

**Protocol for Lower Limb Arterial Duplex Ultrasound Examination**  
(Updated April 2016)

**Purpose**

Duplex ultrasound examination is used to assess the arteries of the lower limb (aorta to ankle level) to determine the location and severity of vascular disease (occlusive and aneurysmal).

**Common Indications**

Common indications for the performance of this examination include:

- Intermittent claudication
- Ischemic rest pain
- Gangrene
- Ulceration
- Post surgical intervention follow-up e.g. angioplasty
- ?aneurysm
- ?false aneurysm

**Contraindications and Limitations**

Contraindications for lower limb arterial duplex ultrasound assessment are unlikely; however, some limitations exist and may include the following:

- Obesity
- Casts, dressings, open wounds etc.
- Bowel gas when examining the aorto-iliac segment
- Patients who are unable to cooperate due to reduced cognitive functions e.g. Alzheimer's or dementia and through involuntary movements

**Equipment:**

Duplex Doppler ultrasound machine with imaging frequencies of 3.5MHz and greater; with both linear and curvilinear transducers available. Doppler frequencies of at least 3.0MHz should be available, with colour Doppler capability.

Evaluation of the following arteries should be included on request or evaluated depending on the waveforms at the groin:

- Aorta
- Common iliac artery (CIA)
- External iliac artery (EIA)

Evaluation of the following arteries should always be included:

- Common femoral artery (CFA)
- Proximal profunda femoris artery (PFA)
- Superficial femoral artery (SFA)
- Popliteal artery
- Tibio-peroneal trunk (TPT)
- Posterior tibial artery (PTA)
- Peroneal artery
- Anterior tibial artery (ATA)

### **Assessment of stenosis**

The degree of stenosis can be estimated using the PSV ratio, which is obtained by calculating the ratio of the highest PSV along the stenosis to the PSV preferably in a proximal clear segment of the artery.

Currently, these PSV ratio relationships are used:

PSV ratio	% Diameter stenosis
2	40
2.5	50
3	60
>3.5	>70

(from Ranke et al.)

### **Reporting:**

The report is a recording and interpretation of observations made during the lower limb arterial duplex ultrasound examination; it should be written by the CVS undertaking the examination and viewed as an integral part of the whole examination (5).

The reporting should include:

- Which arteries have been assessed commenting on an estimate of degree of stenosis (if >40%)
- The anatomical position of stenoses and anatomical position and length of any occlusions e.g. SFA is occluded for x cm in length starting from mid to distal thigh level.
- The size of any aneurysms
- Any limitations e.g. difficult examination due to body habitus
- An appropriate number of annotated images that represent the entire ultrasound examination.