Surface and Radiological Anatomy

? Surface and Radiological Anatomy — Arteries of the Lower Limb

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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**.

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.

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**.

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.

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.

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**.

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**.

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.

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.

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**.

> **? 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.

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.

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**.

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.

? 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.

? 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.

? 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**.

? 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**.

? 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.

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.

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"*
    - **T**ibialis posterior
    - **D**igitorum longus (flexor)
    - **A**rtery (posterior tibial)
    - **N**erve (tibial)
    - **H**allucis longus (flexor)
- **Function:** Keeps flexor tendons close to the ankle and prevents bowstringing during plantarflexion.

? Radiological Anatomy

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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.