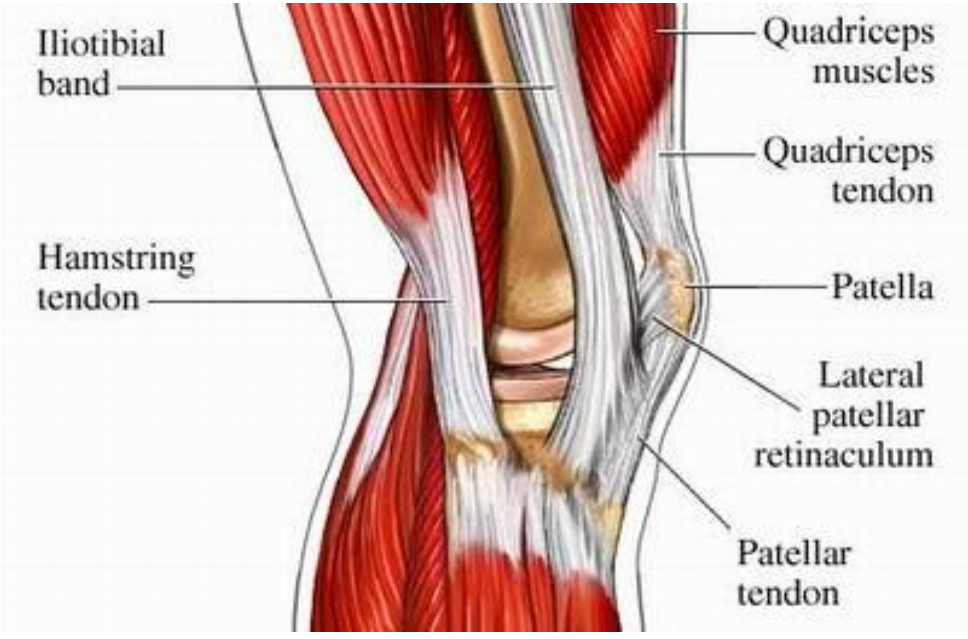
- Attached to fibrous capsule and MM
- Injury rarely isolated – "unhappy triad"
- Can tear with external rotation (skiing), but more commonly from valgus or abduction force (football)
- Pain localized to medial joint line, but can subside following Grade III tear
  - Leads to further injury



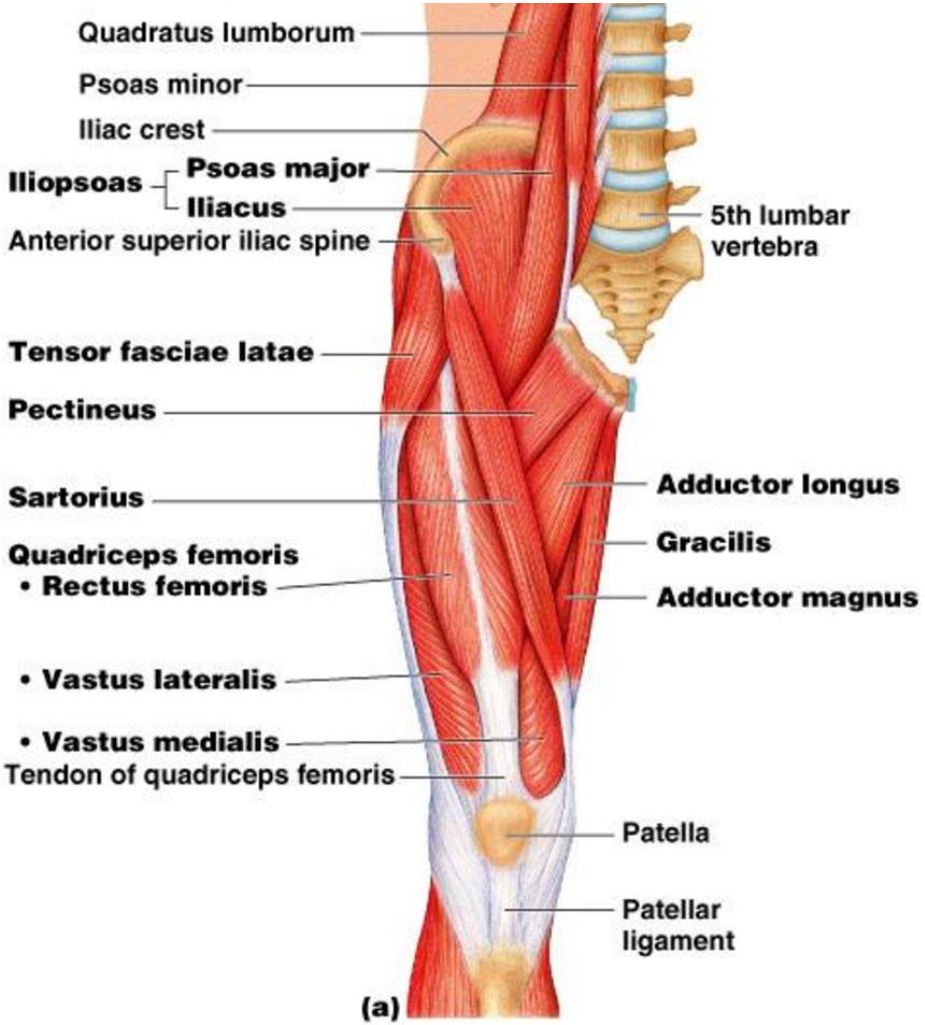
Muscles supporting the knee joint complex

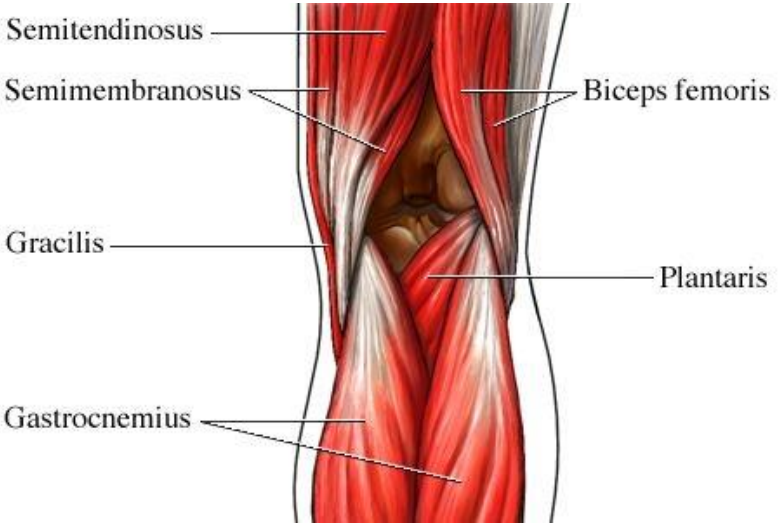


Lateral view of the hip and IT Band



Muscles supporting the knee joint complex



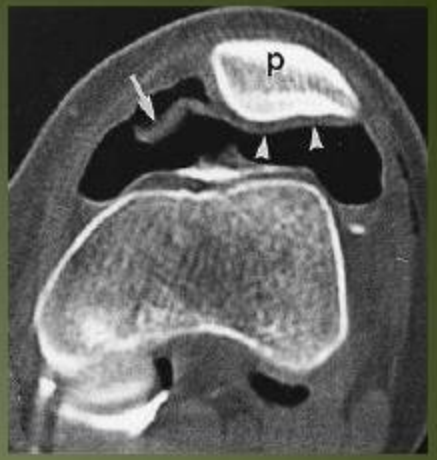


Blood supply

- Popliteal artery
- Femoral artery
- Tibial artery

Patellar Dislocation

- Vastus medialis strain
- Tearing of medial patellar retinaculum
- Hemarthrosis
- Reduces with extension



Patellar Dislocation: Treatment

- Knee extension
- Aspiration to relieve discomfort and check for fat in blood
- Surgery unnecessary unless osteochondral fracture or complete rupture of MPFL
- Crutches, PRICES
- Rehabilitation focusing on vastus medialis

Knee Movements

- Flexion and extension are take place in upper compartment of the joint
- **Flexion** : these muscles produce flexion :
- Biceps femoris , Semitendinosus , Semimembranosus , Gracilis, Sartorius , Popliteus .
- Flexion is limited by the contact of the back of the leg with the thigh .
- **Extension** : by the Quadriceps femoris , tensor fasciae latae
- Extension is limited by the tension of all the ligaments of the joint .

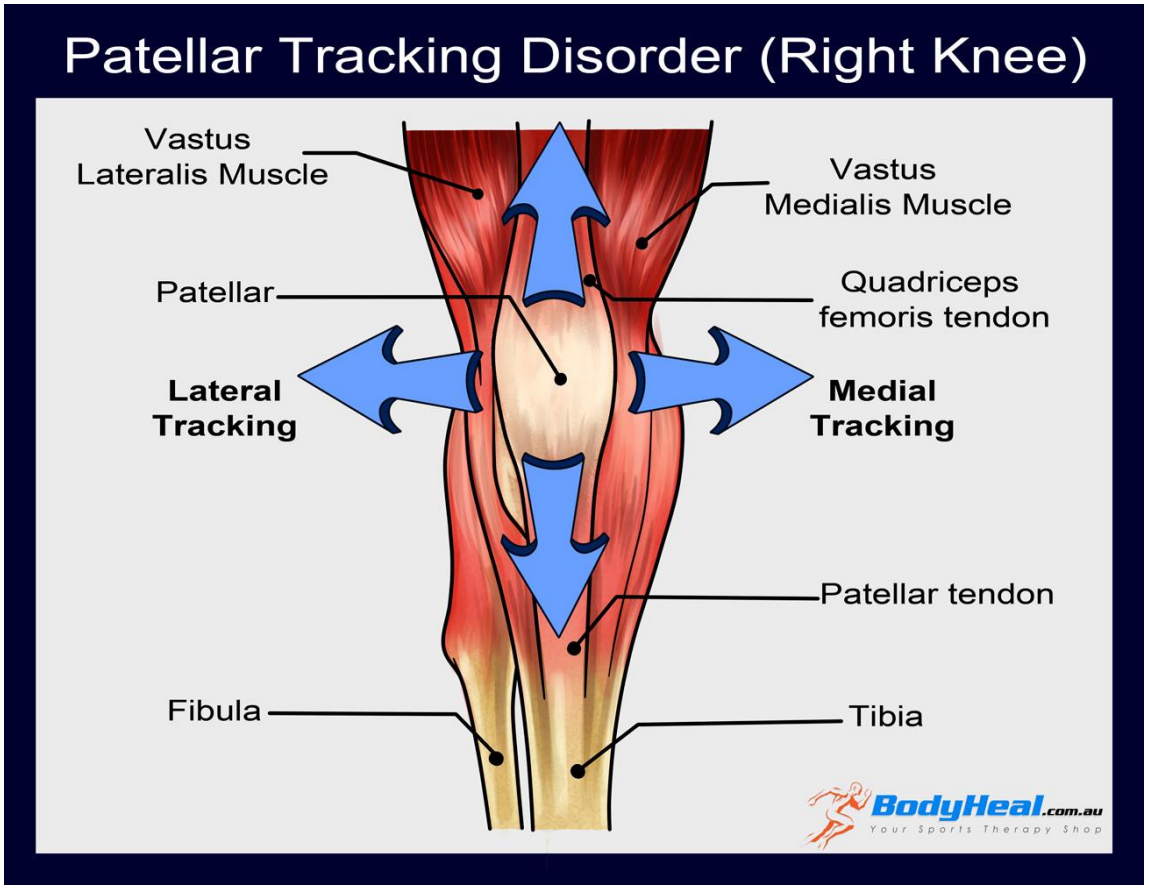
While injured

Stay off Patella

Don’t push against patellar condyles/groove

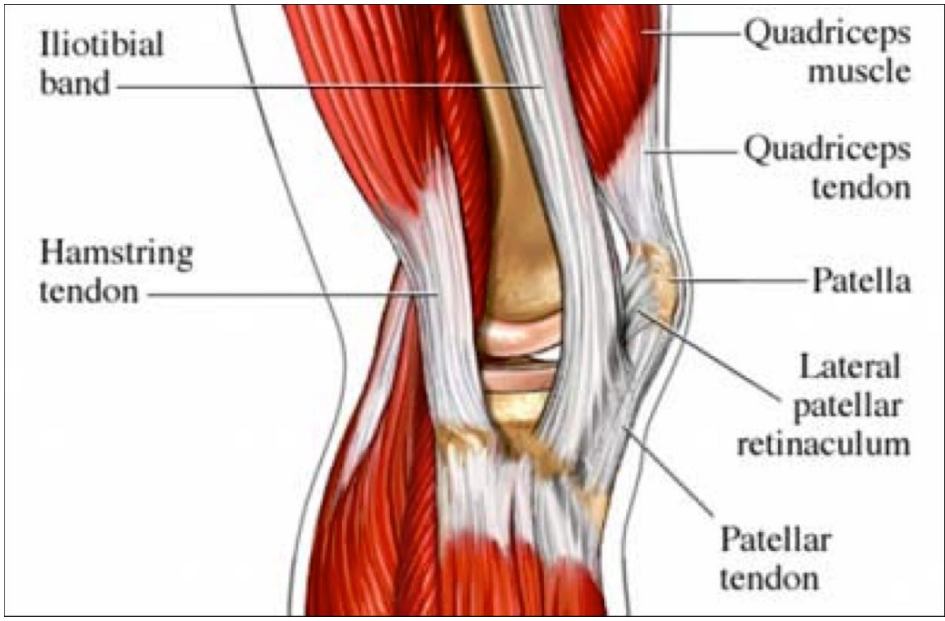
Keep bent

Patellar Tracking



Anterior Knee Pain

Patello-Femoral Joint pain
Chondromalacia Patellae
Fat pad Impingement (Hoffa Syndrome) (pinches on hyperext)
Pre/Infra patellar bursitis
Patellar Tendonitis (jumpers knee)
Osgood-Schlatter's (growth spurt)

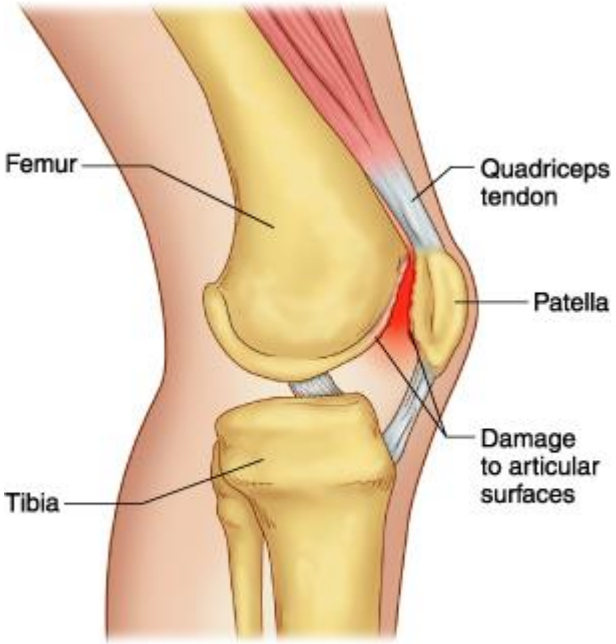


Chondromalacia Patellae

Chondromalacia patellae is damage to the kneecap (patellar) cartilage. It is like a softening or wear and tear of the cartilage.

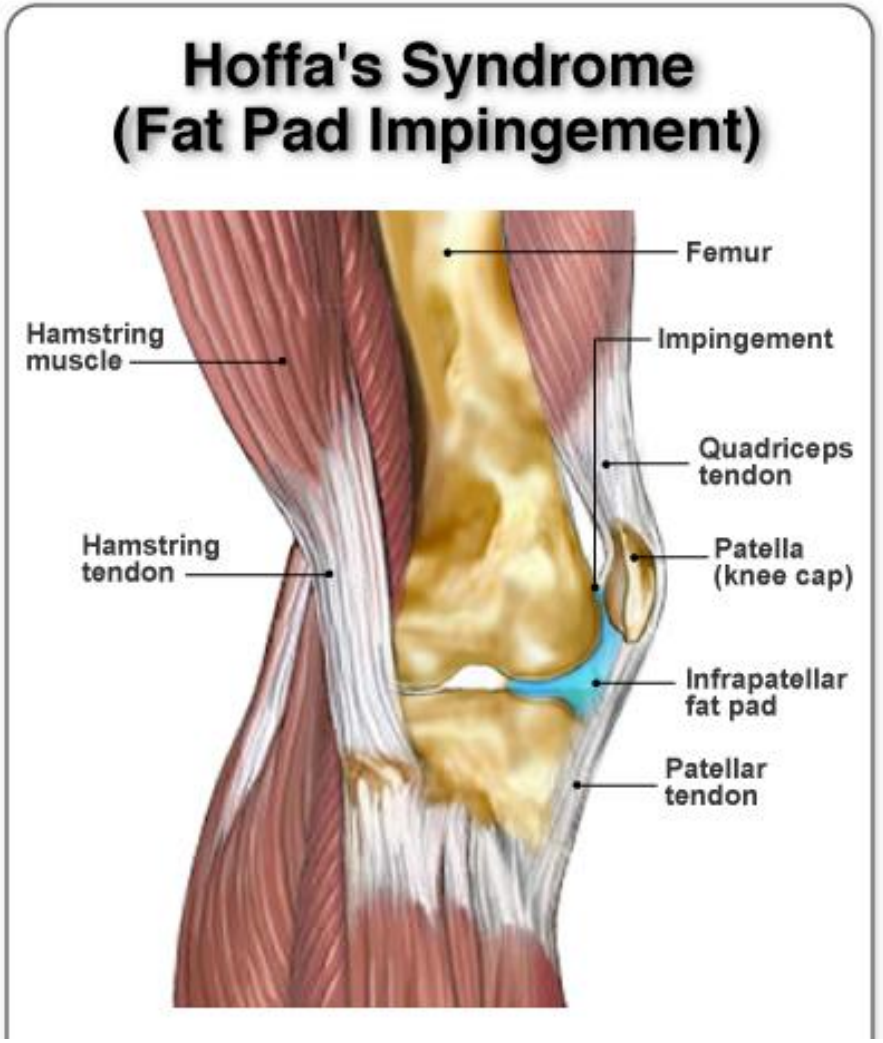
1) Muscle imbalance: a combination of muscle tightness in the quads muscles and other structures .

2) Poor alignment of the kneecap: where the patella doesn't sit in the right position, but tends to be either too high or too low.



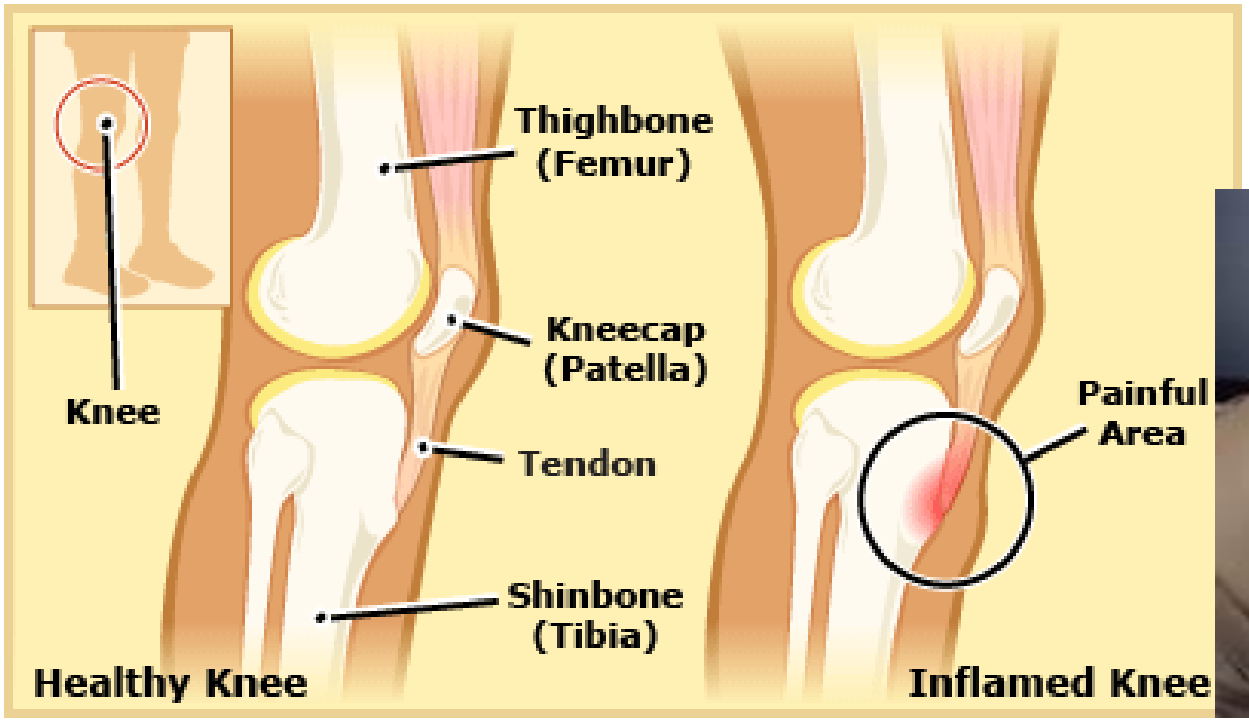
Fat pad Impingement (pinches on hyperext)

Fat pad impingement can be easily confused with patellar tendonitis. However, patellar tendonitis tends to cause pain only at the patellar tendon, especially at the inferior pole of the patella. Fat pad impingement will cause pain on either side of the patellar tendon, where the fatty tissue sits. The pain may be worse with jumping, prolonged standing or any other position that causes the knees to hyperextend. Also, the area around the patellar tendon may be slightly swollen. Fat pad impingement is not associated with clicking, locking or instability



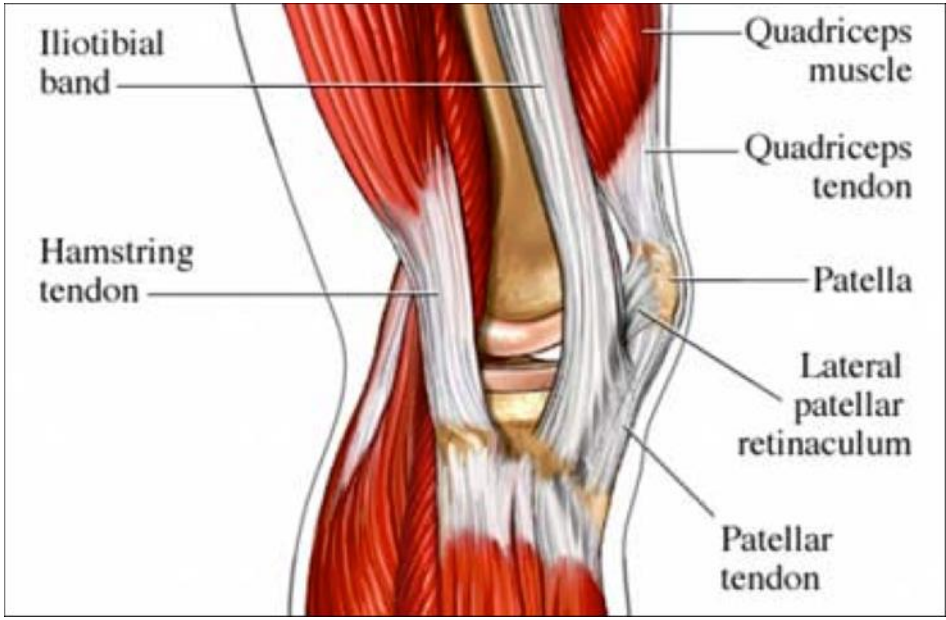
Osgood-Schlatter disease (OSD) is far less frightful than its name. Though it's one of the most common causes of knee pain in adolescents, it's really not a disease, but an overuse injury OSD can be quite painful, but usually resolves itself within 12 to 24 months.

Osgood-Schlatter disease is an inflammation of the bone, cartilage, and/or tendon at the top of the shinbone (tibia), where the tendon from the kneecap (patella) attaches. Most often only one knee is affected.



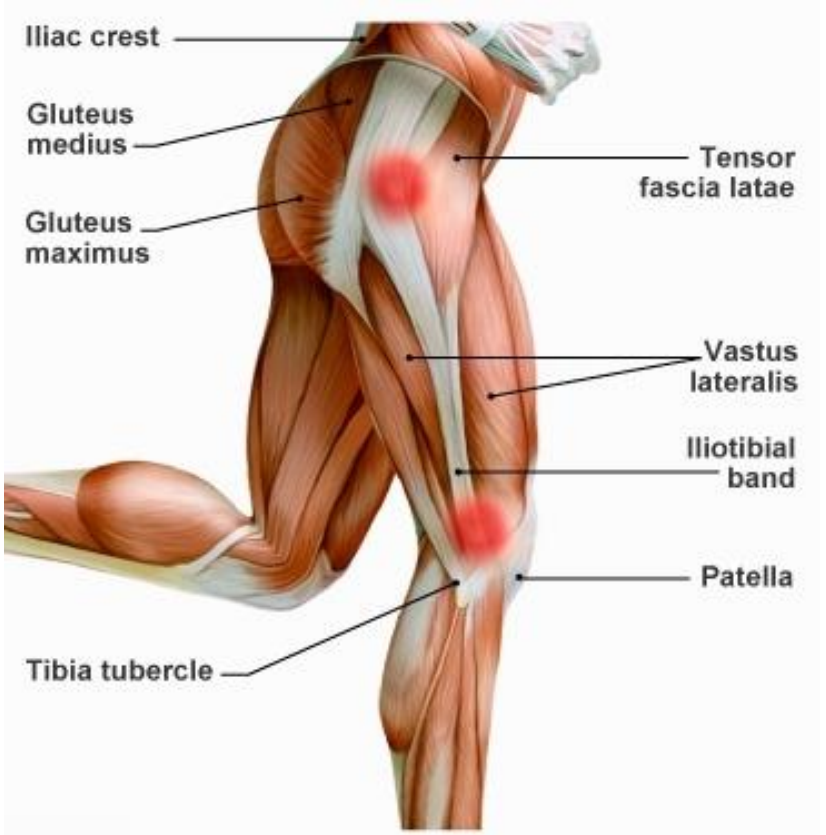
Lateral Knee

Lateral meniscus
Iliotibial Band syndrome
OA
LCL Sprain



IT band Syndrome

Iliotibial band syndrome is one of the leading causes of lateral knee pain in runners. The iliotibial band is a thick band of fascia on the lateral aspect of the knee, extending from the outside of the pelvis, over the hip and knee, and inserting just below the knee. The band is crucial to stabilizing the knee during running, as it moves from behind the femur to the front of the femur during activity. The continual rubbing of the band over the lateral femoral epicondyle, combined with the repeated flexion and extension of the knee during running may cause the area to become inflamed.



Inflammation of the iliotibial band (ITB) causes outer knee pain and possible pain in the hip.

Working the IT band

Effleurage/warming up the tissue. Work from knee up towards heart. This is the direction of blood flow and going in reverse could damage the veins

Kneading working cross fibers to loosen adhesions

Stripping. Either with palms (knee to heart) or with hand tools gua-sha, rollers, etc.

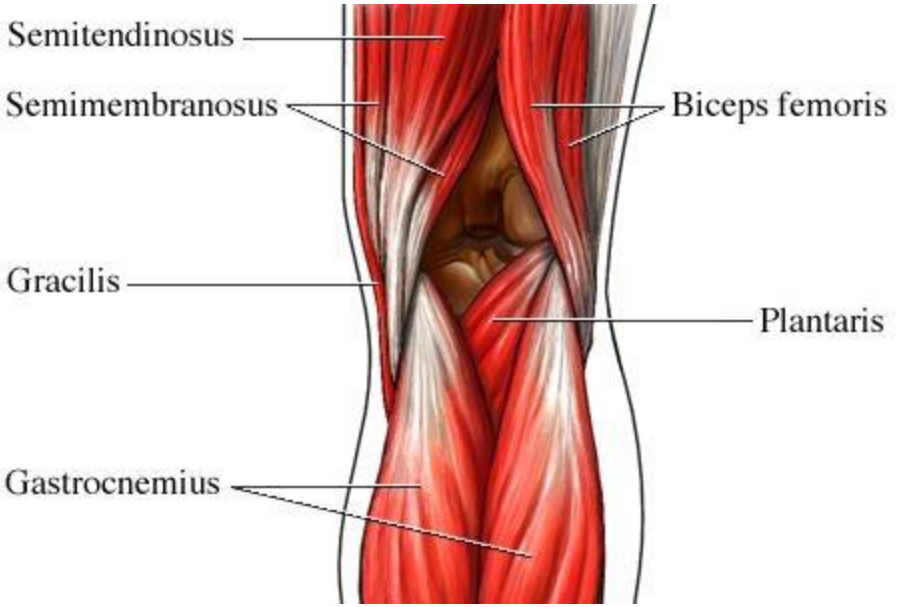
Effleurage finish off

Medial Knee Pain

Medial meniscus
OA
MCL sprain
Pes Anserinus Bursitis

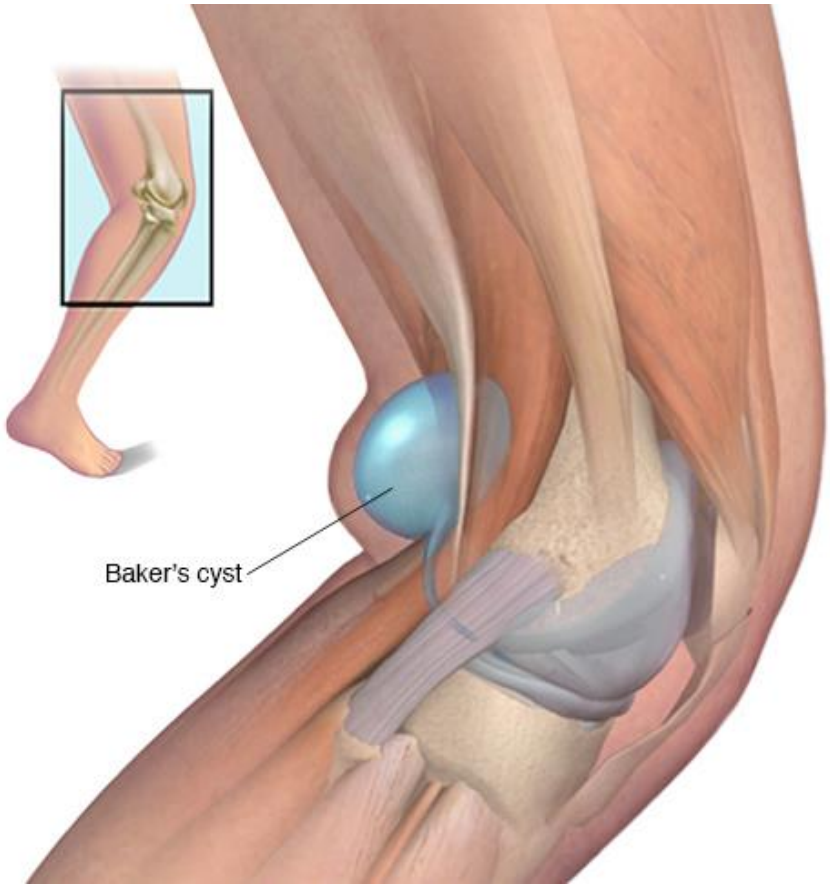
Posterior Knee Pain

Bakers Cyst
Biceps Femoris Tendonitis
DVT
Popliteus Direct Injury



Bakers Cyst

A Baker's cyst is caused when excess joint fluid is pushed into one of the small sacs of tissue behind the knee. When this sac fills with fluid and bulges out, it is called a cyst. The excess fluid is usually caused by conditions such as rheumatoid arthritis or osteoarthritis that irritate the knee. It may also be caused by an injury



Biceps Femoris Tendonitis

Signs & Symptoms of Biceps Femoris Tendonitis

1.Pain or tenderness just under the buttock or at the back-outside corner of the knee with motion.

2.Palpable swelling and tenderness just under the buttock or at the outside of the knee.

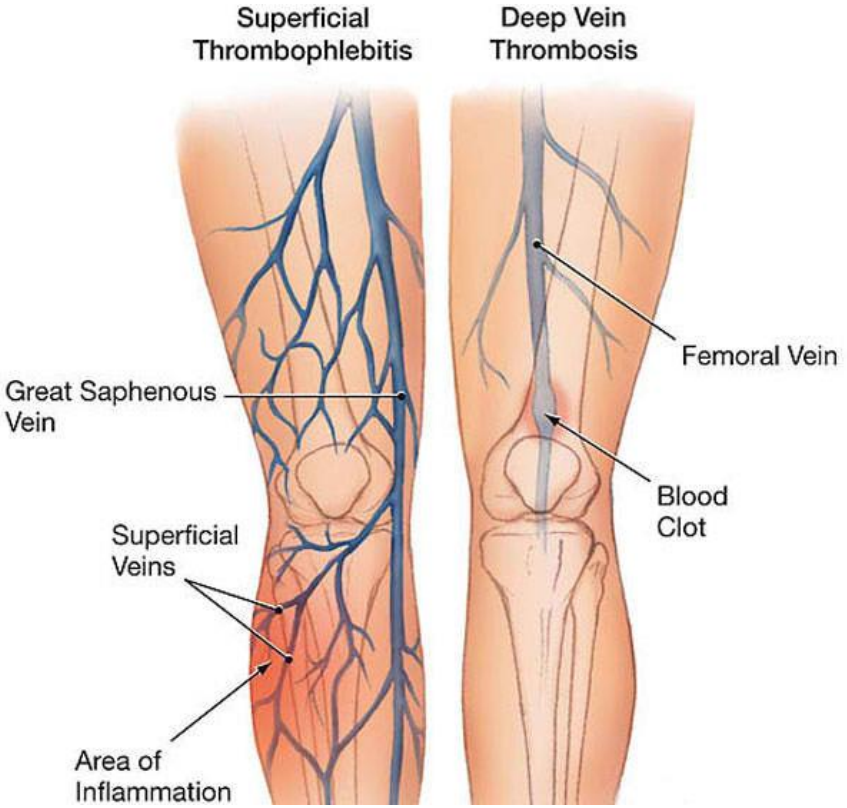
3.Increased pain with active or resistive flexion (bending) of the knee.

4.Pain with lateral or external rotation of the foot and shin while sitting with the knee bent.

Deep Vein Thrombosis DVT

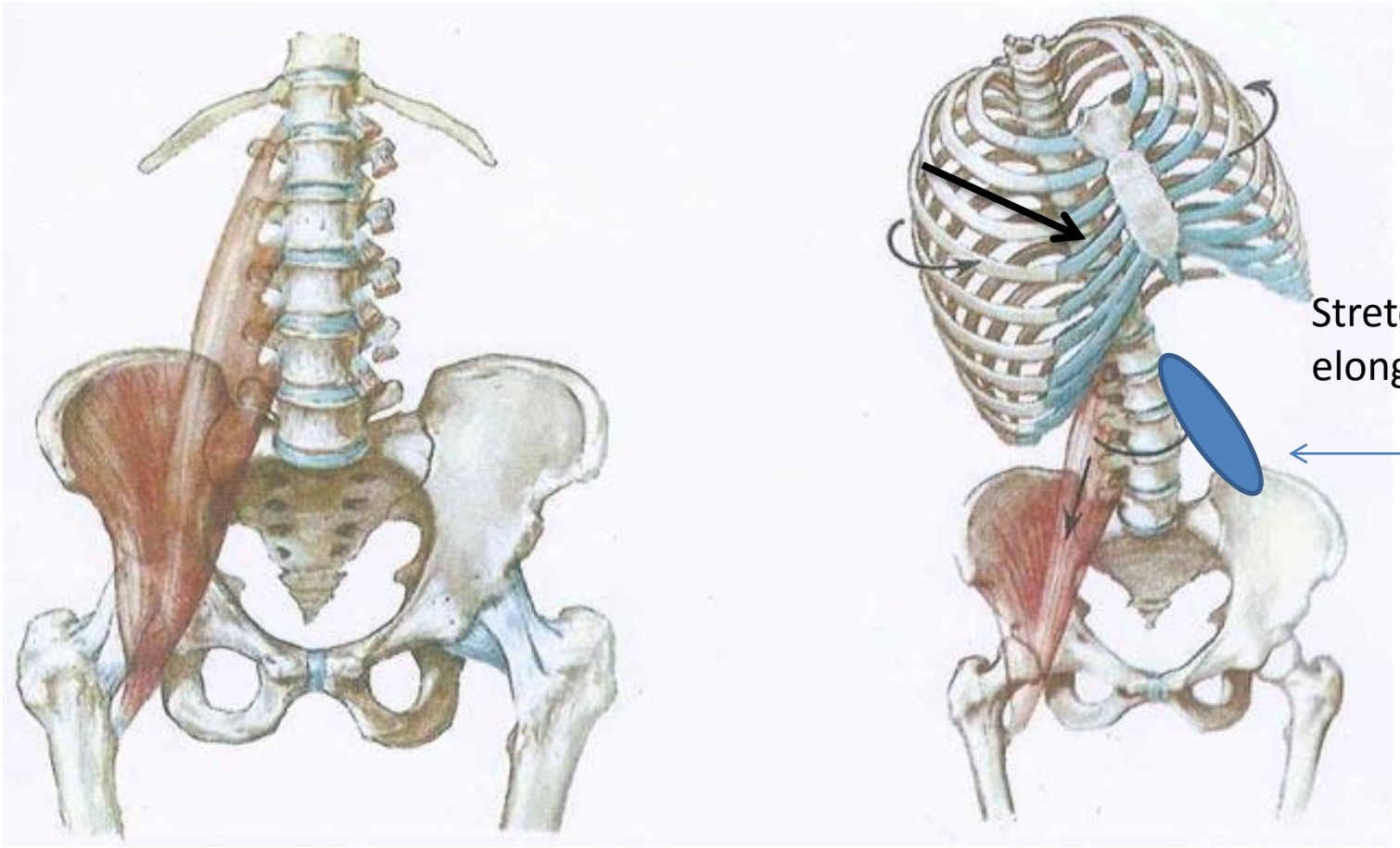
Deep vein thrombosis (DVT) occurs when a blood clot (thrombus) forms in one or more of the deep veins in your body, usually in your legs. Deep vein thrombosis can cause leg pain or swelling, but may occur without any symptoms.

Deep vein thrombosis can also happen if you don't move for a long time, such as after surgery, following an accident, or when you are confined to a hospital or nursing home bed.
Deep vein thrombosis is a serious condition because blood clots in your veins can break loose, travel through your bloodstream and lodge in your lungs, blocking blood flow (pulmonary embolism).

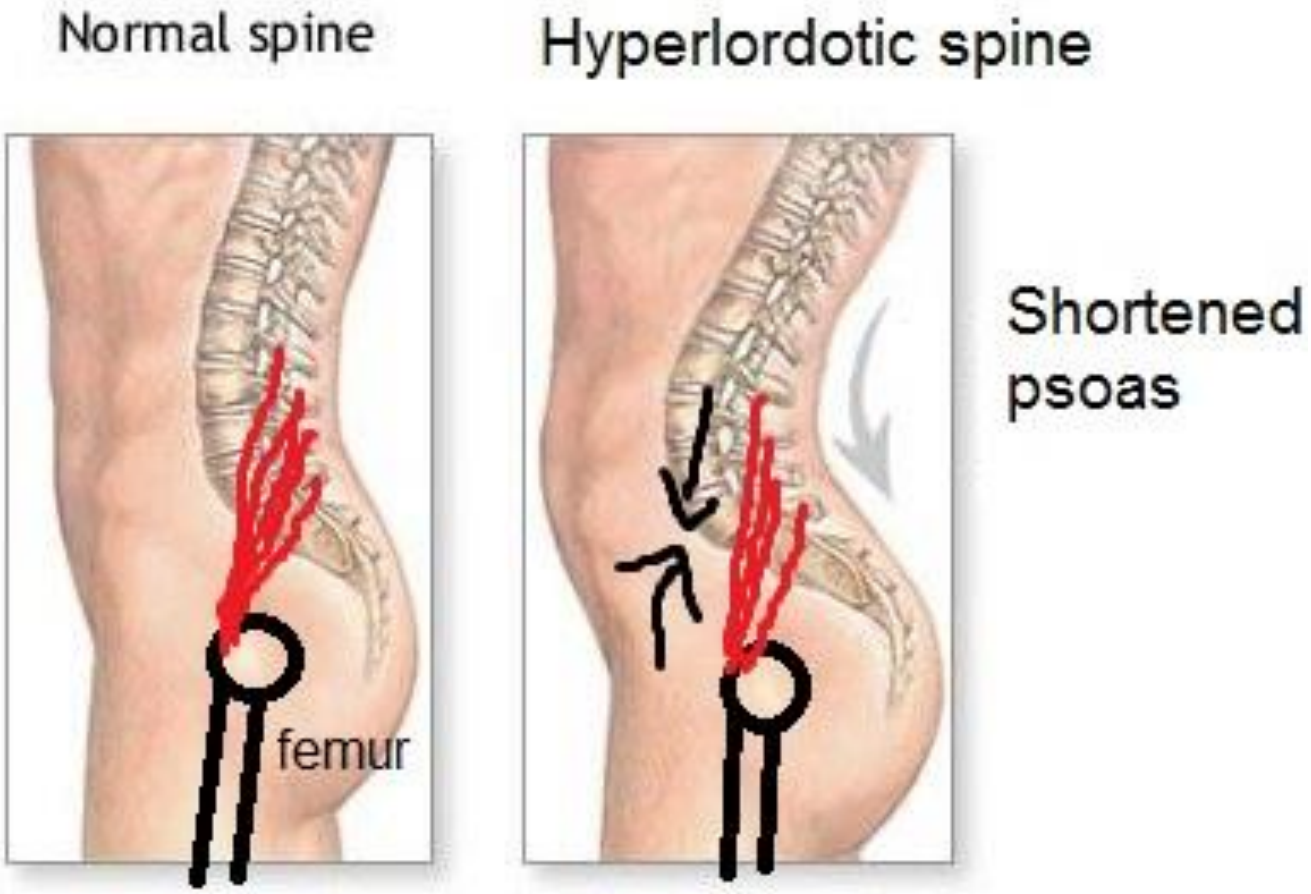


Often Overlooked Muscle

Psoas

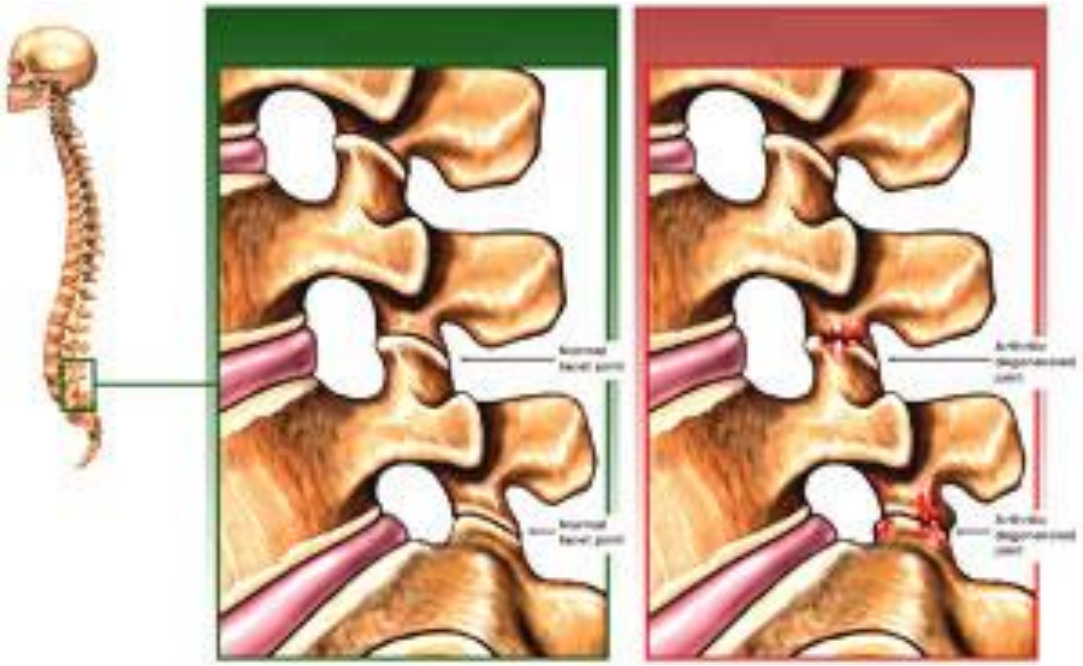


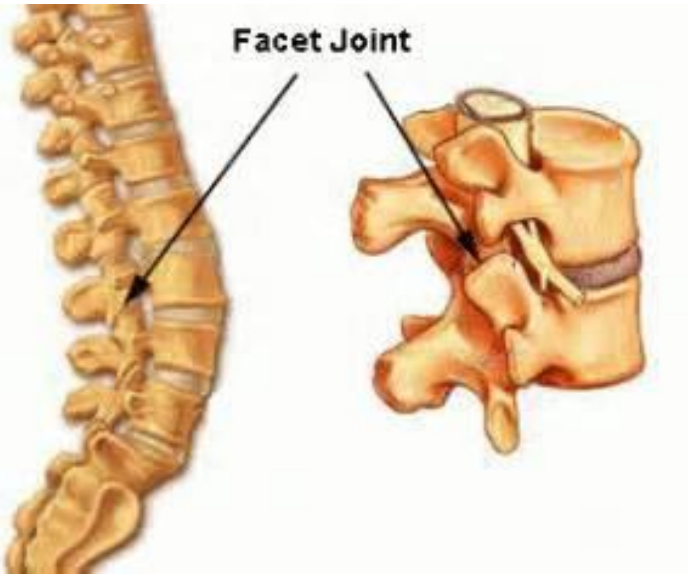
Hyperlordosis and the Psoas



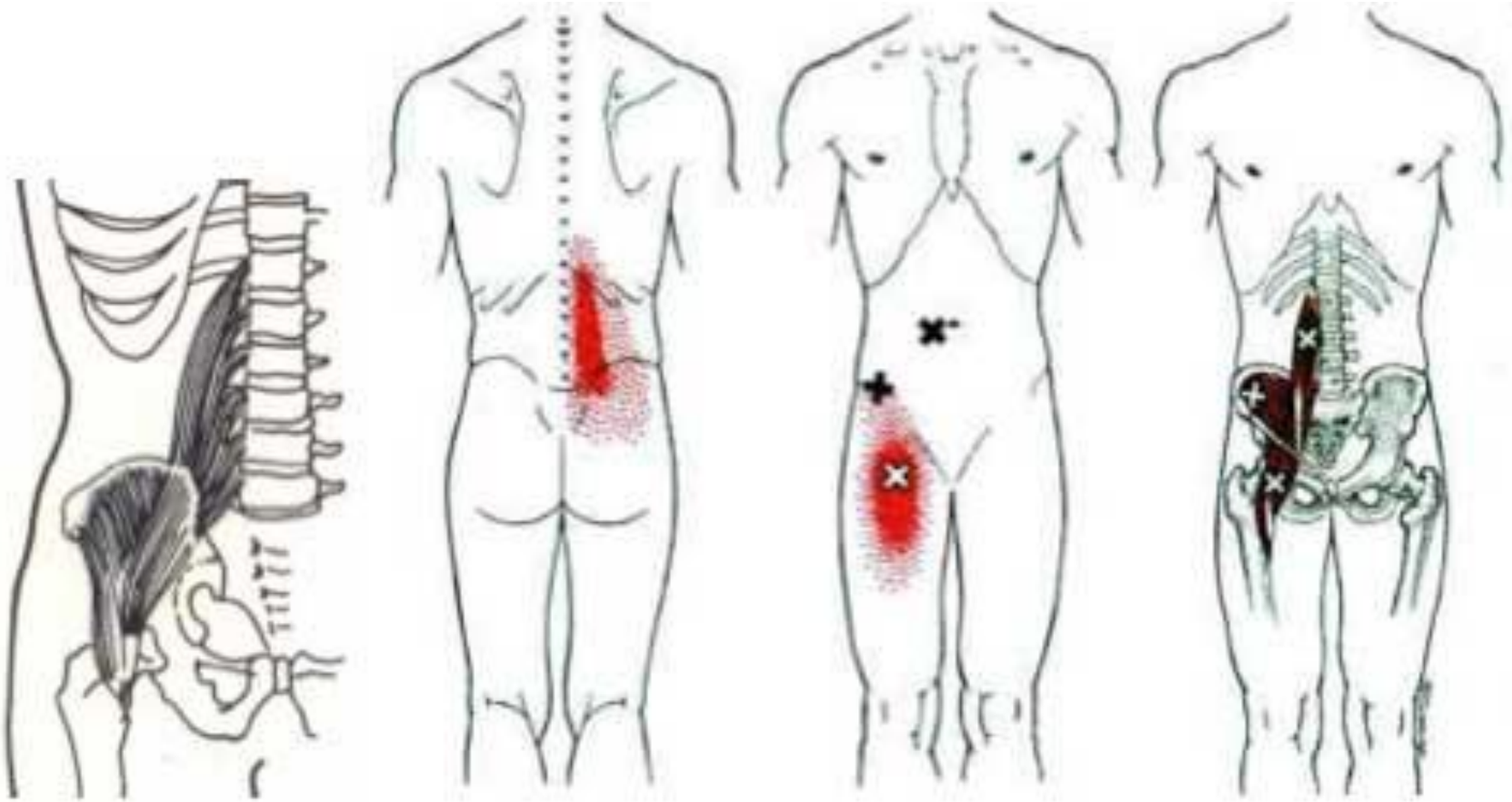
Chronic conditions of Hyperlordosis can lead to Facet Syndrome – Facet Arthrosis

- Signs Symptoms
- Positions for Massage
- Pos Kemps Test



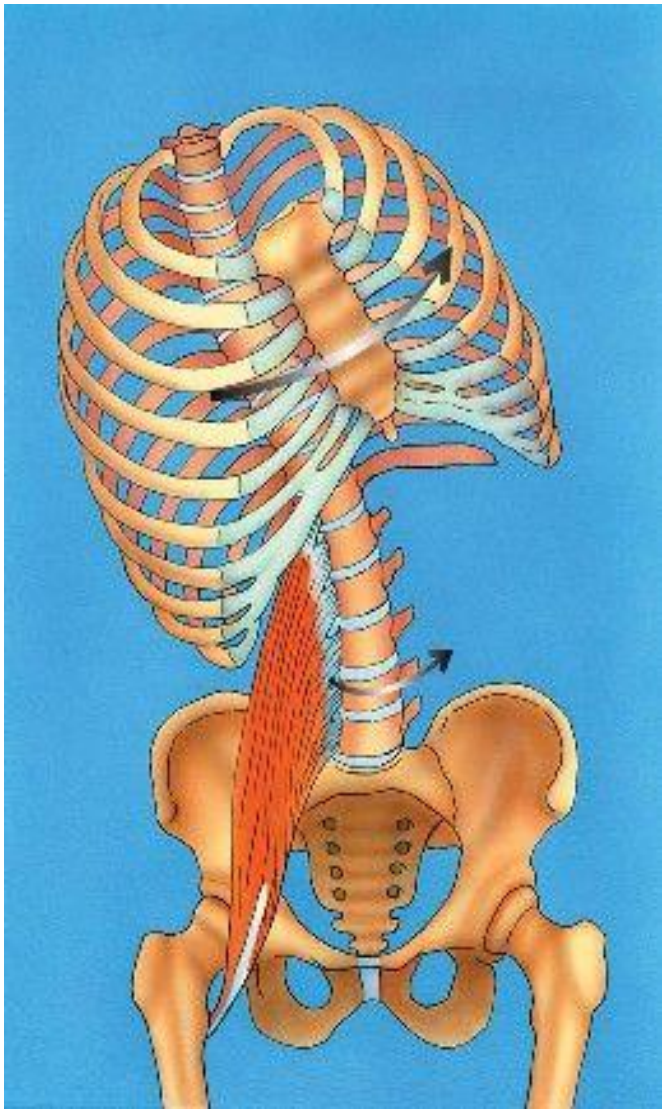


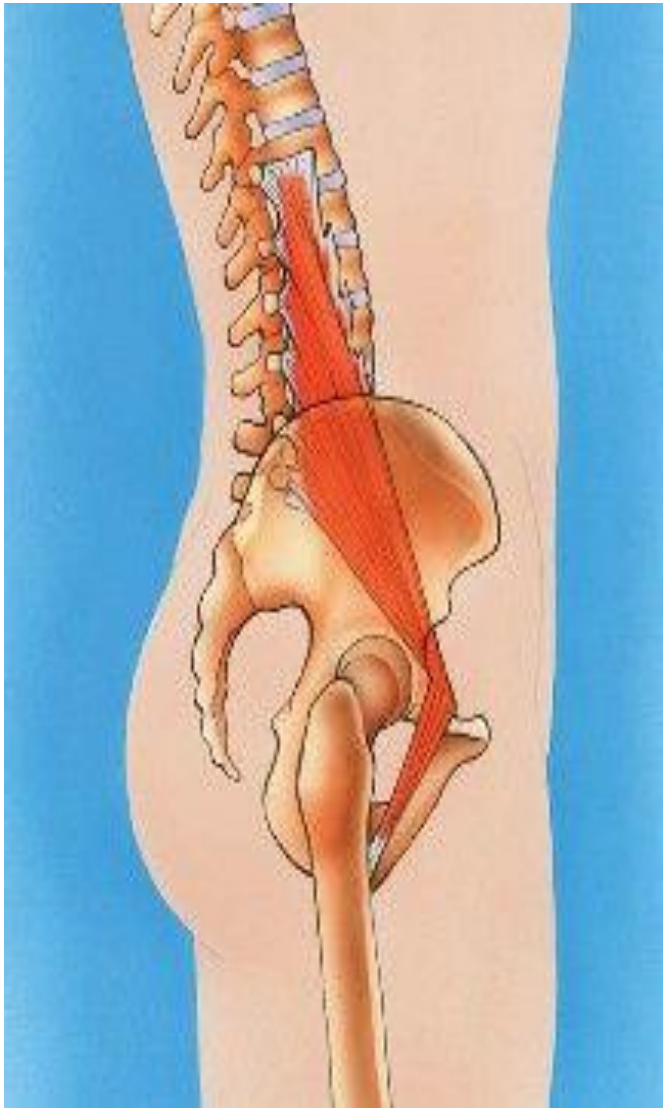
Psoas Trigger points



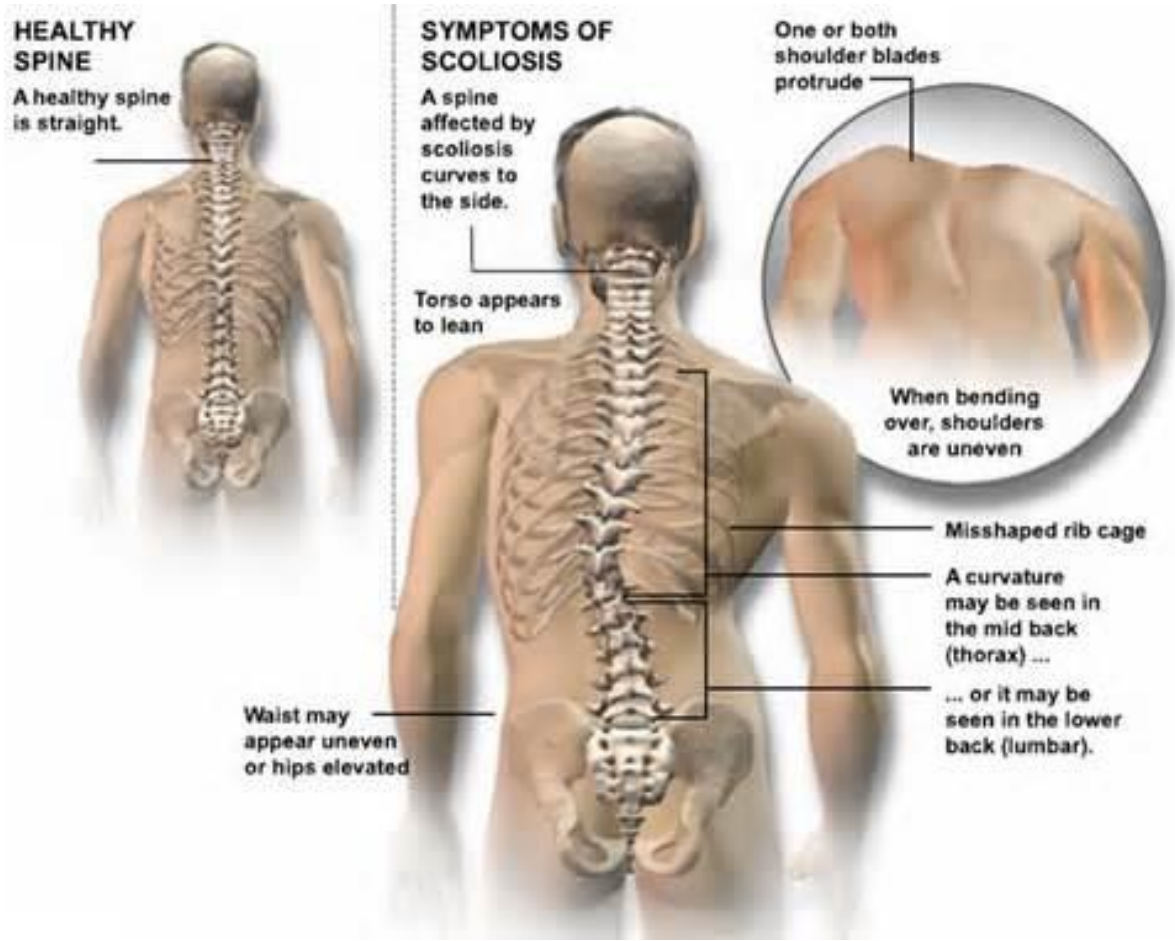
Psoas

Secondarily contributes to lower spinal rotation.

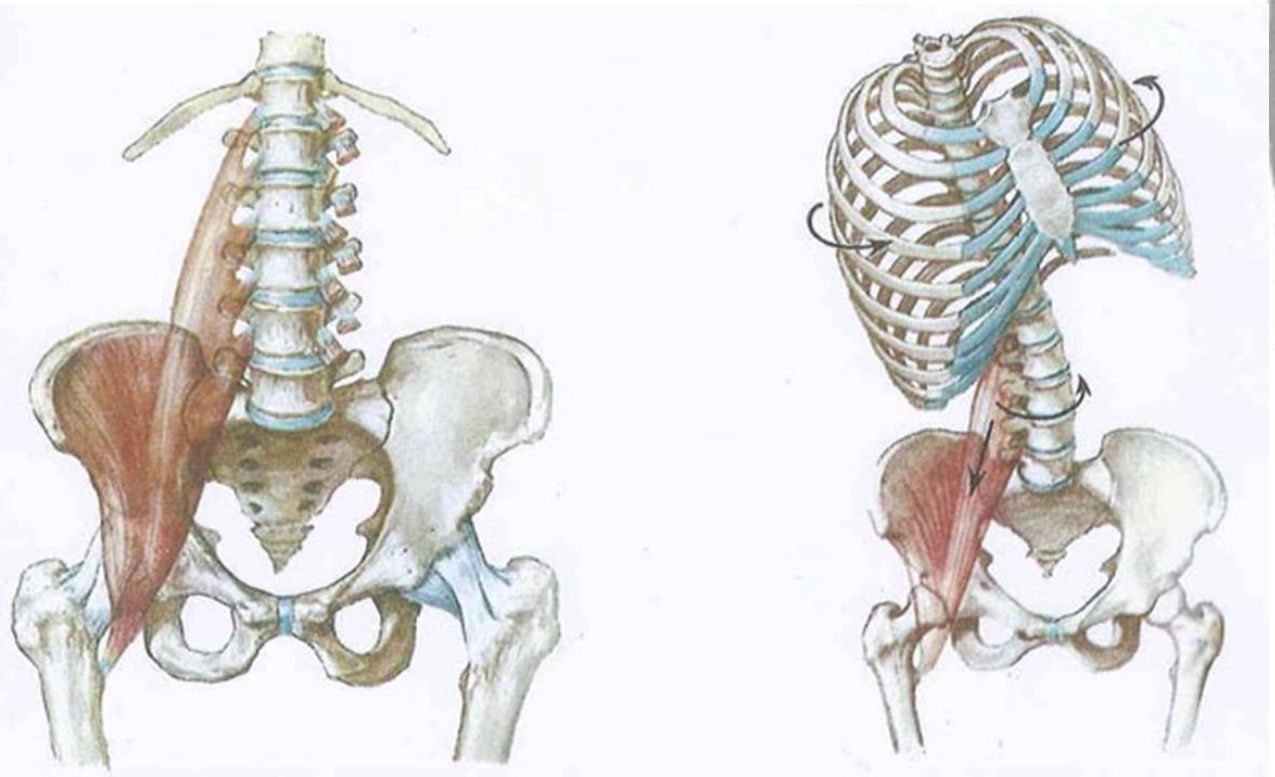


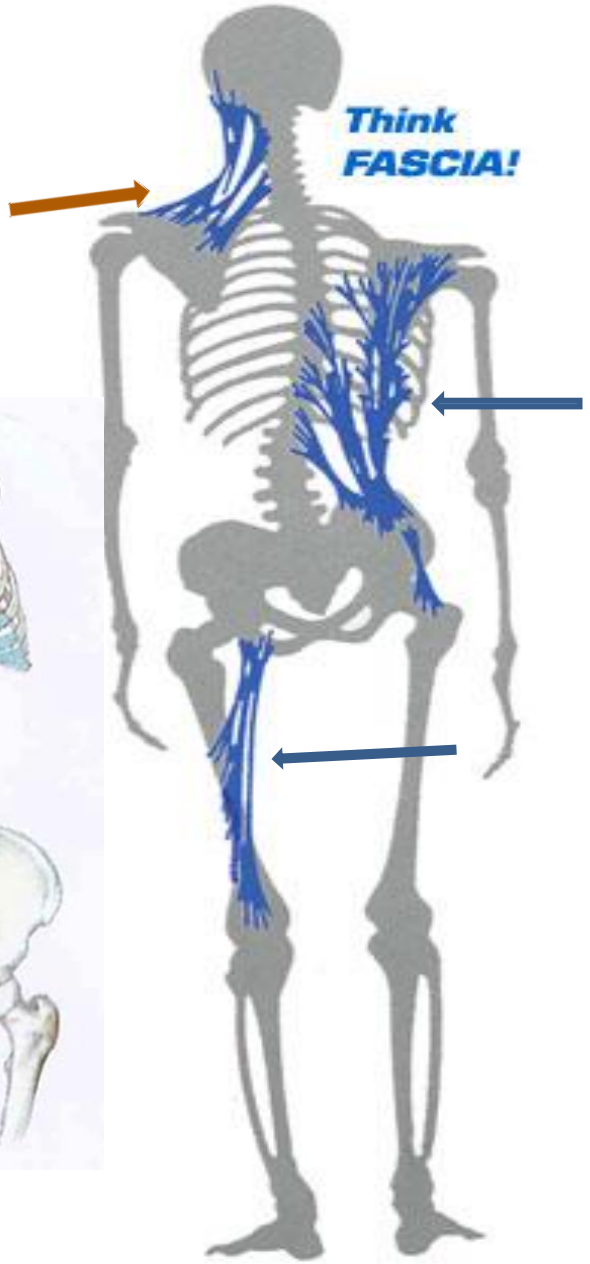



Normal spine
Deformity from scoliosis


HEALTHY SPINE
A healthy spine is straight.
SYMPTOMS OF SCOLIOSIS
A spine affected by scoliosis curves to the side.
Torso appears to lean
One or both shoulder blades protrude
When bending over, shoulders are uneven
Misshaped rib cage
A curvature may be seen in the mid back (thorax) ...
... or it may be seen in the lower back (lumbar).
Waist may appear uneven or hips elevated

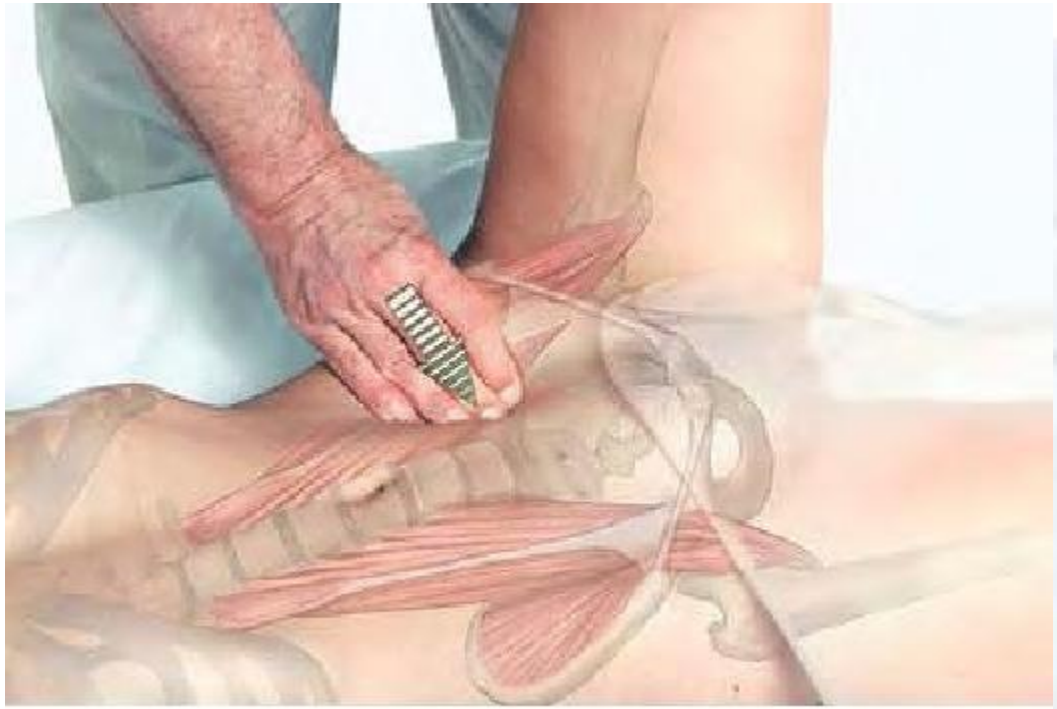
Scoliosis, Rotation, Psoas Contribution

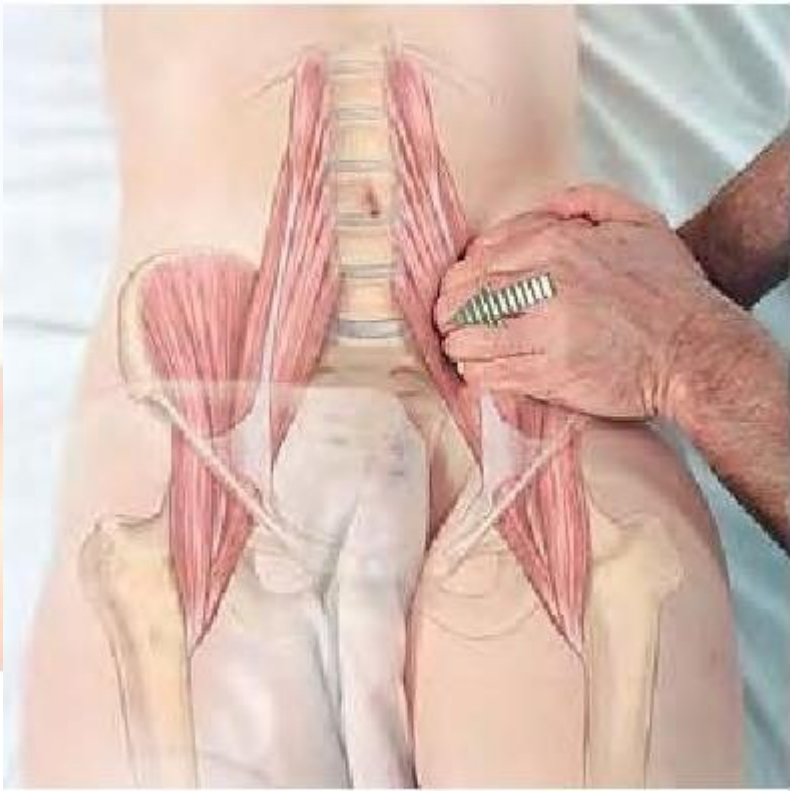




Getting to the psoas

Breathe, wait for exhale
Look for the 3 “Gs”
If you feel pulsing move more lateral (aorta)
Release lower back with opposite hand

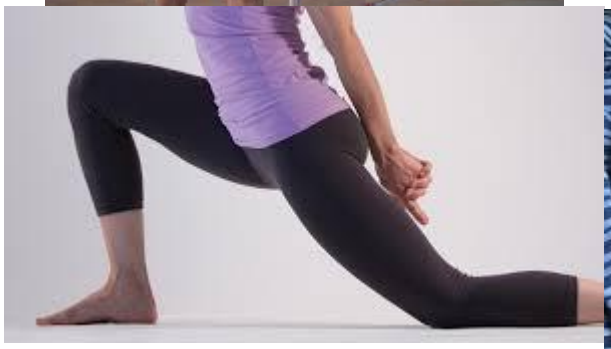




Cool, easy, Psoas Release

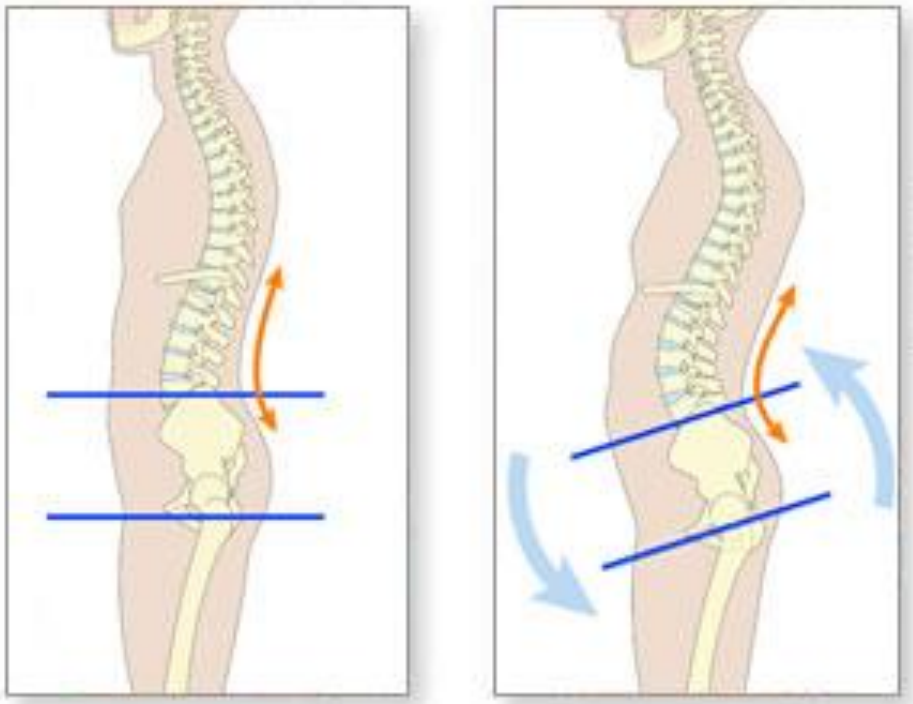
https://youtu.be/OihIk18Z-2c



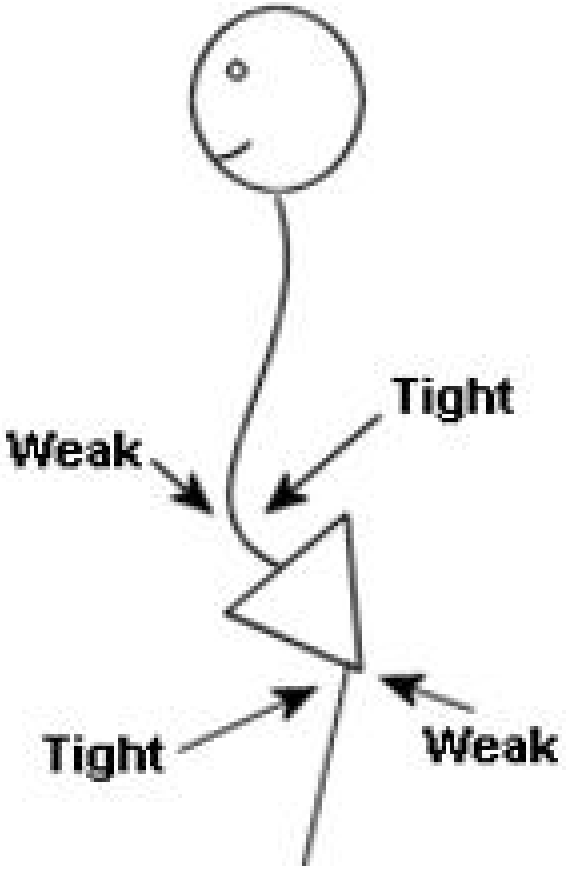




Excessive Hip Flexion

Check;
Psoas, illiacus, rectus femoris, TFL could be tight and or restricted.

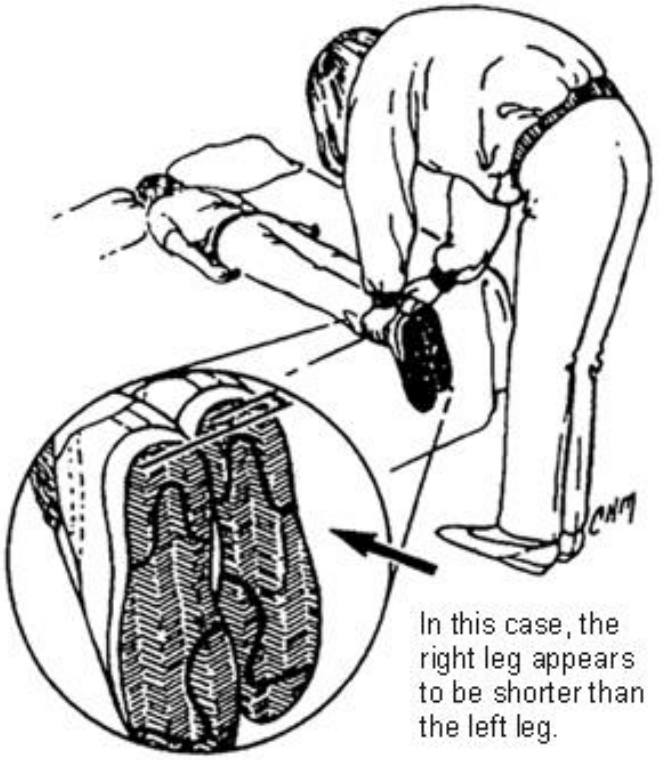


A positive Ely's test indicates:
Irritation or spasm in the iliopsoas muscle or its sheath.
It can also indicate contraction of the rectus femoris.
Contracture of the tensor fasciae latae.


Weak
Tight
Tight
Weak

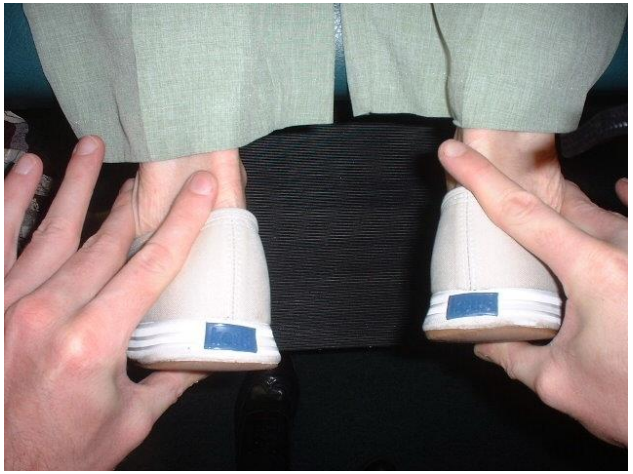
Leg Length

What does it mean?
Are there really 1000s walking around with one leg longer? (walking in circles?)

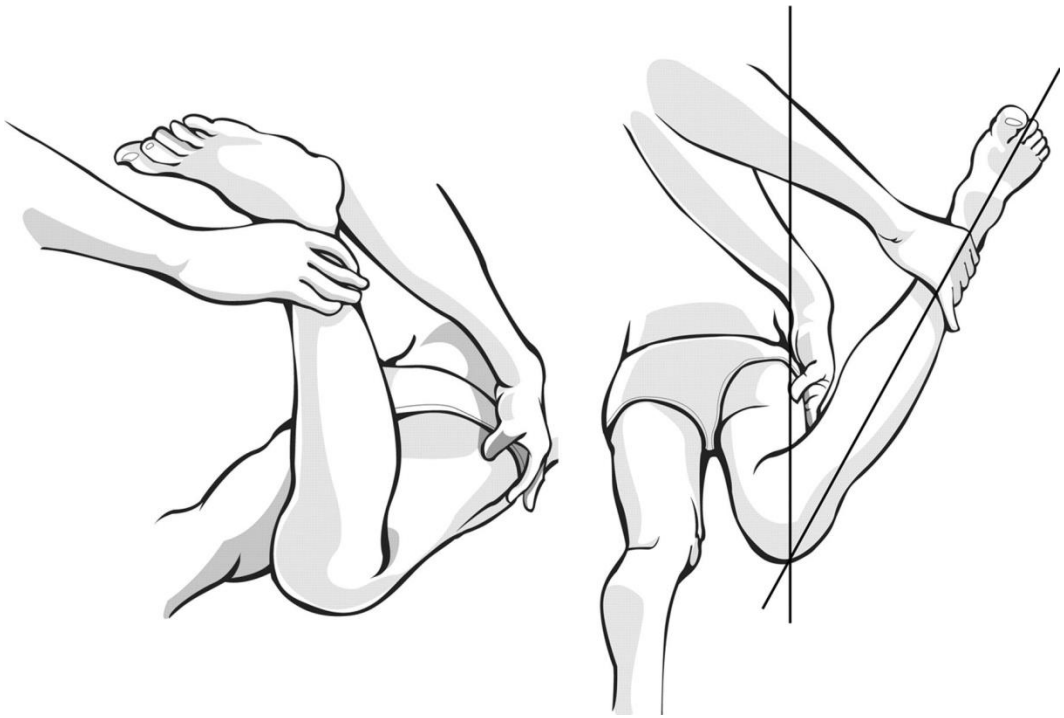


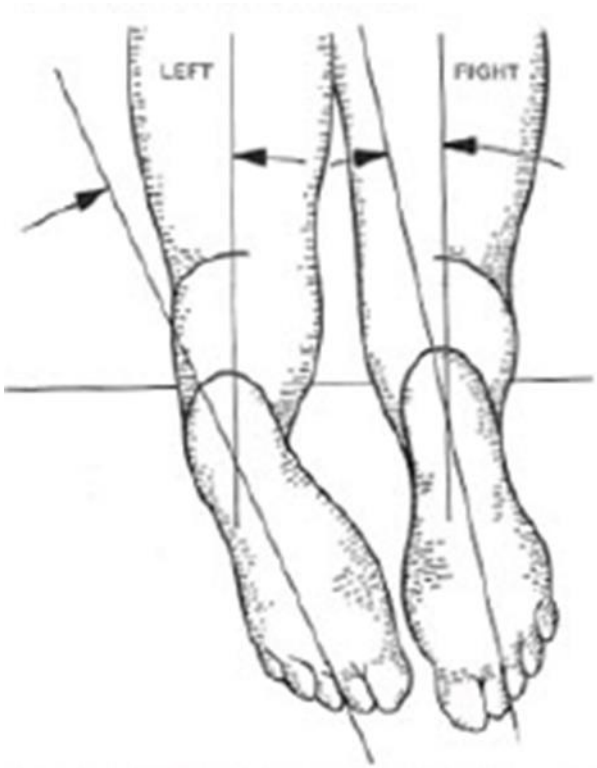
Functional Leg length (Compensatory in nature)

Examine the ASIS and PSIS. Release any spastic or tight muscles then re examine leg length.



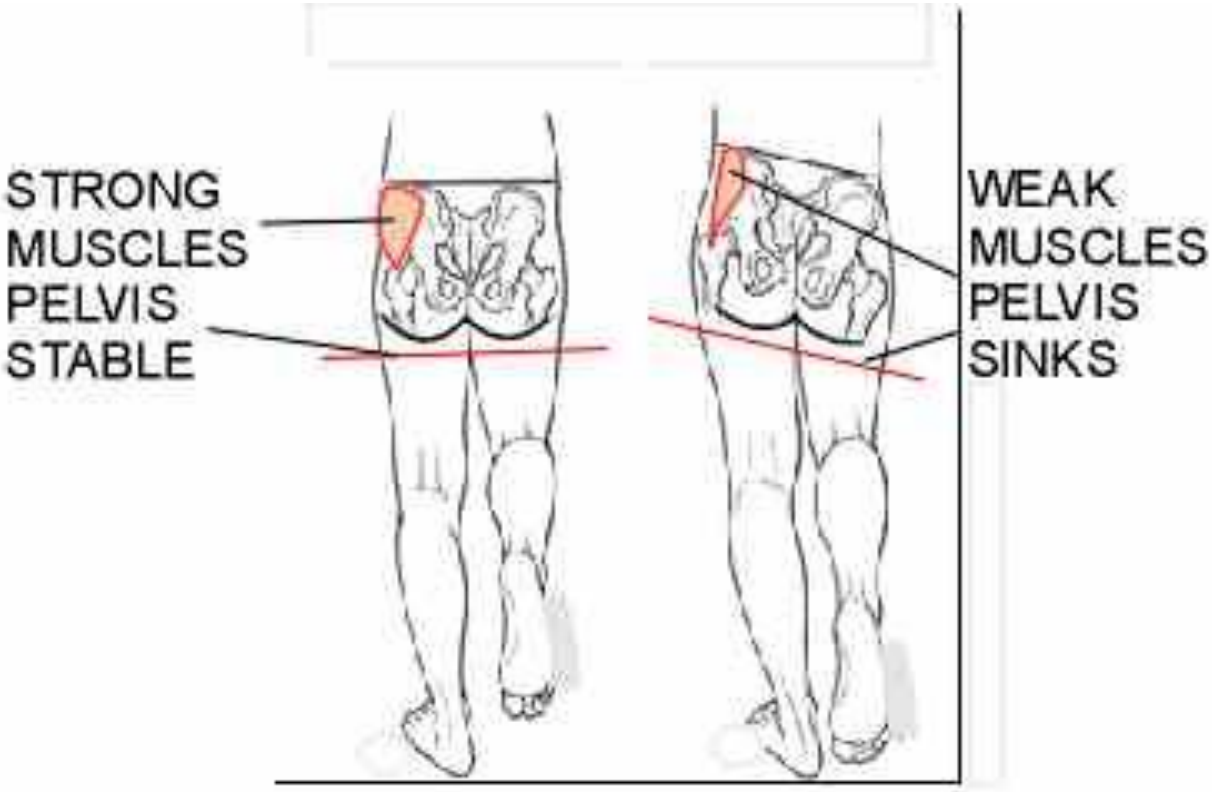
Checking Passively for muscle tension and restriction





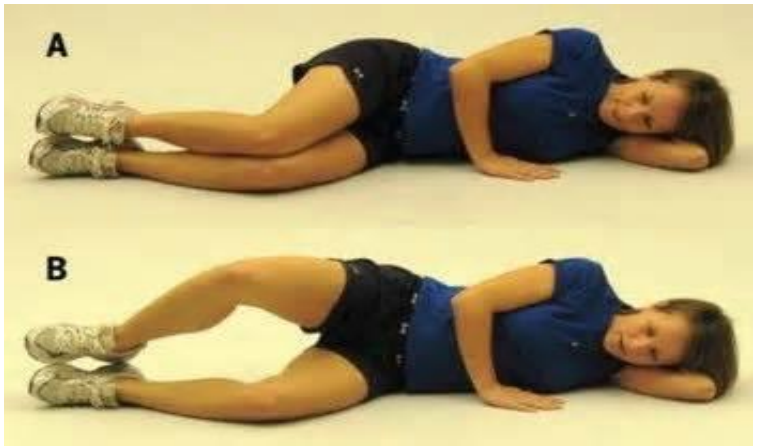
Glute Medius

Trendelenburg sign

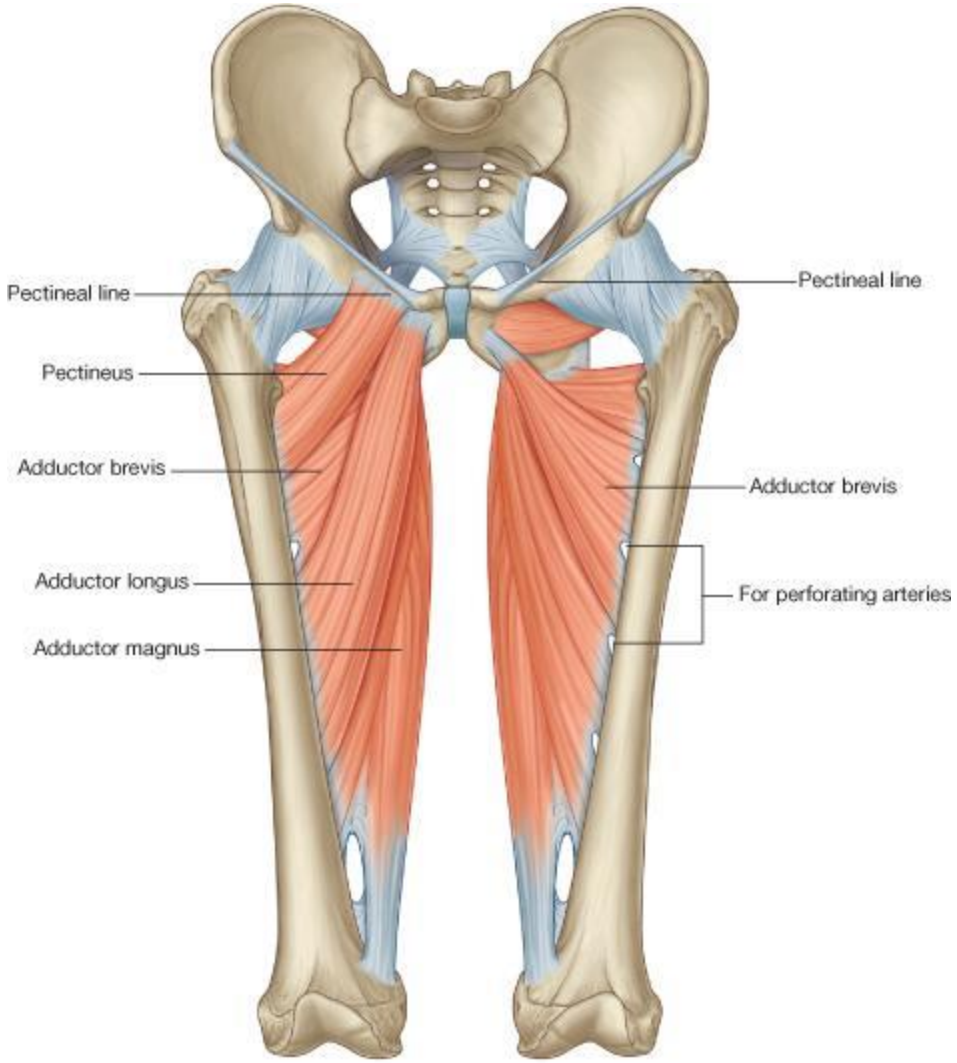


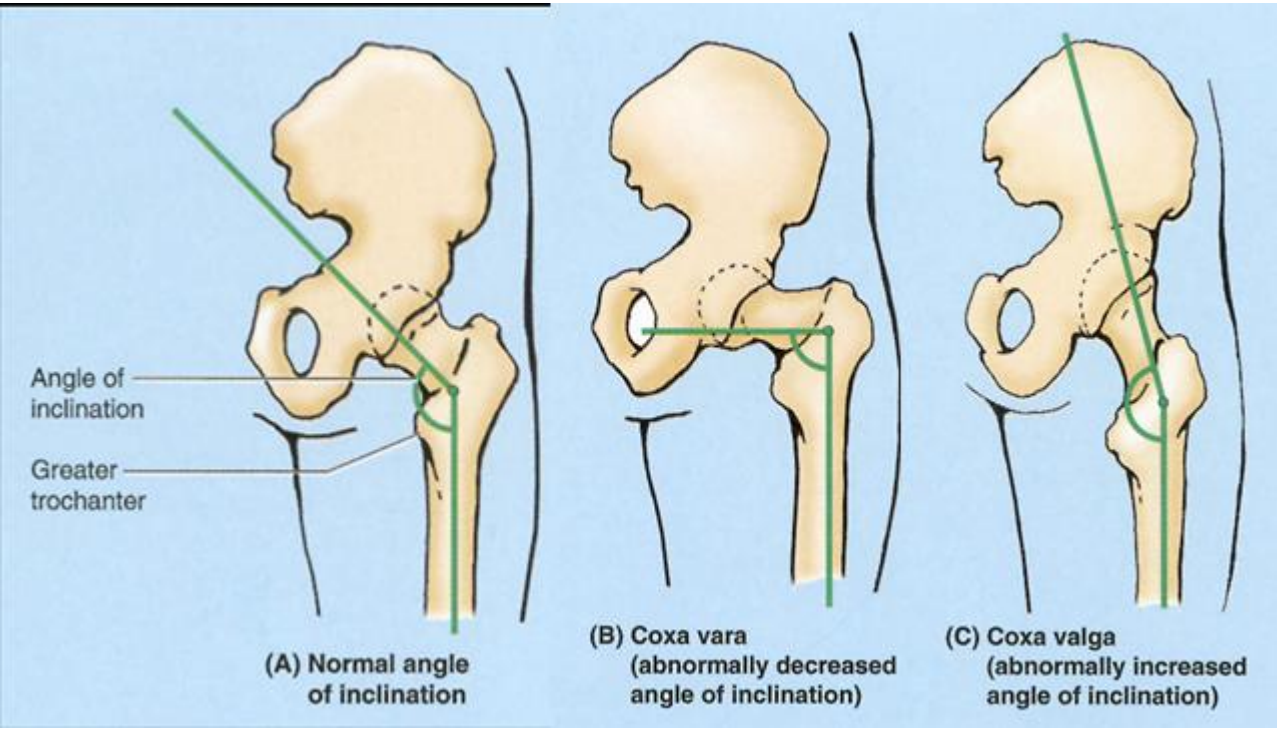
Opposite Sides!!!!

Strengthening the Glute Med



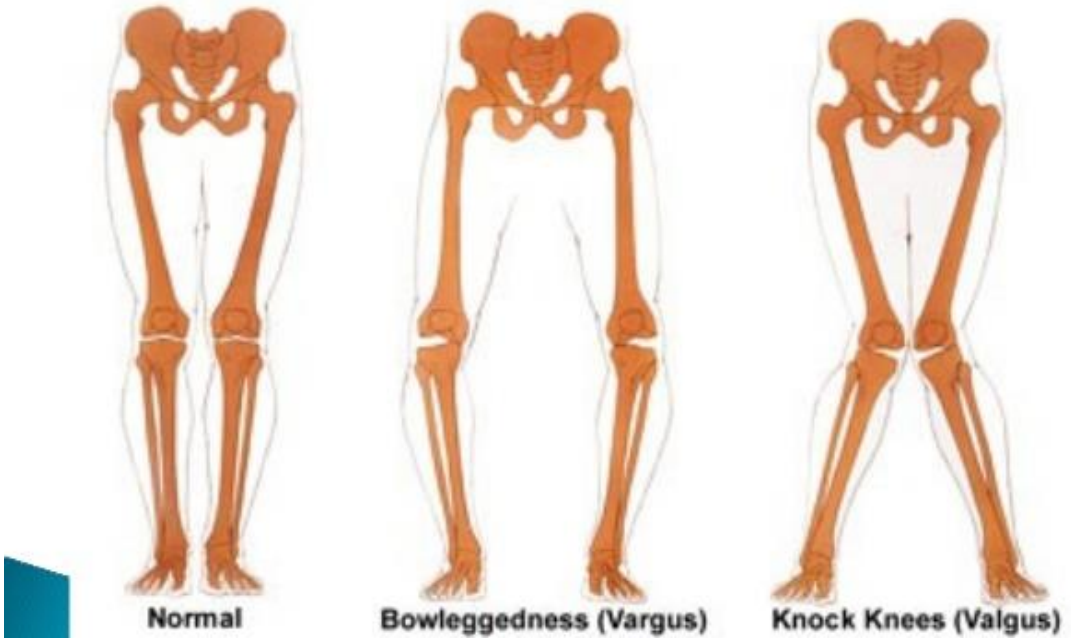
Unilateral Tight ADDuctors





Congenital Femur Head Angles

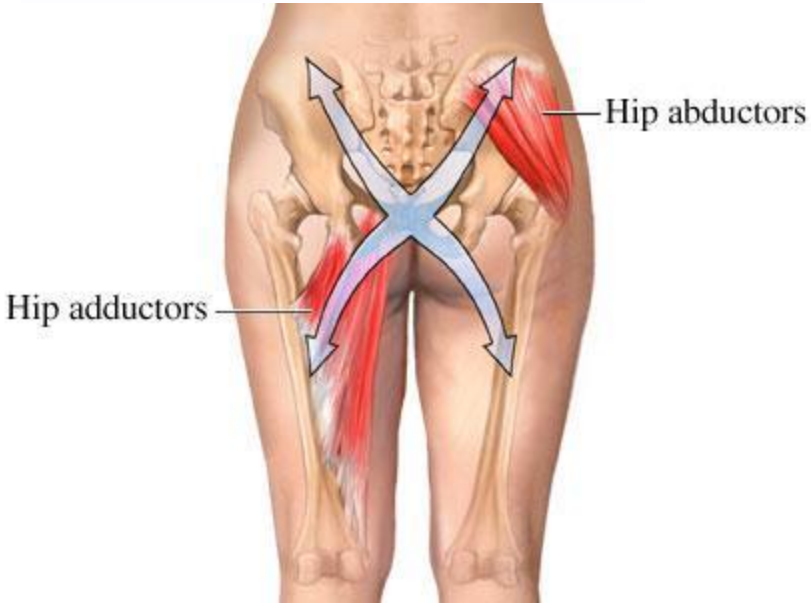
Abnormal Angles and put knee and ankles at increased probability for injuries plus increase muscle spasticity

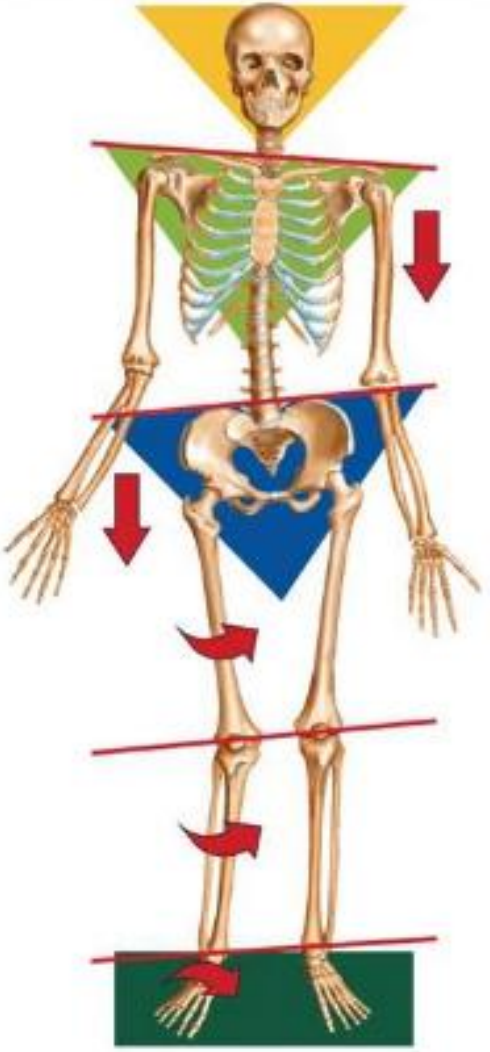


Muscle	Origin	Insertion	Action
Adductor Longus	-Pubis, near the pubic symphysis	-Linea aspera (on the posterior aspect of the femur)	-Adducts the thigh -Internally rotates the thigh -Flexes the thigh
Adductor Brevis	-Body and inferior ramus of the pubis	-Linea aspera above adductor longus	-Adducts the thigh -Internally rotates the thigh
Adductor Magnus	-Ischial and pubic rami and ischial tuberosity	-Linea aspera, medial supracondylar line and adductor tubercle of the femur	-Anterior portion adducts, internally rotates and flexes the thigh -Posterior portion is a synergist of the hamstrings in thigh extension
Pectineus	-Pectineal line of the pubis	-A line from the lesser trochanter to the linea aspera on the posterior aspect of the femur	-Adducts the thigh -Flexes the thigh -Internally rotates the thigh
Gracilis	-Inferior ramus and body of the pubis -Adjacent to the ischial ramus	-Medial surface of the tibia just inferior to the medial condyle	-Adducts the thigh -Flexes the thigh -Internally rotates the thigh (especially during walking)

Stretching

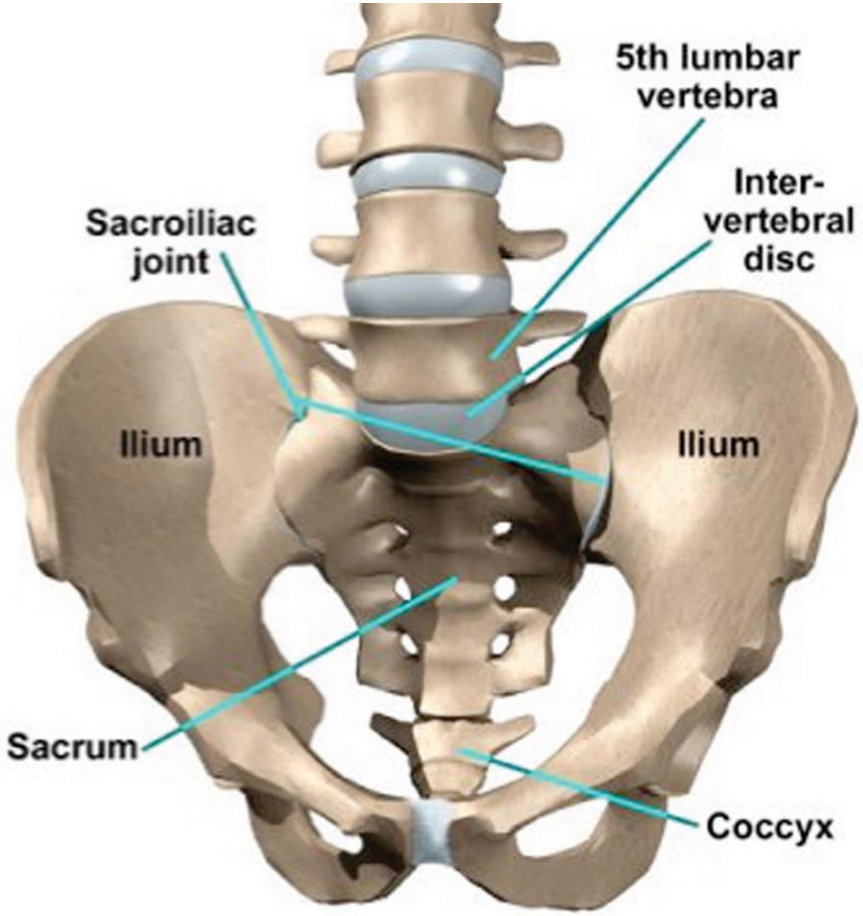
8 to 10 sec
Right before red line
Contract – Hold - Stretch


Hip abductors
Hip adductors



Pelvic Torsion and Pregnancy

Relaxin's peak is reached during the 14 weeks of the first trimester and at delivery. It is known to mediate the hemodynamic changes that occur during pregnancy, such as increased cardiac output, increased renal blood flow, and increased arterial compliance. **It also relaxes other pelvic ligaments.** It is believed to soften the pubic symphysis.


5th lumbar vertebra
Inter-vertebral disc
Sacroiliac joint
Ilium
Ilium
Sacrum
Coccyx

Pelvic Blocking to “De-Rotate”

End of Webinar