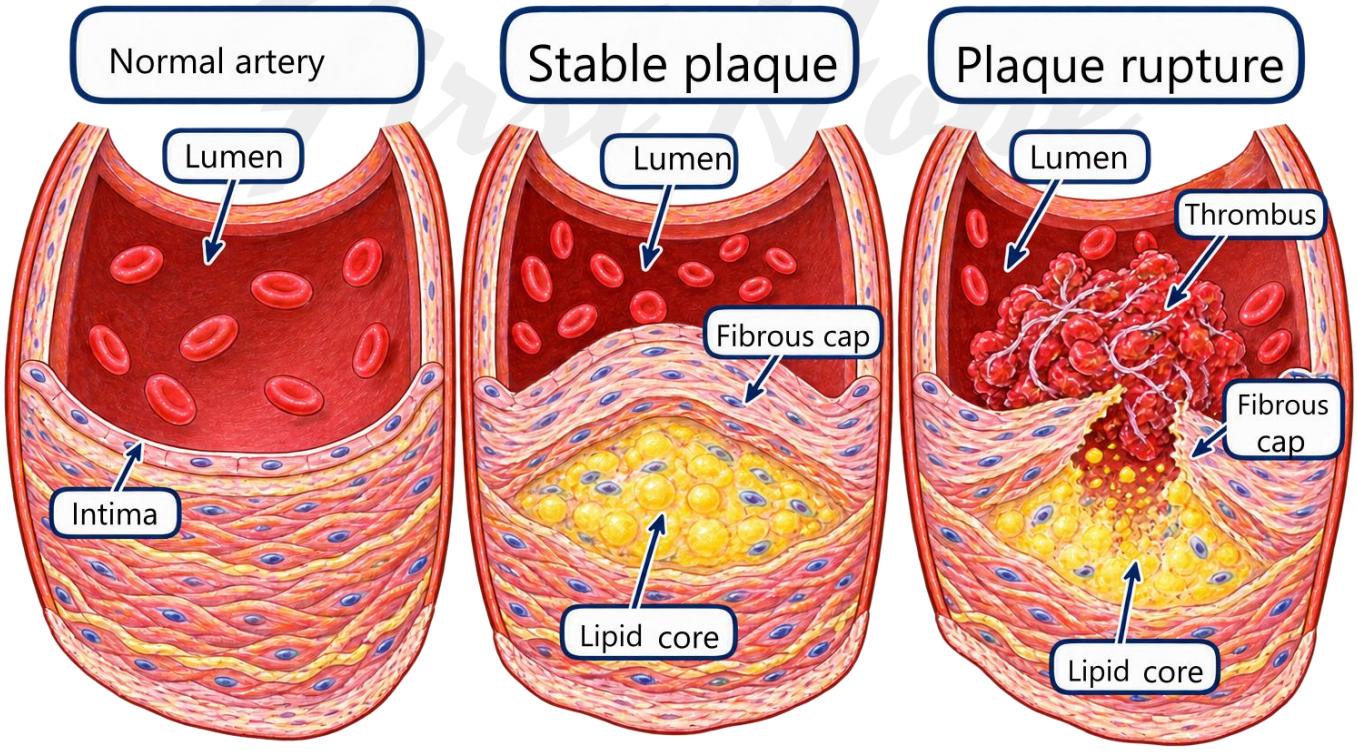
General Surgery - Topic 27 - Vascular disorders

Occlusive Arterial Disease

- Arterial occlusion reduces the delivery of oxygen and nutrients to tissues beyond the blockage.
- The effect depends on the speed of occlusion, the level of disease and the available collateral circulation.

Causes and Mechanisms

- Atherosclerosis narrows large and medium arteries through lipid deposition, inflammation and fibrous plaque formation.
- Smoking, diabetes, hypertension, dyslipidaemia, chronic kidney disease and increasing age increase the risk.
- A thrombus may develop on a diseased artery, whereas an embolus travels from another site and suddenly blocks an artery.
    - Atrial fibrillation, recent myocardial infarction and proximal aneurysms can provide an embolic source.
- Trauma, dissection, vasculitis and graft thrombosis are other causes of acute obstruction.



Plaque formation and rupture can produce progressive narrowing or acute arterial thrombosis

Clinical Patterns of Arterial Disease

1. Chronic Symptomatic Disease

- Intermittent claudication is reproducible muscle discomfort during walking that improves with rest.

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- Calf claudication commonly reflects femoropopliteal disease, while buttock or thigh symptoms can suggest more proximal disease.
- Aortoiliac occlusion may cause buttock claudication, weak femoral pulses and erectile dysfunction.
- Neurological and musculoskeletal disorders can imitate claudication, so the symptom pattern must be compared with vascular findings.

2. Chronic Limb-Threatening Ischaemia

- Chronic limb-threatening ischaemia means arterial disease with persistent ischaemic rest pain, non-healing ulceration or gangrene.
- Rest pain often affects the forefoot, becomes worse when the limb is elevated and improves when the foot is lowered.
- Ischaemic ulcers often occur at the toes, pressure points or margins of the foot.
- Diabetes can combine arterial insufficiency, neuropathy and infection, so absence of pain does not exclude severe disease.
- Urgent specialist assessment aims to preserve a functional limb and control cardiovascular risk.

3. Acute Limb Ischaemia

- A sudden reduction in limb perfusion can produce pain, pallor, pulselessness, coldness, paraesthesia and paralysis.
- Sensory loss and muscle weakness indicate a threatened limb and make immediate vascular assessment essential.
- Do not wait for every classical sign before treating the situation as an emergency.
- An initially normal pulse in another artery does not exclude an embolus in a more distal vessel.

Arterial Examination and Investigations

History and Inspection

- Ask about onset, walking distance, rest pain, ulcers, previous intervention and cardiovascular symptoms.
- Record tobacco exposure, diabetes control, medicines, renal disease and previous thromboembolic events.
- Compare both limbs for colour, temperature, wasting, skin changes, wounds and tissue loss.
- Examine footwear and pressure areas, and assess protective sensation in a person with diabetes.

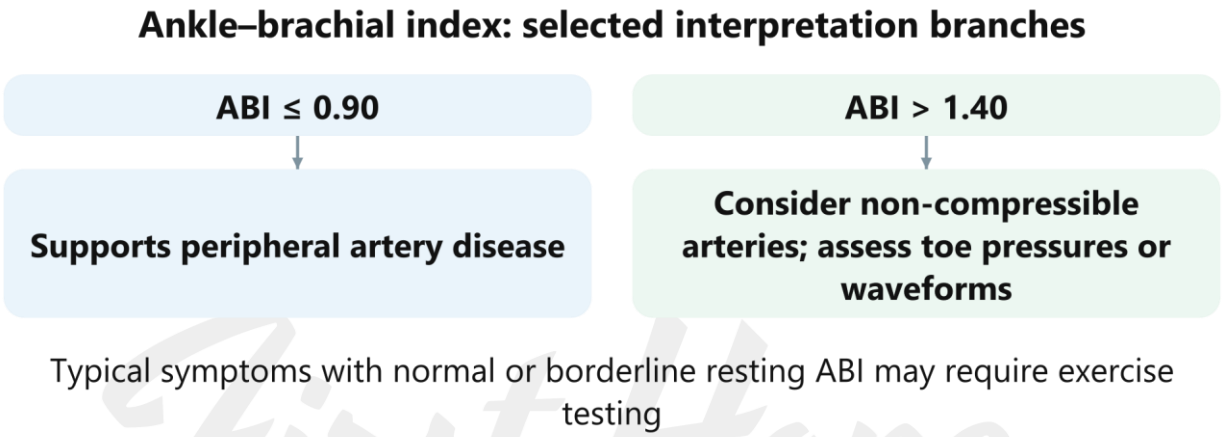
Palpation and Bedside Tests

- Palpate femoral, popliteal, posterior tibial and dorsalis pedis pulses on each side.

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- Record the site and strength of each pulse rather than writing only that the circulation is normal.
- Assess capillary refill, temperature and neurological function, but interpret each sign with the whole examination.
- Listen for relevant bruits and examine the abdomen and heart when proximal disease or an embolic source is suspected.
- Use a handheld Doppler when a pulse is not palpable, and document the arterial signal and venous signal in an acutely threatened limb.
- Avoid prolonged elevation or repeated painful testing in a critically ischaemic foot.

Ankle–Brachial Index



Calculation and Common Thresholds

- For each leg, divide the higher ankle systolic pressure by the higher brachial systolic pressure.
- An index of 0.90 or less supports peripheral artery disease.
- An index above 1.40 suggests non-compressible arteries and needs another perfusion test.

Calcification and Additional Perfusion Tests

- Medial arterial calcification in diabetes or kidney disease can produce a falsely reassuring ankle pressure.
- Toe pressures, toe–brachial index and Doppler waveforms help when ankle arteries are poorly compressible.
- Exercise testing can help when typical exertional symptoms occur despite a normal or borderline resting index.

Imaging and Laboratory Assessment

- Duplex ultrasound identifies the location of stenosis, occlusion and altered blood flow.
- CT or MR angiography helps plan revascularisation, with contrast and renal risks considered individually.

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- Catheter angiography is usually selected when detailed assessment or an endovascular treatment is planned.
- Check the blood count, renal function, glucose and lipid profile, and obtain an ECG when appropriate.
- In an immediately threatened limb, imaging must not delay the treatment needed to restore perfusion.

Arterial Occlusive Disease: Management

Chronic Arterial Disease

Long-Term Protection

Risk Reduction and Structured Exercise

- Complete tobacco cessation, regular foot care and management of blood pressure and diabetes are central measures.
- High-intensity statin treatment and an appropriate antiplatelet medicine reduce cardiovascular risk in symptomatic atherosclerotic disease.
- Supervised or structured walking exercise improves function in stable claudication.

Selected Medicines and Antithrombotic Limits

- Cilostazol may improve claudication in selected patients but is contraindicated in heart failure.
- Low-dose rivaroxaban with low-dose aspirin is an option for selected patients after balancing limb benefit against bleeding risk.
- Full-dose anticoagulation is not routine treatment for stable peripheral artery disease without another indication.

Revascularisation

- Persistent lifestyle-limiting claudication despite appropriate treatment may justify endovascular or surgical revascularisation.
- Chronic limb-threatening ischaemia usually requires prompt assessment of whether blood flow can be restored.
- Angioplasty, stenting, endarterectomy or bypass is chosen according to anatomy, conduit, operative risk and expected function.
- Treat infection, relieve pressure and provide wound care alongside restoration of arterial flow.
- An infected ischaemic foot needs coordinated source control and vascular planning rather than either treatment in isolation.

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Acute Limb Ischaemia

Rutherford Categories of Acute Limb Ischaemia

Category	Sensory and motor findings	Clinical meaning
I: Viable	Sensation and movement are preserved.	The limb is not immediately threatened, but urgent vascular treatment is still needed.
IIa: Marginally threatened	There is no sensory loss or only slight loss in the toes, with no muscle weakness.	The limb can be saved if treated promptly.
IIb: Immediately threatened	Sensory loss extends beyond the toes, with mild or moderate muscle weakness.	Immediate revascularisation is required to save the limb.
III: Irreversible	There is profound sensory loss and paralysis; muscle rigidity may occur.	Major tissue loss is unavoidable, and revascularising dead tissue can cause severe systemic harm.

- Arterial and venous Doppler findings support the clinical category; repeat neurological assessment because the category can worsen.

Emergency Priorities

Immediate Care and Repeated Limb Assessment

- Call the vascular team urgently, provide analgesia and establish intravenous access.
- Give systemic unfractionated heparin promptly for acute limb ischaemia unless bleeding or another contraindication prevents it.
- Document sensory and motor findings repeatedly because deterioration changes the urgency of revascularisation.

Revascularisation, Amputation and Reperfusion Monitoring

- A viable limb needs urgent treatment, while a threatened but salvageable limb needs emergency restoration of blood flow.
- Embolectomy, thrombectomy, catheter-directed thrombolysis, bypass or a combined approach may be used in selected patients.
- A limb with irreversible ischaemia may require amputation because reperfusion can release dangerous metabolites without restoring useful tissue.
- After revascularisation, monitor for compartment syndrome, hyperkalaemia, acidosis, renal injury and recurrent occlusion.

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