Main Menu

1 Hip Joint and Pelvic Girdle

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Hip Joint (acetabular femoral)

Relatively stable due to :

Bony architecture

- strong ligaments
- large supportive muscles

Functions in weight bearing and locomotion

- enhanced significantly by its wide range of motion
- ability to run, cross-over cut, side-step cut, jump, and many other directional changes

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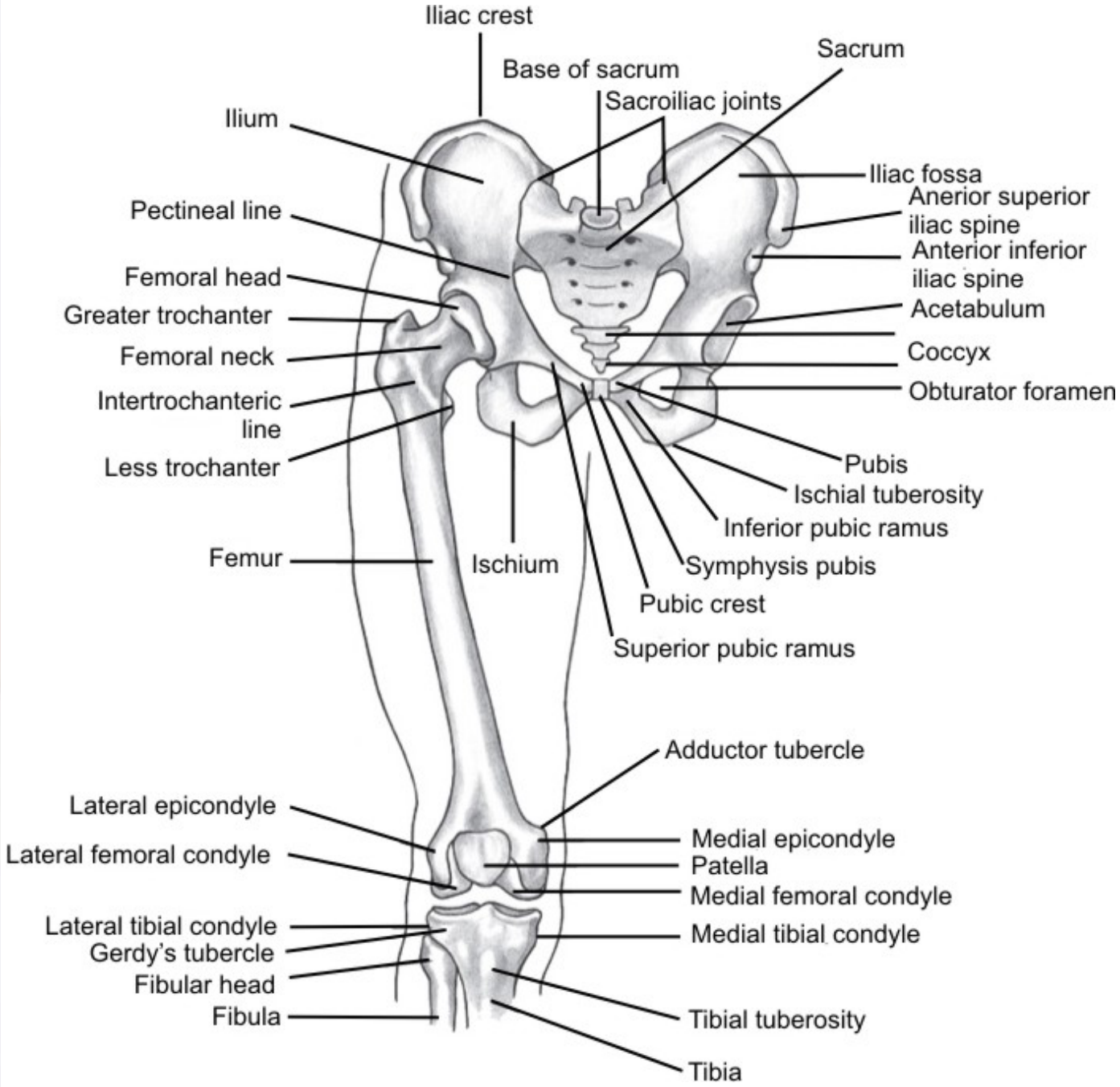
Bones



Bones

Pelvic bone - divided into 3 areas

Upper two fifths = ilium

Posterior & lower two fifths = ischium

Anterior and lower one fifth

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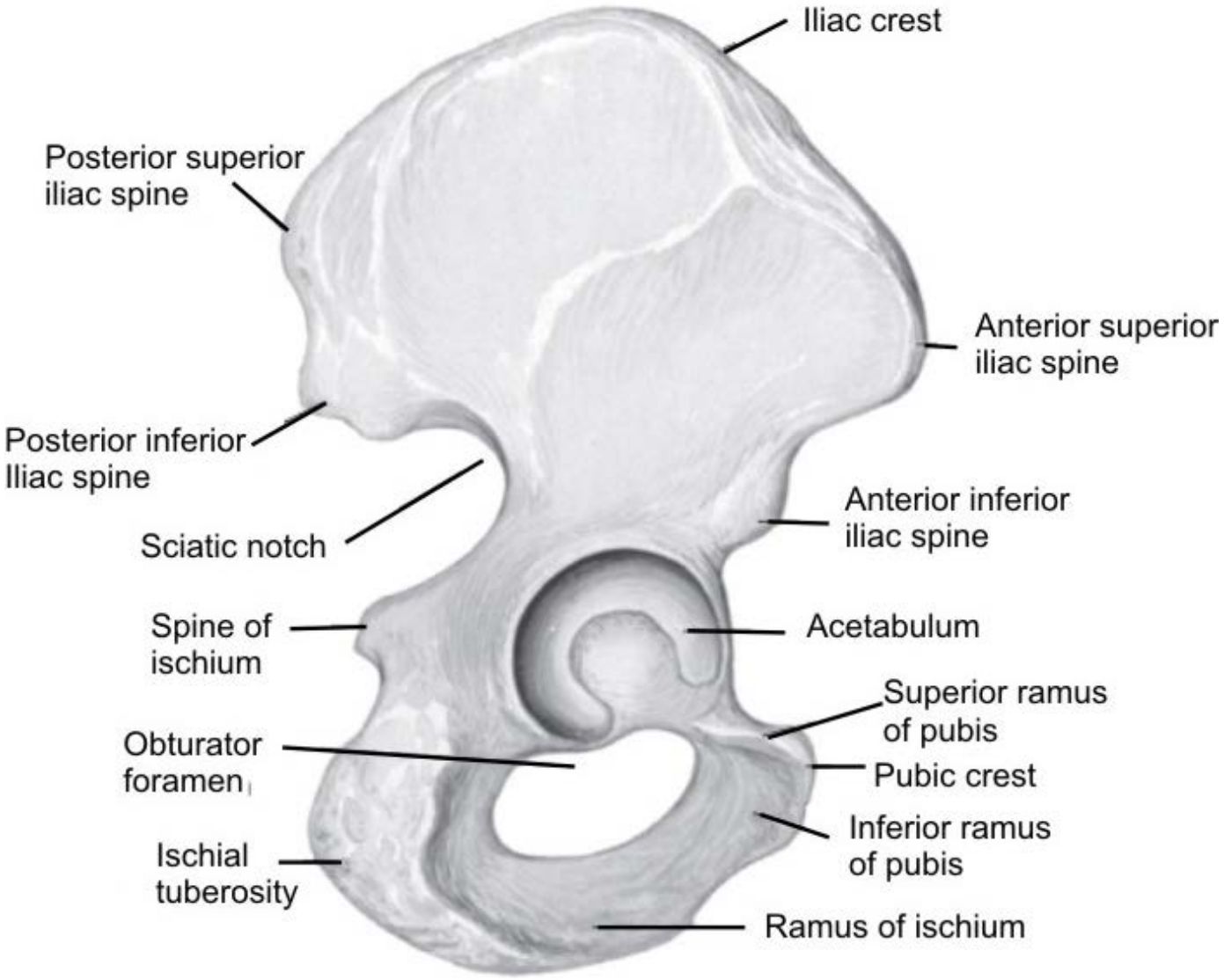
Bones



Boney Landmarks

Anterior pelvis - origin for hip flexors

- tensor fasciae latae - anterior iliac crest
- sartorius - anterior superior iliac spine
- rectus femoris - anterior inferior iliac spine

Lateral pelvis - origin for hip abductors

- gluteus medius and minimus - just below iliac crest

Medially - origin for hip adductors

- adductor magnus, adductor longus, adductor brevis, pectineus, and gracilis - pubis and its inferior ramus

Posteriorly – origin for hip extensors

- gluteus maximus - posterior iliac crest and posterior sacrum & coccyx

Posteroinferiorly - origin for hip extensors

- hamstrings - ischial tuberosity

Proximal thigh - insertion for short muscles of hip

- gluteal muscles and most of the six deep external rotators - greater trochanter
- iliopsoas - lesser trochanter

Proximal thigh - origin for 3 knee extensors

- three vasti muscles of quadriceps – anteriorly
- hip adductors - linea aspera

Patella – insertion for all 4 quadriceps muscles

Proximal tibia or fibula – insertion for remainder of hip muscles

- sartorius, gracilis, & semitendinosus - upper anteromedial tibial surface just below medial condyle after crossing knee posteromedially

semimembranosus - posteromedially on medial tibial condyle

Proximal tibia or fibula – insertion for remainder of hip muscles

biceps femoris – laterally, primarily on fibula head with some fibers attaching on lateral tibial condyle

iliotibial tract of tensor fasciae latae – anterolaterally on Gerdy's tubercle of tibia

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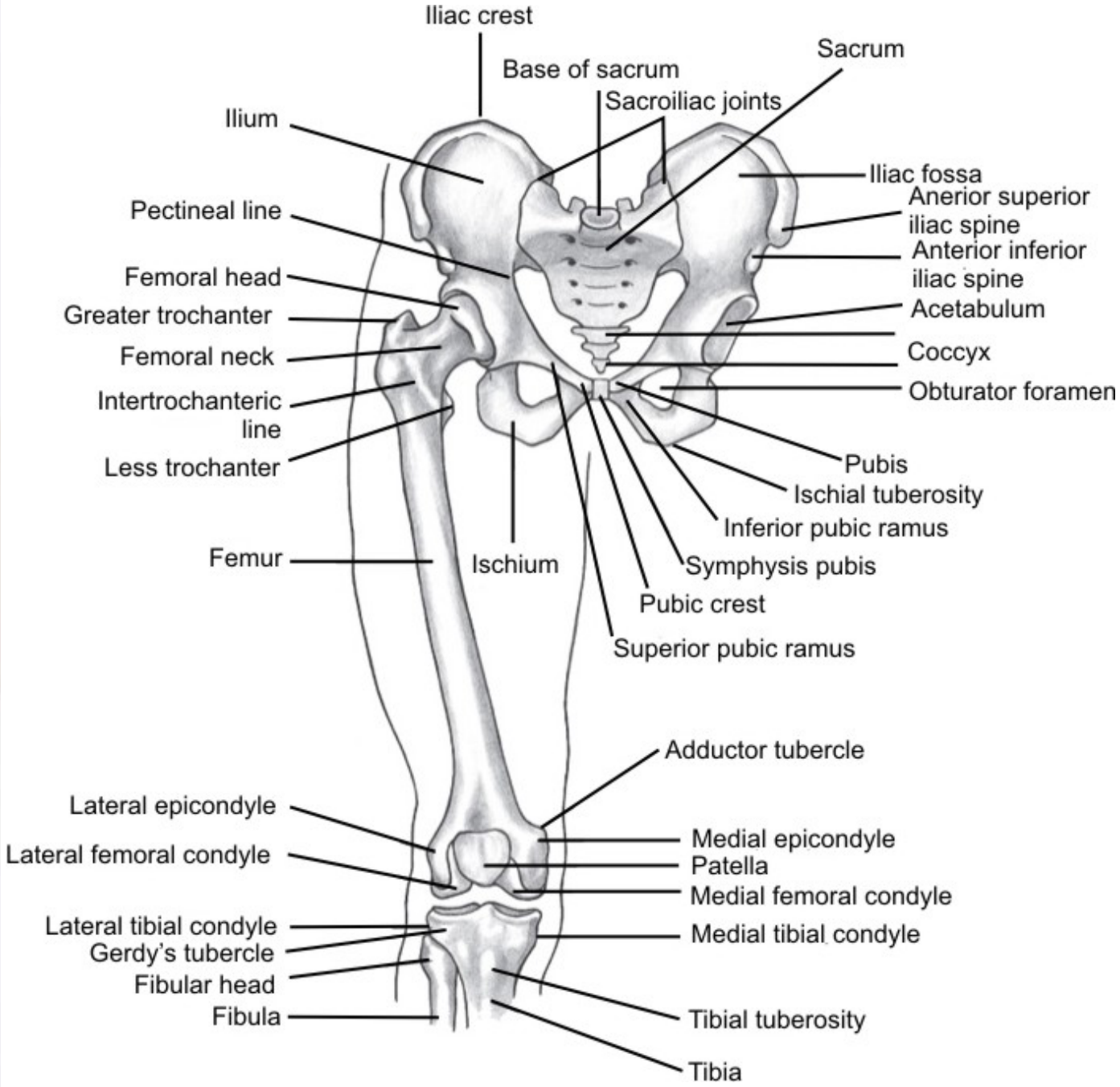
Bones



Joints

Anteriorly

- Two pelvic bones join to form symphysis pubis, amphiarthrodial

Posteriorly

- Sacrum is between the 2 pelvic bones and forms the sacroiliac joints
- Strong ligaments unite these bones to form rigid, slightly movable joints

Large and heavy bones covered by thick, heavy muscles

Very minimal oscillating-type movements occur in sacroiliac joints, as in walking

Body movements usually involve entire pelvic girdle and hip joints

In walking, hip flexion and extension occur with pelvic girdle rotation, forward in hip flexion and backward in hip extension

Jogging and running result in faster movements and greater range of movement

Pelvic rotation increases the length of stride in running; in kicking it results in a greater distance or more speed to the kick

Acetabulofemoral joint - most mobile joints of body (except glenohumeral)

- Multiaxial arrangement
- Bony architecture provides stability
- relatively few hip joint subluxations and dislocations
- Enarthrodial-type joint
- Femoral head inserting into acetabulum
- Reinforced by extremely strong and dense ligamentous capsule, especially anteriorly

Joints

Acetabulofemoral joint

Iliofemoral or Y ligament – located anteriorly, prevents hyperextension

Pubofemoral ligament - located anteromedially and inferiorly, limits excessive extension and abduction

Teres ligament - attaches from deep in acetabulum to a depression in femoral head, slightly limits adduction

Ischiofemoral ligament – located posteriorly, extends from ischium to trochanteric fossa of femur, limits internal rotation

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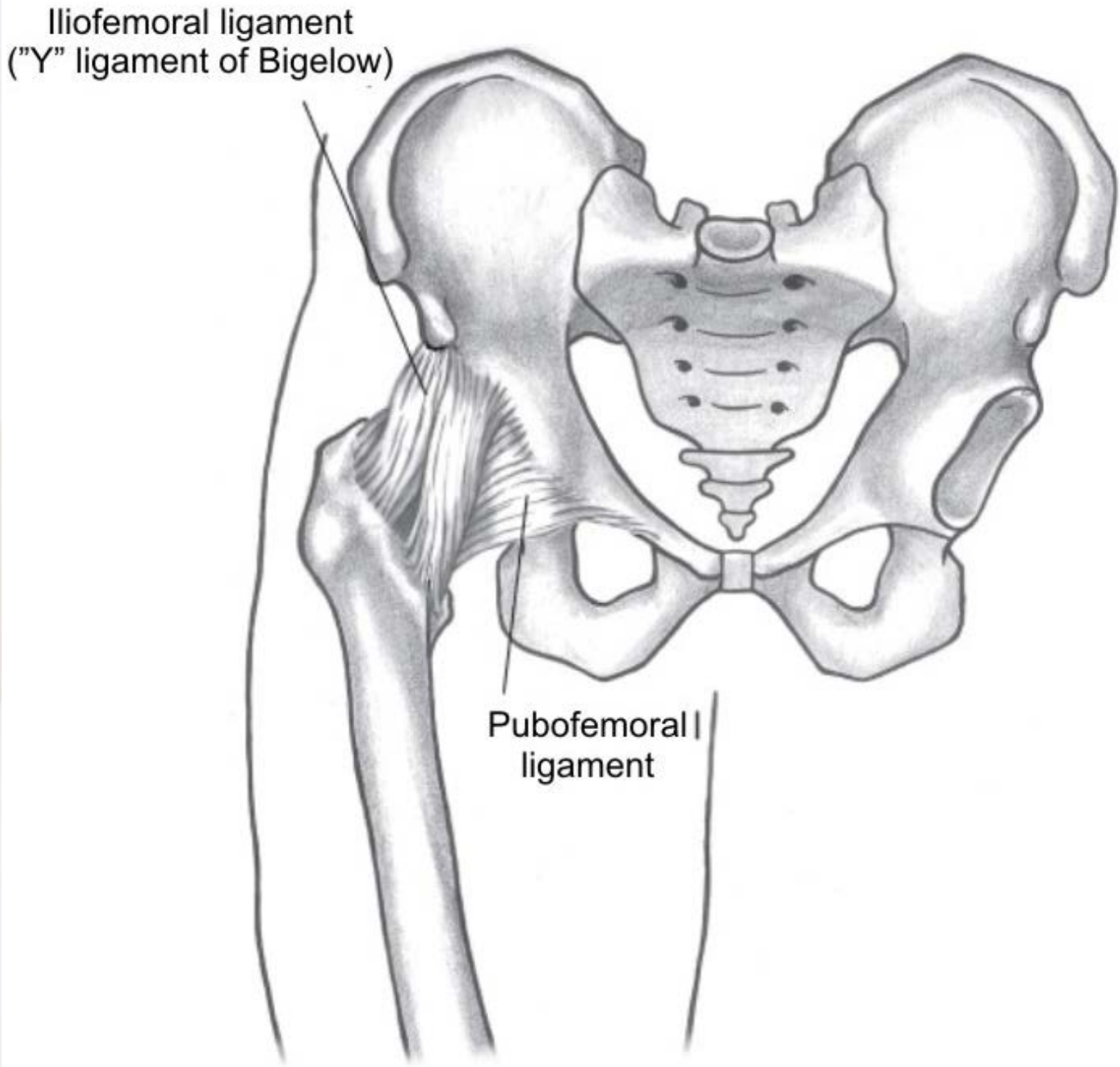
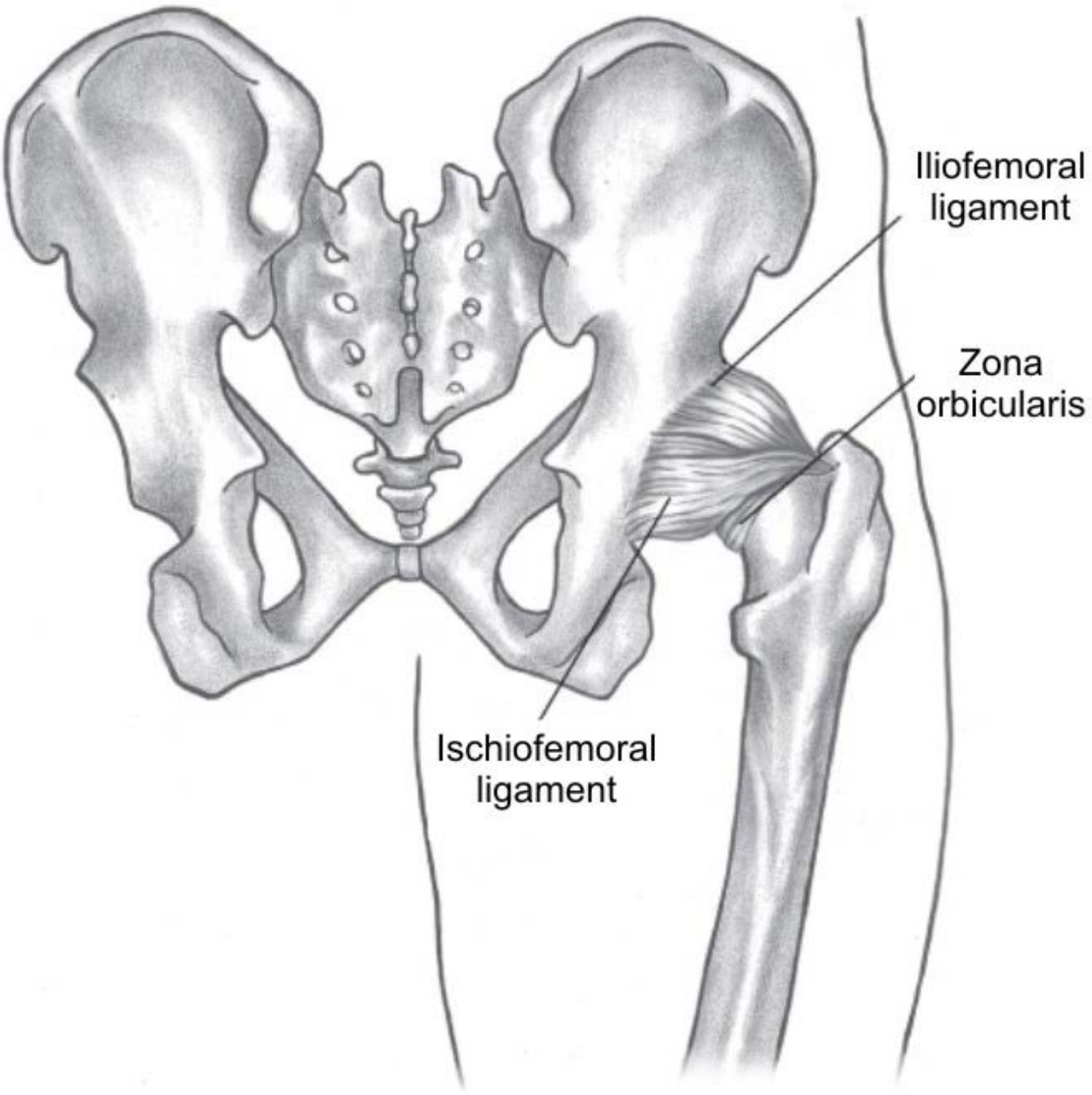
Joints


Iliofemoral ligament
("Y" ligament of Bigelow)
Pubofemoral ligament

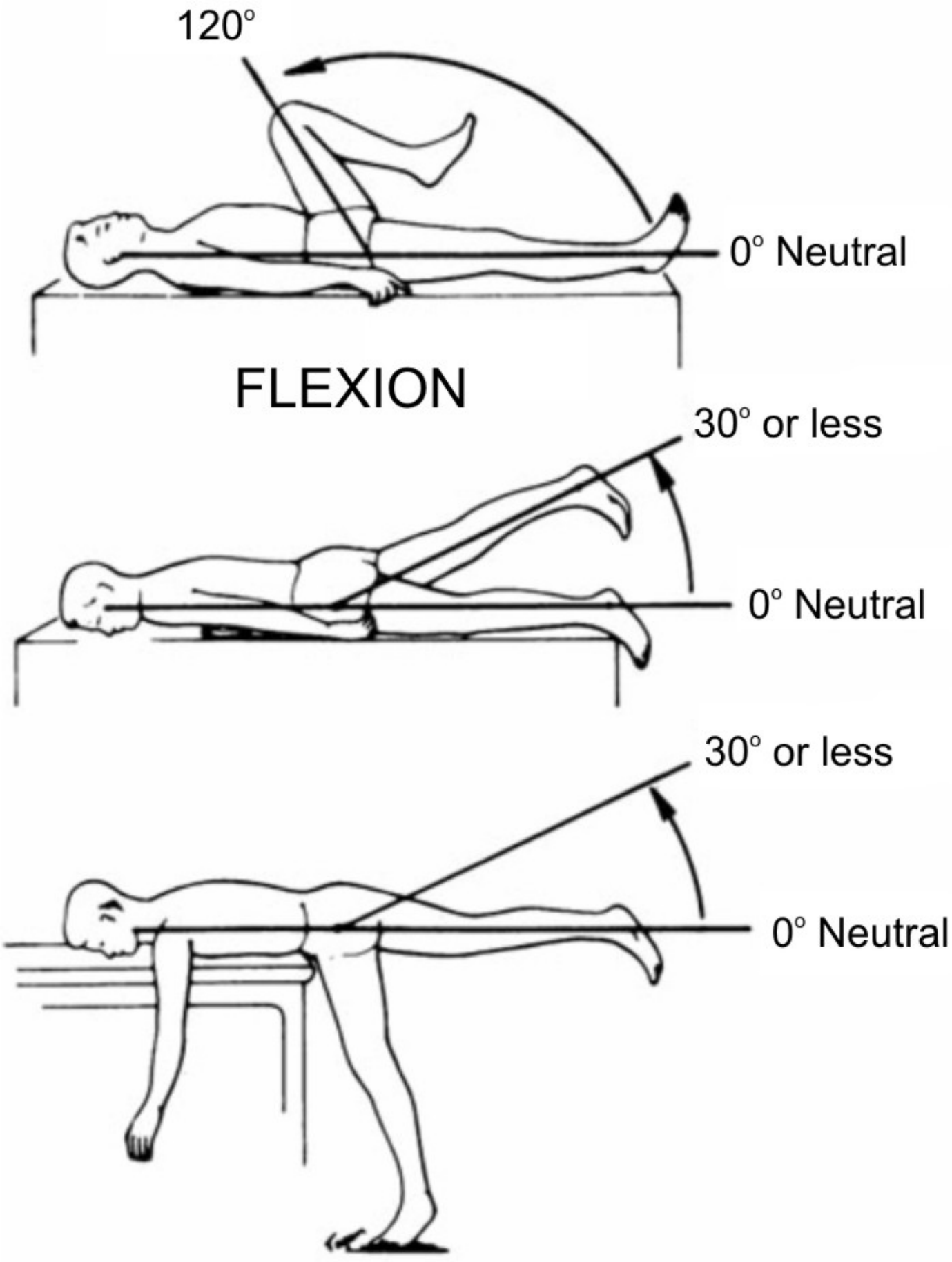


Joints

Some disagreement about exact possible range of each movement in hip joint

0 to 130 degrees of flexion

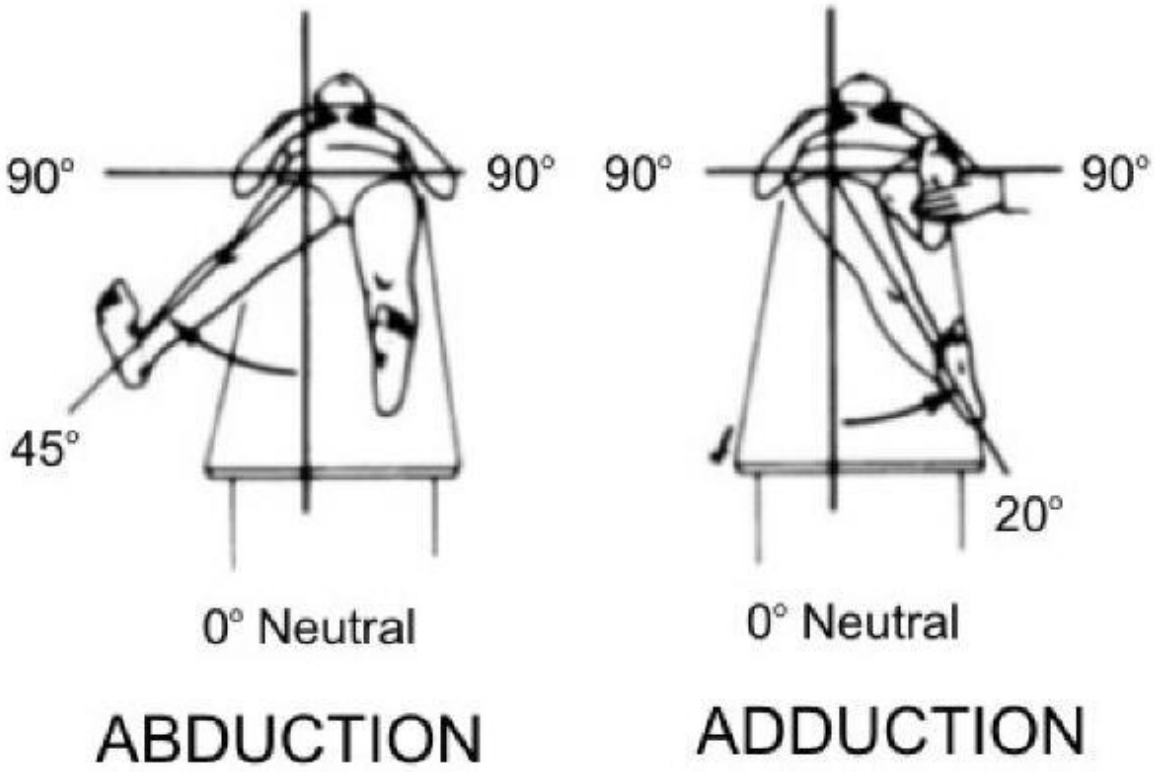
0 to 30 degrees of extension



Joints

0 to 35 degrees of abduction

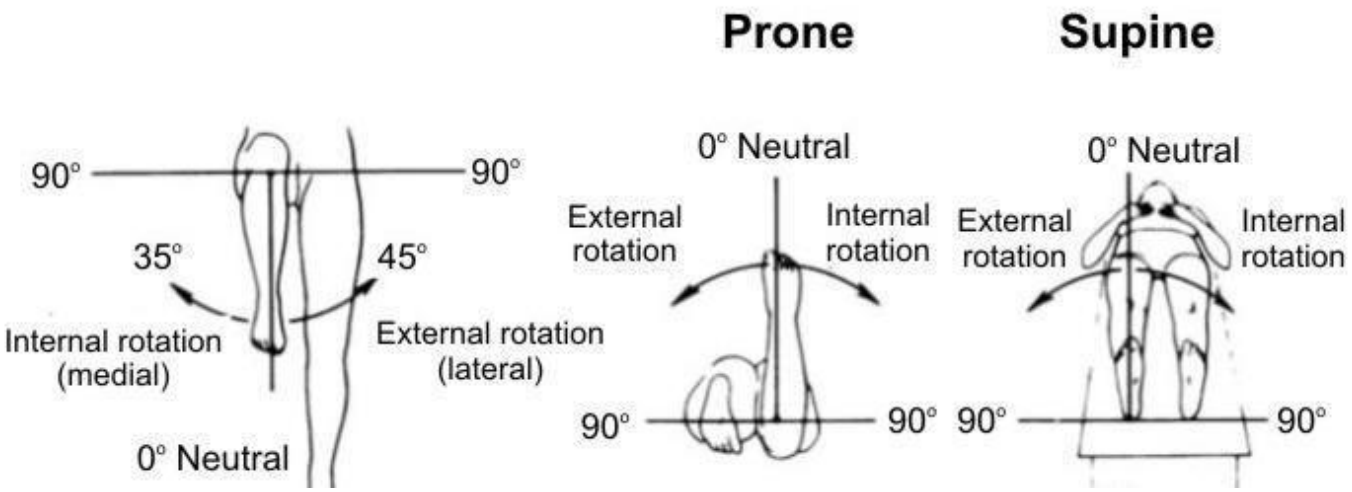
0 to 30 degrees of adduction



Joints

0 to 45 degrees of internal rotation

0 to 50 degrees of external rotation



Joints

Pelvic girdle moves back and forth within 3 planes for a total of 6 different movements :

All pelvic girdle rotation results from motion at one or more locations

right hip

left hip

lumbar spine

Pelvic Rotation	Lumbar Spine Motion	Right Hip Motion	Left Hip Motion
Anterior rotation	Extension	Flexion	Flexion
Posterior rotation	Flexion	Extension	Extension
Right lateral rotation	Right lateral flexion	Adduction	Abduction
Left lateral rotation	Left lateral flexion	Abduction	Adduction
Right transverse rotation	Left transverse rotation	Internal rotation	External rotation
Left transverse rotation	Right transverse rotation	External rotation	Internal rotation

Movements

Anterior and posterior pelvic rotation

sagittal or anteroposterior plane

Right and left lateral rotation

lateral or frontal plane

Right transverse (clockwise) rotation and left transverse (counterclockwise) rotation

horizontal or transverse plane of motion

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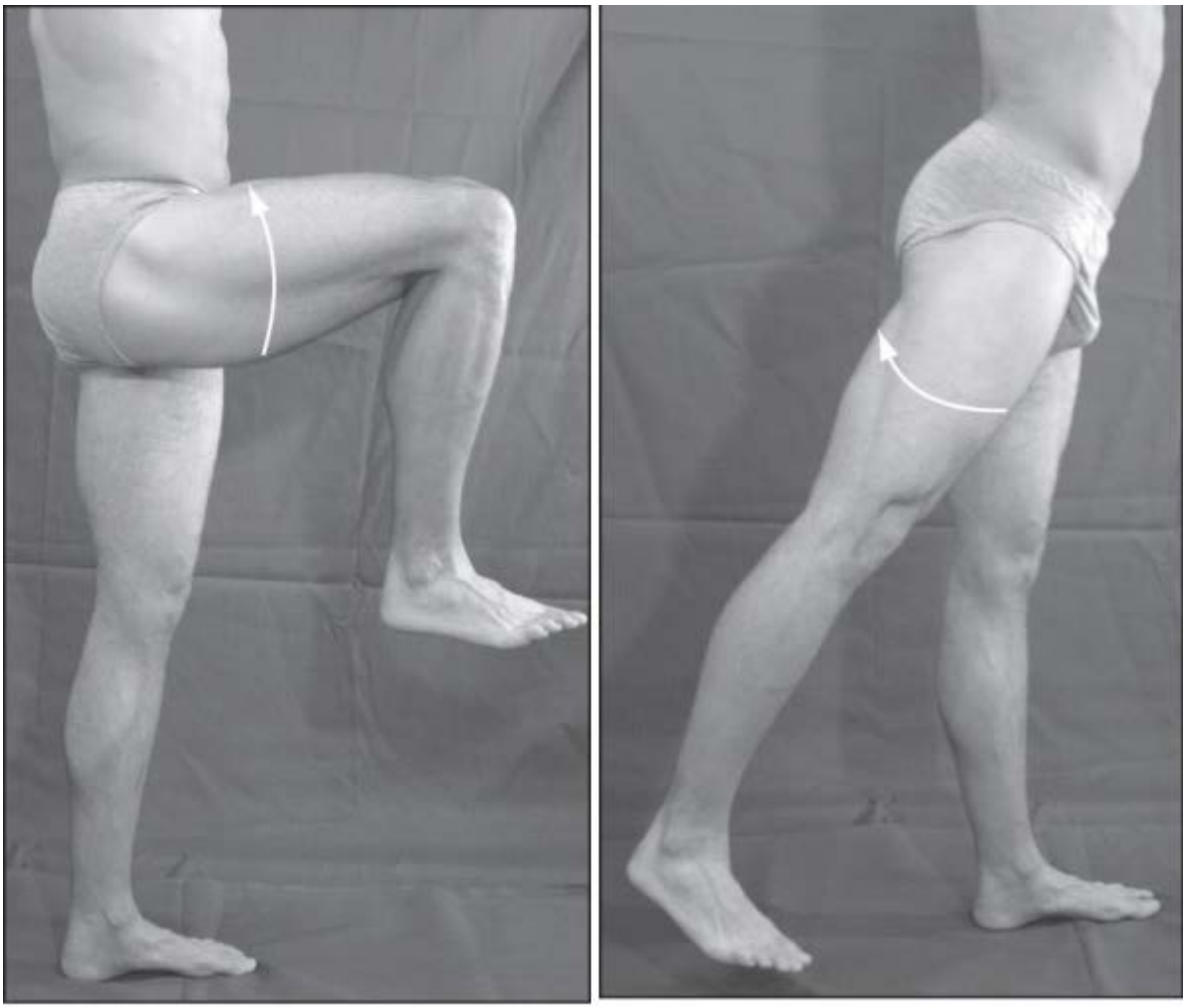
Movements

Hip flexion

movement of femur straight anteriorly toward pelvis

Hip extension

movement of the femur straight posteriorly away from the pelvis; sometimes referred to as hyperextension



Flexion Extension

Movements

Hip abduction

movement of femur laterally to side away from midline

Hip adduction

movement of femur medially toward midline

Abduction Adduction

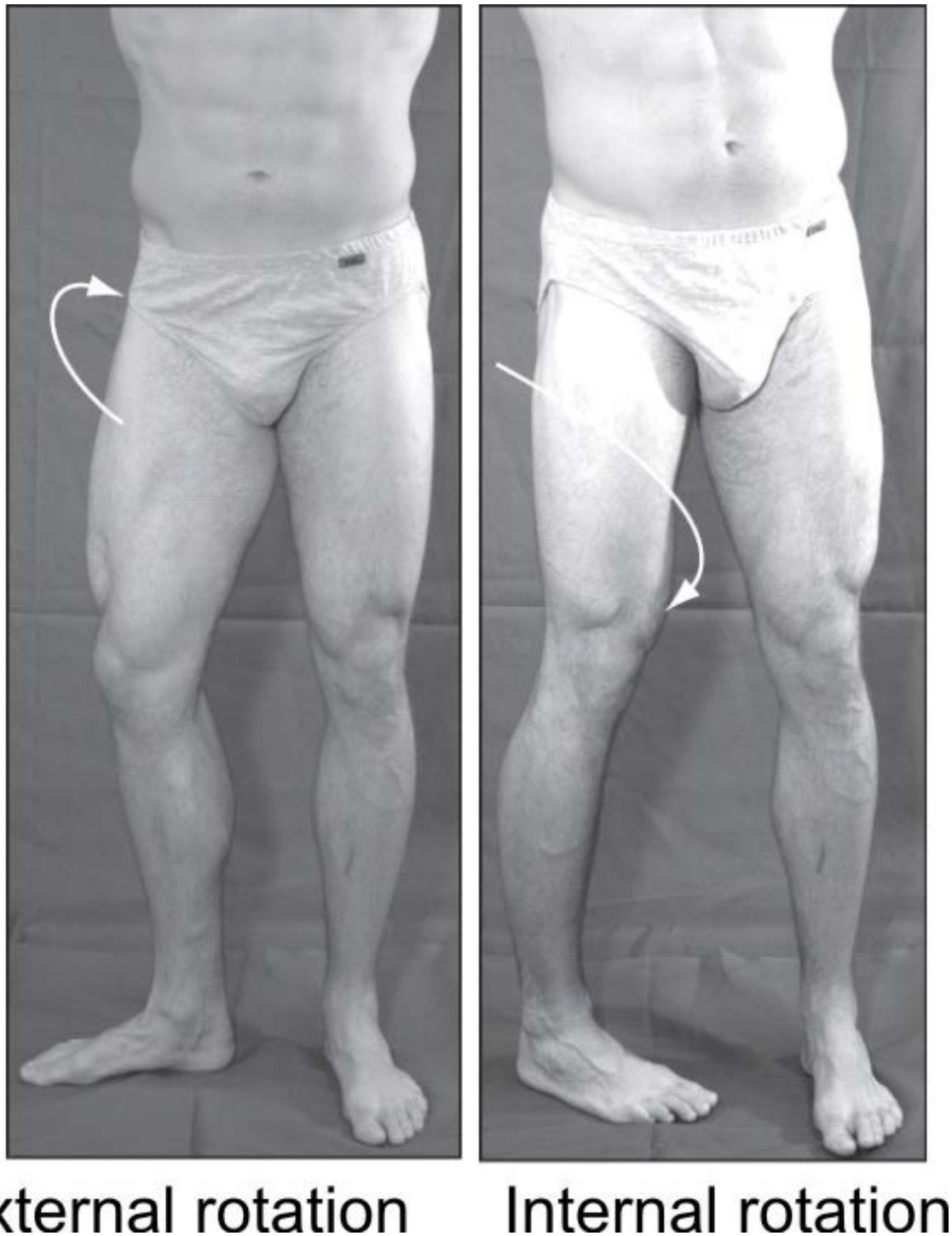
Movements

Hip external rotation

rotary movement of femur laterally around its longitudinal axis away from midline; lateral rotation

Hip internal rotation

rotary movement of femur medially around its longitudinal axis toward to midline; medial rotation



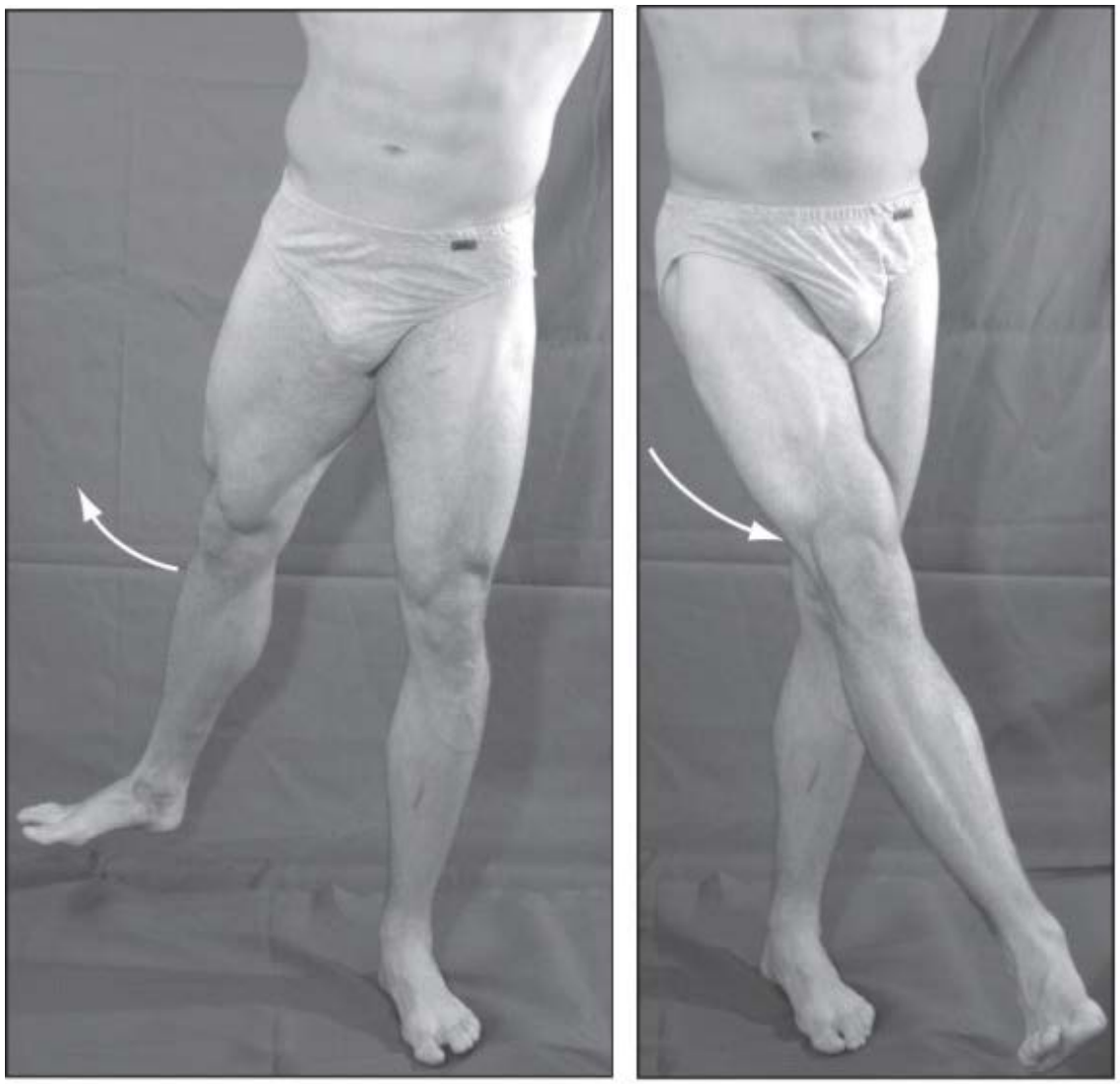
Movements

Hip diagonal abduction

movement of femur in a diagonal plane away from midline of body

Hip diagonal adduction

movement of femur in a diagonal plane toward midline of body



Diagonal abduction Diagonal adduction

Movements

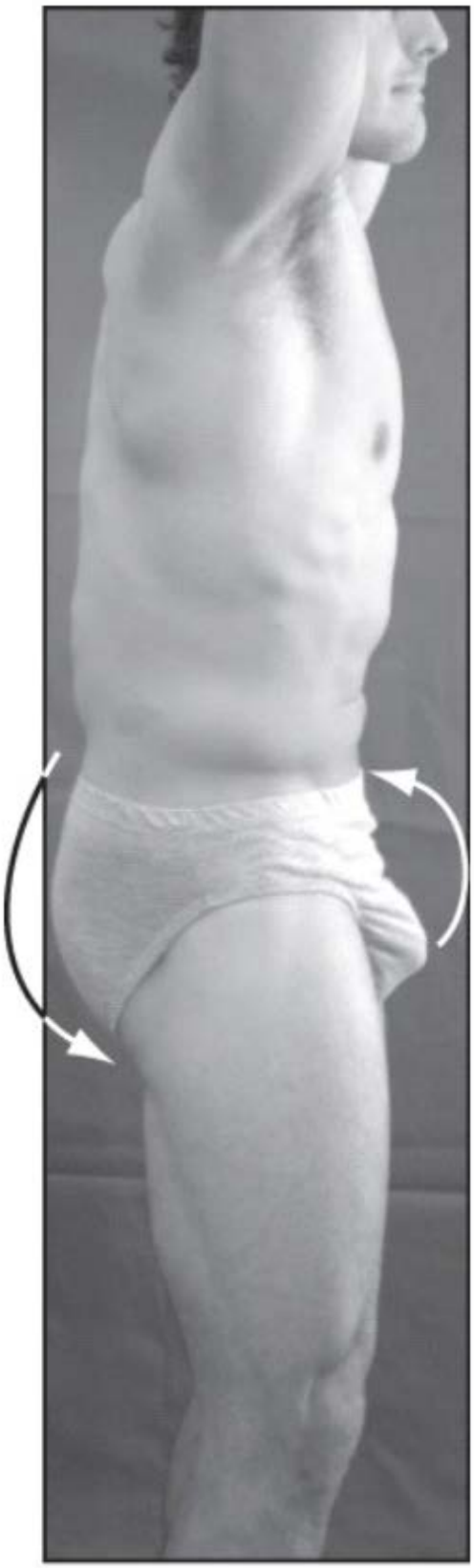
Anterior pelvic rotation

anterior movement of upper pelvis; iliac crest tilts forward in a sagittal plane; anterior tilt

Posterior pelvic rotation

posterior movement of upper pelvis; iliac crest tilts backward in a sagittal plane; posterior tilt

Anterior pelvic rotation



Posterior pelvic rotation

Movements

Left lateral pelvic rotation

in frontal plane left pelvis moves inferiorly in relation to right pelvis; either left pelvis rotates downward or right pelvis rotates upward; left lateral tilt

Right lateral pelvic rotation

in frontal plane right pelvis moves inferiorly in relation to left pelvis; either right pelvis rotates downward or left pelvis rotates upward; right lateral tilt

Left lateral pelvic rotation

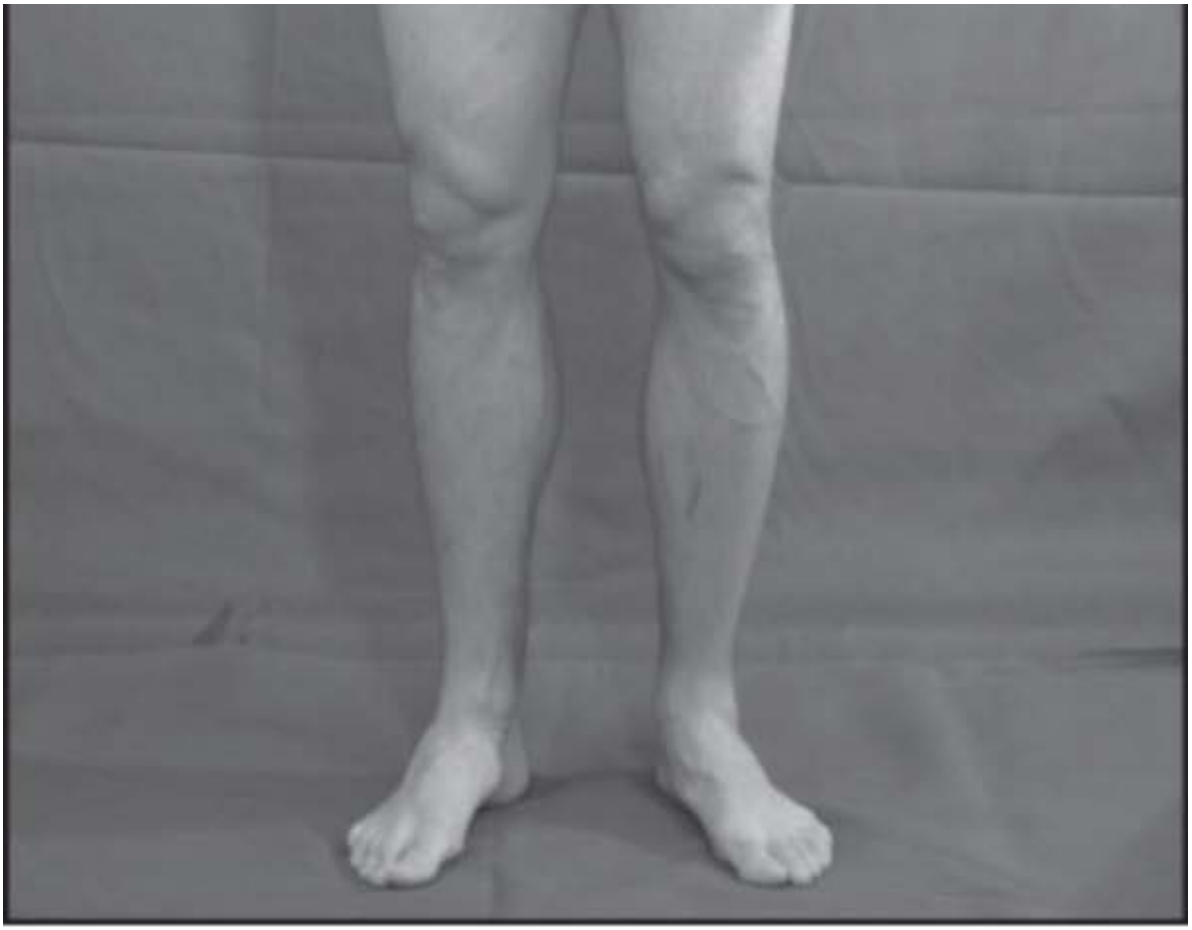
Movements

Left transverse pelvic rotation

in horizontal plane pelvis rotates to body's left; right iliac crest moves anteriorly in relation to left iliac crest, which moves posteriorly

Right transverse pelvic rotation

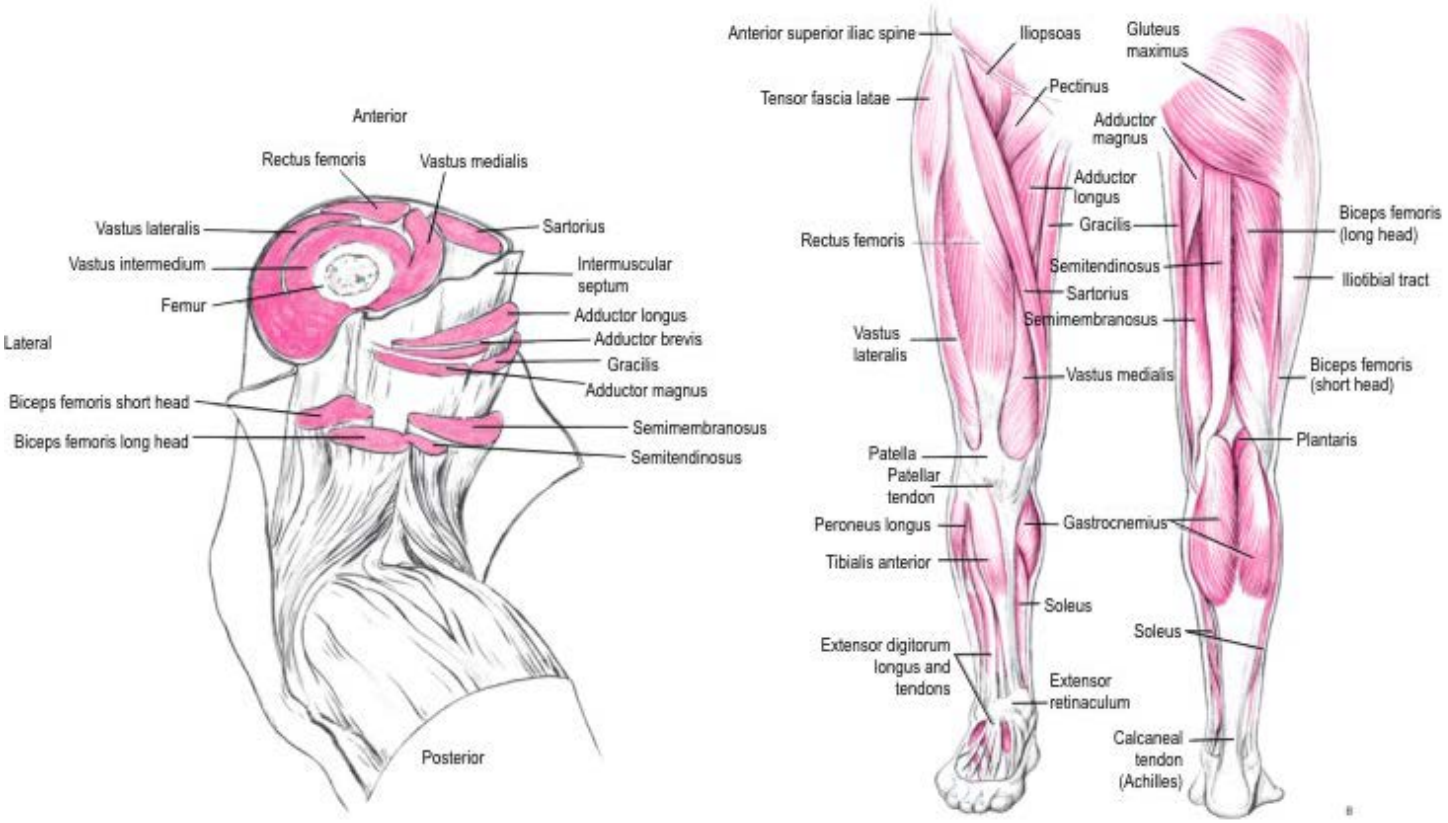
in horizontal plane pelvis rotates to body's right; left iliac crest moves anteriorly in relation to right iliac crest, which moves posteriorly



Right transverse pelvic rotation

Muscles

Seven two-joint muscles have one action at hip and another at knee



Muscles

Muscles involved in hip and pelvic girdle motions depend largely on direction of movement and position of body in relation to earth and gravitational forces

Body part that moves most will be the part least stabilized

- Standing on both feet and contracting hip flexors, the trunk and pelvis rotate anteriorly
- Lying supine and contracting hip flexors, the thighs move forward into flexion on the stable pelvis

Hip flexor muscles used in moving thighs up toward trunk

Hip extensor muscles used eccentrically when pelvis and trunk move downward slowly on the femur and concentrically when trunk is raised on femur (rising to standing position)

In downward phase of knee-bend exercise, movement at hips and knees is flexion

- muscles primarily involved - hip and knee extensors in eccentric contraction

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Muscles

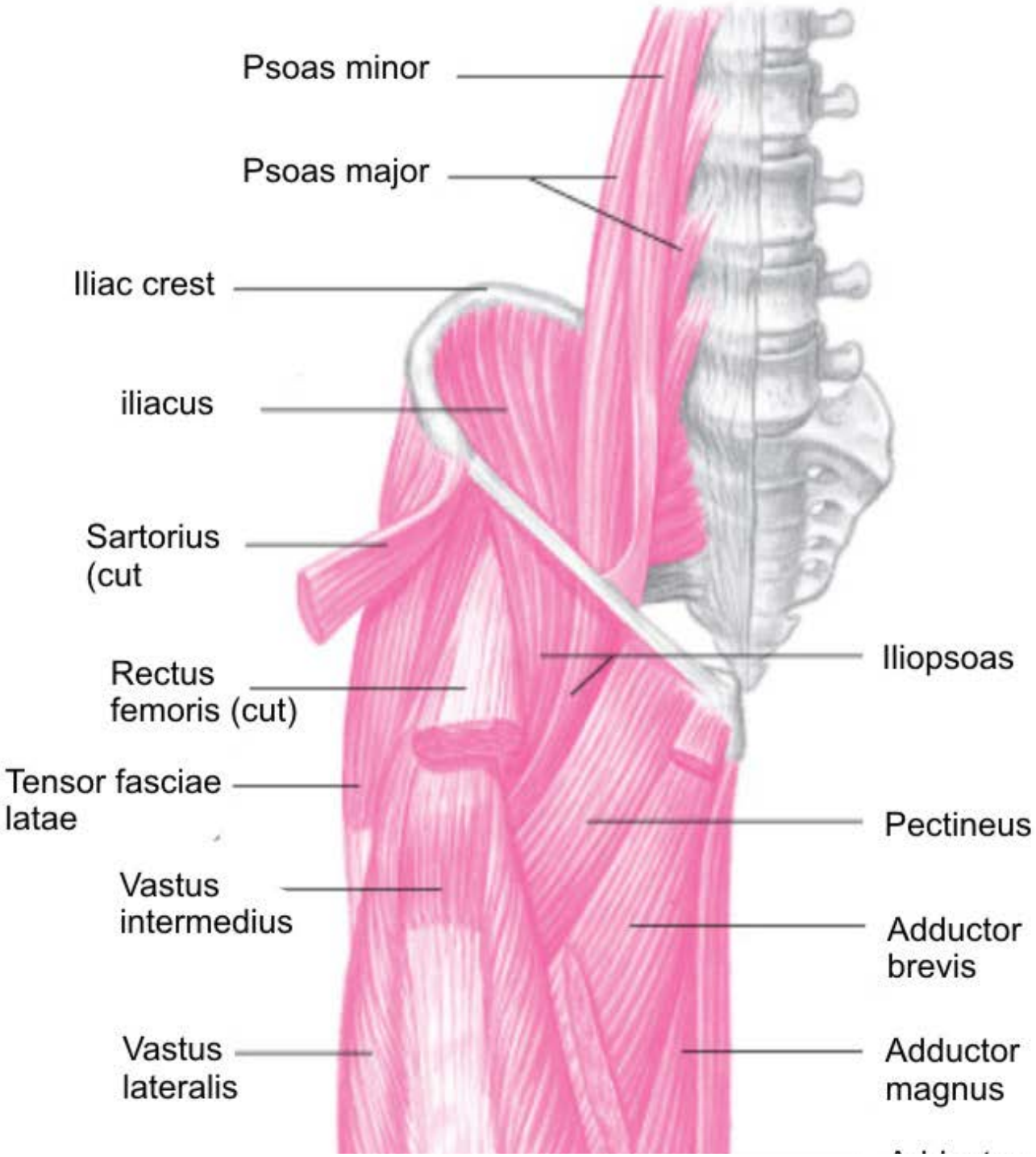
Hip joint and pelvic girdle muscles : Anterior - primarily hip flexion

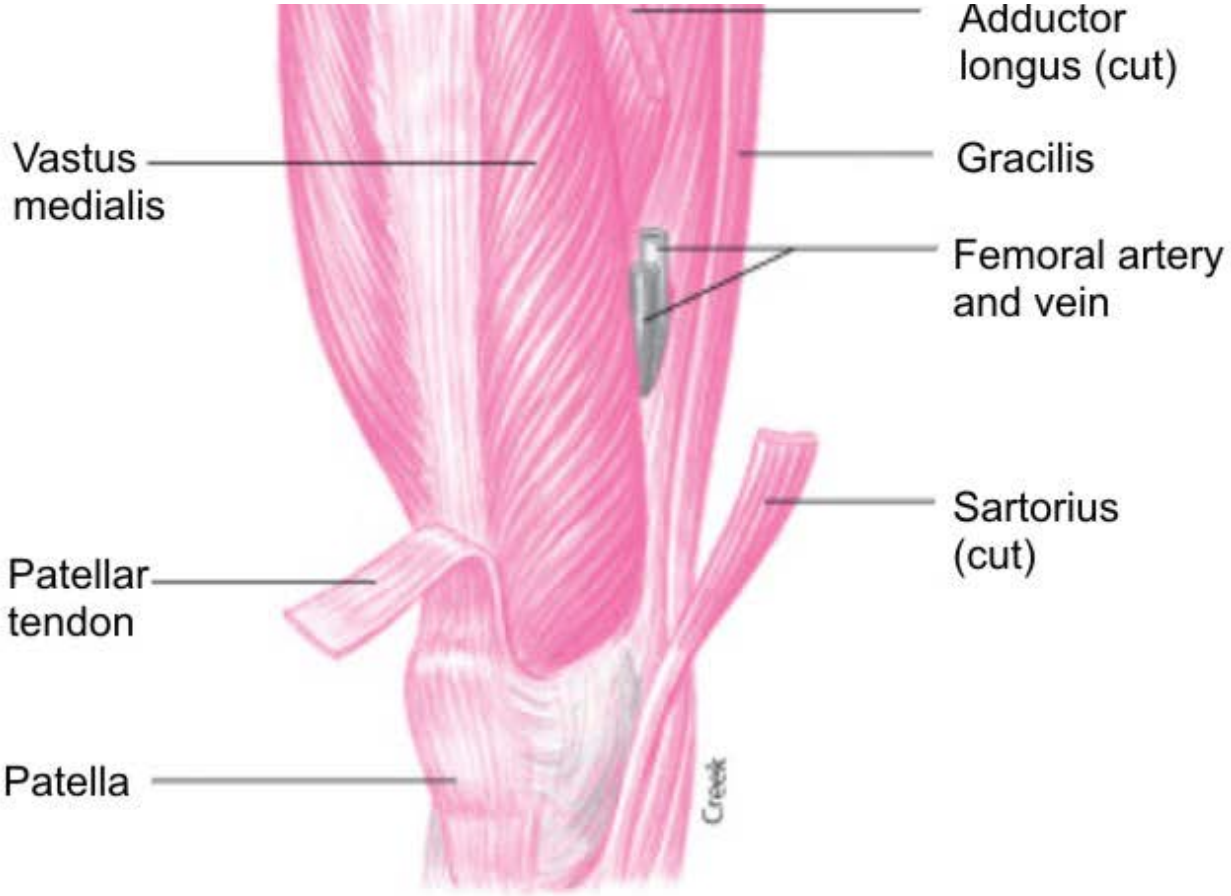
Iliopsoas

Pectineus

Rectus femoris

Sartorius





Muscles

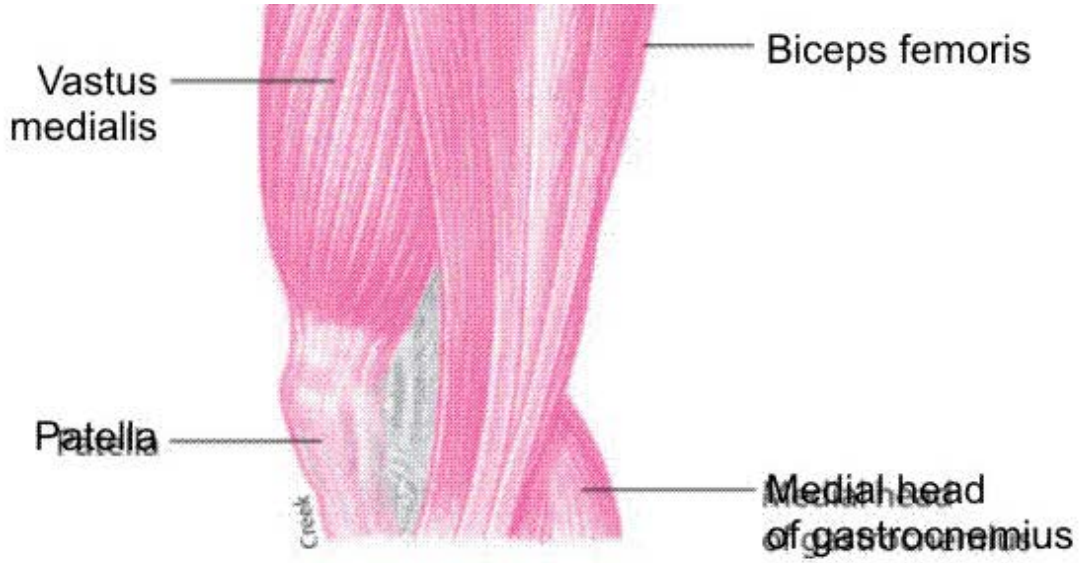
Hip joint and pelvic girdle muscles : Medial - primarily hip adduction

Adductor brevis

Adductor longus

Adductor magnus

Gracilis



Muscles

Hip joint and pelvic girdle muscles : Posterior - primarily hip extension

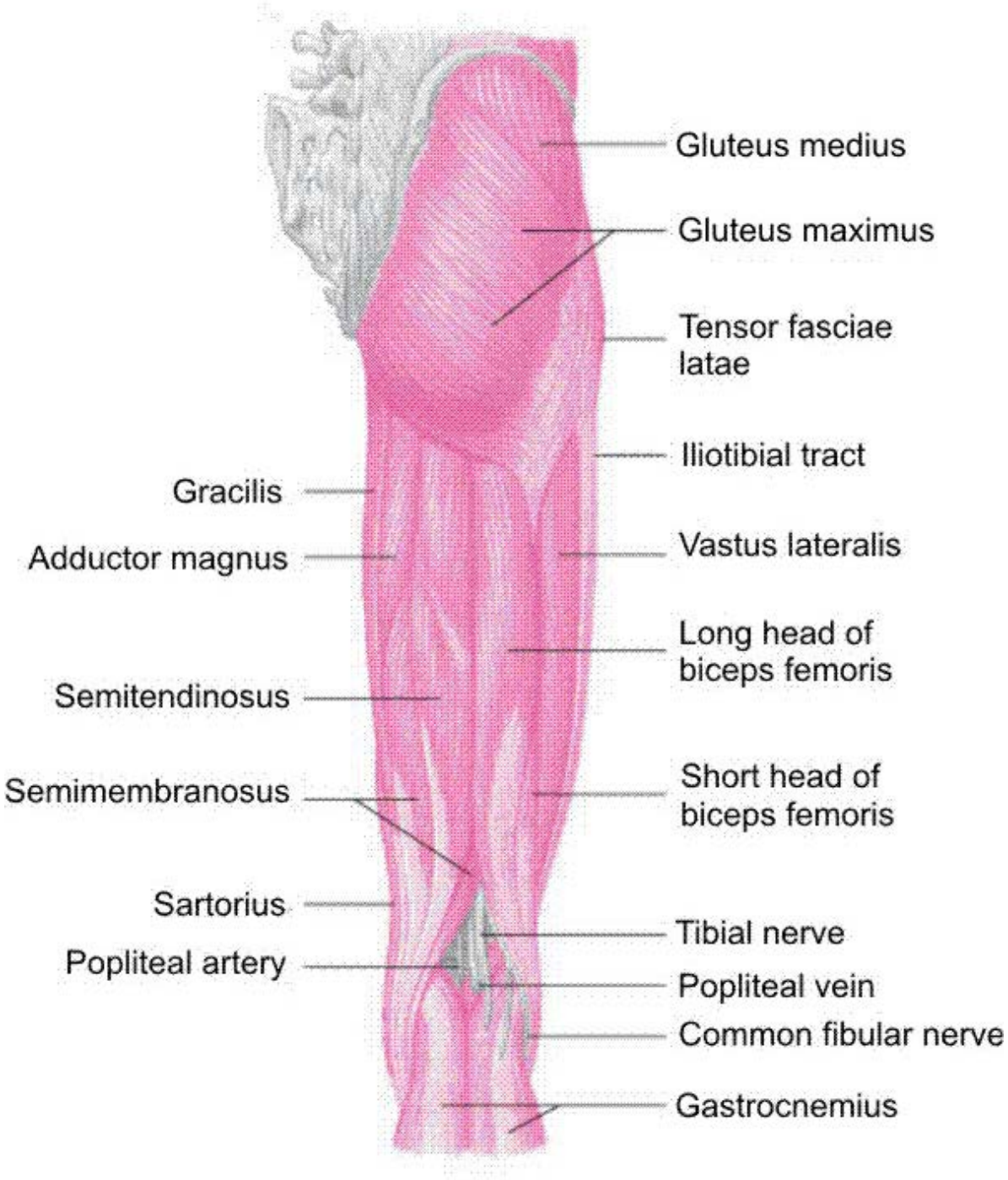
Gluteus maximus

Biceps femoris

Semitendinosus

Semimembranosus

External rotators



Muscles

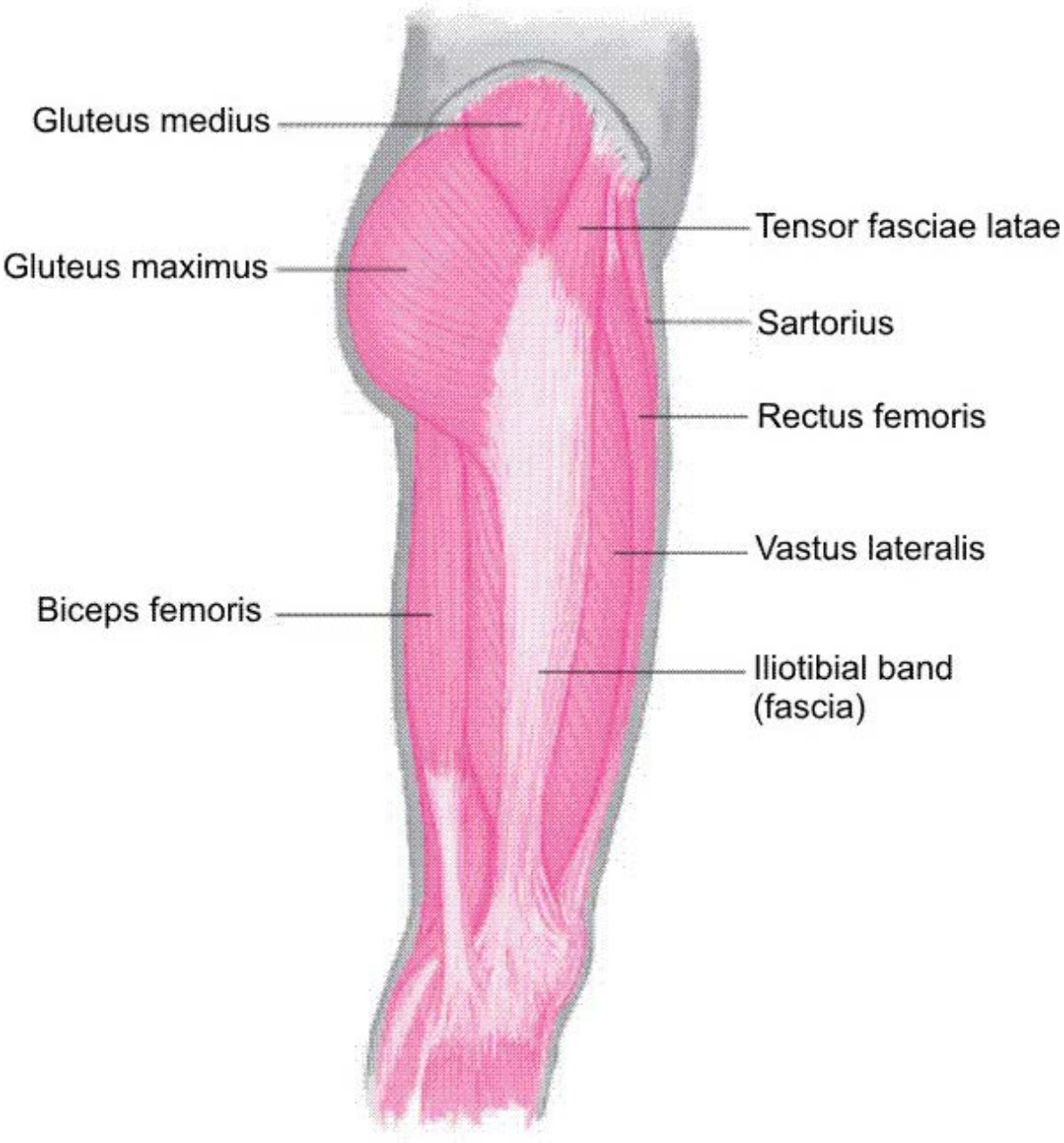
Hip joint and pelvic girdle muscles : Lateral - primarily hip abduction

Gluteus medius

Gluteus minimus

External rotators

Tensor fasciae latae



Muscles

Pelvic muscles acting on hip joint : Iliac region - iliopsoas muscle flexes hip

Iliacus

Psoas major

Psoas minor

Pelvic muscles acting on hip joint

Gluteal region - extend and rotate hip

Gluteus maximus

Gluteus medius

Gluteus minimi

Tensor fascia latae

Six deep external rotators - piriformis, obturator externus, obturator internus, gemellus superior, gemellus inferior, & quadratus femoris

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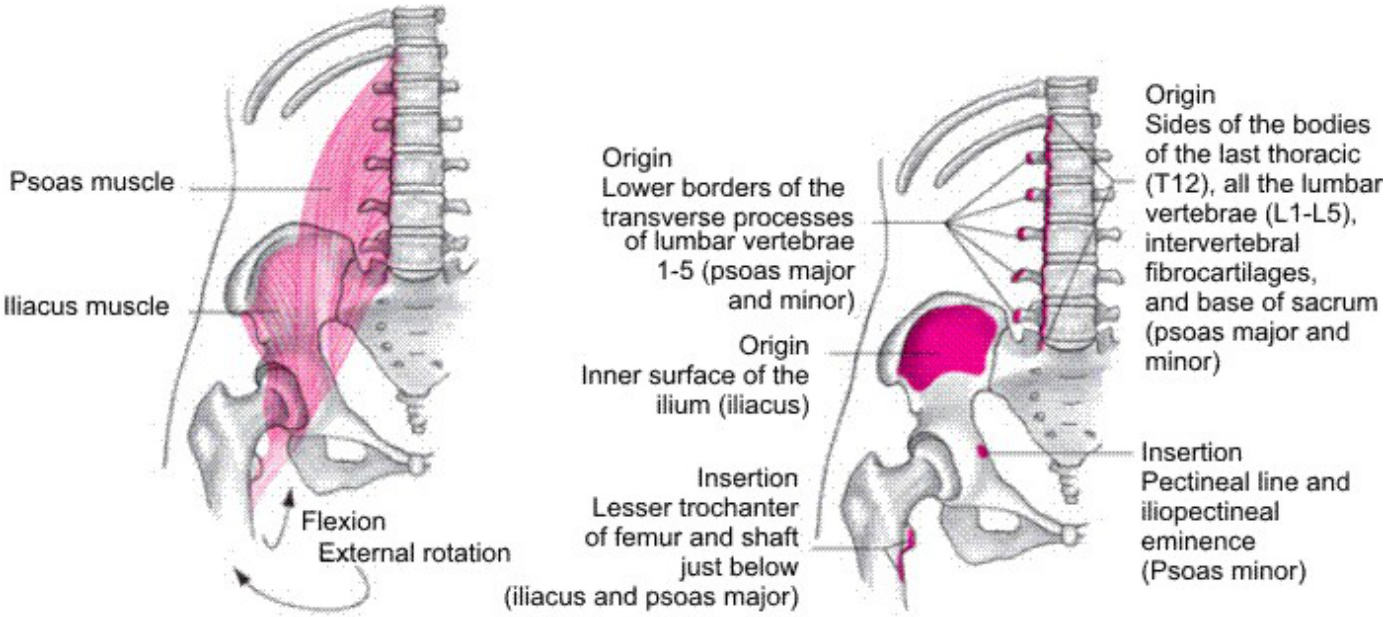
Iliopsoas Muscle

Flexion of hip

External rotation of femur

Transverse pelvic rotation contralaterally when ipsilateral femur is stabilized



Sartorius Muscle

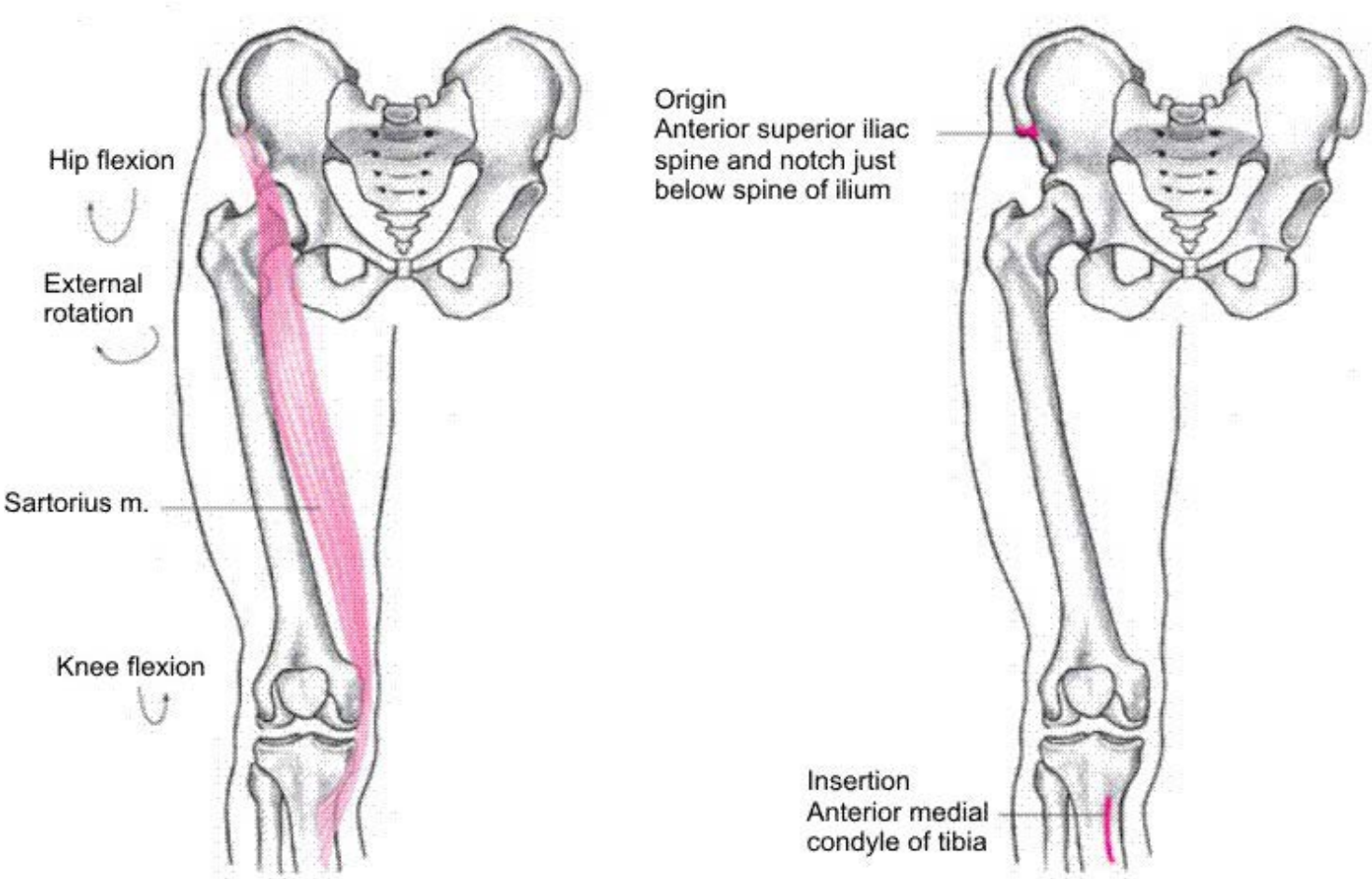
Flexion of hip

Flexion of knee

External rotation of thigh as it flexes hip & knee

Abduction of hip

Anterior pelvic rotation

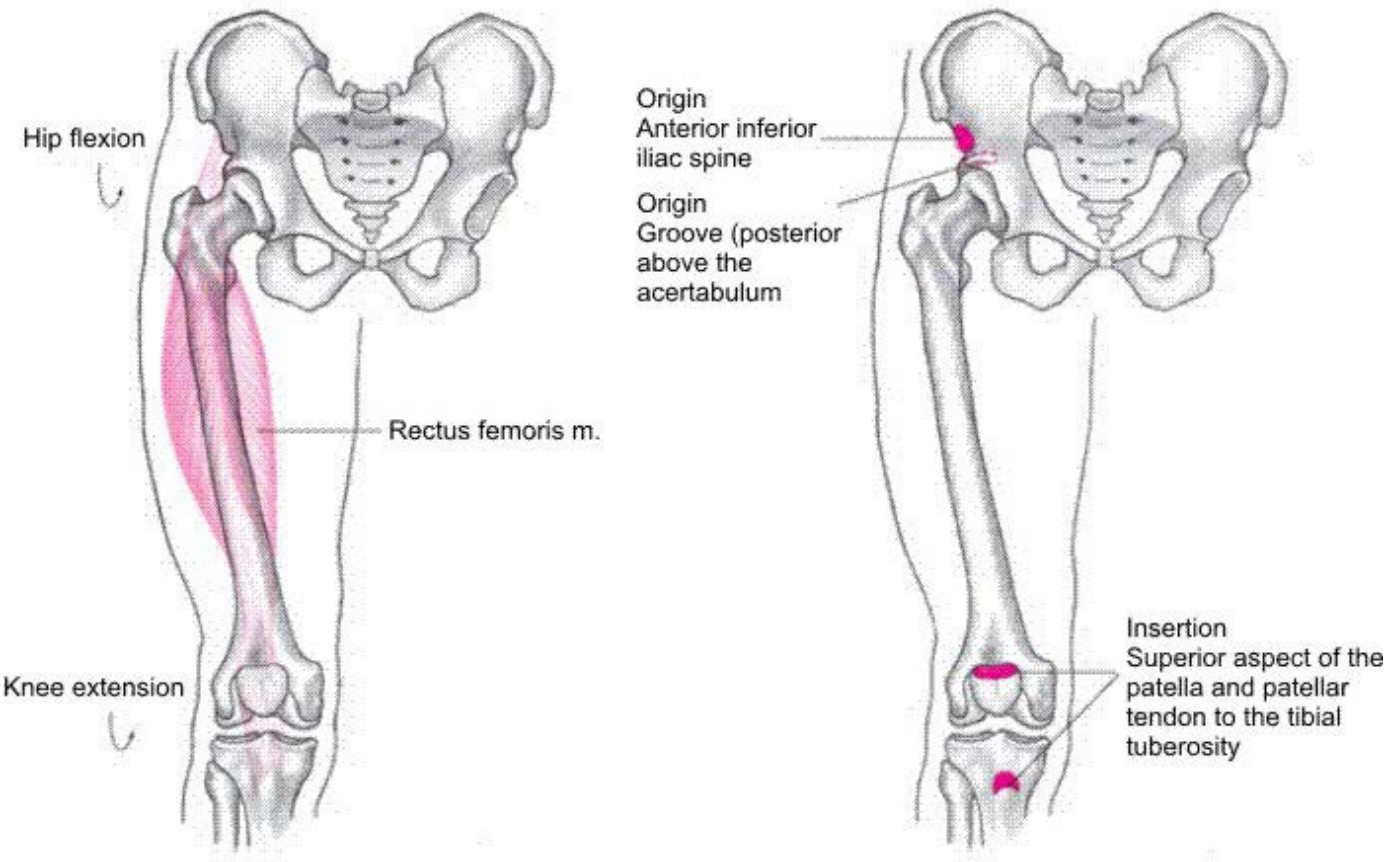


Rectus Femoris Muscle

Flexion of hip

Extension of knee

Anterior pelvic rotation



Gluteus Maximus Muscle

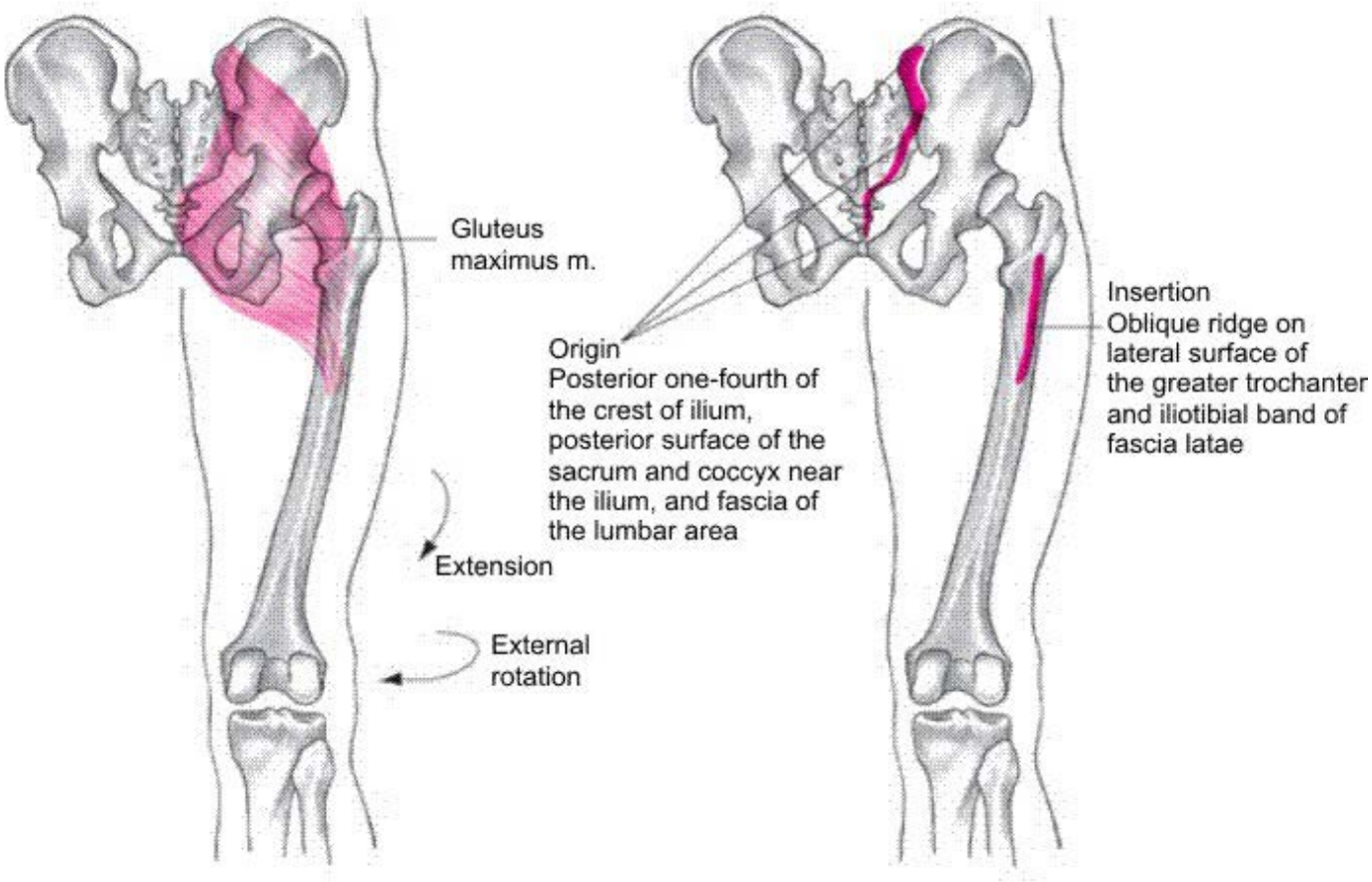
Extension of hip

External rotation of hip

Upper fibers assist in abduction

Lower fibers assist in adduction

Posterior pelvic rotation

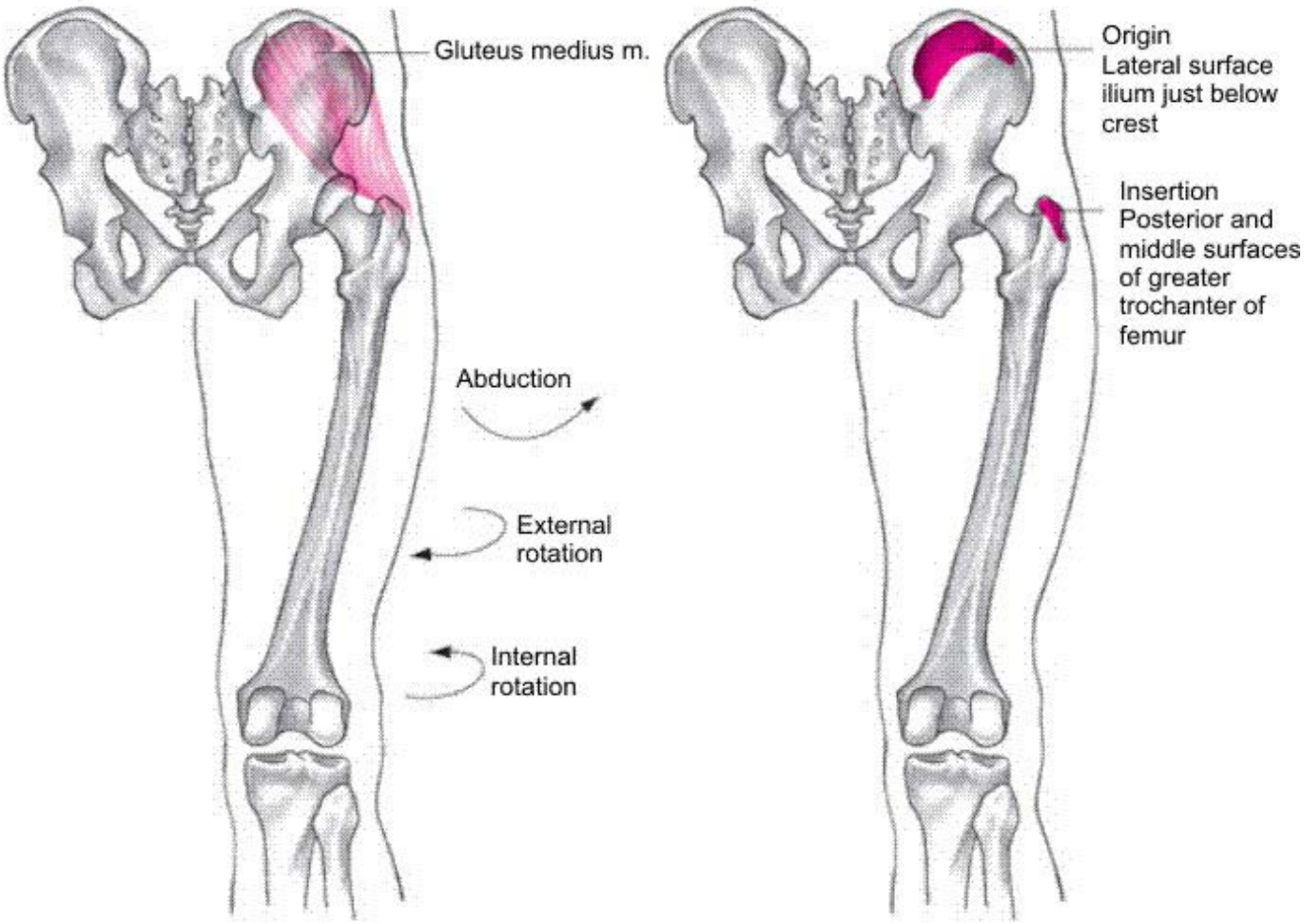


Gluteus Medius Muscle

Abduction of hip

Internal rotation & flexion (anterior fibers)

External rotation & extension (posterior fibers)

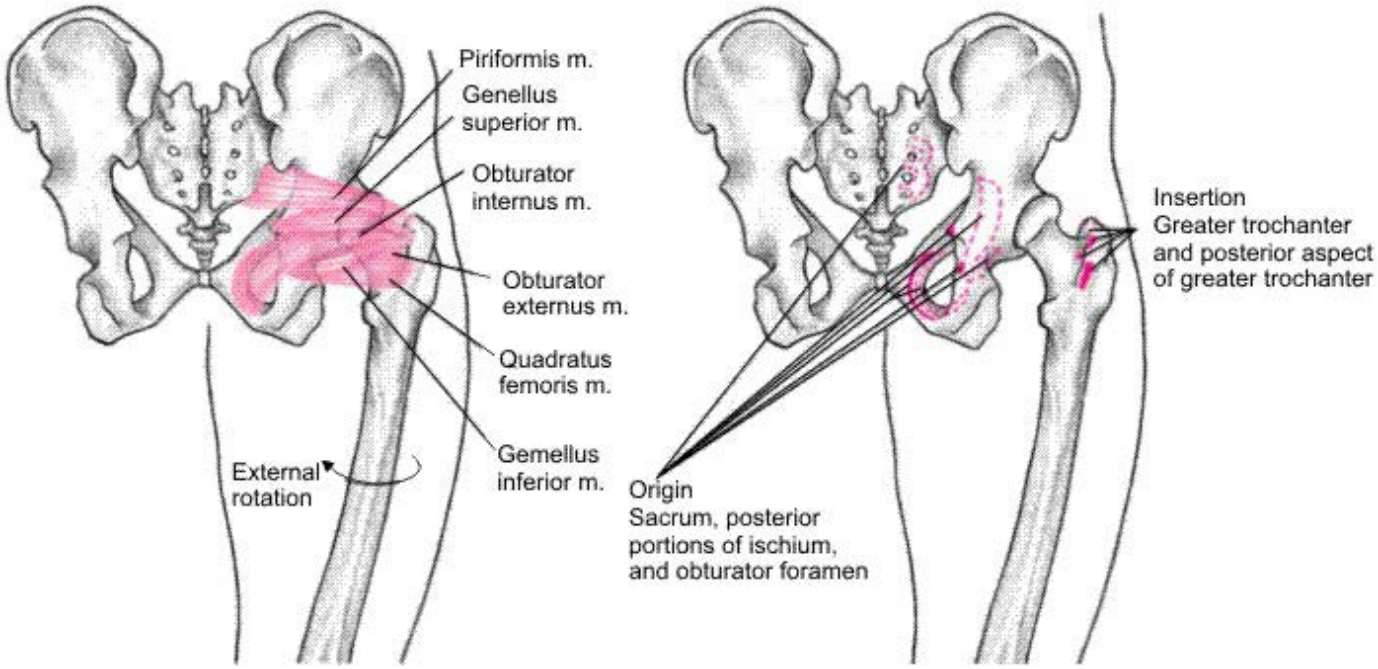


Six Deep Lateral Rotator Muscles :

Piriformis, Gemellus superior, Gemellus inferior,

Obturator externus, Obturator internus, Quadratus femoris

External Rotation of Hip



Semitendinosus Muscles

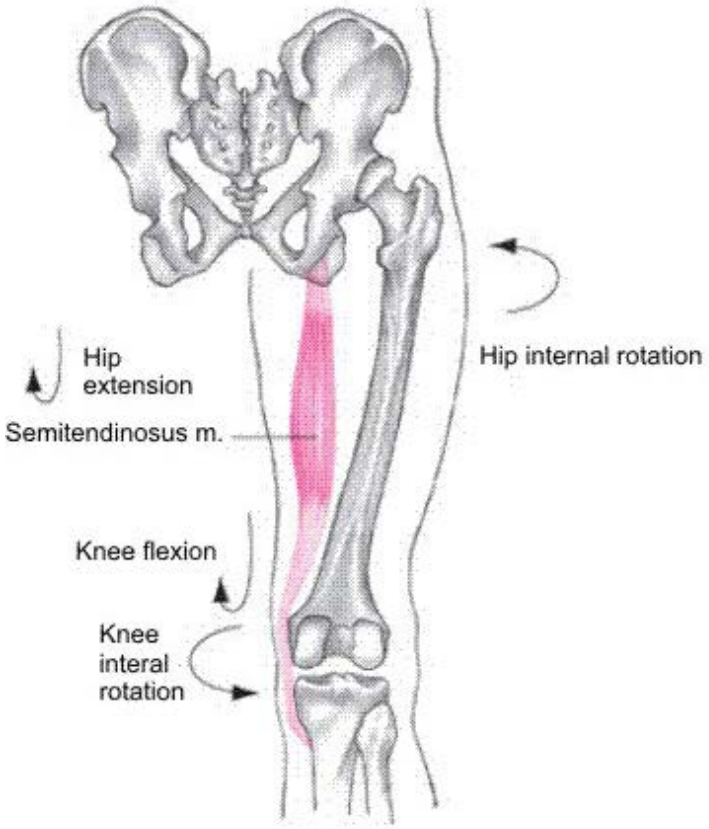
Flexion of knee

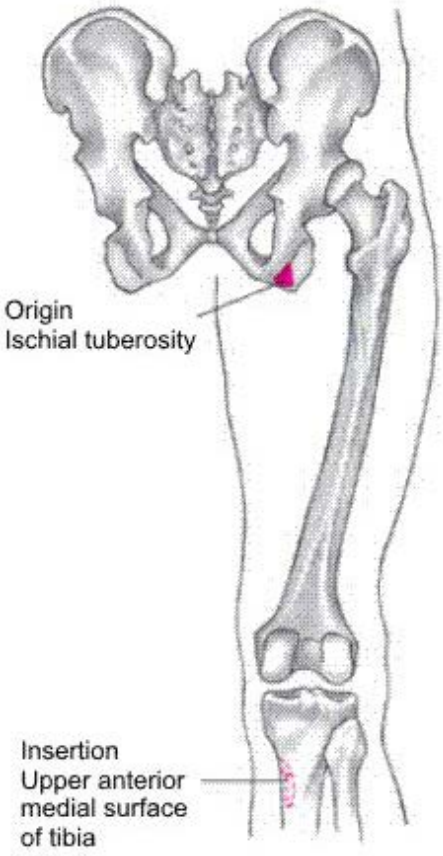
Extension of hip

Internal rotation of hip

Internal rotation of flexed knee

Posterior pelvic rotation





Semimembranosus Muscles

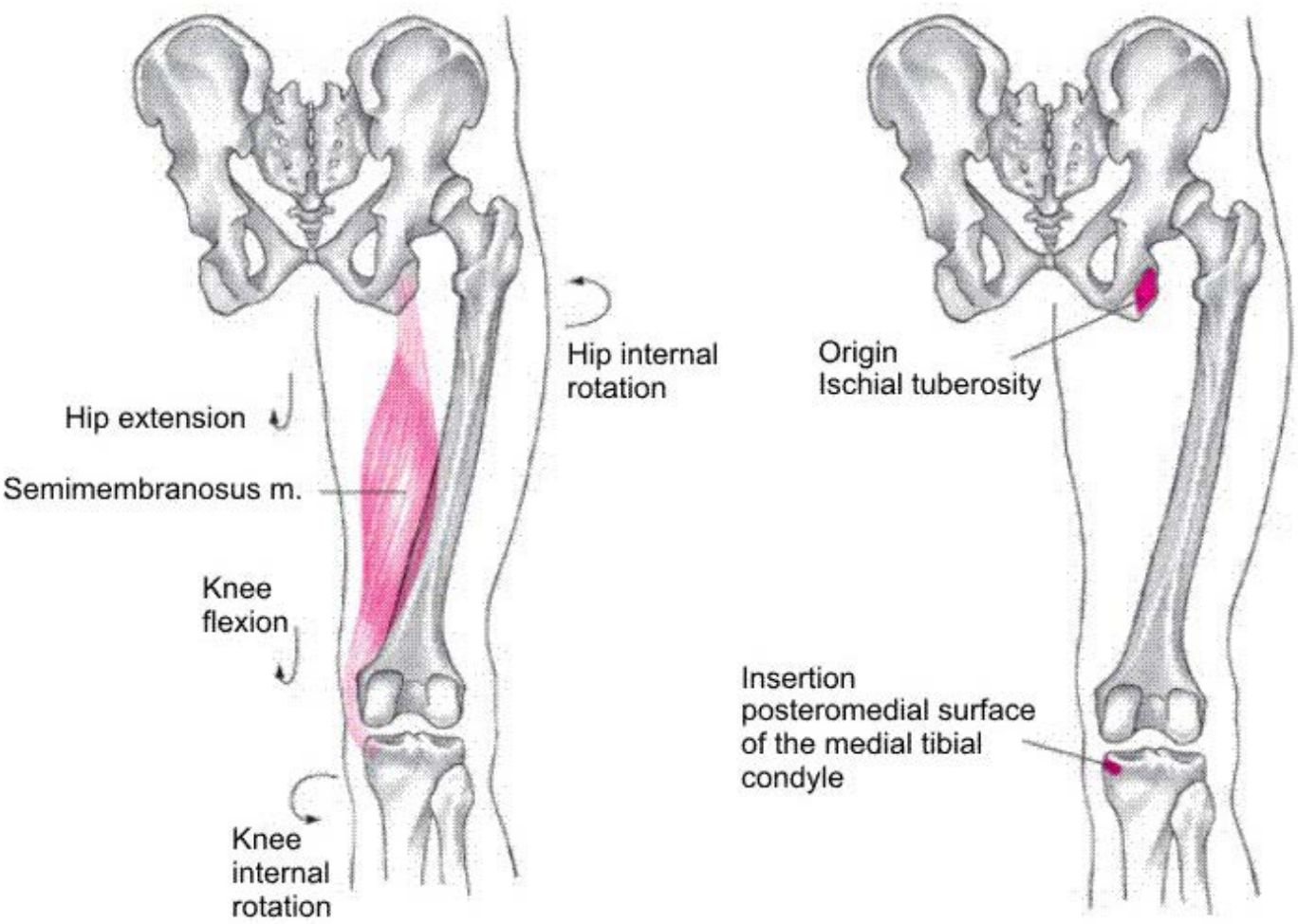
Flexion of knee

Extension of hip

Internal rotation of hip

Internal rotation of flexed knee

Posterior pelvic rotation



Biceps Femoris Muscles

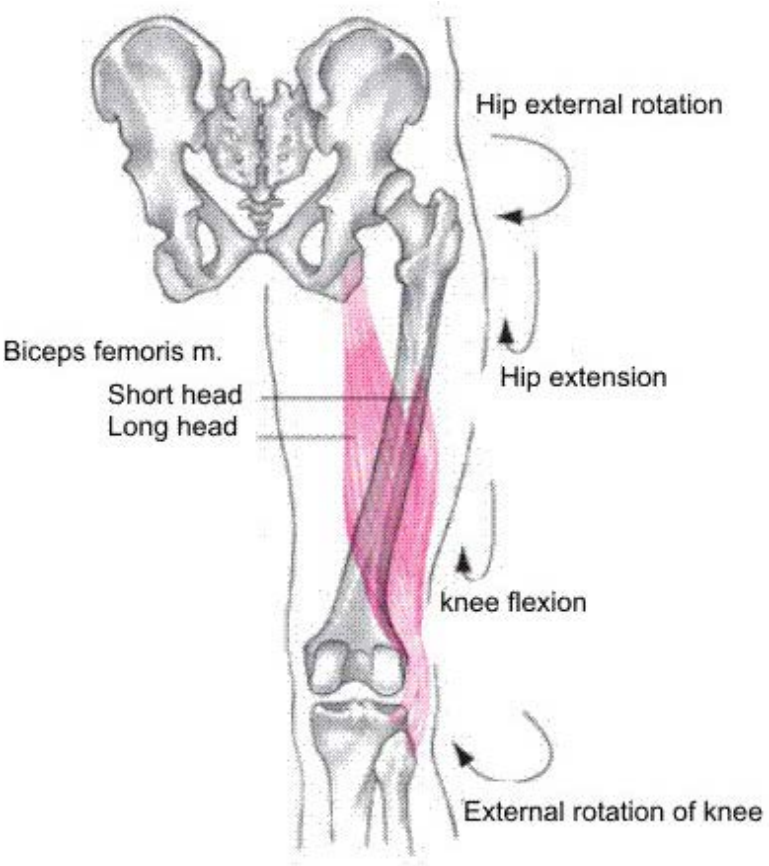
Flexion of knee

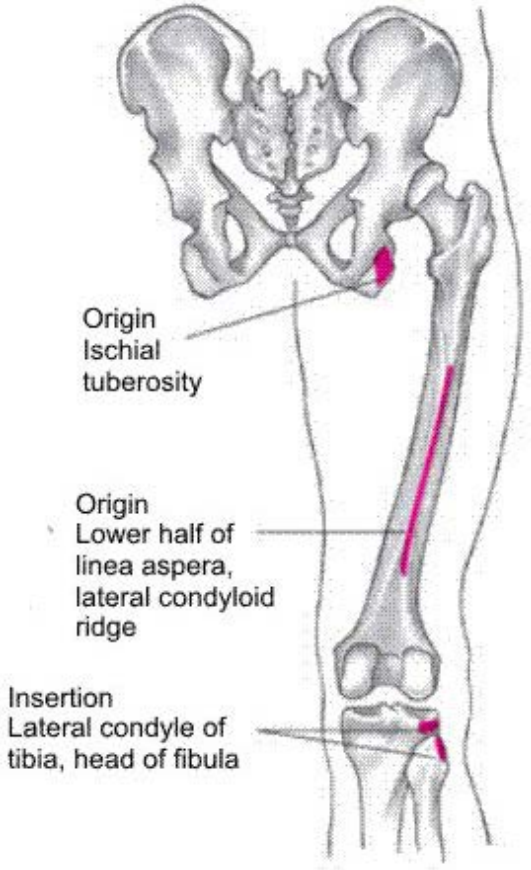
Extension of hip

External rotation of hip

External rotation of flexed knee

Posterior pelvic rotation





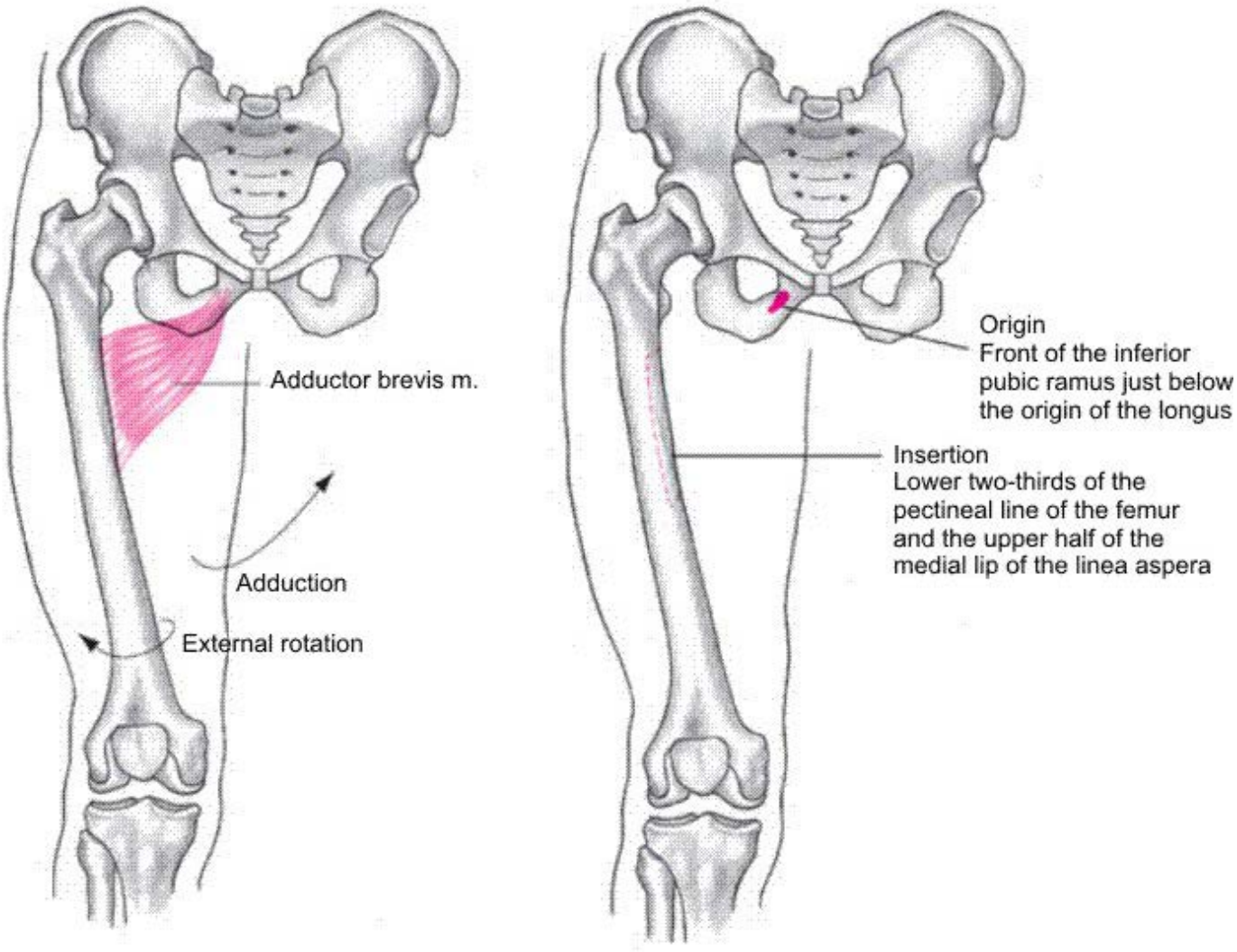
Adductor Brevis Muscles

Adduction of hip

Extension of hip

External rotation as it rotates hip

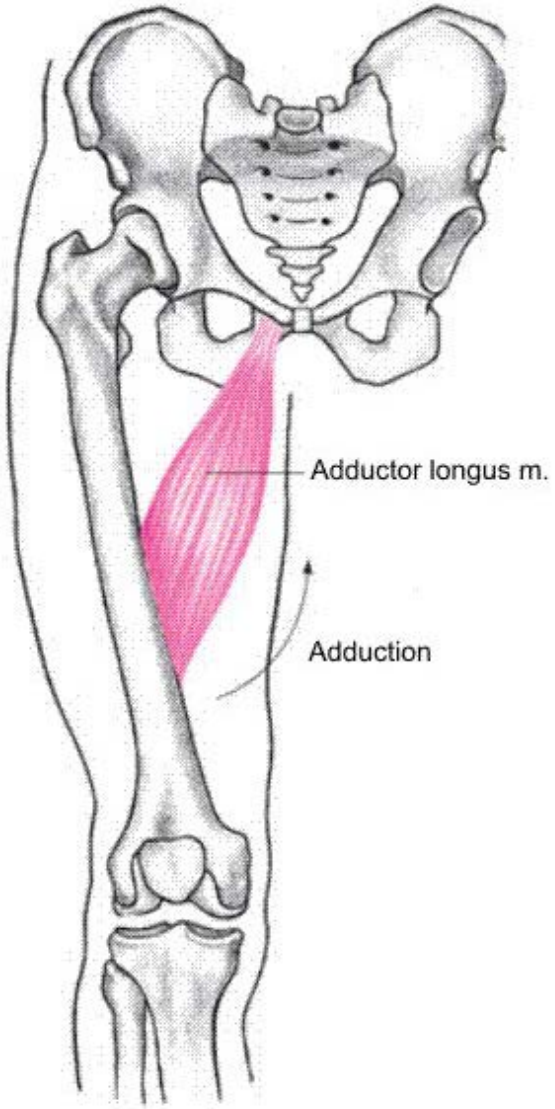
Assists in flexion of hip

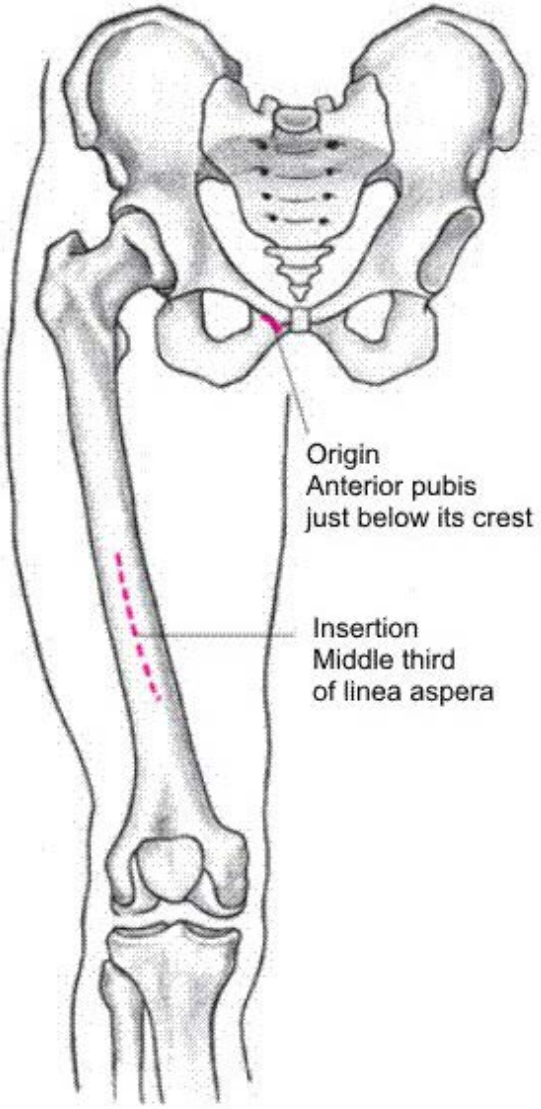


Adductor Longus Muscles

Adduction of hip

Assists in flexion of hip



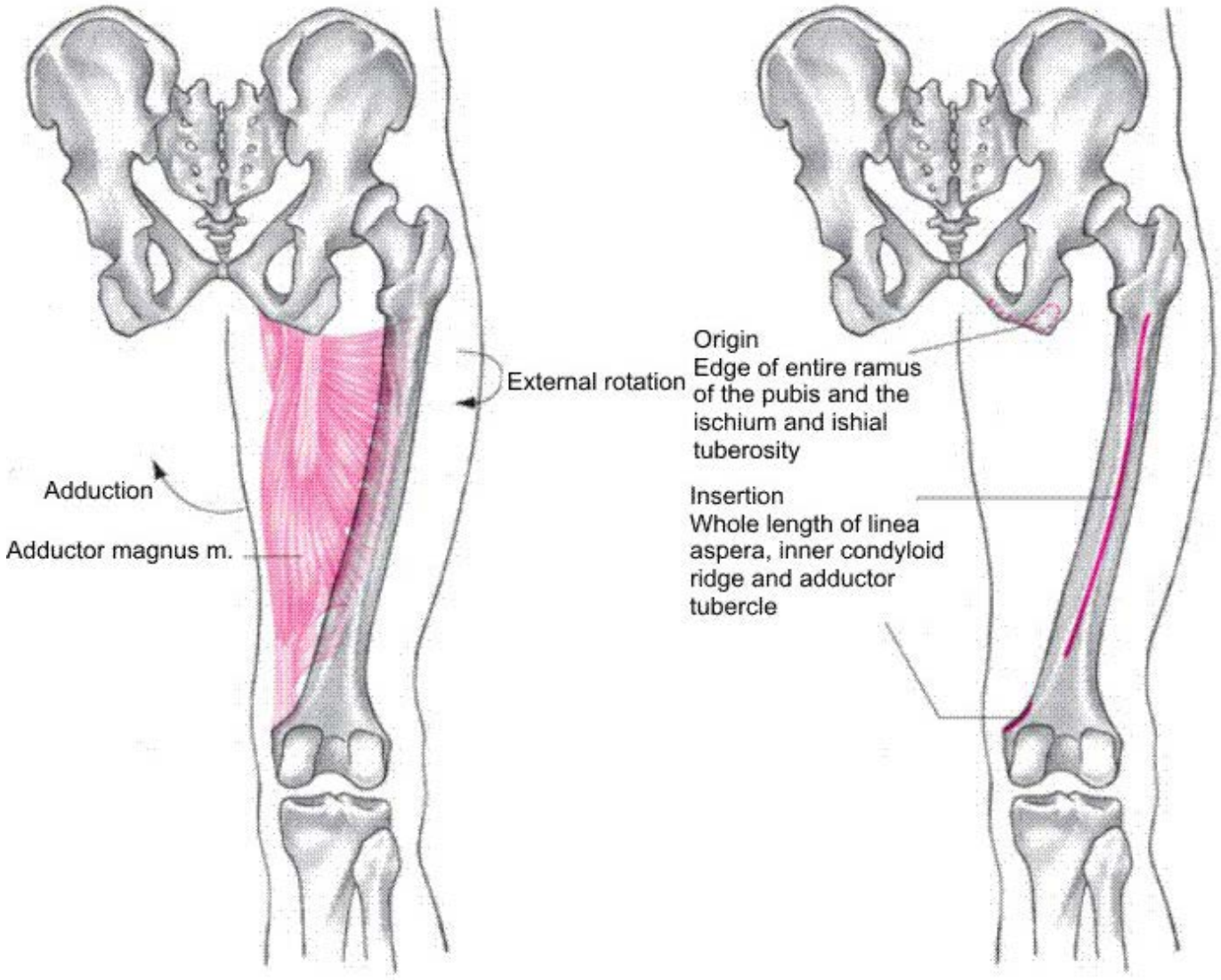


Adductor Magnus Muscles

Adduction of hip

External rotation as hip adducts

Extension of hip

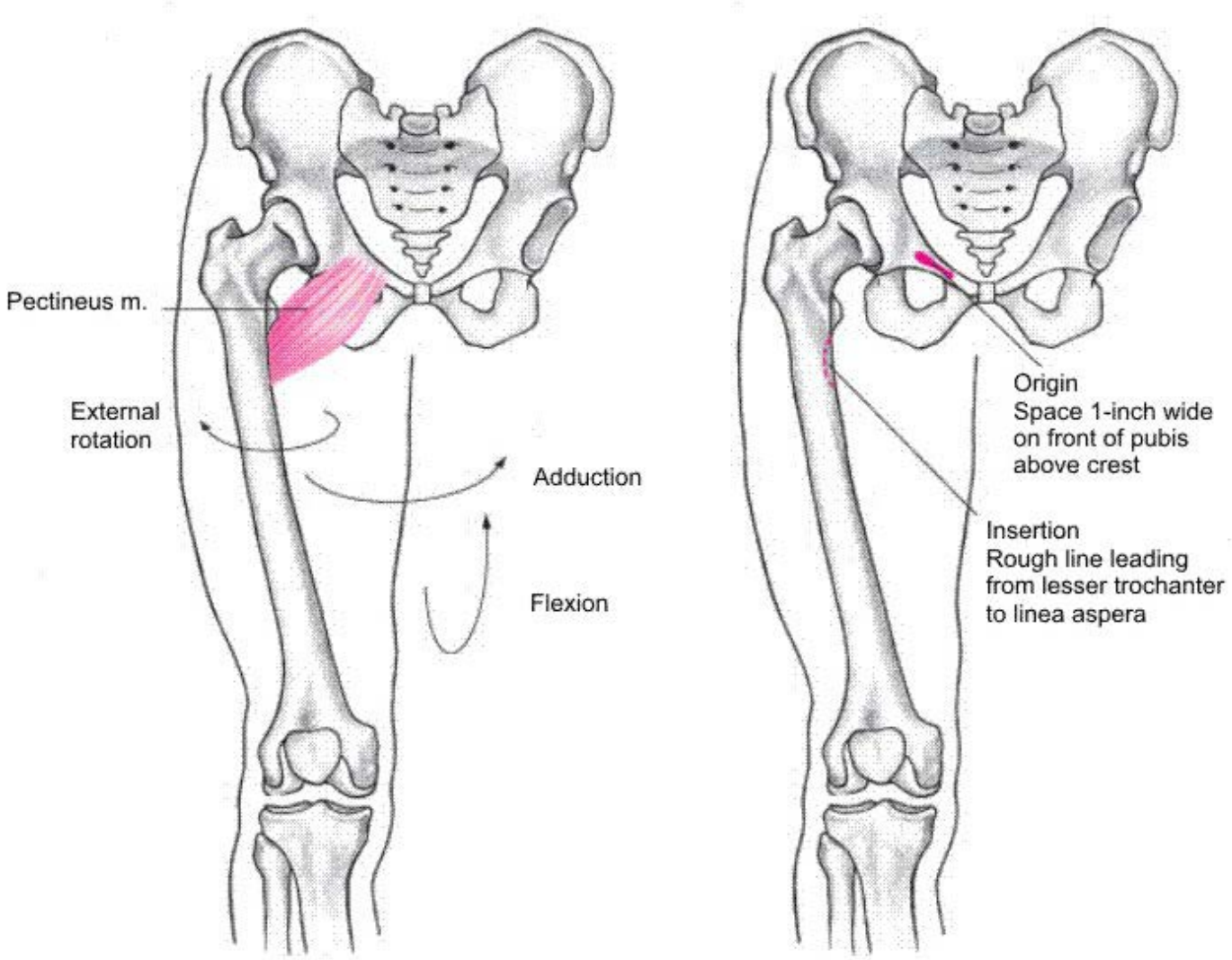


Pectineus Muscles

Flexion of hip

Adduction of hip

External rotation of hip



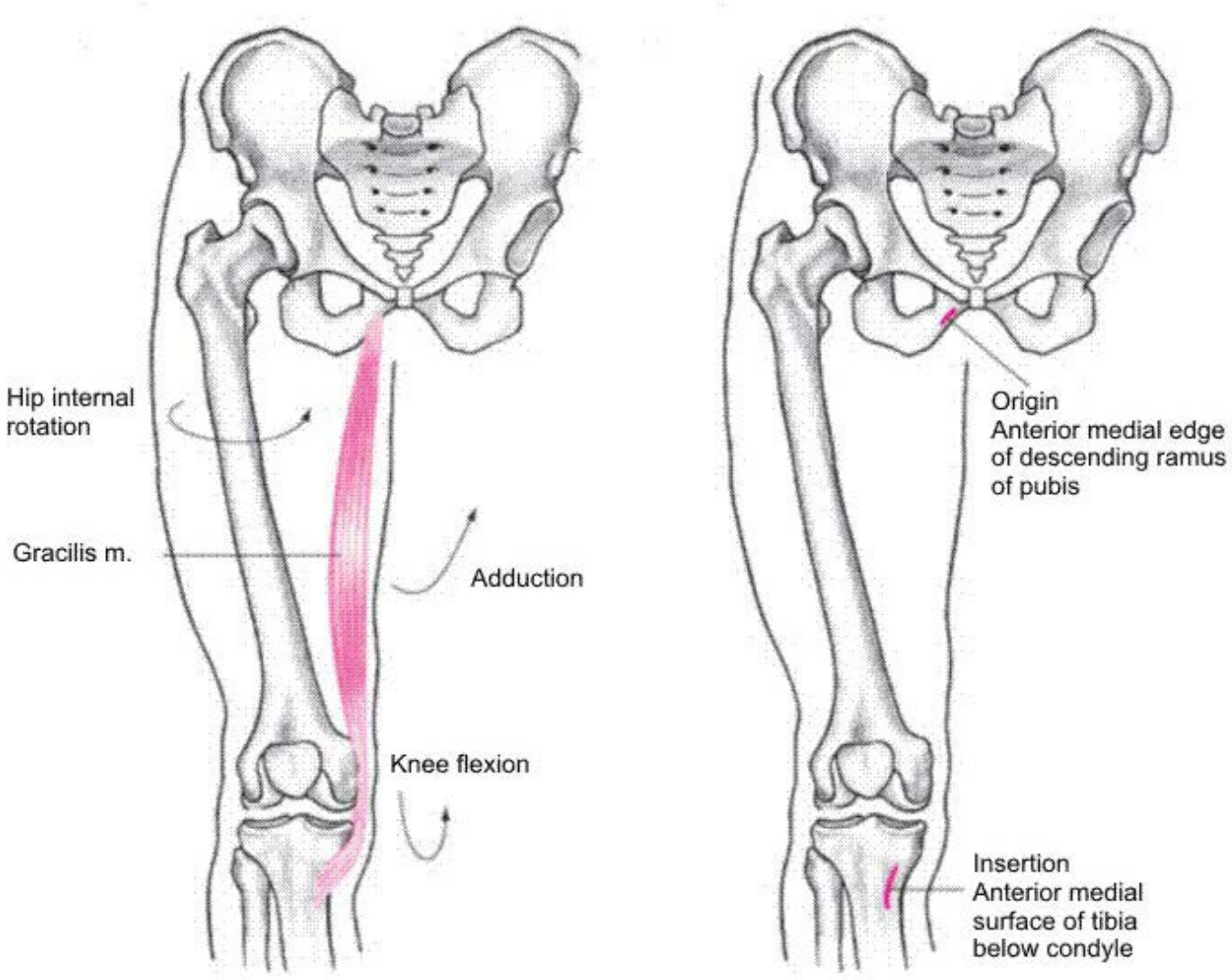
Gracilis Muscles

Adduction of hip

Weak flexion of knee

Internal rotation of hip

Assists with flexion of hip



Hip Flexion

Agonists

Psoas

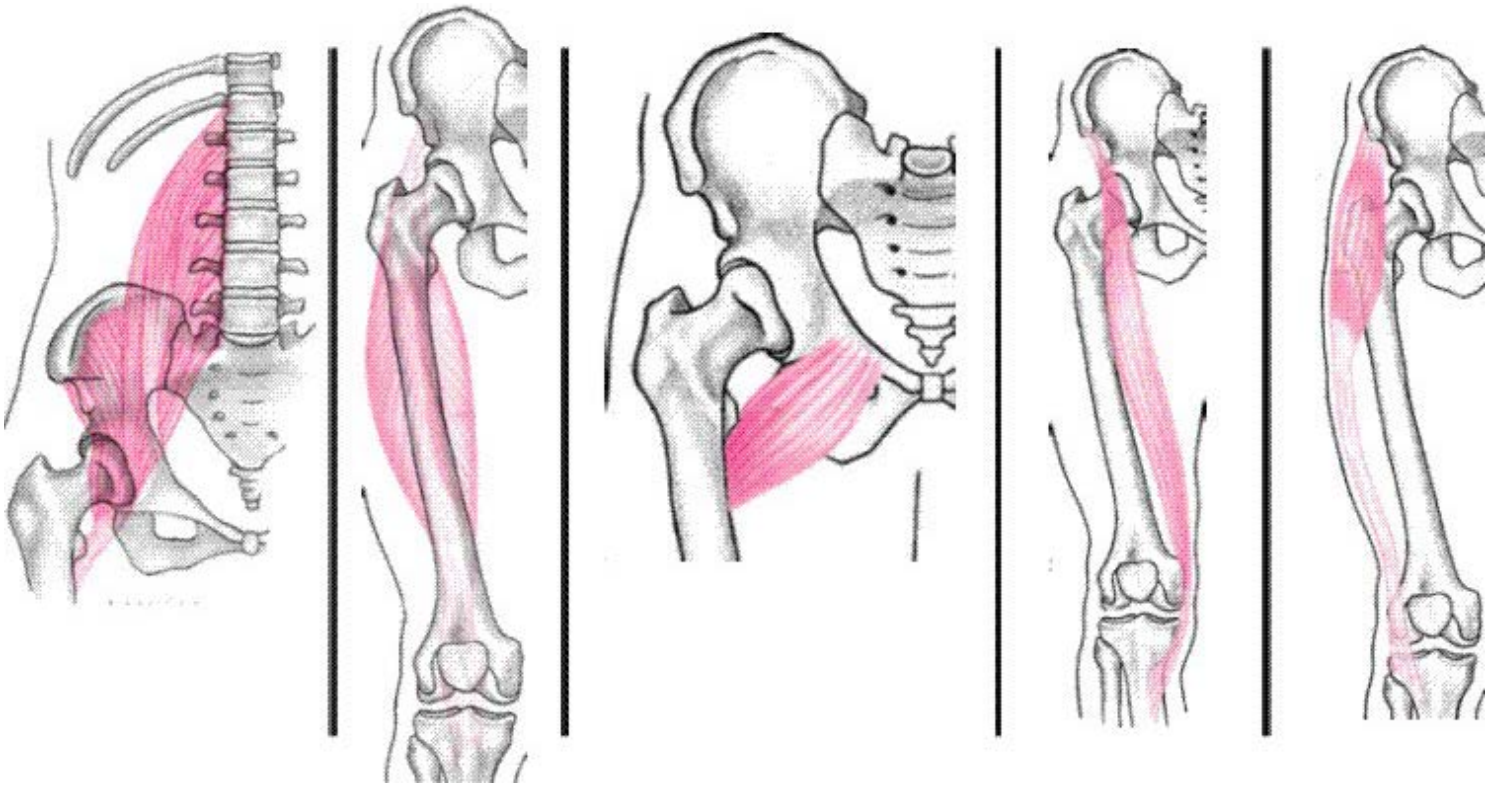
Iliacus (Iliopsoas)

Rectus Femoris

Pectineus

Sartorius

Tensor Fasciae Latae



Hip Extension

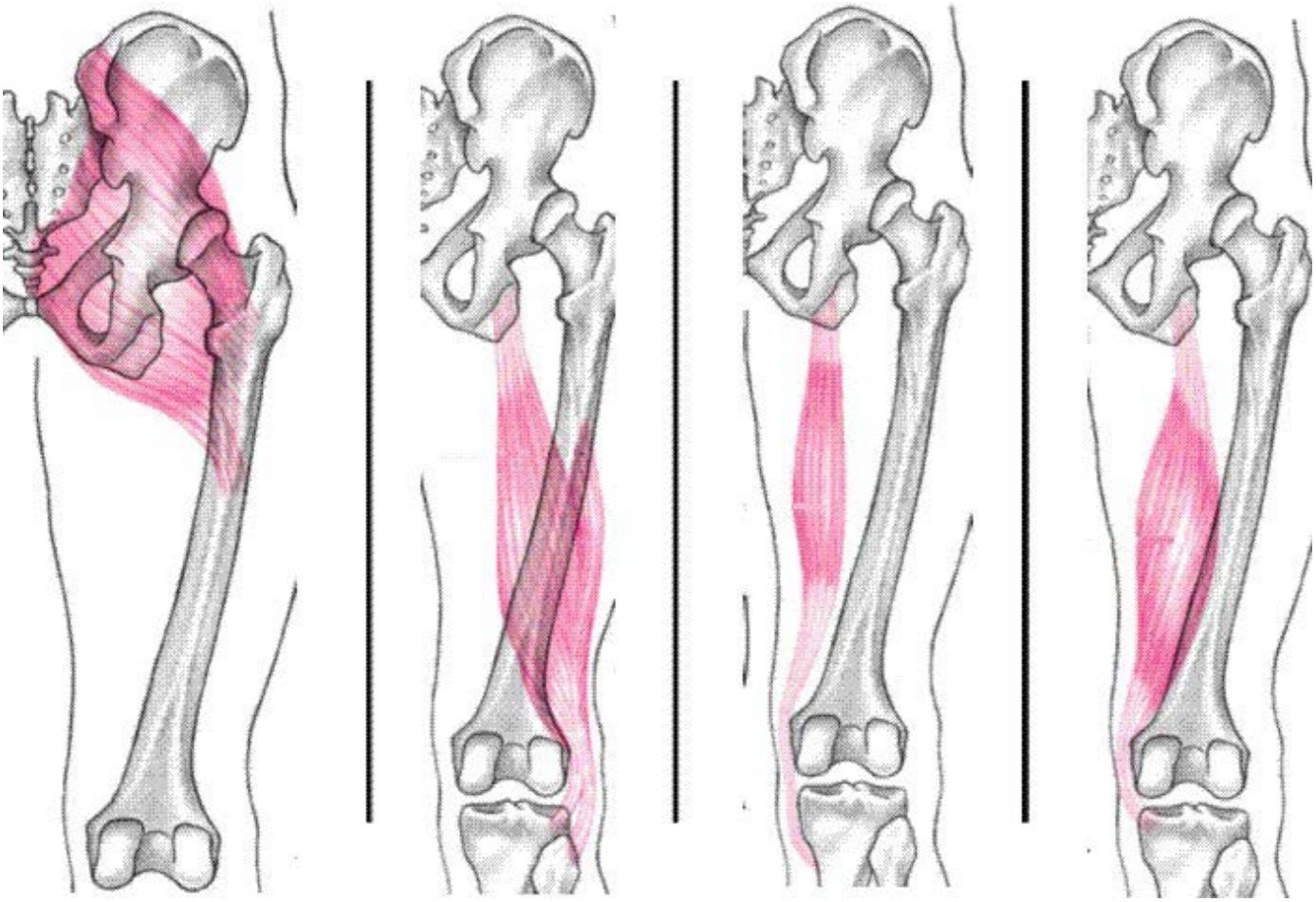
Agonists

Gluteus Maximus

Biceps Femoris (Long Head)

Semitendinosus

Semimembranosus



Hip Abduction

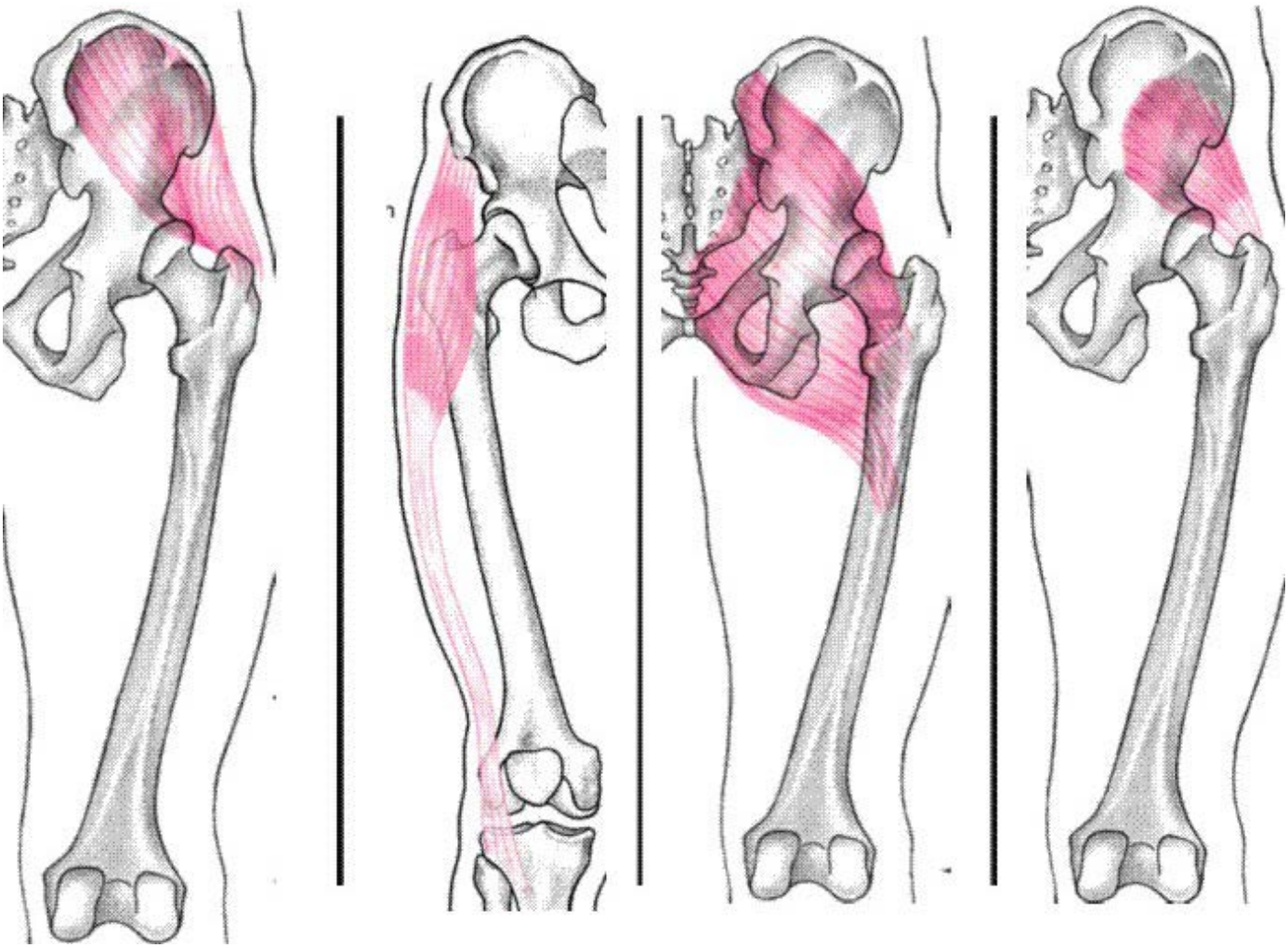
Agonists

Gluteus Medius

Tensor Fasciae Latae

Gluteus Maximus

Gluteus Minimus



Hip Adduction

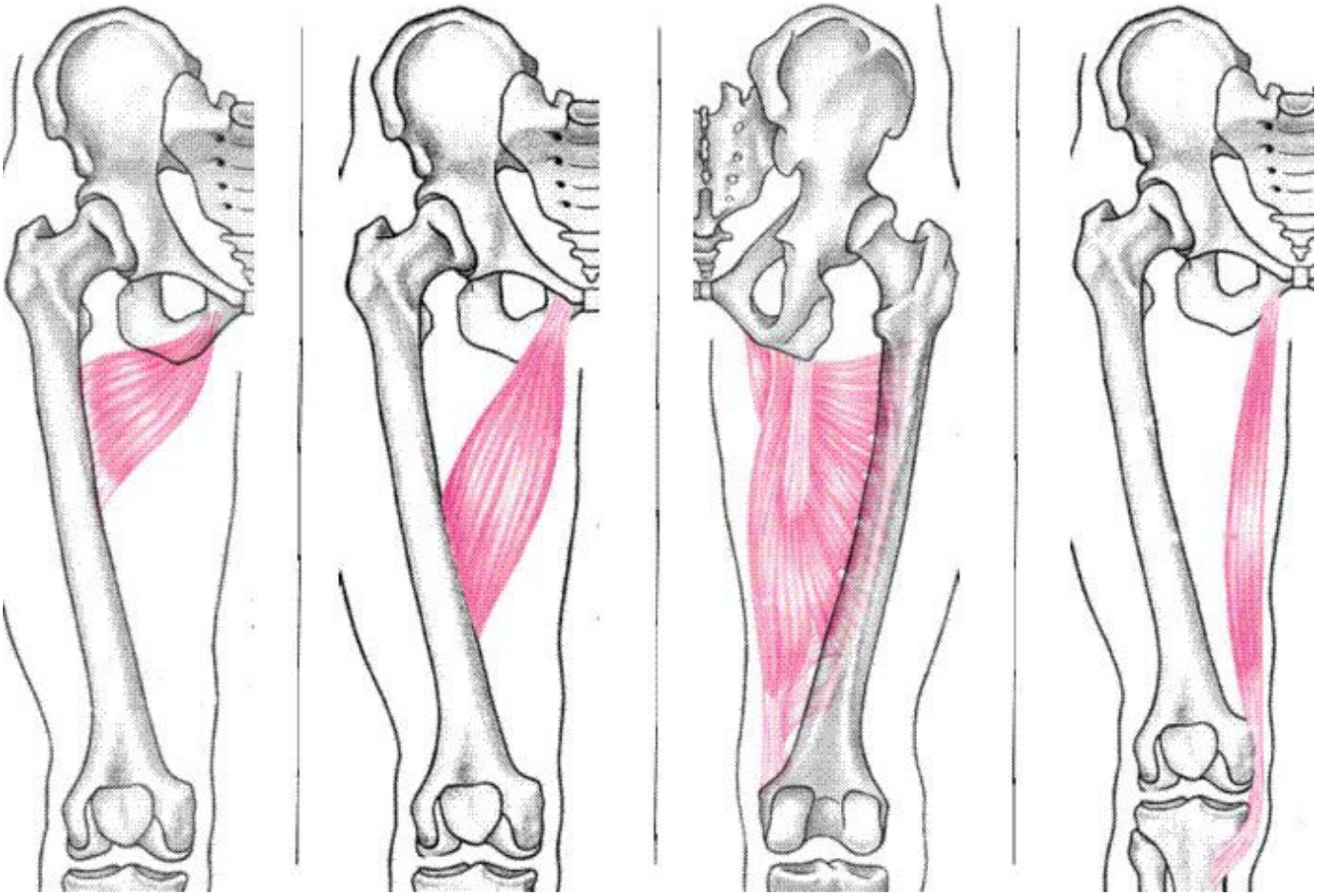
Agonists

Adductor Brevis

Adductor Longus

Adductor Magnus

Gracilis



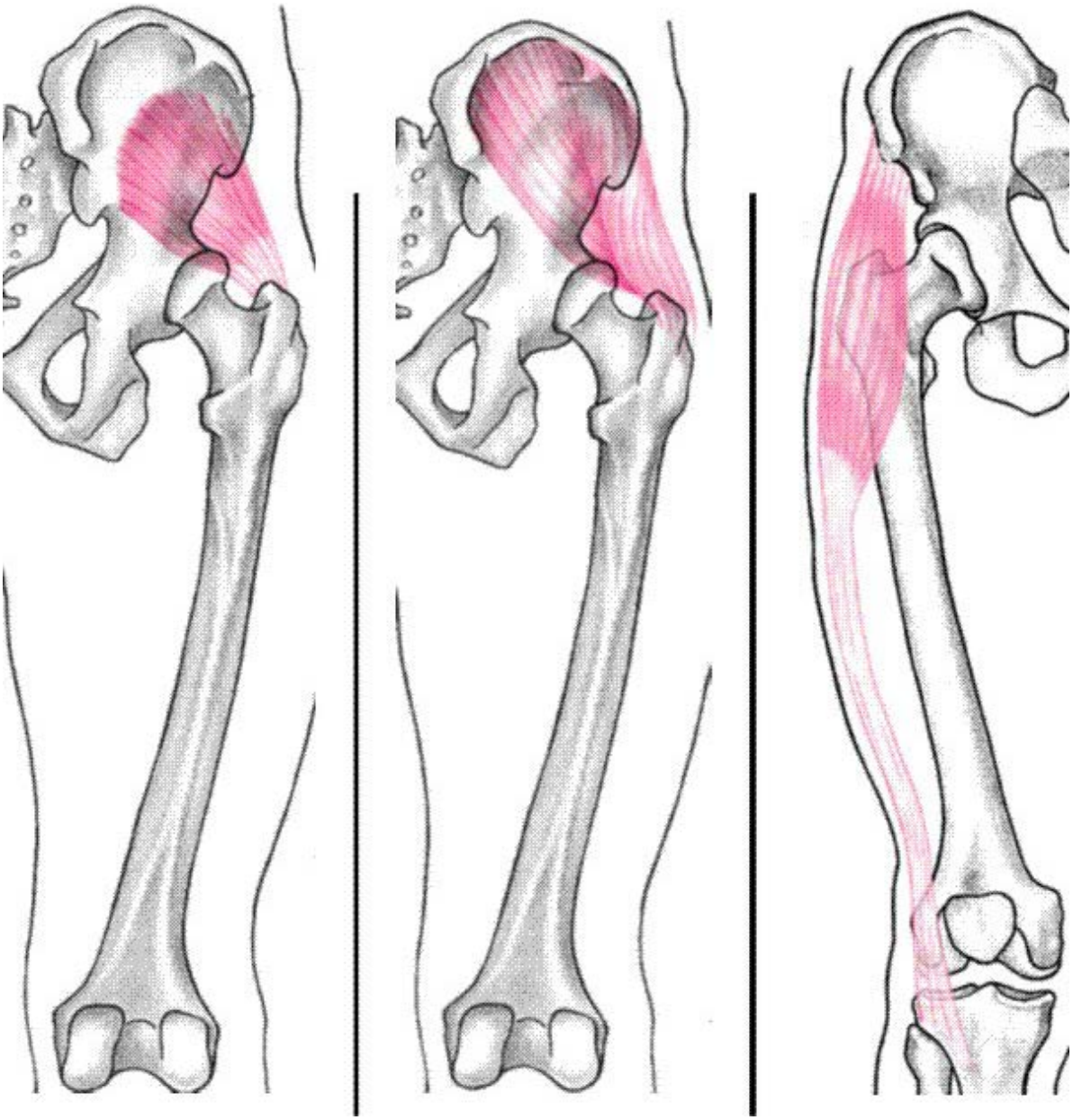
Hip Internal Rotation

Agonists

Gluteus Minimus

Gluteus Medius

Tensor Fasciae Latae

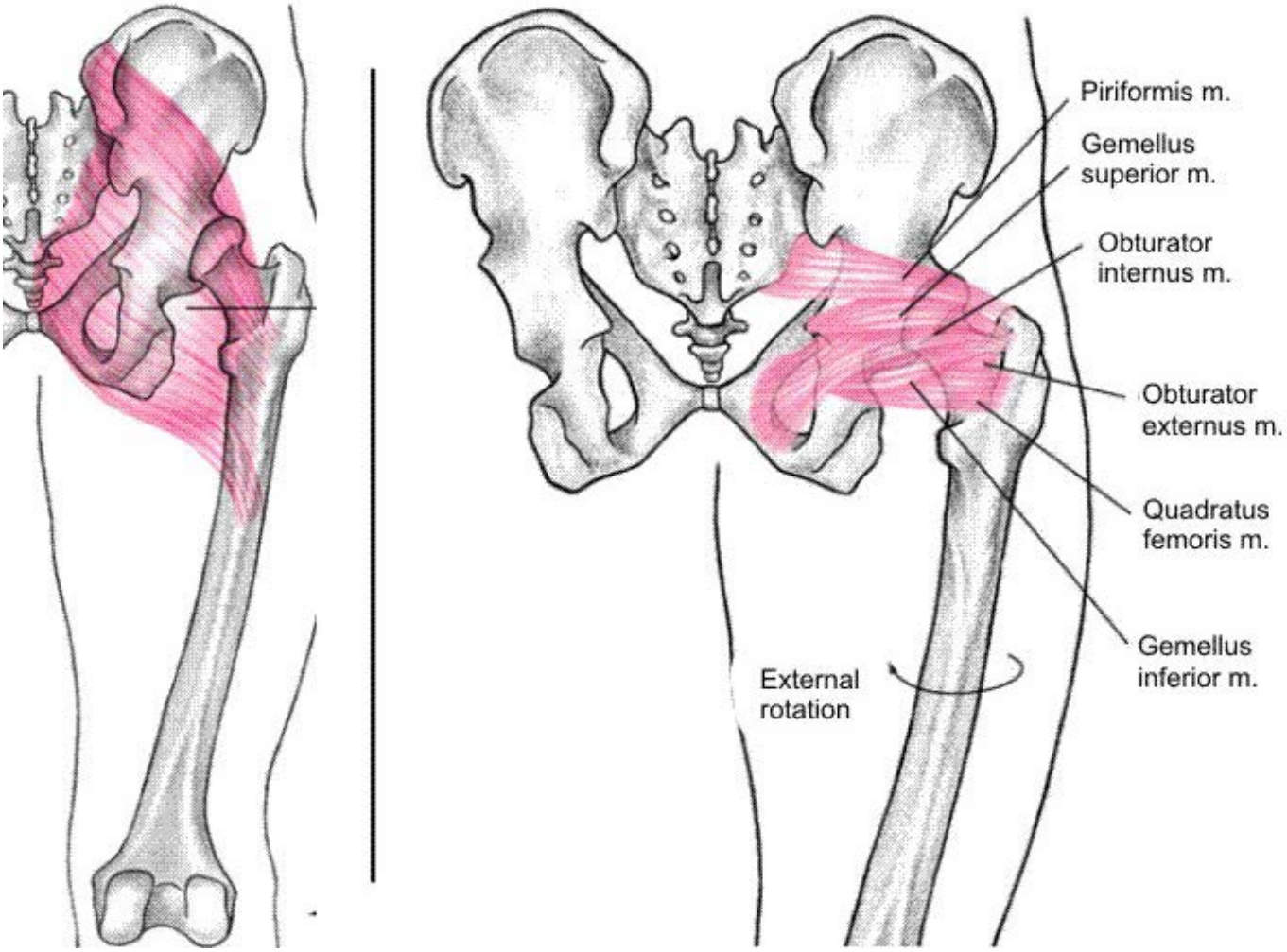


Hip External Rotation

Agonists

Gluteus Maximus

Six Deep External Rotators



To Test

Access Code: 67H69F3

Please write down code. You will be asked for it

Once you have successfully passed the test (70% correct), please email Kim Jackson at kim_hotschool@yahoo.com. We will email you your CE certificate within 7 business days.