MEDICAL EDUCATION RESOURCE

Popliteal Fossa: Facts to Remember & Clinicoanatomical Problem

Facts to Remember — Popliteal Fossa

- **Popliteal artery** is used for **auscultation while measuring blood pressure** in the lower limb.
  (The patient lies prone, knee flexed, and stethoscope placed deep in the fossa.)

- **Arrangement of structures (from superficial to deep):**
  Tibial nerve ? Popliteal vein ? Popliteal artery.

- **Order in upper, middle, and lower parts:**
  - Upper part (medial ? lateral): **A V N**
  - Middle part (posterior ? anterior): **N V A**
  - Lower part (medial ? lateral): **N V A**

- **Short (small) saphenous vein** begins at the **lateral end of the dorsal venous arch** and drains into the **popliteal vein** within the fossa.

- **Popliteus muscle** unlocks the **locked knee joint** by **laterally rotating the femur** on the tibia to initiate flexion.

- **Tibial nerve** gives:
  - **Genicular branches** (upper part)

    - **Cutaneous branch** (middle part)
    - **Muscular branches** (lower part)

- **Common peroneal (fibular) nerve** winds around the **neck of the fibula** — the **most frequently injured nerve** in the lower limb.
  Injury results in **foot drop** (loss of dorsiflexion and eversion).
- **Popliteal artery** gives five genicular branches (2 superior, 2 inferior, 1 middle) that form the **genicular anastomosis** around the knee.
- **Popliteal lymph nodes** (6–7 in number) lie along the **small saphenous vein** and **popliteal vessels**, draining the **lateral foot and posterior leg** into **deep inguinal nodes** .
- The **popliteal artery** is prone to **aneurysm formation** because of its fixed position between strong fibrous structures (femur and fascia).

Clinicoanatomical Problem

Case:
A 45-year-old male complains of **weakness and coldness** in both lower limbs. His **blood pressure** measured at the ankles is **much lower** than that in the upper limbs.

Questions:

1. **How is blood pressure in the lower limb taken?**
    - The patient lies **prone**.
    - A **wider cuff** is wrapped around the **thigh**.

- The **popliteal artery** is **auscultated** in the fossa while the cuff is slowly deflated.

2. **What could be the reason for low blood pressure in the lower limbs?**
   - **Coarctation of the aorta** — a **congenital narrowing** of the aortic arch just distal to the origin of the left subclavian artery.
   - This reduces blood flow to the descending aorta and hence to the lower limbs, resulting in **diminished popliteal and posterior tibial pulses**.
3. **What clinical findings support this diagnosis?**
   - **Higher pressure in upper limbs**, **weak femoral and popliteal pulses**, and **radio-femoral delay**.
   - **Collateral circulation** develops through the **intercostal, internal thoracic, and scapular arteries** to bypass the narrowed segment.
4. **Treatment:**
   - **Surgical correction or stent placement** to restore aortic continuity and improve lower limb perfusion.

Clinicoanatomical Problems — Popliteal Fossa

1. Coarctation of Aorta and Popliteal Blood Pressure

- **Case:** A middle-aged man presents with weakness in both lower limbs and diminished pulses in the popliteal region.
- **Explanation:** The **blood pressure** in lower limbs is taken by auscultating the **popliteal artery** with the patient prone.

- **Finding:** A **lower popliteal pressure** compared to brachial indicates **coarctation of the aorta** — narrowing of the aorta below the origin of subclavian artery, leading to reduced lower limb blood flow.

- **Management:** Surgical repair or stenting of the narrowed segment.

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2. Popliteal Artery Aneurysm

- **Case:** A patient has a **pulsatile swelling behind the knee** with pain radiating down the leg.

- **Explanation:** The **popliteal artery**, being fixed between the femur and popliteal fascia, is prone to **aneurysm formation**.

- **Symptoms:** Localized swelling, pressure over **tibial nerve** (causing calf pain), or **common peroneal nerve** (causing paresthesia).

- **Treatment:** Ligation or graft repair; collateral circulation through genicular anastomosis maintains blood supply.

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3. Popliteal Artery Occlusion

- **Case:** Elderly patient with **intermittent claudication** (pain on walking).

- **Explanation: Atherosclerosis** or thrombosis of the popliteal artery causes ischemic pain; collateral circulation via the **profunda femoris artery** often prevents gangrene.

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4. Deep Vein Thrombosis (DVT)

- **Case:** A bedridden patient develops **pain, warmth, and swelling of the calf**.

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- **Explanation: Thrombosis of the popliteal vein** due to stasis of blood or post-surgical immobility.
- **Complication:** May lead to **pulmonary embolism** if the thrombus dislodges.
- **Diagnosis:** Doppler ultrasound; treated with anticoagulants.

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5. Common Peroneal Nerve Injury (Foot Drop)

- **Case:** A plaster cast compresses the **neck of fibula**; patient cannot dorsiflex the foot.
- **Explanation:** The **common peroneal nerve** winds around the **fibular neck**; injury leads to **foot drop** (loss of dorsiflexion and eversion) but normal plantar flexion and inversion.
- **Sign:** Toes drag while walking (“steppage gait”).

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6. Popliteal Lymphadenitis

- **Case:** A child with an **infected wound on the lateral sole** presents with **tender swelling behind the knee**.
- **Explanation:** Infection drains via **small saphenous vein** to **popliteal lymph nodes**, causing inflammation.
- **Note:** Popliteal nodes enlarge in infections on the **posterolateral foot and leg**.

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7. Compression of Tibial Nerve (Popliteal Entrapment Syndrome)

- **Case:** An athlete complains of calf pain and numbness in sole after vigorous exercise.

- **Explanation: Tibial nerve or popliteal artery** compressed by abnormal **muscle slip of gastrocnemius** or fibrous bands ? causes intermittent ischemia or paresthesia.

- **Management:** Surgical decompression of entrapped structures.

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8. Injury to Popliteus Muscle

- **Case:** A runner experiences difficulty unlocking the knee during flexion.

- **Explanation:** The **popliteus muscle** initiates flexion by **laterally rotating the femur** on tibia; strain or injury can cause painful locking of the joint.

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9. Baker's Cyst (Popliteal Cyst)

- **Case:** A patient with chronic arthritis presents with **soft swelling in the popliteal fossa** that enlarges during knee extension.

- **Explanation:** A **synovial outpouching** from the posterior capsule of the knee, between **semimembranosus and medial gastrocnemius**.

- **Clinical Test:** Swelling reduces on flexion and reappears on extension.

- **Treatment:** Aspiration or excision of cyst after managing underlying joint pathology.

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10. Popliteal Pulse Palpation

- **Case:** Student unable to locate popliteal pulse in a patient.

- **Explanation:** Pulse is palpated with the **knee flexed** to relax the fascia; pressing deeply in the **midline** between hamstring tendons.

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- **Clinical Significance:** Absence of popliteal pulse indicates **blockage proximal to knee** or **femoral artery occlusion**.