Feeling the peripheral pulses of the lower limb

- Pulses are most easily felt where an artery is superficial and crosses a bone.
- In the neck, shoulder and upper limbs the carotid, subclavian, brachial and both wrist arteries are close to the skin and easy to palpate.

1. **Where you can find the femoral artery pulsation?**

The femoral pulse lies in the groin halfway between the symphysis pubis (in the mid-line) and the anterior superior iliac spine (the mid-inguinal point). The artery is so superficial it can usually be felt, even when it is pulseless.

2. **What are the needs for detecting the femoral pulse?**
    a) As part of examination of the vascular system of the lower limb either part of routine examination but more specifically in patient with ishaemic lower limb.
    b) Compare the pulses in the arms and legs (In patient with coarctation of the aorta the upper limb pulses are much stronger than the leg pulses). Also in coarctation of the aorta there is radio-femoral delay.
    c) As a landmark for femoral venous aspiration (the vein is exactly medial to the artery)
3. **Where you can find the dorsalis pedis artery (DPA) pulsation?**

The dorsalis pedis artery runs as a continuation of the anterior tibial artery from a point on the anterior surface of the ankle joint, mid-way between the malleoli **(anterior tibial artery)**, towards the cleft between the first and second metatarsal bones **(DPA).**

Simultaneous palpation of the dorsalis pedis pulses

4. Where you can find the posterior tibial artery (PTA) pulsation?

The **posterior tibial artery** lies one-third of the way along a line between the tip of the medial malleolus and the point of the heel, but is easier to feel it one finger's breadth below and behind the medial malleolus.

Simultaneous palpation of the posterior tibial pulses

5. How you feel for the DPA?

Stand at the end of the bed or couch and feel the dorsalis pedis artery of each foot, simultaneously, by placing the pulps of all the fingers of each hand along the line of the artery, with your thumbs beneath the arch of the foot.

6. How you feel for the PTA?

Position the pulps of your fingers in the groove between the Achilles tendon and the medial malleolus. The pulps of the fingers can then be pulled up against the back of the tibia, trapping the posterior tibial pulse against the bone (medial malleolus).

Top Tips

- Peripheral pulses can only be felt against bones
- Use more than one finger to palpate the pulse
- Go to the bottom end of the examination couch to palpate the foot pulses
- Do not be tempted to palpate the dorsalis pedis (DPA) and posterior tibial (PTA) pulses simultaneously. Instead, examine each pulse in turn using 2 or 3 fingers, while simultaneously comparing it with the contralateral side
- To examine the DPA ask the patient to bring the big toe towards the head (thus demonstrating the tendon of extensor hallucis longus). The artery lies immediately lateral to this tendon. Examine both DPAs simultaneously. It is easier to do this crouching down.
- Position your fingers in the direction of the artery to optimize your chances of feeling it
- Palpate both sides simultaneously to detect subtle differences
- In 10 per cent of subjects, the anterior tibial artery is absent and replaced by a branch of the peroneal artery.
- The PTA is absent in about 2% of peoples

7. How you can feel the popliteal artery pulsation?

The popliteal pulse is difficult to feel for two reasons:-

A. Because it does not cross a prominent bone
B. It is not superficial.

There are three ways to feel it and all three may have to be tried before deciding that the pulse is present or absent.

1. The **most convenient** technique for feeling the popliteal pulse is as follow:
    - Extend the patient's knee fully
    - Place both hands around the top of the calf with the thumbs placed on the tibial tuberosity and the tips of the fingers of each hand touching behind the knee, over the lower part of the popliteal fossa.
    - The pulps of all the fingers are then pulled forwards against the posterior part of the tibial condyle, trapping the popliteal artery between them and the posterior surface of the tibia.
    - The pulsating artery can be felt in the mid-line (provided the fingers are held still).
    - If in doubt, count any pulse you feel against the rate detected by a second examiner feeling the radial or superficial temporal pulse to check for synchronization.
2. Flexing the knee to 135°, use the pulps of your four fingers of both hands held alongside each other to feel the two heads of the gastrocnemius as they join (marking the lower borders of the popliteal fossa). The pulse lies between these two heads

Top Tip

- With this way of detecting the popliteal artery pulsation, the lower half of the artery is easier to feel, but may make palpation of the upper half of the artery more difficult because this maneuver moves the vessel further from the surface making it sinks into the large fat pad between the femoral condyles.

3. It is sometimes worth turning the patient into the **prone position** and feeling along the course of the artery with the fingertips of both hands.

Palpating the popliteal pulse with the knee extended.

(The patient has rolled over to one side to reveal the back of the knee and the position of the fingers when feeling the popliteal pulse)