

## Muscles of the Lower Extremity

### 1. Gluteal

Gluteus Maximus  
Gluteus Medius  
Gluteus Minimus  
Tensor Fascia Lata

### 2. Six Deep Lateral Rotators

Piriformis  
Gemellus Superior  
Obturator Internus  
Gemellus Inferior  
Obturator Externus  
Quadratus Femoris

**all insert into the Greater Trochanter**

### 3. Posterior Thigh

Biceps Femoris  
Semimembranosis  
Semitendinosis

**all extend the Hip and Flex the Knee  
all innervated by the Sciatic nerve**

### 4. Medial Thigh

Gracilis  
Adductor Magnus  
Adductor Longus  
Adductor Brevis  
Pectineus

**all, except Pectineus innervated by Obturator Nerve**

### 5. Anterior Thigh

Sartorius  
Psoas Major  
Iliacus  
Rectus Femoris  
Vastus Lateralis  
Vastus Intermedius  
Vastus Medialis

### 6. Posterior Leg

Gastrocnemius  
Soleus  
Plantaris  
Popliteus  
Tibialis Posterior  
Flexor Digitorum Longus  
Flexor Hallucis Longus

## **7. Anterolateral Leg**

- Tibialis Anterior
- Peroneus Longus
- Peroneus Brevis
- Peroneus Tertius
- Extensor Hallucis Longus
- Extensor Digitorum Longus

## **8. Foot**

- Abductor Hallucis
- Flexor Digitorum Brevis
- Abductor Digiti Minimi
- Quadratus Plantae
- Lumbricals
- Flexor Hallucis Brevis
- Adductor Hallucis
- Extensor Hallucis Brevis
- Extensor Digitorum Brevis
- Flexor Digiti Minimi Brevis
- Plantar Interossei
- Dorsal Interossei

## Lower Extremity: Gluteal Muscles

Muscle	Origin	Insertion	Nerve	Actions
<b>Gluteus Maximus</b>	Posterior <b>Sacrum</b> & <b>Ilium</b>	Gluteal tuberosity & <b>I-T tract</b> (to lat. condyle of tibia)	Inferior Gluteal (L5-S2)	<ul style="list-style-type: none"> <li>• Hip (thigh) extension</li> <li>• Lateral rotation (of an extended hip)</li> <li>• Hip abduction</li> <li>• chief antigravity muscle when knee slightly flexed—steps, skiing</li> </ul>
<b>Gluteus Medius</b>	Lateral <b>Iliac crest</b> (betw. Sup and mid gluteal lines)	Greater Trochanter	Superior Gluteal (L4-S1)	<ul style="list-style-type: none"> <li>• Hip (thigh) abduction</li> <li>• Medial rotation of hip (ant. fibers)</li> <li>• primary stabilizer of hip when walking or standing</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>Trendelenberg Sign</b></div>
<b>Gluteus Minimus</b>	<b>Ilium</b>	Greater Trochanter		<ul style="list-style-type: none"> <li>• Hip (thigh) abduction</li> <li>• Medial rotation of hip deep to G. Medius</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>“Side-atica”</b></div>
<b>Tensor Fascia Lata</b>	<b>Iliac Crest</b> (just posterior to ASIS)	I-T Tract		<ul style="list-style-type: none"> <li>• Hip flexion</li> <li>• Medial rotation (of flexed hip)</li> <li>• Abduction of a flexed hip braces/supports knee during walking</li> </ul>

Note: hip = thigh = femur  
knee = leg  
ankle = foot

## Lower Extremity: 6 Deep Lateral Rotators

Muscle	Origin	Insertion	Nerve	Actions	
<b>Piriformis</b>	<b>Anterior Sacrum</b>	<b>Greater Trochanter</b> of the Femur	Sacral Plexus (L4-S2)	<p><b>Note: when the thigh is flexed beyond 60°, piriformis becomes an internal rotator!</b></p> <ul style="list-style-type: none"> <li>• Laterally rotates Thigh</li> </ul> (Piriformis aids and stabilizes during hip abduction)	
<b>Gemellus Superior</b>	ischial spine				
<b>Obturator Internus</b>	obturator membrane				
<b>Gemellus Inferior</b>	ischial tuberosity				
<b>Obturator Externus</b>	surrounding obturator membrane				Obturator (L3-4)
<b>Quadratus Femoris</b>	ischial tuberosity (lateral)				Sacral Plexus (L4-S2)

“Piece goods often go on quilts.”  
“Please go, go quietly”

## Lower Extremity: Posterior Thigh (Hamstrings)

all 3 extend the hip and flex the knee (mule kicking)

Muscle	Origin	Insertion	Nerve	Actions
<b>Biceps Femoris</b>	<u>LH</u> : Ischial tuberosity <u>SH</u> : Linea aspera (post. femur)	Head of the <b>Fibula</b> & Lateral <b>Tibial</b> condyle	Sciatic Nerve: <u>LH</u> : Tibial division (S1-S3) <u>SH</u> : Peroneal division (L5-S2)	<ul style="list-style-type: none"> <li>• <u>LH</u>: <b>Hip Extension</b></li> <li>• Both heads: <b>Flexes knee</b> &amp; lat. rotation of flexed knee</li> <li>• eccentrically contracts with walking at end-swing Phase</li> </ul>
<b>Semimembranosus</b>	Ischial Tuberosity	Posterior Medial <b>Tibial</b> Condyle	Sciatic Nerve (Tibial division) (L5-S2)	<ul style="list-style-type: none"> <li>• <b>Extends Hip</b></li> <li>• <b>Flexes Knee</b></li> <li>• Medially rotates leg</li> <li>• SM: pulls medial meniscus posterior during knee flexion</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>Pes Anserine</b></div>
<b>Semitendinosus</b>		<b>Tibia</b> (anterior medial aspect)		

The 2 semi's go together. Membranosis is medial, therefore so is Tendinosus and therefore Biceps Femoris must be lateral.

Insertions from lateral to medial at the distal thigh "BTM" biceps, semitend, semimemb.  
 Pes Anserine = goose neck = 3 conjoined tendons of Sartorius, Gracilis & Semitendinosus  
 "girl between 2 sergeants": insertion of Gracilis is between Sartorius and Semitendinosus

## Lower Extremity: Medial Thigh "Adductors" "GAAAP"

closes the gap

Muscle	Origin	Insertion	Nerve	Actions
<b>Gracilis</b>	<b>Pubic bone</b>	<b>Tibia</b> (anteromedial) at Pes Anserine	Obturator (L2-L4)	<ul style="list-style-type: none"> <li>• Hip Adduction</li> <li>• Knee flexion &amp; medial rotation</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>Pes Anserine</b></div>
<b>Adductor Magnus</b>	<u>Ant.</u> belly: <b>Ischial</b> ramus & <b>Pubis</b> <u>Post.</u> belly: <b>Ischial</b> tuberosity (hamstring)	<b>Femur</b> (linea aspera)	<u>Ant.</u> : Obturator (L2-L4) <u>Post.</u> : Sciatic (L4-L5)	<ul style="list-style-type: none"> <li>• Hip Adduction</li> <li>• <u>Ant.</u>: Hip flexion</li> <li>• <u>Post.</u>: Hip extension and lateral rotation</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>Adductor Hiatus</b></div> the tibial medial collateral ligament is a continuation of the hamstring portion
<b>Adductor Longus</b>	<b>Pubic bone</b>	<b>Femur</b> (linea aspera)	Obturator (L3-L4)	<ul style="list-style-type: none"> <li>• Hip Adduction</li> <li>• aids in Hip Flexion</li> <li>• may laterally rotate hip/thigh</li> </ul>
<b>Adductor Brevis</b>				
<b>Pectineus</b>	<b>Pubic bone</b>	<b>Femur</b> (betw. Lesser trochanter and linea aspera)	Femoral (L2-L4)	<ul style="list-style-type: none"> <li>• Hip Adduction</li> <li>• Hip Flexion</li> </ul>

**Note: All adductors (except Gracilis) assist hip flexion.**

**Note: All adductors (except Pectineus) innervated by Obturator nerve.**

## Lower Extremity: Anterior Thigh (Quadriceps)

Muscle	Origin	Insertion	Nerve	Actions
<b>Sartorius</b>	<b>ASIS</b> of Ilium	<b>Tibia</b> (anteromedial) at Pes Anserine tendon	<b>Femoral (L2-L4)</b>	<ul style="list-style-type: none"> <li>Flexion, Abduction &amp; External rotation of Hip</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block;"><b>Pes Anserine</b></div> <ul style="list-style-type: none"> <li>Flexion &amp; medial rotation of the knee (<b>F</b>) aka "FM-FABER" muscle; Tailor's muscle; Figure 4 muscle</li> </ul>
<b>Psoas Major</b>	Bodies & TPs of <b>L1-L5</b> (& adjacent discs)	<b>Lesser Trochanter</b>		<ul style="list-style-type: none"> <li>Flexion of Hip</li> <li>Lateral rotation of Hip (&amp; some adduction)</li> <li>Trunk flexion (improper sit-ups)</li> <li>tightness may result in lumbar hyperlordosis or scoliosis <i>"the improper sit-up muscle"</i></li> </ul>
<b>Iliacus</b>	Iliac Fossa (anterior Ilium)	<b>Lesser Trochanter</b> (via Psoas tendon)		<ul style="list-style-type: none"> <li>Flexion of Hip</li> <li>Lateral rotation of Hip (some adduction)</li> </ul>
<b>Rectus Femoris</b>	<u>LH</u> : AIIS of Ilium <u>SH</u> : Upper Acetabulum	<b>Common Quadriceps Tendon</b> into patella and becomes <b>patella ligament</b> then into <b>Tibial tuberosity</b>		<ul style="list-style-type: none"> <li>Flexes Hip</li> <li>Extends Knee</li> </ul> <i>crosses 2 joints</i>
<b>Vastus Lateralis</b>	<b>Femur</b> (Linea Aspera)			<ul style="list-style-type: none"> <li>Extends Knee</li> </ul>
<b>Vastus Intermedius</b>	<b>Femur</b> Greater trochanter; Linea Aspera			<ul style="list-style-type: none"> <li>Extends Knee (midline muscle of femur)</li> </ul>
<b>Vastus Medialis</b>	<b>Femur</b> (Linea Aspera)			<ul style="list-style-type: none"> <li>Extends Knee (terminal)</li> </ul> <div style="border: 1px solid black; padding: 2px; display: inline-block; margin-top: 5px;">                     Important in rehabilitating Patellar Maltracking Syndrome &amp; Chondromalacia Patellae                 </div>

Quadriceps = Rectus Femoris and 3 Vastus muscles

## Lower Extremity: Posterior Leg

Muscle	Origin	Insertion	Nerve	Actions
<b>Gastrocnemius</b>	2 heads: <u>Med</u> : medial condyle <u>Lat</u> : lateral condyle of <b>Femur</b>	<b>Calcaneus</b> via Achillis' tendon	Tibial (S1-S2)	<ul style="list-style-type: none"> <li>• Knee flexion</li> <li>• Ankle plantarflexion</li> </ul> <i>crosses 2 joints stretch with knee extended</i>
<b>Soleus</b>	<b>Tibia</b> & upper shaft of <b>Fibula</b>			<ul style="list-style-type: none"> <li>• Ankle plantarflexion</li> </ul> <i>deep to gastrocs , aka “<b>peripheral heart</b>” <b>Triceps Surae</b>: 2 heads of gastroc + soleus Stretch with knee flexed or extended</i>
<b>Plantaris</b>	Lateral epicondyle of <b>Femur</b>		Tibial (L4-S1)	<ul style="list-style-type: none"> <li>• weak knee flexion</li> <li>• weak plantarflexion of ankle</li> </ul> <i>(used in autografts) crosses 2 joints located between gastroc and soleus absent in 7%; analogous to Palmaris Longus</i>
<b>Popliteus</b>	<b>Femur</b> (lateral condyle) and lateral meniscus	upper posterior <b>Tibia</b>	Tibial (L5-S1)	<ul style="list-style-type: none"> <li>• initiates knee flexion – medially rotates tibia on femur to unlock the extended knee and vice versa</li> <li>• attaches to and retracts <u>lateral meniscus</u> <i>“the key that unlocks the knee” deepest muscle, tendon is intracapsular</i></li> </ul>
<b>Flexor Digitorum Longus</b>	middle posterior <b>Tibia</b>	<b>4 toes</b> (distal phalanges)		<ul style="list-style-type: none"> <li>• flexes toes 2 - 5</li> <li>• weak plantarflexion and inversion</li> </ul>
<b>Tibialis Posterior</b>	Posterior <b>Tibia</b> , <b>Fibula</b> & <b>interosseou</b> <b>membrane</b>	<b>Navicular, Cuboid,</b> <b>Cuneiforms +</b> <b>metatarsals 2-4</b>		<ul style="list-style-type: none"> <li>• weak plantarflexion and inversion <i>prevents hyperpronation during gait</i></li> </ul>
<b>Flexor Hallucis Longus</b>	Posterior <b>Fibula</b> (distal 2/3)	<b>Hallux</b> (base of distal phalanx)	Tibial (L5-S2)	<ul style="list-style-type: none"> <li>• flexes big toe (hallux)</li> <li>• weak plantarflexion and inversion</li> </ul>

Leg = knee

Notes: **Tibialis Posterior**, **Flexor Digitorum Longus** and **Flexor Hallucis Longus** all run past the medial malleolus and are called **Tom, Dick and Harry**.

## Lower Extremity: Anterolateral Leg

Muscle	Origin	Insertion	Nerve	Actions
<b>Tibialis Anterior</b>	<b>Tibia:</b> lateral shaft & condyle. I-O membrane	base of <b>1<sup>st</sup> metatarsal</b> and <b>1<sup>st</sup> cuneiform</b> (superior surface)	Deep Peroneal (L4-S1)	<ul style="list-style-type: none"> <li>strong Dorsiflexion and Inversion of ankle</li> </ul> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin-left: auto;">Shin Splints / Foot Drop</div>
<b>Peroneus Longus</b>	<b>Fibula:</b> head & lateral shaft (proximal 2/3 <sup>rd</sup> s)	base of <b>1<sup>st</sup> metatarsal</b> and <b>1<sup>st</sup> cuneiform</b> (plantar surface)	Superior Peroneal (L4-S1)	<ul style="list-style-type: none"> <li>Plantarflexion and Eversion of ankle</li> </ul>
<b>Peroneus Brevis</b>	<b>Fibula:</b> lateral shaft (distal 1/3 <sup>rd</sup> )	Base of the <b>5<sup>th</sup> metatarsal</b>		
<b>Peroneus Tertius</b>	lower 1/3 <sup>rd</sup> of anterior <b>Fibula</b>	Base of the <b>5<sup>th</sup> metatarsal</b>	Deep Peroneal (L4-S1)	<ul style="list-style-type: none"> <li>Ankle dorsiflexion and eversion</li> </ul> <p><i>an anterior muscles that doesn't pass behind the lateral malleolus</i></p>
<b>Extensor Hallucis Longus</b>	Anterior shaft of <b>Fibula</b> & Interosseous membrane	Base of the distal phalanx of <b>Hallux</b>		<ul style="list-style-type: none"> <li>Extends big toe</li> <li>aids ankle dorsiflexion and inversion</li> </ul>
<b>Extensor Digitorum Longus</b>	Lateral condyle of <b>Tibia</b> & proximal anterior <b>Fibula shaft</b>	Middle and distal phalanges of <b>lateral 4 toes</b>		<ul style="list-style-type: none"> <li>extends lateral 4 toes</li> <li>aids ankle dorsiflexion and eversion</li> </ul>

Note: Some books refer to each Peroneal muscle with the name “fibularis,” e.g. fibularis longus instead of peroneus longus.

Note: Peroneus Longus travels under the sole of the foot to meet the tendon of the Tibialis Anterior. They function like a stirrup.

all **peroneal** muscles **Evert**  
all **tibialis** muscles **Invert**

Anterior Muscles of the leg: **The Hospitals are not dirty Places:**

T: Tibialis Anterior                      N: deep fibular Nerve  
H: Extensor Hallucis Longus            D: Extensor Digitorum longus  
A: Anterior tibial Artery                P: Peroneus Tertius

### Review Chart:

Muscle	Inversion / Eversion	Dorsiflexion /Plantarflexion
<b>Tibialis Anterior</b>	Inversion	Dorsiflexion
<b>Tibialis Posterior</b>	Inversion	Plantarflexion
<b>Peroneus Longus</b>	Eversion	Plantarflexion
<b>Peroneus Brevis</b>	Eversion	Plantarflexion
<b>Personus Tertius</b>	Eversion	Dorsiflexion

Also: 2<sup>nd</sup> letter rule for inversion/eversion: Peroneus = **E**version; Tibialis = **I**nversion.

## Lower Extremity: Foot

Muscle	Origin	Insertion	Nerve	Actions
<b>Abductor Hallucis</b>	<b>Calcaneus</b>	Big toe (base of proximal phalanx)	Medial Plantar (L4-L5)	<ul style="list-style-type: none"> <li>Abduction of the big toe at the MP joint</li> </ul>
<b>Flexor Digitorum Brevis</b>		Middle phalanges of 4 lateral toes		<ul style="list-style-type: none"> <li>Flexion of PIP joints of lateral 4 toes</li> </ul>
<b>Abductor Digiti Minimi</b>		Little toe (base of proximal phalanx)	Lateral Plantar (S1-S2)	<ul style="list-style-type: none"> <li>Flexion and Abduction of little toe at MP joint</li> </ul>
<b>Quadratus Plantae</b>		tendons of Flex. Dig. Longus	<sup>1</sup> st: Med. Plantar (L4-L5) <sup>2</sup> nd: Lat. plantar (S1-S2)	<ul style="list-style-type: none"> <li>assists Flexor Digitorum Longus in flexion of DIP joints</li> </ul>
<b>Lumbricals</b>	from tendons of Flex. Dig. Longus	Extensor expansion of 4 lateral toes	Lateral Plantar (S1-S2)	<ul style="list-style-type: none"> <li>Flexes proximal toes 2-5</li> <li>Extension of DIP and PIP joints</li> </ul>
<b>Flexor Hallucis Brevis</b>	Cuboid and lateral cuneiform	Great toe (base of proximal phalanx)	Medial Plantar (L4-S1)	<ul style="list-style-type: none"> <li>Flexes proximal phalanx of Big toe (MP joint)</li> </ul>
<b>Adductor Hallucis</b>	<u>Oblique</u> : Base of 2 <sup>nd</sup> -4 <sup>th</sup> metatarsals <u>Transverse</u> : 3-5 <sup>th</sup> MP capsules		Lateral Plantar (S1-S2)	<ul style="list-style-type: none"> <li>Adducts big toe</li> </ul>
<b>Flexor Digiti Minimi Brevis</b>	Cuboid & base of 5 <sup>th</sup> metatarsal	5 <sup>th</sup> toe (base of proximal phalanx)		<ul style="list-style-type: none"> <li>Flexes MP joint of little toe</li> </ul>
<b>(4) Plantar Interossei</b>	3-5 <sup>th</sup> metatarsal (medial side)	Extensor expansion of 3 lateral toes		<ul style="list-style-type: none"> <li>Adduction of 3 lateral toes</li> <li>Flexion of proximal phalanges of 4 lateral toes</li> </ul>
<b>(3) Dorsal Interossei</b>	Adjacent metatarsals	Extensor expansion of 2 <sup>nd</sup> -4 <sup>th</sup> lateral toes		<ul style="list-style-type: none"> <li>Abduction of 2<sup>nd</sup>-4<sup>th</sup> toes</li> <li>Flexion of proximal phalanges of 4 lateral toes</li> </ul>
<b>Extensor Hallucis Brevis</b>	Calcaneus (upper surface)	Great toe (proximal phalanx)	Deep Peroneal (L4-S1)	<i>the portion of Extensor Digitorum Brevis that goes to Hallux is called EHB</i>
<b>Extensor Digitorum Brevis</b>	Calcaneus (anterior)	Extensor expansion of 2 <sup>nd</sup> -4 <sup>th</sup> lateral toes		<ul style="list-style-type: none"> <li>Aids in extension of 4 medial toes (at MP joints)</li> </ul>



**Useful Web Pages:**

<http://www.ptcentral.com/muscles/>

**Abbreviations Used:**

LH Long head

IT intertubercular

SPs spinous processes

MP metacarpophalangeal or metatarsophalangeal joint

Sup = superior

L1-L5 Lumbar vertebrae 1 through 5

SM = semimembranosis

SH Short head

I-T iliotibial

TPs transverse processes

IP = interphalangeal

Mid = middle

C1-C4 Cervical vertebrae 1 through 4

**Notes:**

Medial rotation = internal rotation

Lateral rotation = external rotation

Carpi = wrist

Digitorum = 4 digits/fingers/toes

ASIS = anterior superior iliac spine

AIIS = anterior inferior

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