

Surface and Radiological Anatomy

? Surface and Radiological Anatomy — Arteries of the Lower Limb

Femoral Artery

- Represents the **upper two-thirds** of a line joining:
 - **Midinguinal point**: midway between **ASIS** and **pubic symphysis**.
 - **Adductor tubercle**: lower end of the tendon of adductor magnus.
 - **Upper one-third**: Lies in the **femoral triangle**.
 - **Middle one-third**: Lies in the **adductor canal**.
 - **Lower one-third**: Represents the region of **descending genicular** and **saphenous branches**.
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Profunda Femoris Artery

- Draw after marking the femoral artery.
- Joins **two points** on femoral artery:
 - **Point 1**: 3.5 cm below midinguinal point.
 - **Point 2**: 10 cm below midinguinal point.

- Course: Slightly **convex laterally** in its upper part.
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Popliteal Artery

- Mark by joining:
 1. Junction of middle and lower thirds of thigh — **2.5 cm medial to midline** on back of thigh.
 2. Midline of back of **knee**.
 3. Midline of back of **leg** at tibial tuberosity level.
 - Lies deep in popliteal fossa, dividing into **anterior and posterior tibial arteries**.
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Superior Gluteal Artery

- Join:
 - **Posterior superior iliac spine (PSIS)** and **apex of greater trochanter**.
 - Artery enters gluteal region at junction of **upper and middle thirds** of this line.
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Inferior Gluteal Artery

- Mark:
 - **PSIS, greater trochanter, and ischial tuberosity**.
 - Artery emerges **just medial to the sciatic nerve** at midpoint between greater trochanter and ischial tuberosity.
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Anterior Tibial Artery

- Join:
 1. A point **2.5 cm below the medial side of the head of fibula.**
 2. A point **midway between the two malleoli.**
- The artery runs **downwards and slightly medially** along this line.

Posterior Tibial Artery

- Join:
 1. Midline of back of leg at **tibial tuberosity level.**
 2. Midpoint between **medial malleolus and tendocalcaneus.**
- The artery passes **obliquely downwards and medially** in the calf.

Dorsalis Pedis Artery

- Join:
 1. A point midway between the **two malleoli.**
 2. A point at the **proximal end of the first intermetatarsal space.**
- Pulse felt **lateral to the tendon of extensor hallucis longus.**

Medial Plantar Artery

- Join:
 1. Midpoint between **medial malleolus** and **heel prominence**.
 2. **Navicular bone**, midway between heel and root of great toe.
 - Direction: Runs **toward the first interdigital cleft**.
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Lateral Plantar Artery

- Start at **medial malleolus** level; draw a curve towards the base of **5th metatarsal**, then medially across the sole to join the **deep plantar branch** forming the **plantar arch**.
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Plantar Arch

- Formed by the **lateral plantar artery** (main contributor) and the **deep plantar branch of dorsalis pedis artery**.
- Lies **opposite the bases of the metatarsals**, convex forwards, crossing from **lateral to medial side** of the sole.
- It supplies **digital branches** to the toes.

? Surface Marking — Veins

Femoral Vein

- Marking is the same as the **femoral artery**, except:

- **Upper point** ? 1 cm **medial** to the midinguinal point.
 - **Lower point** ? 1 cm **lateral** to the adductor tubercle.
 - The **vein** lies:
 - **Medial** to the artery at the upper end.
 - **Posterior** to it in the middle.
 - **Lateral** to it near the lower end.
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Great Saphenous Vein

- Easily visible on the living subject.
 - Surface marking can be made by joining:
 1. **Medial end** of the dorsal venous arch on dorsum of foot.
 2. **Anterior surface** of medial malleolus.
 3. **Medial border of tibia** at junction of upper two-thirds and lower one-third.
 4. **Adductor tubercle**.
 5. **Below the saphenous opening** in the thigh.
 - The vein ascends **in front of the medial malleolus** and drains into the **femoral vein** at the saphenous opening.
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Small (Short) Saphenous Vein

- Surface marking line passes through:
 1. **Lateral end** of the dorsal venous arch.
 2. **Behind the lateral malleolus.**
 3. **Lateral to tendocalcaneus** above the malleolus.
 4. **Centre of popliteal fossa.**
 - It drains the **lateral border of foot, heel, and back of leg** and opens into the **popliteal vein**.
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? Surface Marking — Nerves

Femoral Nerve

- Join two points:
 1. 1.2 cm **lateral to the midinguinal point.**
 2. 2.5 cm **vertically below** that first point.
 - Lies lateral to femoral artery in femoral triangle.
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Sciatic Nerve

- Marked by joining:

- A point **2.5 cm lateral to the midpoint** between **posterior superior iliac spine (PSIS)** and **ischial tuberosity**.
 - Continues downward to a point midway between the **greater trochanter** and **ischial tuberosity** (site of emergence).
 - Runs down in the **posterior thigh**, deep to gluteus maximus.
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Tibial Nerve

- Continuation of the **sciatic nerve** in the **popliteal fossa**.
 - Marked by a line from:
 - **Centre of popliteal fossa** ? to midpoint between **medial malleolus** and **tendocalcaneus**.
 - Runs deep to soleus and supplies the **posterior compartment of leg** and **sole of foot**.
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Common Peroneal Nerve

- Branch of sciatic nerve.
 - Marked by joining:
 - **Upper point:** Junction of middle and lower thirds of thigh, **lateral side**.
 - **Lower point:** **Neck of fibula**, where it winds around the bone.
 - Divides into **superficial** and **deep peroneal nerves**.
 - Injury ? **foot drop** due to loss of dorsiflexors and evertors.
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? Surface Marking — Deep Peroneal Nerve

- **Point 1:** On the **lateral aspect of the neck of the fibula**.
 - **Point 2:** In front of the ankle, **midway between the two malleoli**, where it divides into medial and lateral branches.
 - The **medial branch** runs to the **first interosseous space**.
 - Relation to anterior tibial artery:
 - **Upper & lower thirds:** Lateral to the artery.
 - **Middle third:** Anterior to the artery.
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? Surface Marking — Superficial Peroneal Nerve

- **Point 1:** On the **lateral aspect of the neck of the fibula**.
 - **Point 2:** On the **anterior border of peroneus longus**, at the junction of **upper two-thirds and lower one-third of the leg**.
 - At the lower point, the nerve **pierces the deep fascia** and divides into **medial and lateral branches** supplying the dorsum of the foot.
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? Surface Marking — Medial Plantar Nerve

- Marked **similar to the medial plantar artery**.
 - Lies **lateral to the artery**.
 - Course: From **midpoint between medial malleolus and heel** ? towards the **navicular bone**, ending in the direction of the **first interdigital cleft**.
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? Surface Marking — Lateral Plantar Nerve

- Marked **similar to the lateral plantar artery**.
 - Lies **medial to the artery**.
 - Course: From **medial malleolus**, curves across the sole to the **base of the fifth metatarsal**, then turns medially to form the **plantar arch**.
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? Miscellaneous Structures

Saphenous Opening

- **Centre:** Lies **4 cm below and 4 cm lateral** to the pubic tubercle.
- **Shape and size:** About **2.5 cm long** and **2 cm broad**.
- **Orientation:** Long axis directed **downwards and laterally**.

- Anatomical importance: It transmits the **great saphenous vein**, **superficial epigastric**, **superficial circumflex iliac**, and **superficial external pudendal vessels**, and is covered by the **cribriform fascia**.

Miscellaneous Surface Structures

Femoral Ring

- **Location:** Lies deep to the **inguinal ligament**.
- **Surface marking:** Represented by a **horizontal line 1.25 cm long** over the inguinal ligament, placed **1.25 cm medial to the midinguinal point**.
- **Significance:**
 - Medial boundary of the **femoral canal**, through which femoral hernia may protrude.
 - Contains lymphatics and a lymph node (Cloquet's node).

Superior Extensor Retinaculum

- **Description:** A thick band of deep fascia at the front of the lower leg.
- **Extent:**
 - **Laterally:** From the *anterior border of the triangular subcutaneous area of fibula*.
 - **Medially:** To the *lower part of the anterior border of the tibia*.

- **Shape:** About **3 cm broad vertically**.
 - **Function:**
 - Holds the **tendons of tibialis anterior, extensor hallucis longus, and extensor digitorum longus** in position as they cross the ankle joint.
 - Prevents bowstringing during dorsiflexion.
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Inferior Extensor Retinaculum

- **Shape:** Y-shaped structure with **three parts**.
 - **Attachments:**
 1. **Stem:** From the *anterior part of the upper surface of the calcaneum* to a point *medial to the tendon of extensor digitorum longus* on the dorsum of foot.
 2. **Upper band:** From the medial end of the stem to the *anterior border of the medial malleolus*.
 3. **Lower band:** From the medial end of the stem to the *medial side of the foot*, continuing into the sole.
 - **Function:**
 - Stabilizes the extensor tendons over the dorsum of foot during movement.
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Flexor Retinaculum

- **Location:** On the **medial side of the ankle**.

- **Extent:**
 - From the **medial malleolus** ? to the **medial side of the heel**, running **downwards and backwards**.
 - **Breadth:** About **2.5 cm**.
 - **Structures passing deep to it (anteroposteriorly)** — *Mnemonic: "Tom, Dick, ANd Harry"*
 - **Tibialis posterior**
 - **Digitum longus (flexor)**
 - **Artery (posterior tibial)**
 - **Nerve (tibial)**
 - **Hallucis longus (flexor)**
 - **Function:** Keeps flexor tendons close to the ankle and prevents bowstringing during plantarflexion.
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? Radiological Anatomy

1. Hip Joint

- **Normal AP radiograph** shows:
 - **Femoral head** fitting into the **acetabulum**.

- **Shenton's line:** Smooth curve along the *inferior border of superior pubic ramus and medial border of femoral neck* (interrupted in dislocation).
 - **Neck-shaft angle:** ~125° in adults.
 - **Trabecular pattern:** Radiating from femoral head — tension and compression trabeculae forming an intersecting pattern.
 - **Clinical relevance:**
 - Used to identify **fracture neck of femur** and **congenital dislocation of hip**.
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2. Knee Joint

- **Radiographic features:**
 - **Femoral condyles, tibial plateau, patella, and joint space** clearly visible.
 - In **lateral view:** Patella anterior to femur, joint cavity forming an open angle.
 - **Suprapatellar pouch** may be outlined in effusion.
 - **Clinical relevance:**
 - **Loss of joint space** ? osteoarthritis.
 - **Displaced patella** ? ligament or tendon injury.
 - **Osteochondritis dissecans** visible as irregular subchondral lucencies.
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3. Foot

- **AP view:** Shows **tarsal bones**, **metatarsals**, and **phalanges** in alignment.
- **Lateral view:** Demonstrates **longitudinal arches** (especially the medial arch).
- **Oblique view:** Best for **joints between tarsal and metatarsal bones**.
- **Clinical relevance:**
 - **Flat foot (pes planus):** Flattened medial arch.
 - **Clubfoot (talipes):** Medial deviation and plantar flexion deformity.
 - **Fractures of metatarsals (e.g., Jones fracture)** clearly seen on oblique view.