

BIO 4432 – Human Anatomy*Resource #5*

The concepts this resource covers are the topics typically covered during this week of the semester. If you do not see the topics your particular section of class is learning this week, please take a look at other weekly resources listed on our website for additional topics throughout the semester.

We also invite you to look at the group tutoring chart on our website to see if this course has a group tutoring session offered this semester.

If you have any questions about these study guides, group tutoring sessions, private 30 minute tutoring appointments, the Baylor Tutoring YouTube channel or any tutoring services we offer, please visit our website www.baylor.edu/tutoring or call our drop in center during open business hours. M-Th 9am-8pm on class days 254-710-4135.

Keywords: Gluteal muscles, Lateral hip rotators, Muscles of the thigh and leg, Muscles of the foot, Brachial plexus, Lumbar plexus, Sciatic nerve, Cutaneous fields, Peripheral nerves

Topics of the Week: Lower Limb Musculature, Brachial Plexus, and Lumbosacral Plexus

Gluteal muscles:

Gluteus maximus – inferior gluteal nerve

Origin: ilium, sacrum, coccyx, and sacrotuberous ligament

Insertion: fascia lata, gluteal tuberosity

Action: **extends**, laterally rotates, and abducts hip joint

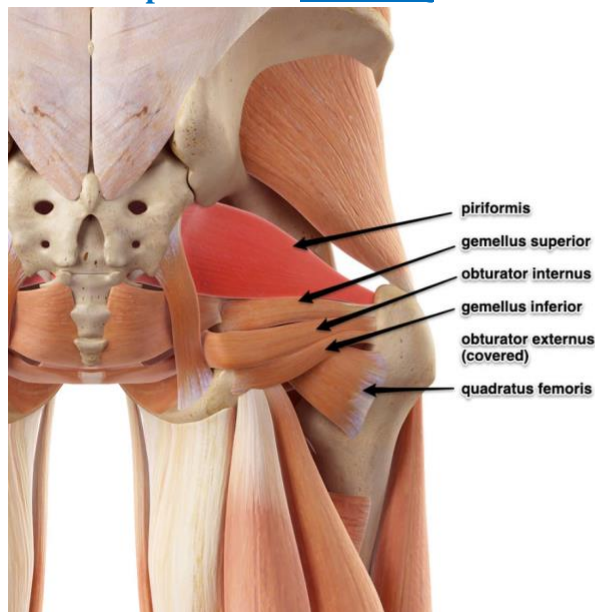
Gluteus medius and minimus – superior gluteal nerve

Origin: ilium

Insertion: greater trochanter

Action: hip abduction and pelvic stabilization

Lateral hip rotators: PGOGOQ



All of the lateral hip rotators are innervated by **lower lumbar nerves**.

They all insert on the **greater trochanter of the humerus**.

This image was taken from yogaanatomy.com

Muscles of the medial thigh compartment: all function to **adduct the thigh**

Innervations:

All adductors are innervated by **obturator nerve**.

- 2 of these have **dual innervation**:
 - **Pectineus** is dually innervated by **obturator and femoral nerves**.
 - **Adductor magnus** is dually innervated by **obturator and tibial nerves**.

Origins: all adductors originate from the **pubic bone**

Insertions: all adductors insert onto **linea aspera** **except gracilis**: **medial aspect of proximal tibia**

- This is because gracilis does more than just adduct the thigh! It **flexes and medially rotates the leg at the knee joint**.

Link to Dr. Acland's video on the hip adductors:

<https://aclandanatomy.com/MultimediaPlayer.aspx?multimediaId=10528139>

Anterior thigh muscles: all innervated by **femoral nerve**

Quadriceps muscles:

Rectus femoris:

Origin: **anterior inferior iliac spine (AIIS)** – only quadricep muscle that originates from **ABOVE** the hip joint!

Insertion: **tibial tuberosity**

Action: **flexes hip** and extends the leg

Vastus lateralis:

Origin: **greater trochanter**

Insertion: **tibial tuberosity**

Action: **extends the leg**

Vastus medialis:

Origin: **intertrochanteric line/linea aspera**

Insertion: **tibial tuberosity**

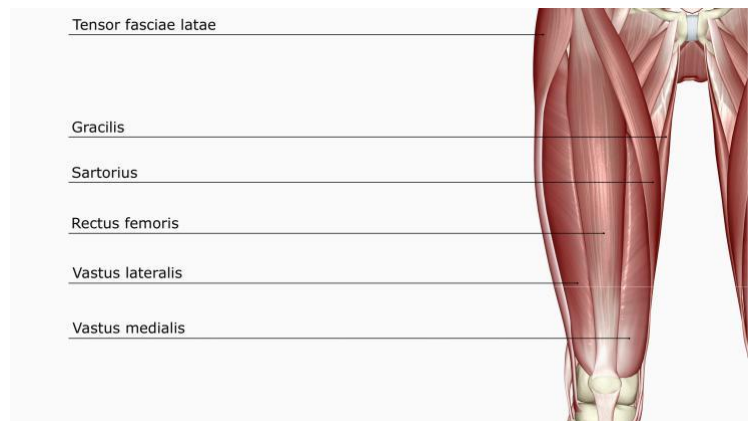
Action: **extends the leg**

Sartorius: not a quadriceps muscle

Origin: **anterior superior iliac spine (ASIS)**

Insertion: **medial tibia**

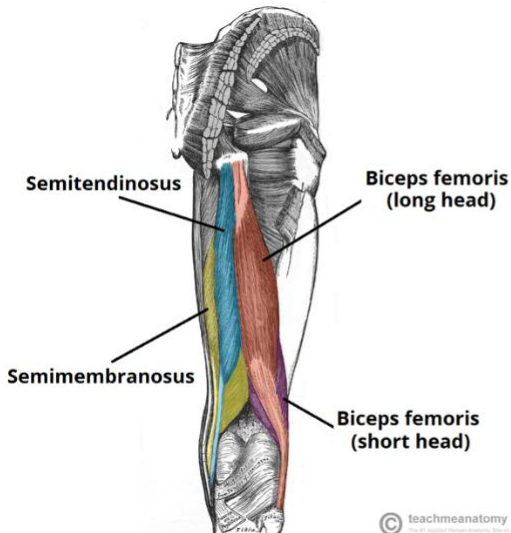
Action: **flexes the hip**



This image was taken from verywellfit.com.

This image was taken from simplemed.co.uk

Posterior thigh muscles: hip extensors and leg flexors



This image is from teachmeanatomy.com.

All originate from the **ischial tuberosity** except for the **short head of biceps femoris** which originates from the **femur**.

All are innervated by **tibial nerve** except for the **short head of biceps femoris** which is innervated by **common fibular nerve**.

Anterior muscles of the leg: all innervated by deep fibular nerve

Anterior tibialis (Tom)

Insertion: **first cuneiform and first metatarsal**

Action: **dorsiflexion and inversion of the foot**

Extensor digitorum longus (Dick)

Insertion: **dorsal aspect of middle and distal phalanges 2, 3, 4, and 5**

Action: **extension of lesser toes and dorsiflexion of the foot**

Extensor hallucis longus (Harry)

Insertion: **dorsal aspect of distal phalanx of hallux (big toe)**

Action: **extension of hallux and dorsiflexion of ankle**

Posterior muscles of the leg: all innervated by tibial nerve

Gastrocnemius

Origin: **medial and lateral condyles of the femur**

Insertion: **posterior surface of calcaneus via calcaneal tendon**

Action: **plantar flexes the foot and extends the knee**

Soleus

Origin: **head of fibula, soleal line, and medial border of the tibia**

Insertion: **posterior surface of calcaneus via calcaneal tendon**

Action: **plantarflexes the foot**

Posterior tibialis (Tom)

Insertion: **navicular**

Action: **inverts and plantarflexes foot**

Flexor digitorum longus (Dick)

Insertion: **plantar aspect of middle and distal phalanges 2, 3, 4, and 5**

Action: **flexes lesser toes and plantar flexes foot**

Flexor hallucis longus (Harry)

Insertion: **plantar aspect of distal phalanx of hallux**

Action: **flexes hallux and plantar flexes foot**



Lateral muscles of the leg:

Fibularis brevis

Insertion: 5th metatarsal

Action: everts foot and assists in plantarflexion

Innervation: superficial fibular nerve

Fibularis longus

Insertion: 1st metatarsal

Action: everts foot and assists in plantarflexion

Innervation: superficial fibular nerve

Fibularis tertius (found in the anterior compartment, but everts the foot)

Insertion: 1st metatarsal

Action: everts foot; weak dorsiflexor

Innervation: **deep fibular nerve**

Muscles of the foot:

Extensor digitorum brevis and extensor hallucis brevis: both innervated by **deep fibular nerve** and **extend the digits**

Plantar foot muscles innervation: **LAFF**

L = first lumbrical

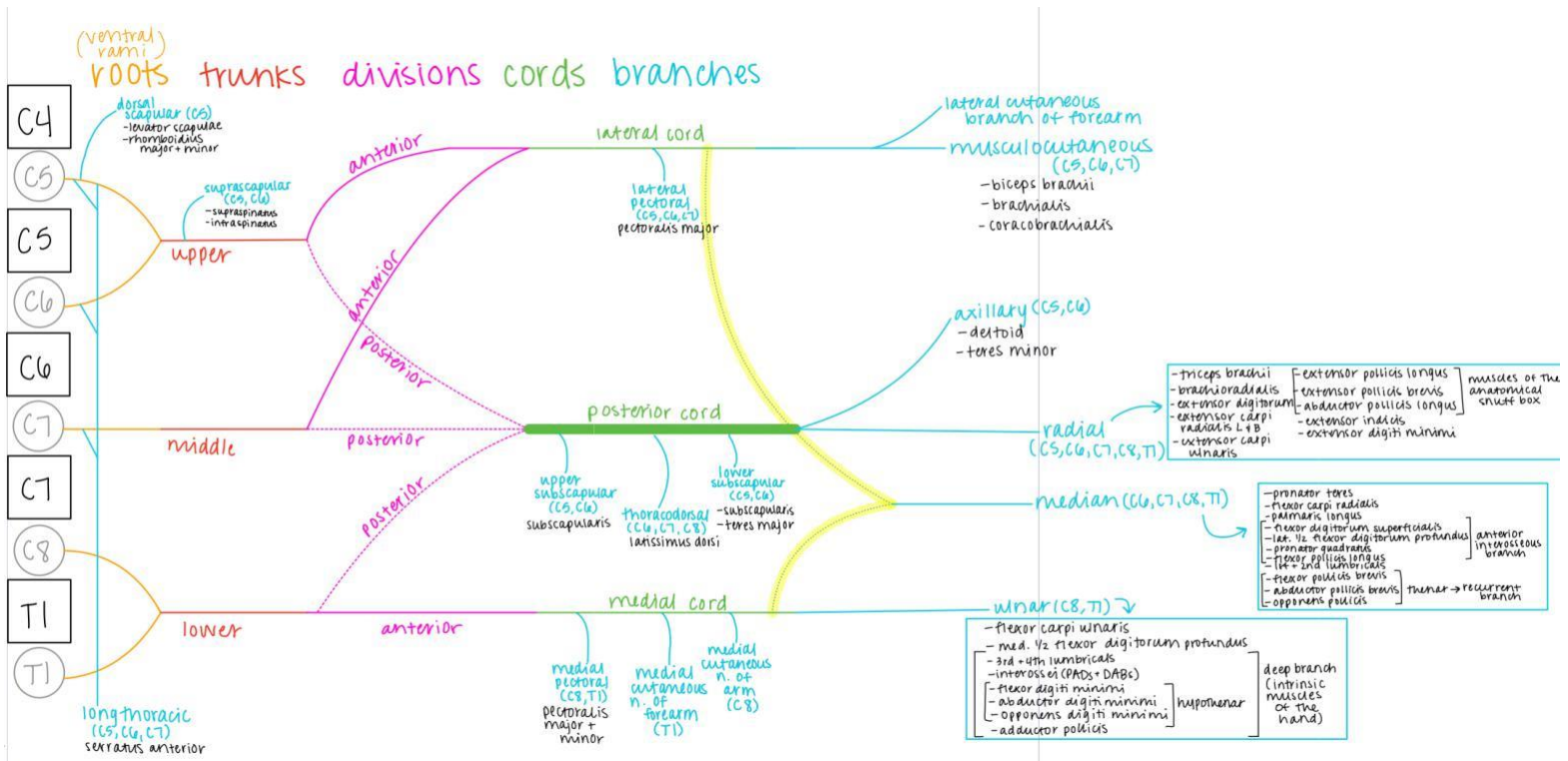
A = abductor hallucis

F = flexor digitorum brevis

F = flexor hallucis brevis

All others are innervated by **lateral plantar nerve**.

Brachial plexus: the best thing you can do to study the brachial plexus is to draw it from memory!



Lumbar plexus: L1 – L4

Important nerves:

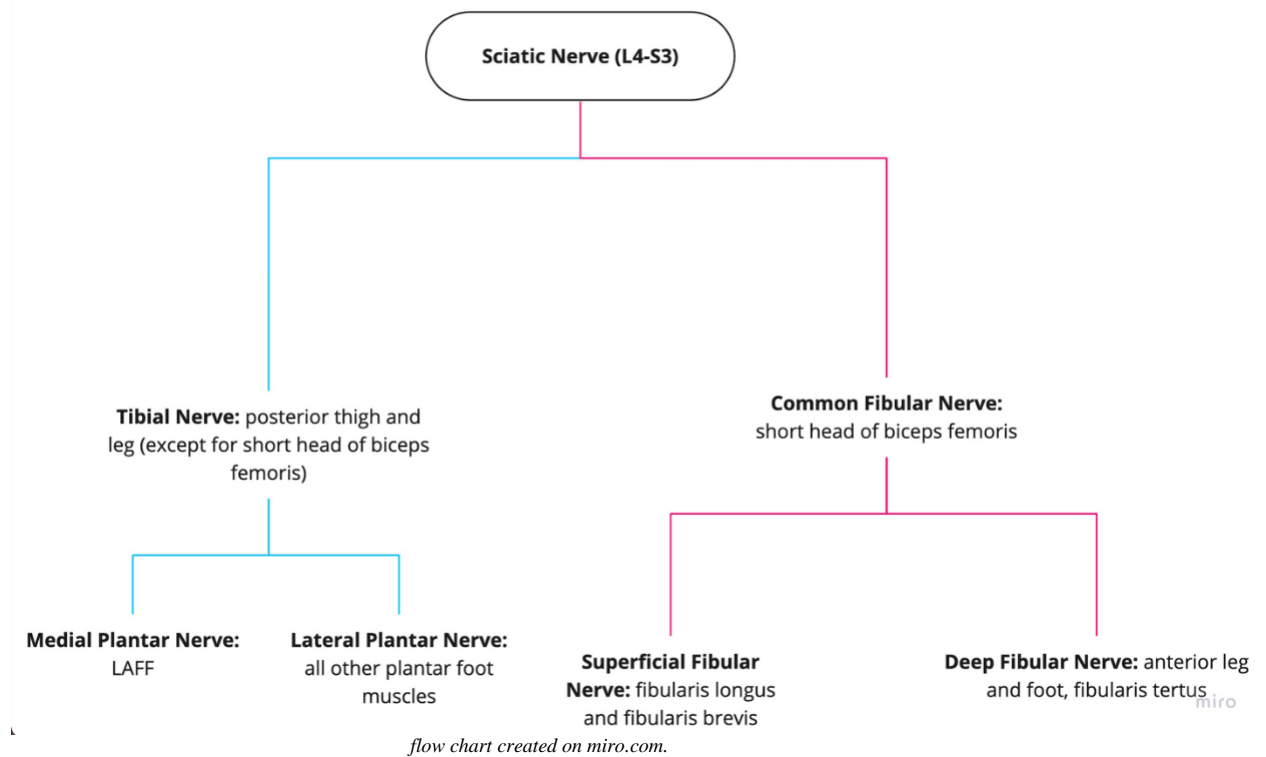
Genitofemoral (L1-L2)

Lateral femoral cutaneous (L2-L3)

Obturator (L2-L4)

Femoral (L2-L4)

the muscles these nerves innervate are mentioned in the topics above, or will be mentioned later on in the course

Highlight #1: Sciatic Nerve

Highlight #2: Dermatomes and Cutaneous Fields

The following information is from the Noted Anatomist's video on dermatomes and cutaneous fields: <https://www.youtube.com/watch?v=FpdL24OUYM8>

Overview:

A **dermatome** is an area of skin supplied by sensory neurons from a **single spinal cord level**. To lose sensation in an entire dermatome, an injury has to occur to a **ventral ramus** (i.e., C5, C6, etc.).

A **cutaneous field** is an area of skin supplied by sensory neurons from a single **peripheral nerve** which may be distributed by more than one spinal cord level (i.e., radial nerve comes from C5-T1). Injury to a **peripheral nerve** results in loss of sensation in the corresponding cutaneous field.

The cutaneous fields:

1. Lateral side of the shoulder → **axillary nerve**
2. Posterior side of the arm → **radial nerve**
3. Posterior side of the forearm → **radial nerve**
4. Medial side of the forearm → **medial cutaneous nerve of forearm**
5. Lateral side of forearm → **musculocutaneous**
6. The hand:
 - a. Medial anterior and posterior surface → **ulnar nerve**
 - b. Digits 1, 2, and 3, and medial half of 4 → **median nerve**
 - c. Posterior surface of the thumb → **radial nerve**
7. Medial side of the thigh → **anterior femoral cutaneous nerve**
8. Lateral side of the thigh → **lateral femoral cutaneous nerve**
9. Medial side of the leg → **saphenous nerve**
10. Lateral side of the leg → **sural nerve**
11. Anterior side of the leg and dorsal side of the foot → **superficial fibular nerve**
12. Skin between the first and second toes → **deep fibular nerve**
13. Plantar surface of the foot → **medial plantar nerve, lateral plantar nerve, saphenous nerve, sural nerve, and tibial nerve**

Highlight #3: Myotomes and Peripheral Nerves

The following information is from the Noted Anatomist's video on myotomes and peripheral nerves: <https://www.youtube.com/watch?v=4fMgypHEozo>

Overview:

A **myotome** is a muscle supplied by motor neurons at a **single spinal cord level**. The muscle can be supplied by more than one nerve (i.e., how the median and radial nerves both come from C6). Injury to a **nerve root or trunk** results in strength loss in that corresponding myotome.

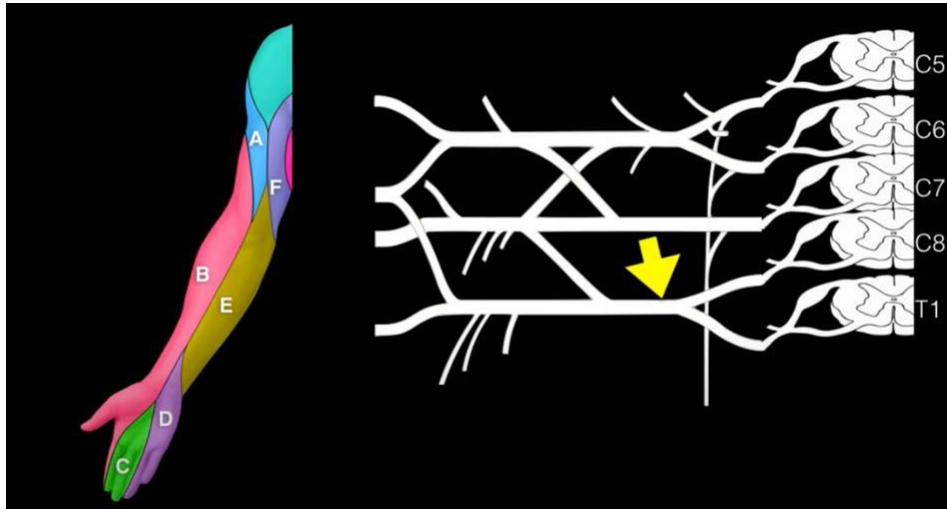
Muscles can be supplied by motor neurons from a single **peripheral nerve**. Peripheral nerves can arise from more than one spinal cord level (i.e., radial nerve C5-T1). Injury to a **peripheral nerve** results in strength loss in all muscles supplied by that nerve.

Week 7 Knowledge Checkpoint:

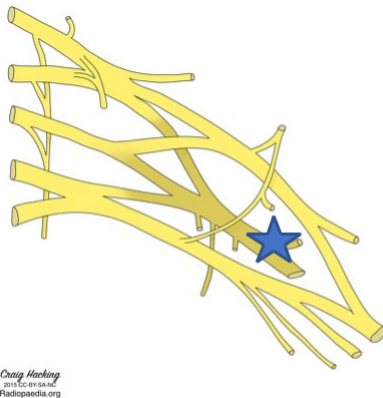
1. Which nerve innervates the Gluteus Maximus?
 - a. Sciatic nerve
 - b. Inferior Gluteal nerve
 - c. Superior Gluteal nerve
 - d. Tibial nerve

2. If a patient presents with Sciatic nerve damage, which of the following muscles may be weakened?
 - a. Biceps brachii
 - b. Tibialis Anterior
 - c. Piriformis
 - d. Plantaris

3. Using the following screenshot from the Noted Anatomist, identify the corresponding letters to the area(s) of skin that would lose sensation if the indicated nerve on the brachial plexus was injured. *(image from [The Noted Anatomist](#))*



4. Identify the indicated nerve.



THINGS YOU MAY STRUGGLE WITH!

1. ***Myotomes v. peripheral nerves and dermatomes v. cutaneous fields:*** This concept is typically challenging. Make sure you watch the Noted Anatomist's videos on these two topics to really get them down!

- 2. *The brachial plexus:*** As I mentioned earlier, drawing the brachial plexus by memory is the best way to solidify the information. Once you can do that, you'll be able to answer any test question with confidence!

CONGRATS: You made it to the end of the resource! Thanks for checking out these weekly resources! Don't forget to check out our website for group tutoring times, video tutorials and lots of other resources: www.baylor.edu/tutoring!

Answers

1. b
2. b
3. d and e
4. radial nerve