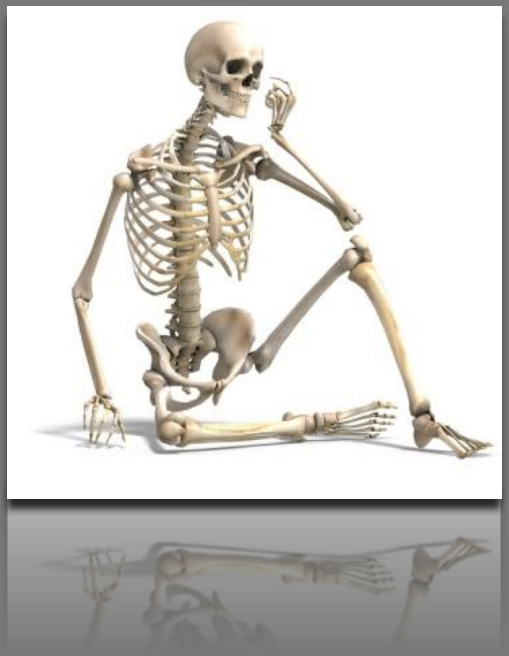
BALANCED BODY
ANATOMY IN THREE DIMENSIONS™



An Introduction to Anatomy for Movers and Movement Educators

balanced body

Introduction: Establishing Vocabulary

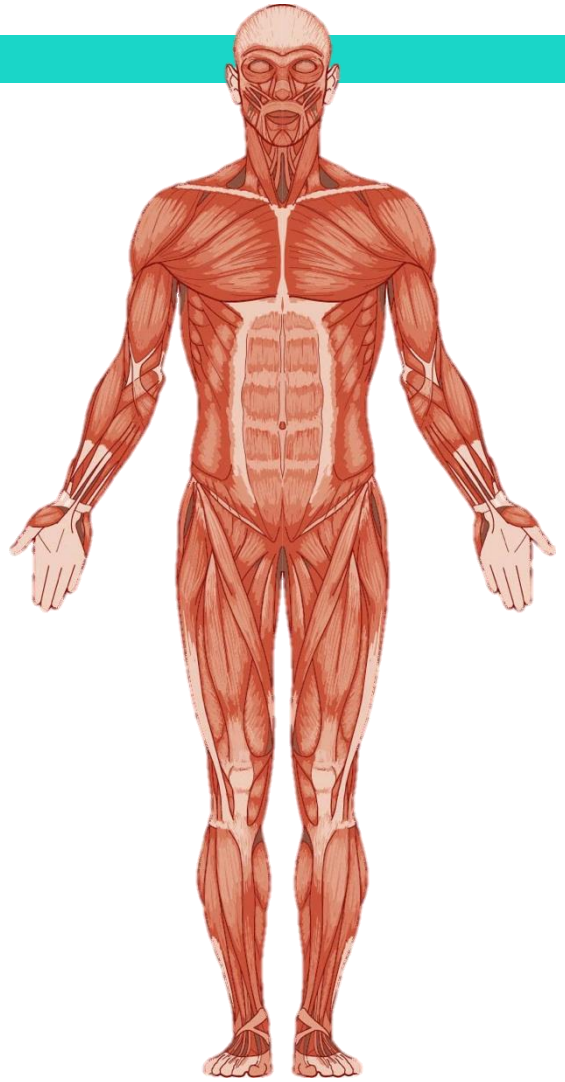
Anatomy vocabulary basics

- Joints
- Muscles
- Bones
- Systems of the body
- Planes of Motion

balanced body

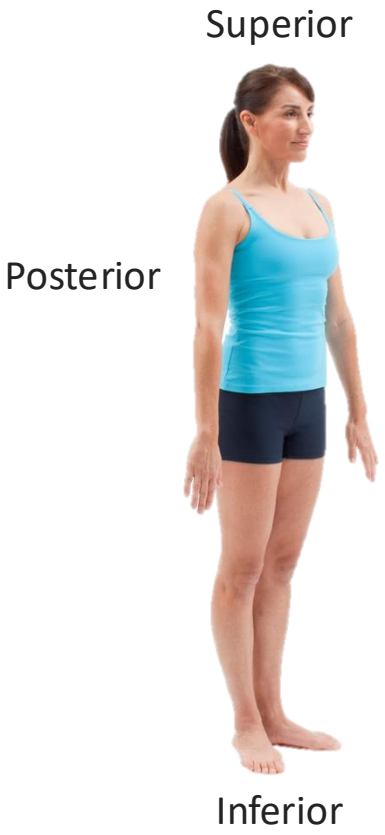
Anatomical Position

Western anatomical position is standing with the palms and feet facing forward. As if lying face up on a dissecting table.

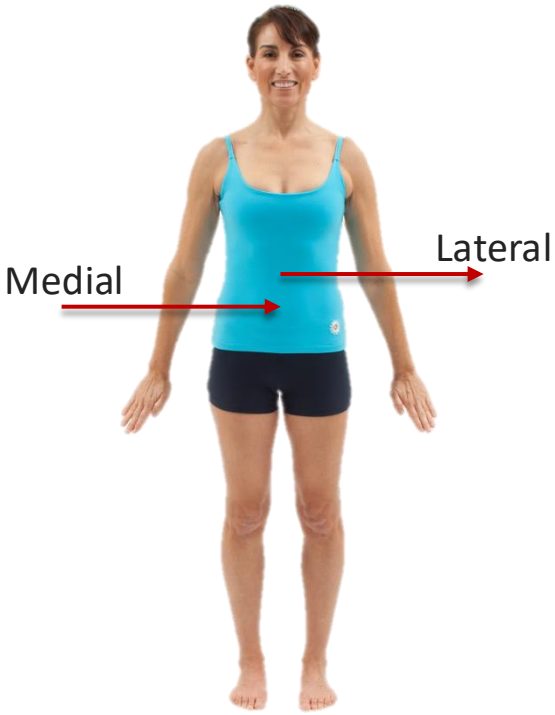


balanced body

Anatomical Directions

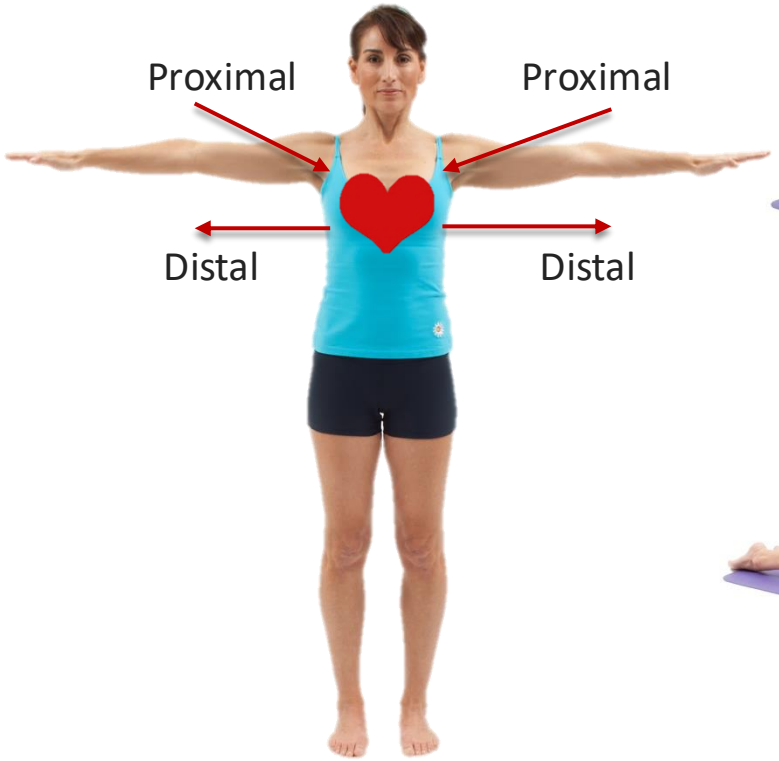


Superior Above	**Inferior** Below
Anterior In the front	**Posterior** In the back
Superficial Closer to the surface of the body	**Deep** Further from the surface of the body
Cranial Toward the head	**Caudal** Toward the tail



balanced body

Anatomical Directions



Supine

Prone

Proximal
Closer to the heart

Distal
Farther from the heart

Supine
Lying on the back

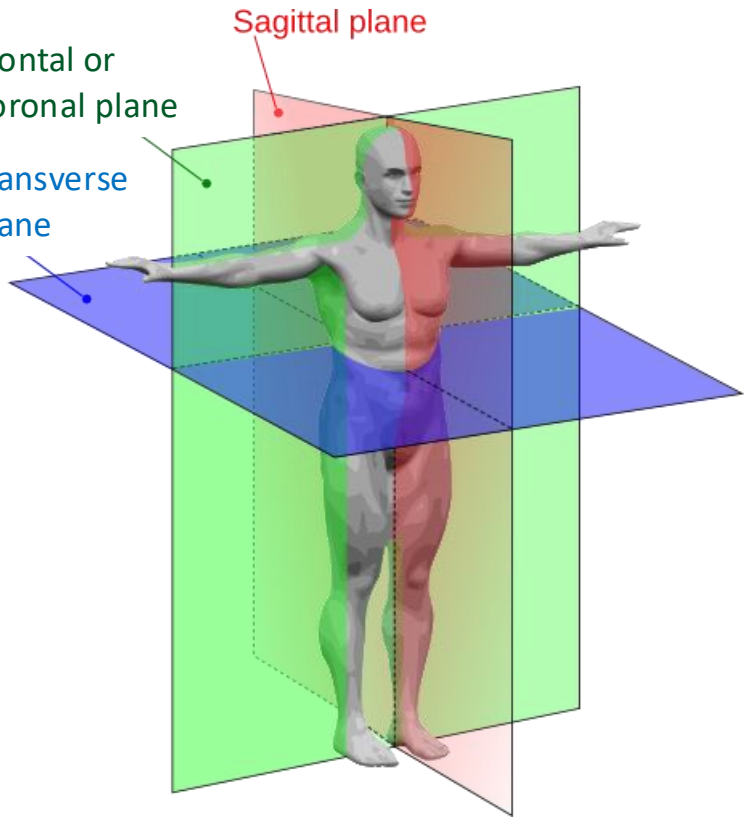
Prone
Lying on the stomach

Ipsilateral
To the same side (usually referring to rotation)

Contralateral
To the opposite side (usually referring to rotation)

balanced body

Planes of Motion



Sagittal or
Wheel plane

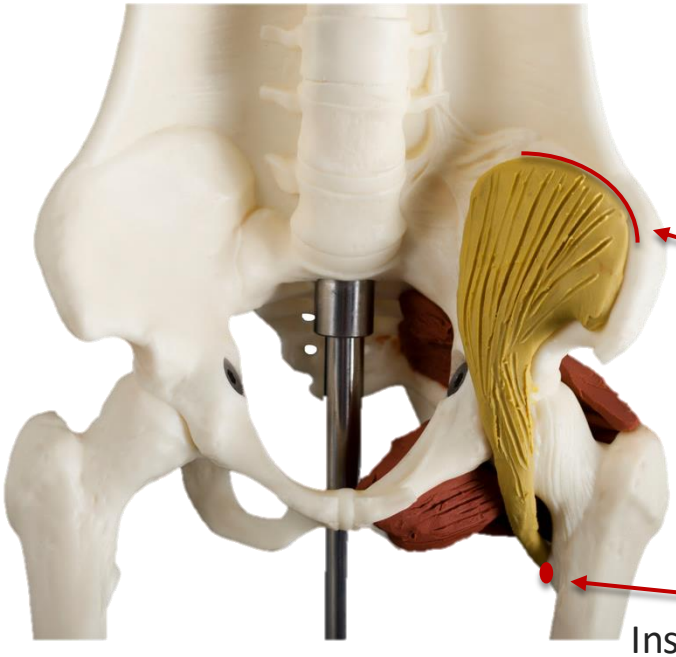
Coronal or
Frontal plane

Transverse,
Horizontal or
Rotational
plane

balanced body

Origin and Insertion

Iliacus



Origin: Superior two thirds of iliac fossa

Insertion: Lesser trochanter

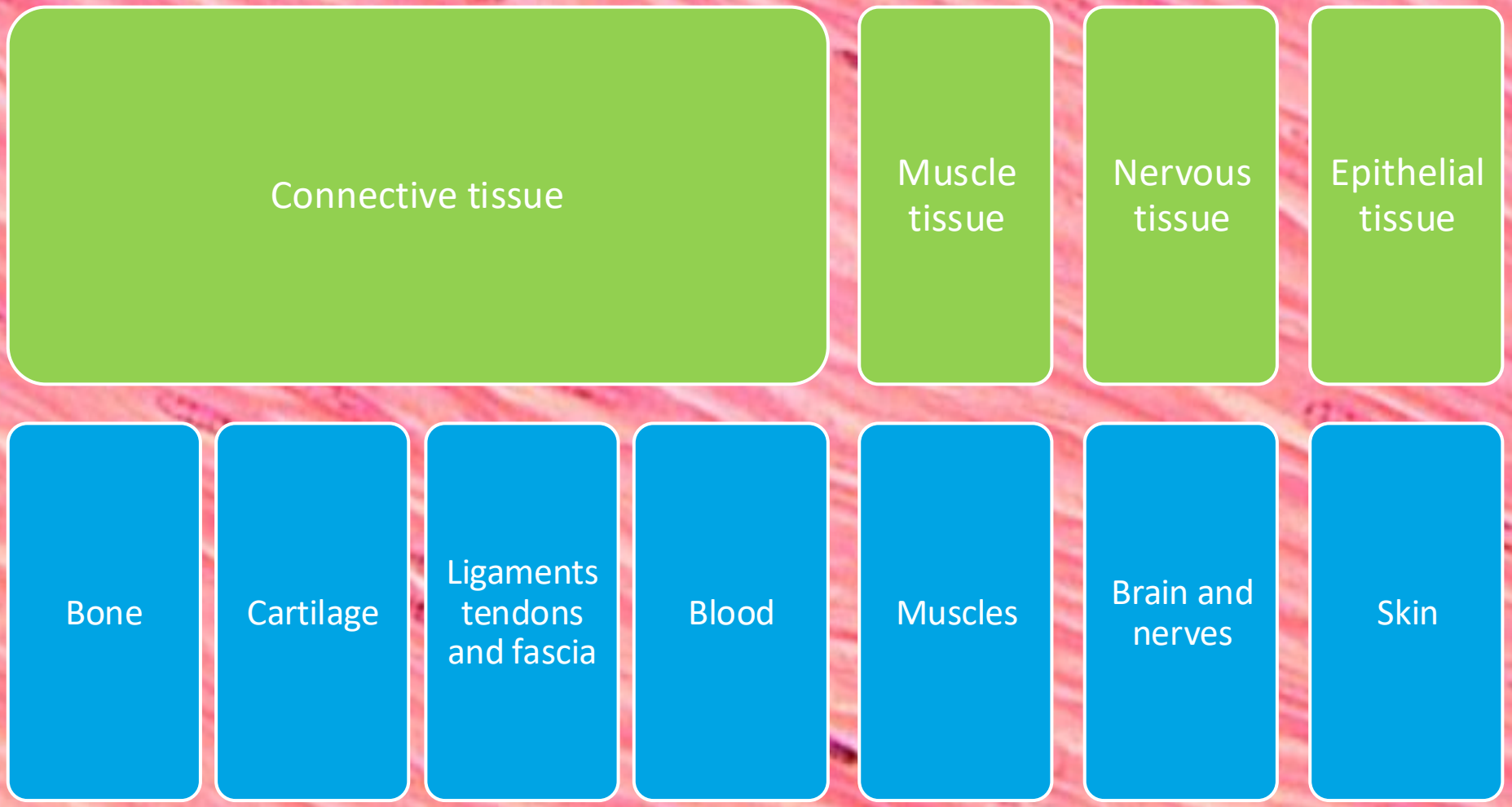
Origin
Refers to the relatively stationary or fixed end of a muscle (O)

Insertion
Refers to the relatively more mobile end of a muscle (I)

Since muscles can often move joints from both the insertion towards the origin and from the origin towards the insertion, the origin can more accurately be referred to as the proximal end and the insertion as the distal end of the muscle.

balanced body

Tissues of the Body



Background is smooth muscle tissue

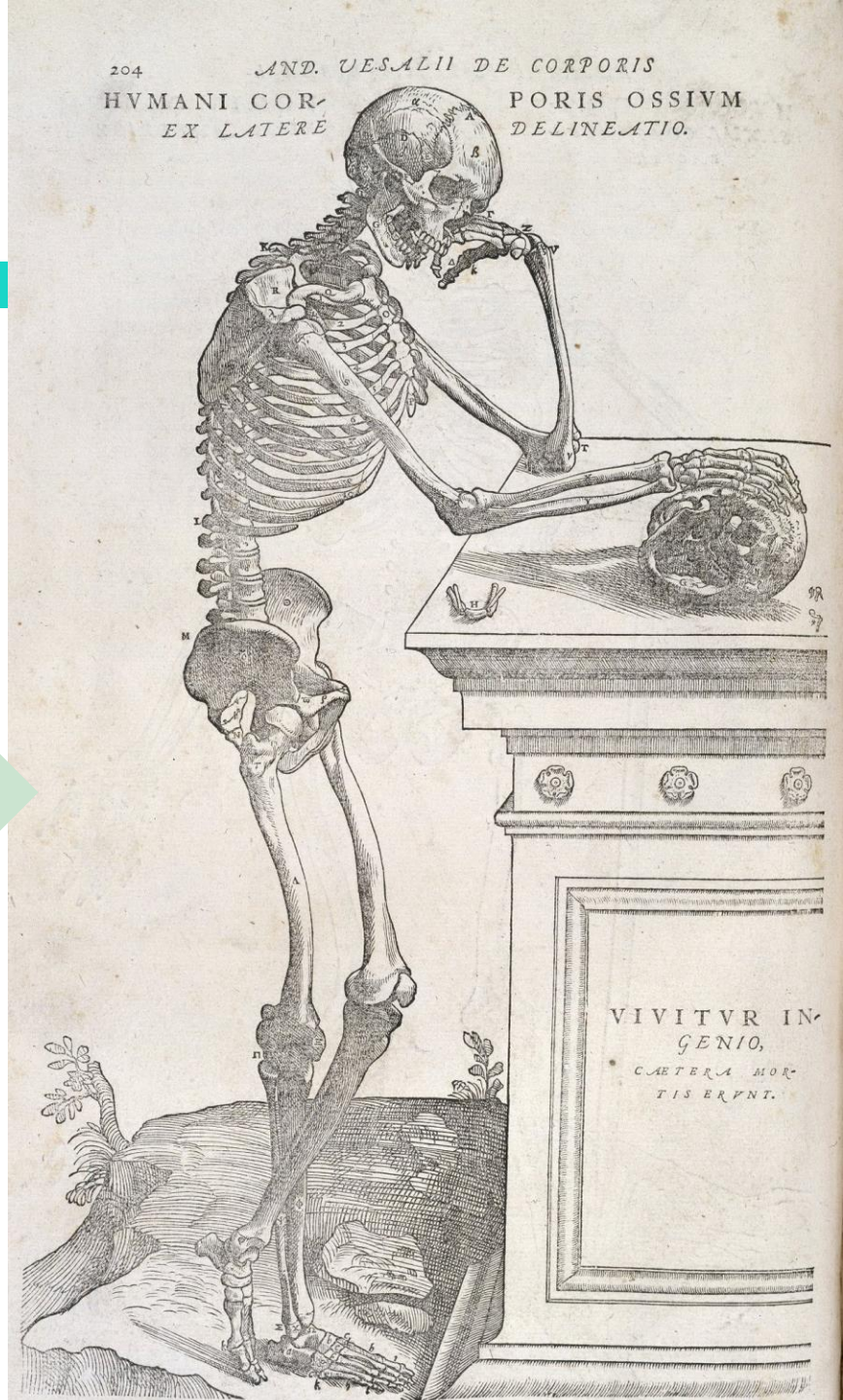
Bone

206 bones in the human body create structure, protect organs and anchor muscles.

Bones are the levers by which muscles create movement.

Bones are alive. Remodel in response to stress. Contain immune system components.

As strong as steel, but lightweight and flexible



balanced body

Bones

Function

- Protection
- Support
- Movement
- Red and white blood cell production
- Mineral storage

Common Pathologies

- Breaks
- Fractures
- Osteoporosis

balanced body

Bones

Periosteum

- Outer layer
- Creates new bone
- Blood and nerve supply

Cortical (or compact) bone

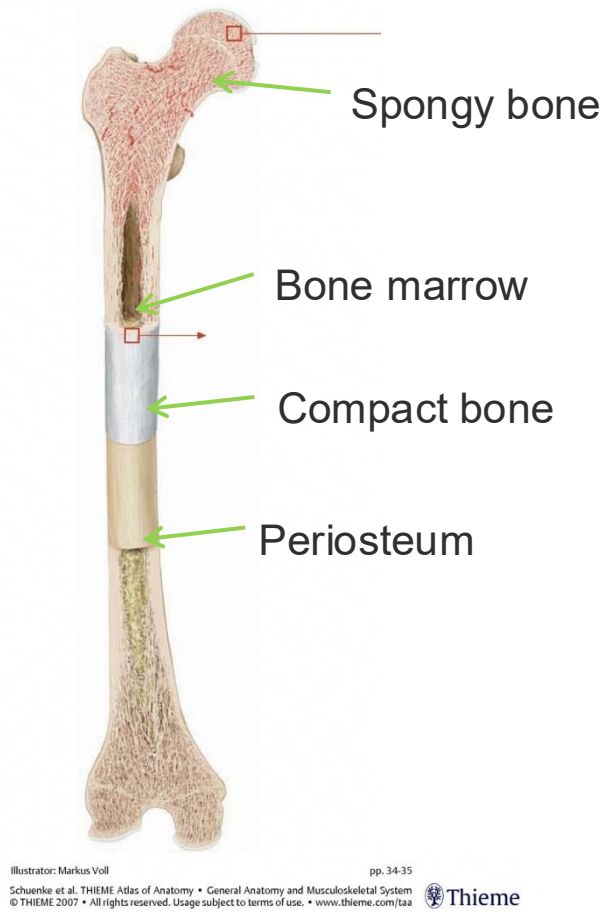
- Surface of the bone
- Tightly packed structure

Trabecular (cancellous or spongy) bone

- Inside the bones
- Composed of trabeculae, arches of bone formed in response to stress
- Trabeculae thin with osteoporosis

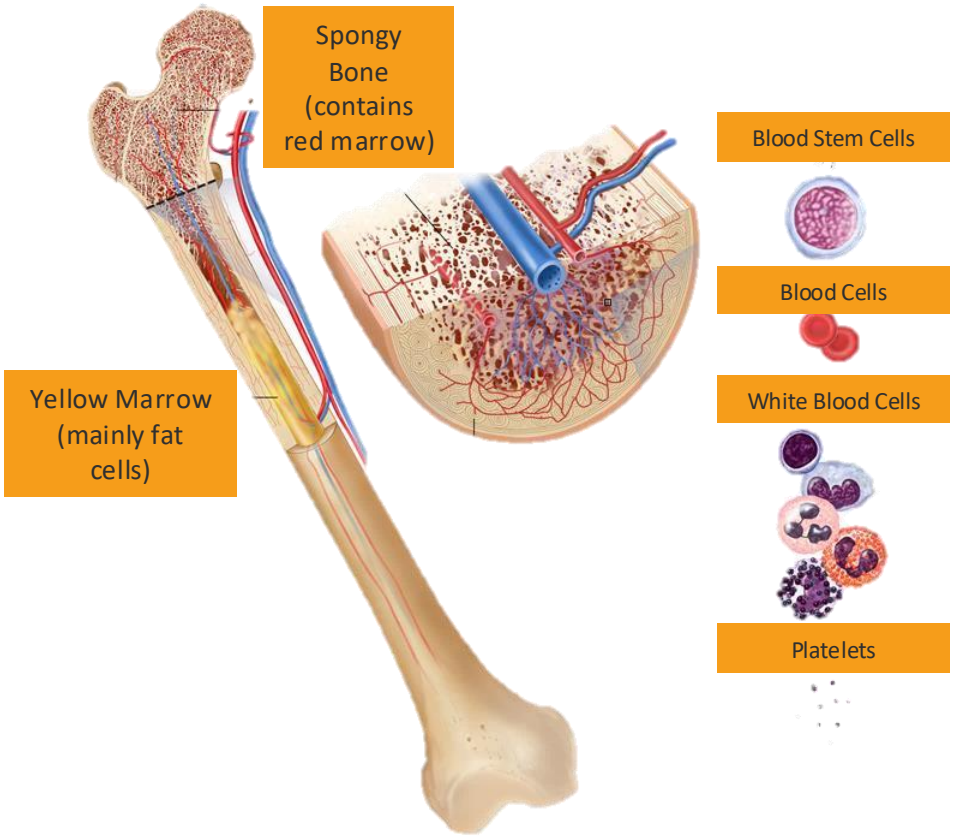
Bone marrow

- Inside the long bones and flat bones
- Produces red and white blood cells



balanced body

Bone Marrow



Bone marrow produces blood cells of all kinds including red blood cells and white or immune system cells.

In adults it is primarily found in the flat bones: sternum, ilium, vertebrae, scapulae and ribs.

Red blood cell production is a process known as hematopoiesis

The hematopoietic component of bone marrow produces 500 billion blood cells per day

Bone marrow is essential for good energy metabolism and a healthy immune system.

balanced body

Skeletal System

Axial Skeleton

Skull

Spine

Ribcage

Appendicular Skeleton

Shoulder Girdle

Pelvic Girdle

Appendages

- Arms
- Legs

balanced body

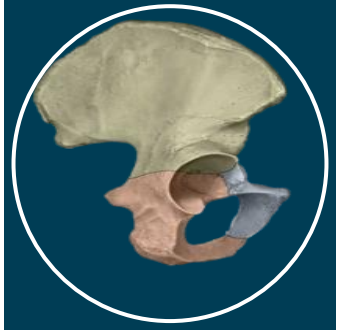
Types of Bones

Long Bone

has a shaft, mostly limb bones (humeral bone, femur bone)

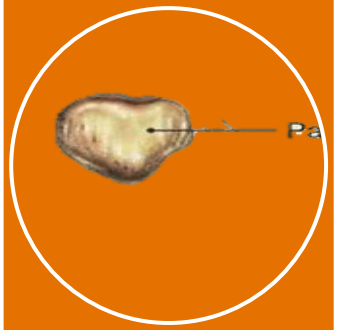
Short Bones

"cubed" most carpal (wrist) and tarsal (ankle) bones



Flat Bones

thin and generally curved, skull, hip bones, sternum, ribs and scapulae



Sesamoid Bones

Embedded in tendons, i.e. Patella

Irregular Bones

shapes are irregular, vertebrae, sacrum and coccyx

balanced body

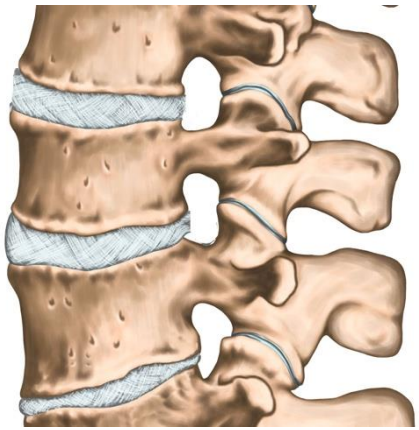
Joints: Classification

Fibrous Joints

- Bones held together by fibrous tissue
- Fibrous joints allow little or no movement.
- Examples: Joints of the skull, teeth in the jaw

Cartilaginous or Symphyseal Joints

- Bones held together by thickened discs of cartilage.
- Cartilaginous joints are strong and stable and allow a small amount of movement
- Examples: Symphysis pubis, joints between the bodies of the vertebrae, joint between the sternum and the manubrium



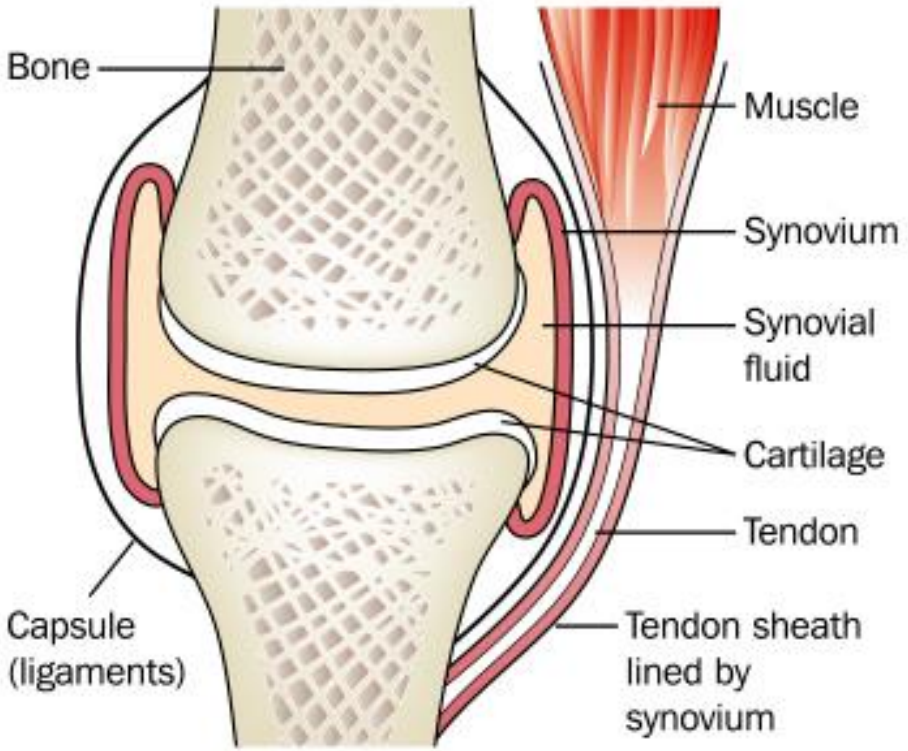
balanced body

Synovial Joints

The bones are not joined directly together leaving space for the bones to move.

Allows maximum range of motion.

Example: Knee, elbow, hip, finger and toe joints

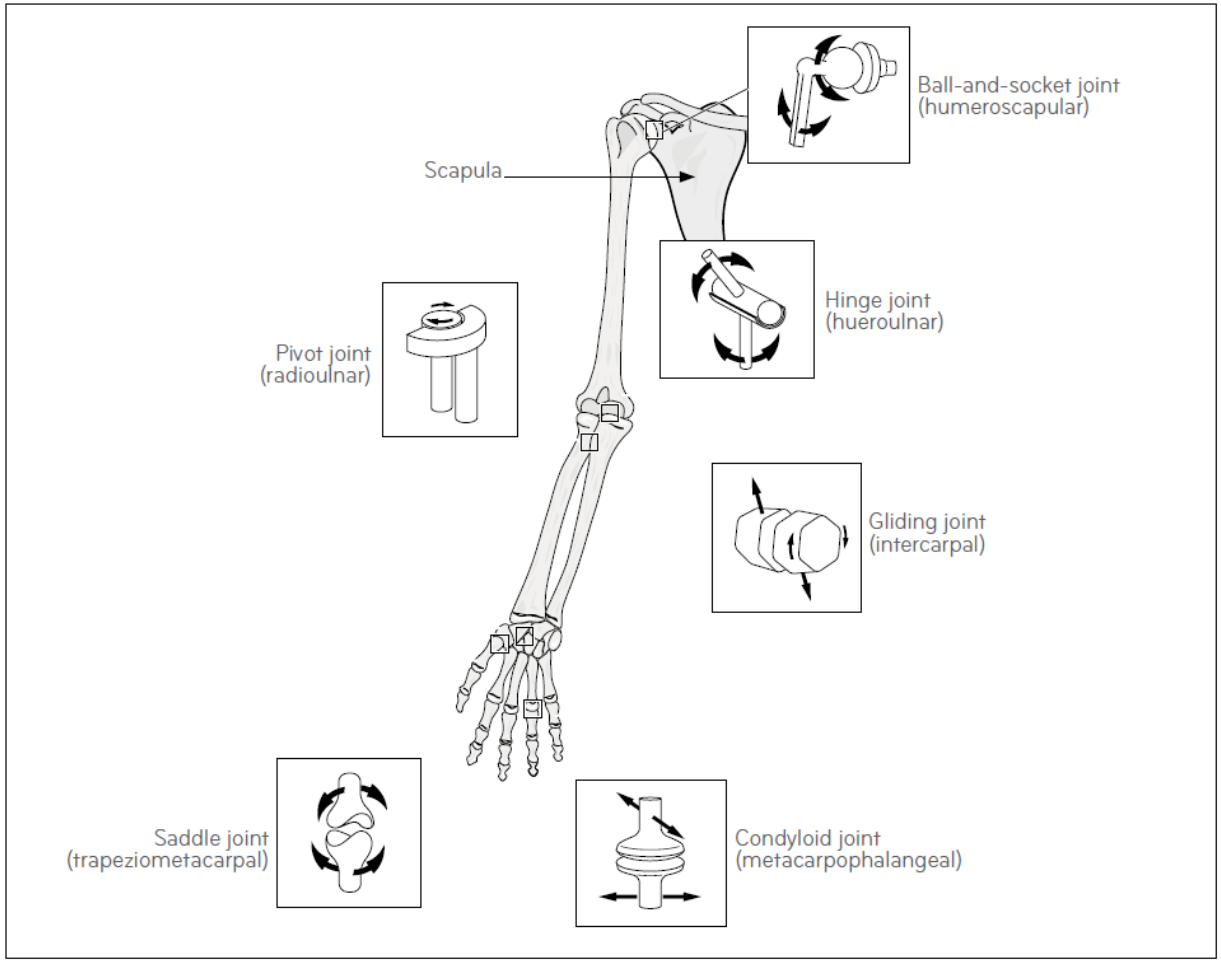


balanced body

Types of Synovial Joints

Type of Joint	Example	Joint Shape	Joint Movement
Ball and Socket	Hip, Shoulder	Ball and Socket	Movement in all planes
Hinge	Elbow, Knee, Phalanges	Varies	Flexion and extension
Gliding	Carpals, Tarsals	2 flat surfaces meeting	Small amount of glide in one or several planes
Ellipsoid or Condyloid	Radiocarpal	Oval end articulates with elliptical basin	Flexion, extension, abduction, adduction
Saddle	Thumb, Sternoclavicular	2 nesting saddles	Flexion, extension, abduction, adduction
Pivot	Atlantoaxial or radioulnar	Axle and Wheel	Rotation

Types of Joints



balanced body

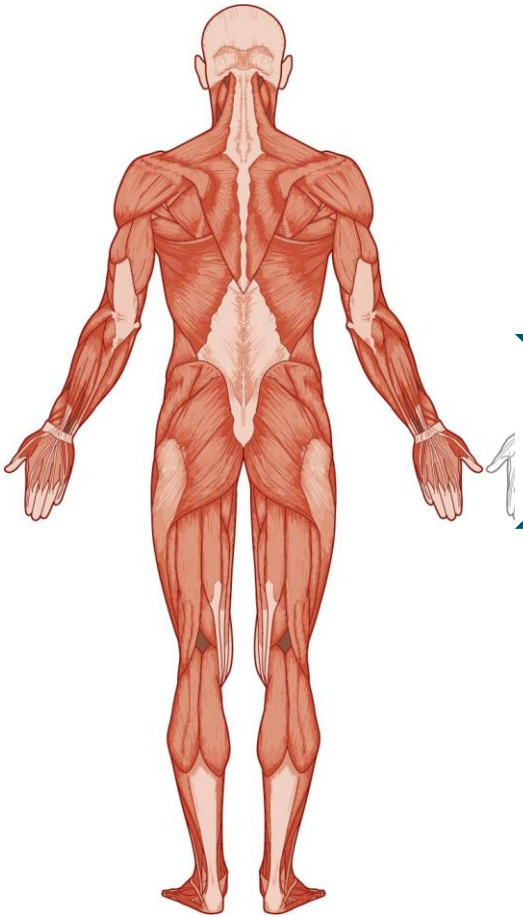
Muscular System

There are three categories of muscle:

- Skeletal
- Smooth
- Cardiac

The skeletal muscles consist of striped or striated fibers. They move the various parts of the body.

Skeletal muscles are considered "voluntary" muscles because the person controls their use.

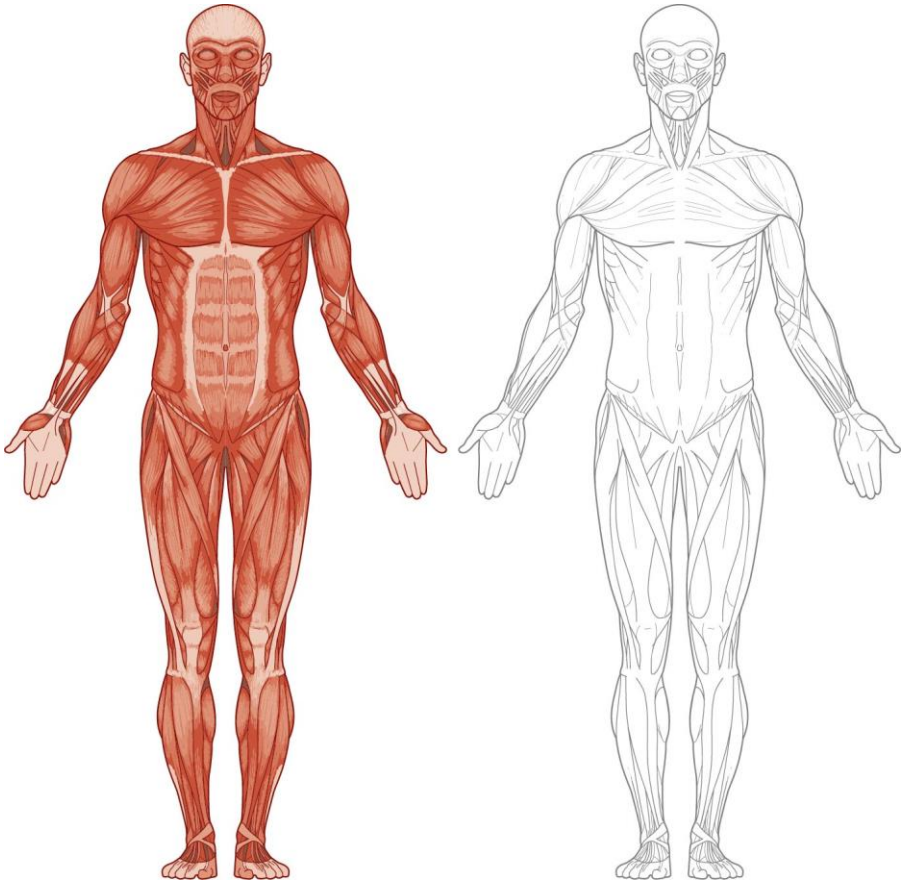


The muscular system is made up of some six trillion muscle fibers.

Each fiber is thinner than a human hair, but can support up to 1,000x its own weight

balanced body

Muscular System



The number of muscles in the human body varies from about 656 to 850, depending on which expert you consult.

No exact figure is available because there are a variety of opinions about what constitutes a distinct muscle (versus part of a complex muscle).

There is also variability in muscular structure between individuals.

balanced body

Muscle Structure

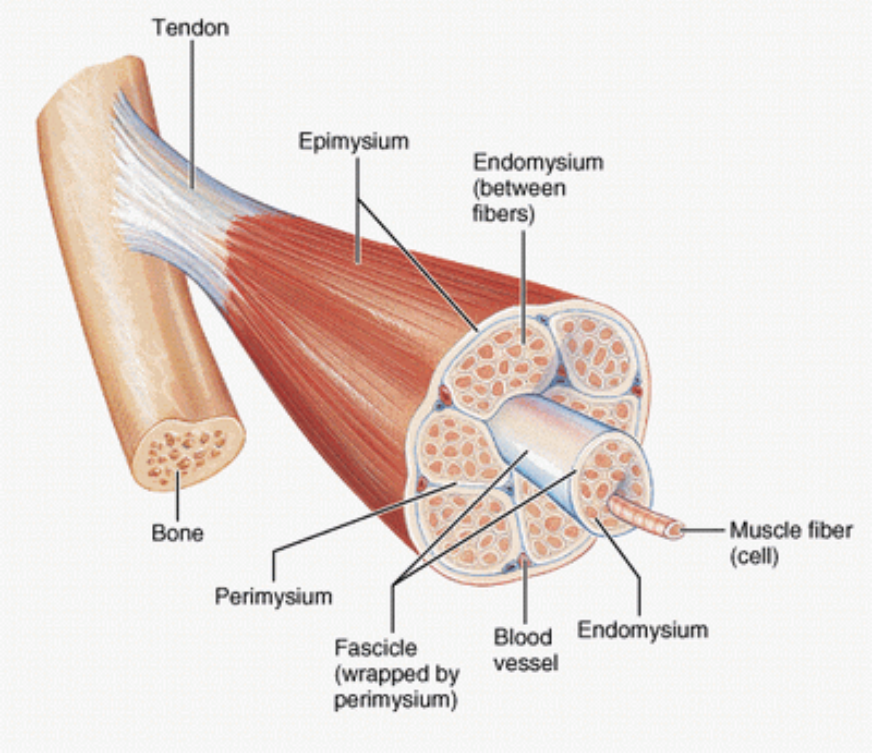
Typical Skeletal Muscle

Structure: Muscles are composed of a combination of muscle fibers and connective tissue.

Endomysium: Internal layer of connective tissue which encases individual muscle fibers.

Perimysium: Connective tissue that surrounds bundles of muscle fibers.

Epimysium: Connective tissue which encases entire muscle.



Tendon: Epimysium merges with the tendon which attaches to the bone. Creates a strong junction between muscle and tendon.

balanced body

Muscle Shapes

Parallel

Parallel to the force generating axis.

Strap

Strap or belt shape. Can shorten about 40-60% of resting length

Fusiform

Wider in the center and tapers at both ends. Force production is concentrated into a small area (i.e. Biceps)

Triangular or Fan shaped

Spread from broad area to converge at one end.

Flat

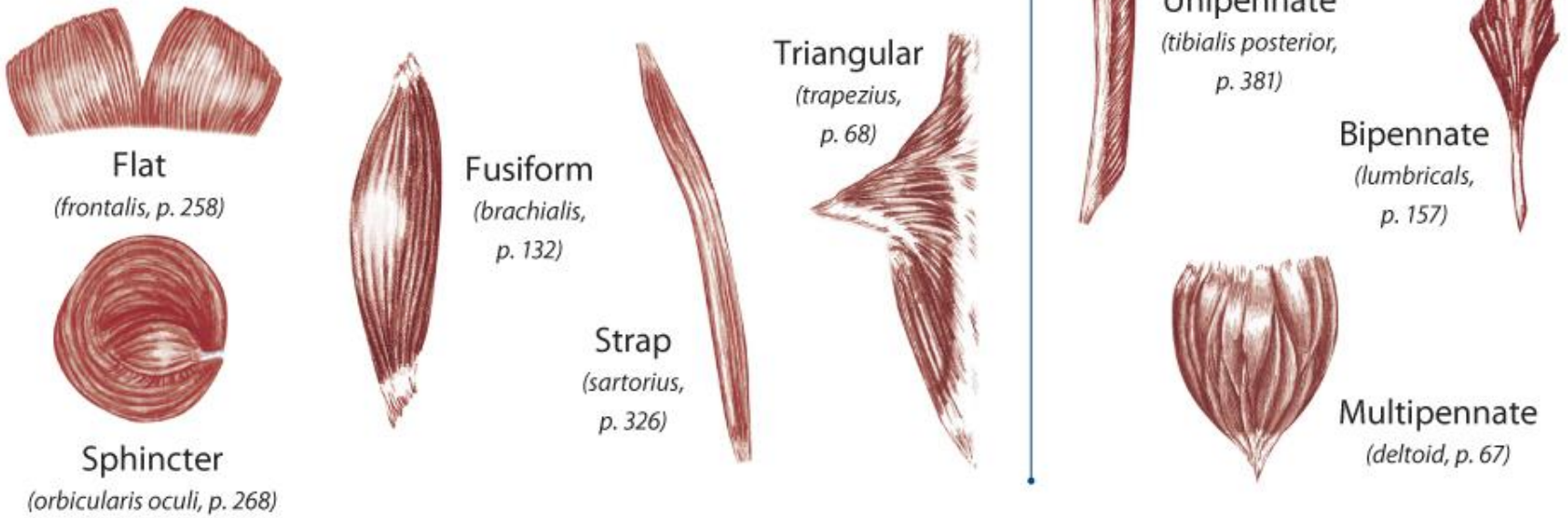
Broad, relatively thin, sheet-like muscle

Sphincter

Circular muscle controlling body passages or orifices. (i.e. urinary sphincter)

Pennate – uni, bi or multipennate

Feather shaped. Short fibers insert at an angle along a central tendon. Produce greater force then parallel muscles.



Build a Muscle!

Make 3 muscle fibers

Cover each muscle fiber with a layer of endomysium

Wrap all three muscle bundles together in a layer of perimysium

Wrap them all up in epimysium and make a tendon where they all attach.

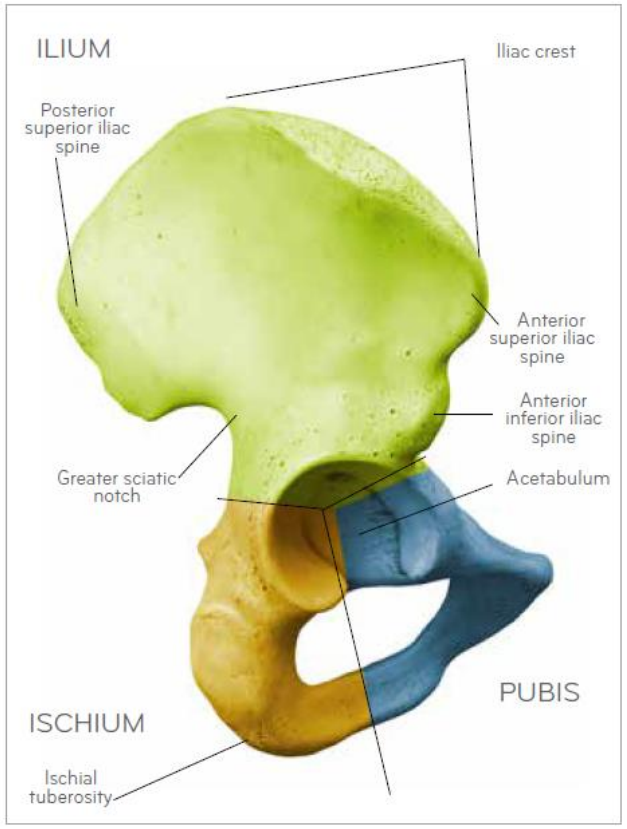
balanced body

The Lower Body

Including the bones, muscles and actions of the hip and knee

balanced body

The Pelvic Half



The ilium, ischium and pubis, three island of bones which fuse together to form the hemi pelvis or hip bone.

The pelvic bone is also called

- Innominate
- Os coxa
- Hip Bone
- Hemi-pelvis

The pelvic half is made up of three fused bones

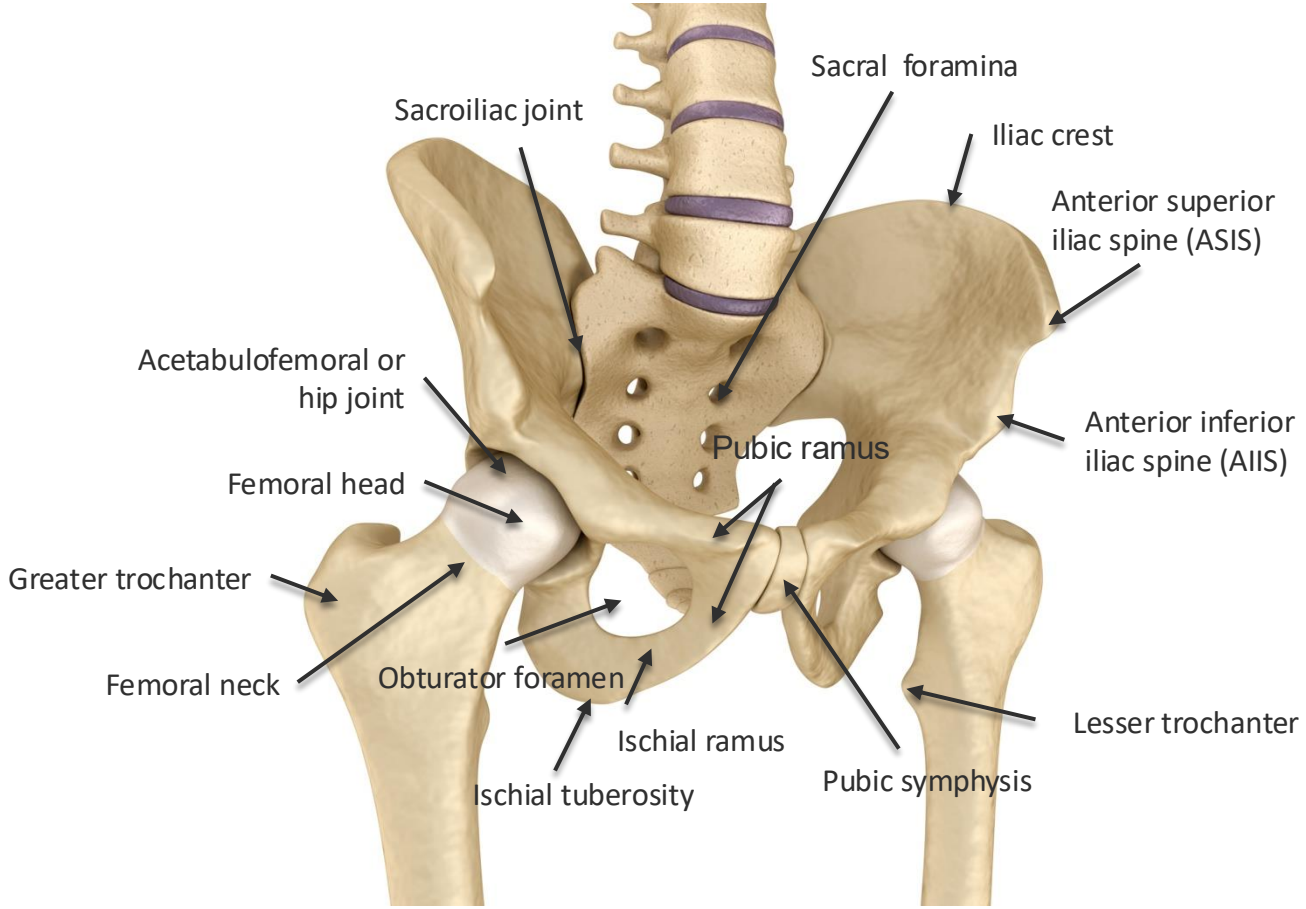
- Ilium
- Ischium
- Pubis

The acetabulum is the cup that holds the head of the femur forming the hip joint.

By the end of puberty these three bones fuse together and ossify by around 25 years of age.

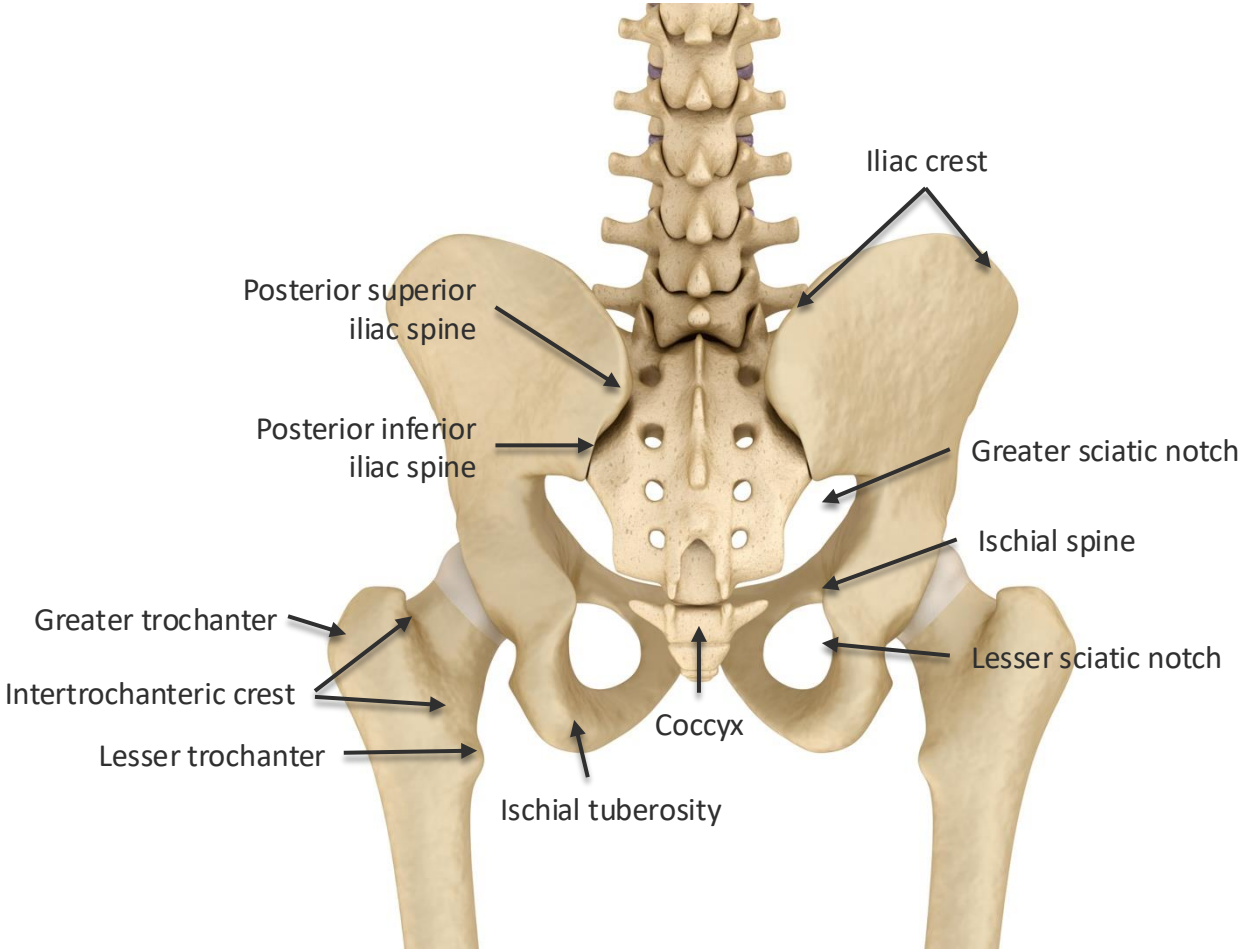
balanced body

Bony Landmarks
Anterior Pelvis, Sacrum and Hip



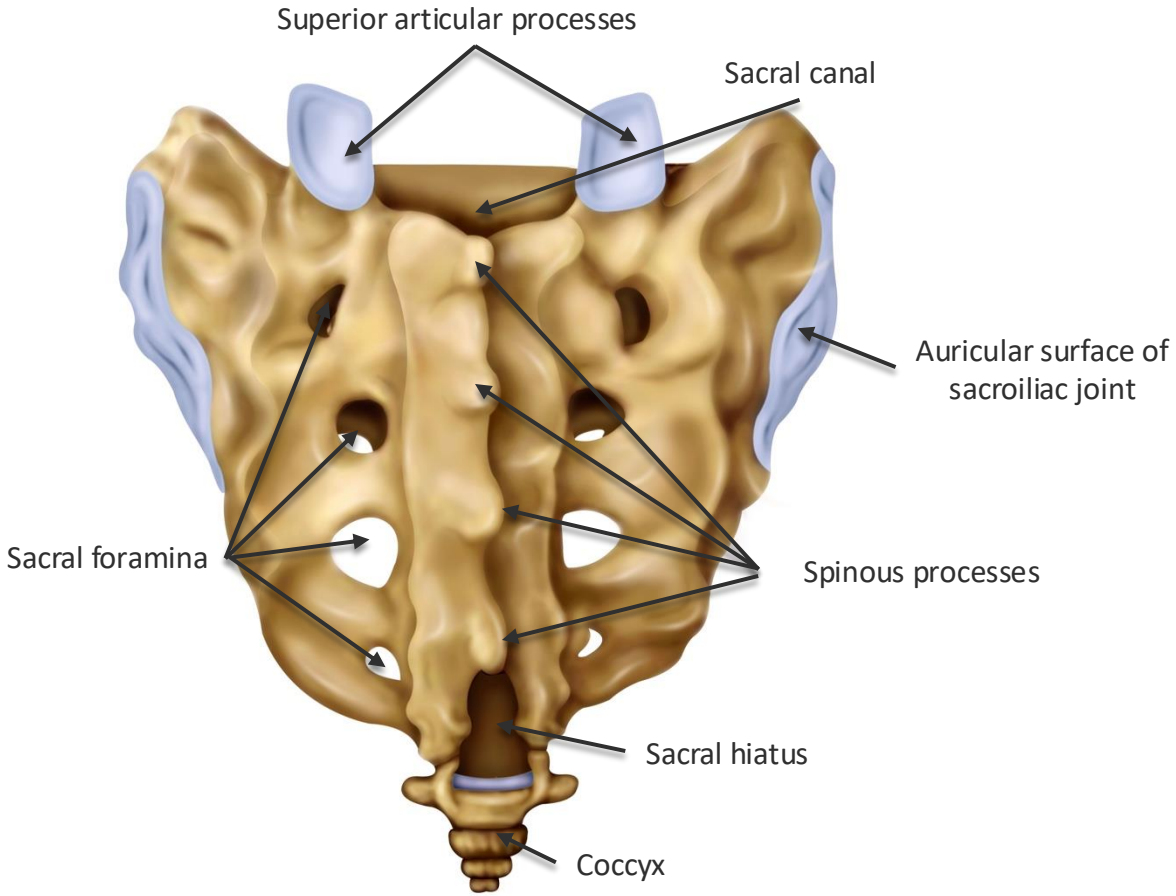
balanced body

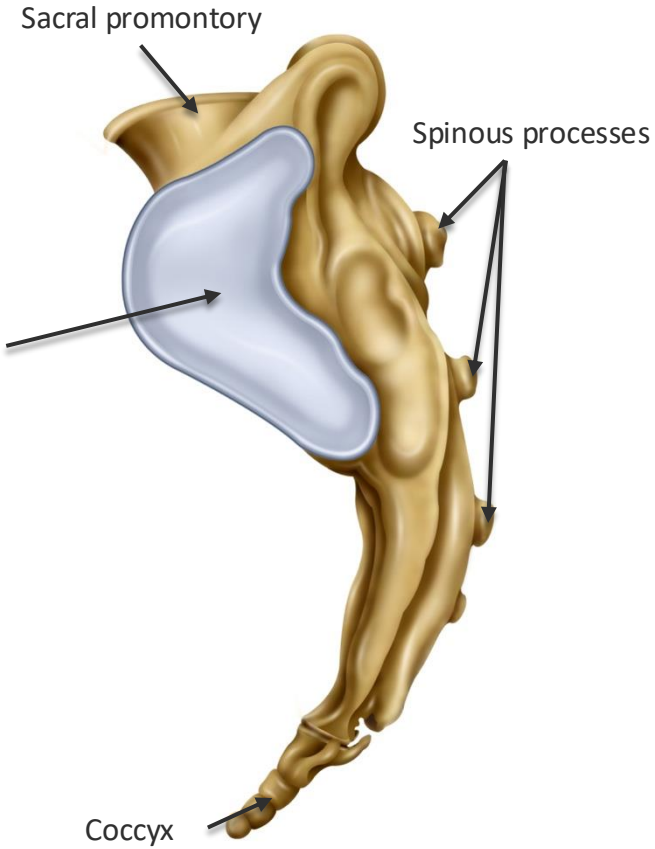
Bony Landmarks
Posterior Pelvis, Sacrum and Hip



balanced body

Bony Landmarks
Sacrum





balanced body

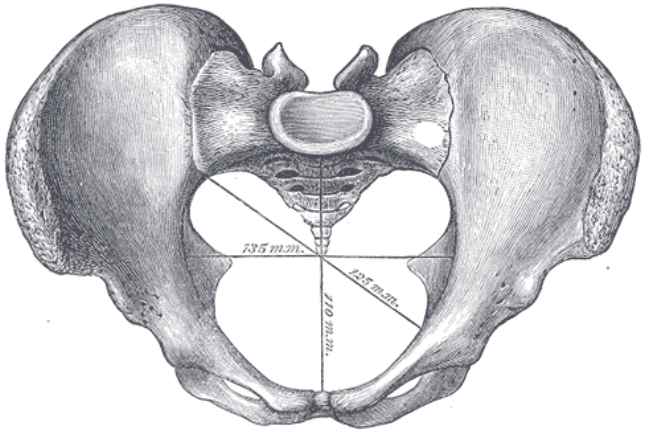
Sacrum as Keystone of the Pelvis

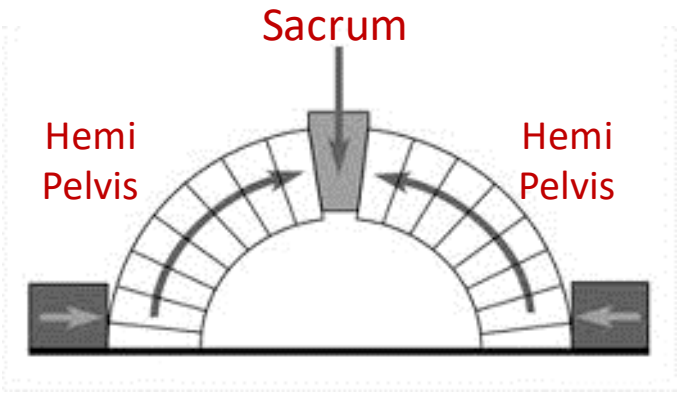
The sacrum has two roles, one is the keystone to pelvis, the other is the platform for the spine.

Keystone is a wedge between two arching columns.

A keystone prevents the columns from falling in on one another

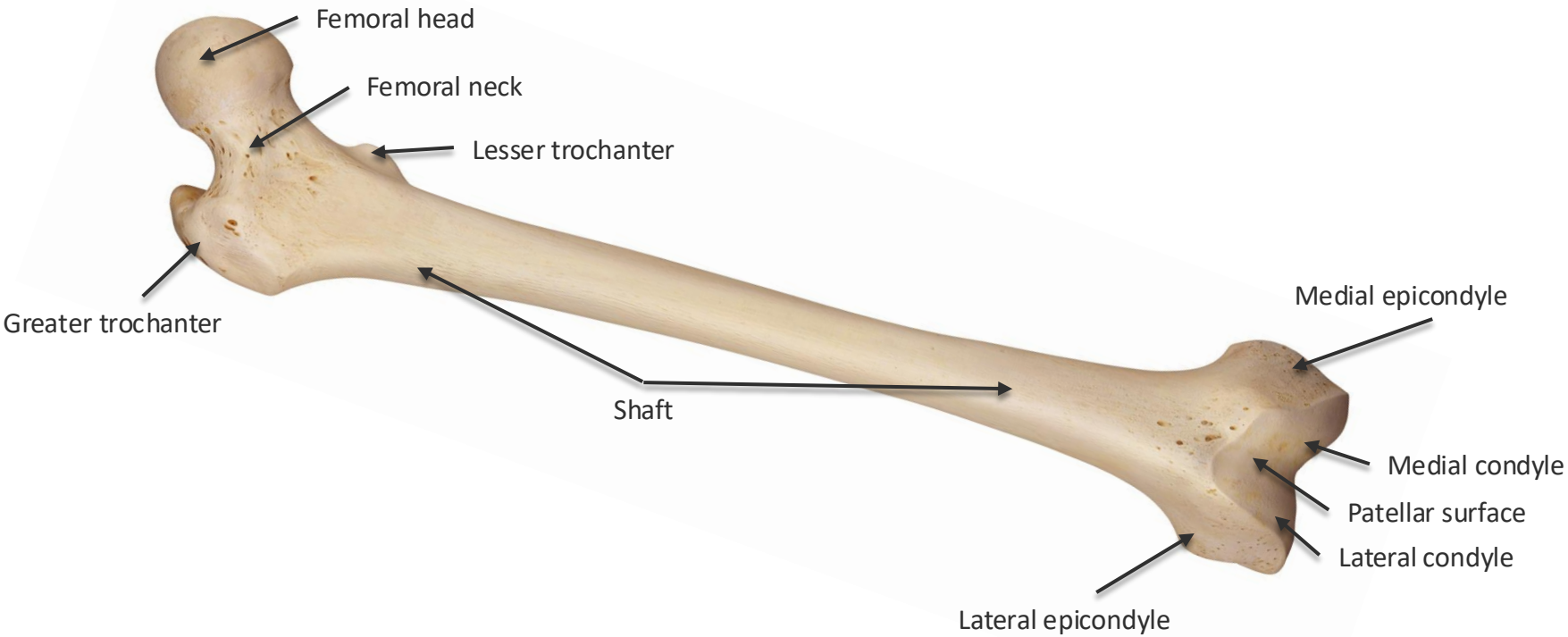
The downward forces of the body fall onto the sacrum via the spine and are met by the ground forces pressing upward and inward through the femur heads and around the ilium.





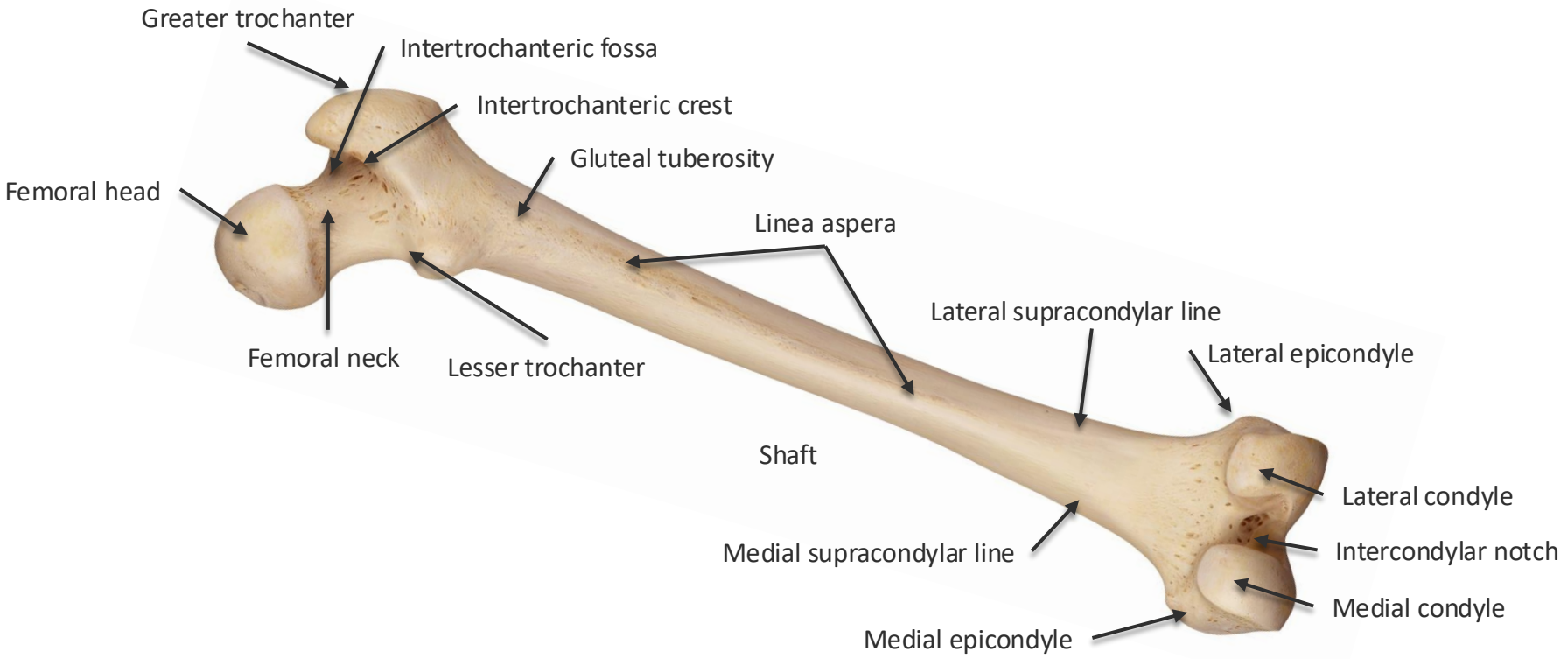
balanced body

Bony Landmarks
Anterior Femur



balanced body

Bony Landmarks
Posterior Femur



balanced body

Lower Body Build

Hip and Thigh

Deep Rotators

- Obturator Externus and Internus
- Gemellus Inferior and Superior
- Piriformis
- Quadratus Femoris

Psoas and Iliacus

Primary Hip Flexors and Knee Actors

- Quadriceps: Vastus Intermedius, Lateralis and Medialis, Rectus Femoris
- Sartorius

Abductors and lateral thigh

- Gluteus Minimus and Medius
- Iliotibial Band
- Tensor Fascia Lata

balanced body

Lower Body Build

Hip and Thigh

Adductors

- Pectineus
- Adductor Longus
- Adductor Brevis
- Adductor Magnus
- Gracilis

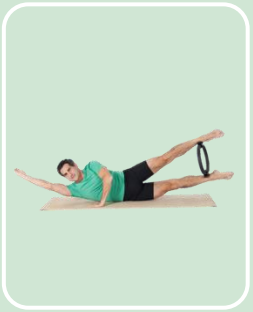
Hip Extensors and Knee Actors

- Semimembranosus, Semitendinosus
- Biceps Femoris
- Gluteus Maximus

balanced body

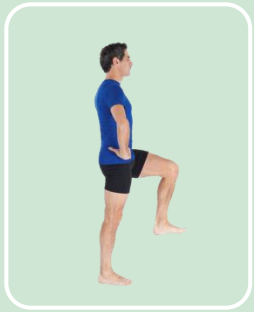
Lower Body Build

Movements of the Hip

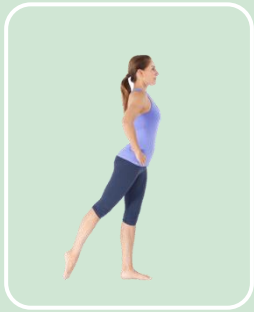


Adduction

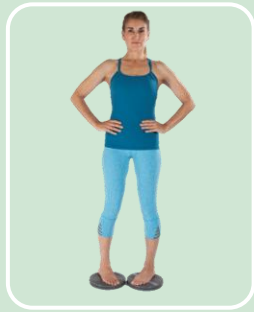
Abduction



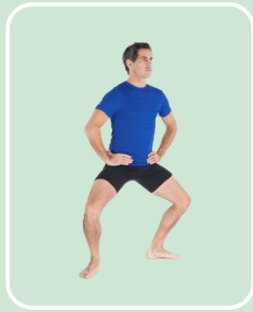
Flexion



Extension



Medial rotation



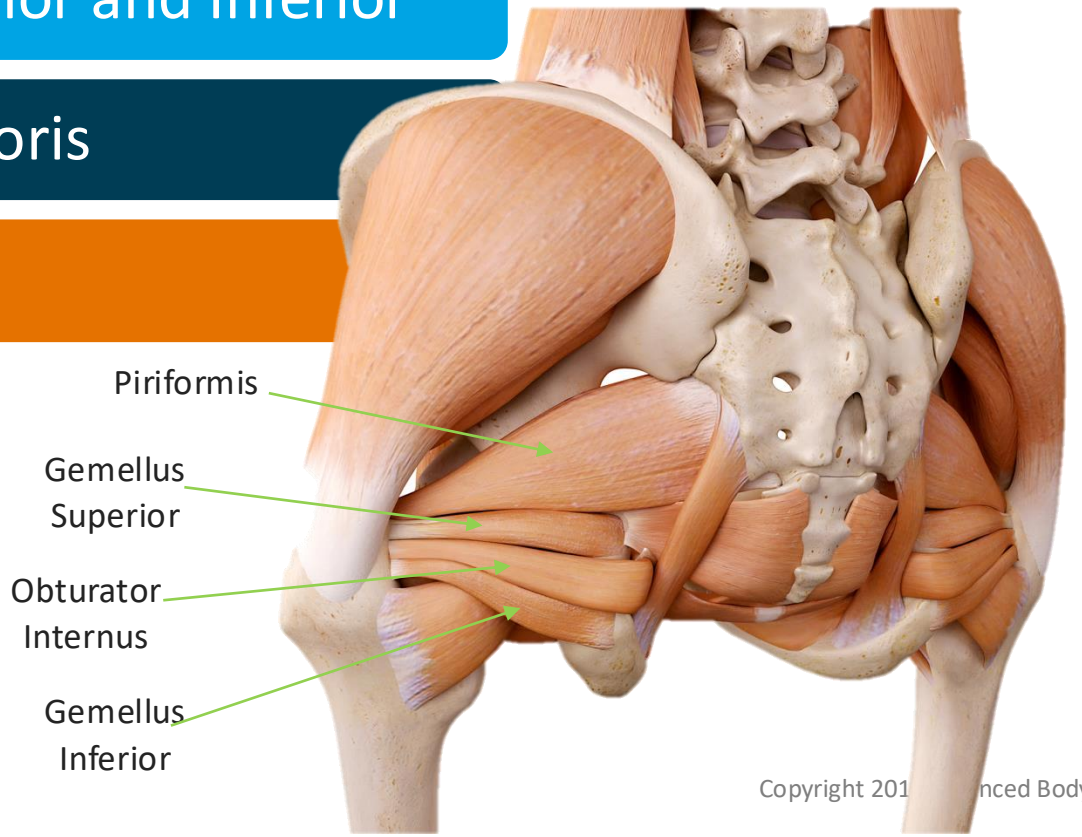
Lateral rotation

balanced body

Deep Rotators

Ready, set, build!

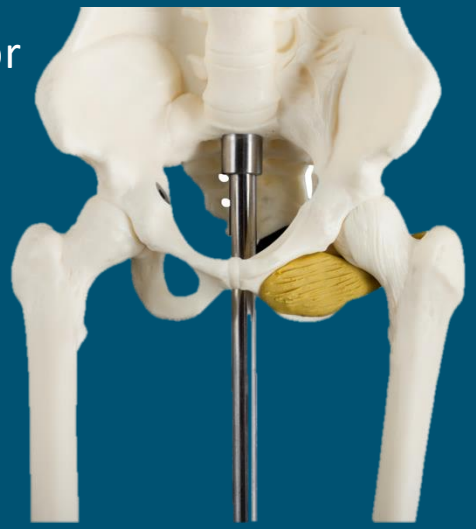
- Obturator Externus and Internus
- Gemellus Superior and Inferior
- Quadratus Femoris
- Piriformis



balanced body

Obturator Externus

Anterior View



Posterior View

Origin:

- Rami of pubis
- Rami of the ischium
- External surface of obturator membrane

Insertion:

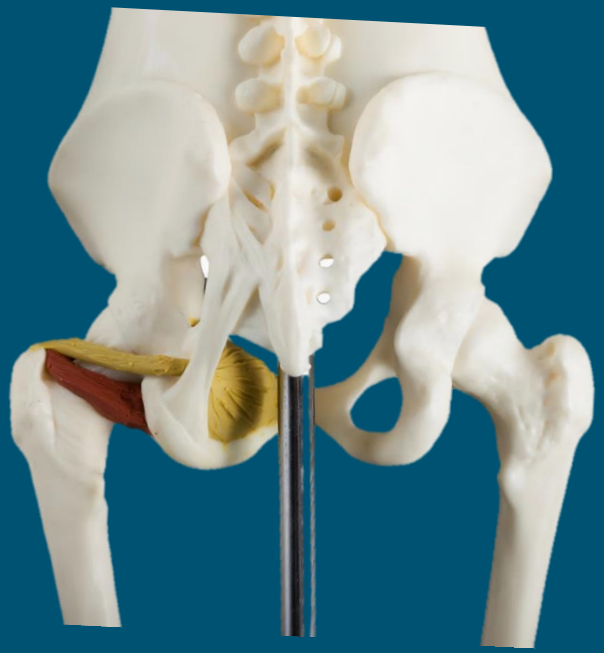
- Trochanteric fossa of the femur

Actions:

- Lateral rotation
- Adduction
- Supports the inferior surface of femoral neck and stabilizes the pelvis

Obturator Internus

Posterior View



Origin:

- Fills lesser pelvis covering inferior surface of obturator membrane

Insertion:

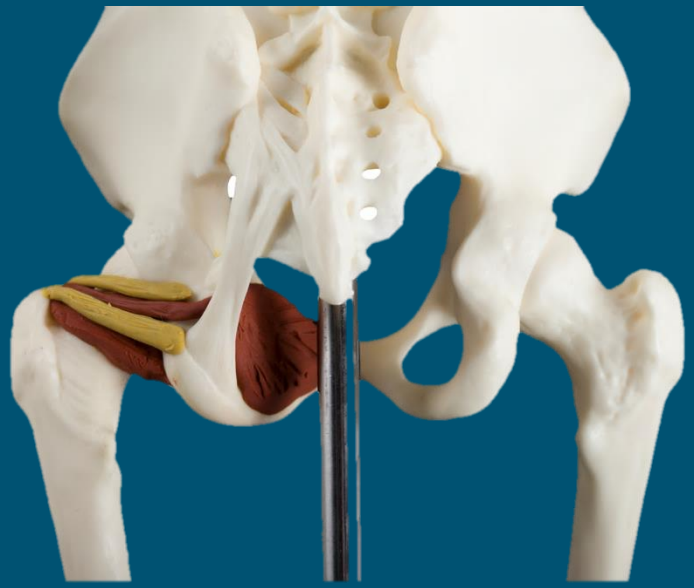
- Medial surface of greater trochanter of femur
- Proximal and superior to trochanteric fossa.

Actions:

- Laterally rotates
- Abducts and laterally rotates extended hip
- Abducts leg when hip is neutral, flexed or extended
- Stabilizes hip during walking
- Serves as attachment point for Levator Ani

Gemellus Superior and Inferior

Posterior View



Origin:

- *G. Superior:* External surface of ischial spine superior to obturator internus.
- *G. Inferior:* Superior ischial tuberosity just inferior to obturator internus.

Insertion:

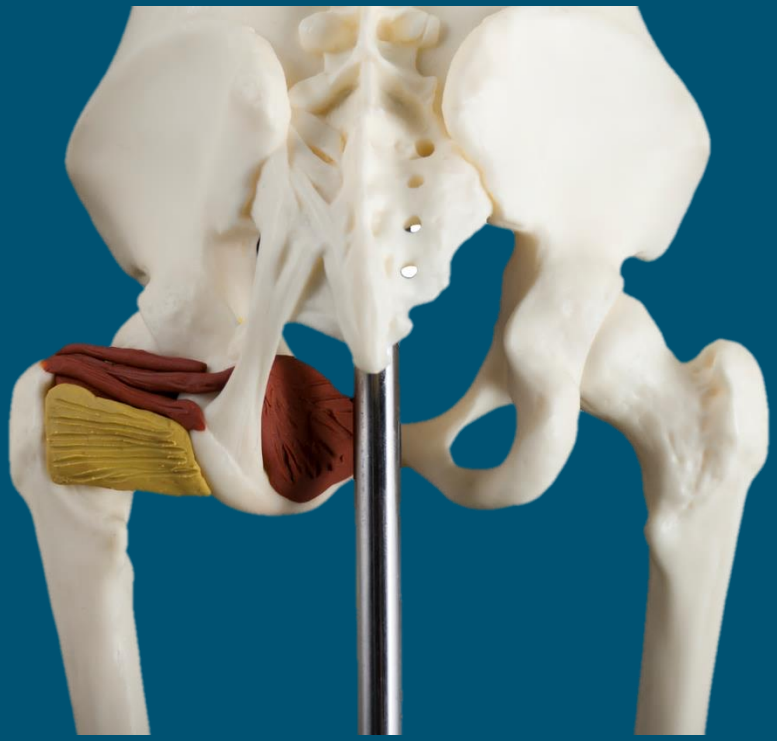
- With the tendon of the obturator internus onto medial surface of greater trochanter of femur

Actions:

- Lateral rotation on neutral or extended hip
- Abduction on neutral, flexed or extended hip
- Steadies head of the femur in acetabulum

Quadratus Femoris

Posterior
View



Origin:

- Proximal part of lateral border of ischial tuberosity

Insertion:

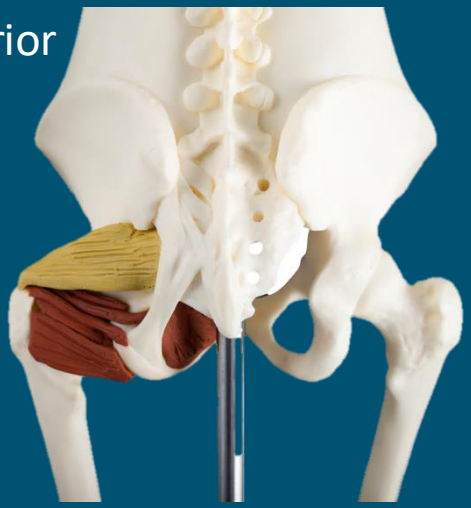
- Intertrochanteric crest between the greater and lesser trochanters

Actions:

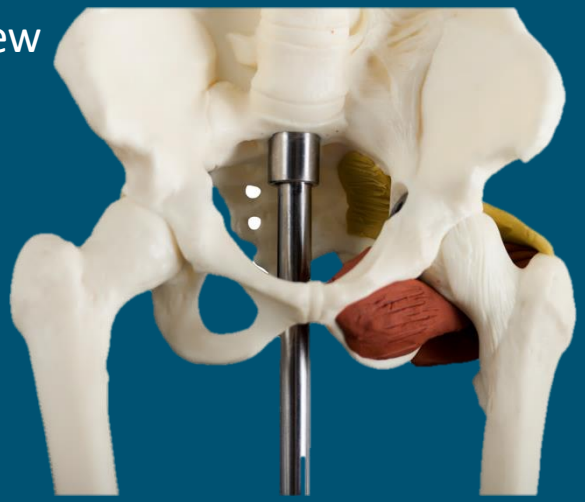
- Lateral rotation of the hip
- Adduction of the hip
- Stability of femur and acetabulum

Piriformis

Posterior View



Anterior View



Origin:

- Pelvic surface of sacrum between (and lateral to) pelvic sacral foramen 1-4
- Margin of greater sciatic foramen
- Pelvic surface of sacrotuberous ligament

Insertion:

- Superior border of the greater trochanter

Actions:

- Laterally rotates and abducts neutral or extended hip
- Medial rotation when hip flexed above 60^{o}
- Creates posterior wall of the pelvis and shares connective tissue with the Coccygeus of the pelvic floor

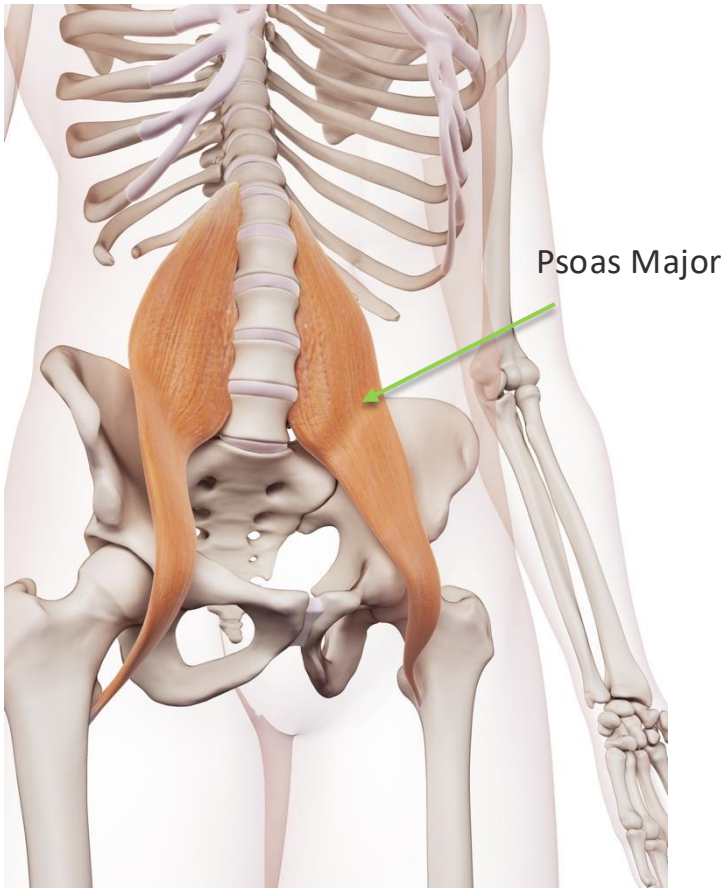
Deep Posterior Hip Muscle Movements

Muscle	Lateral rotation	Medial rotation	Adduction	Abduction	Extension	Stability
Quadratus femoris	X		X			X
Obturator externus	X		X			X
Obturator internus	X			X		X
Gemellus inferior and superior	X			X		X
Piriformis	X	X (above 60 degrees of flexion)		X	X	X

balanced body

Iliacus and Psoas

- Iliacus
- Psoas Major
- Psoas Minor



balanced body

Iliacus

Anterior
View

Origin:

- Superior two thirds of iliac fossa
- Iliolumbar and ventral sacroiliac ligaments

Insertion:

- Lesser trochanter of the femur

Actions:

- Fixed Pelvis:
  - Hip flexion, adduction, lateral rotation
- Fixed Leg:
  - Anterior pelvic tilt

Psoas Major

Anterior
View

Origin:

- Bodies, transverse processes and intervertebral discs of T12 to L5

Insertion:

- Lesser trochanter of the femur
- Shares common tendon with iliacus

Actions:

- Fixed Pelvis:
  - Hip flexion, adduction, lateral rotation
- Fixed Leg:
  - Anterior pelvic tilt

Psoas Minor

Anterior View

Origin:

- Sides of vertebral bodies of T12 and L1

Insertion:

- Superior pubic ramus
- Medial to iliopsoas tendon

Actions:

- Posterior pelvic tilt
- Anterior translation of the ribcage

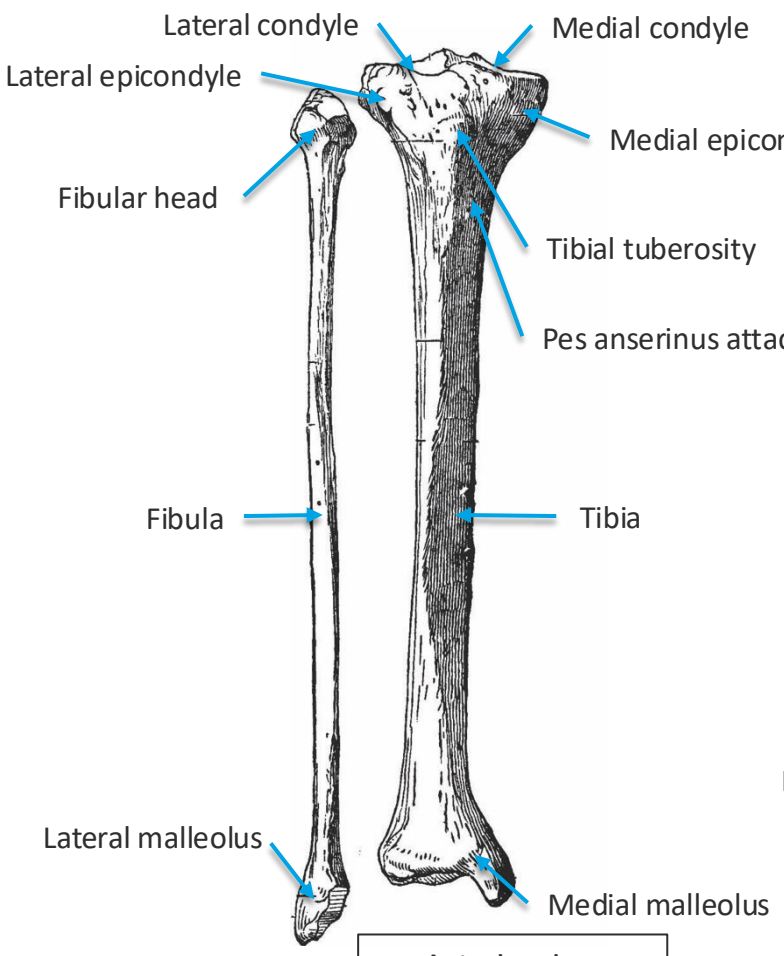
Psoas minor is absent in approximately 60% of the population.

Deep Anterior Hip Muscle Movements

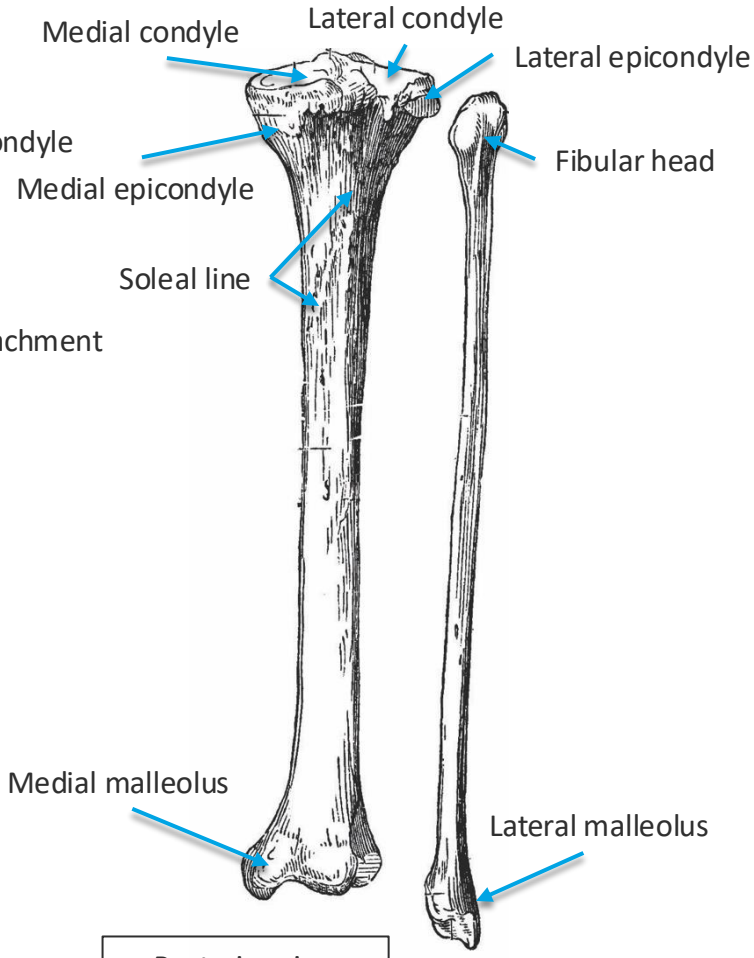
	Hip Actions			Pelvic Actions	
Muscles	Flexion	Adduction	Lateral rotation	Anterior pelvic tilt	Posterior pelvic tilt
Iliacus	X	X	X	X	
Psoas major	X	X	X	X	
Psoas minor					X

balanced body

Bony Landmarks
Tibia and Fibula



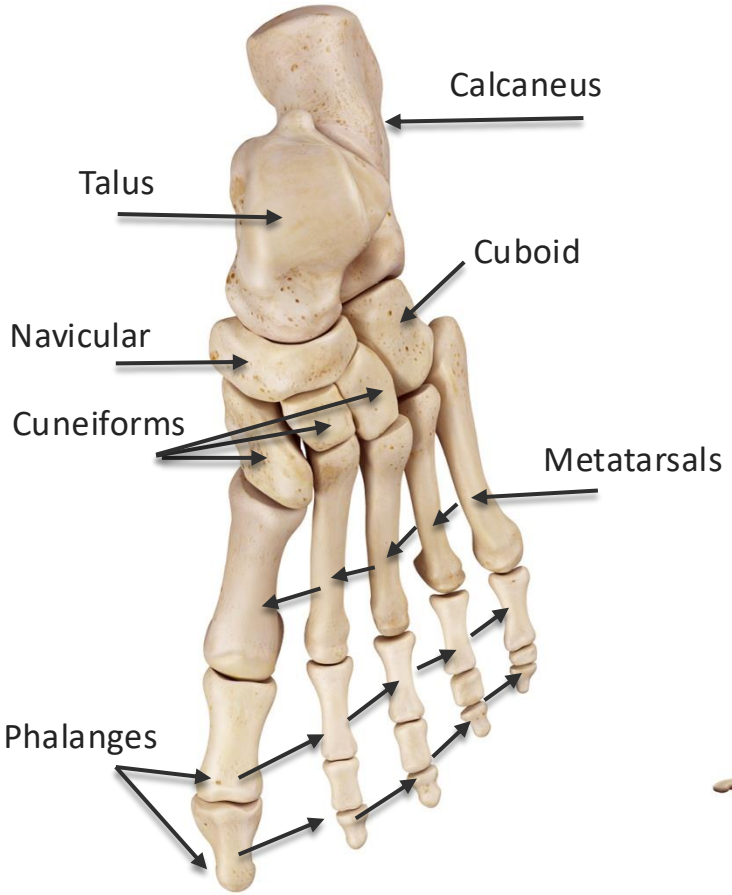
Anterior view

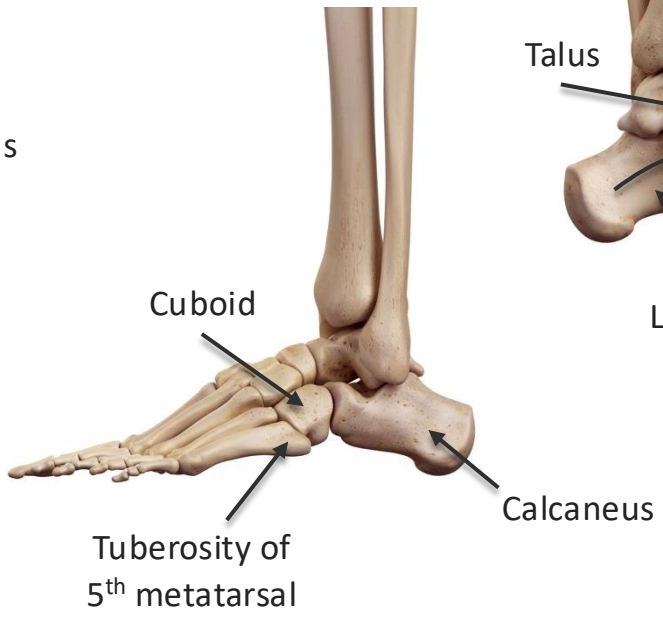


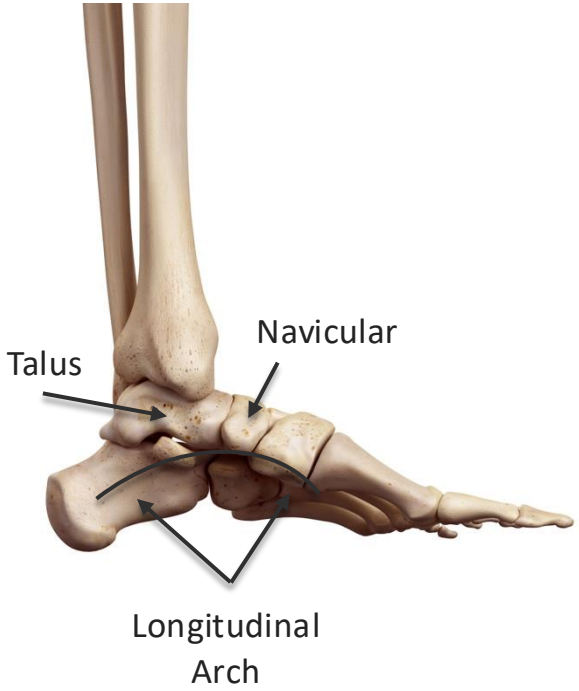
Posterior view

balanced body

Bony Landmarks
Foot







balanced body

Movements: Ankle, Foot and Toes

(talocrural, talotarsal, midtarsal, tarsometatarsal, metatarsophalangeal and interphalangeal joints)

Dorsiflexion of ankle

Inversion of foot

Flexion of toes

Plantar flexion of ankle

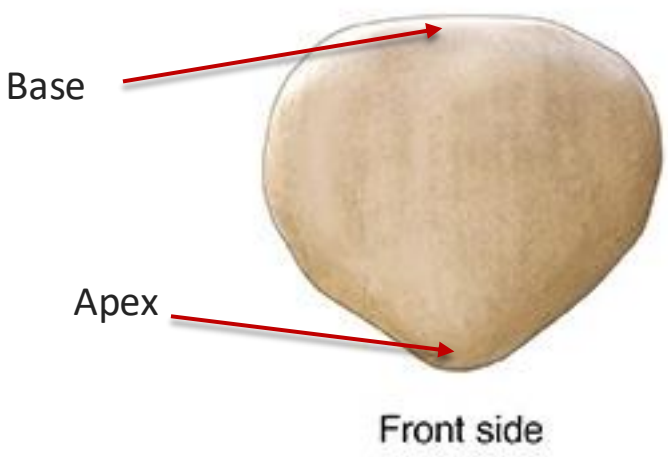
Eversion of foot

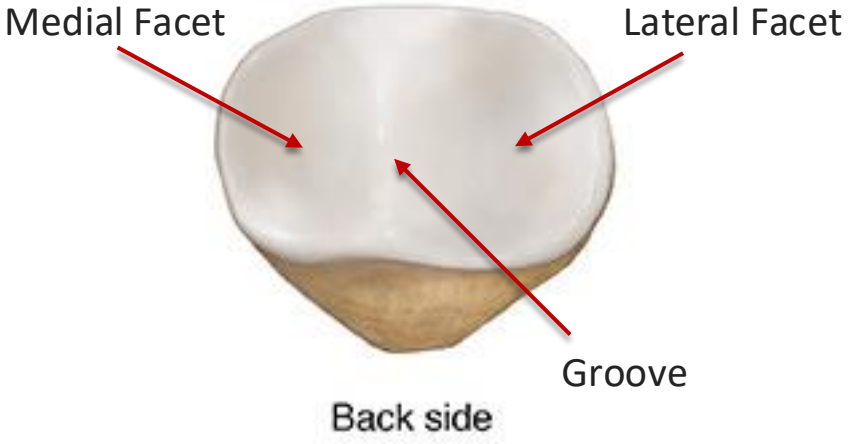
Extension of toes

Patella

The patella is a sesamoid bone. It is slightly triangular shaped and is encased in the tendon of the quadriceps muscle.

Notice the slight groove in the posterior view. Imagine how that groove will rest in the space between the condyles at the distal end of the femur.





balanced body

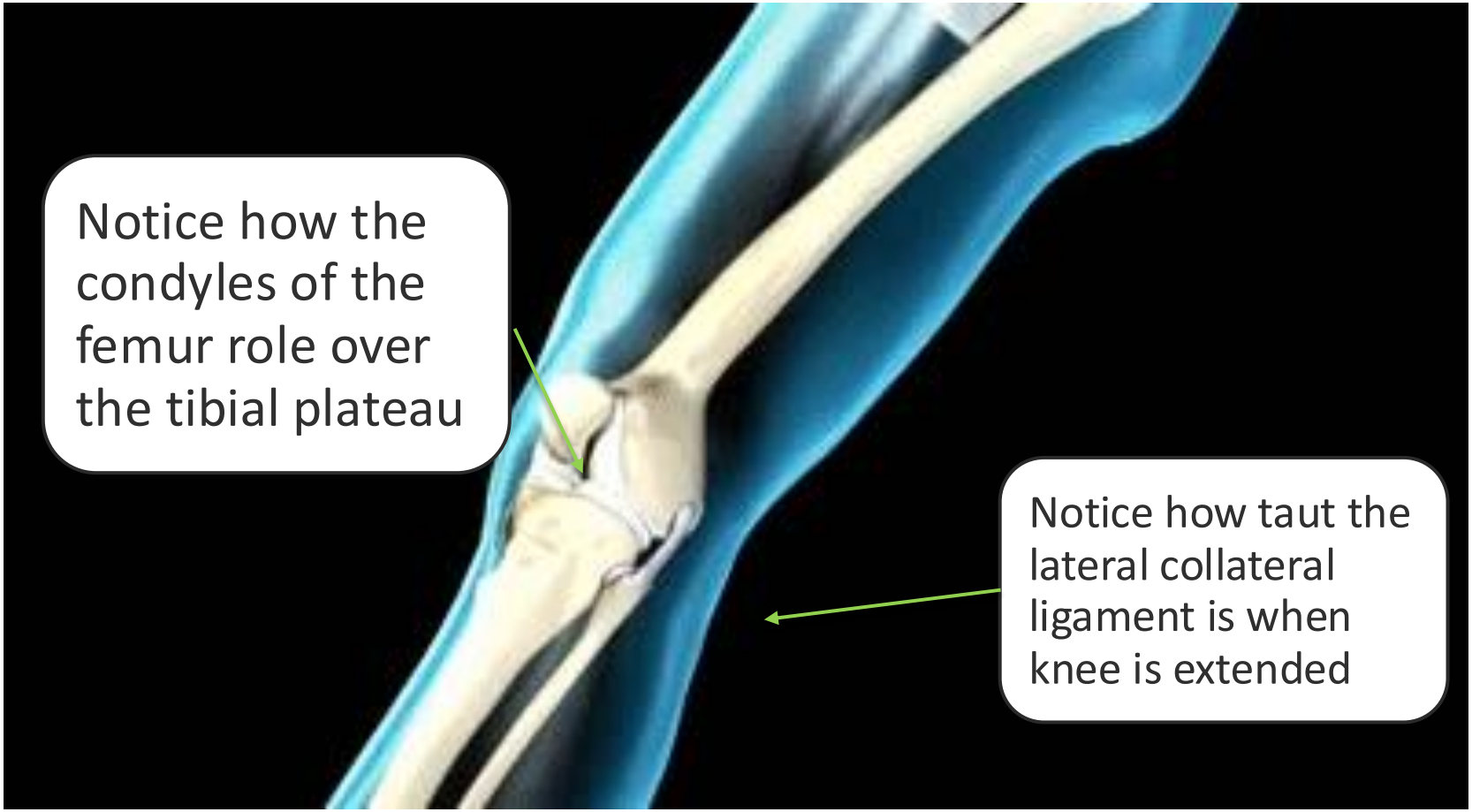
Movements: Knee

(tibiofemoral joint)

Lateral rotation of flexed knee (right knee)

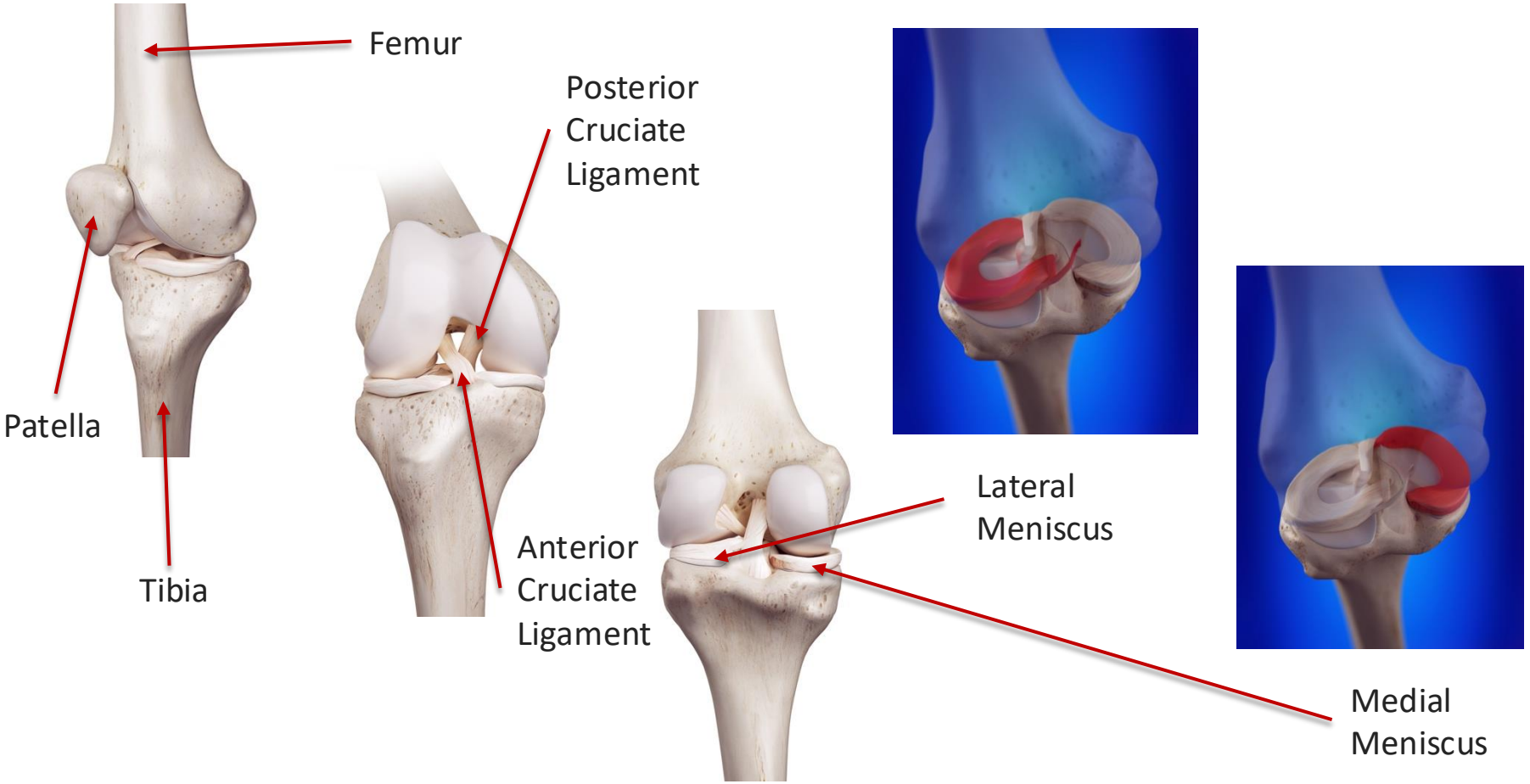
Medial rotation of flexed knee (right knee)

Knee Movement



balanced body

Let's Build The Knee



balanced body

Tendon vs. Ligament

Tendon

Structure: Tendons are flexible but inelastic tissue made of fibrous collagen tissue

Function: Tendons connect muscle to bone, focusing the force of the muscle onto the bone.

Common Pathologies: Sprains and full or partial tears, tendonitis

Ligament

Structure: Ligaments are made of dense connective tissue and are viscoelastic.

Function: Ligaments connect bones to bones and create a passive support structure for the joints, limiting how far a joint can move in any one direction

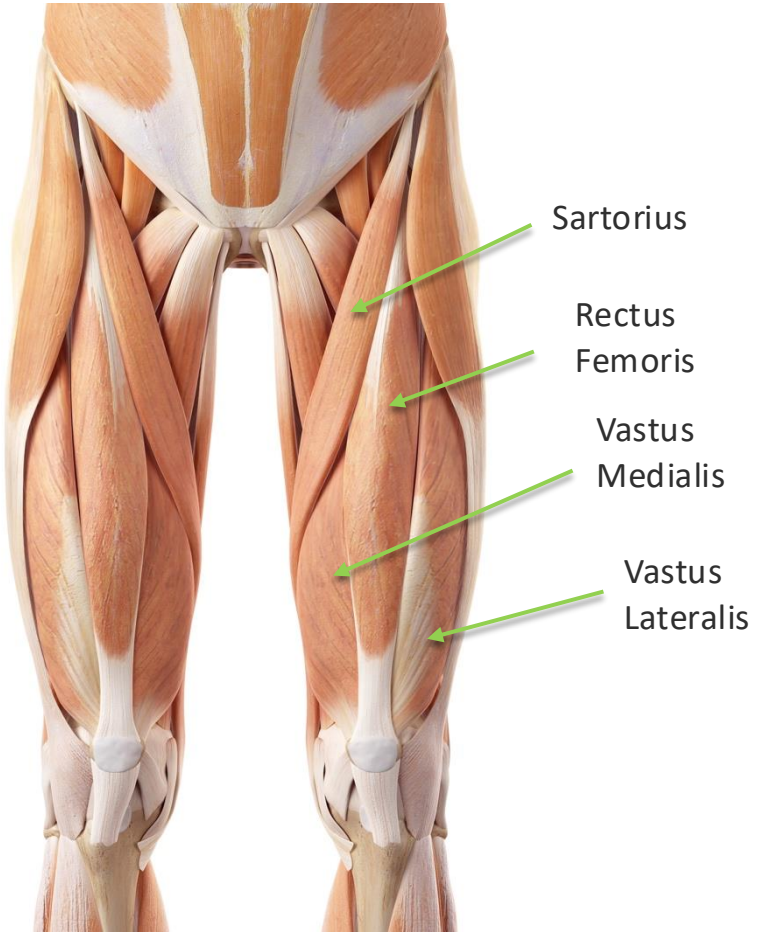
Common pathologies: Sprains and full or partial tears

balanced body

Anterior Thigh

Hip Flexors and Knee Actors

- Vastus Intermedius
- Vastus Lateralis
- Vastus Medialis
- Rectus Femoris
- Sartorius



balanced body

Vastus Intermedius

Origin:

- Anterior and lateral surfaces of proximal two thirds of shaft of the femur
- Intermedius wraps around the femur to attach to distal half of medial and lateral edges of the linea aspera and lateral intermuscular septum

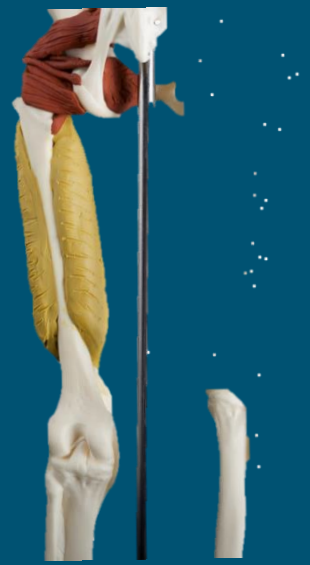
Insertion:

- Tibial tuberosity via patella and patellar tendon

Actions:

- Extend the knee

Vastus Lateralis and Medialis



Origin:

Vastus Lateralis:

- Anterior and inferior border of greater trochanter
- Lateral lip of gluteal tuberosity
- Lateral intermuscular septum
- Lateral lip of linea aspera

Origin:

Vastus Medialis:

- Below the intertrochanteric line
- Proximal part of medial supracondylar line
- Medial intermuscular septum
- Medial lip of linea aspera

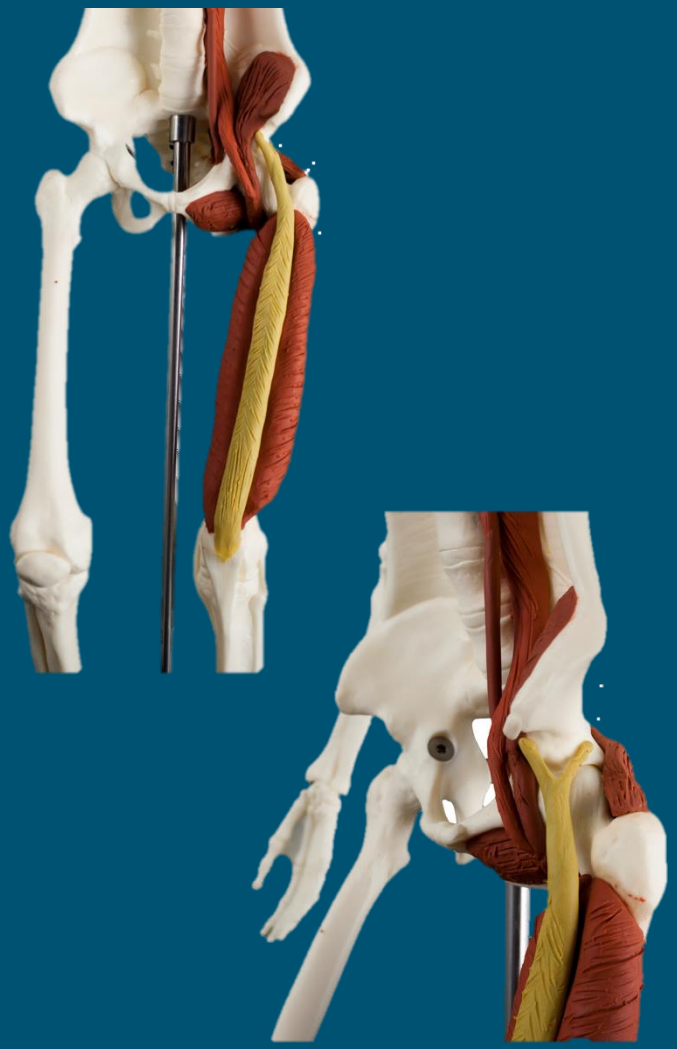
Insertion:

- Tibial tuberosity via patella and patellar tendon

Actions:

- Extend the knee

Rectus Femoris



Origin:

- Straight head arises from anterior inferior iliac spine (AIIS)
- Reflected head arises from groove of acetabulum

Insertion:

- Tibial tuberosity via patella and patellar tendon

Actions:

- Flexes the hip
- Extends the knee

Sartorius

Origin:

- Anterior superior iliac spine (ASIS)

Insertion:

- Proximal, medial shaft of the tibia at pes anserinus

Actions:

- Flexes, abducts and laterally rotates the flexed hip
- Flex the knee
- Medially rotate the flexed knee at tibiofemoral joint

Pes Anserinus (Goose Foot)
The joined tendon of Semitendinosus, Gracilis and Sartorius on the medial surface of the tibia.

Anterior Hip & Thigh Muscle Movements

	Hip Actions			Pelvic Actions	Knee Actions	
Muscle	Flexion	Lateral Rotation	Abduction	Anterior Tilt	Extension	Flexion
Vastus intermedius, lateralis and medialis					X	
Rectus femoris	X			X	X	
Sartorius	X	X	X			X (with medial tibial rotation)

balanced body

Types of Muscle Contractions

Isotonic

Concentric

A concentric contraction is a shortening contraction. The muscle contracts with a force greater than the resistance causing it to shorten

Eccentric

An eccentric contraction is a lengthening contraction. The muscle contracts with a force less then the resistance causing the muscle to lengthen.

Isometric

An isometric contraction does not change the length of the muscle. The muscle contracts with a force equal to the resistance so the muscle does not change length.

Isokinetic

Movement at a constant speed regardless of the force applied. Muscles contract and shorten at a constant speed.

balanced body

Roles of Muscles in Movement

Agonist

Muscle or muscles that contract to produce the desired action. "Prime Mover" i.e. biceps brachii in elbow flexion.

Antagonist

Muscle or muscles who oppose the action of the agonist. i.e. triceps brachii in elbow flexion.

Co-contraction

Occurs when the agonist or prime mover and the antagonist contract together. i.e. concentric biceps and eccentric triceps contracting to control elbow flexion.

Stabilizers

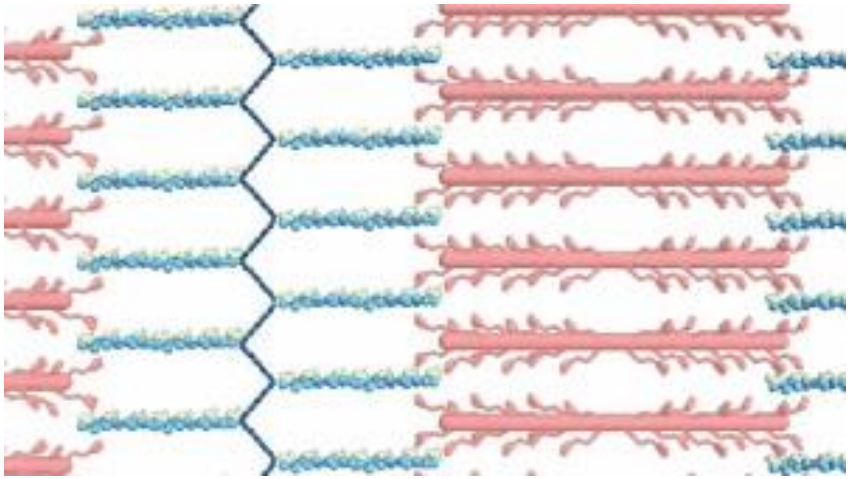
Muscle that acts to stabilize a joint against the pull of another muscle or gravity.

Synergist

Muscles which contribute to the desired action but are not the agonist. Synergists can also correct for unwanted action. i.e. wrist flexors in elbow flexion.

balanced body

Actin and Myosin Crossbridge



Actin and Myosin cross bridge sliding act as a molecular dance whose wave creates muscle contraction.

A graceful image of force generating movement.

Notice how the shorter lever arm and force of pull change the movement speed and quality.

balanced body

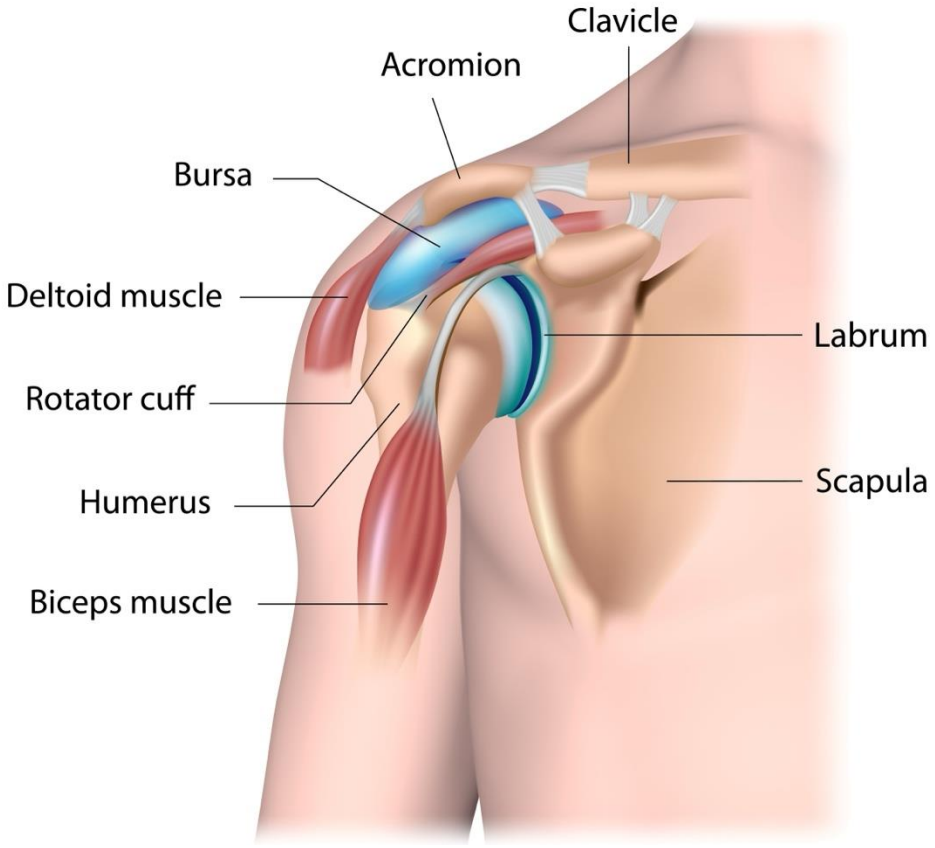
Bursae

Structure and function:

- Small, fluid filled sacks that reduce friction and help to provide cushioning between adjacent muscles, tendons and bones.

Common pathologies:

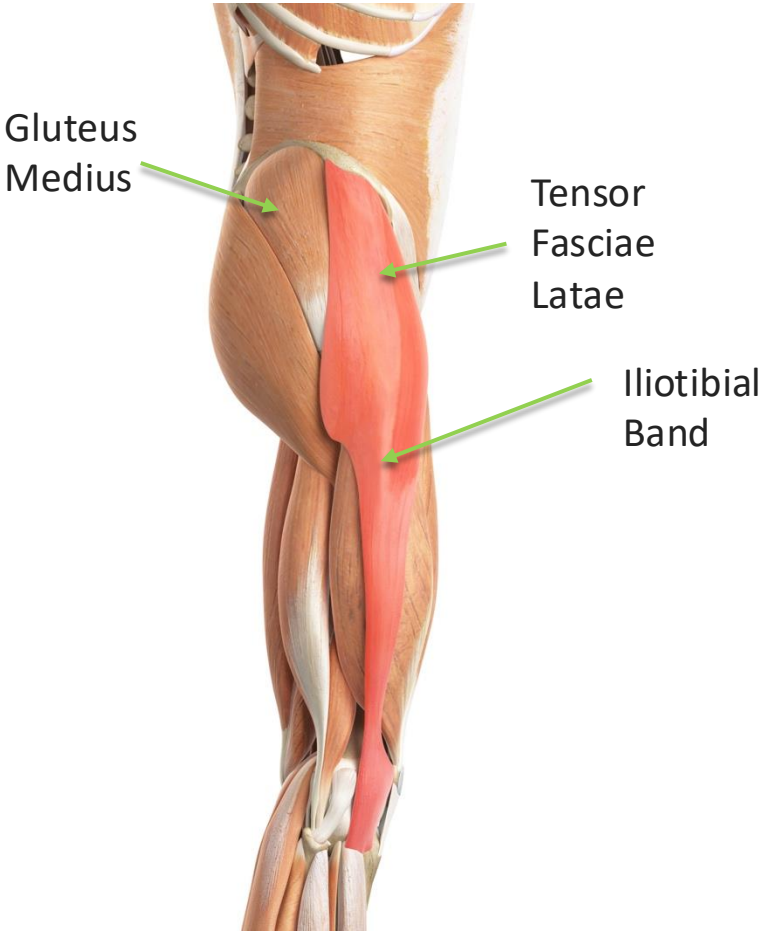
- Inflammation and swelling.



balanced body

Abductors and Lateral Thigh

- Gluteus Minimus
- Gluteus Medius
- Iliotibial Band
- Tensor Fasciae Latae



balanced body

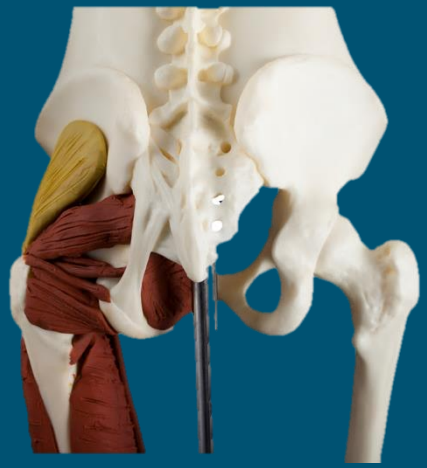
Gluteus Minimus

Origin:

- Gluteal surface of the ilium between the anterior and inferior gluteal lines

Insertion:

- Anterior aspect of greater trochanter and hip joint capsule



Actions:

Fixed Pelvis

- Abducts the hip
- Hip flexion
- Medially rotates a flexed hip
- Stabilizes the hip

Fixed Leg

- Anterior pelvic tilt
- Pelvic down slip
- Pelvic out flare

Gluteus Medius

Origin:

- External surface of ilium between iliac crest and posterior gluteal line

Insertion:

- Lateral surface of greater trochanter of femur

Actions:

Fixed Pelvis

- Hip abduction, flexion, and medial rotation

Fixed Leg

- Anterior pelvic tilt

Fixed Pelvis

- Hip abduction, extension and lateral rotation

Fixed Leg

- Posterior pelvic tilt
- Pelvic down slip

Iliotibial Band (ITB)

The Iliotibial Band is a thick band of connective tissue originating on lateral iliac crest and inserting onto lateral side of the tibia. It is not a muscle!

Origin:

- High point of iliac crest, over greater trochanter.

Insertion:

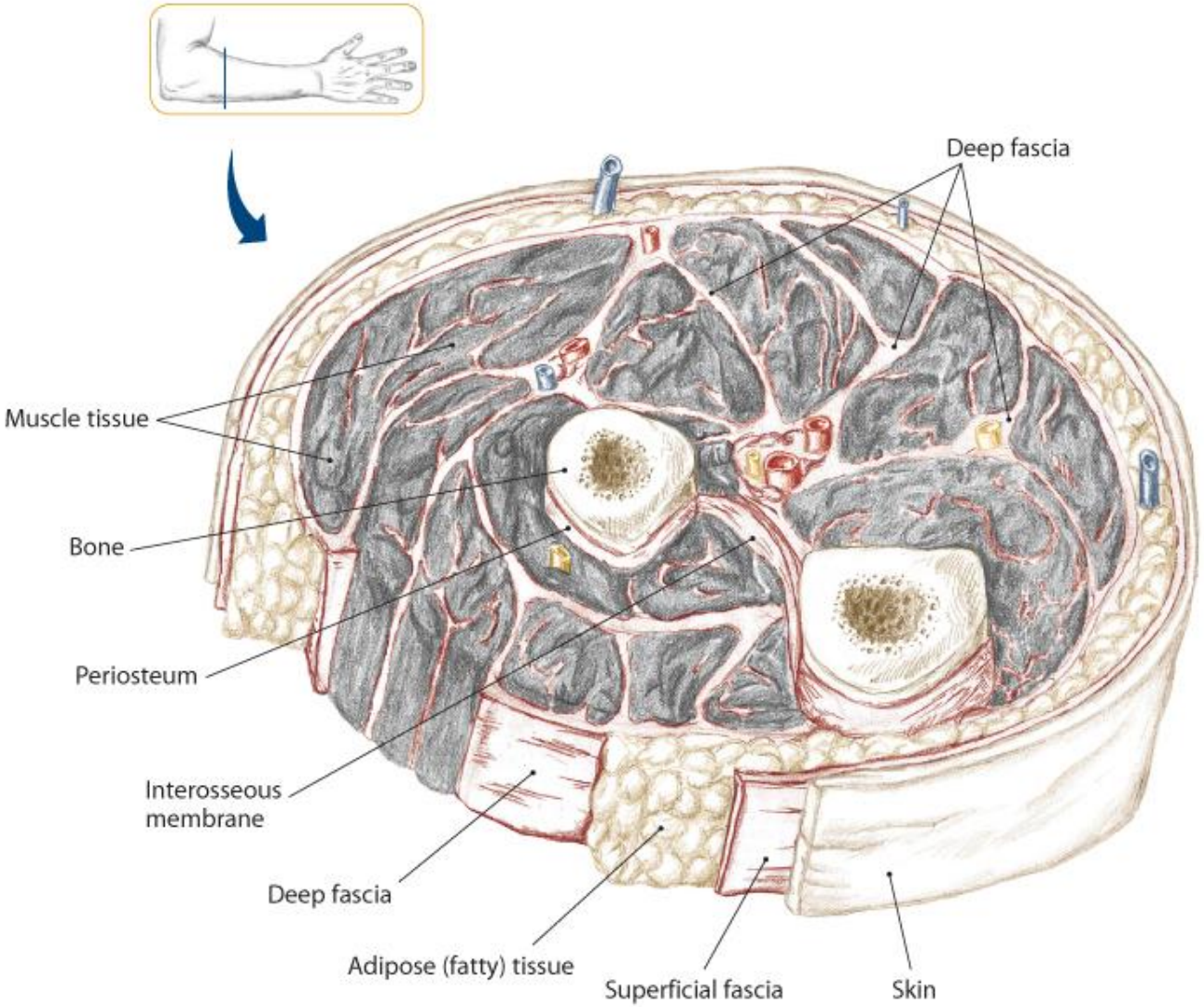
- Lateral anterior tibia.

Actions:

- Acts as an attachment for Tensor Fascia Lata and Gluteus Maximus.
- Stabilizes lateral leg.

Fascia

- Fascia, interpenetrates and surrounds muscles, bones, organs, nerves, blood vessels and other structures.
- An uninterrupted, three-dimensional web of tissue that extends from head to toe, from front to back, from interior to exterior *(T. Meyers)*



0.20 Cross section of the forearm showing the arrangement of bone, muscle and fascia

Tensor Fascia Lata

Origin:

- Anterior part of iliac crest
- Outer surface of ASIS and proximal part of IT band

Insertion:

- Into IT Band at proximal and middle third of thigh

Actions:

- Abduction and medial rotation when the hip is flexed
- Stabilize lateral knee through IT band

What is Fascia?

Fascia includes all the different kinds of connective tissue that create and support the structure of the body including:

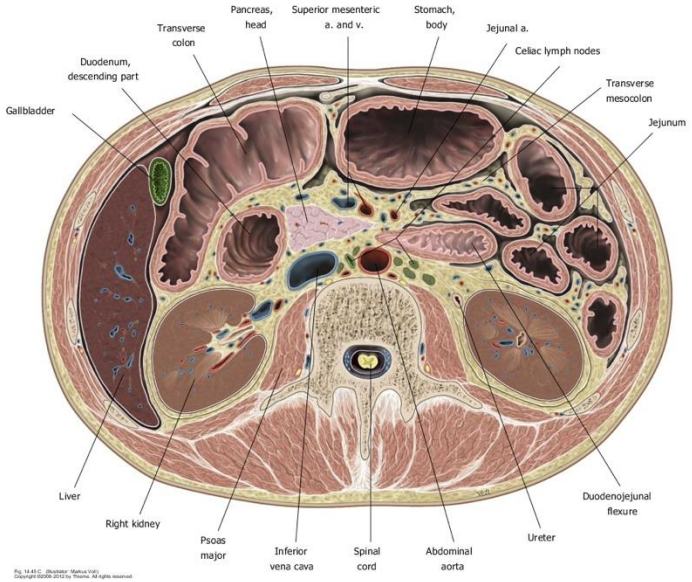
- Tendons
- Ligaments
- Muscle structure (endomysium, perimysium and epimysium)
- Organ structure
- Bones

balanced body

What does fascia do?

It surrounds and penetrates all of the structures of the body to:

- Create structure
- Transfer force
- Assist with proprioception
- Serve as a pathway for
  - Cellular nutrition
  - Immune system
  - Hydration
  - Healing and recovery



balanced body

The Structure of Fascia

Fascia takes on many different shapes and textures depending on where it is in the body.

- Superficial fascia occurs between the skin and the underlying muscles.
  - It is a very loose structure that supports fat cells and allows gliding between the muscles and skin.
  - It provides a matrix for veins, arteries and nerves to be flexibly supported.
- Deep fascia is a stiffer and more structured version of fascia surrounding and separating muscle bellies, creating tendons and ligaments, transferring force and creating stiffness.

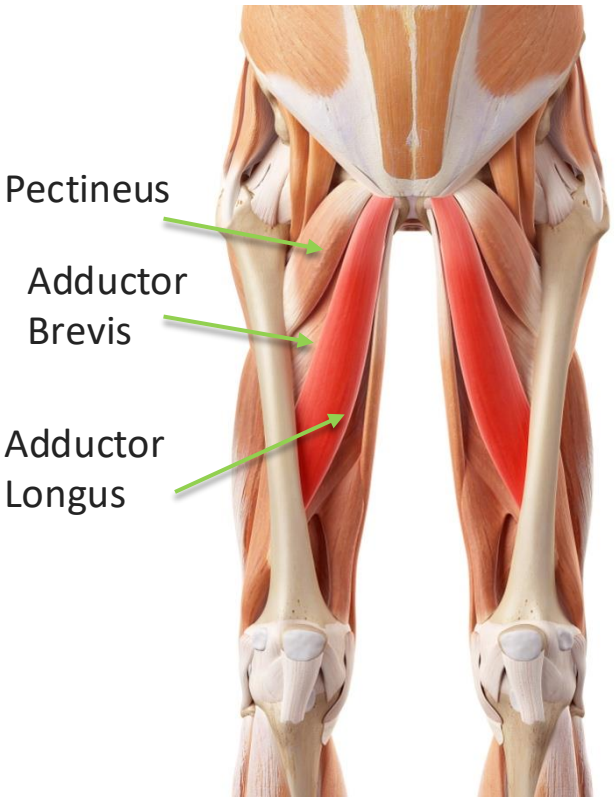
Fascia

Lateral Hip and Thigh Muscle Movements

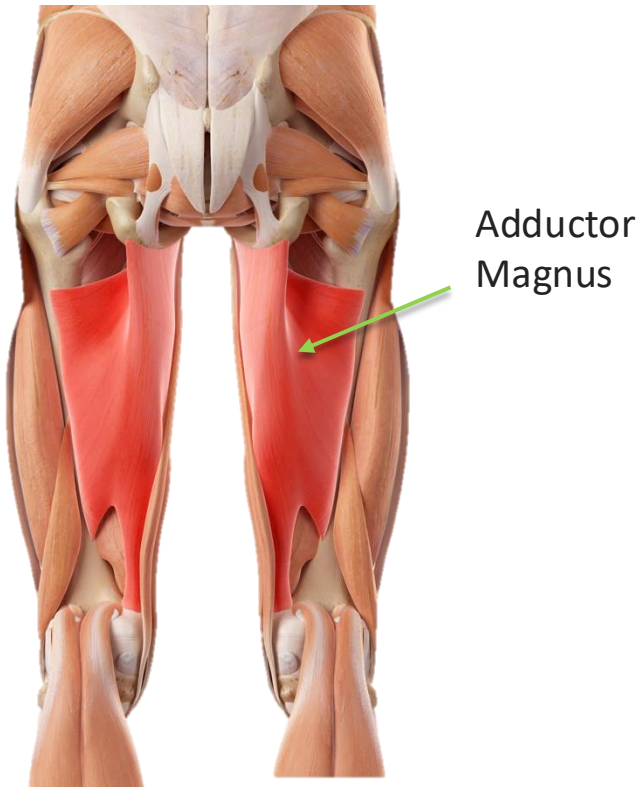
	Hip Actions, Pelvis stable					Pelvis Actions, femur stable	
Muscle	Abduction	Flexion	Extension	Medial Rotation	Lateral Rotation	Downslip	Anterior Tilt
Gluteus minimus	X	X		X		X	X
Gluteus medius (anterior fibers)	X	X		X		X	X
Gluteus medius (posterior fibers)	X		X		X	X	
Tensor fascia lata	X	X		X		X	X

balanced body

Adductors and Medial Thigh



- Pectineus
- Adductor Longus
- Adductor Brevis
- Adductor Magnus
- Gracilis



balanced body

Pectineus

Origin:

- Anterior lip of superior pubic ramus between the iliopectineal eminence and the pubic tubercle

Insertion:

- Pectineal line of femur

Actions:

Fixed pelvis

- Hip adduction and flexion

Fixed leg

- Anterior pelvic tilt and pelvic up slip

Adductor Longus

Origin:

- Anterior surface of pubis at junction of pubic crest and pubic symphysis

Insertion:

- Middle one third of medial lip of linea aspera

Actions:

Fixed pelvis

- Hip adduction and flexion

Fixed leg

- Anterior pelvic tilt and pelvic up slip

Adductor Brevis

Origin:

- Outer surface of inferior pubic ramus

Insertion:

- Distal two thirds of pectineal line and proximal half of medial lip of linea aspera

Actions:

Fixed pelvis

- Hip adduction and flexion

Fixed leg

- Anterior pelvic tilt and pelvic up slip

Adductor Magnus

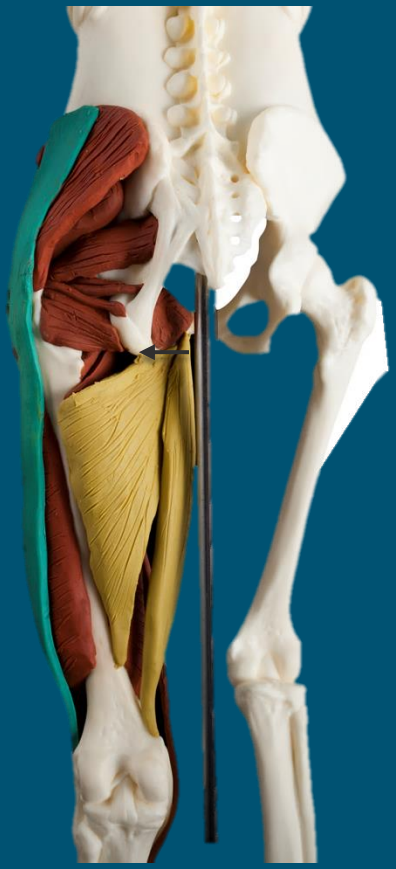
Anterior Fibers

Origin:

- Inferior pubic ramus, ramus of ischium

Insertion:

- Medial to gluteal tuberosity
- Middle line of linea aspera
- Medial supracondylar line



NOTE: Posterior fibers origin = Ischial tuberosity
Image not accurate

Posterior Fibers

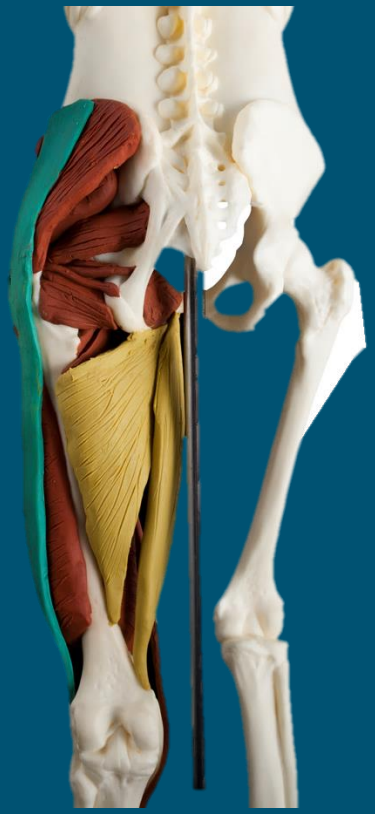
Origin:

- Anterior portion of the ischial tuberosity

Insertion:

- Adductor tubercle
- Medial condyle of femur

Adductor Magnus



Actions:

Fixed pelvis
- Hip adduction, flexion and slight medial rotation

Fixed leg
- Anterior pelvic tilt, pelvic up slip and pelvic out flare

Fixed pelvis
- Hip adduction, extension and slight flexion

Fixed leg
- Posterior pelvic tilt, pelvic up slip and pelvic out flare

Gracilis

Origin:

- Inferior half of pubic symphysis and medial margin of inferior pubic ramus

Insertion:

- Medial surface of body of tibia, distal to condyle, proximal to the insertion of the Semitendinosus and lateral to insertion of Sartorius at pes anserinus

Actions:

Fixed pelvis

- Hip adduction and assists with flexion

Fixed leg

- Anterior pelvic tilt and pelvic up slip

Action at the knee

- Stabilizes medial knee and assists knee flexion and medial rotation

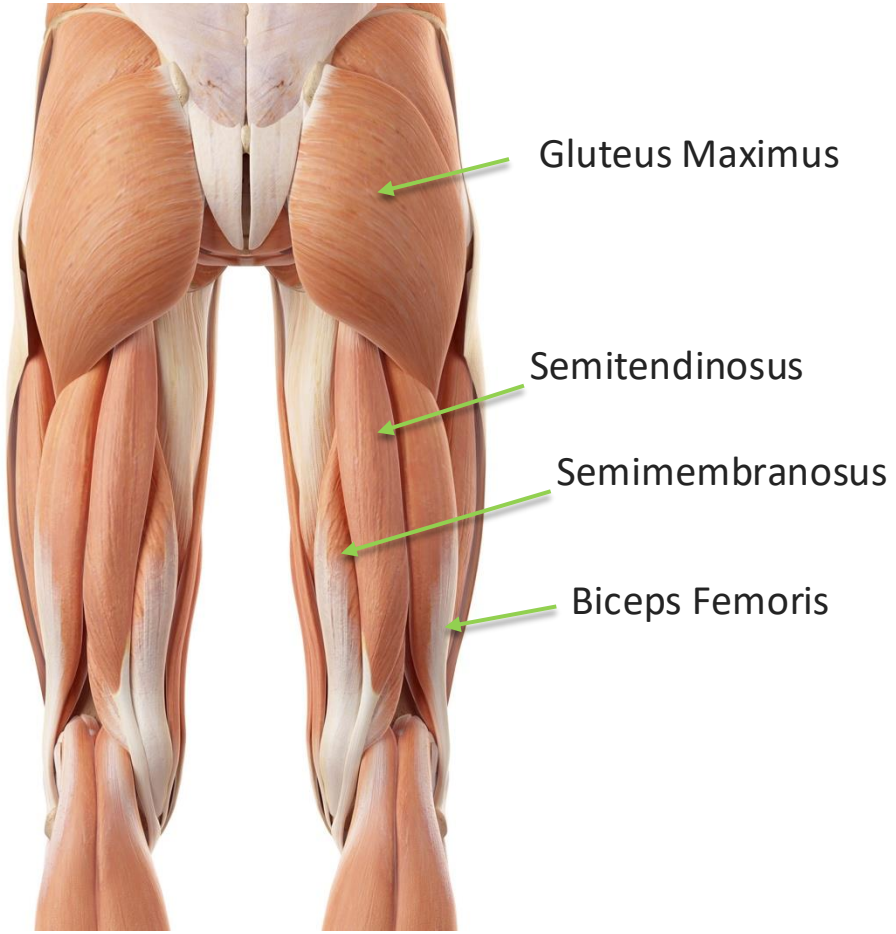
Medial Hip and Thigh Muscle Movements

	Hip Actions, Pelvis stable			Pelvis Actions, femur stable			Knee
Muscle	Hip Adduction	Hip Flexion	Hip Extension	Anterior Pelvic Tilt	Posterior Pelvic Tilt	Pelvic Upslip	Flexion and Med Rotation
Pectineus	X	X		X		X	
Adductor longus	X	X		X		X	
Adductor brevis	X	X		X		X	
Adductor magnus	X	X (anterior fibers)	X (posterior fibers)	X	X (posterior fibers)	X	
Gracilis	X	X		X		X	X

Muscles of the Posterior Leg

Hip extension, knee flexion

- Semitendinosus
- Semimembranosus
- Biceps Femoris
- Gluteus Maximus



balanced body

Semimembranosus

Origin:

- Tuberosity of ischium, proximal and lateral to Biceps Femoris and Semitendinosus

Insertion:

- Posteromedial aspect of medial condyle of tibia, popliteal fossa and medial meniscus

Actions:

- Knee flexion, hip extension and tibial medial rotation

Fixed pelvis

- Hip extension, adduction and medial rotation

Fixed leg

- Posterior pelvic tilt

Semitendinosus

Origin:

- Tuberosity of ischium by common tendon with long head of Biceps femoris

Insertion:

- Proximal part of medial surface of body of tibia and deep fascia of leg at pes anserinus along with sartorius and the gracilis

Actions:

- Knee flexion, hip extension and tibial medial rotation

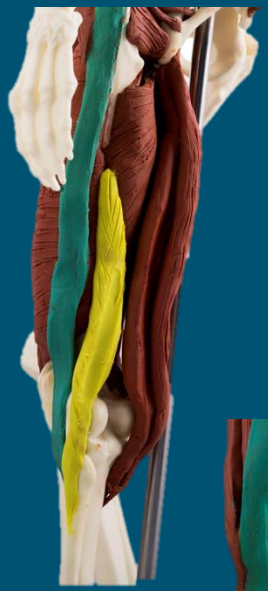
Fixed pelvis

- Hip extension, adduction and medial rotation

Fixed leg

- Posterior pelvic tilt

Biceps Femoris



Short Head

Long Head

Origin:

Short head

- Lateral lip of linea aspera, proximal two thirds of supracondylar line and lateral intermuscular septum

Long head

- Distal part of sacrotuberous ligament and posterior part of ischial tuberosity

Insertion:

- Lateral side of head of fibula, lateral condyle of tibia and deep fascia on lateral side of leg

Actions:

- Knee flexion, hip extension and tibial lateral rotation

Fixed pelvis

- Hip extension, lateral rotation and assists with abduction.

Fixed leg

- Posterior pelvic tilt

Gluteus Maximus

Deep Fibers

Superficial Fibers

Origin:

- Posterior gluteal line of ilium and a portion of bone superior and posterior to it
- Posterior surface of lower part of sacrum, side of coccyx
- Aponeurosis of erector spinae, sacrotuberous ligament and gluteal aponeurosis

Insertion:

- Deep fibers insert into the gluteal tuberosity of femur
- Proximal and superficial fibers inserts into iliotibial tract of fascia lata

Actions:

- Fixed pelvis – Hip extension, lateral rotation, adduction and abduction
- Fixed leg – Posterior pelvic tilt

Posterior Hip and Thigh Muscle Moves

	Fixed Pelvis					Fixed Leg	Knee	
MUSCLES	**Hip Extension**	**Hip Abduction**	**Hip Adduction**	**Hip Medial Rotation**	**Hip Lateral Rotation**	**Posterior Pelvic Tilt**	**Flexion and Medial Rotation**	**Flexion and Lateral Rotation**
Semi-membranosus	X		X	X		X	X	
Semi-tendinosus	X		X	X		X	X	
Biceps Femoris	X	X			X	X		X
Gluteus Maximus	X	X	X		X	X		

balanced body