MEDICAL EDUCATION RESOURCE

Medial Side of Thigh

Introduction

- The **medial side of the thigh** is also called the **adductor compartment**.
- It lies **between the anterior and posterior compartments** of the thigh.
- The compartment contains muscles that mainly **adduct the thigh** at the hip joint.
- These muscles also assist in **flexion** and **medial rotation** of the thigh.
- The **obturator nerve**, **obturator artery**, and **deep branches of femoral artery** supply this region.
- The compartment is enclosed by **deep fascia (fascia lata)** and separated from adjacent compartments by **intermuscular septa**.

Adductor Compartment

- This compartment contains the following **five main muscles**:
    1. **Adductor longus**
    2. **Adductor brevis**
    3. **Adductor magnus**

4. **Gracilis**

5. **Pectineus** (functionally part of adductor group but partially in anterior compartment)

- The **obturator externus** lies deep in this region and is often described with the **gluteal region**.

- These muscles collectively **stabilize the hip joint** and help in maintaining posture during standing and walking.

Boundaries of Medial Compartment

- **Anteriorly:** Medial intermuscular septum separating it from the **anterior (extensor) compartment**.

- **Posteriorly:** Posterior intermuscular septum, poorly defined, separating it from **posterior (flexor) compartment**.

- **Medially:** Deep fascia of the thigh and skin overlying the medial surface.

- **Laterally:** Medial surface of the shaft of femur.

- **Superiorly:** Continuous with **pelvic fascia** at the brim.

- **Inferiorly:** Continuous with **adductor canal** and **popliteal fossa**.

Dissection of the Medial Side of Thigh

1. **Position:** Place the cadaver supine, thigh slightly abducted and rotated laterally.

2. **Incision:** Make a vertical incision along the **medial border of thigh** from the **inguinal ligament** to the **medial condyle of femur**.

3. Reflect the **skin and superficial fascia** to expose the **great saphenous vein** and **superficial inguinal lymphatics**.

4. Remove the **deep fascia (fascia lata)** carefully to reveal the **adductor longus** — a prominent triangular muscle on the surface.

5. Identify the muscles layer-wise:

    - **Superficial layer:** Adductor longus, gracilis, pectineus.

    - **Middle layer:** Adductor brevis.

    - **Deep layer:** Adductor magnus and obturator externus.

6. The **obturator nerve** appears between **adductor longus and brevis**; trace its anterior and posterior divisions.

7. **Medially**, note the **gracilis**, a long slender muscle that runs vertically down to the upper tibia.

8. Deep dissection exposes the **obturator artery** and its branches supplying the adductor muscles.

9. Clean the **adductor magnus**, which forms the **posteromedial boundary** of the compartment and opens distally into the **adductor hiatus**.

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Muscles of the Adductor Compartment of Thigh

Muscles included:

1. Adductor longus
2. Adductor brevis
3. Adductor magnus
4. Gracilis
5. Pectineus

Origin and Insertion:

- **Adductor longus:**
  - *Origin* – Body of pubis in the angle between pubic crest and pubic symphysis.
  - *Insertion* – Linea aspera in middle one-third of femur between vastus medialis and adductor magnus.
  - *Note:* Sometimes contains a sesamoid bone near its origin (rider's bone)

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- **Adductor brevis:**
  - *Origin* – Body and inferior ramus of pubis between gracilis and adductor magnus.
  - *Insertion* – Line from lesser trochanter to upper part of linea aspera, behind adductor longus

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- **Adductor magnus:**
  - *Origin* – Inferolateral ischial tuberosity, ramus of ischium, and lower part of inferior ramus of pubis.
  - *Insertion* – Medial margin of gluteal tuberosity, linea aspera, medial supracondylar line, and adductor tubercle.
  - *Note:* It is a **hybrid muscle**, as it has double nerve supply

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- **Gracilis:**
  - *Origin* – Body and inferior ramus of pubis.
  - *Insertion* – Upper medial surface of tibia (behind sartorius and in front of semitendinosus).
- **Pectineus:**
  - *Origin* – Pecten pubis and upper pectineal surface of superior ramus of pubis.
  - *Insertion* – Line from lesser trochanter to linea aspera.
  - *Note:* Flat, quadrilateral muscle forming part of floor of femoral triangle

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Nerve Supply and Actions

MUSCLE	NERVE SUPPLY	ACTION
Adductor longus	Anterior division of obturator nerve	Adducts thigh at hip joint
Adductor brevis	Anterior or posterior division of obturator nerve	Adducts and flexes thigh
Adductor magnus	Adductor part – posterior division of obturator nerve Hamstring part – tibial part of sciatic nerve	Adductor part adducts thigh; hamstring part extends hip and flexes knee
Gracilis	Anterior division of obturator nerve	Flexes and medially rotates thigh; weak adductor; used for muscle transplantation
Pectineus	Dual supply – femoral nerve (anterior fibers) and obturator nerve (posterior fibers)	Flexes and adducts thigh Volume 2, BD Chaurasia's Human …

Relations of Adductor Longus

- **Anterior surface:**
    - Skin, fascia lata, great saphenous vein, superficial inguinal nodes, and femoral triangle structures (femoral artery, vein, nerve).
- **Posterior surface:**

- Adductor brevis, adductor magnus, anterior division of obturator nerve, and profunda femoris vessels.

- **Lateral border:** Pectineus.

- **Medial border:** Gracilis

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Obturator Nerve

- **Origin:** From lumbar plexus (ventral divisions of L2–L4).

- **Course:**

  - Lies in pelvis, passes through **obturator canal**, and divides into **anterior and posterior divisions**

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Divisions in the Thigh:

- **Anterior Division:**

  - Descends in front of **adductor brevis**, behind **pectineus and adductor longus**.

  - *Supplies:*

    1. Pectineus

2. Adductor longus
3. Gracilis
4. Sometimes adductor brevis

- *Other branches:*
  - To hip joint
  - To **subsartorial plexus** below adductor longus
  - To **femoral artery** in adductor canal

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- **Posterior Division:**
  - Passes behind **adductor brevis** and in front of **adductor magnus**.
  - *Supplies:*
    1. Obturator externus
    2. Adductor magnus
    3. Sometimes adductor brevis
  - Ends as a **genicular branch** that supplies **oblique popliteal ligament** and **knee joint**

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Clinical Anatomy

- **Testing Adductor Muscles:**
    - Patient lies supine with limb abducted. Examiner resists adduction — failure indicates obturator nerve injury.
- **Obturator Nerve Injury:**
    - Causes weakness or loss of thigh adduction.
    - May occur in pelvic surgery or childbirth.
    - Loss of sensation on **medial thigh**.
- **Gracilis Muscle Transplant:**
    - Used in reconstructive surgeries, e.g., for facial paralysis or anal sphincter repair, due to its slender structure and long tendon.
- **Adductor Strain (Rider's Strain):**
    - Occurs in horse riders or athletes due to overstretching of adductor longus; may cause pain near pubic symphysis.
- **Referred Pain:**
    - Obturator nerve irritation can cause **pain on medial thigh** during **pelvic inflammation** or **ovarian pathology**

Accessory Obturator Nerve

- **Incidence:** Present in about **30% of individuals**.
- **Origin:** From the **lumbar plexus**, formed by the **ventral divisions of the anterior primary rami of L3 and L4** spinal nerves.
- **Course:**
    - Descends along the **medial border of psoas major**.
    - Crosses the **superior ramus of the pubis** behind the **pectineus muscle**.
    - Terminates by dividing into **three branches**:
        1. **Muscular branch** – to deep surface of *pectineus*.
        2. **Articular branch** – to the *hip joint*.
        3. **Communicating branch** – joins the *anterior division of obturator nerve*.
- **Variation:** Sometimes very small and ends by supplying the *pectineus only*

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Obturator Artery

- **Origin:** Branch of the **internal iliac artery**.

- **Course:**
    - Accompanies (below) the **obturator nerve** in the pelvis.
    - Passes through the **obturator canal** with the nerve.
    - At the upper margin of the **obturator foramen**, it divides into:
        - **Anterior (medial) branch**
        - **Posterior (lateral) branch**
    - Both branches form a **vascular circle** over the *obturator membrane* and anastomose with the **medial circumflex femoral artery**.
- **Branches:**

1. **Anterior branch** – supplies adductor muscles and obturator externus.
2. **Posterior branch** – gives an **acetabular branch** that passes through the *acetabular notch*, supplies the *fat in the acetabular fossa*, and sends a **foveolar artery** through the *ligamentum teres* to the *head of femur*

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Medial Circumflex Femoral Artery

- **Origin:** From the **profunda femoris artery** (sometimes directly from the femoral artery).

- **Course:**
    - Leaves the femoral triangle by passing **posteriorly between pectineus and psoas major muscles**.
    - Ends by dividing into **ascending** and **transverse** branches

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Branches and Anastomoses:

1. **Ascending branch:**
    - Anastomoses with the **ascending branch of lateral circumflex femoral artery** and **superior gluteal artery**.
    - Forms part of the **trochanteric anastomosis**, which supplies the **head and neck of femur** via *retinacular branches* running along the capsule of hip joint.
2. **Transverse branch:**
    - Joins with the **transverse branch of lateral circumflex femoral**, **inferior gluteal**, and **first perforating branch of profunda femoris** to form the **cruciate anastomosis**, ensuring collateral circulation around the hip joint.
3. **Acetabular branch:**
    - A small twig to the *acetabulum*, assisting the obturator artery in vascularizing the *head of femur*.

Clinical Anatomy

- **Trochanteric Anastomosis:**
  - Provides the main arterial supply to the **head of femur** through *retinacular arteries* from the **medial circumflex femoral artery**.
  - Damage to these vessels (especially in **fracture of neck of femur**) can cause **avascular necrosis of the femoral head**.
- **Accessory Obturator Nerve (Surgical Relevance):**
  - May be encountered during **hernia repairs or pelvic surgeries**; accidental injury causes weakness of *pectineus* and loss of hip flexion strength.
- **Obturator Artery Variations:**
  - Sometimes arises from **inferior epigastric artery** (aberrant obturator artery).
  - Important to recognize during **femoral hernia surgery**, as it may form a "**corona mortis**" (dangerous anastomosis) around the *pubic ramus*, leading to **severe bleeding** if cut inadvertently.
- **Obturator Nerve Entrapment:**
  - May occur due to **athletic overuse or pelvic tumors**, producing **pain on medial side of thigh** and weakness in **adduction**.