📚 Anterior Compartment of Thigh

🧠 Overview

The anterior compartment of thigh is primarily a flexor (hip) + extensor (knee) compartment 💪

🧴 Fascia of Thigh

🔲 Superficial Fascia

🧩 Layers

- 🔹 Membranous Layer
  - Continuation of Scarpa's fascia (anterior abdominal wall)

- Attaches to fascia lata below inguinal ligament

👉 Prevents downward spread of fluid

⚠️ Clinical Correlation: Extravasation of Urine

🧠 Flowchart

Urethral injury → Urine leaks into superficial fascia → Spread limited by attachments → Accumulates in anterior abdominal wall & thigh

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🔹 Fatty Layer

- Continuous with abdominal wall fat
- No clear boundary

2️⃣ Deep Fascia (Fascia Lata)

🧩 Features

- Encloses thigh like a tight sleeve (trouser) 👖
- Attachments:
  - Superior → pelvis & inguinal ligament
  - Lateral → iliotibial tract

🦵 Iliotibial Tract (IT Band)

🧩 Features

Feature	Description
Type	Thickened fascia lata
Upper attachment	Iliac tubercle

Lower attachment	Lateral condyle of tibia

💪 Insertions

- Tensor fasciae latae
- Gluteus maximus

⭐ Exam Pearl:

IT band = lateral stabilizer of knee

🕳️ Saphenous Opening (Fossa Ovalis)

📍 Location

- ~4 cm below & lateral to pubic tubercle

📦 Contents

- Great saphenous vein
- Superficial branches of femoral artery
- Lymphatics

🔍 Key Feature: Falciform Margin

- Crescent-shaped edge
- Overlies femoral vessels

🧠 Flowchart: Structure of Opening

Fascia lata → Defect (saphenous opening) → Covered by cribriform fascia → Transmits vessels & lymphatics

⭐ Clinical Importance: Site for femoral hernia

📦 Fascial Compartments of Thigh

The thigh is divided into three distinct compartments (anterior, medial, and posterior) by strong deep fascia called intermuscular septa, which extend from the outer, superficial covering (the fascia lata) to the femur.

📦 Anterior Compartment of Thigh

Anterior compartment contains:

- Muscles
- Femoral nerve

- Femoral artery

💪 Muscles of Anterior Compartment

🔢 List

- Sartorius
- Iliopsoas (iliacus + psoas major)
- Pectineus
- Quadriceps femoris

💪 Sartorius (Longest Muscle)

🧩 Features

Feature	Description

Origin	ASIS
Insertion	Upper tibia (pes anserinus)
Action	Flexion, abduction, lateral rotation of hip

⭐ Mnemonic:

"Tailor's muscle" (cross-legged sitting)

💪 Iliopsoas (Primary Hip Flexor)

🧠 Flowchart

Psoas major + Iliacus → Form iliopsoas → Insert on lesser trochanter → Powerful hip flexion

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⭐ Exam Pearl: Strongest hip flexor

💪 Pectineus

Feature	Description
Origin	Superior pubic ramus
Insertion	Pectineal line of femur
Action	Adduction + weak flexion

💪 Quadriceps Femoris

🧩 Components

Muscle	Key Feature
Rectus femoris	Crosses hip & knee
Vastus lateralis	Largest
Vastus medialis	Stabilizes patella
Vastus intermedius	Deep

📍 Common Insertion

Into Tibial tuberosity via:

- Quadriceps tendon
- Patellar ligament

⚙️ Actions

- Extension of knee ❗
- Rectus femoris → also flexes hip

🧠 Flowchart: Quadriceps Mechanism

🦵 Knee Extension:

Quadriceps contraction → Pulls patella → Via patellar ligament → Extends tibia → Knee extension

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🔗 Stability:

- Retinacula strengthen knee joint
- Vastus medialis → Prevents lateral patellar dislocation

⭐ Exam Pearl: Most powerful extensor of knee

🔌 Nerve Supply

- Femoral nerve (L2-L4)

🩸 Blood Supply

- Femoral artery

⚠️ Clinical Correlations

🦵 Quadriceps Weakness

- Difficulty in:
  - Standing
  - Climbing stairs

🧠 Vastus Medialis

⭐ Exam Pearl:

- First to atrophy
- Last to recover

💥 Injuries

🧠 Flowchart: Quadriceps Injury

Trauma → Muscle/tendon rupture → Loss of knee extension → Difficulty walking

📌 Important Conditions

- Rectus femoris rupture
- Patellar ligament rupture

🦴 Knee Stability

Quadriceps tone → Maintains patellar alignment → Prevents instability

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⭐ Summary

- Anterior compartment = hip flexors + knee extensors
- Main nerve = Femoral nerve
- Main artery = Femoral artery
- Quadriceps = powerful knee extensor

- IT band = lateral stabilizer
- Saphenous opening = clinically important site

🔺 Femoral Triangle

📦 Main Contents

👉 From lateral → medial:

Femoral nerve → Femoral artery → Femoral vein →

Deep inguinal lymph nodes

⭐ Mnemonic: "NAVeL"

(Nerve – Artery – Vein – Lymphatics)

📌 Important Note

- Femoral nerve lies OUTSIDE femoral sheath ❗
- Artery & vein lie INSIDE femoral sheath

🧱 Femoral Sheath

🧩 Definition

- Downward extension of abdominal fascia into thigh

🧱 Walls

Wall	Formed by
Anterior	Transversalis fascia
Posterior	Fascia iliaca

📦 Contents

- Femoral artery
- Femoral vein
- Lymphatics

⭐ Exam Pearl: Femoral sheath extends ~2.5 cm below inguinal ligament

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🕳️ Femoral Canal

🧩 Features

Feature	Description

Location	Medial compartment of femoral sheath
Length	~1.3 cm
Function	Allows expansion of femoral vein

📦 Contents

- Lymph vessels
- One deep inguinal lymph node

🔝 Upper Opening: Femoral Ring

- Closed by femoral septum

🔍 Relations of Femoral Ring

Direction	Structure
Anterior	Inguinal ligament
Posterior	Pectineal ligament + pubic ramus
Medial	Lacunar ligament
Lateral	Femoral vein ⚠️

⭐ Exam Trick:

Lateral relation = femoral vein → danger in surgery

⚠️ Clinical Correlation: Femoral Hernia

🧠 Mechanism

Weakness in femoral ring → Hernial sac enters femoral canal → Appears in upper thigh

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🧠 Flowchart: Femoral Hernia

Defect in transversalis fascia → Hernia enters femoral ring → Passes through femoral canal → Swelling below inguinal ligament → Femoral hernia

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📍 Location

- Below & lateral to pubic tubercle

⚠️ Key Features

- More common in females 👩
- High risk of strangulation ❗
- Often irreducible

⚖️ Femoral vs Inguinal Hernia

Feature	Inguinal Hernia	Femoral Hernia
Sex	Male	Female
Path	Inguinal canal	Femoral canal
Position	Above & medial to pubic tubercle	Below & lateral ❗
Strangulation	Less common	More common ❗
Treatment	Often conservative	Surgical

⭐ Exam Pearl:

Position relative to pubic tubercle = KEY DIFFERENCE

🔍 Differential Diagnosis of Femoral Hernia

- Inguinal hernia
- Lymphadenitis
- Saphenous varix
- Psoas abscess
- Femoral artery aneurysm

🛤️ Adductor Canal (Subsartorial Canal)

📍 Location

- Middle 1/3 of thigh (medial side)

📏 Extent

Apex of femoral triangle → Opening in adductor magnus (adductor hiatus)

🔺 Shape

- Triangular

🧱 Boundaries

Wall	Structure
Anteromedial	Sartorius + fascia

Posterior	Adductor longus
Lateral	Vastus medialis

📦 Contents

- Femoral artery
- Femoral vein
- Saphenous nerve

🧠 Flowchart: Adductor Canal Pathway

Femoral artery → Enters adductor canal → Travels downward → Passes through adductor hiatus → Becomes popliteal artery

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⭐ Exam Pearl:

Key transition: Femoral artery → Popliteal artery

🧠 Functional Integration

Femoral triangle → Entry of major vessels

Adductor canal → Safe passage of vessels

Popliteal fossa → Redistribution

⭐ Summary

- Femoral triangle contents = NAVeL
- Femoral sheath contains artery + vein (not nerve)
- Femoral canal = site of femoral hernia
- Femoral hernia = below & lateral to pubic tubercle
- Adductor canal = vascular passage to leg

🩸 Femoral Artery

🧩 Overview

- Continuation of external iliac artery
- Begins below inguinal ligament
- Ends at adductor hiatus → becomes popliteal artery

🌿 Branches of Femoral Artery

🧠 Flowchart: Branching Pattern

Femoral artery

Superficial branches

→ Superficial epigastric (towards umbilicus)

→ Superficial circumflex iliac (towards ASIS)

→ Superficial external pudendal (scrotum/labia)

Deep branches

→ Deep external pudendal

→ Profunda femoris ⭐

→ Medial circumflex femoral

→ Lateral circumflex femoral

→ 3 perforating arteries

→ Ends as 4th perforating artery

Terminal branch → Descending genicular artery

⭐ Exam Pearl:

Profunda femoris = main blood supply of thigh

💉 Clinical: Femoral Artery Catheterization

- Easily accessible in femoral triangle

- Used for:
  - Angiography
  - Cardiac catheterization

🩸 Femoral Vein

🧩 Overview

Feature	Description
Origin	Continuation of popliteal vein
Begins	Adductor canal
Ends	Becomes external iliac vein

🧠 Flowchart: Course of Femoral Vein

Popliteal vein → Adductor canal → Femoral vein →

Passes under inguinal ligament → External iliac vein

📥 Tributaries

- Great saphenous vein ⭐
- Profunda femoris vein
- Popliteal vein

⭐ Exam Pearl: Great saphenous vein drains into femoral vein

🧠 Lymphatic Drainage of Lower Limb

📍 Deep Inguinal Lymph Nodes

- Located medial to femoral vein
- One lies in femoral canal

📦 Drainage Areas

- Deep structures of lower limb
- Glans penis / clitoris
- Efferents from superficial nodes

🧠 Flowchart: Lymphatic Drainage

Lower limb lymphatics → Superficial inguinal nodes → Deep inguinal nodes → External iliac nodes

⭐ Exam Pearl:

Deep nodes → final station before pelvis

⚡ Femoral Nerve

🧩 Basic Features

Feature	Description
Roots	L2–L4
Origin	Lumbar plexus
Compartment	Anterior thigh

🛣️ Course

Lumbar plexus (L2–L4) → Between psoas major & iliacus → Passes under inguinal ligament → Enters thigh (lateral to femoral artery) → Divides into branches

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⭐ Exam Pearl: Lies lateral to femoral artery

🌿 Branches of Femoral Nerve

💪 Muscular Branches

- Sartorius
- Quadriceps femoris

- Iliacus
- Pectineus

🔗 Articular Branches

- Hip joint
- Knee joint

🧠 Cutaneous Branches

- Anterior thigh (medial & intermediate cutaneous nerves)
- Saphenous nerve → medial leg & foot

⚠️ Clinical: Femoral Nerve Injury

🧠 Causes

- Pelvic fracture
- Hip dislocation
- Disc prolapse (L2–L4)
- Surgical complications

🧠 Flowchart: Effects of Injury

Femoral nerve damage → Quadriceps paralysis → Loss of knee extension ❗ → Weak hip flexion + Loss of sensation (anterior thigh + medial leg)

💪 Motor Effects

- Quadriceps wasting

- Inability to extend knee
- Difficulty walking

🧠 Sensory Loss

- Anterior thigh
- Medial leg & foot

🔁 Reflex: Knee Jerk (Quadriceps Reflex)

🧠 Flowchart: Reflex Arc

Tap patellar ligament → Stretch quadriceps → Sensory signal (afferent) → Spinal cord (L2–L4) → Motor response (efferent) → Quadriceps contracts → Knee extension

⭐ Exam Pearl:

Tests:

- Femoral nerve
- L2, L3, L4 spinal segments

⚠️ Femoral Nerve Entrapment

Causes

- Disc herniation (L2–L4)
- Compression under inguinal ligament

Effects

- Weak knee extension

- Reduced reflex
- Pain along nerve distribution

🔥 Must-Remember Points

- Femoral artery → main arterial supply
- Profunda femoris → deep supply
- Femoral vein → drains into external iliac
- Femoral nerve → L2-L4
- Knee jerk reflex → tests femoral nerve
- Femoral triangle → clinical access point

-> The End <-