GUIDELINE FOR THE DIAGNOSIS AND MANAGEMENT OF PATIENTS WITH PERIPHERAL ARTERIAL DISEASE (PAD)

Title: Guidelines for the diagnosis and management of patients with peripheral arterial disease (PAD) – resource notes

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ACKNOWLEDGMENT

Acknowledgement goes to Dr Jane Skinner, Consultant Community Cardiologist, Graeme Young, Advanced Podiatrist and Sue Long, Network Education and Training Lead for their contribution to these guidelines.
This guideline was originally developed in 2005 from the Newcastle, Northumberland and North Tyneside PAD guideline. The guideline was then adopted by the North of England Cardiovascular Network Vascular Advisory Group and subsequently updated in 2011. This document has now been updated in line with the NICE PAD clinical guideline published in August 2012¹.

In addition, in January 2014 NICE published PAD Quality Standard 52² which includes five quality statements covering the diagnosis and management of lower limb peripheral arterial disease, a list of these quality standards are included in Appendix 1.

**Background:**

Patients with PAD are at increased risk of coronary and cerebrovascular events, and more than half of patients with PAD have significant co-existing coronary disease. The commonest presentation of PAD is pain on walking termed intermittent claudication (IC). The management of IC can be divided into two strategies which are not mutually exclusive: reducing the patient’s cardiovascular risk and strategies designed to improve walking distances.

All patients with suspected PAD should have an appropriate assessment and accurate diagnosis. Those with confirmed disease require appropriate management, including measures aimed at reducing cardiovascular risk, improving symptoms and making progression of disease less likely. Those with critical ischaemia (rest pain, necrosis or gangrene) are at high risk of progressing to amputation and need urgent/emergency referral for a vascular surgical opinion. Patients with PAD are at increased risk of having other forms of occlusive vascular disease (coronary heart disease, cerebro-vascular disease) and if they have symptoms of these require appropriate assessment and management.

This network guideline is intended for all clinicians across the Northern Clinical Network involved in the diagnosis and management of patients with PAD. It does not include detailed recommendations for the management of patients seen in vascular surgical clinics, but does make recommendations to ensure care is effectively integrated between primary and secondary care.

This guideline makes recommendations for the diagnosis and management of PAD. The interventions should be offered to all people who are likely to benefit, irrespective of race, disability, gender, age, sexual orientation or religion. Information should be provided to patients in an accessible format and consideration should be given to mobility and communication issues, and being aware of sensitive and cultural issues.

HOW TO USE THE GUIDELINE

The guideline has two parts; a summary (Appendix 2) which can be folded to be double sided A5, easily laminated and kept readily available, and this set of supporting resource notes. The notes contain each of the summary statements with some background detail and, in some cases, expands the summary statement providing more detailed guidance. Clinicians should be familiar with these and use them to refer to for further clarification of management in individual patients as needed.

Where appropriate referral is made to other local guidelines and these are not duplicated here. Prescribers should review patients for any contra-indications before initiating drugs. The drugs are recommended assuming there are no contra-indications to treatment, and no contra-indications develop.

PATIENTS WITH SUSPECTED PAD

Assess patients for the presence of PAD if they:

- Have symptoms suggestive of PAD
- Or have diabetes, non-healing wounds on the leg
- Or are being considered for interventions to the leg or foot
- Or need to use compression hosiery

**Ask about Symptoms:**

- Which leg?
- Pain only on walking?
- Pain resolves with rest?
- Pain worse walking up hill quickly?
- Any associated numbness / pain?
- Location of pain?
- Symptoms / history other vascular disease.

These should be asked routinely and are based on the Edinburgh Claudication Questionnaire:

- Which leg (right, left or both)?
- Does the pain only occur on walking? If no, it is less likely the patient has intermittent claudication (IC)
- Does the pain go away on stopping? If yes, it is more likely the patient has IC
- Is the pain worse going uphill or walking fast? If yes, it is more likely the patient has IC.
- Does the patient have any associated numbness or weakness? If so, it might suggest spinal claudication. If so, enquire about back symptoms.
- Where does the patient feel the pain? Pain from IC will be in a muscle group, most often
the calf, sometimes the thigh or buttock.

**Examination:**

- Necrosis / critical ischaemia – refer
- Peripheral pulses?
- Signs other cardiovascular disease?
- Check ABI (see ABI guide)
- Leg ulcer? – refer to local guidelines

- Initial assessment will identify those with who need urgent/ emergency referral (urgent letter/fax, phone the on-call vascular team for advice, emergency admission, depending on severity). Those with acute ischaemia require emergency admission without delay, many patients with necrosis also require urgent admission (if in doubt discuss with the on call vascular team). Those with rest pain require urgent referral.
- Peripheral pulses should be assessed and documented in all patients (see Appendix 3). However, the presence of pulses does not exclude the diagnosis of PAD.
- Patients may have signs of other vascular disease, and occasionally of vascular risk factors (eg xanthelasmata, xanthomata). The presence of other vascular disease or the presence of multiple vascular risk factors makes it more likely the patient will have PAD.
- PAD is an important diagnosis to make, is associated with an adverse prognosis, and patients require lifelong treatment and regular review. All patients with suspected PAD should have the diagnosis confirmed with measurement of the ankle brachial index (ABI), unless co-morbidity makes this inappropriate or the patient declines. It is anticipated that all GP practices will have access to an appropriately trained nurse competent in ABI assessment and the ABI should be taken by an appropriately trained individual and where there is doubt it should be re-checked\(^3\).
- Patients who have been referred for assessment by the vascular surgeons will have ABI measurements as part of the hospital assessment.
- If patients have mainly sensory symptoms, particularly if bilateral, spinal claudication is more likely (however, many patients with spinal claudication have co-existent vascular disease). Where doubt exists referral to the vascular surgeons for investigation as indicated.

**ASSESSMENT OF ALL PATIENTS WITH CONFIRMED PAD**

- Ask about severity of symptoms; Distance able to walk, effect on quality of life, any threat to employment

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\(^3\) North of England Clinical Network. A Guide to the measurement of the ankle/brachial pressure index (ABI).
Patients with confirmed PAD should be asked about their symptoms. It is important to establish the impact of patients symptoms on their quality of life as well as the distance a patient can walk before developing IC.

- Check for symptoms/signs other cardiovascular disease

About 75% of patients will have other forms of vascular disease. This should be identified and appropriately managed.

- Identify lifestyle risk factors (smoking, exercise, diet, alcohol, BMI), blood pressure, known diabetes

Lifestyle risk factors should be identified, blood pressure checked and those with known diabetes identified and managed in line with local guidelines.

- FBC, U&E, glucose, lipids, LFT, TFT at baseline. Annual U&E, lipids, glucose. FBC if worsening symptoms or anaemia suspected

- FBC; exclude anaemia, polycythaemia, thrombocythaemia
- U&E; exclude chronic kidney disease (CKD). Patients are at risk of reno-vascular disease (if CKD, refer to local guidelines)
- Glucose; can be a random sample, but those with a raised level will require a fasting sample taken to exclude diabetes or impaired fasting glycaemia
- Lipids; in with local guidelines
- LFTs; in line with local guidelines
- TFTs; in line with local guidelines

**MANAGEMENT OF PATIENTS WITH CONFIRMED PAD**

- Ensure on disease register; Read codes G73, Xa01v

Consistent Read coding in each practice will facilitate audit. Read codes for PAD are G73, Xa01v (systemone). Read code for ABI is Xalup.

- Arrange annual review

All practices should have an accurate and regularly maintained disease register which is used to ensure patients are offered an annual review.
All patients should be offered oral and written information about their condition. This should include:

- The causes of their symptoms and the severity of their disease
- The risk of limb loss and cardiovascular events
- The key modifiable risk factors including:
  - Smoking
  - Lipid modification
  - Control of diabetes
  - Weight and diet
  - Exercise

As well as advice about risk factors they should be encouraged to set appropriate goals to address them. Those making changes to their lifestyle may need additional review for support and monitoring. Referral to other services may be appropriate e.g. stop smoking, weight management, exercise referral. Some patients may find that activities such as swimming, cycling allow them to achieve and maintain a higher level of fitness than walking, and programmes of supervised exercise have been shown to increase the distance that patients are able to walk before developing IC. Such a programme will typically involve 2 hours of supervised exercise a week for a 3-month period.

- Lipids – refer to local guidelines

All patients should have lipids assessed and monitored in line with local guidelines. Patients with PAD have established atheromatous disease and should be managed as having occlusive vascular disease.

- Hypertension – refer to local hypertension guidelines

All patients should have blood pressure measured and hypertension managed in line with the local hypertension guidelines. Beta blockers are not specifically contra-indicated in PAD. Particular attention should be made to monitoring renal function in those treated with an ACE inhibitor in view of the increased risk of reno-vascular disease.
In general patients with critical ischaemia should have further assessment of the PAD before high blood pressure is lowered. If high blood pressure is felt to need immediate treatment in such patients, this should be discussed with the vascular surgeons first.

- Optimal diabetes control – refer to local guidelines

Patients with established diabetes or those in whom the diagnosis is made during the baseline assessment should be managed in line with local guidelines. Foot care is particularly important.

- Anti-platelet agents – clopidogrel first line

All patients should take anti-platelet agents. In line with the NICE TAG 210\(^4\), clopidogrel is first line and aspirin second line\(^5\).

- Therapeutic interventions;
  Regular physical activity – offer supervised exercise
  Specific drug therapy- only after full conservative treatment for 6 mths+, other therapeutic interventions not possible/declined
  Naftidrofuryl oxalate – only after at least 6 months of intensive conservative management

All patients with IC should have a therapeutic management plan which includes intensive lifestyle measures. A programme of regular physical activity should be discussed with the patient and goals set, with the aim of gradually increasing their claudication distance. Advice should be given that patients should aim for activity levels which lead to claudication pain, walking through the pain as far as possible (unlike patients with angina who are advised to stop / slow down if they develop angina). Supervised exercise programmes have been shown to increase the distance patients can walk before developing IC and have been shown to be superior to advice to exercise alone. Referral to an exercise programme should be offered to appropriate patients. Weight loss in those who are obese or overweight is also likely to improve symptoms. Stopping smoking will not improve symptoms of claudication, but will substantially reduce cardio-vascular risk, the chances of disease progression, and the chances of success from any revascularisation procedure.

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\(^4\) Available at http://www.nice.org.uk/nicemedia/live/13285/52030/52030.pdf

\(^5\) Surgery and invasive procedures in patients treated with anti-platelet agents. In general clopidogrel will be stopped for 10 days before and for the duration of an elective procedure, and aspirin is continued or substituted. In patients treated with clopidogrel alone and who are more than 3 months following an acute event (eg acute ischaemic stroke or TIA), clopidogrel can be temporarily withheld with minimal risk. However, in all patients treated with dual anti-platelet agents (aspirin in combination with either clopidogrel or prasugrel) or if there is concern about the risks of withholding clopidogrel, any proposed modification to the anti-platelet regime should be discussed in advance with the interventional cardiologist, vascular surgeon or other clinician who initiated the treatment.
Specific drug therapy should only be considered in those with persistent significant limitation in activity which is leading to a reduced quality of life and or threatened employment. Patients should have had at least 6 months of intensive conservative management and failed to improve despite a supervised exercise programme and been considered for other therapeutic interventions (unless declined).

Following publication of the NICE TAG 223\(^6\), only naftidrofuryl oxalate is recommended. Cilostazol is no longer recommended In line with the NICE TAG 223, those already treated with cilostazol should have the option to continue treatment until they and their clinicians consider it appropriate to stop.

All patients treated with naftidrofuryl oxalate should be assessed 3 months after initiation and treatment only continued if there has been a clear improvement in symptoms.

Patient / carer information and support, including appropriate foot care

Patients and their carers as appropriate should be provided with appropriate information about the nature of the disease, possible interventions and risk factor management. This should include the importance of appropriate foot care. Written information including a factfile on PAD has been developed by the British Heart Foundation (http://www.bhf.org.uk) and the Circulation Foundation (http://www.circulationfoundation.org.uk/).

- Identification of patients for specialist referral
  Critical ischaemia (rest pain, necrosis, gangrene) – urgent/emergency,
  Claudication significantly impairing Quality of Life, threatened employment, diagnostic doubt
  Leg ulcer

- Patients with definite or possible critical ischaemia need urgent/emergency specialist referral (urgent letter/fax, phone the on-call vascular team for advice, emergency admission, depending on severity). If there are signs of cellulitis, swabs should be taken and the patient treated with antibiotics at the same time as referral is considered. Staph. Aureus is a likely pathogen and flucloxacillin (at least 500mg qds) should be considered as first line (refer to the local primary care antibiotic guidelines). In patients with infected necrotic tissue or gangrene anaerobes are likely but such patients will usually require admission and should be discussed with the on call vascular team. Patients who are pyrexial and or have other signs of systemic upset should be admitted.

- Patients with symptoms significantly impairing their Quality of Life, should be referred for vascular surgical assessment. Generally such patients should have had 3-6 months of intensive conservative management, including exercise. However, those with more severe symptoms or whose employment is threatened should be referred earlier. Patients with absent femoral pulses and more proximal disease are more likely to be suitable for

\(^6\) Available at http://guidance.nice.org.uk/TA223/Guidance/pdf/English
revascularisation than those with more distal disease.

- Patients without a secure diagnosis should be referred early.
- Patients with a leg ulcer should be assessed and managed in line with local leg ulcer guidelines. Approximately 10% of ankle ulcers are due to a combination of venous and arterial disease.

For all patients who are referred, the following minimum information is helpful:

- Brief summary of current symptoms. If critical ischaemia is present this should be emphasised.
- Baseline assessment including, presence or absence of pulses, results of any baseline biochemical and haematological investigations and ABI measurement.
- Previous / current management plan
- Current medication
- Important past medical history
Appendix 1

List of quality statements

Statement 1. People who have symptoms of, or who are at risk of developing, peripheral arterial disease (PAD) are offered a clinical assessment and ankle brachial pressure index (ABPI) measurement.

Statement 2. People with PAD are offered an assessment for cardiovascular comorbidities and modifiable risk factors.

Statement 3. People with intermittent claudication are offered a supervised exercise programme.

Statement 4. People with PAD being considered for revascularisation who need further imaging after a duplex ultrasound are offered magnetic resonance angiography (MRA).

Statement 5. People with intermittent claudication are offered angioplasty only when imaging has confirmed it is appropriate, after advice on the benefits of modifying risk factors has been given and after a supervised exercise programme has not improved symptoms.
Appendix 2

DIAGNOSIS AND MANAGEMENT OF PATIENTS WITH PERIPHERAL ARTERIAL DISEASE (PAD)

Please use in conjunction with the resource notes. It is assumed that patients with contraindications will be identified and excluded (refer to the BNF).

PATIENTS WITH SUSPECTED PAD

- Ask about symptoms; Which leg?
  - Pain only on walking?
  - Pain resolves with rest?
  - Pain worse walking up hill/quickly?
  - Any associated numbness / pain?
  - Location of pain?
  - Symptoms/history other vascular disease?

- Examination;
  - Necrosis / critical ischaemia; refer urgently
  - Peripheral pulses?
  - Signs of other cardiovascular disease?
  - Check ABI (see notes)
  - Leg ulcer – refer to local guidelines

ASSESSMENT OF ALL PATIENTS WITH CONFIRMED PAD

- Ask about severity of symptoms; Distance able to walk, effect on quality of life, any threat to employment

- Check for symptoms/signs other cardiovascular disease

- Identify and offer help for lifestyle risk factors (smoking, exercise, diet, alcohol, BMI), blood pressure, known diabetes

- FBC, U&E, glucose, lipids, LFT, TFT at baseline. Annual U&E, lipids, glucose. FBC if worsening symptoms or anaemia suspected

- Urgent / emergency hospital referral; Rest pain, necrosis, acute ischaemia, diabetic foot.

MANAGEMENT OF PATIENTS WITH CONFIRMED PAD

- Ensure on disease register, read codes G73, Xa01v

- Arrange annual review

- Lifestyle vascular risk factors;
  - Smoking (stop smoking service referral if motivated to quit)
  - Healthy eating, alcohol safe limits
  - Regular physical activity (referral for supervised exercise)
  - Weight reduction if appropriate

- Lipids – refer to FATS guidelines. Patients with PAD should be on a statin if tolerated.

- Hypertension – refer to local hypertension guidelines

- Optimal diabetes control – refer to local guidelines

- Anti-platelet agents – clopidogrel 75mg first line

- Therapeutic interventions;
  - Regular physical activity – supervised exercise
  - Specific drug therapy with Naftidrofuryl – only after conservative treatment and if other therapeutic interventions not possible/declined

- Patient / carer written and verbal information and support, including appropriate foot care to be given

- Identification of patients for specialist referral
  - Critical ischaemia (rest pain, necrosis, gangrene) – urgent/emergency
  - Limiting symptoms, threatened employment, diagnostic doubt
  - Leg ulcer – refer to local guidelines.
A Guide to the measurement of the ankle/brachial pressure index (ABI).
Authors

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Sue Long. Education and Training Lead, North of England Cardiovascular Network

Revised/updated (Gerry Stansby) 2014

Consultation Process
Diabetic footcare network
Tissue Viability Services
Vascular Advisory Group
## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Introduction</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Evidence for practice</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Key points for Doppler Use</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Equipment</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Indications</td>
<td>7</td>
</tr>
<tr>
<td>6</td>
<td>Contra-indications</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Limitations to practice</td>
<td>7</td>
</tr>
<tr>
<td>8</td>
<td>Criteria for competence</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>Protocol and skills audit</td>
<td>9</td>
</tr>
<tr>
<td>10</td>
<td>Clinical incident reporting and management</td>
<td>9</td>
</tr>
<tr>
<td>11</td>
<td>References</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td><strong>Appendices</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Appendix 1 - Illustrations</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Appendix 2 – Report form</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Appendix 3 – Competency form</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Appendix 4 – Case example</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Appendix 5 – NECVN Guidelines for Peripheral Arterial Disease</td>
<td>21</td>
</tr>
</tbody>
</table>
1.0 Introduction

• Doppler ultrasound is used to detect velocity and location of blood flow in both arteries and veins and is used to record a Resting Pressure Index (RPI) also known as Ankle Brachial Pressure Index (ABI).

• Ankle brachial pressure index (ABI) compares the traditional arm systolic reading with the ankle systolic reading as an assessment of arterial blood flow to the feet. These recordings are expressed as a ratio. Doppler ultrasound is an essential part of the assessment of suspected peripheral arterial disease (PAD).

• While an important element of the assessment process it should be used in conjunction with a holistic assessment of the patient. However, the ABI can help to inform the differential diagnosis, can be utilised to exclude arterial disease and to identify those patients with impaired arterial flow who should be referred to the vascular surgeon. Assessment should involve both legs regardless of whether only one limb is affected.
2.0 Evidence for practice

ABI is used during assessment of PAD as an objective aid to substantiate the presence or absence of significant disease\textsuperscript{1}. It is essential that there is a consistent approach to undertaking the procedure and a period of supervision by an experienced practitioner is necessary for those new to performing ABI\textsuperscript{1,2}.

The attached competencies outlining the procedure (Appendix 3) provide a framework for a standardised approach to ABI measurement\textsuperscript{3,4,5}, while the reporting form (Appendix 2) supports consistent, clear calculation and recording of ABI measurement.

Further information on the diagnosis and management of patients with Peripheral Arterial Disease can be found in Appendix 5.
3.0 Key points for Doppler in testing ABI

<table>
<thead>
<tr>
<th>Priority</th>
<th>Action</th>
<th>Rationale</th>
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<tbody>
<tr>
<td>1.</td>
<td>Patients must have an ABI measurement using a Doppler ultrasound as part of a leg ulcer/ PAD assessment especially if they are to be considered to have compression bandaging or hosiery</td>
<td>The ABI indicates the presence and severity of PAD which may contraindicate compression therapy</td>
</tr>
<tr>
<td>2.</td>
<td>Ensure that the patient is rested and lying flat and is comfortable prior to procedure</td>
<td>Lying the patient in a supine position reduces the risk of inaccurate readings</td>
</tr>
<tr>
<td>3.</td>
<td>Measure both brachial pressures and use the highest reading of the two to calculate the ABI pressure ratio</td>
<td>Increases the accuracy of obtaining a central systolic pressure measurement</td>
</tr>
<tr>
<td>4.</td>
<td>Locate two pulses on each foot. The highest reading on each is used to calculate the APBI</td>
<td>To calculate the ABI reading</td>
</tr>
<tr>
<td>5.</td>
<td>Calculate the ABI using the standard formulae Highest ankle for each foot over the highest brachial pressure</td>
<td>To ensure accurate and repeatable calculations are made</td>
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</tbody>
</table>

4.0 Equipment

The following equipment is required:-

- A hand held Doppler with 8 megahertz probe for lower limb assessment
- **5 megahertz probe should be available for use in lymphoedema**
- Aneroid sphygmomanometer. (automated sphygmomanometer must not be used )
- Ultrasonic gel and tissues
- Cling film to cover any dressing or discharge from the legs
- A quiet room with couch to enable the patient to lie down to ascertain accurate readings
5.0 **Indications**

The assessment of patients with suspected PAD by practitioners using Doppler Ultrasound to measure the ABI

6.0 **Contra-indications**

The ABI measurement should not be measured using the Doppler Ultrasound in the following circumstances: -

6.1 The patient refuses procedure

6.2 The patient has had an ABI performed by an experienced practitioner within the last three months and the clinical condition is unchanged.

6.3 The patient has cellulitis

6.4 The patient has a DVT and is not fully anti-coagulated.

6.5 The patient is under 16 years of age

6.6 Cautions for taking blood pressure e.g. fistula for dialysis, removal of lymph glands

7.0 **Limitations to practice**

These include:-

1. Availability of appropriate equipment
2. Equipment is unsafe to use due to being damaged or faulty
3. The patient is not suitably prepared

Please note that false high systolic pressure readings may be obtained in individuals with diabetes mellitus (i.e. the cuff is unable to compress calcified distal vessels). In these circumstances the practitioner will be required to use their clinical judgement to decide whether the patient requires an alternative such as toe pressures or Duplex scan or vascular referral.
8.0 Criteria for competence

8.1 Registered practitioners undertaking ABI measurements will be required to complete a competency framework or will have undertaken a recognised theoretical course and have evidence to demonstrate they have maintained their practical skills in the measurement of ABI’s.

8.2 The registered practitioner will have a working knowledge of guidelines for the diagnosis and management of patients with PAD.

8.3 All registered practitioners undertaking this role are responsible for accessing an appropriately experienced supervisor. Supervisors must be registered practitioners who have a theoretical knowledge and maintain practical skills in the management of PAD and/or leg ulceration.

8.4 The registered practitioner and their supervisor will determine the number of supervised practices required to achieve competence. This will take into account the registered practitioner’s individual learning needs (appendix 3).

8.5 All registered practitioners undertaking the assessment of ABI will be required to demonstrate competence in the relevant skills. Please refer to appendix 3. Evidence of competence must be provided and a copy kept in the registered practitioner’s individual file.

8.6 Competence must be maintained by regular clinical experience and supported by updating of theoretical knowledge. Evidence of continuing professional development and maintenance of skill level will be required.
9.0 Skills audit

In order to ensure delivery of quality care it is good practice to undertake an audit of compliance to guidelines and skills competencies on a regular basis.

The audit may include:

- Adherence to the protocol
- Any untoward incidents or complaints
- Number of competent registered practitioners
- Any additional educational needs

10.0 Clinical incident reporting and management

Any untoward incidents and near misses must be reported and dealt with via the appropriate local pathway.
11.0 References


Appendix 1

Figure 1: Palpating the dorsalis pedis pulse

Figure 2: Palpating the post tibial pulse
Figure 3: Measuring ankle systolic pressure
Clients Details

NHS Number ____________________________
Name ____________________________
DOB ____________________________
Address ____________________________
Tel ____________________________
Indication for referral ____________________________

<table>
<thead>
<tr>
<th>Results</th>
<th>RIGHT</th>
<th>LEFT</th>
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<tbody>
<tr>
<td>Highest ankle pressure (for this leg)</td>
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<tr>
<td>Divided by</td>
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<tr>
<td>Highest brachial pressure (highest of 2 arm readings)</td>
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<td>ABI Reading</td>
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Report for ABI measurement

Interpretation of results

- ABI normally 0.9-1.3 at rest
- ABI 0.5-0.89 indicates arterial disease
- ABI < 0.5 indicates severe arterial disease and requires referral to vascular
- ABI > 1.3 may indicate calcification of the arteries
- ABI > 0.8 is considered safe to apply compression therapy

Name of person completing ABI ____________________________

Date of ABI ________________ Contact Number ____________________________

Reason if unable to complete ABI
______________________________________________________________________

______________________________________________________________________
## Appendix 3
### Competency Title: ABI measurement for the assessment of PAD

<table>
<thead>
<tr>
<th>ACTION</th>
<th>RATIONALE</th>
<th>W</th>
<th>A and S</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td><strong>Pre checks prior to test</strong></td>
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<tr>
<td>1. Upon receipt of referral check clinical details and that there are no contraindications to the procedure</td>
<td>To ensure it is appropriate to perform the procedure</td>
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<td>2. Check equipment is available and is working correctly i.e. no battery warning sign flashing and sphygmanometer works and appropriate cuff available.</td>
<td>To ensure the resources for the procedure are available. To meet the requirements of the Management of Medical Devices Policy and the Doppler machine competency statement</td>
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<tr>
<td>3. Select Doppler and appropriate probe</td>
<td>To use an 8MHz probe to detect peripheral vessels. <em>In lymphoedema use a 5MHz probe.</em></td>
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<td>4. Select sphygmomanometer and appropriate size BP cuff for the patient's limbs. The cuff must be 40% of the limb circumference at the mid-point</td>
<td>To use either a small, standard or obese cuff to ensure accurate measurement of BP</td>
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<td>6. Select appropriate ultrasound gel</td>
<td>To use a gel which will accurately transmit the sound without damaging the probe</td>
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<td>ACTION</td>
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<td>7.</td>
<td>Verbally check the identity of the patient by asking name and DOB. If this is not possible check details with family or carers</td>
<td>To confirm that this is the correct patient for the procedure</td>
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<td>8.</td>
<td>Explain the procedure to the patient. Ask the patient if they have any difficulties with lying flat. If the patient has difficulties or is unable to lie flat then this must be recorded as it can influence the readings</td>
<td>To ensure the patient understands what the procedure will involve and that they consent to this. To ensure that the results are repeatable and meaningful</td>
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<td>9.</td>
<td>Ask the patient if they wish family/ friends/ carer to be present. Use curtains and close doors</td>
<td>To ensure privacy and dignity. Adhere to Trust Chaperone policy</td>
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<td>10.</td>
<td>Record outcome of discussions and document in patient notes including consent to procedure</td>
<td>Trust records policy and informed consent to treatment</td>
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<td>11.</td>
<td>Clean/wash hands as per local policy.</td>
<td>To minimise the risk of infection</td>
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<td>12.</td>
<td>Prepare the patient by positioning on the couch i.e. lying flat with 1 pillow. Adjust clothing if required for procedure i.e. no tight clothing restricting limbs. The patient must be lying down for 5-10 minutes</td>
<td>To ensure accurate recording of resting systolic blood pressure readings in the arms and legs</td>
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<tr>
<td>ACTION</td>
<td>RATIONALE</td>
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<tr>
<td>Performing ABI procedure</td>
<td>To ensure correct technique for brachial pressure recording. Cuff should be correctly placed to avoid tubing interfering with ultrasound gel or probe. The probe should be held at between 45-60 degree angle to allow the signal to pass through the greater cross section of the artery. Ensure that the probe is over the artery by listening to the sound. An artery will either be Monophasic = single whooshing sound (note this can be confused as similar to the sound of a vein) indicative of calcification of the artery. Biphasic = Twin sound indicating some degree of reduced elasticity in the artery Triphasic= Three sounds normal reading</td>
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<tr>
<th>W Score</th>
<th>A and S Score</th>
<th>P Score</th>
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13. Brachial systolic pressure
- Support arm, place appropriate size sphygmomanometer cuff 2 cm above the inner aspect of the elbow with the tubing pointing towards the shoulder
- Locate the brachial artery, apply gel, angle probe at 60° into the direction of the blood flow
- Adjust probe to pick up the best signal. Inflate cuff slowly until the signal disappears - STOP if patient reports pain Do not compress over 200mm Hg.
- Deflate slowly until the sound returns, taking care to keep the probe on the line of the artery
- Record the reading on the sphygmomanometer
- Repeat procedure on the opposite arm and record
- Record the highest brachial pressure
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<td></td>
<td>• Remove gel from patient</td>
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|        | **Ankle systolic pressure.**  
(See illustrations in Appendix 1) |   |         |   |
| 14.    | • If there are any wounds to the limb remove dressings and protect areas with cling film.  
• Locate the dorsalis pedis on the dorsum of the foot and posterior tibial pulse behind the medial malleolus. Apply appropriate size BP cuff just above the ankle with the tubing pointing towards the knee.  
• Apply gel to the pulse point on dorsum of the foot and angle probe at 60° to detect best signal  
• Inflate cuff until signal disappears **STOP** if pain reported. Do not compress over 200mm Hg.  
• Deflate slowly until the signal reappears, taking care to keep to the line of the artery  
• Record this measurement next to dorsalis pedis pulse |   |         |   |
|        | To minimize cross infection  
To ensure correct technique for measurement of ankle systolic pressure |   |         |   |
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<td></td>
<td>for that leg</td>
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<td></td>
<td>• Repeat for posterior tibial pulse</td>
<td>Score</td>
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<td>Score</td>
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<td></td>
<td>• Record this next to posterior tibial pulse for that leg</td>
<td>Score</td>
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<td></td>
<td>• Use the higher of these two readings to give the ankle systolic pressure for that leg.</td>
<td>Score</td>
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<td>• Remove any gel</td>
<td>Score</td>
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15. Repeat procedure for the other leg

16. Replace dressings as required
   Assist with replacing clothes as necessary
   To reduce risk of infection

**Calculations** (See case example, Appendix 4)

17. ABI formula:
   - Highest ankle systolic pressure
   - Highest brachial systolic pressure
   Repeat for the other leg
   To ensure the correct data is entered into the calculation for the left and right leg

18. Record ABI on the referral form and in the notes.
   Return form to person requesting the procedure
   To ensure results are transferred to the referrer and to comply with local policy for record keeping
<table>
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<td>19.</td>
<td>Discuss and agree subsequent actions with patient</td>
<td>The patient remains informed of the results and pathways</td>
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<td>20.</td>
<td>Clean the Doppler and probe Dispose of any dressings, wipes and tissues in a clinical waste bag Clean/wash hands as per local policy</td>
<td>To prevent cross infection and ensure adherence to infection control policy for decontamination of reusable instruments</td>
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**DATE**

**SIGNATURE OF CLINICIAN**

**SIGNATURE OF ASSESSOR**

Score as follows:

1 = NEEDS FURTHER PRACTICE
Reassessment of competencies WASP
Compentence should be reassessed every three years as a minimum to ensure skills and knowledge are maintained.

Declaration
**STAFF MEMBER:** By signing below you confirm that you have had theoretical and practical instruction on how to safely and competently undertake each activity and agree to comply with the policy and procedures of the Trust.

**ASSESSOR:** By signing below you confirm that you have assessed the staff member as competent in both theoretical and practical aspects of the activity.

Name……………………………………………

Base…………………………………………

Title…………………………………………..

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<tr>
<th>Competency Topics</th>
<th>Date of reassessment Signature of staff member and assessor</th>
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Appendix 4

Case example

72 year old man attends for measurement of ABI. Readings are as follows –

- Right brachial – 130mm Hg
- Left brachial – 126mm Hg
- Right DP – 114 mm Hg
- Right PT – 92mm Hg
- Left DP – 130 mm Hg
- Left PT – 122 mm Hg

To calculate ABI

\[
\frac{\text{Highest ankle systolic pressure}}{\text{Highest brachial systolic pressure}}
\]

\[
\frac{130}{130} = 1.00
\]

\[
\frac{114}{130} = 0.87
\]