# Objectives

- Define the boundaries of the femoral triangle and adductor canal and locate and identify the contents of the triangle and canal.
- Identify the anterior and medial osteofascial compartments of the thigh.
- Differentiate the muscles contained in each compartment with respect to their attachments, actions, nerve and blood supply.

# Anterior and Medial Thigh

 After removing the skin from the anterior thigh, you can identify the cutaneous nerves and veins of the thigh and the fascia lata. The fascia lata is a dense layer of deep fascia surrounding the large muscles of the thigh. The great saphenous vein reaches the femoral vein by passing through a weakened part of this fascia called the fossa ovalis which has a sharp margin called the falciform margin.



## **Cutaneous Vessels**

#### superficial epigastric artery and vein

- a. supplies the lower abdominal wall
- b. artery is a branch of the femoral artery
- c. vein empties into the greater saphenous vein

#### superficial circumflex iliac artery and vein

- a. supplies the upper lateral aspect of the thigh
- b. artery is a branch of the femoral
- c. vein empties into the greater saphenous vein
- superficial and deep external pudendal arteries and veins
  - a. supplies external genitalia above
  - b. artery is a branch of the femoral artery
  - c. vein empties into the greater saphenous vein

#### • greater saphenous vein

- a. begins and passes anterior to the medial malleolus of the tibia, up the medial side of the lower leg
- b. passes a palm's breadth from the patella at the knee
- c. ascends the thigh to the saphenous opening in the fascia lata to empty into the femoral vein
- d. receives many tributaries along its course

### Lymphatics of Anterior and Medial Thigh

- Located high in the thigh, just below the inguinal ligament, are the superficial inguinal lymph nodes, usually arranged in a Tshape. These nodes receive lymph drainage from the entire lower limb and the superficial structures of the perineum.
- tends to follow venous drainage
- superficial inguinal nodes drain into the deep inguinal nodes and then to external iliac nodes
- skin and superficial fascia from the lower abdomen, gluteal region, and external genitalia send lymph to the superficial inguinal nodes



# Cutaneous Nerves of the Thigh

- The cutaneous nerves found piercing the deep fascia are the:
- lateral femoral cutaneous
- intermediate cutaneous, branches of the femoral nerve
- medial cutaneous, branches of the femoral nerve



- dermatome charts differ and spinal cord segments overlap in their distribution
  - a. L1 for inguinal ligament
  - b. L4 for patella
- peripheral cutaneous nerves
  - a. lateral femoral cutaneous nerve
    - 1. enters thigh by passing deep to lateral end of inguinal ligament, then pierces fascia lata
    - 2. supplies lateral/anterior surface of thigh down to knee
    - 3. direct branch of lumbar plexus, L2 and L3 posterior divisions
  - b. anterior femoral cutaneous nerve
    - 1. branches of femoral nerve to serve anterior and medial surfaces of thigh
    - 2. may be subdivided into intermediate & medial branches

### Muscles of the Anterior Compartment

- The anterior compartment of the thigh contains a large muscle, consisting of four heads, the quadriceps femoris muscle. This is a strong extensor of the knee. The four heads of the quadriceps femoris muscle are the:
- rectus femoris
- vastus lateralis
- vastus medialis
- vastus intermedius
- One other muscle of the anterior compartment is the sartorius.



• The thigh is completely surrounded by a dense layer of deep fascia called the fascia lata. This fascia is particularly thickened on the lateral aspect of the thigh and is named the iliotibial tract. This tract extends from the iliac crest to the lateral condyle of the tibia.



# Femoral Triangle

The femoral triangle is an anatomical region of the upper thigh that has the following boundaries:

- inguinal ligament
- sartorius
- adductor longus

The floor of the triangle is made up of the:

- iliopsoas muscle
- pectineus muscle

The contents of the femoral triangle from lateral to medial are:

- femoral nerve and its terminal branched
- femoral artery and its major branches
- femoral vein and its branches
- femoral ring (sheath) (usually contains a lymph node)
- Deep inguinal lymph nodes



- The last three structures are found in a sheath of deep fascia that has extended down from the abdominal wall, the femoral sheath. The sheath contains the following items, from lateral to medial:
- femoral artery
- femoral vein
- femoral canal (usually containing a lymph node). The femoral canal is also the site of a femoral hernia. The femoral nerve is not considered to be in the sheath.



## Nerve of the Anterior Compartment of the Thigh

 The femoral nerve (L2,L3,L4) supplies the muscles of the anterior compartment of the thigh, including the pectineus muscle. The psoas muscles receives its nerve supply from the lumbar plexus.

#### Artery of the Anterior Compartment of the Thigh

- The femoral artery (1) is the principal supply to the anterior compartment of the thigh, as well as the rest of the lower limb.
  Its branches are:
- superficial iliac circumflex (3). This branch travels along the lower border of the inguinal ligament and supplies lower abdomen and upper thigh.
- **external pudendal** (2). This branch supplies superficial perineal structures.
- **lateral femoral circumflex** (5). The lateral circumflex travels around the anterior surface of the surgical neck of the femur and anastomoses with the medial circumflex.
- **medial femoral circumflex** (4). The medial circumflex travels around the posterior surface of the surgical neck of the femur.
- **profunda femoris** (6) . The deep (profunda) femoris artery descends along the attached margin of the adductor magnus muscle, giving rise to
  - 3 perforating branches (6a-6c)
- superior (highest) genicular (7)

The femoral artery changes its name to become the *popliteal artery* after it passes through the adductor hiatus.



#### Muscles of the Anterior and Medial Thigh

Muscle	Origin	Insertion	Action	Nerve Supply
sartorius	anterior superior iliac spine	upper medial surface of tibial shaft	flexes, abducts, laterally rotates thigh; flexes and medially rotates leg at knee	femoral nerve
iliacus	iliac fossa	with psoas into lesser trochanter	flexes thigh; if thigh is fixed, it flexes the trunk on the thigh as in sitting up	femoral nerve
psoas major	12th thoracic vertebral body transverse process, bodies and intervertebral disks of lumbar vertebrae	lesser trochanter	same as iliacus	segmental branches from lumbar plexus
pectineus	superior ramus of pubis	upper end shaft of femur	flexes and adducts thigh	femoral nerve
rectus femoris	straight head: anterior inferior iliac spine reflected head: ilium just above the acetabulum	patella	extension of leg	femoral nerve
vastus lateralis	upper end shaft of femur	quadriceps tendon into patella	extension of leg	femoral nerve
vastus medialis	upper end shaft of femur	quadriceps tendon to patella	extension of leg	femoral nerve

# **Adductor Canal**

- adductor (subsartorial) canal begins at the apex of the femoral triangle and ends where the femoral vessels enter the hiatus in the adductor magnus muscle contents
  - a. femoral vessels
  - b. saphenous nerve
  - c. nerve to the vastus medialis muscle

#### **Cross Section Through the Thigh**



It helps sometimes to be able to examine a section of the body, in order to gain a third dimension to the region. Again, when examining a cross section through the body, you are looking up into the the section. This is the left leg so medial should be to your left as you examine it.

# **Medial Compartment of Thigh**

• The medial compartment of the thigh is frequently called the adductor compartment because the major action of this group of muscles is adduction, except for the hamstring portion of the adductor magnus which performs as a hamstring and is supplied by a different nerve than the obturator, which supplies the muscles of the medial compartment. Some people also include the pectineus with this group of muscles but it really belongs to the anterior compartment and is supplied by the femoral nerve, which is the nerve of the anterior compartment.



The superficial layer of adductor muscles are the:

- gracilis
- adductor longus



- When the pectineus and adductor longus muscles are reflected, the second layer of muscles can be identified:
- adductor brevis

Note that the obturator nerve exits the pelvis by passing through a small canal in the upper part of the obturator foramen. It then pierces the obturator externus muscle and splits on either side of the adductor brevis muscle as an anterior and posterior branch. It then supplies the adductor muscles.

In this image, you can see the anterior division of the obturator lying on the anterior surface of the adductor brevis muscle. posterior division of obturator nerve

adductor magnus

cut edge of adductor brevis

cut edge of adductor longus hamstring part of adductor magnus  The deepest and largest muscle in the medial compartment is the adductor magnus. Most of this muscle inserts along the linea aspera of the femur. However, one part inserts into the adductor tubercle of the femur. This part is called the hamstring portion of this muscle and is thus, supplied by the tibial part of the sciatic nerve and functions along with the hamstrings in the posterior compartment of the thigh.

# **Table of Muscles**

Muscle	Origin	Insertion	Action	Nerve Supply
gracilis	inferior ramus of pubis; ramus of ischium	upper part of shaft of tibia on its medial surface	adducts thigh; flexes leg	obturator nerve
adductor longus	body of pubis	posterior surface of shaft of femur	adducts thigh and assists in lateral rotation	obturator nerve
adductor brevis	inferior ramus of pubis	posterior surface of shaft of femur	adducts thigh and assists in lateral rotation	obturator nerve
adductor magnus	inferior ramus of pubis; ramus of ischium ischial tuberosity	posterior surface of shaft of femur; adductor tubercle of femur	adducts thigh and assists in lateral rotation. Hamstring part extends thigh	obturator nerve and tibial part of sciatic

## Obturator Nerve Supplies All The Muscles of the Medial Compartment

- 1. major supply to the pectineus muscle is the femoral nerve or accessory obturator nerve, when present
- 2. adductor magnus muscle frequently receives nerve fibers from the sciatic nerve
- 3. divides into anterior and posterior branches
  - a. anterior branch
    - (1) lies on surface of adductor brevis muscle
  - (2) supplies adductor longus, gracilis and adductor brevis muscles
  - b. posterior branch
    - (1) lies deep to the adductor brevis muscle
    - (2) supplies the obturator externus and adductor magnus muscle