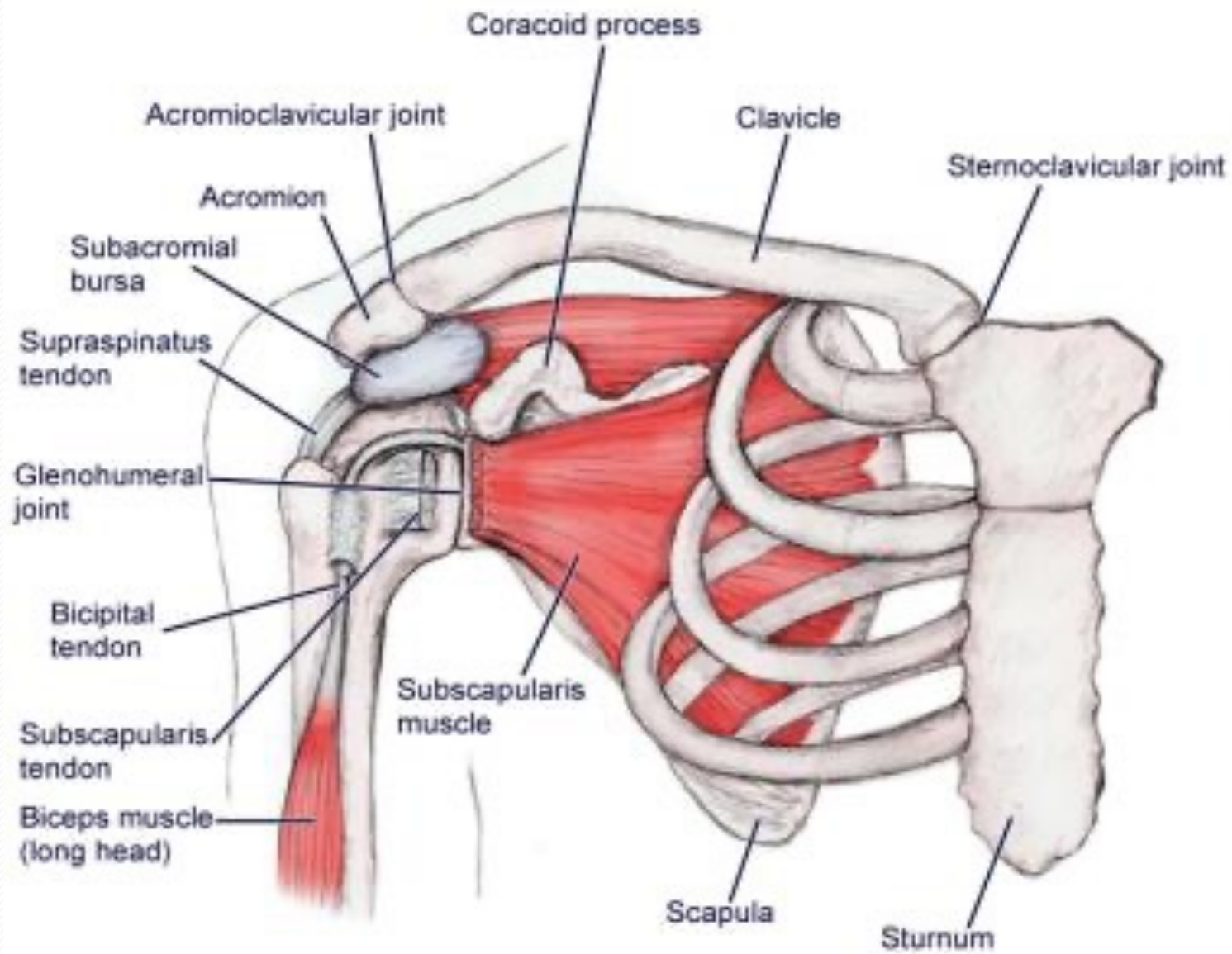
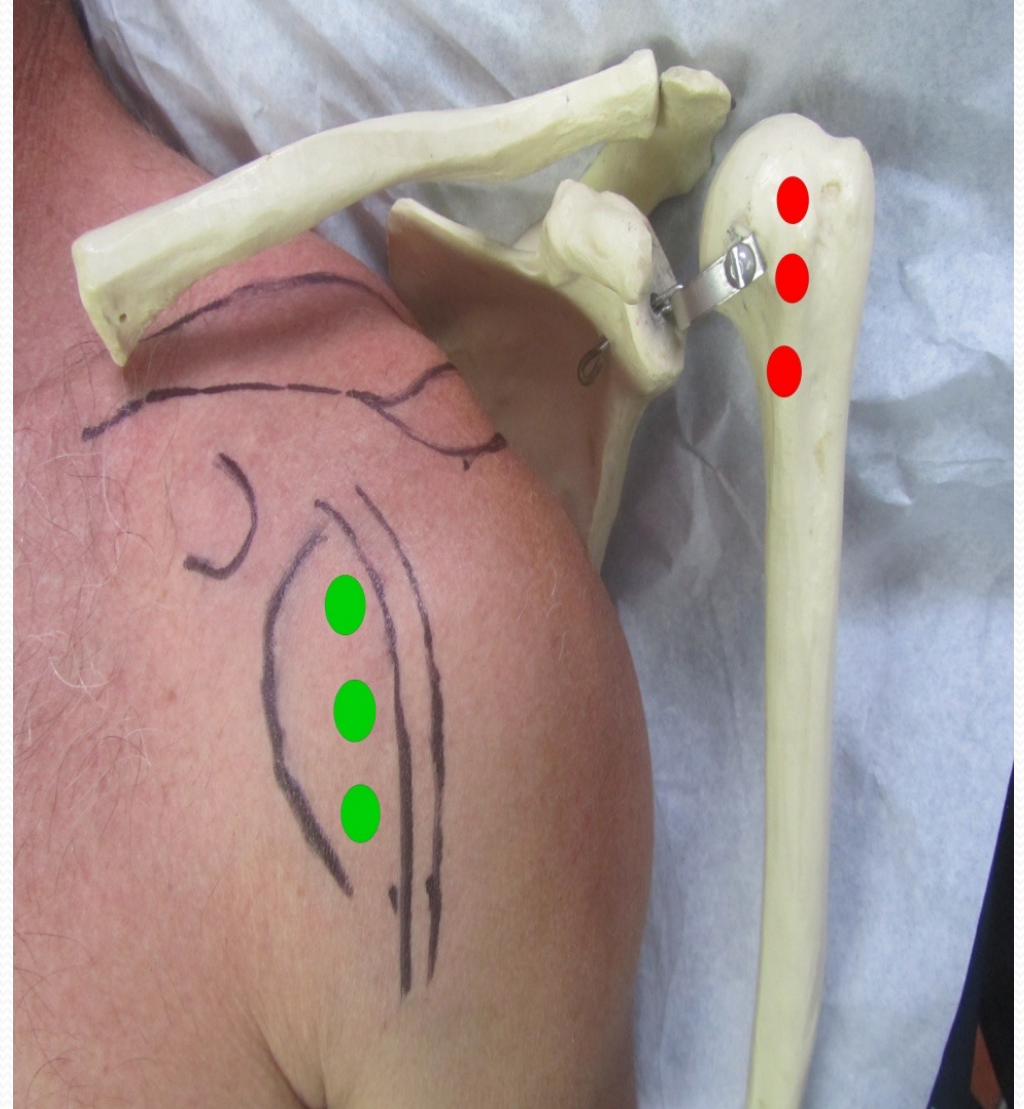
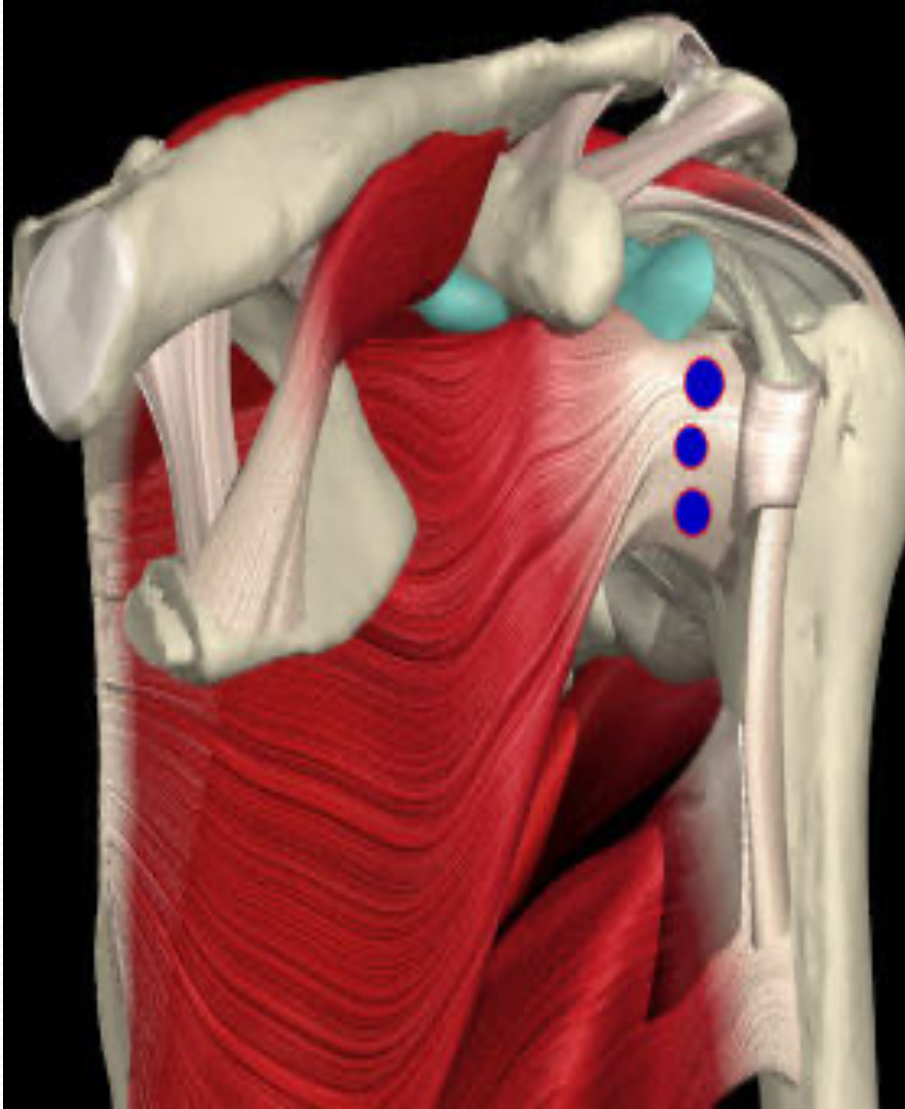


Biceps tendon in Internal Rotation





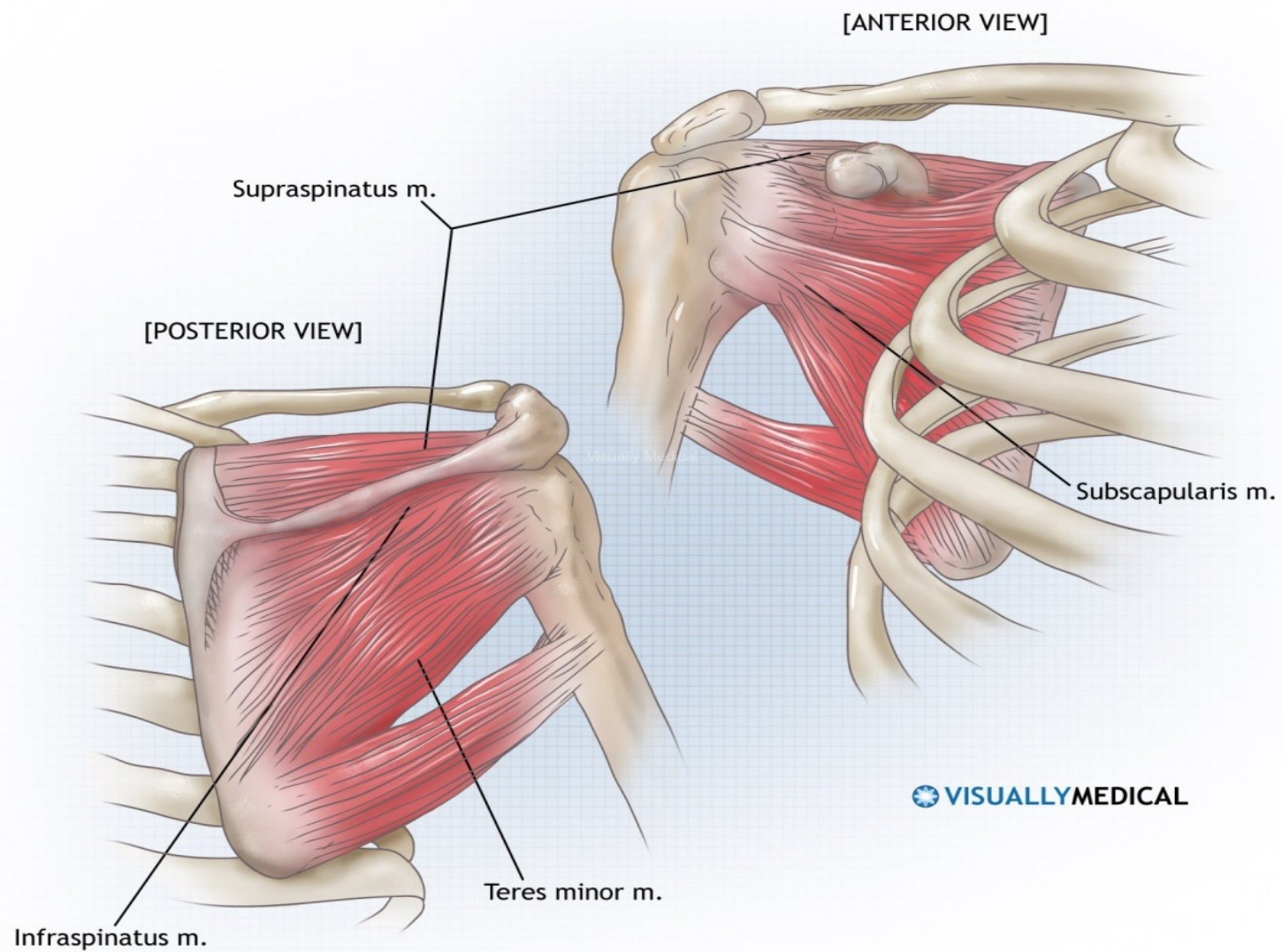
Lesser Tubercle and Subscapularis



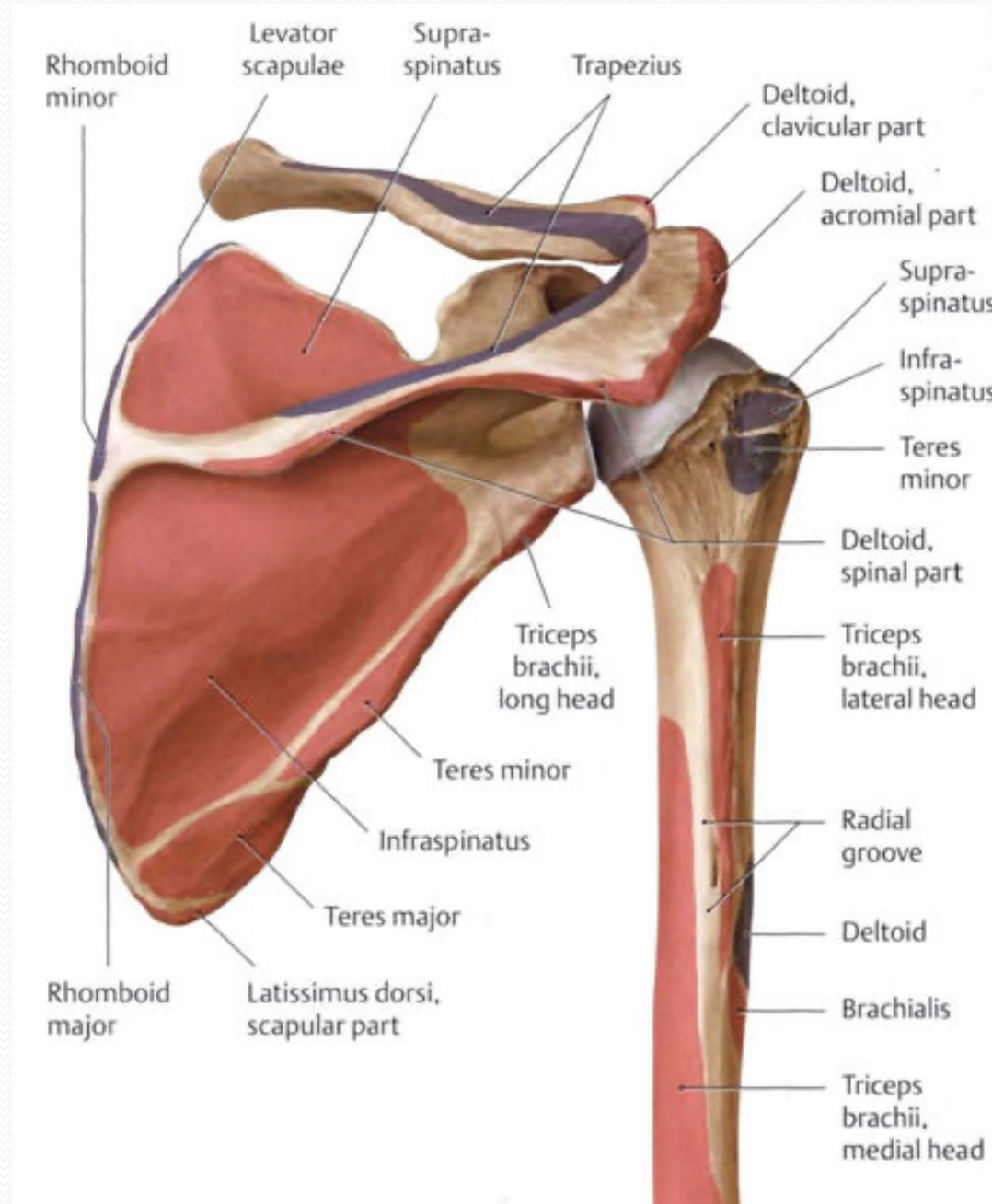
Supraspinatus tendon and Fascia



ROTATOR CUFF MUSCLES

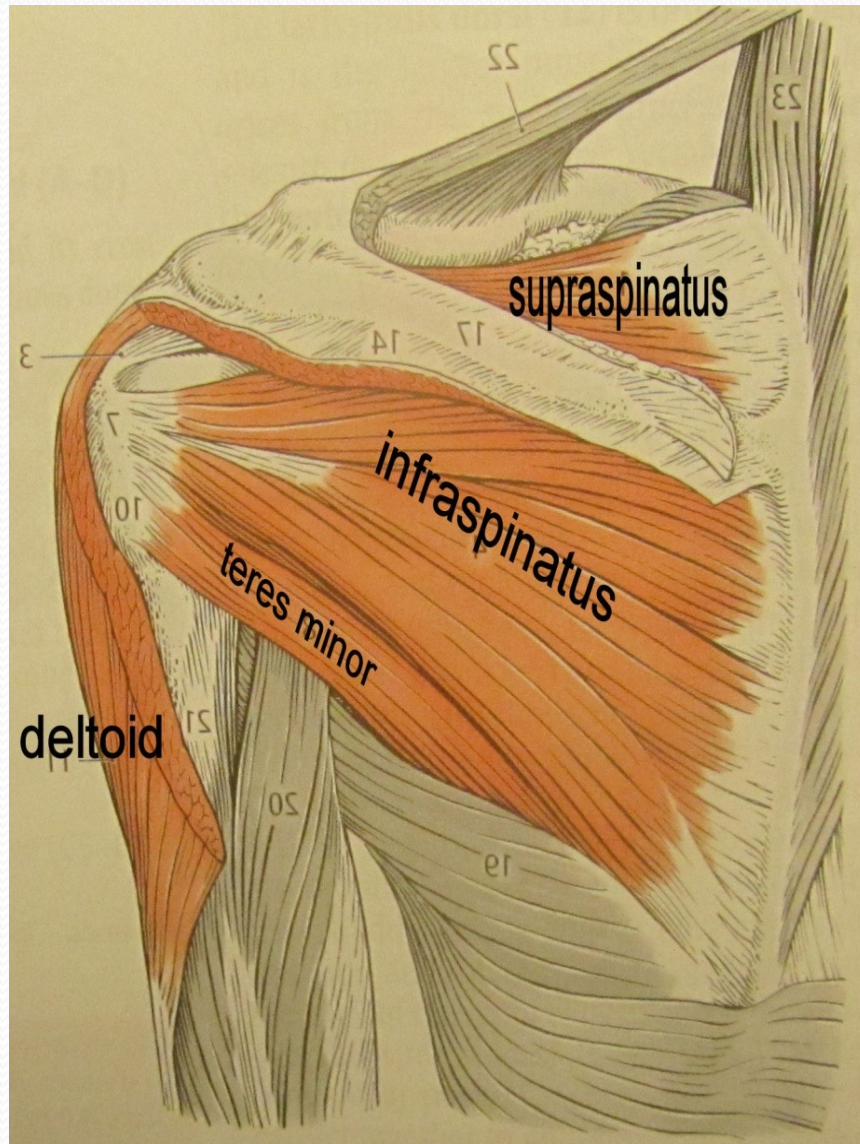


Posterior Tendon Origins and Insertions

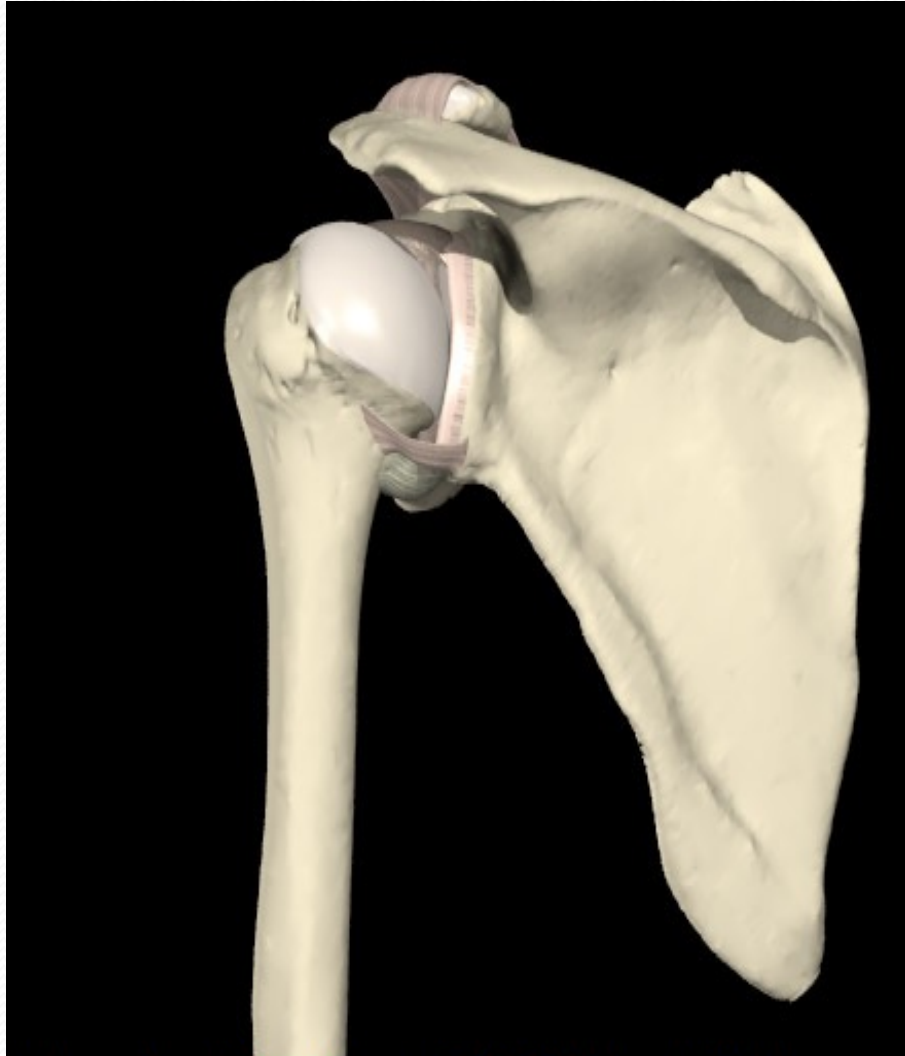


IA Shoulder and Infraspinatus Tendon

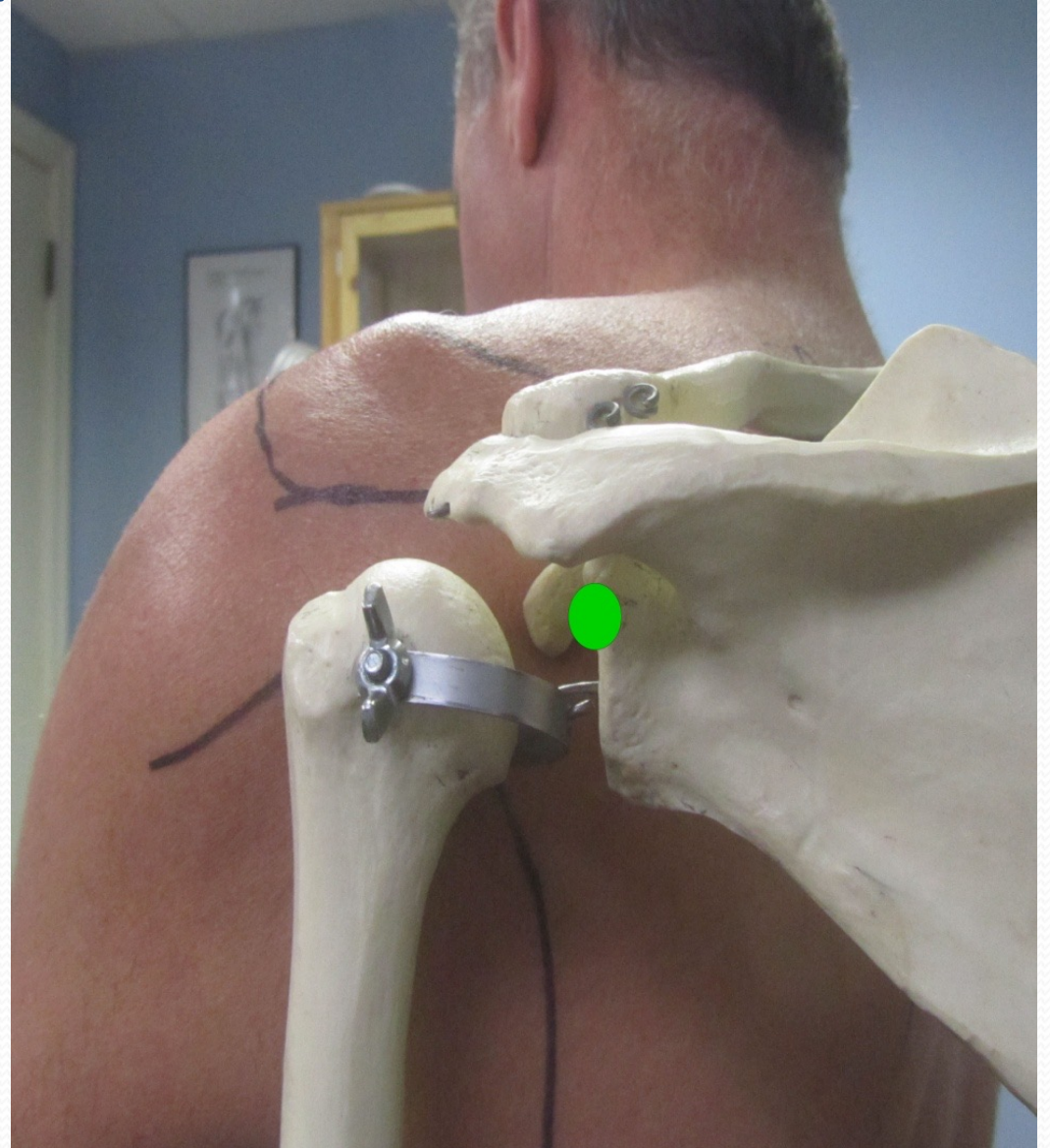
Adduction and External Rotation



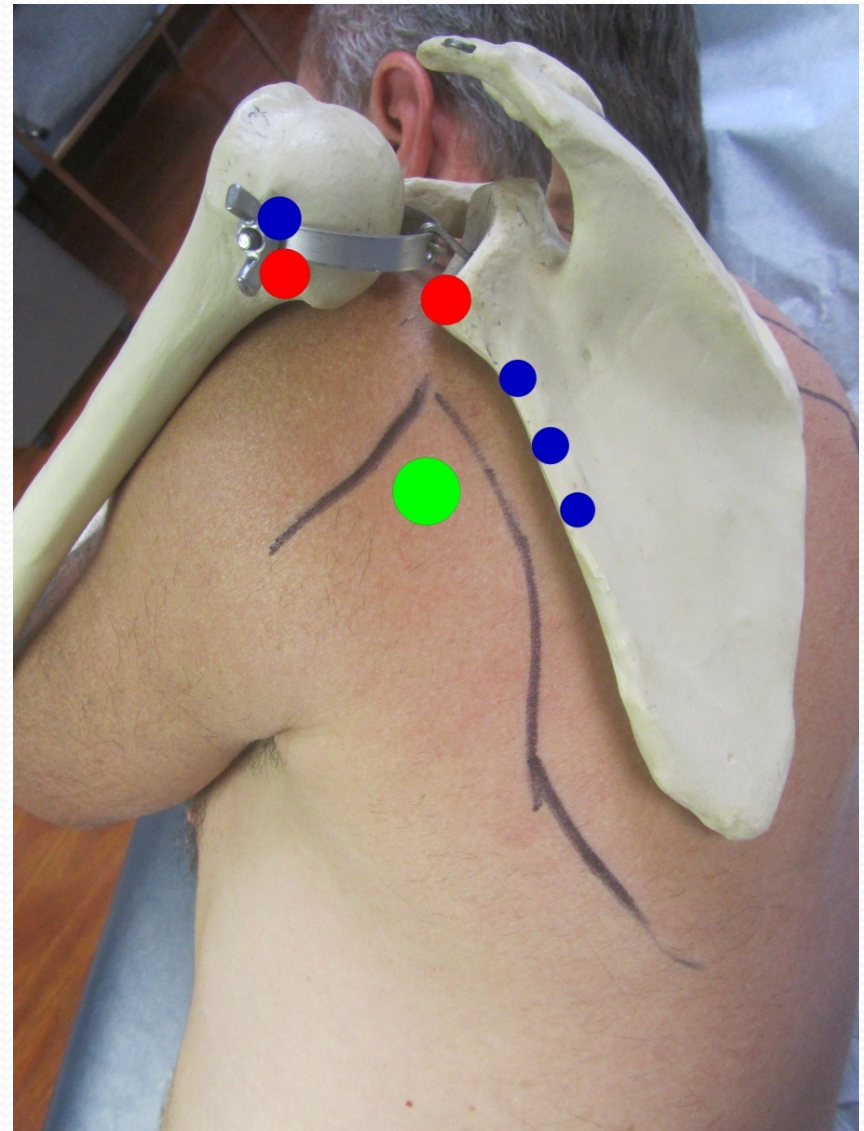
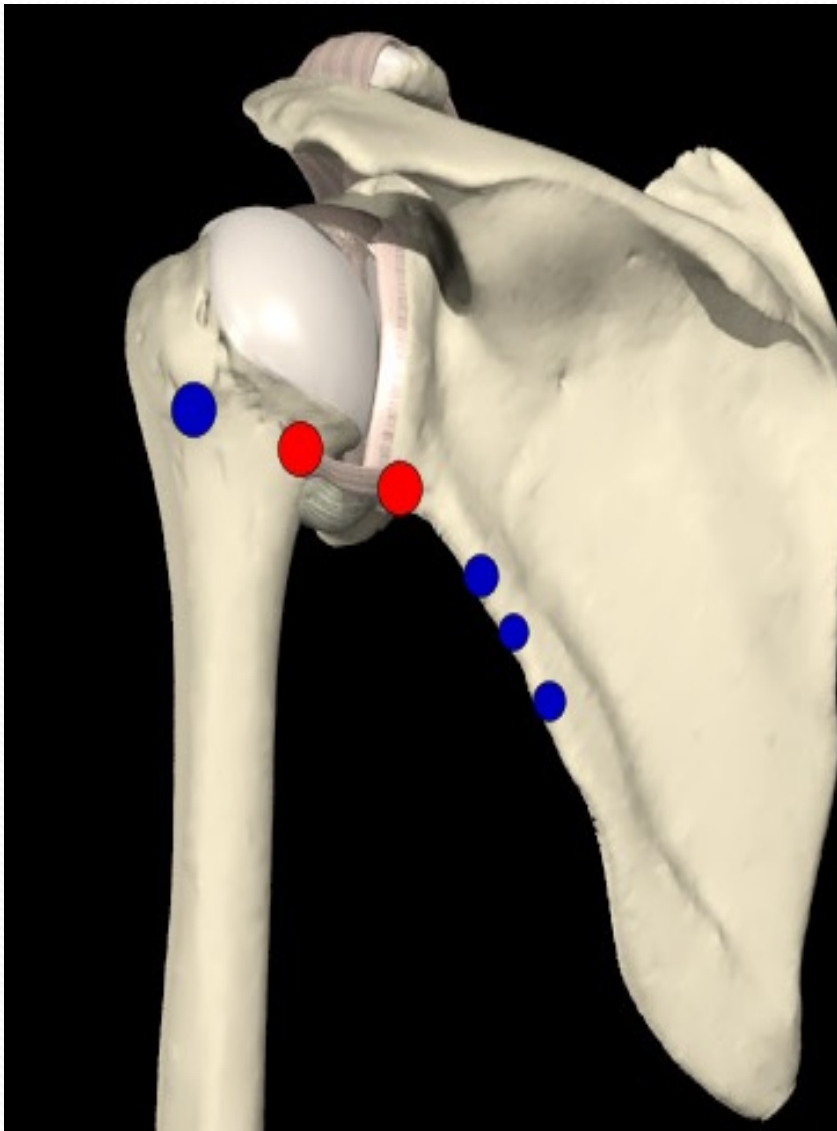
Intra-articular Shoulder Joint Injection Hand on Stomach



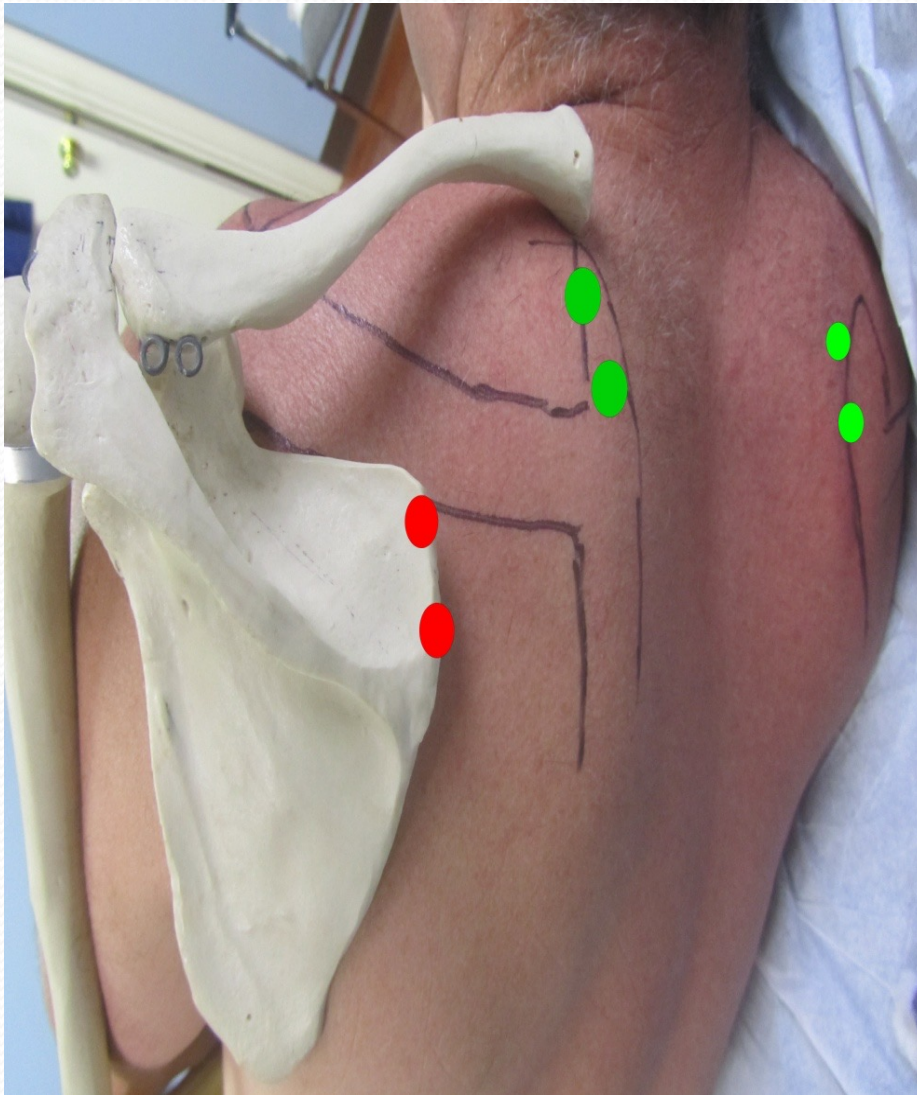
Interactive Shoulder © 2000 Primal Pictures
Ltd.



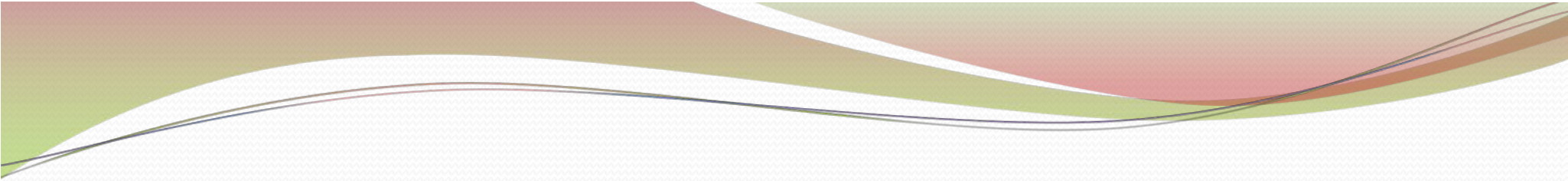
Inferior Posterior Glenohumeral Ligament and Teres Minor Origin



Levator Scapulae Injection



- The objective is to lift the medial border of the scapula from the chest wall. There are many ways of trying to do this. Extreme adduction of the shoulder, hand behind the back, and lying on the ipsilateral side are the most common and usually effective.

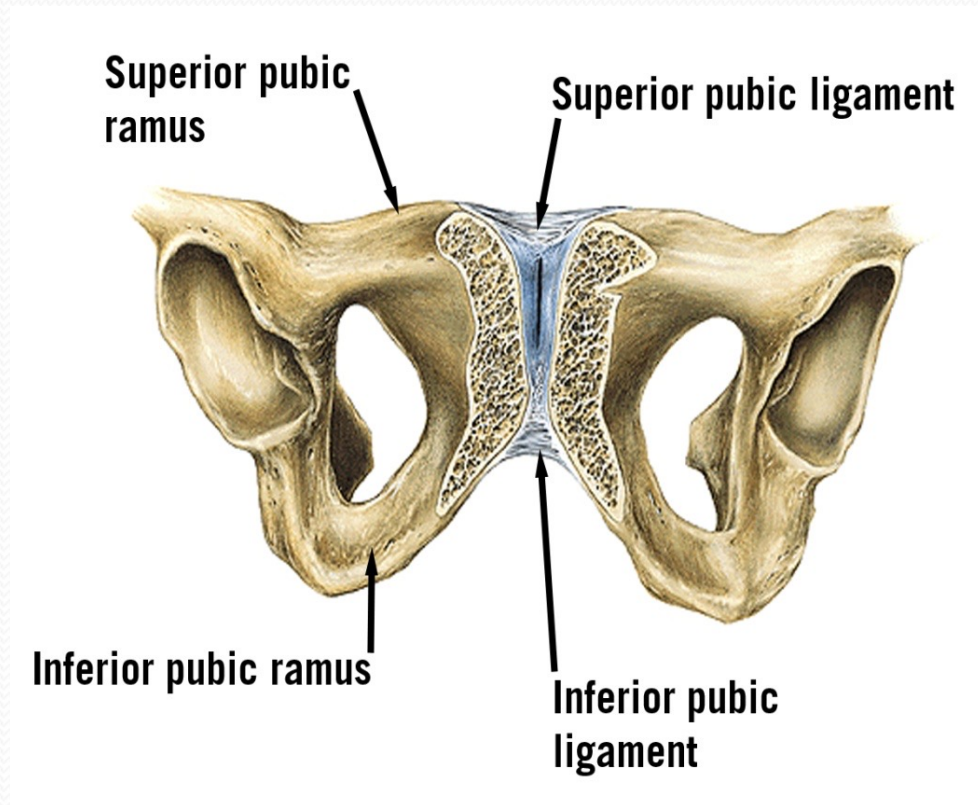


HIP and PELVIS

Injection Targets

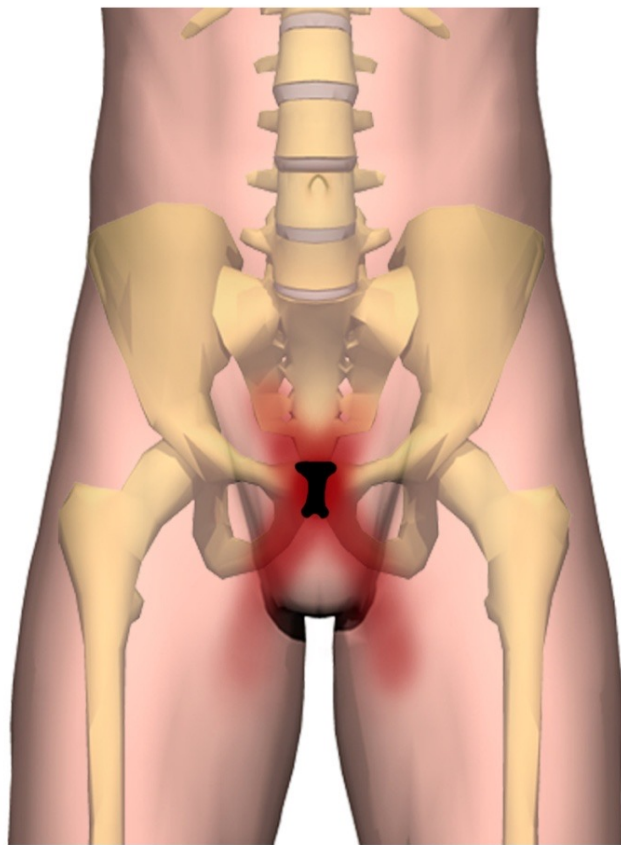
- ASIS
 - Inguinal ligament
 - AIIS
 - Adductor tubercle/pubis
- Pubic Ramus
- Greater Trochanter
 - Gluteus Medius, Minimus
 - Piriformis
 - Superior Gemellus
 - Obturator Internus
 - Inferior Gemellus
 - Quadratus Femoris
- Intra-articular
 - Lateral approach
 - Anterior approach
- Ilio-tibial band
- Iliac attachments-Gluteal Muscles- max, med,min

Pubic Symphysis Pain



- Pregnancy
- Accidents
 - Automobile—foot on brake
 - Falls
 - Crush injuries
- Chronic
 - Climbing-ladders and stairs

Pubic Symphysis Diagnosis and Referred Pain



● = Ligament

● = Referred pain

- Pain to palpation
 - Over symphysis
- Unlevel pubic rami
- Severe instability creates tendinosis
 - Rectus abdominis
 - Pectineus and adductor longus

Clinical Conditions of Hip and Pelvis

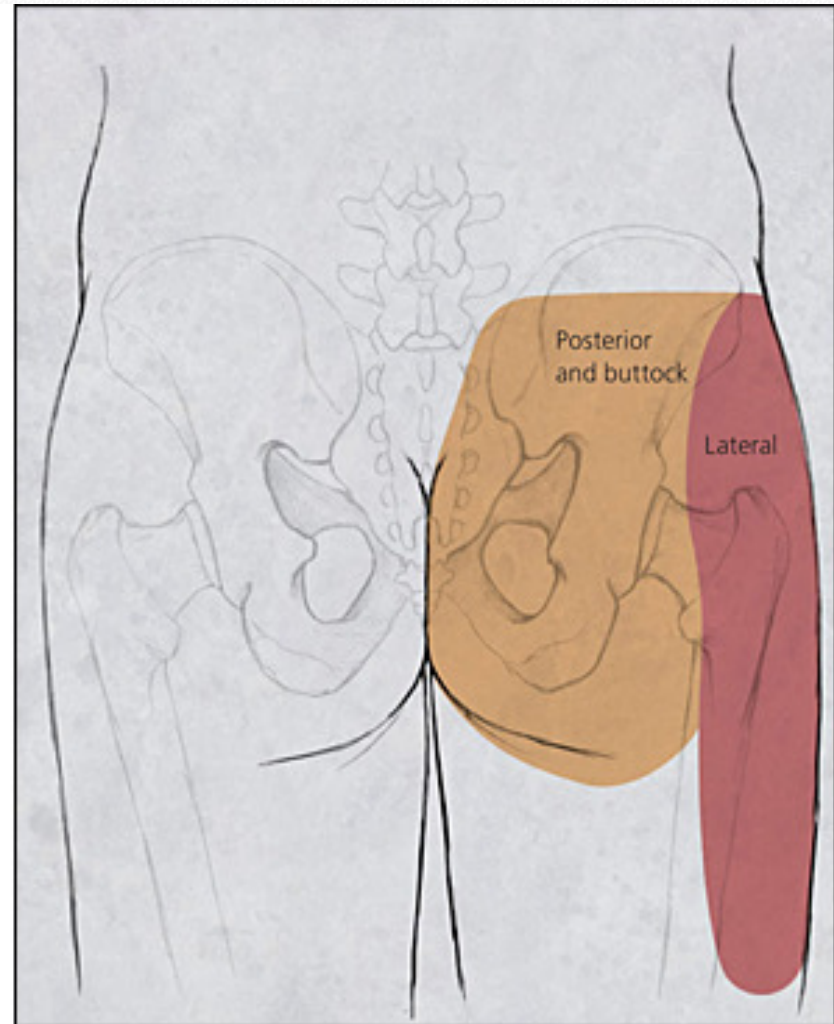
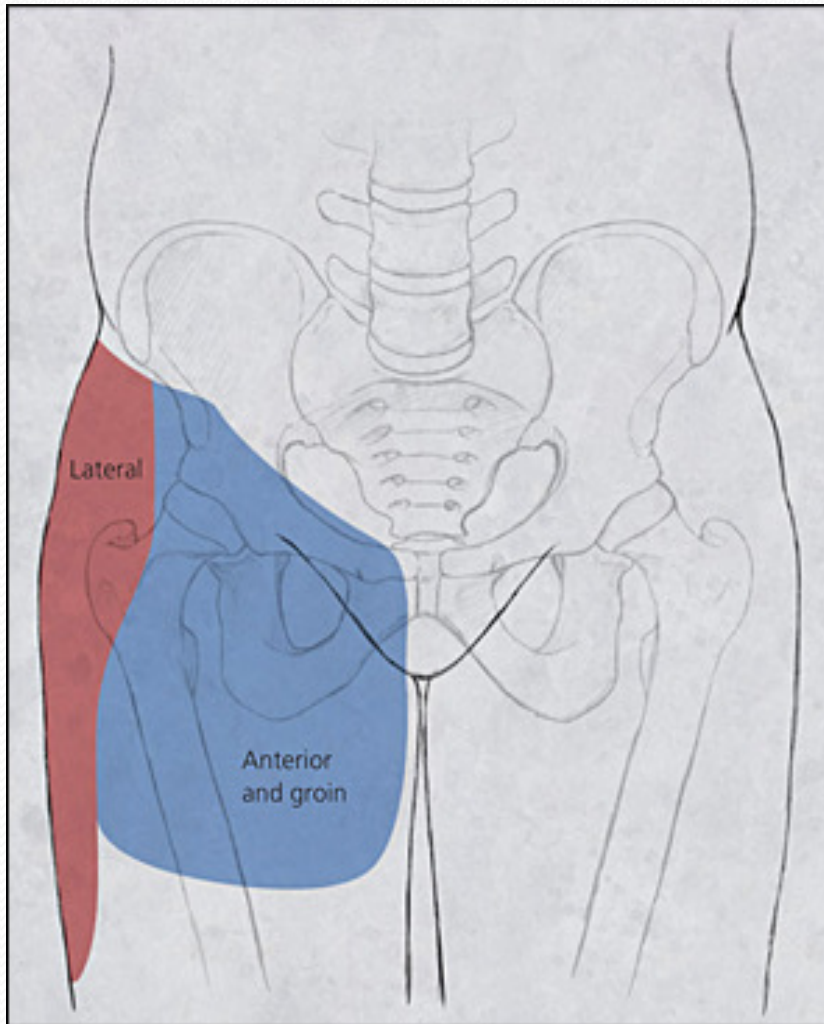
- Osteoarthritis
- Sports Hernias
- Labral tears of hip
- Trochanteric Bursitis
- Iliopsoas bursitis
- Tendinosis
- Structure and Function relationships-"low back pain" complaints

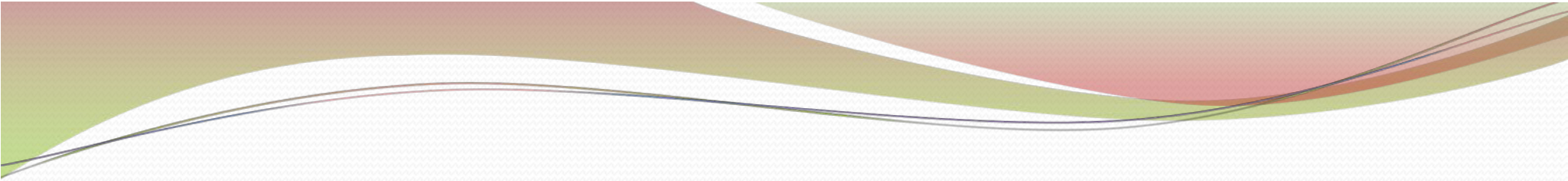
Hip and pelvis physical examination

- Hip Anatomy Animated Tutorial
<https://www.youtube.com/watch?v=qlCvKEOZtpo&index=9&list=PLdFi-NEDUoHcJLwxK7Jn4kbvx-BUEDwPb>
- Joint-by-Joint Musculoskeletal Physical Exam: Hip
<https://www.youtube.com/watch?v=824IRDG9o7c>
- [Physical Examination of the Hip and Pelvis - Springer](#)
 - www.springer.com/.../9781441957870-c1.pdf?.
- **CLINICAL EXAMINATION AND PHYSICAL ASSESSMENT OF HIP JOINT-RELATED PAIN IN ATHLETES** Int J Sports Phys Ther. 2014 Nov; 9(6): 737-755. PMCID: PMC4223284
- Acetabular Labral Tears of the Hip: Examination and Diagnostic Challenges
<http://www.jospt.org/doi/pdf/10.2519/jospt.2006.2135>
- Evaluation of the Patient with Hip Pain
<http://www.aafp.org/afp/2014/0101/p27.html>

Localization of hip pain

(A) Posterior view. (B) Anterior view.





Hip Joint/Capsule Pain Presentations

- Classically groin pain
- •Often pain about the greater trochanter
- •Sometimes posterior gluteal pain below the piriformis
- •Rarely ischial tuberosity pain
- •Presents as medial knee pain in children

Diagnosis of Hip Pain

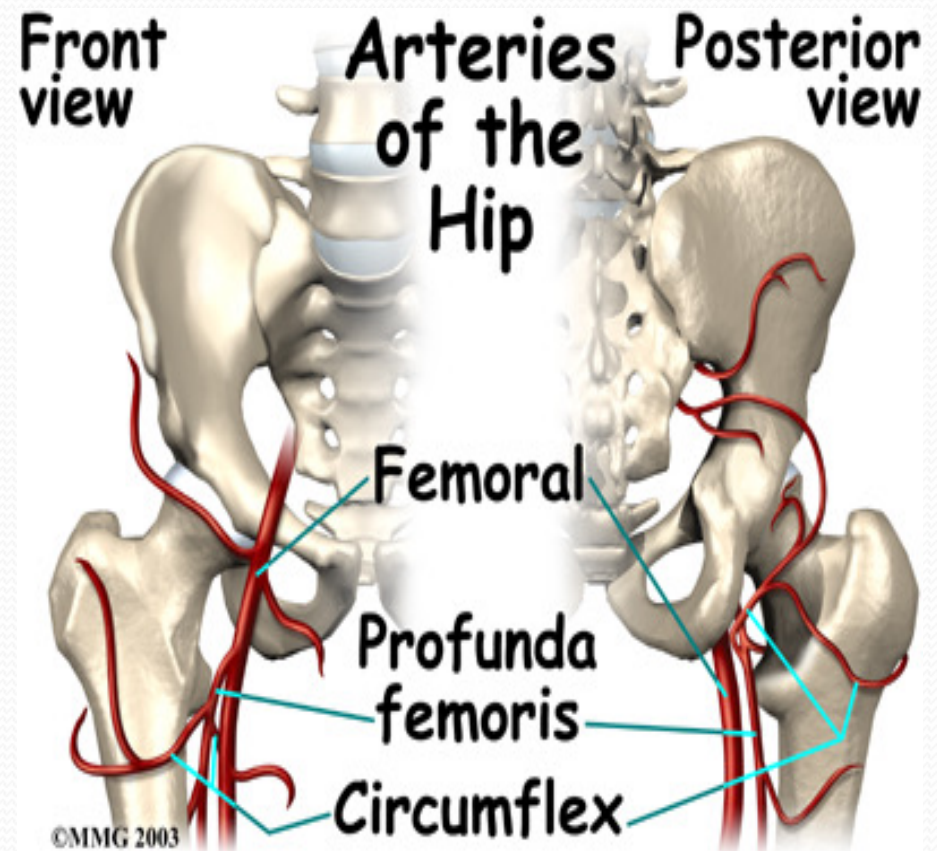
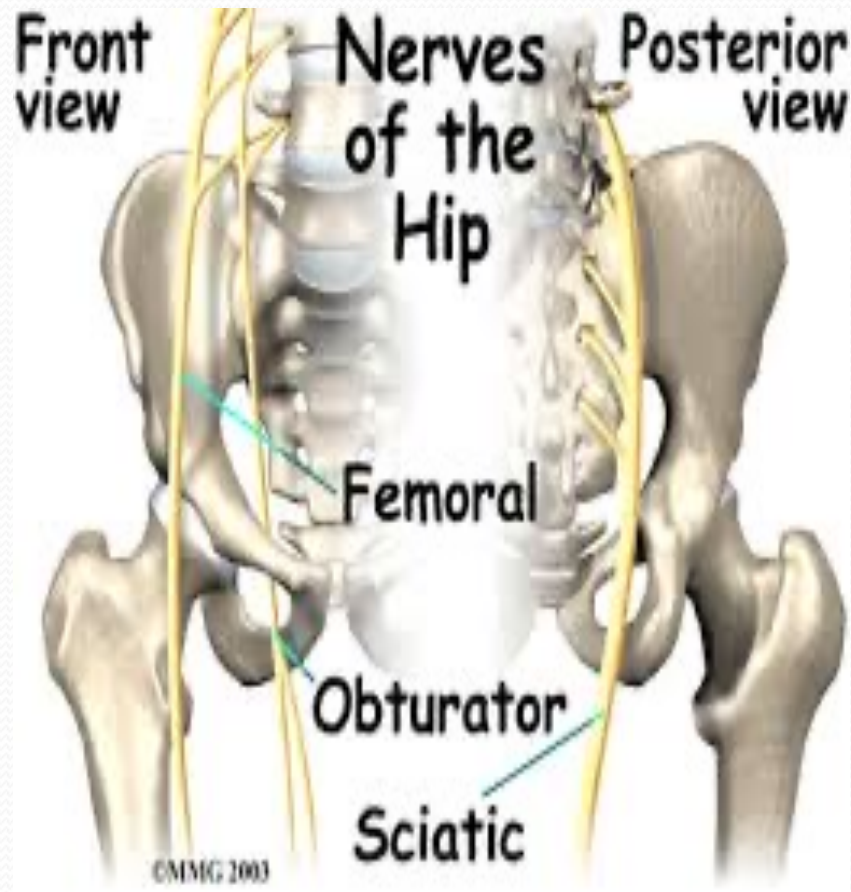
- Capsulitis
 - Reduced extension, internal rotation, adduction and faber positioning with hard end-point
- Osteoarthritis
- Femoro-acetabular impingement
- Labral tear
- Peri-trochanteric pain syndrome
 - No longer called trochanteric bursitis!!
- Rarely exists
- Almost always tendinosis



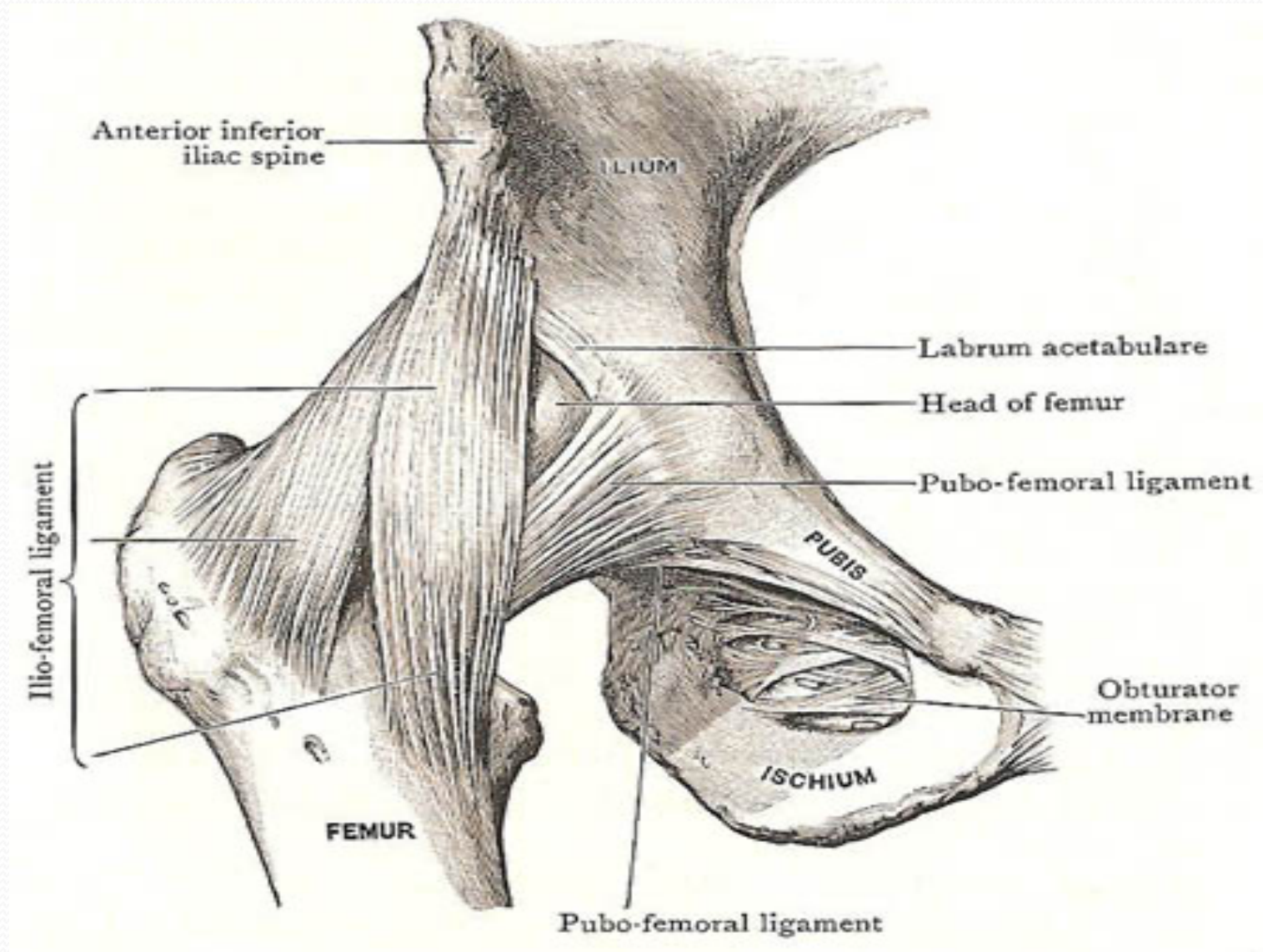
Muscles directly affecting the hip joint

- Flexor muscles of the hip
 - Psoas major, iliacus, tensor fasciae latae, rectus femoris, sartorius, pectineus
- Extensor muscles of the hip
 - Gluteus maximus, gluteus medius, ischial portion of the adductor magnus muscle
- Adductor muscles of the hip
 - Adductor magnus, adductor longus, adductor brevis, pectineus, gracilis
- Abductor muscles of the hip
 - Gluteus medius, gluteus minimus
- Medial rotator muscles of the hip
 - Gluteus minimus, anterior fibers of the gluteus medius, the tensor fasciae latae
- Lateral rotator muscles of the hip
 - Posterior fibers of the gluteus medius, piriformis, obturator internus and externus, gemelli superior and inferior, quadratus femoris, gluteus maximus, sartorius

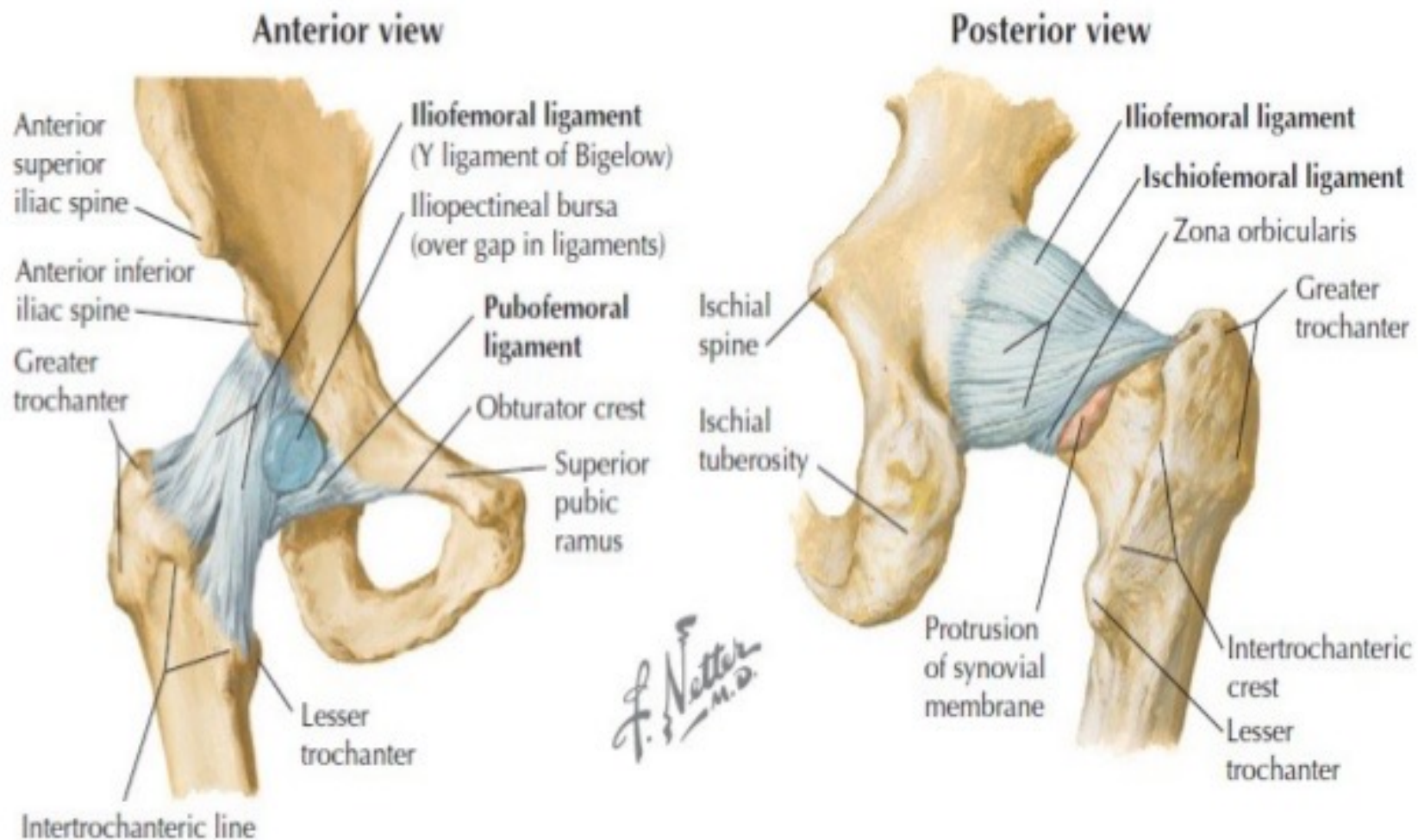
Hip/pelvis



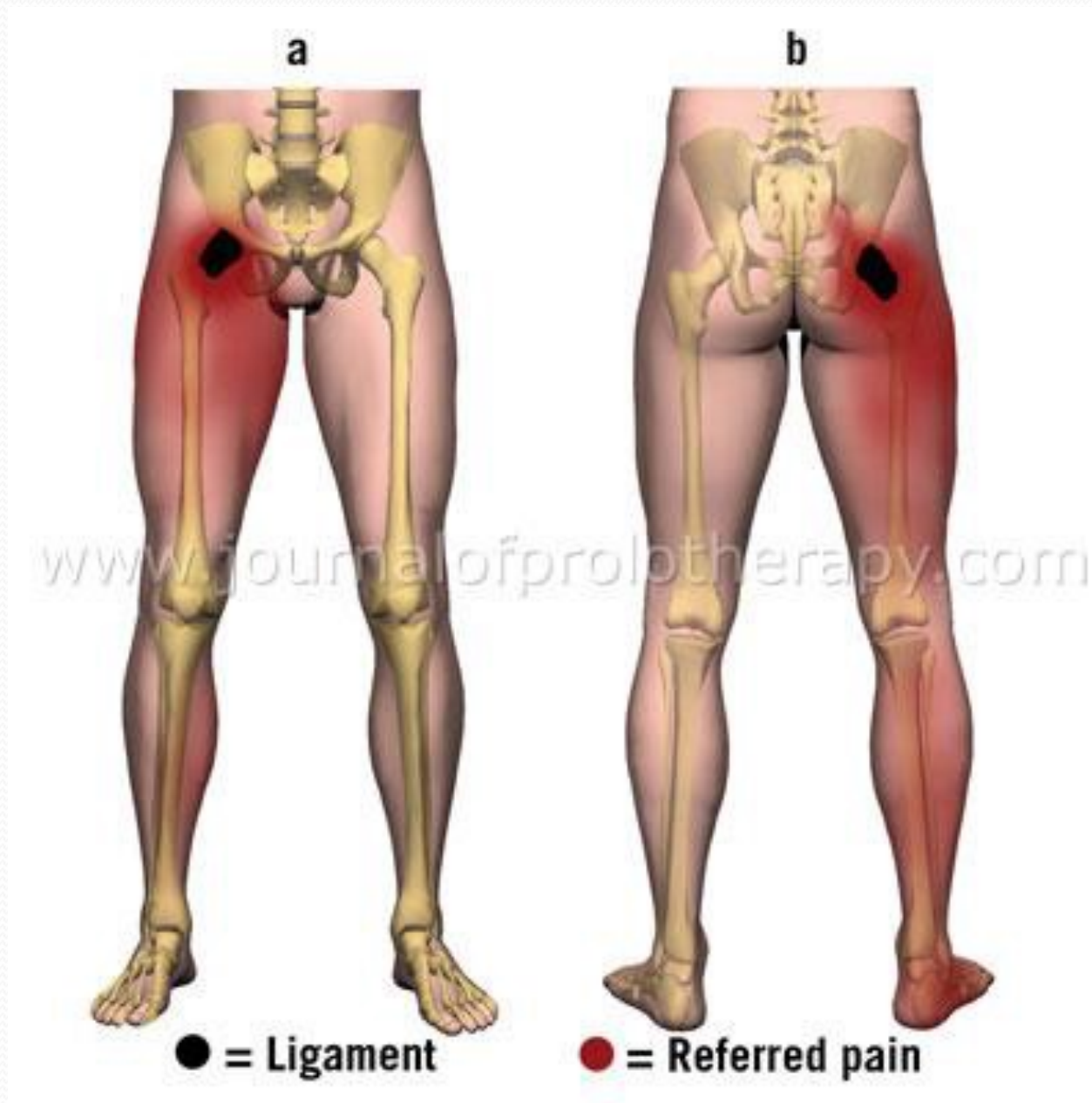
Hip Ligaments



Hip joint ligaments



Hip Ligament Referral Patterns



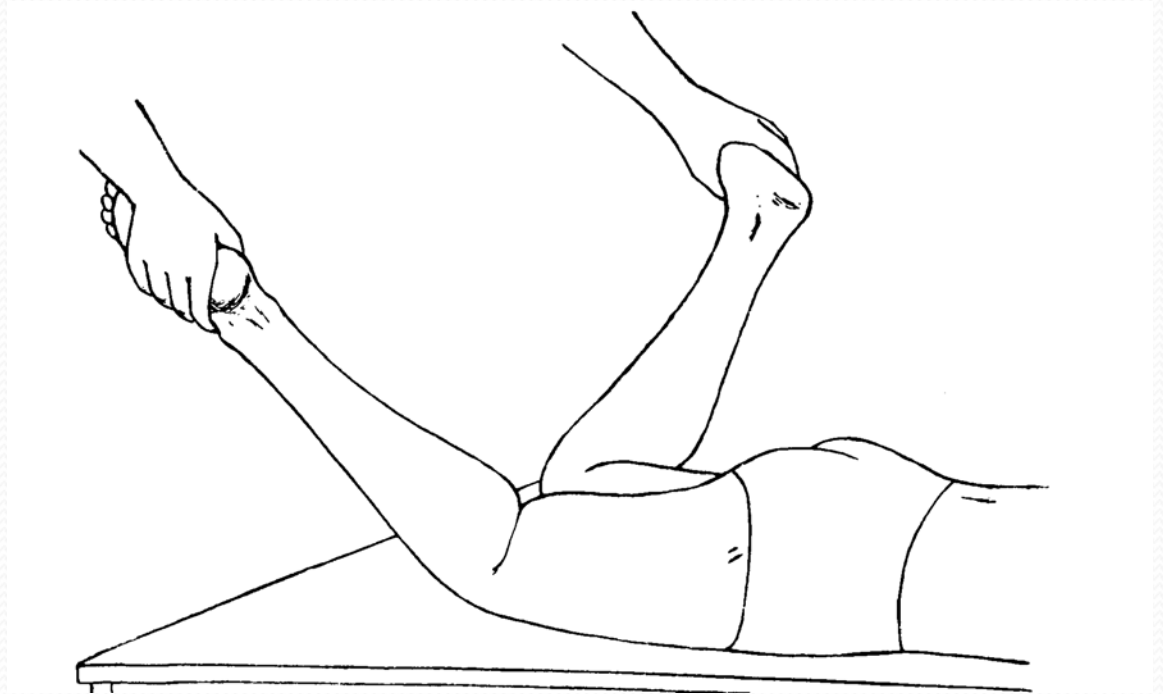
Ischiofemoral Ligament

- -Triangular (spiral) band of fibers
- -From posterior ilium / acetabular rim
- -Crosses the femoral neck
- -Merges with the joint capsule
- -Inserts on the medial surface of the greater trochanter



Ischiofemoral Stress Testing

- Passive internal rotation



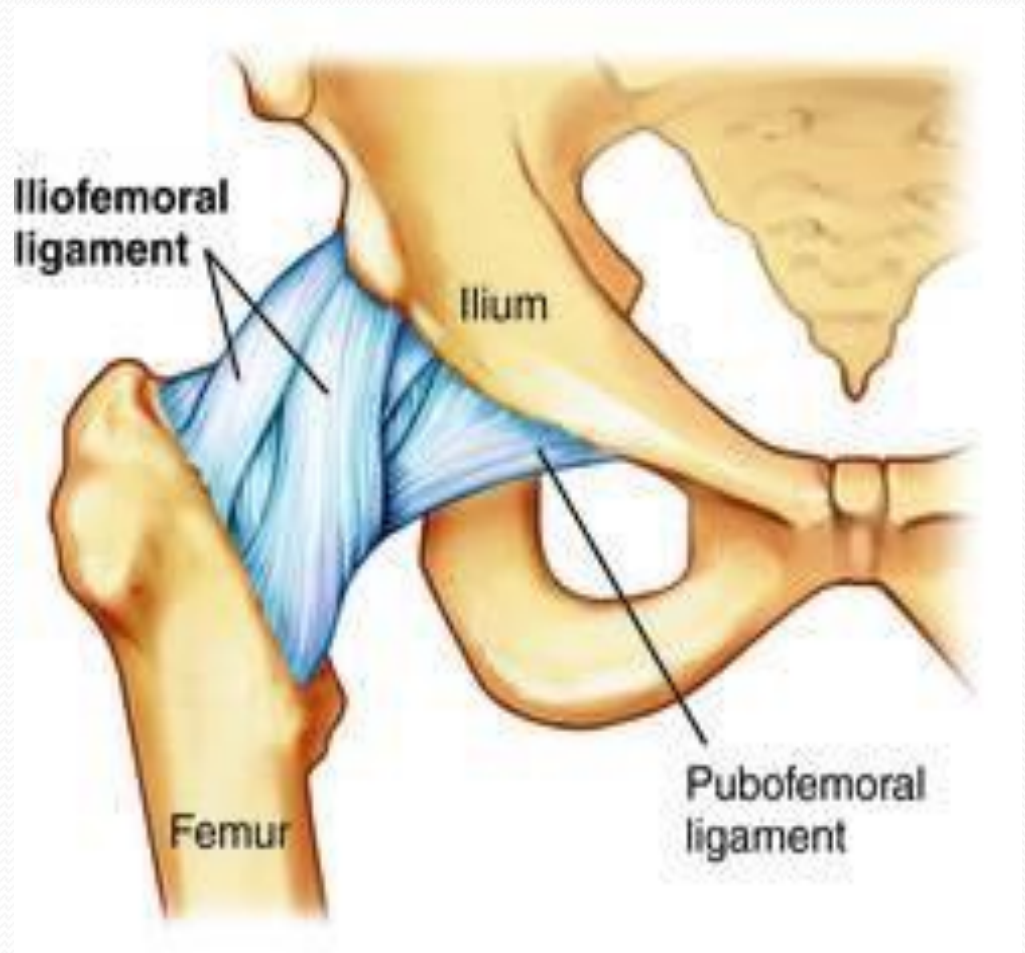
- Passive extension



Pubofemoral Ligament

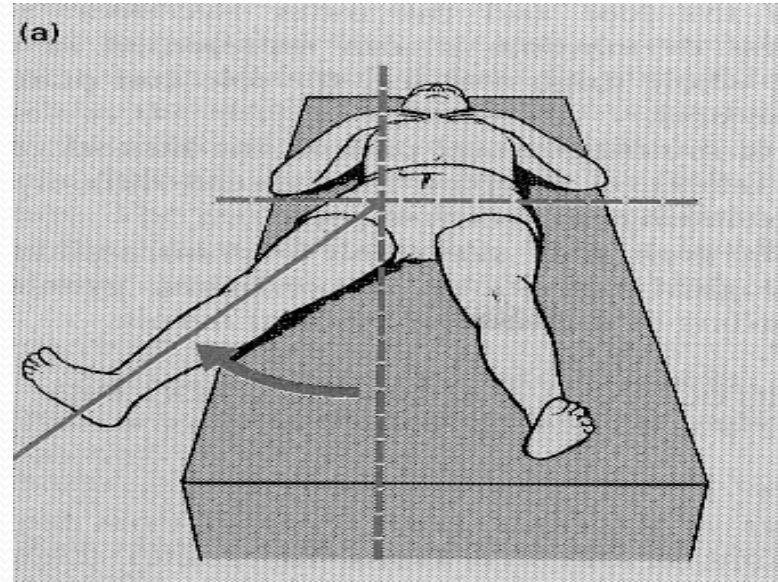
Fibers:

- From the obturator crest and superior pubic rami
- Merges with the capsule and with the deep vertical portion of the iliofemoral ligament

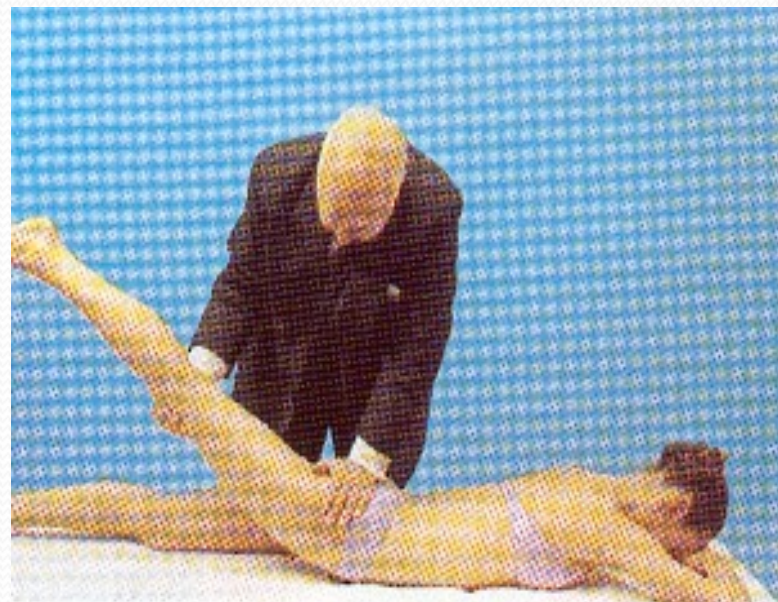


Pubofemoral Stress Testing

- Passive abduction



- Passive extension



Iliofemoral Ligament

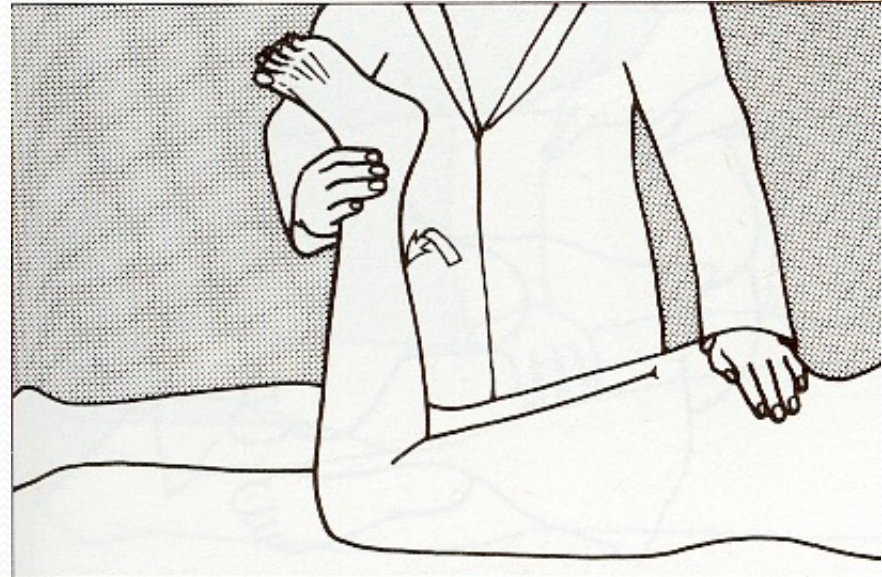
Strongest ligament in the body

- Fibers run from inferior aspect of AIIS and acetabulum
 - Divide into 2 bands
 - Transverse band runs parallel to the axis of the femoral neck, inserting into the proximal intertrochanteric line
 - Descending portion is parallel to the femoral shaft and inserts into the distal intertrochanteric line
 - Resists hyperextension
- Primary postural lig. in standing



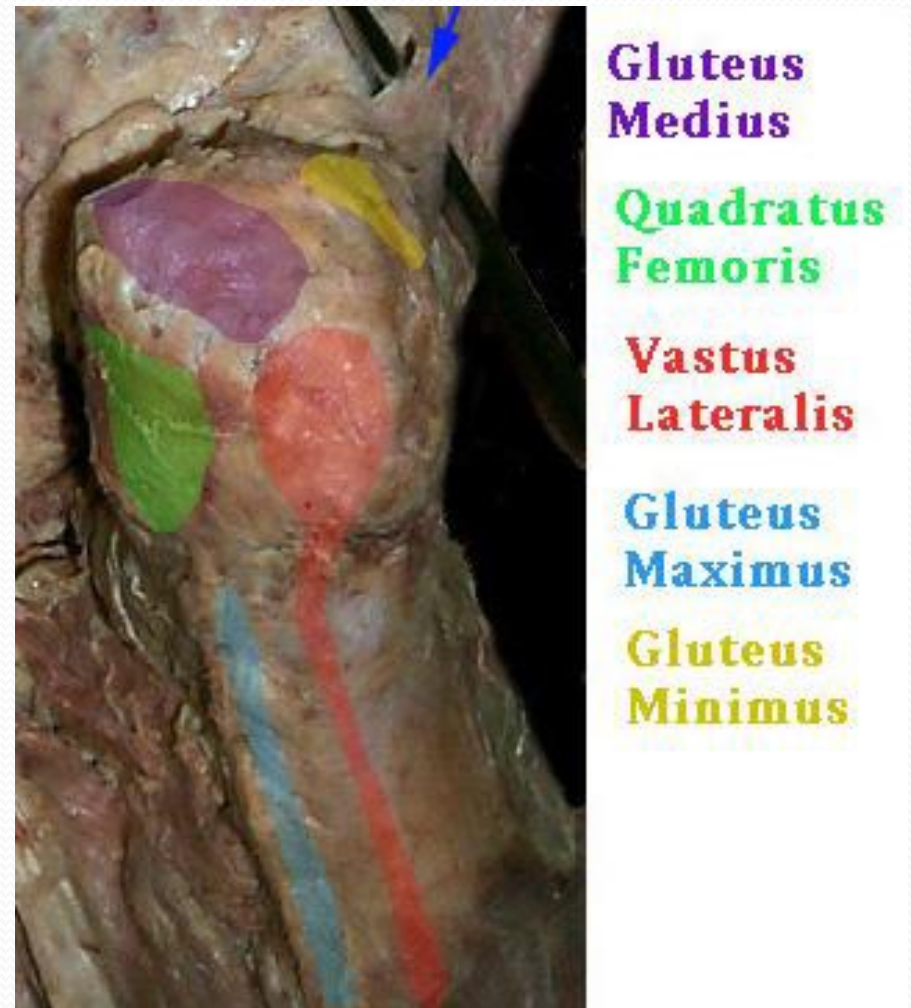
Iliofemoral Stress Testing

- Passive prone hip extension
- Passive external rotation



Lateral Tendons of GT

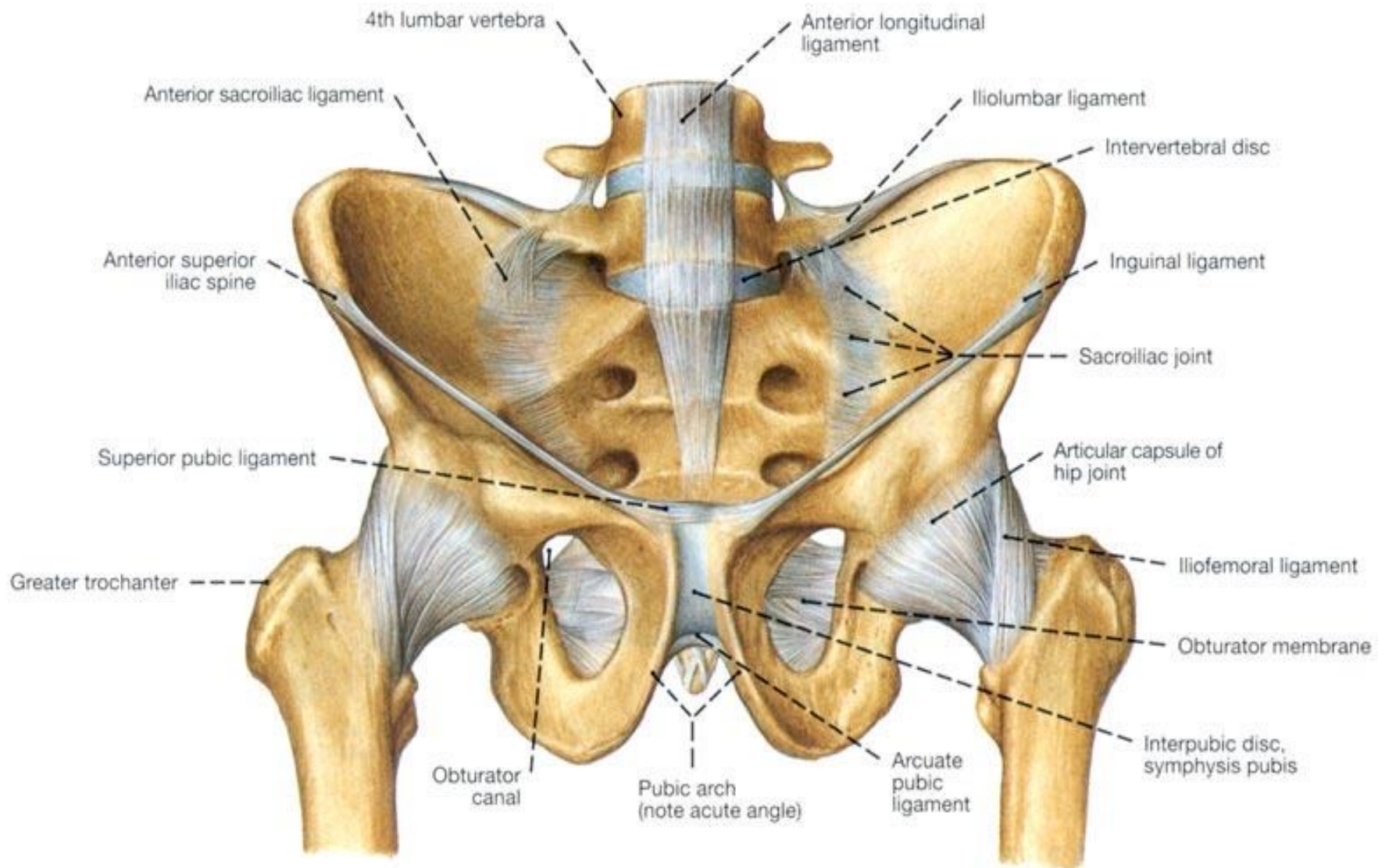
- [?]Gluteus medius, minimus and (maximus) insertion into the greater trochanter
- [?]Note the maximus also inserts into the posterolateral intermuscular septum posterior to the V. Lateralis



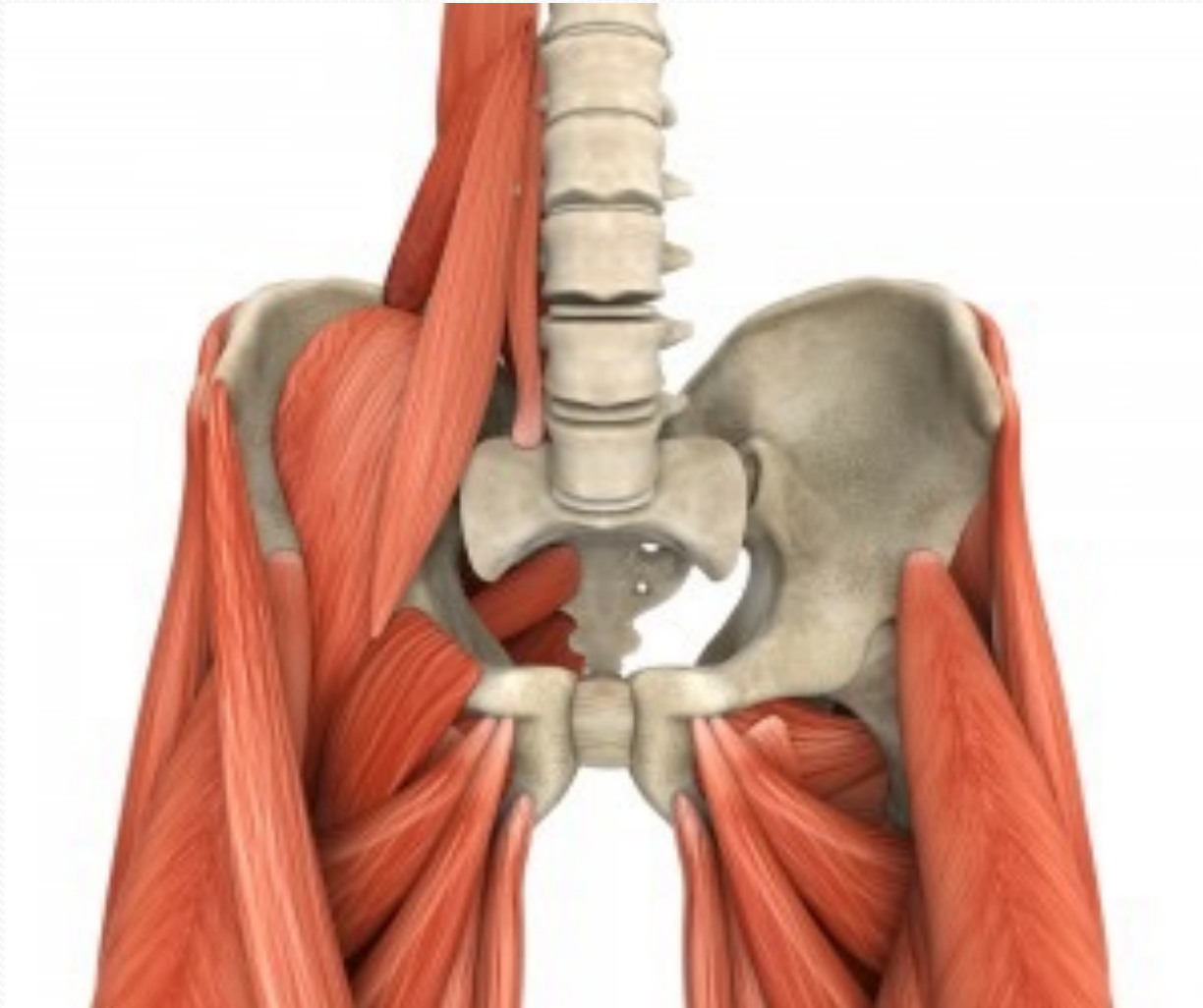
Lateral Leg



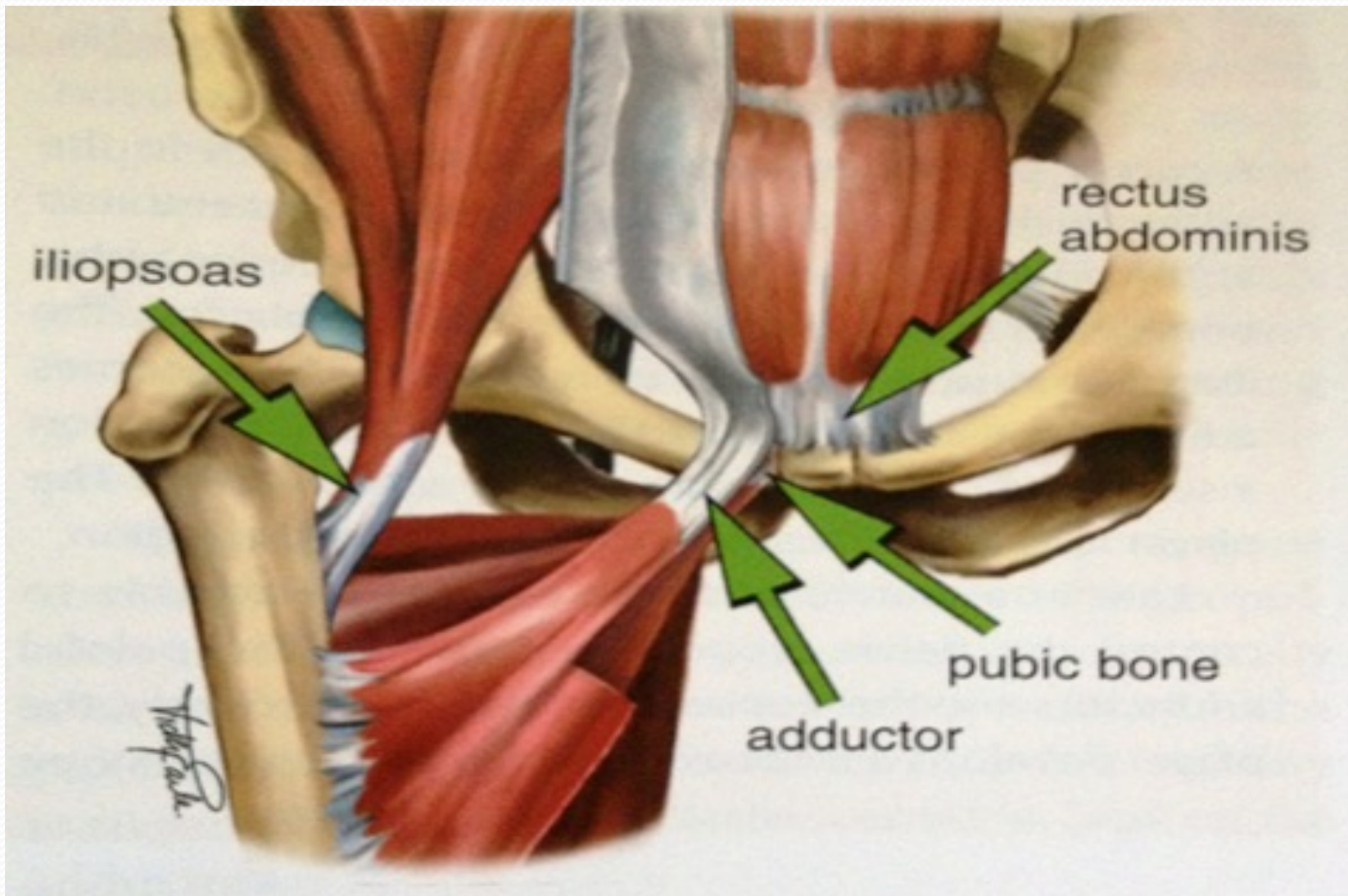
Pelvis and Ligaments, Front View, Male



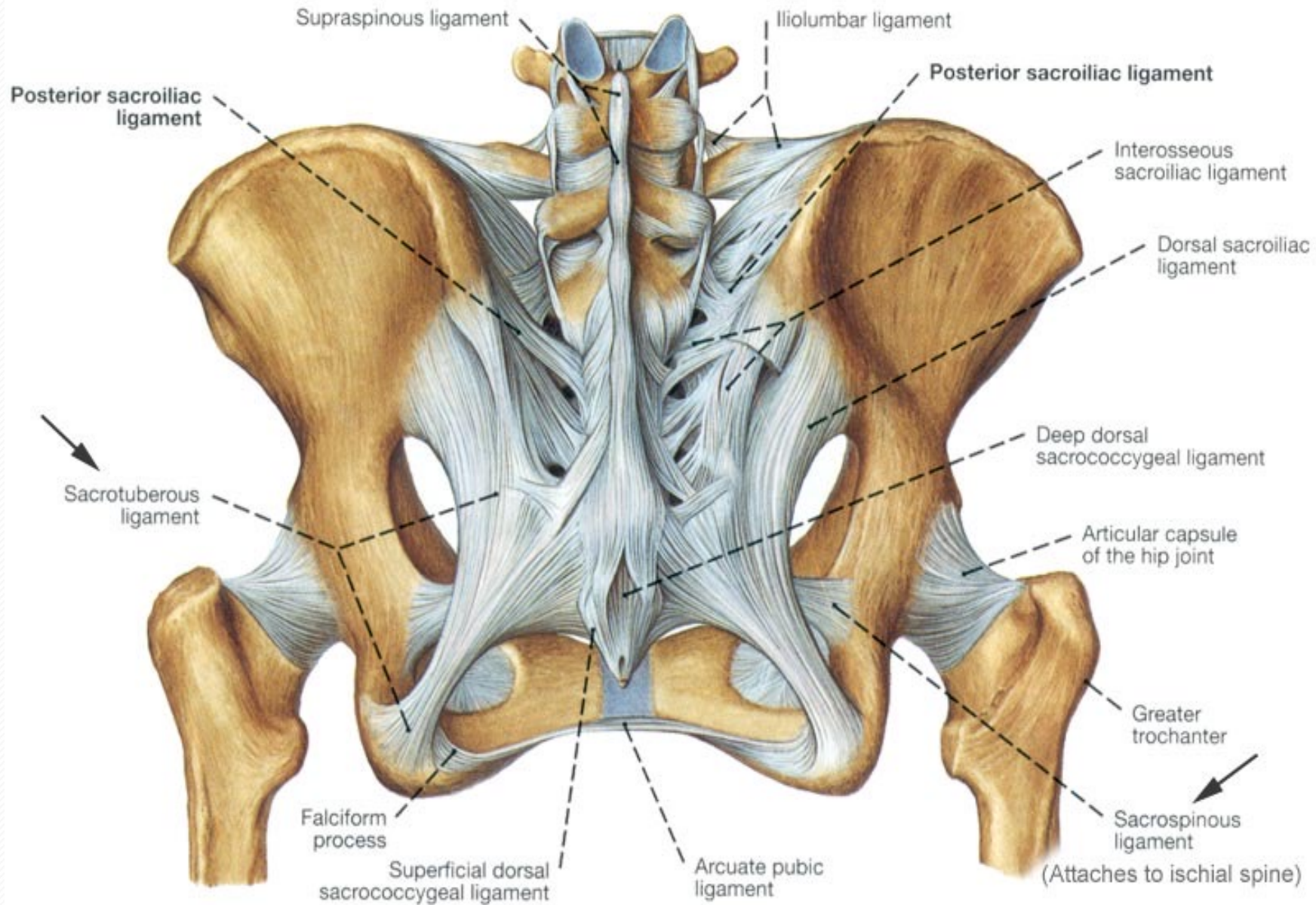
Muscular attachments-pelvis



Muscular attachments

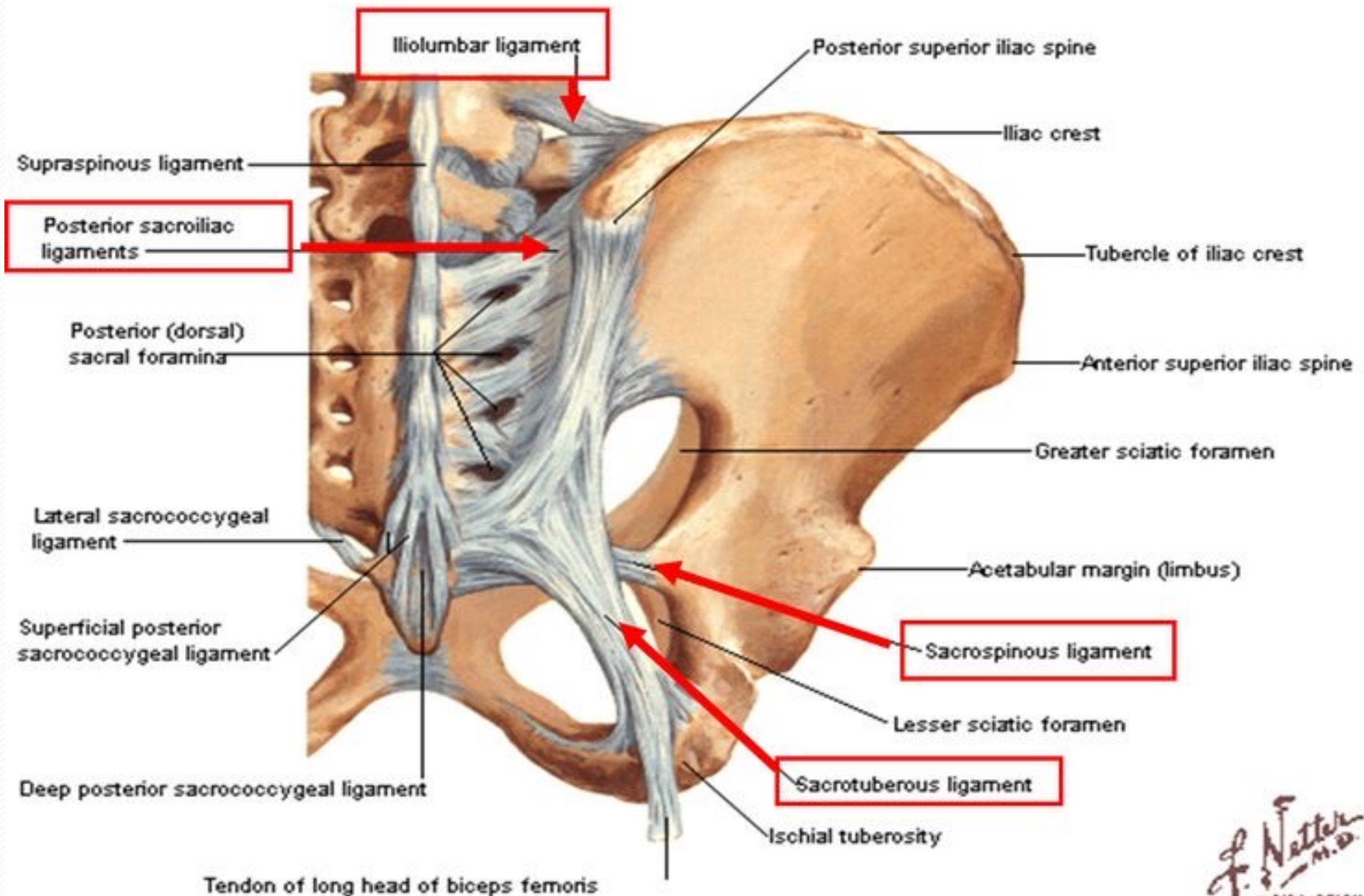


Pelvis and Ligaments, Rear View, Female

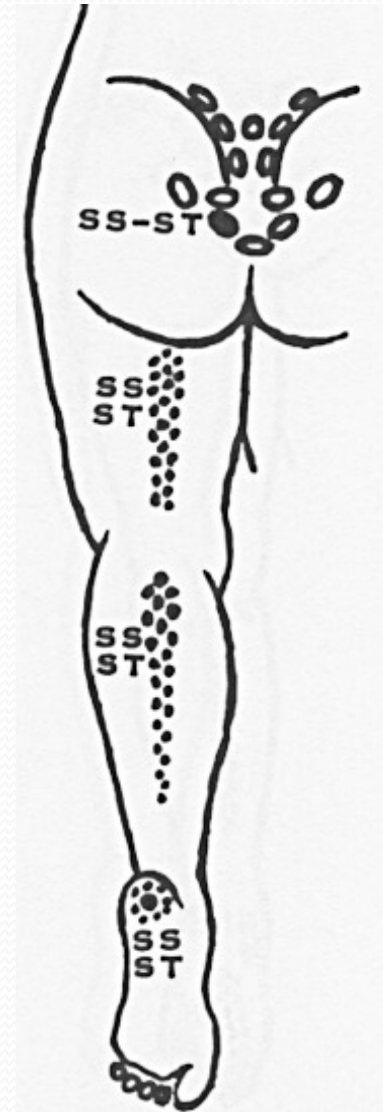
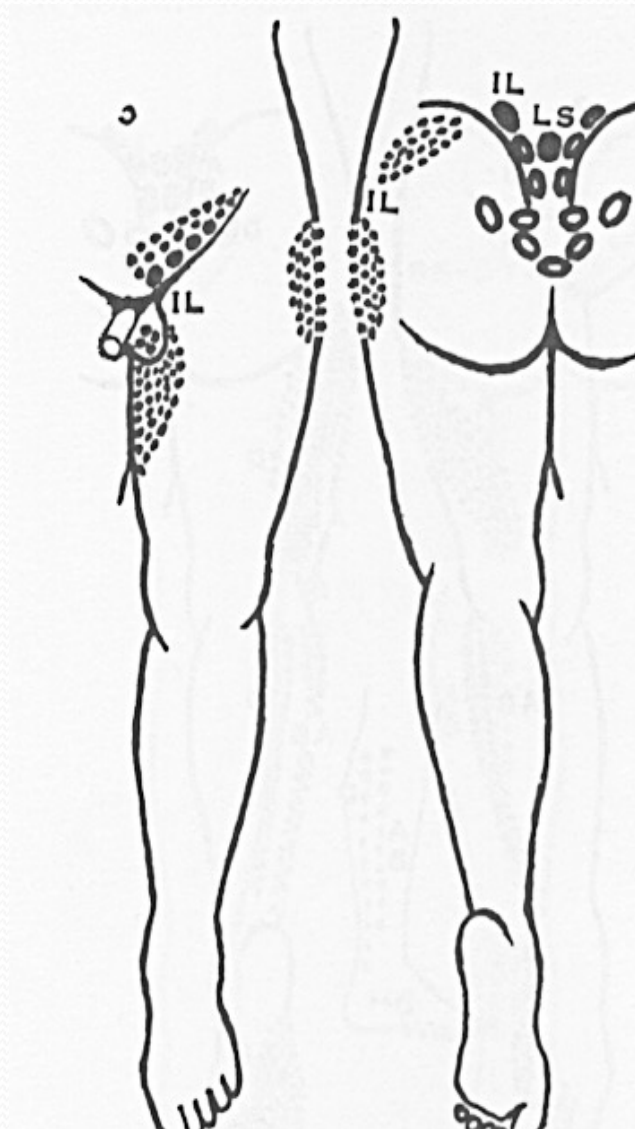


Bones and Ligaments of Pelvis

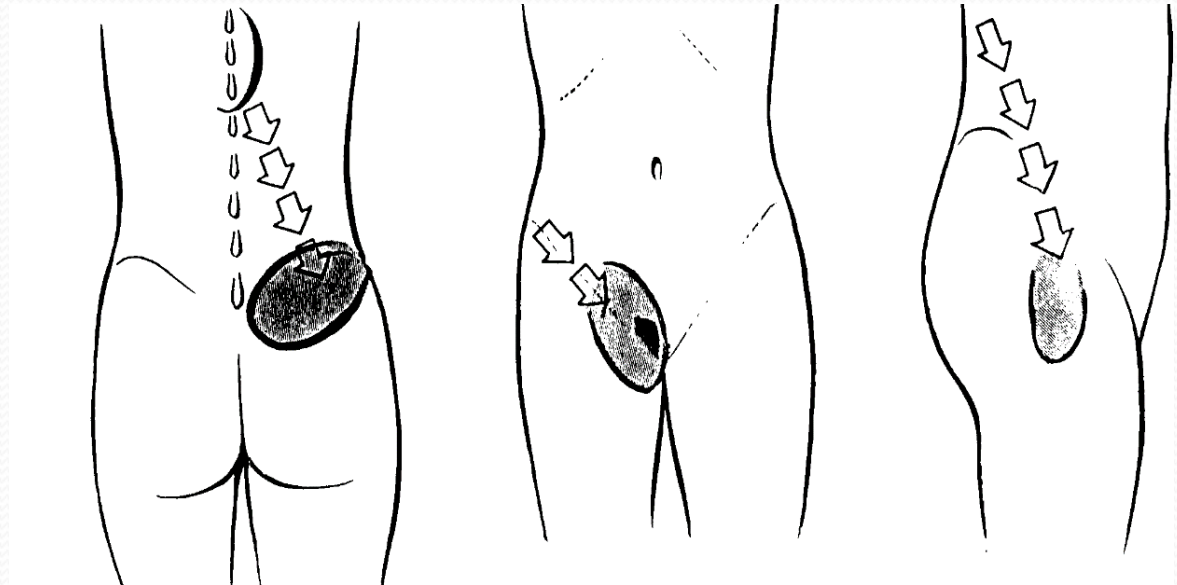
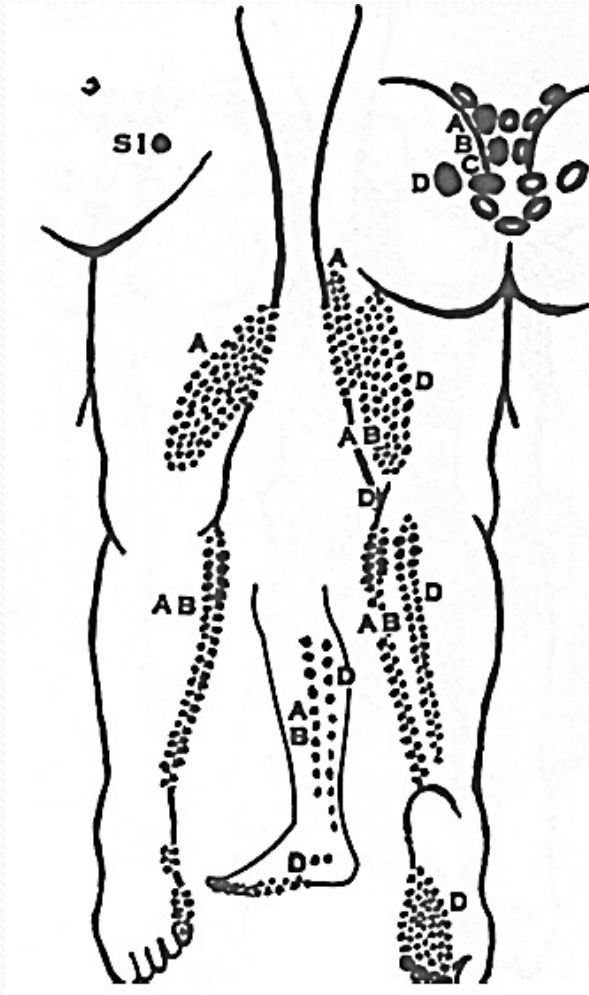
Posterior View



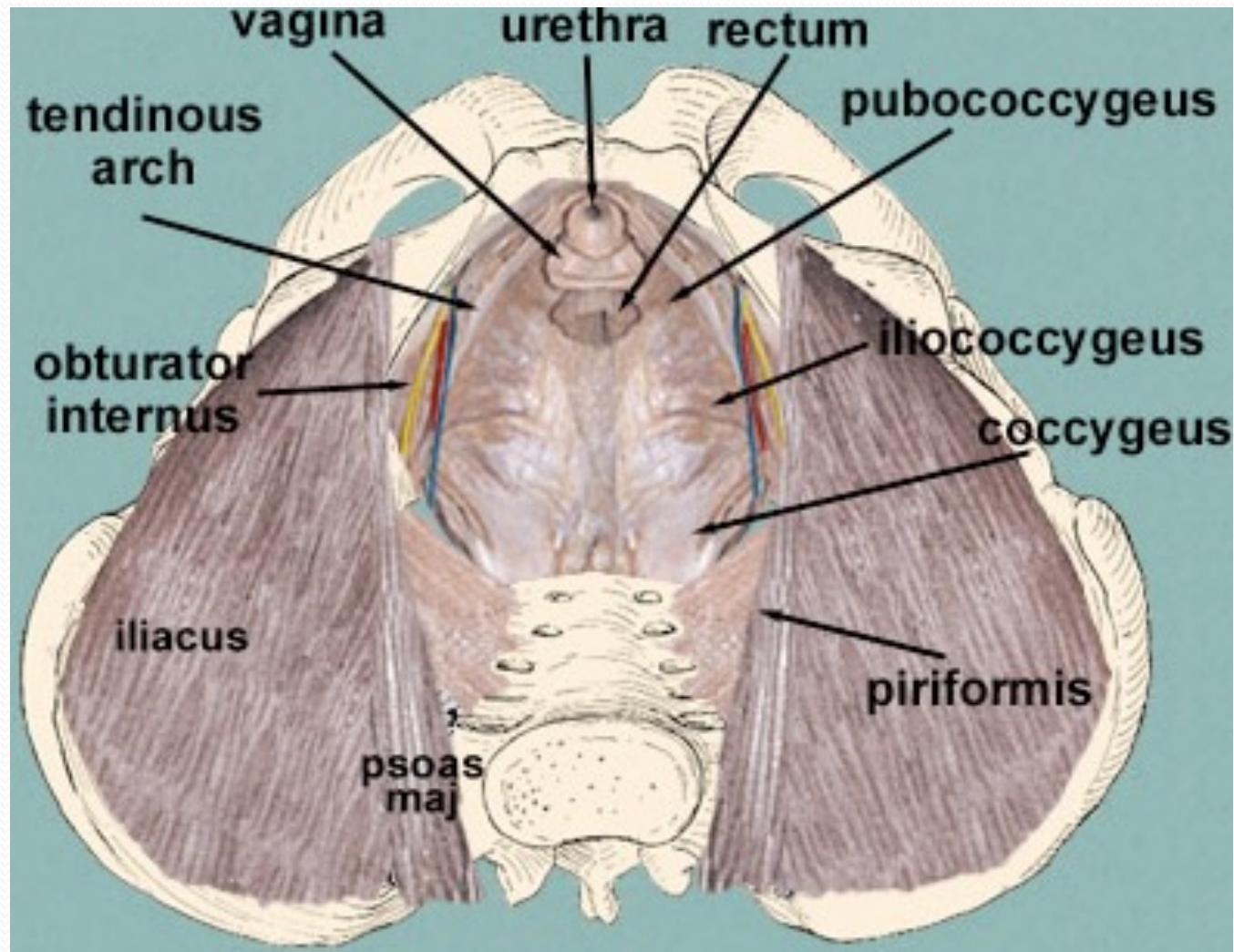
Referred pain Patterns for Iliolumbar and Sacrotuberous and Sacrospinous Ligaments



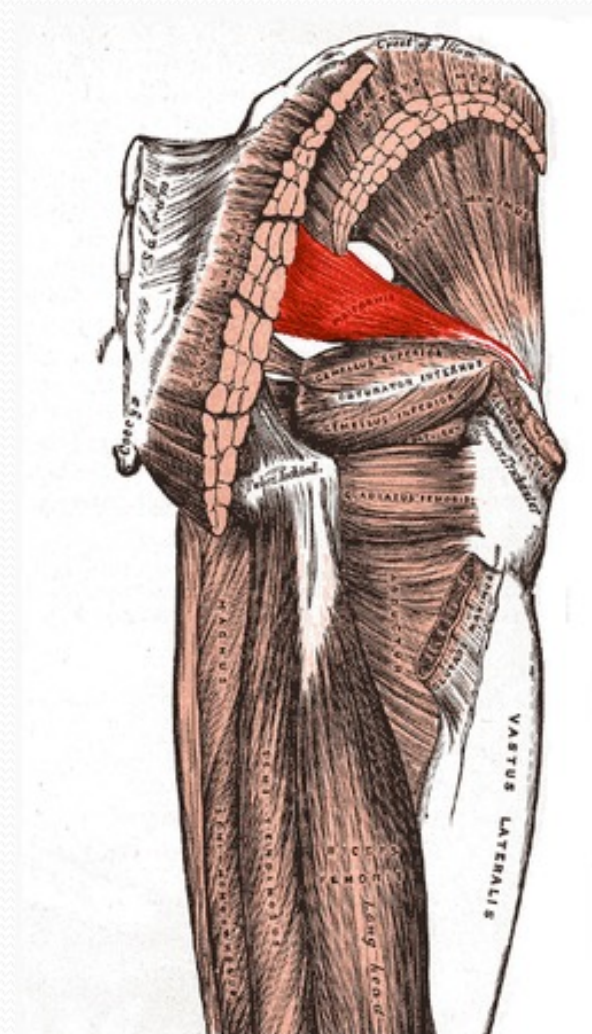
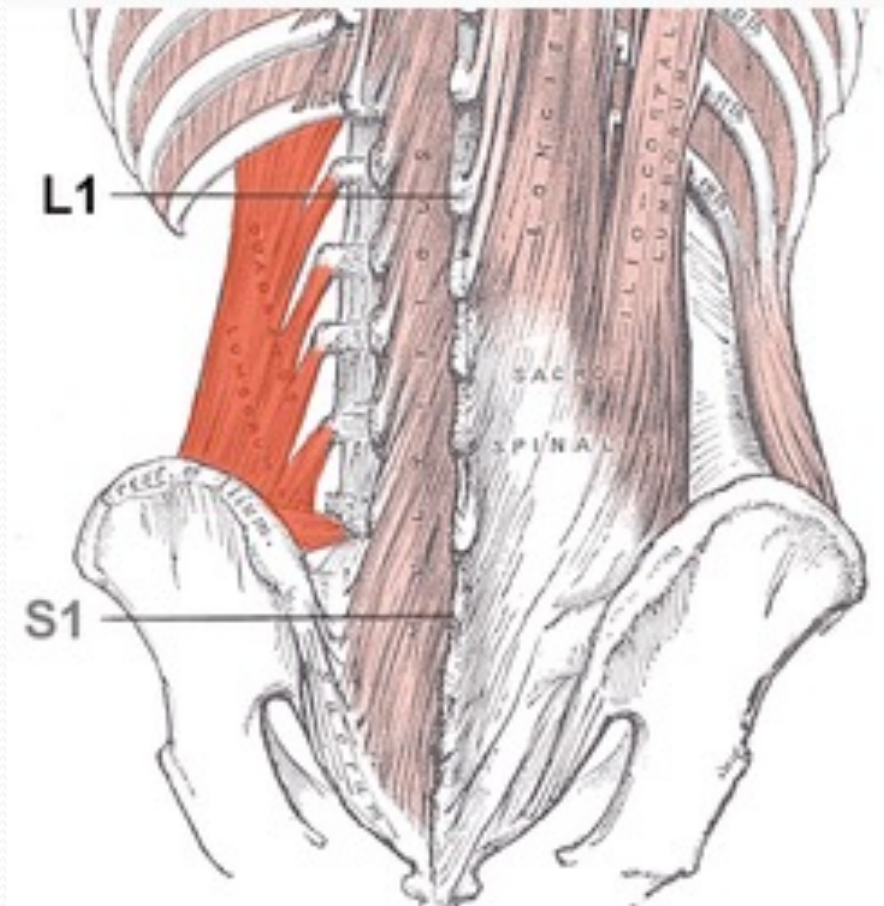
Referral patterns from SI Ligaments and from T12-L1 Transition Zone



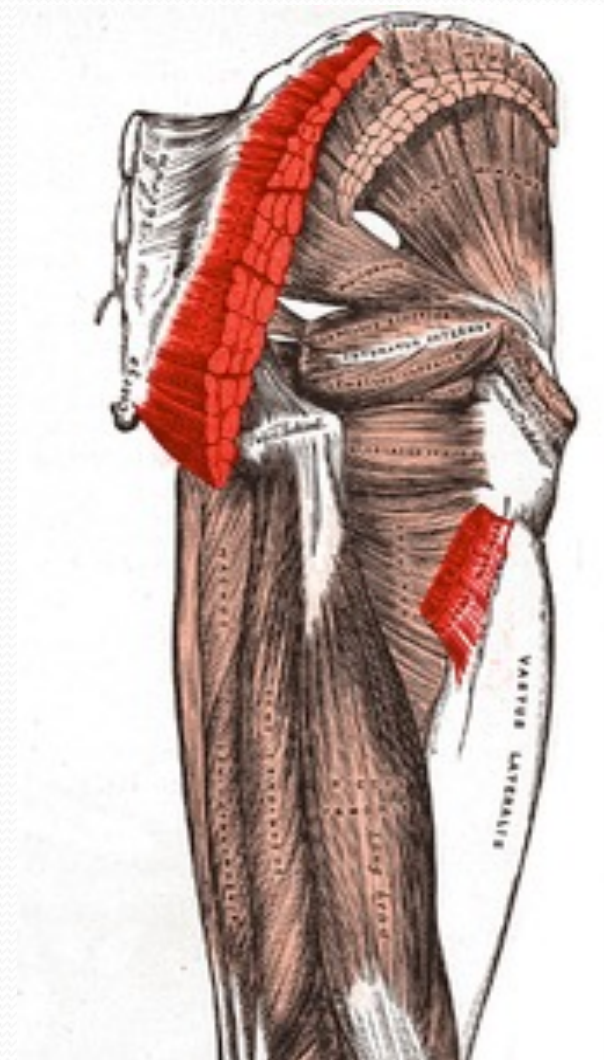
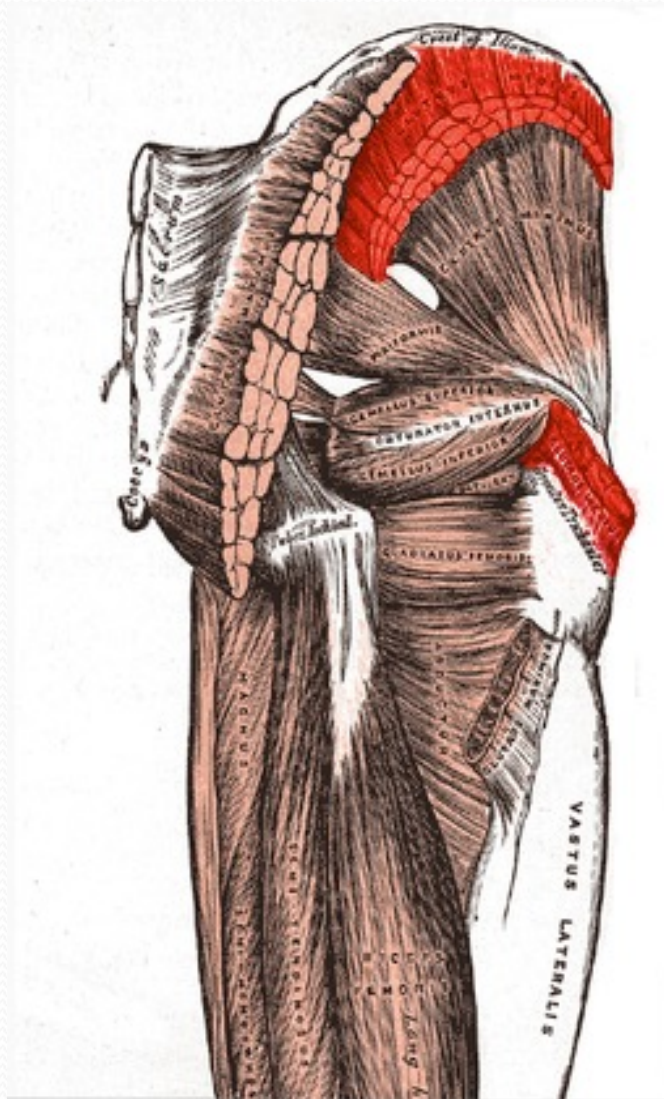
Pelvic muscles add dynamic stability



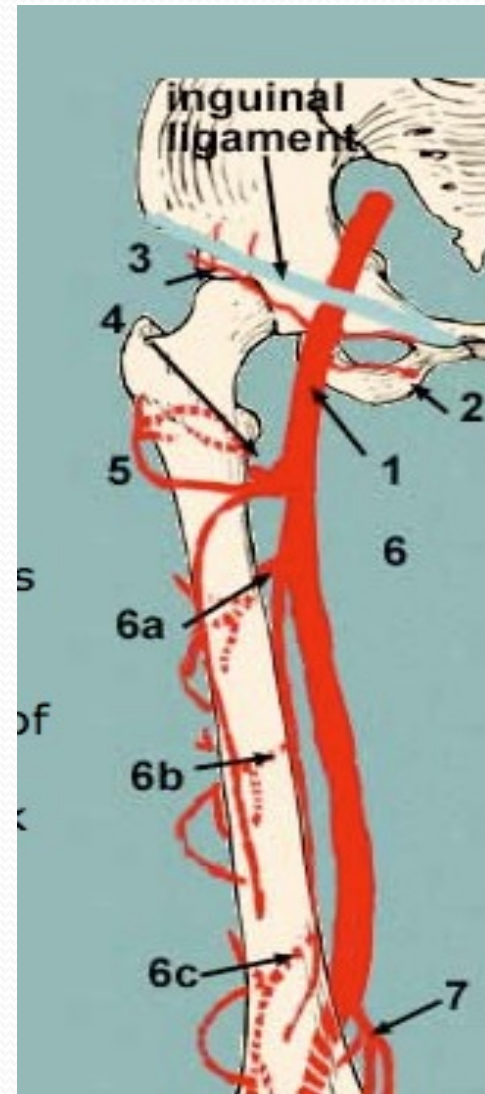
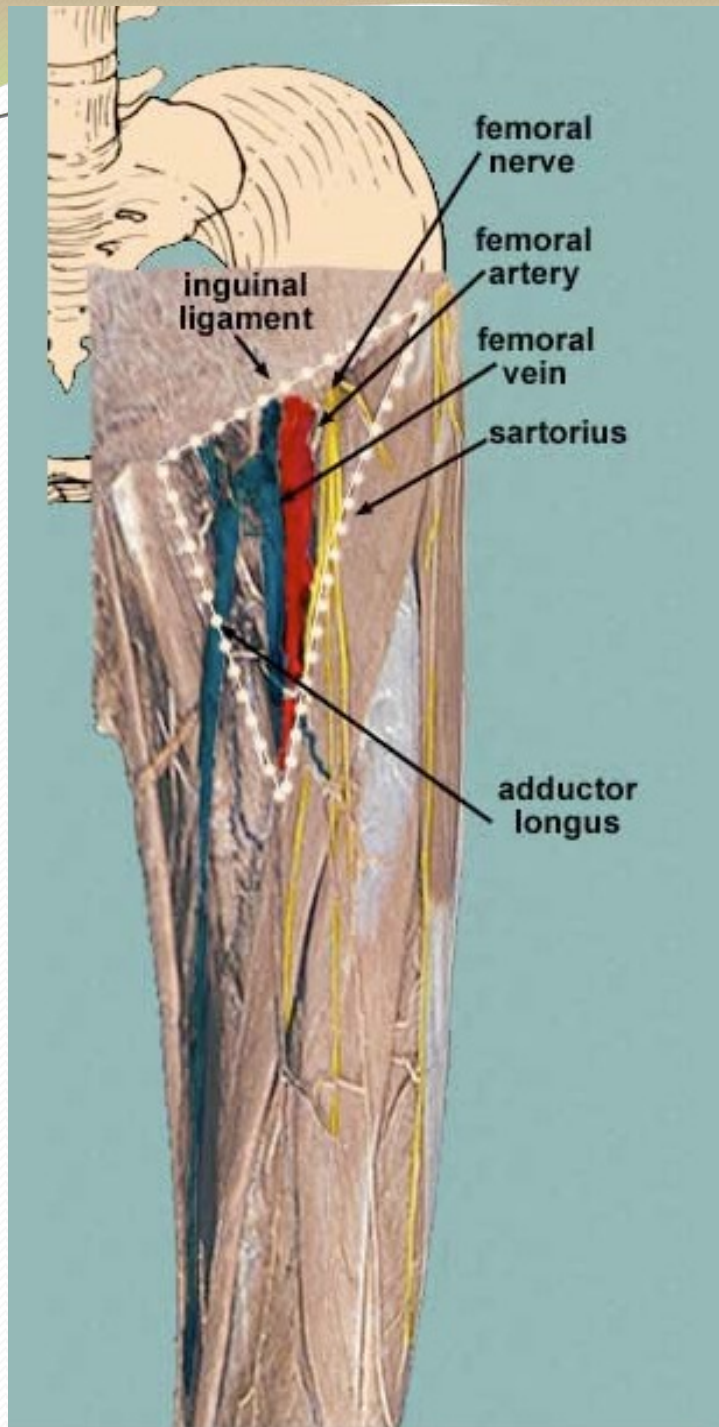
Quadratus lumborum and Piriformis



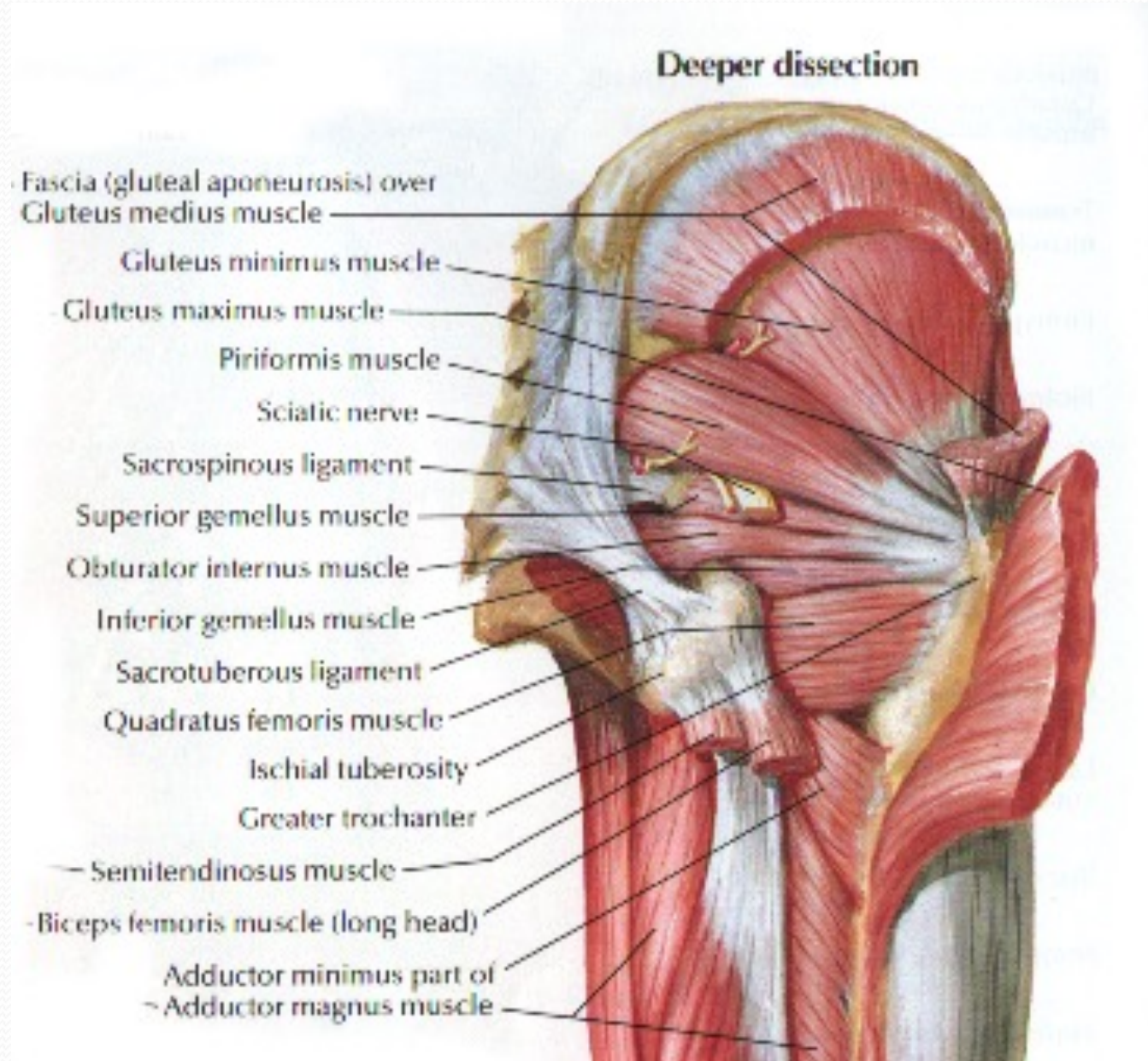
Gluteus Medius and Maximus



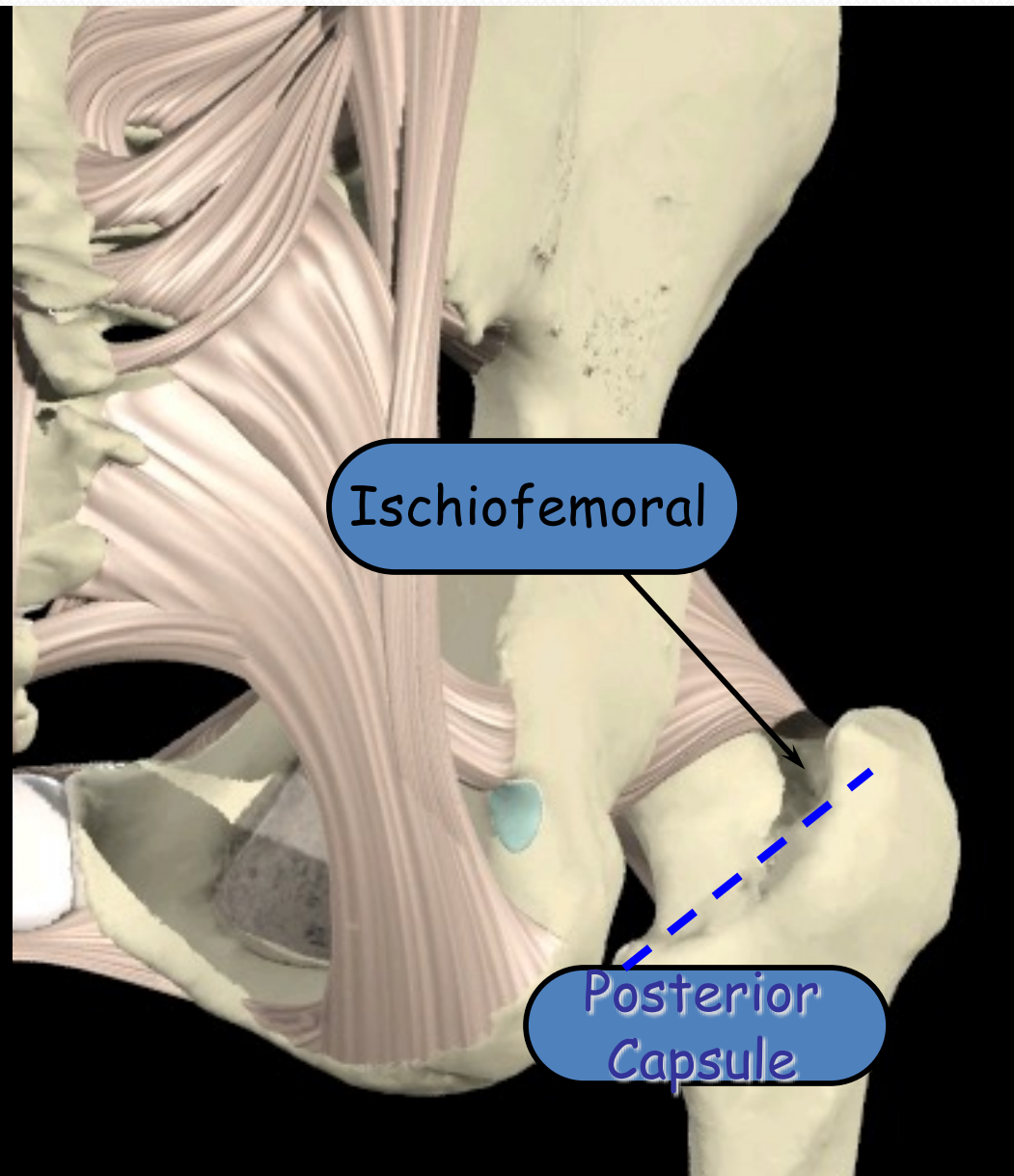
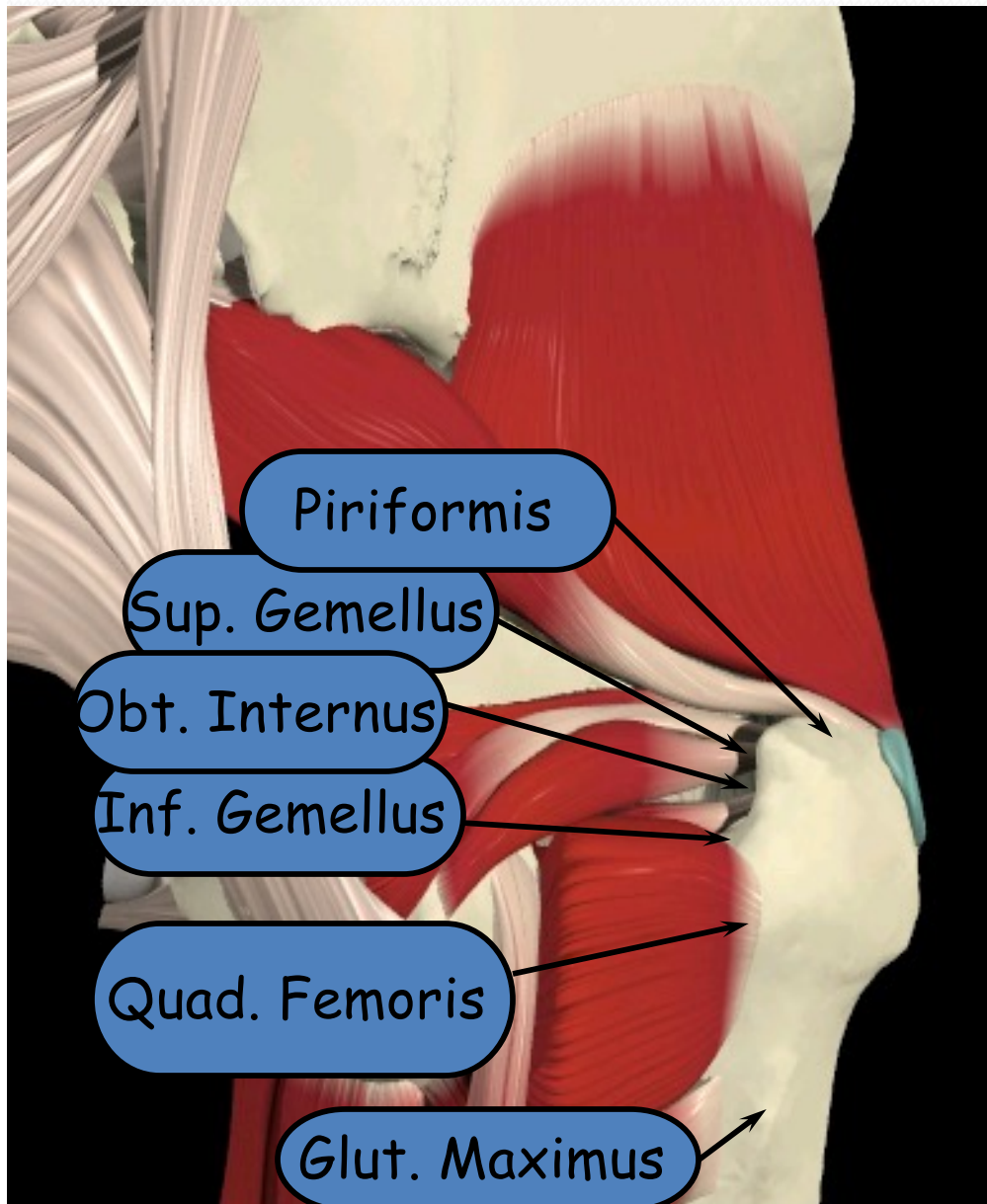
Neuro-Vascular Anatomy



Greater Trochanter Insertions

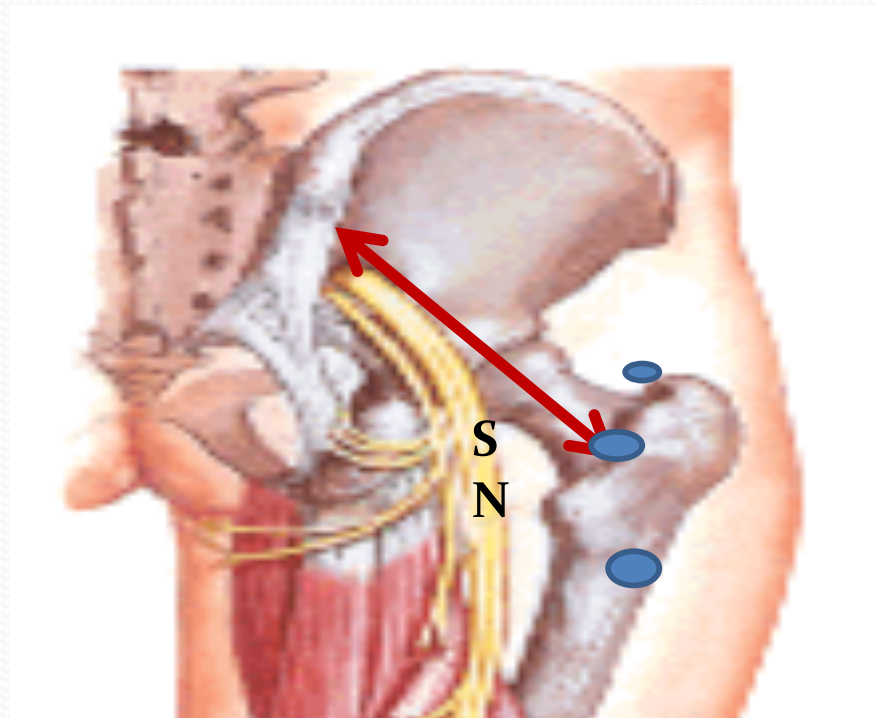
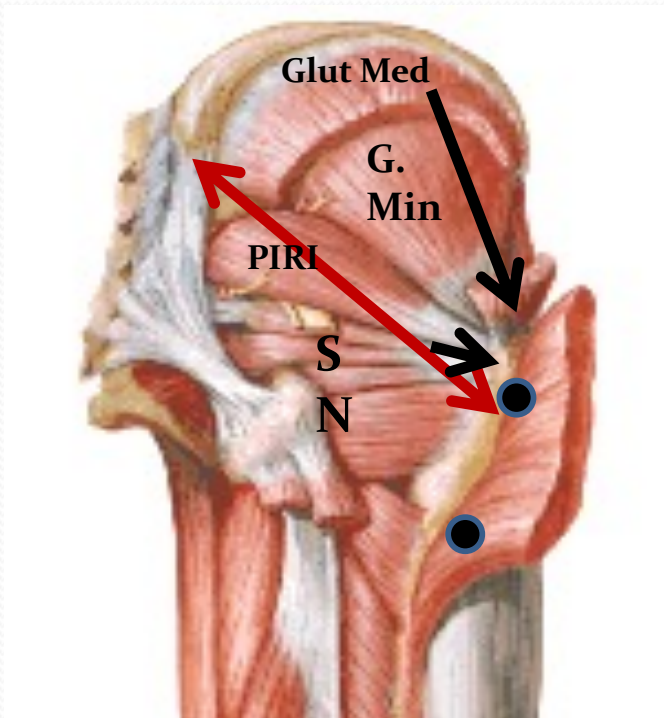


HIP ANATOMY: Posterior-Lateral



Safe Posterior Injections

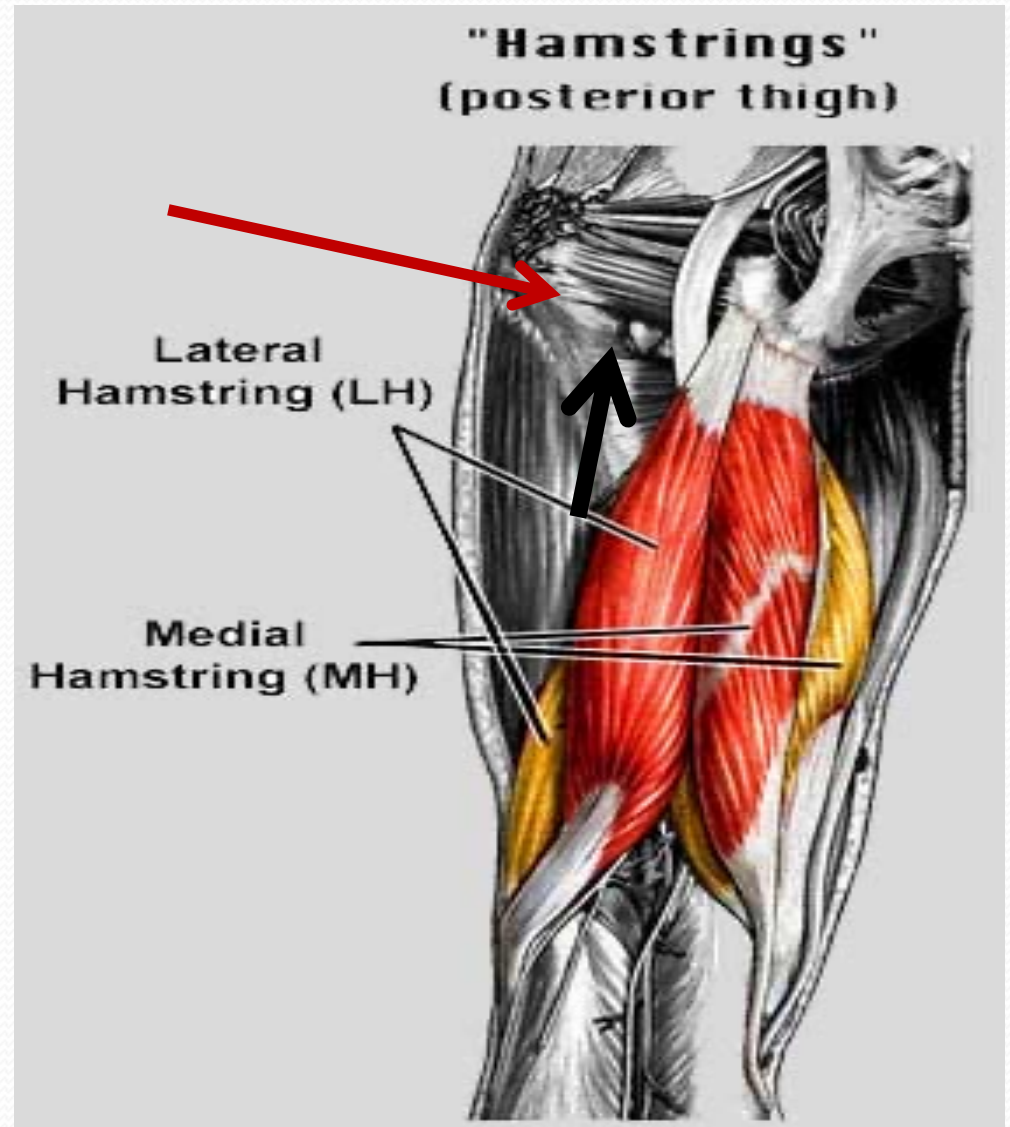
Do not go inferomedial to the Red Line
(PSIS to greater trochanter)



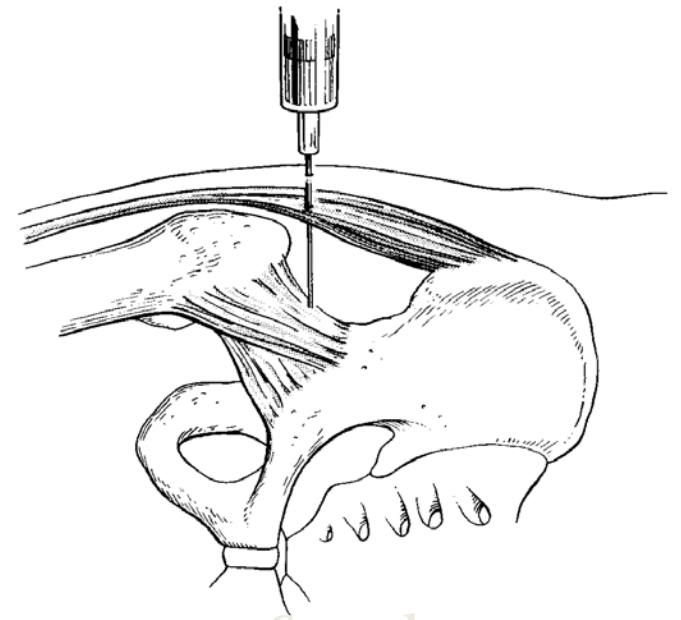
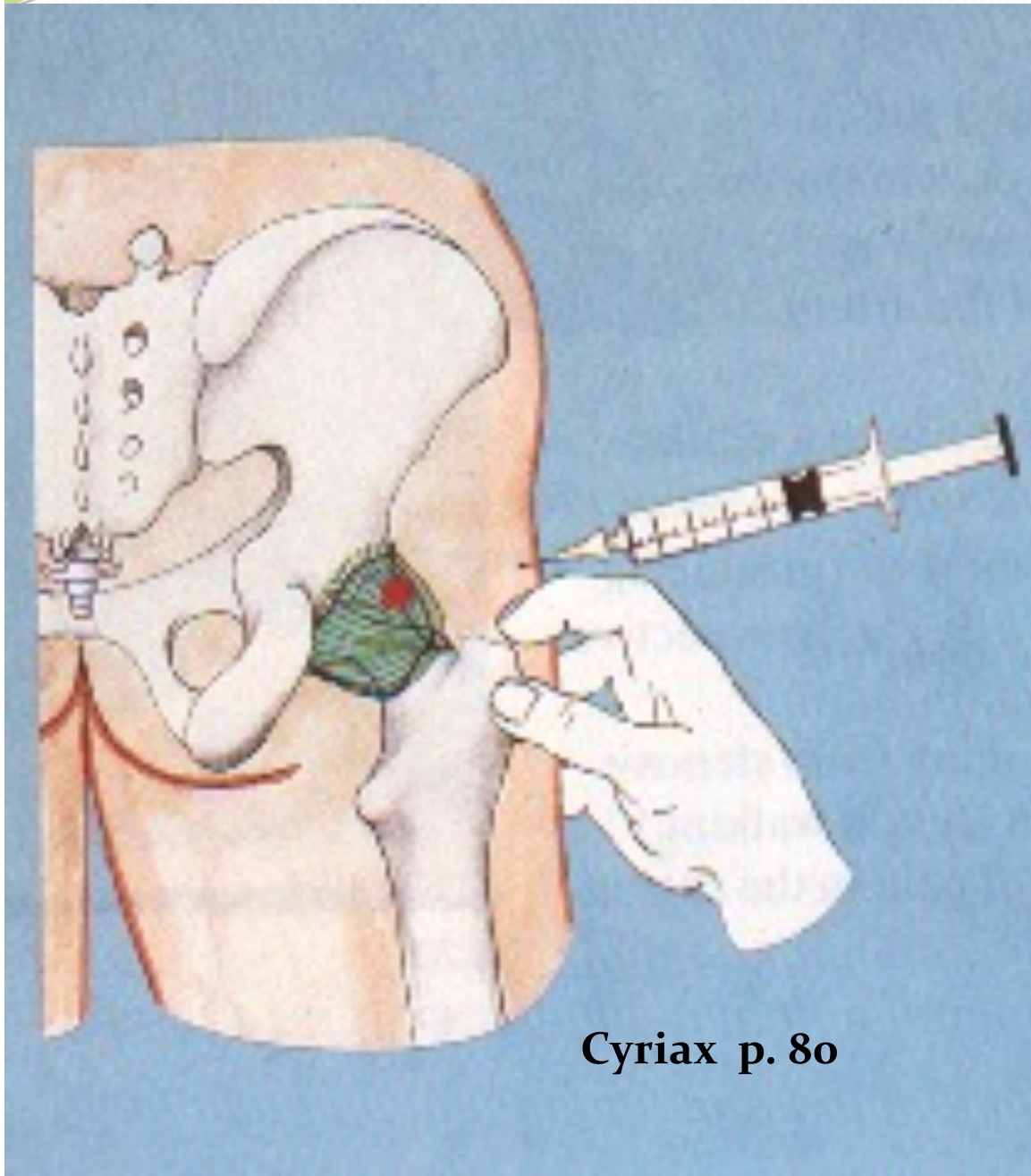
Prone, leg internally rotated

Hamstrings

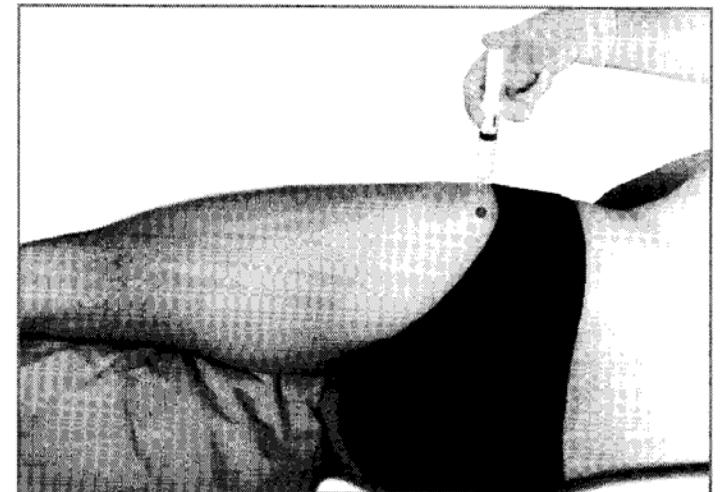
- Sciatic Nerve!!
- Patient prone, large abdominal pillow, leg internally rotated
- Lift gluteals off ischial tuberosity
- Inject ischial tuberosity directly from inferior to superior
- Only inject if have bony contact with needle



Hip Joint Injection



Saunders p. 57



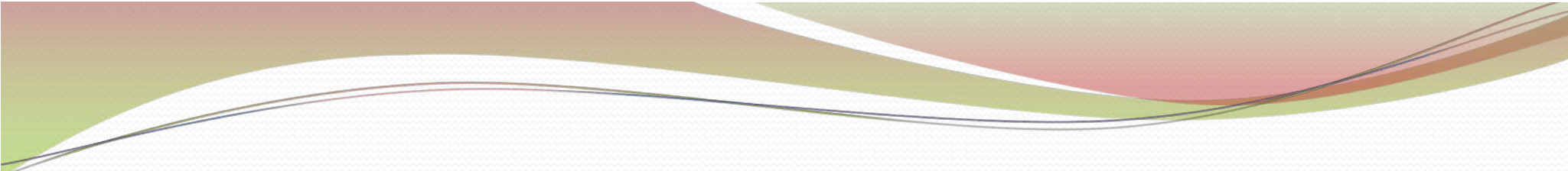
KNEE



© 2003 Primal Pictures Ltd.

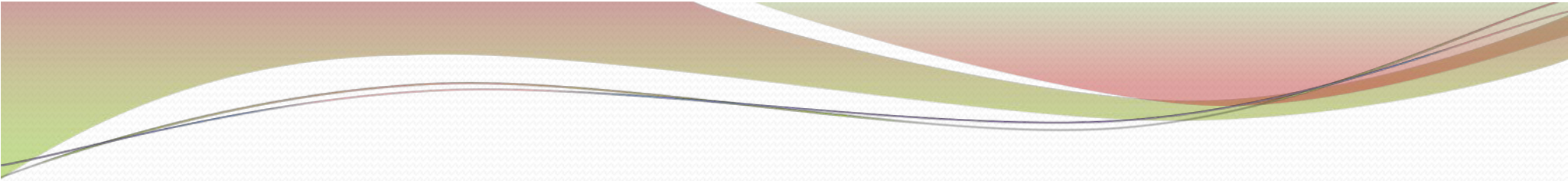
Knee physical assessment

- Musculoskeletal Physical Exam: Knee <https://www.youtube.com/watch?v=-Z7j09LKt8Q>
- Musculoskeletal Physical Exam: Knee <https://www.youtube.com/watch?v=-Z7j09LKt8Q&list=PLijalQObzAG7giwNTjHPusirYphK6Now9&index=1>
- Knee Anatomy Animated Tutorial https://www.youtube.com/watch?v=_q-Jxj5sTog&index=4&list=PLdFi-NEDUoHcJLwxK7Jn4kbvx-BUEDwPb
- Knee Exam <https://inside.fammed.wisc.edu/system/files/dmt/knee.pp>
- A Tool For Evaluating Patients with Knee Injury
<http://www.aafp.org/fpm/2005/0300/p67.html>
- For knee pain, how predictive is physical examination for meniscal injury? *J Fam Pract.* 2004 November;53(11):914-928.
<http://www.jfponline.com/home/article/for-knee-pain-how-predictive-is-physical-examination-for-meniscal-injury/bf535cc34ecddb7f3c7b76fd145fb01.html>



Prolotherapy injection targets

- Ligaments of the knee-MCL, LCL, MJL, LJJ (coronary ligaments)
- Pes Anserine
- Gerdy's Tubercle
- Intra-articular
- Patellar Tendon
- Quadriceps tendon attachments
- ACL/PCL (advanced)



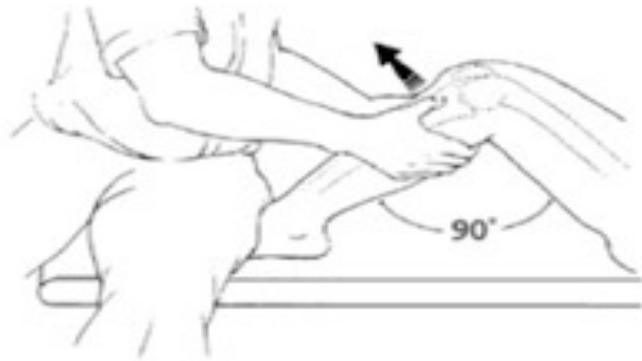
Clinical Conditions

- Tendinopathies
- PatelloFemoral Syndrome
- Osgood-Schlatter's
- ITB Syndrome
- Osteoarthritis
- Hypermobility

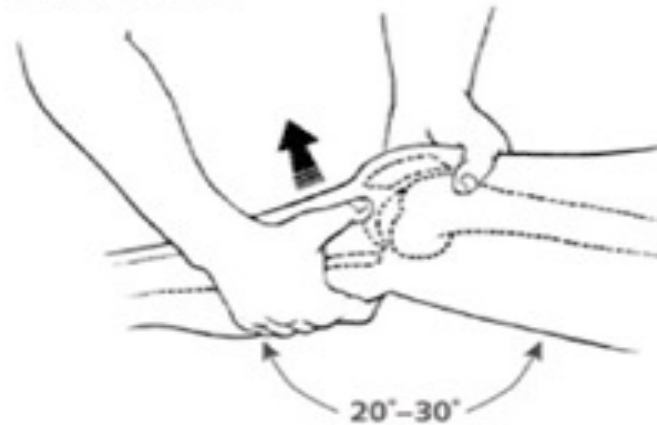
Knee Exam

Common Maneuvers of the Knee for Assessing Possible Ligamentous and Meniscal Damage

Anterior Drawer Test



Lachman Test



Pivot Test



McMurray Test



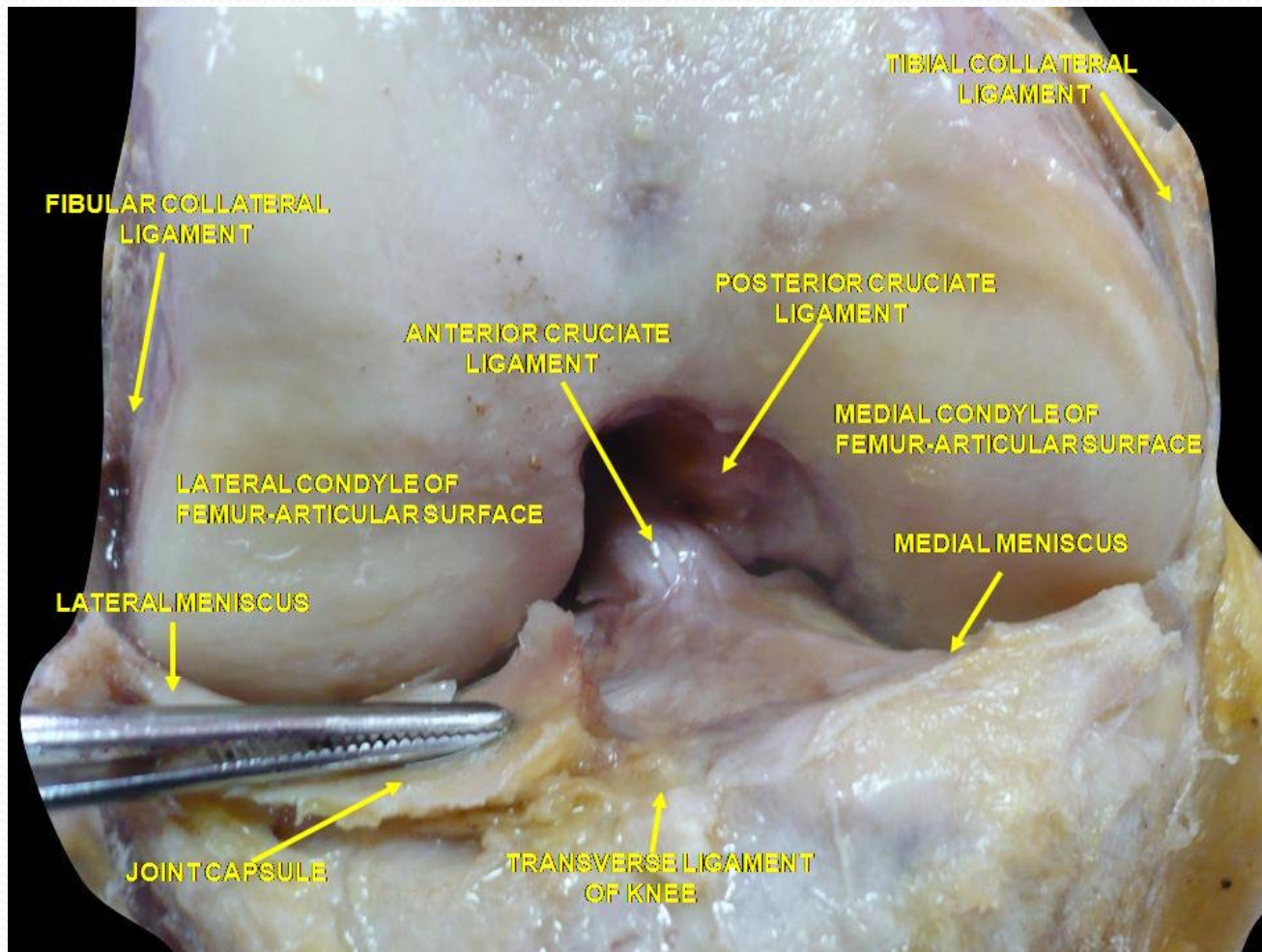
Knee xray



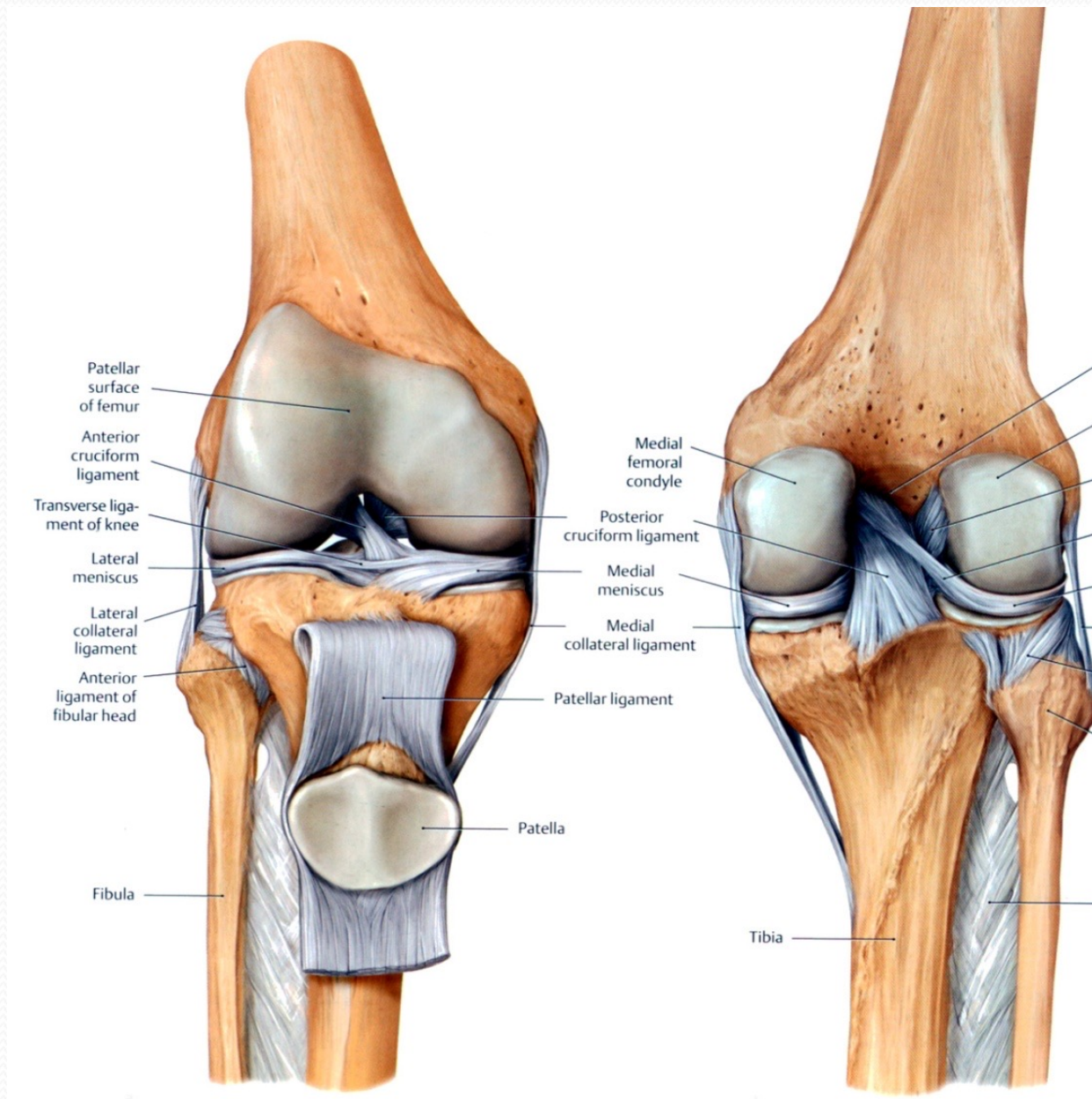
Flexed Knee



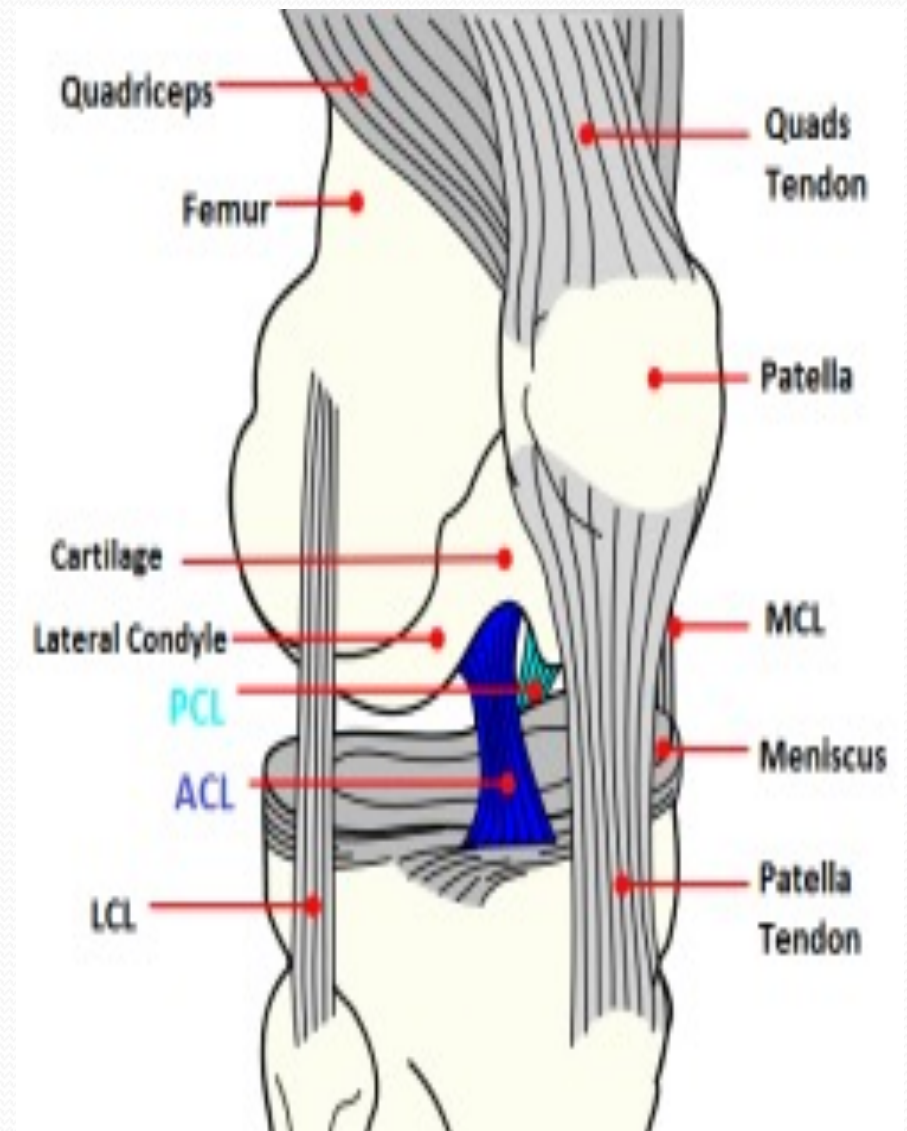
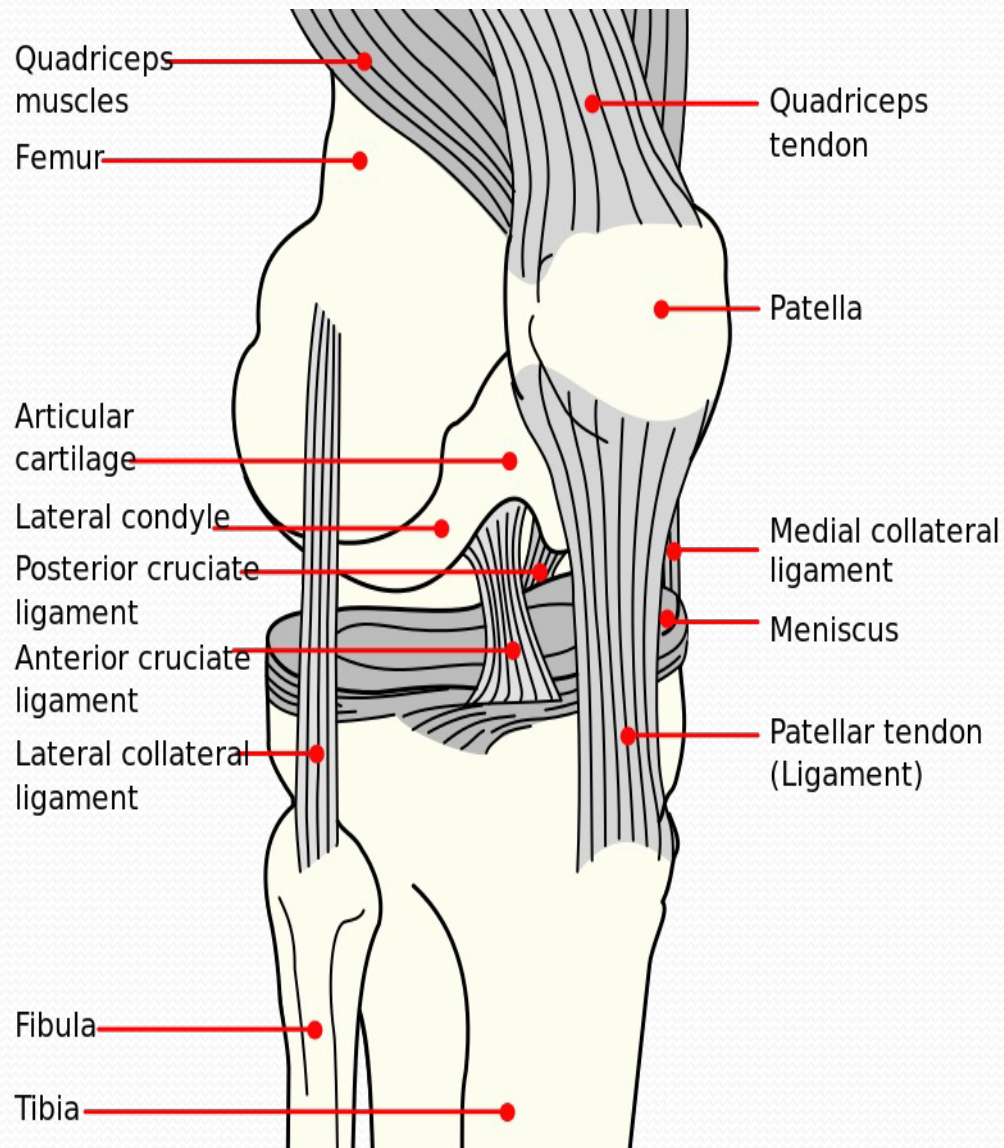
Dissected view



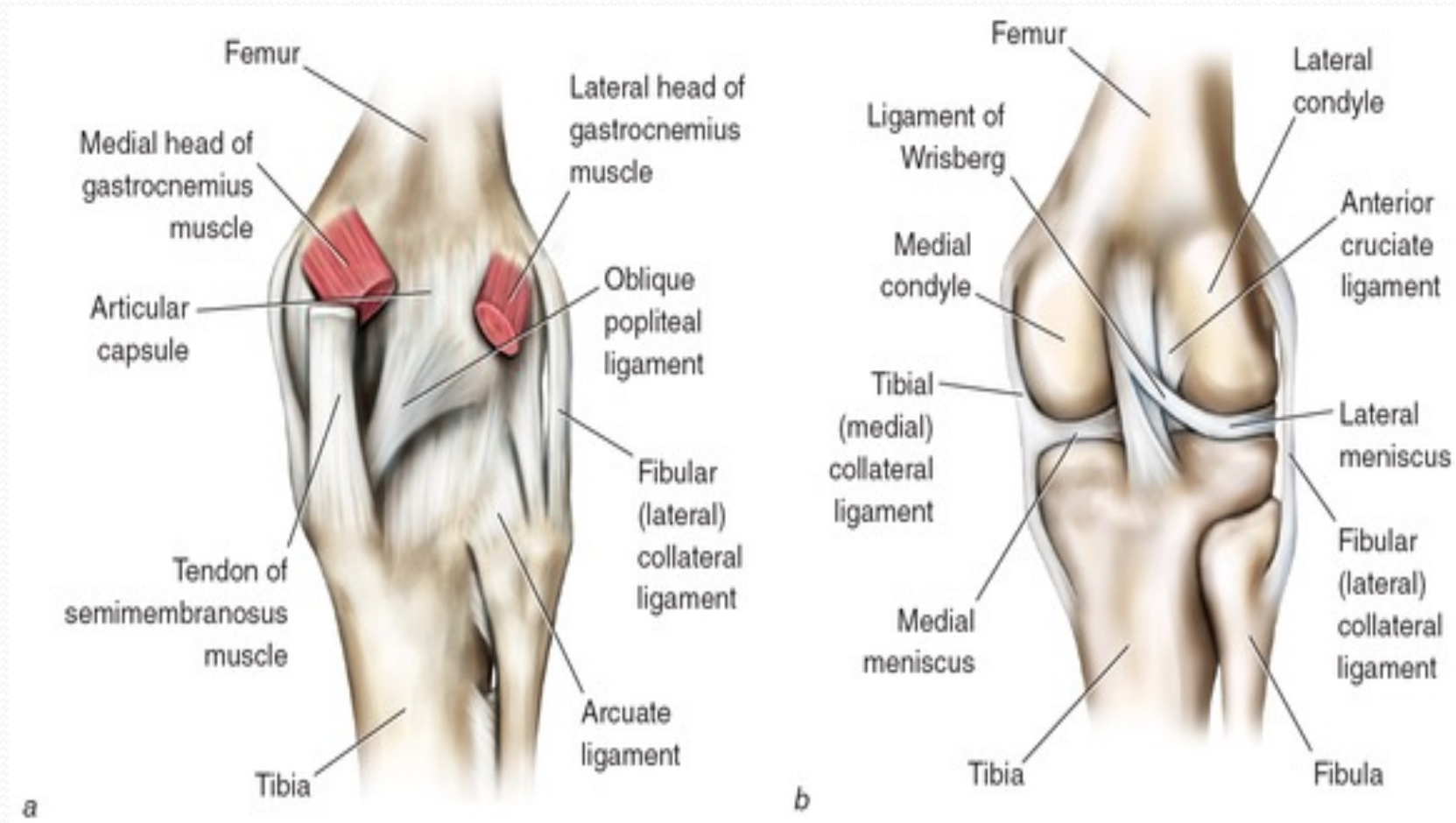
Anterior and Posterior knee



Knee ligaments

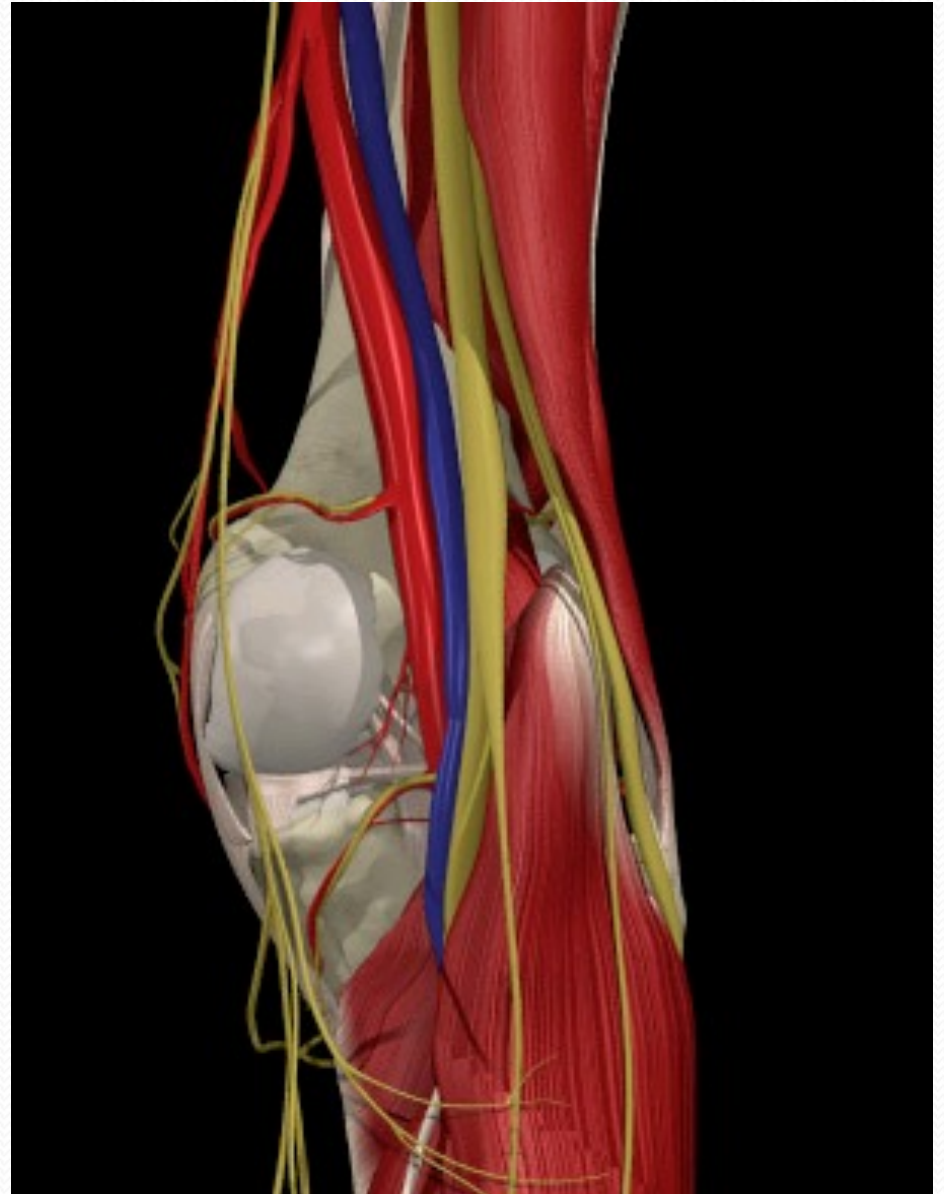


Posterior view knee

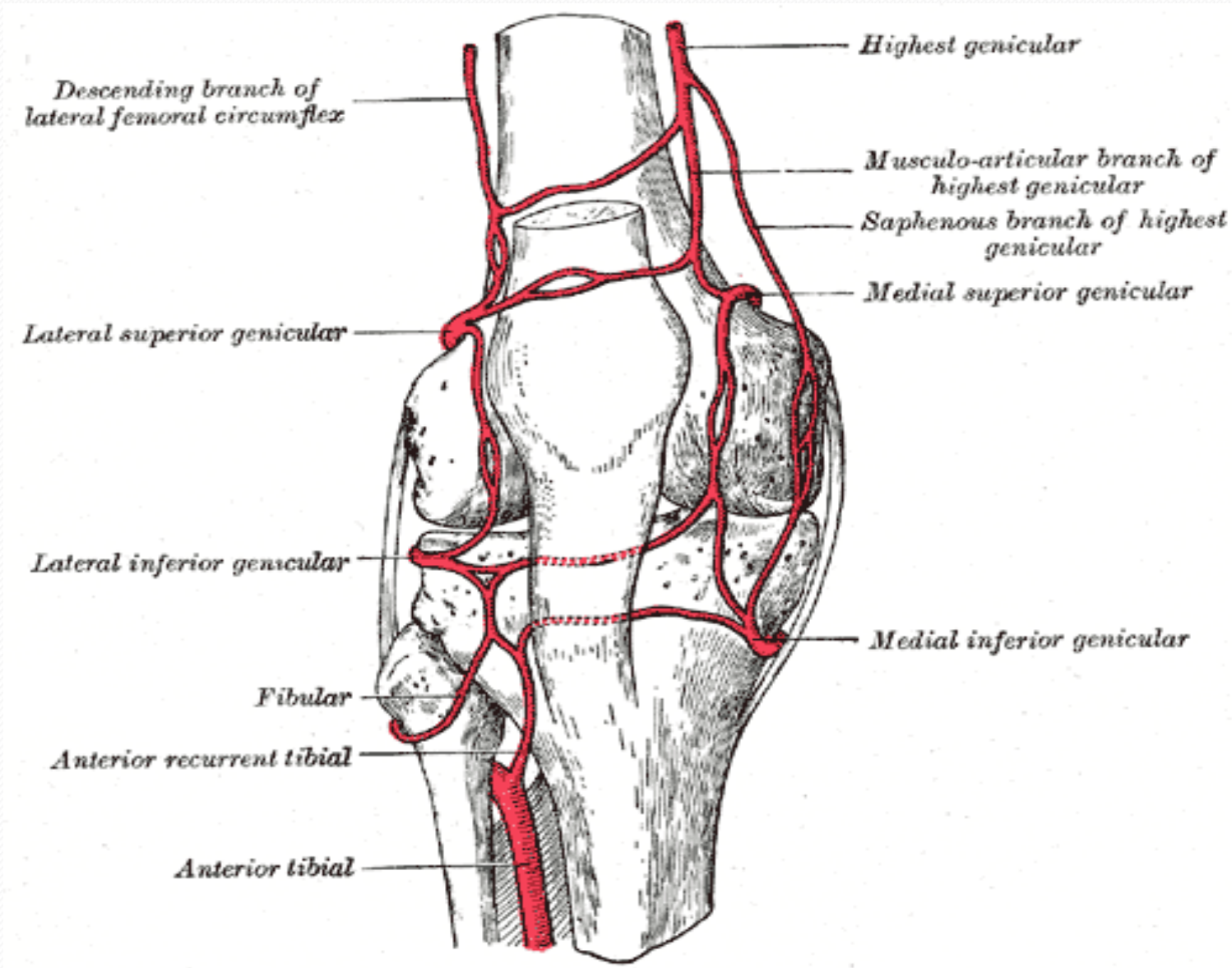


Nerves and Vessels

- Nerves- Tibial, peroneal, saphenous, sural, sartorial
- Vessels- arteries and veins

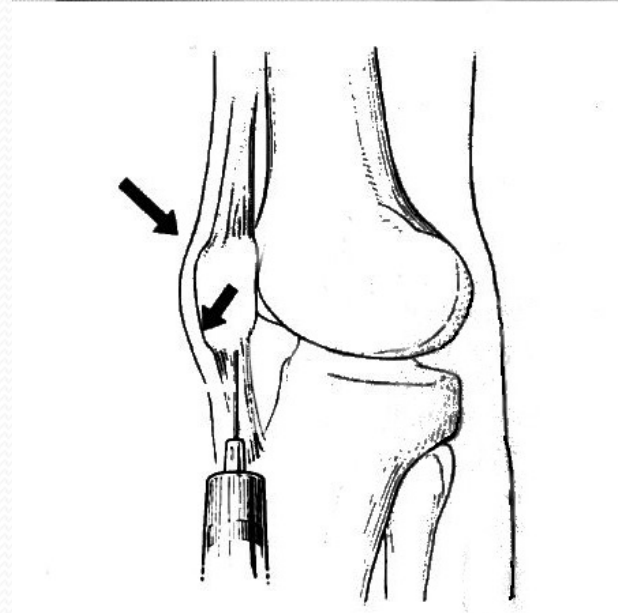
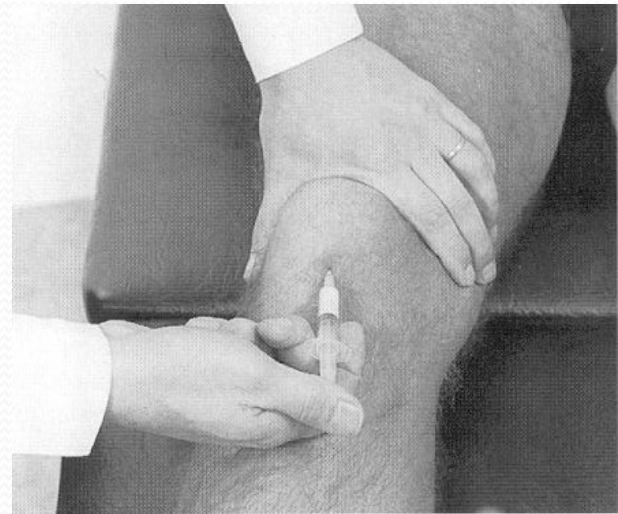


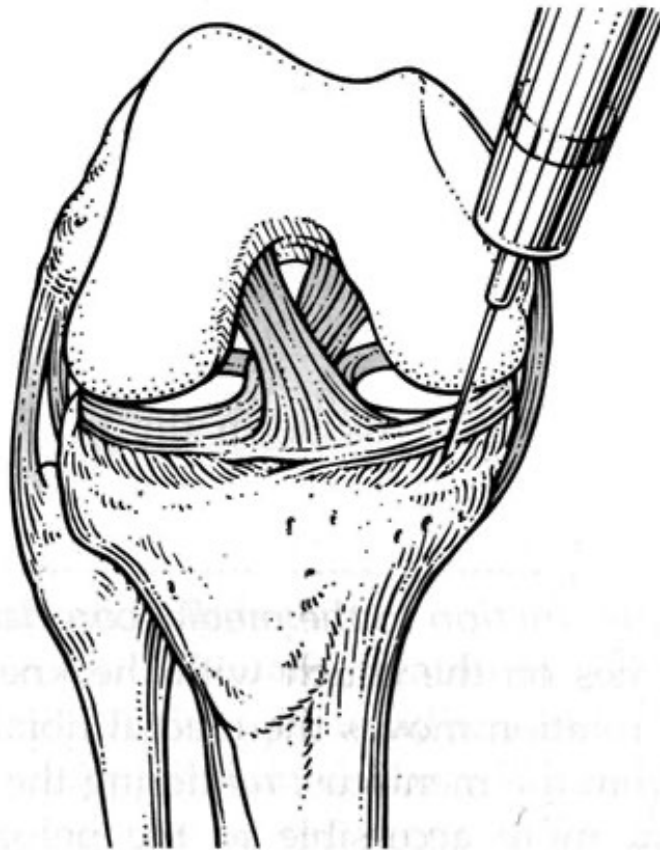
Arteries of the knee



Injection of the Peripatellar Ligaments and Retinaculum

- a. Patient lies supine with the leg either extended or flexed slightly so the patella can be moved.
- b. Palpate the edge of the patella and mark all the tender areas.
- c. Numb the skin over the marked areas. Disinfect with chlorhexadine.
- d. Insert the needle through the wheals and onto to edge of the patella.

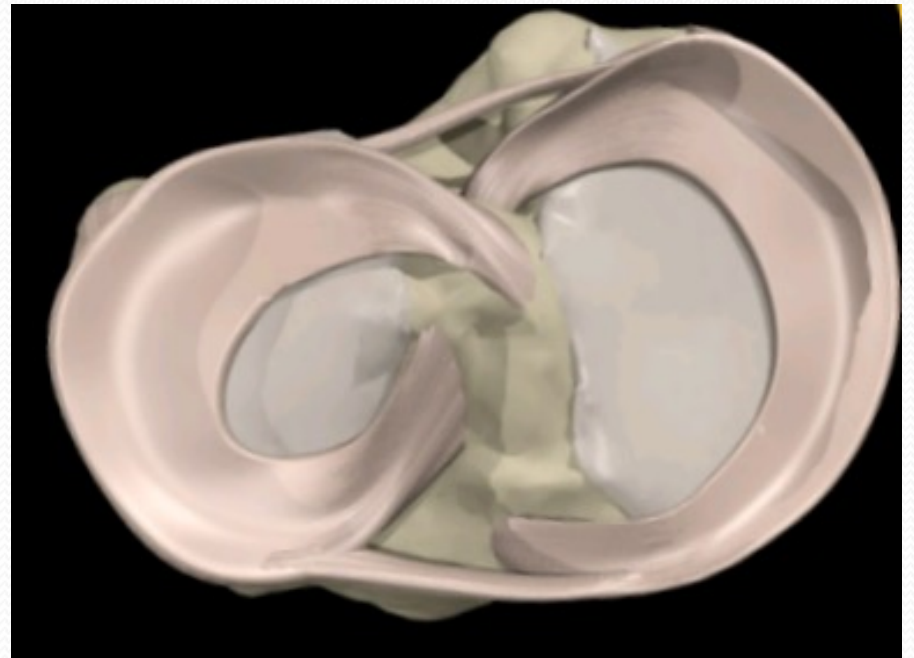




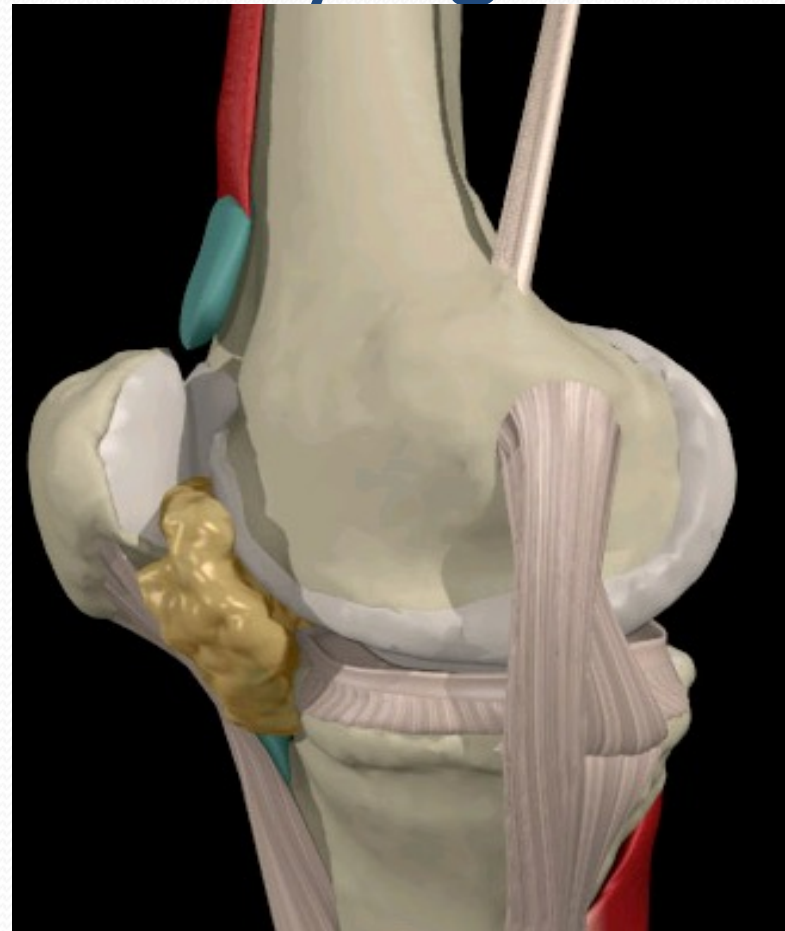
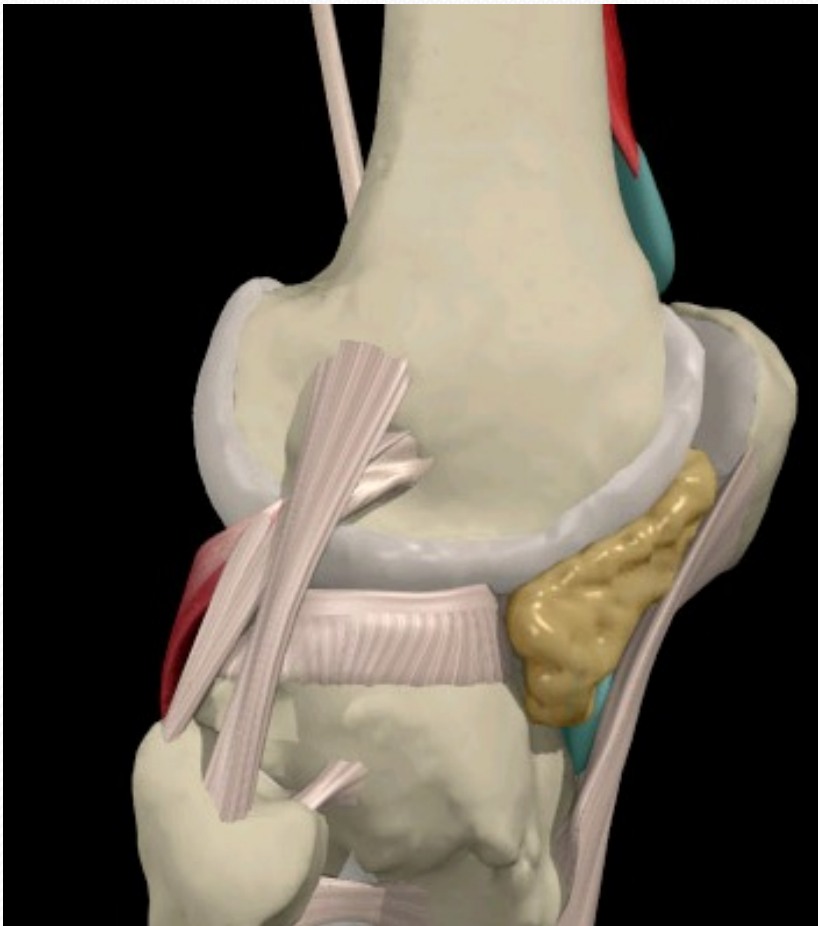
Infiltration of the medial coronary ligament.

Constraints on motion

Medial and Lateral Meniscus



Medial and Lateral Coronary Ligaments



Injection of the knee joint

Lateral approach-

Patient is supine with knee in extension.

The patella is pulled laterally and a mark is drawn at the intersection of the line of the underside of the patella and a line drawn laterally starting 1cm distal to the superior pole of the patella.

There is often a indentation in the tissue at that spot.

This is the point of insertion.

Chlolohexidine cleaning,

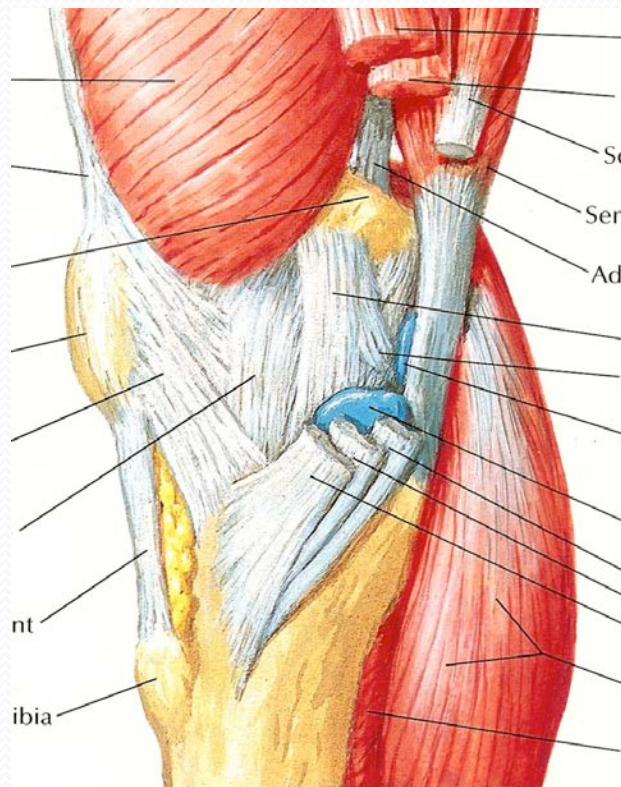
Skin wheal with lidocaine and deposit 0.5cc more deeply to anesthetize the capsule.

Pull the patella laterally, insert needle through the wheal aiming medially and slightly anteriorly.

There should not be any pain just a feeling of pressure.

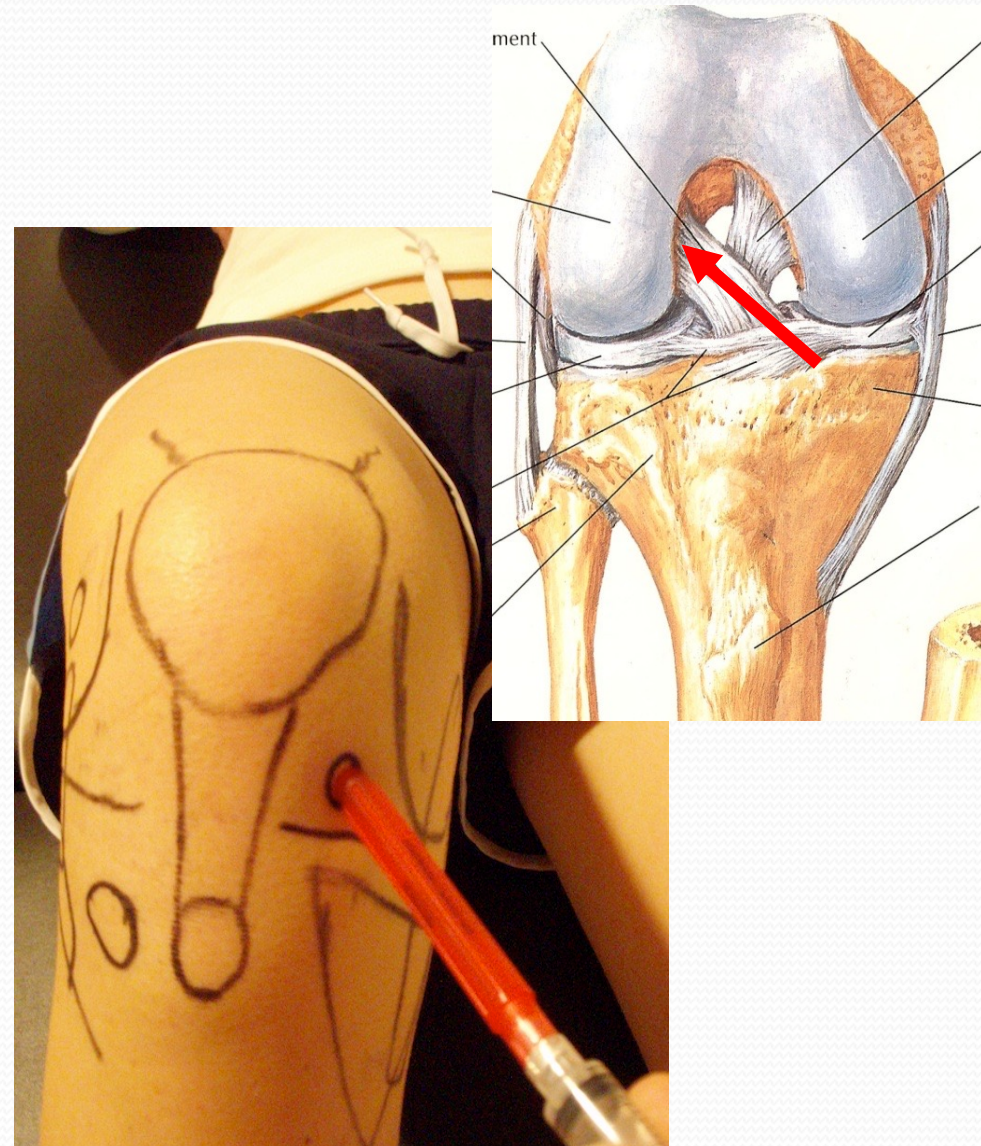


Medial Joint Drawing



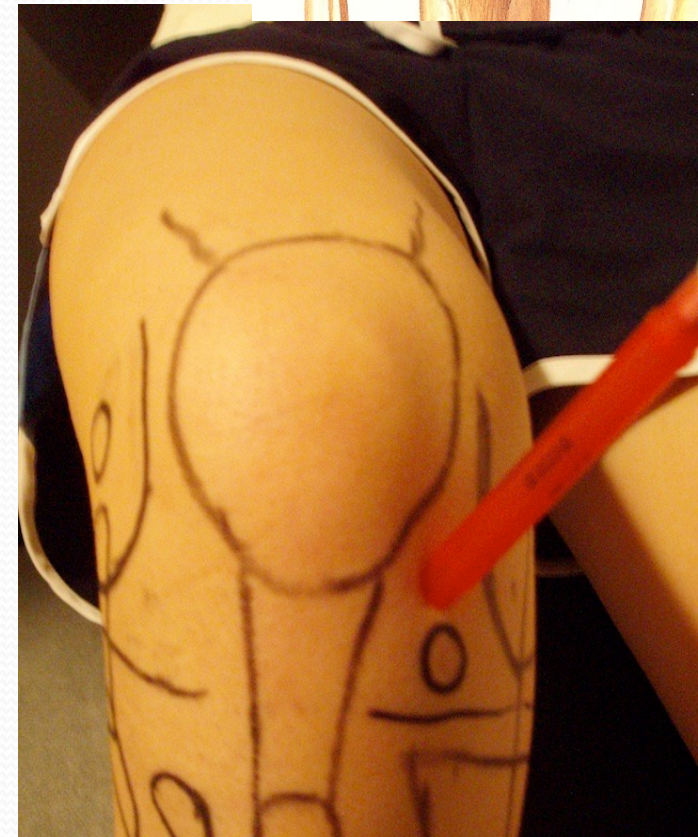
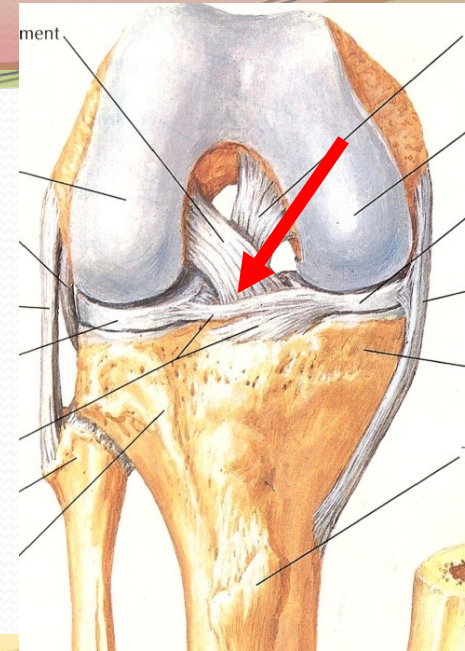
ACL Origin Injection Tech

- ACL Injection for partial tears only
- Pt supine, knee flexed 90°
- Insert needle in medial peri-patellar fossa of the knee but stay just above tibial plateau
- Direct 25x2" needle posterior, cephalad and lateral
- Feel for lig w/ tip of needle
- Inject 1-2cc of D15-20 in a 1cm area

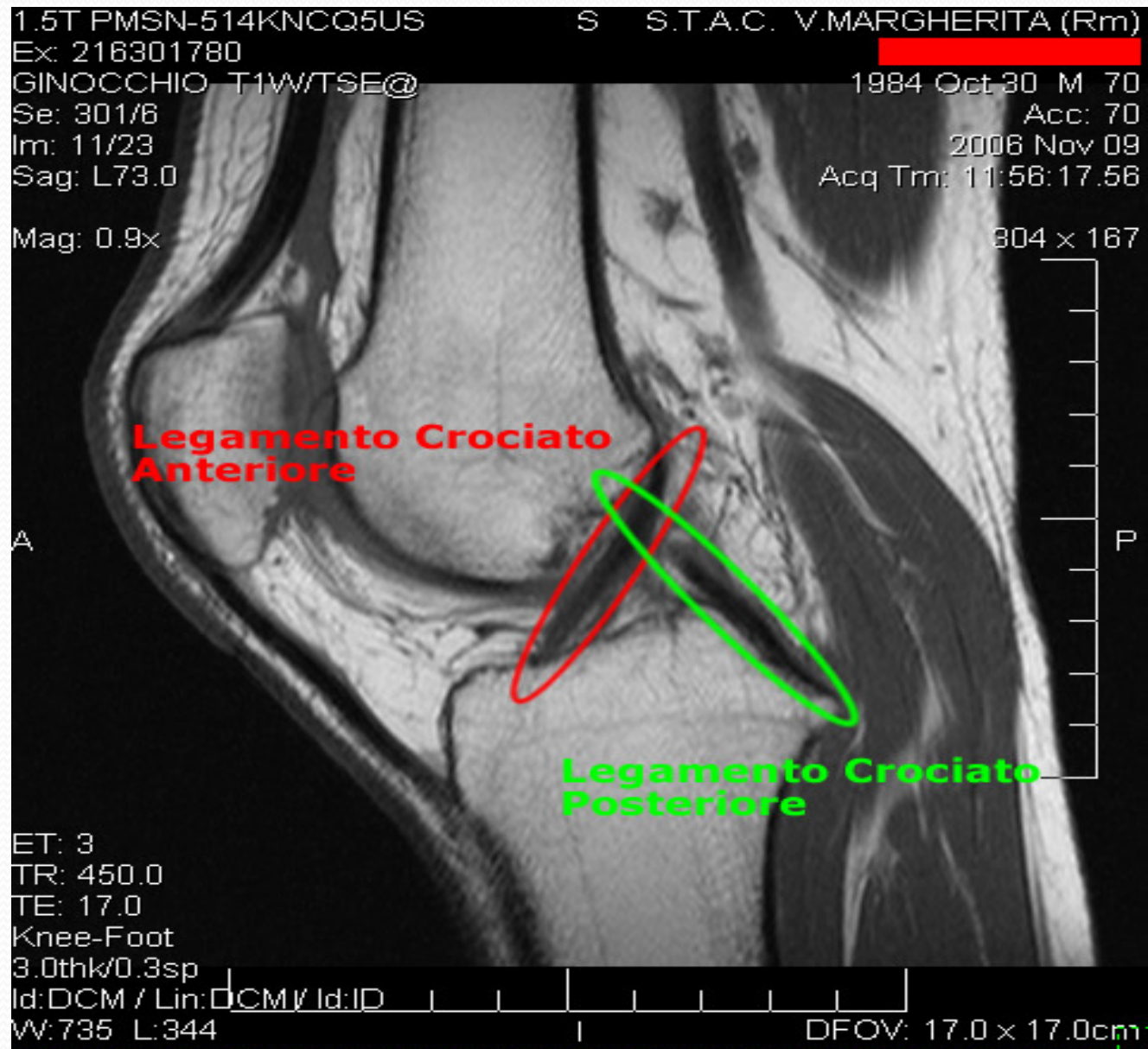


ACL Insertion Injection

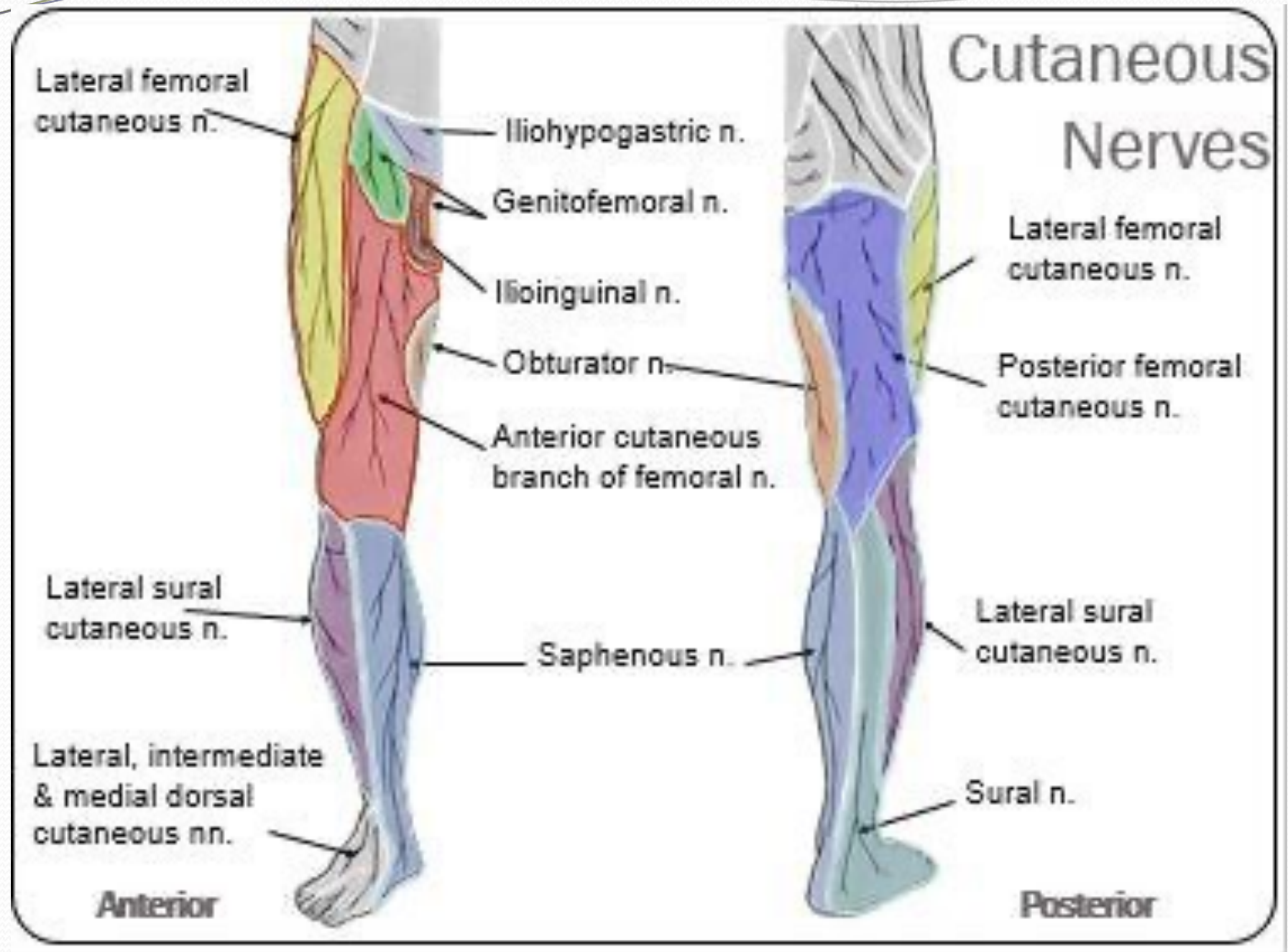
- ACL Insertion for partial tears only
- Pt Supine, Knee Flexed 90°
- Insert needle posterior to inferior border of patella 3cm sup to tibial surface
- Direct 25x2" needle inferiorly, medially and posteriorly onto the tibia at the Intercondylar Fossa
- Inject 1cc in 1cm area on bone



MRI knee



Cutaneous Nerves



The Tibial Nerve

- Motor functions
- Foot plantar flexion and inversion, toe flexion

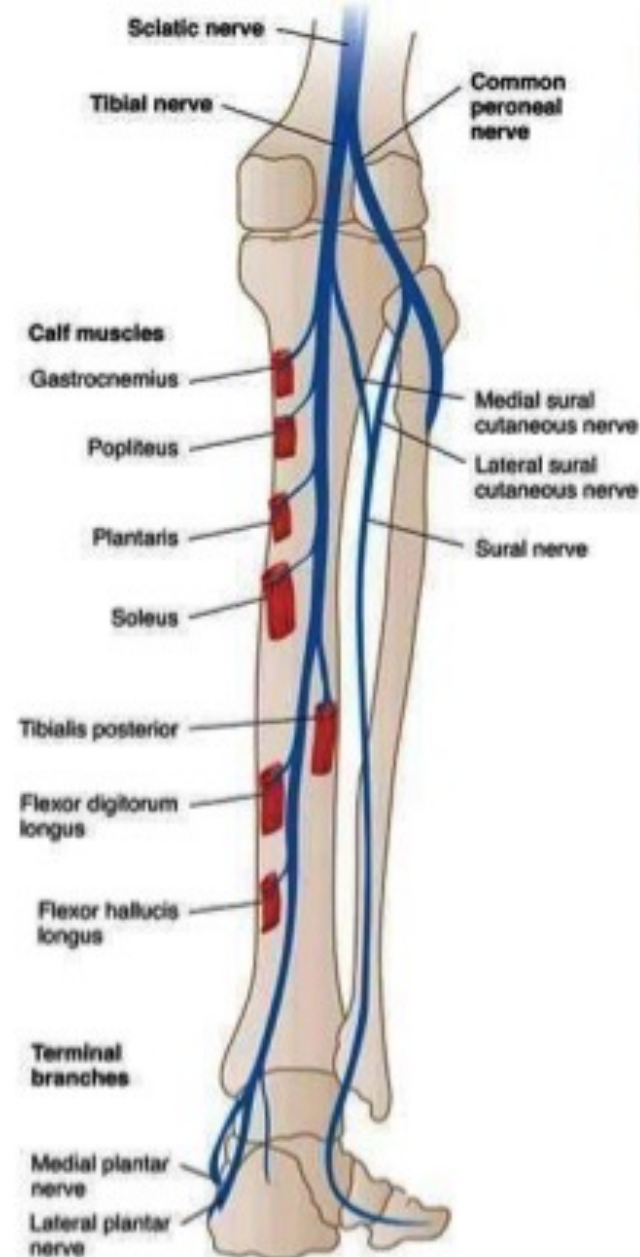
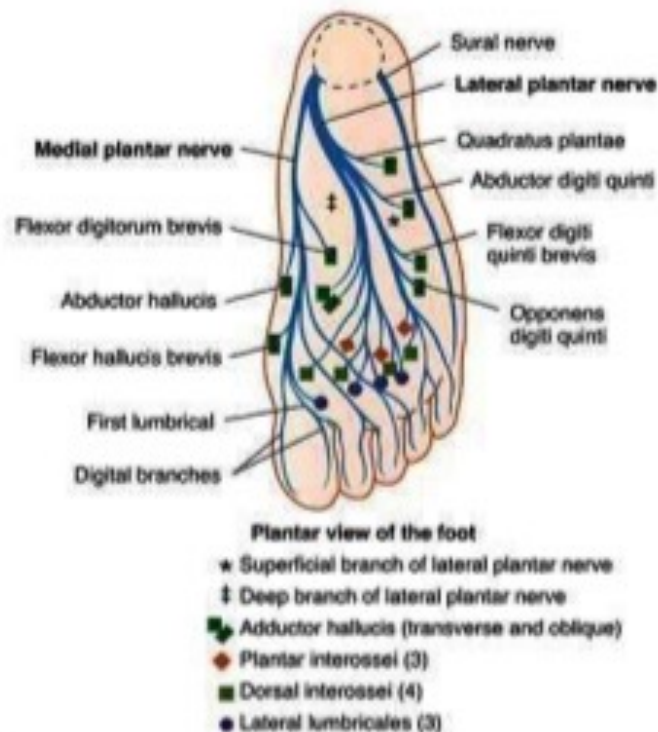


Figure 28-17 . The tibial nerve (L4, 5; S1–3). In: Waxman SG. *Clinical Neuroanatomy*. 26th ed. New York, NY: McGraw-Hill; 2010. <http://www.accessphysiotherapy.com>. Accessed March 22, 2012.

Drawing the knee- anterior

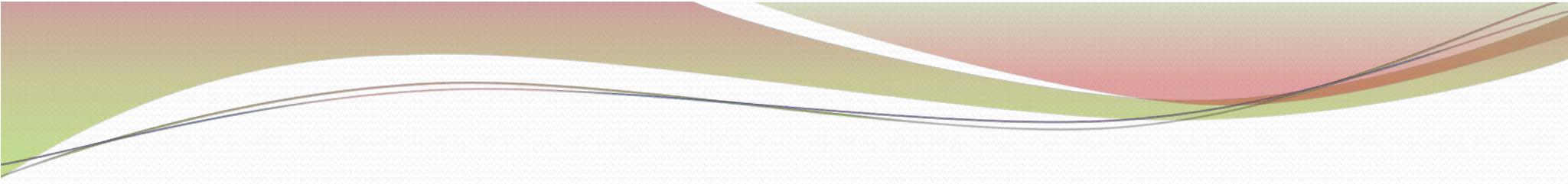


Medial Knee



Lateral Knee

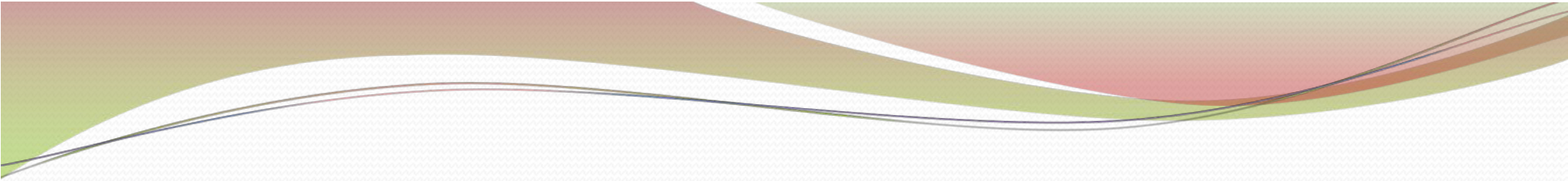




FOOT and ANKLE

Foot and ankle assessment

- Musculoskeletal Physical Exam: Ankle
<https://www.youtube.com/watch?v=QiSm8rz2cmo&index=2&list=PLijalQObzAG7giwNTjHPusirYphK6Now9>
- Ankle Anatomy Animated Tutorial
https://www.youtube.com/watch?v=4hCS1O2LP_c&list=PLdFi-NEDUoHcJLwxK7Jn4kbvx-BUEDwPb&index=7
- Tendinopathies of the Foot and Ankle
<http://www.aafp.org/afp/2009/1115/p1107.html>
- Diagnosis and Treatment of Plantar Fasciitis
<http://www.aafp.org/afp/2011/0915/p676.html>



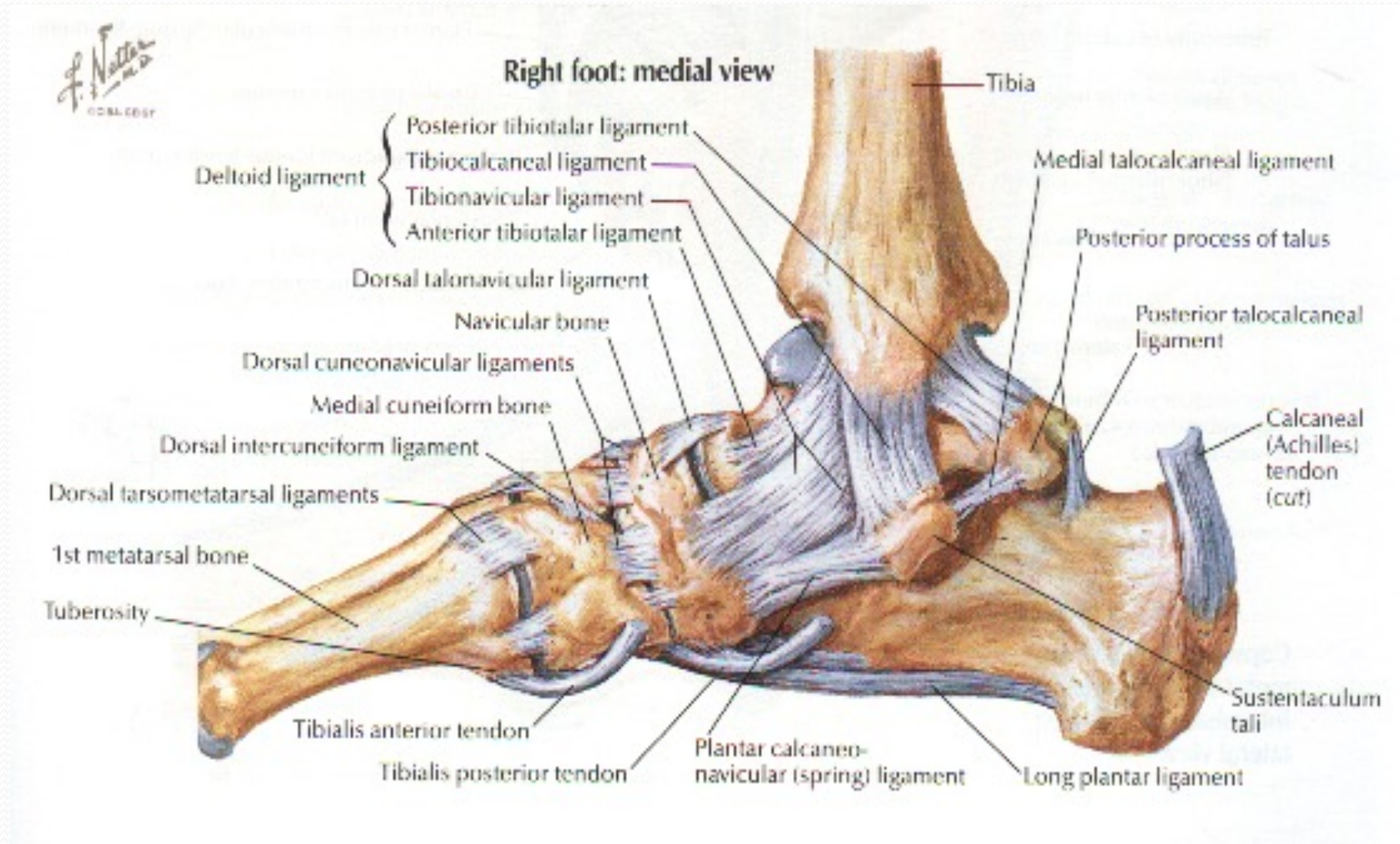
Prolotherapy targets

- Ankle/Toes-intra-articular
- Metatarsal ligaments
- Lateral Ligament complex (ATFL, CFL, PTFL)
- Sinus Tarsi
- Medial Deltoid Ligament

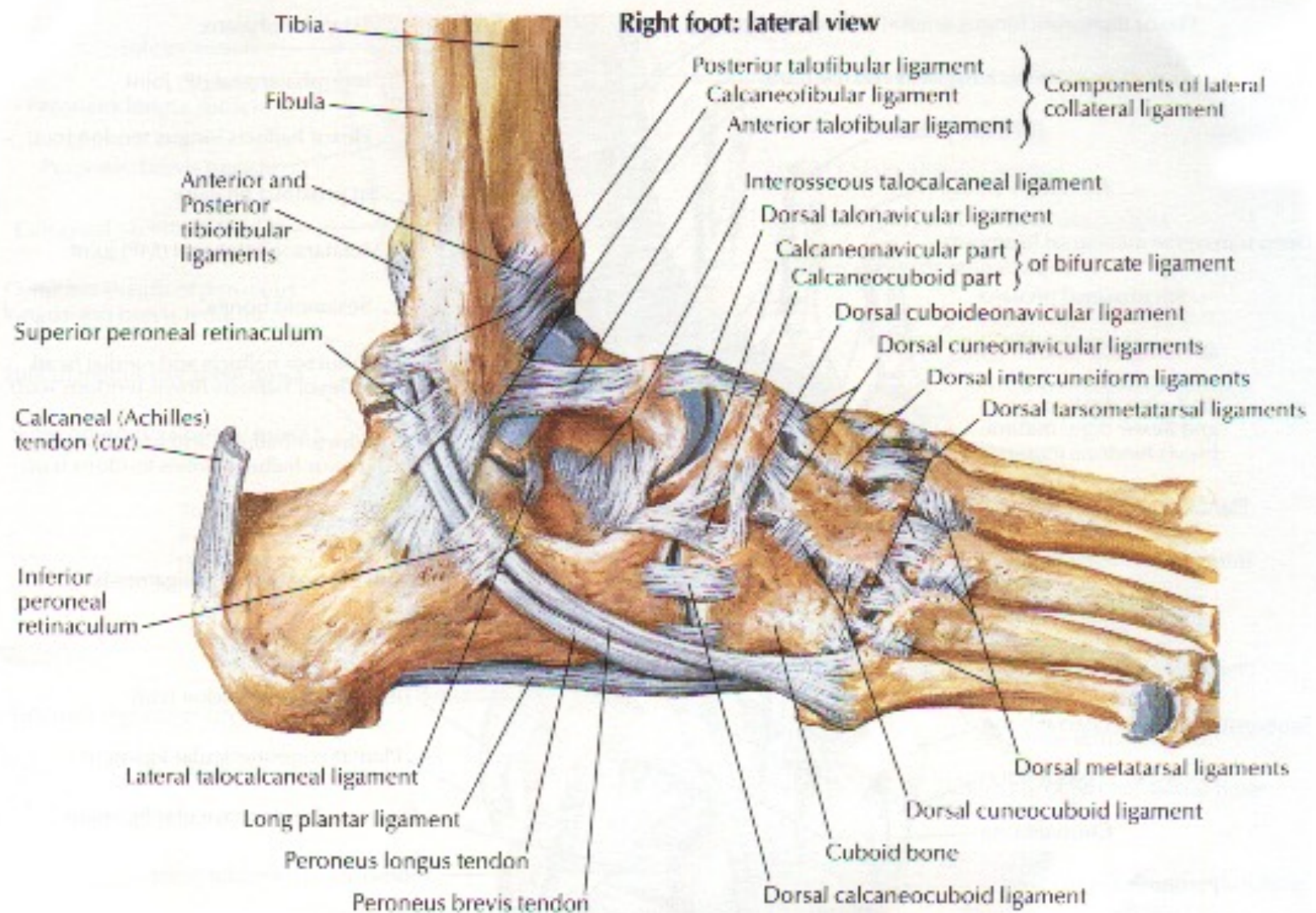
Clinical conditions

- Osteoarthritis
- Sinus Tarsi Syndrome
- Metatarsalgia
- Morton's Neuroma
- "Turf Toe" – Capsular Injuries
- Lis Franc variants
- Chronic Ankle Sprains

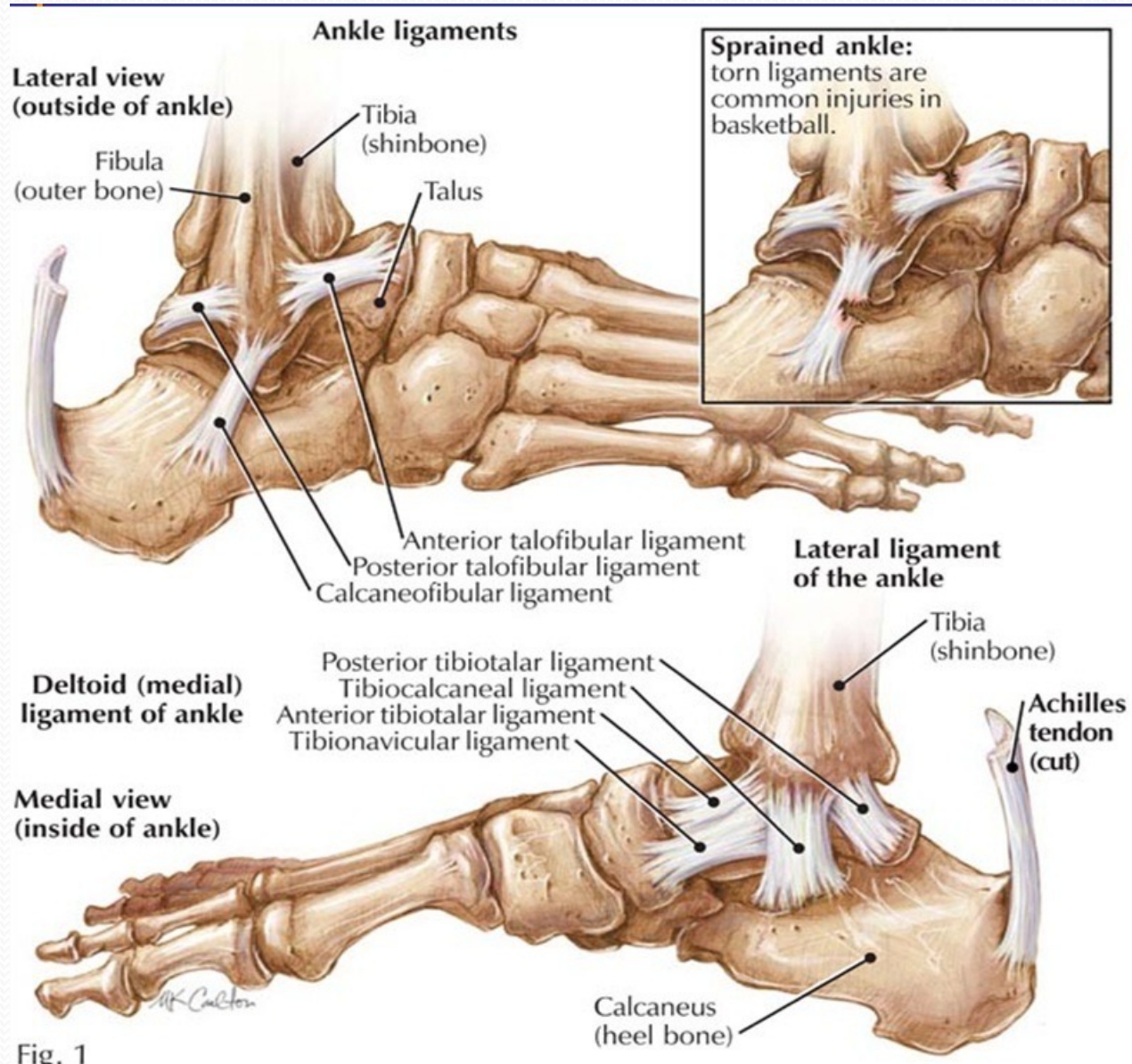
Medial Foot and Ankle Ligaments



Lateral Foot and Ankle Ligaments



Ankle ligaments

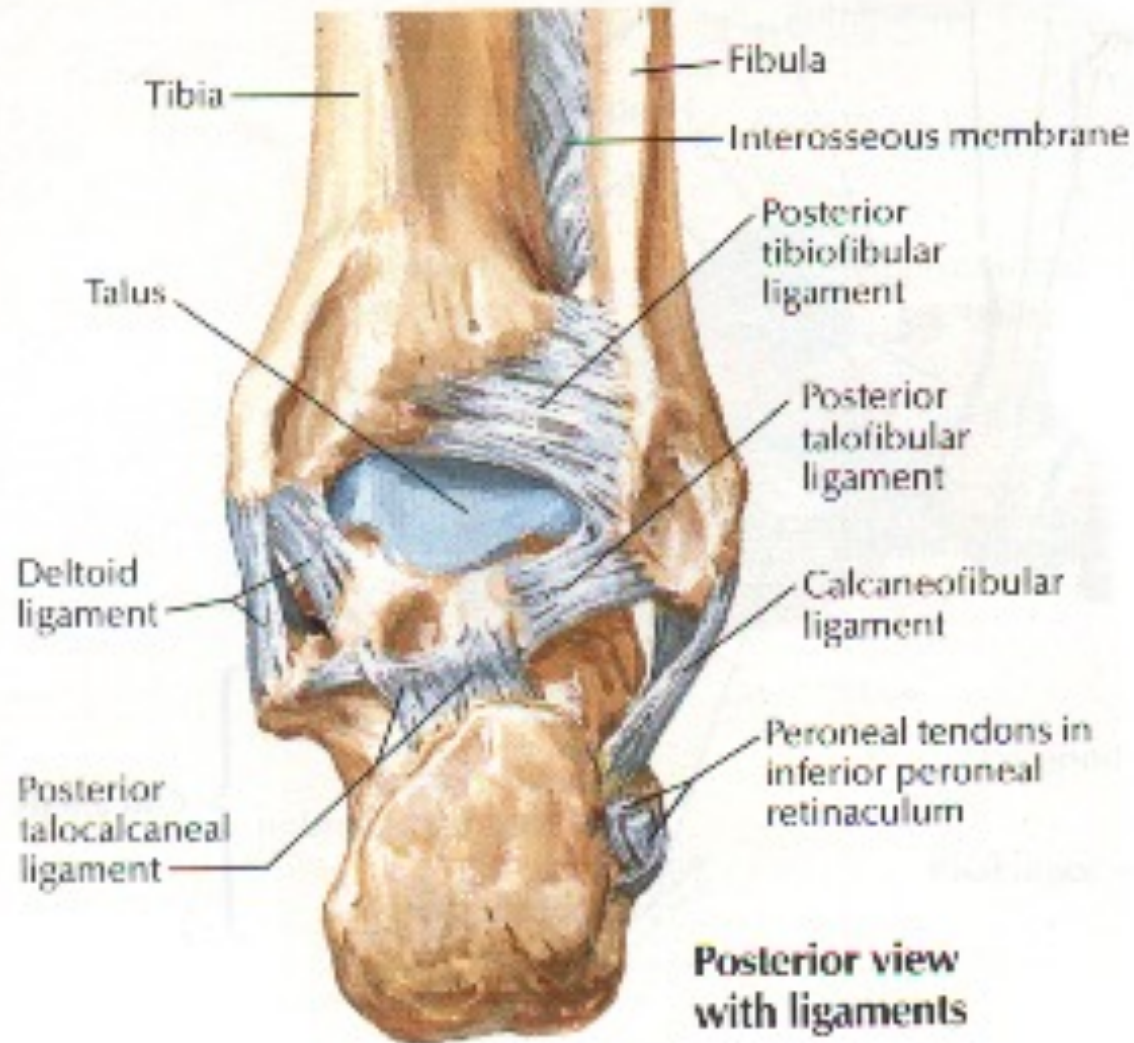


Primary Treatment Sites for Heel Pain

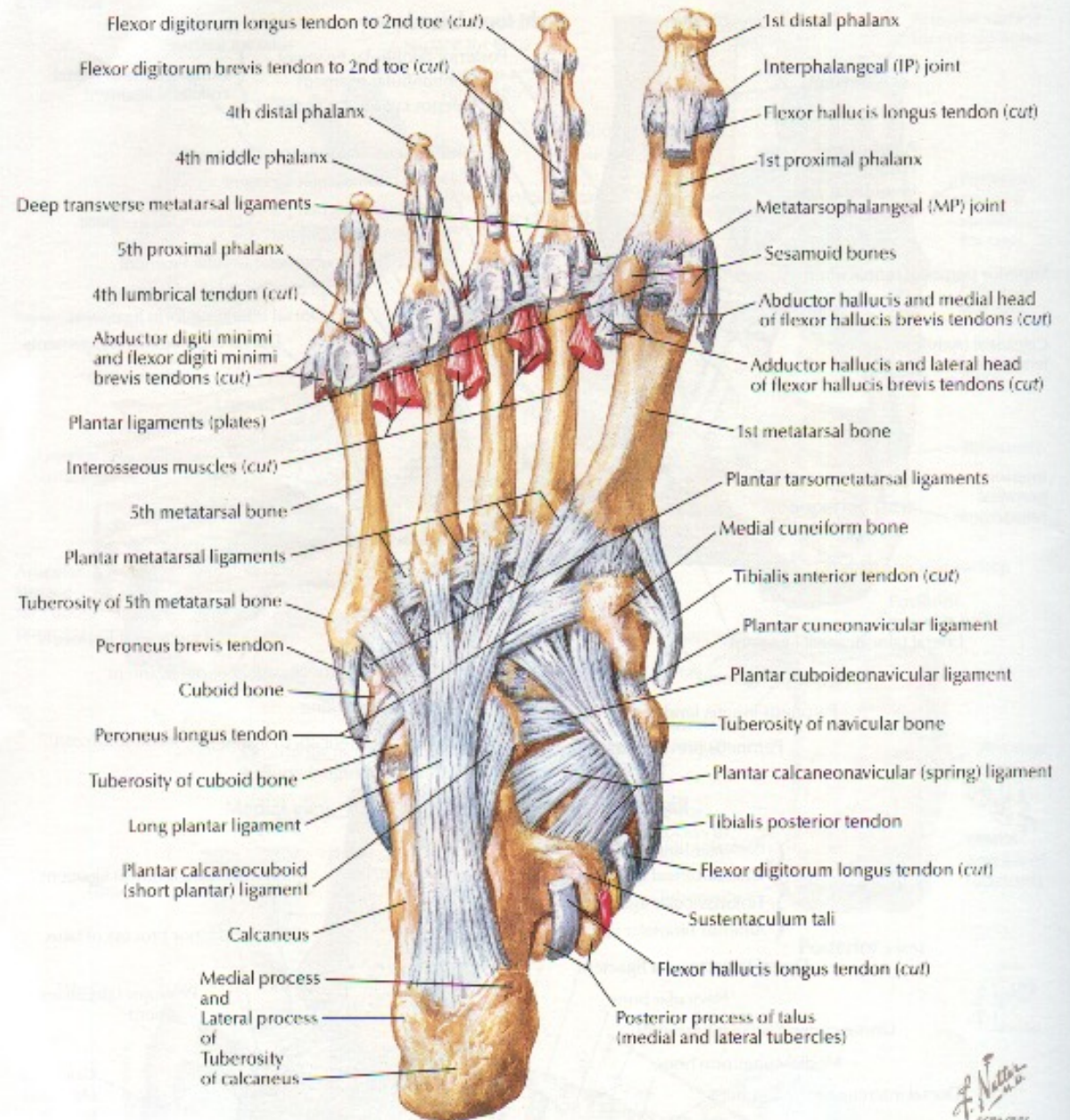
- Sinus Tarsi (interosseous talocalcaneal ligaments)*
- Spring Ligament (plantar calcaneonavicular ligament)
- Talofibular Ligaments – anterior and posterior
- Tibiofibular Ligaments – anterior and posterior
- Deltoid Ligament
- Plantar Fascial Attachment to the Calcaneus

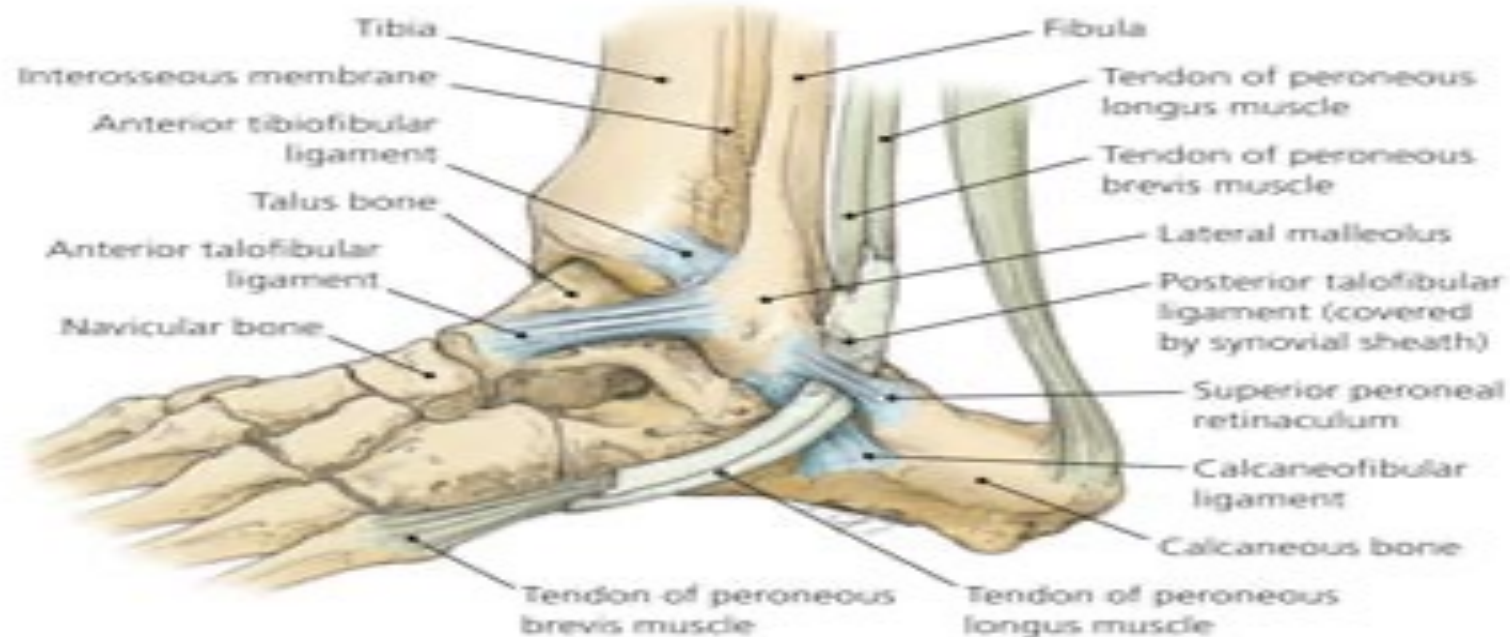
*most commonly involved ligament structures

Posterior Right Ankle



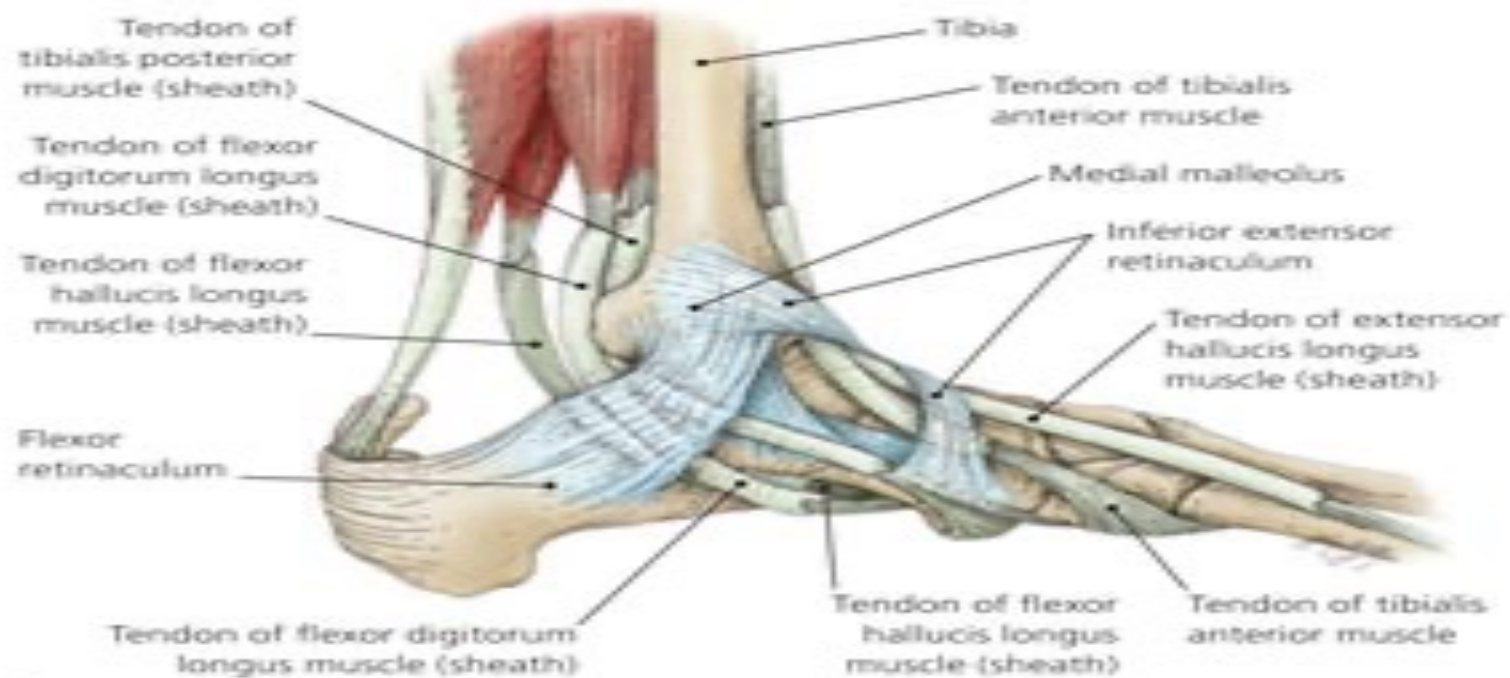
Plantar Foot





A

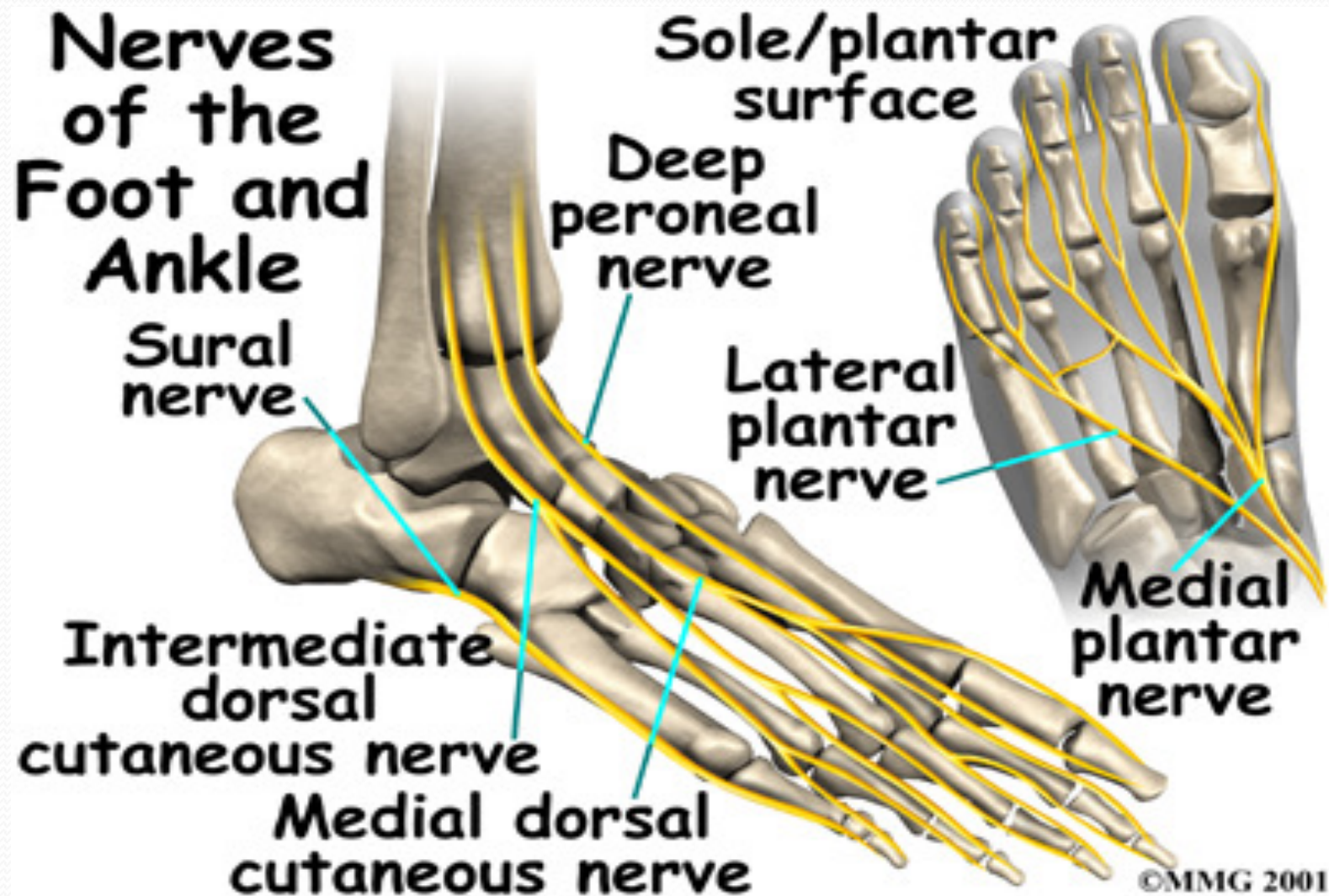
© 2009 FLOYD E. HOSMER

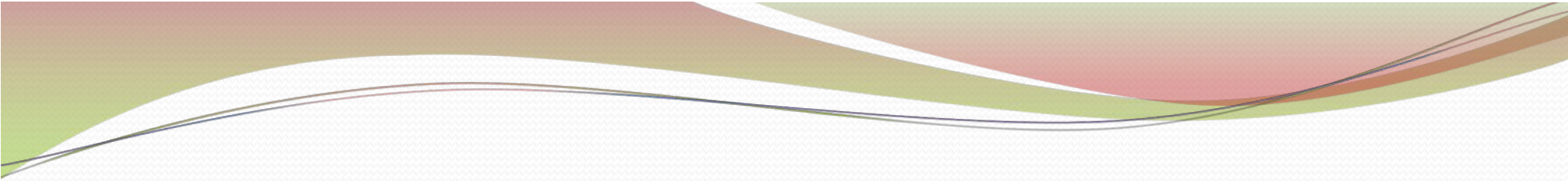


B

© 2009 FLOYD E. HOSMER

nerves

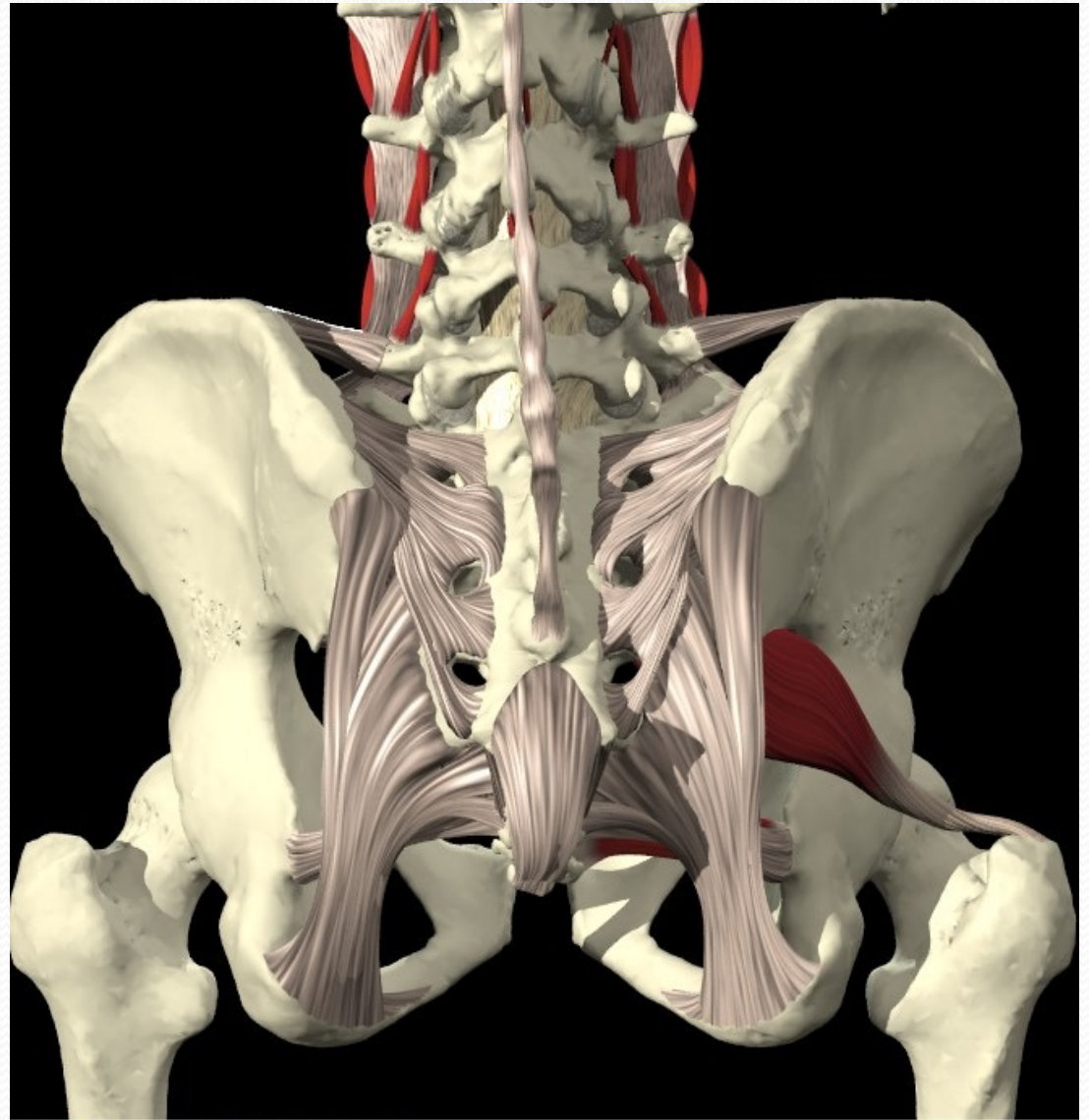




LUMBAR SPINE

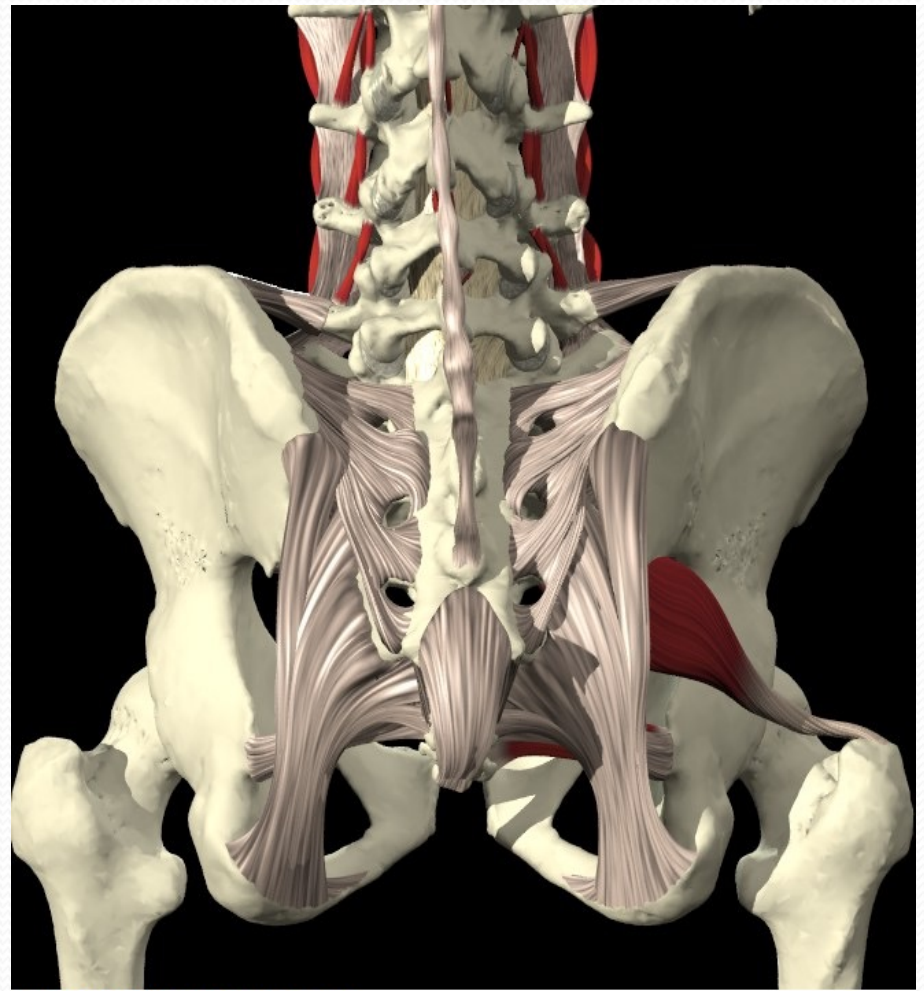
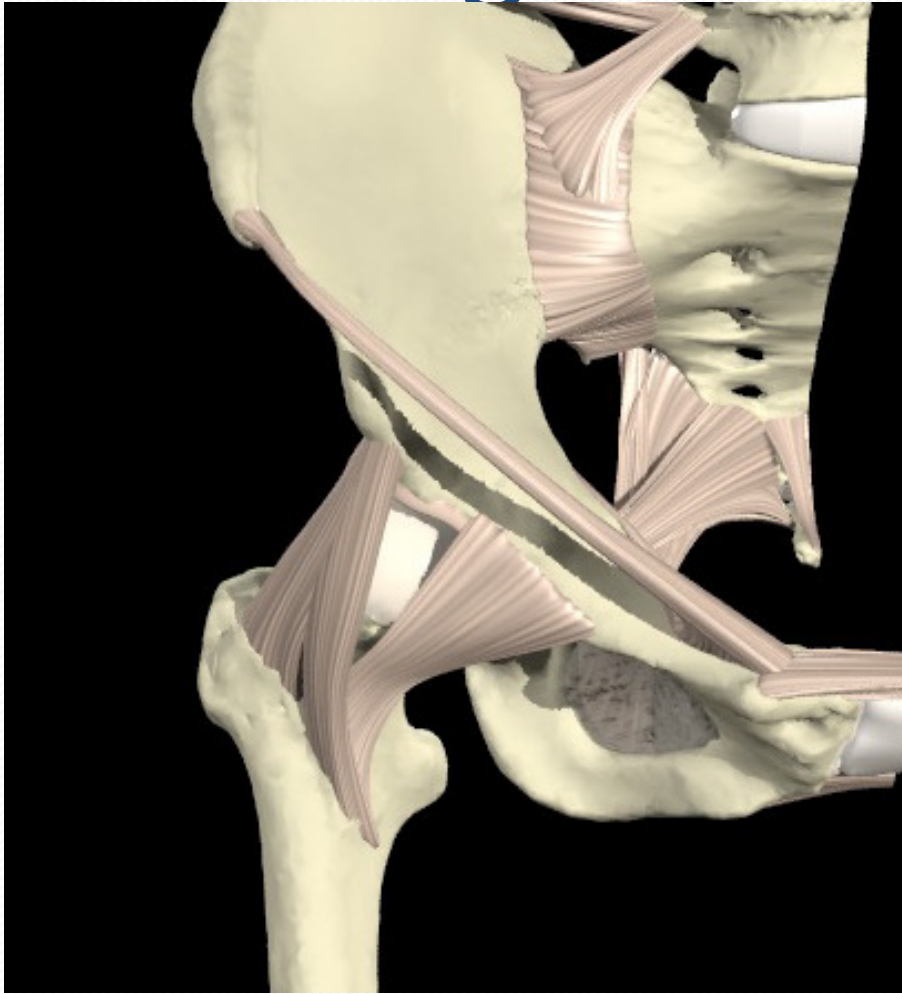
Injection Sites Lumbosacral Spine

- IS/SS Ligaments
- Facet Joints
- Transverse Processes
- Iliac Crest
- SI Ligaments
- IL Ligament
- ST/SS Ligaments
- Ischial Tuberosity
- Gluteal Muscles



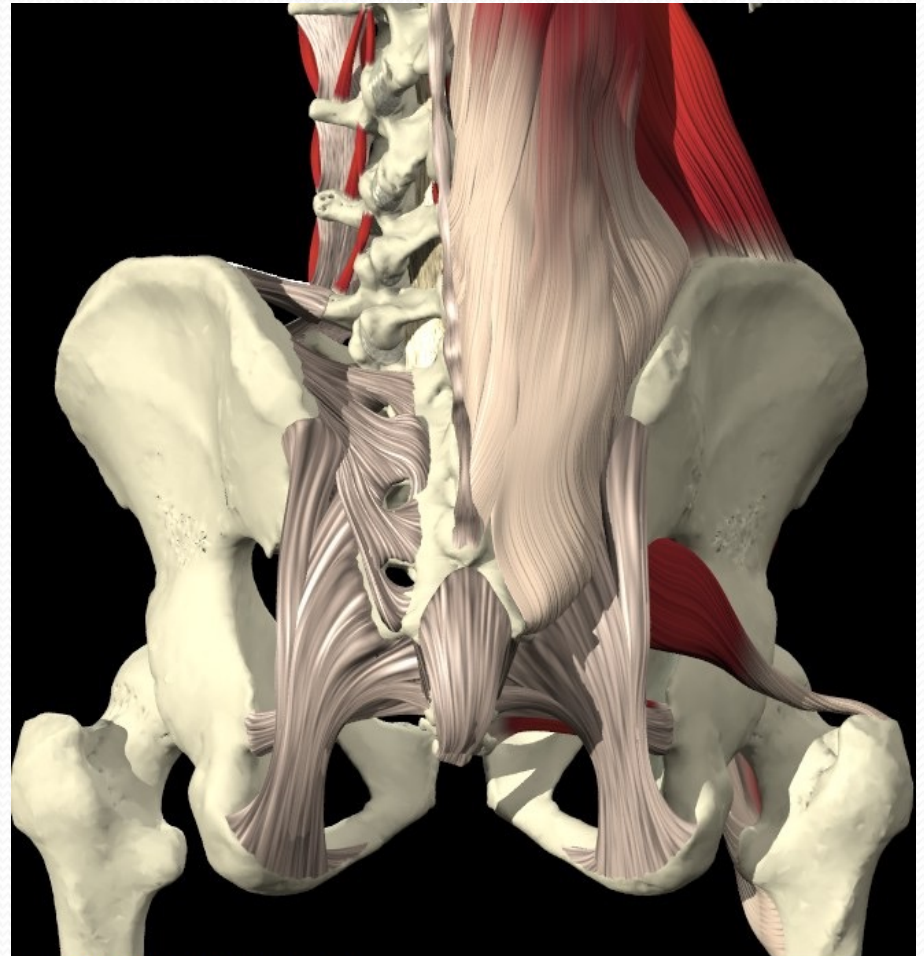
© 2003 Primal Pictures Ltd.

Pelvic Ligaments



© 2003 Primal Pictures Ltd.

Pelvic Muscles and Fascia



© 2003 Primal Pictures Ltd.

Spinal anatomy

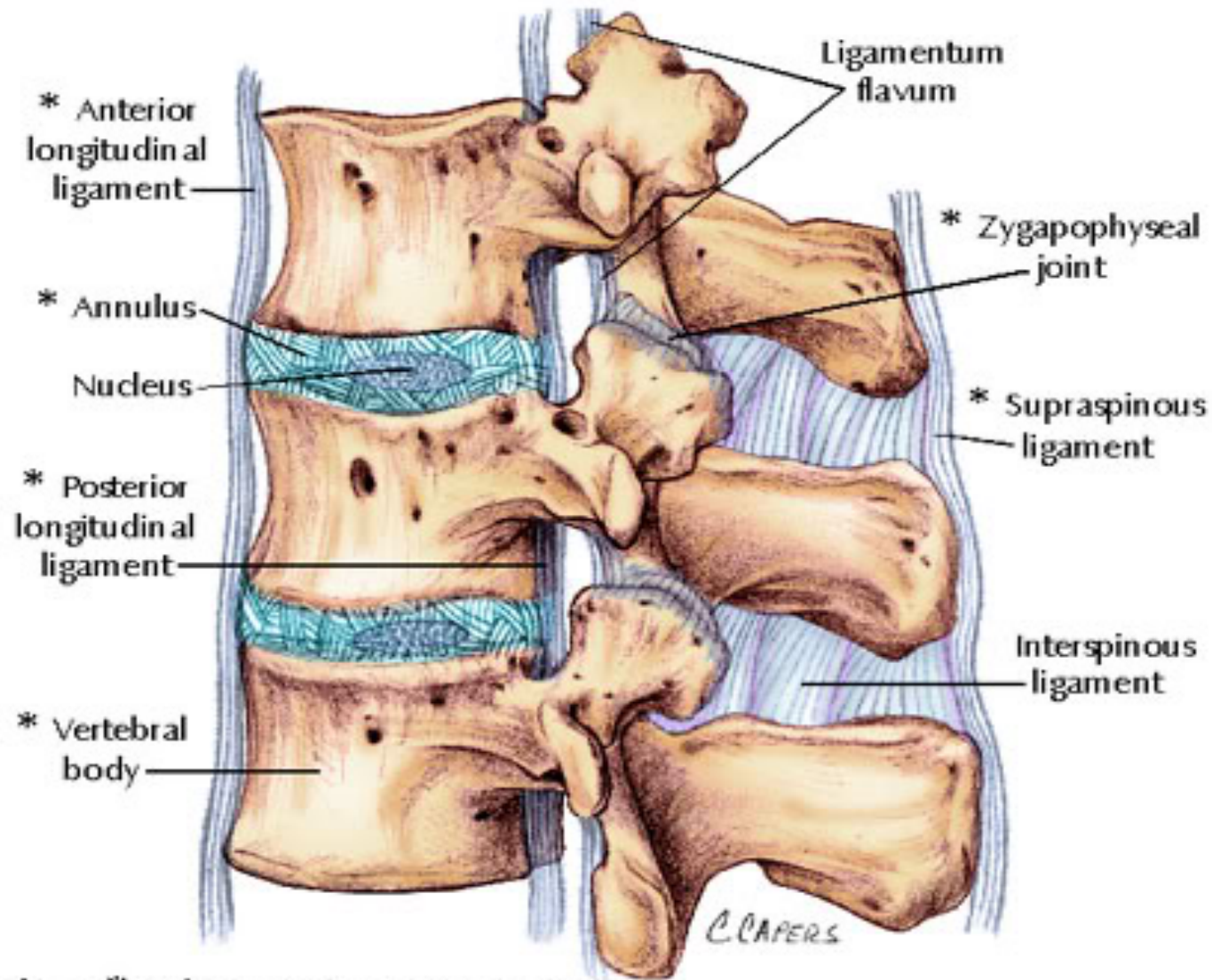
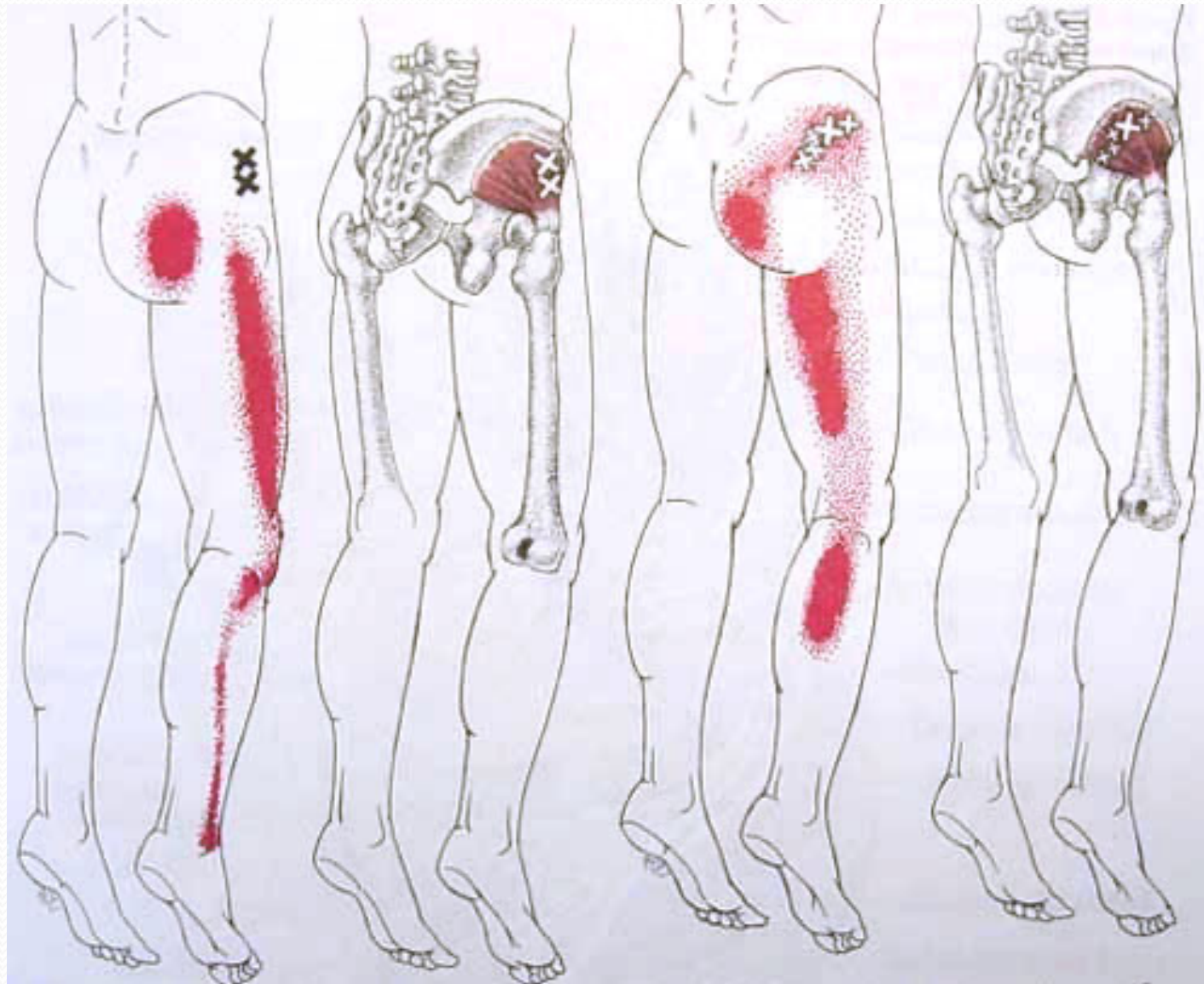


Fig. 1 * indicates pain-sensing structures

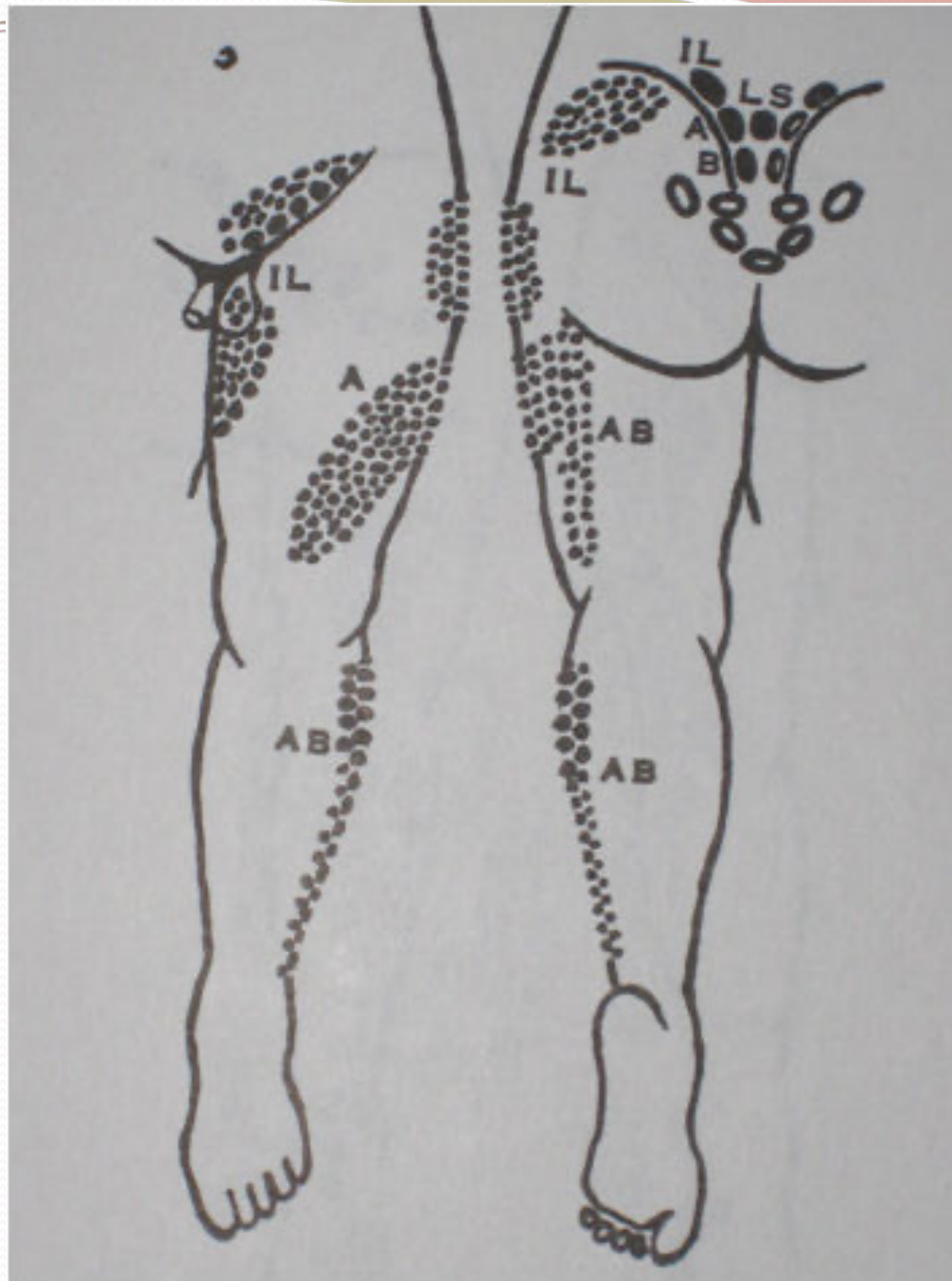


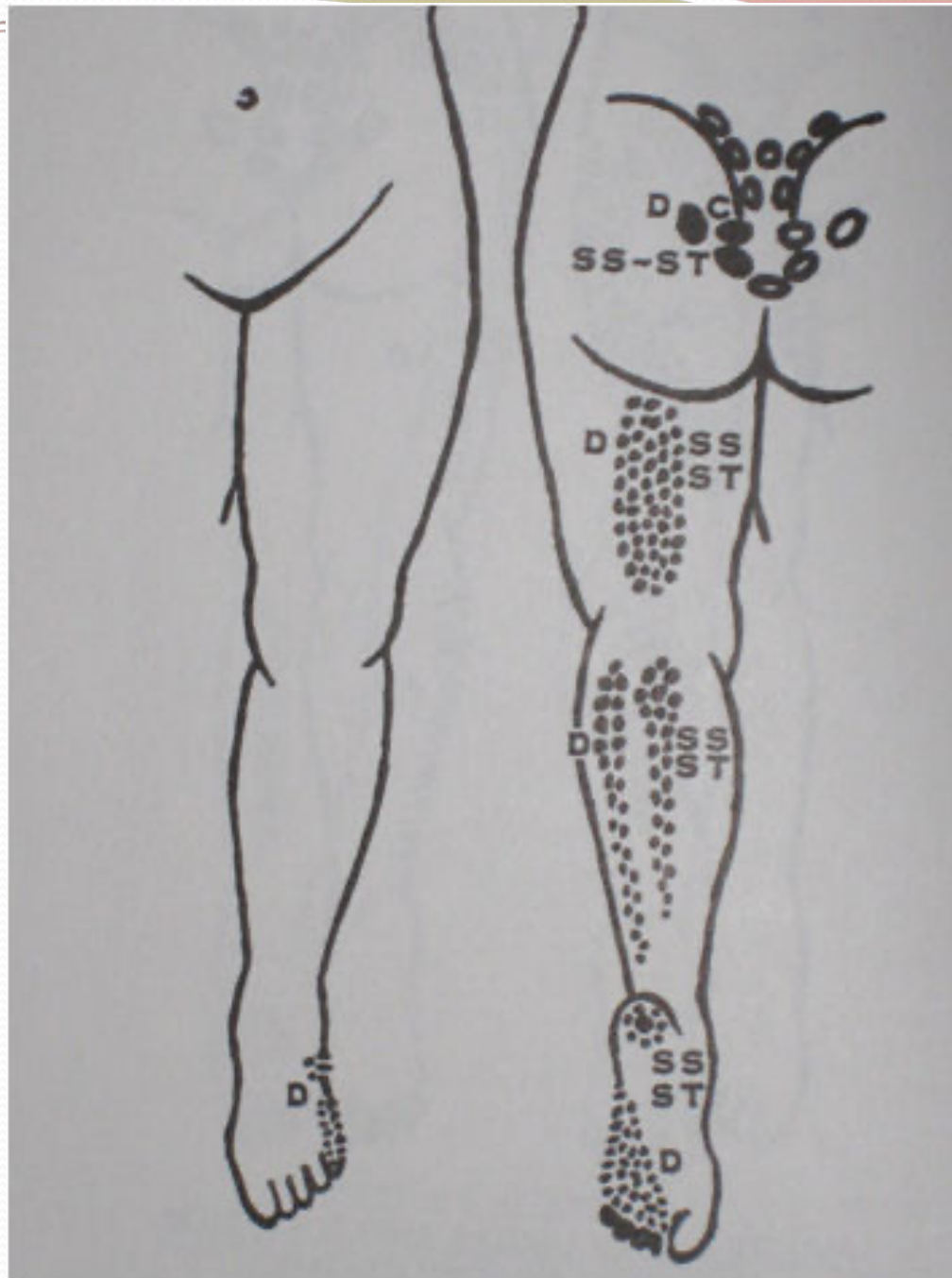
REFERRED PAIN AREAS AND SCIATICA FROM RELAXATION OF LUMBOSACRAL AND SACROILIAC LIGAMENTS



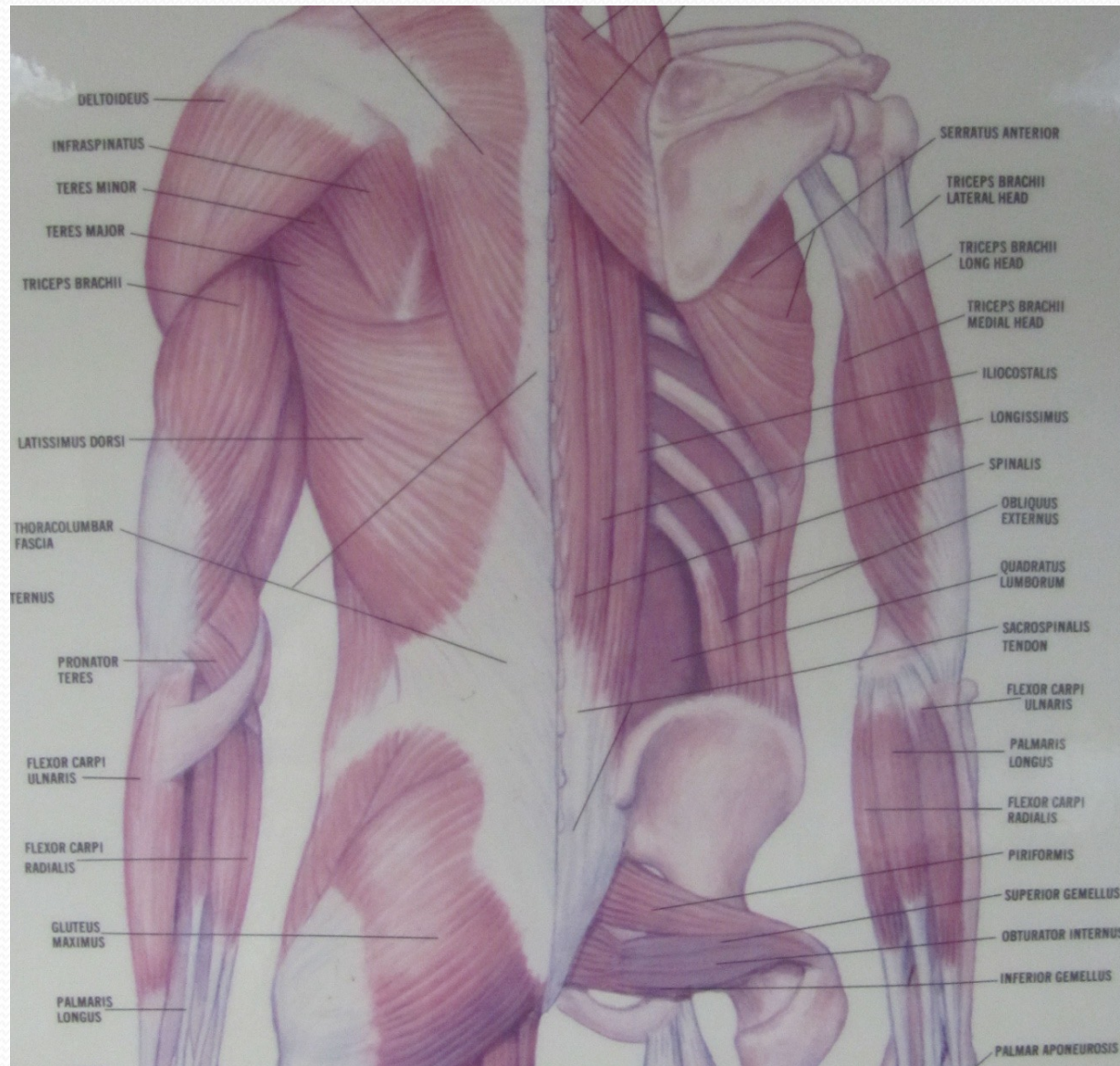
LIGAMENTS

- ILIOLUMBAR
- LUMBOSACRAL
- SACROILIAC (UPPER)
- SACROILIAC (LOWER)
- SACROSPINUS
- SACROTUBERUS
- 'SCIATICA'





THORACOLUMBAR FASCIA



Most Frequent Cause of Non-Specific Low Back Pain

(mechanical low back pain)

- **Strain of the dorso-lumbar fascia at the fibro-periosteal junction at the posterior iliac crest**
- **Sprain of the ilio-lumbar ligament at the fibro-periosteal junction at the posterior iliac crest**
- **Sprain of the L5-S1 facet joint capsule**
- **Sprain of the sacro-iliac joint and ligaments**
- **Sprain of the L4-5 facet joint capsule**

Additional Causes of Mechanical Low Back Pain

- Localized paraspinal muscle spasm usually from L4 to sacrum
- Patients with hypermobile connective tissue often will sustain sacro-iliac subluxation, usually an up-slip
- Cluneal nerve entrapment/irritation
- Posterior thigh radiation often is due to irritation of the medial nerve branches about the L5-S1 facet joint

Red Flag Conditions

For Acute Low Back Pain

- Age of onset- Less than 20, greater than 50
- Violent trauma- Auto accident, falling from a tall height, etc.
- Less severe trauma
- Osteoporosis
- Systemic steroids
- Major neurological compromise ie. Cauda equina syndrome
- Past medical history of tuberculosis
- Past medical history of cancer
- Constant progressive, non-mechanical pain
- Severe night pain
- Pain that worsens when supine
- Unexplained weight loss
- Drug abuse, HIV
- Systemically unwell

Metabolic or Inflammatory Conditions That Can Cause or Aggravate Low Back Pain

- **Osteoporosis**
 - Lack of hormones
 - Overly acidic diet
 - Lack of minerals as CA, Mg
 - Excessive sodium intake
- **Connective Tissue Hypermobility**
 - Ehlers Danlos Syndrome
 - Aggravated by trauma, repetitive stress or poor posture
- **Protein Deficiency**
 - Often found in vegetarians
 - Commonly found in people with poor health
- **Cellular Inflammation**
 - Increased arachadonic acid levels

Metabolic or Inflammatory Conditions That Can Cause or Aggravate Low Back Pain

- **Gluten Intolerance/Lactose Intolerance**
- **Intestinal Permeability (Leaky Gut Syndrome)**
 - Drugs such as NSAIDS & ASA
 - Environmental toxins
 - Stress – lowers serotonin → decreases intestinal motility → increases yeast and unhealthy bacteria
 - Auto-immune inflammatory reaction
- **Systemic Infection**
 - Yeast, etc.
- **Fibromyalgia (metabolic syndrome)**
 - Low serotonin
 - Low adrenal function
 - Low thyroid function
 - High insulin level (insulin resistance)

Flat Back (almost)

