**Introduction**

This protocol was prepared by the Senior Vascular Physiologist. The SVT guidelines were used in conjunction with our current lab practices. Mapping of lower limb vessels such as the Greater Saphenous Vein and the Short Saphenous Vein prior to lower limb bypass surgery is beneficial as venous grafts have a higher percentage of patency rates and a lower incidence of postoperative infections when compared to lower limb synthetic grafts. The following is the order of preference for veins to be mapped.

1. The Ipsilateral GSV
2. The contralateral GSV
3. Short saphenous veins depending on the suitability of length of the vessel

**Common Indications**

1. Planning of infrainguinal bypass surgery

**Patient referral**

The referral must be made by a physician or other appropriately licenced healthcare provider. Clinical information detailing the patient’s clinical situation should be included.

**Patient Preparation**

No preparation is required. The examination is performed in the supine position. The patient will be instructed to externally rotate their lower limb with the knee slightly bent. The examination should be fully explained to the patient and consent obtained. Patient name and date of birth must be confirmed. Relevant medical history should be taken prior to the examination.

**Examination**

1. The patient will be asked to remove their lower body clothing. A disposable gown can be placed over the patient’s abdomen and contralateral lower limb to maintain patient dignity at all times.
2. Apply ultrasound gel to the correct linear array transducer (a combination of the 8 MHz and the 18 MHz probes may be necessary) and select the venous programme on the Ultrasound Machine.
3. There will be constant adjustment of the different functions on the control panel throughout the exam to ensure optimal imaging and spectral analysis eg., depth, focus, gain, TGC, Tissue Harmonics, sample volume size, colour box, colour scale etc.
4. In transverse and B Mode identify the CFV and CFA at the groin. Locate the Saphenofemoral junction and the GSV.
5. In the longitudinal plane assess the CFV and the Saphenofemoral junction for patency using Colour and Spectral Doppler.
6. In transverse and B Mode using mild external pressure compress the GSV below the inguinal crease to confirm patency.
7. Measure the inner lumen AP diameter of the vein using the callipers. Assess the vein for any evidence of vessel wall thickening, atheroma or thrombus.
8. Repeat steps 6 and 7 from below the inguinal crease to the level of the medial malleolus. Recording AP lumen diameter and patency of vessel every 1 centimetre.
9. If the GSV is suitable and within size i.e., **between 0.2 - 0.6cm** the vein is suitable for mapping. Note: vein must be of suitable size and length to bypass the occluded arterial segment.
10. If the ipsilateral GSV is not suitable, the contralateral GSV should be investigated next. Repeating Steps 4-9.
11. If both GSVs are not suitable the SSVs should be examined next, repeating Steps 4-9.

**Vein Marking**

1. In Transverse and B Mode align the vein with the middle of the probe and mark the centre of the transducer checking that the vein compresses with the pressure from the indelible pen. A small dot should be clearly visualised on the skin.
2. Any branches, perforators or tortuous areas should be marked on the skin as per NIVU protocols.
3. Marks should only be placed along the length of the vein suitable and then cease.
4. Carefully using tissue remove any excess gel from the upper arm, ensuring not to wipe away the indelible pen marks.
5. Place clear dressings over the indelible pen marks.

**Reporting**

The report is a recording and interpretation of observations made during the assessment. It should be written by the Vascular Physiologist who performed the exam**.**

The Non-Invasive Vascular Unit has a standardised reporting system for each examination so that all Vascular Physiologists and clinicians alike can understand the report.

The report should include:

* Patient name, Medical Record Number, Date of examination, examination type, Vascular Physiologists initials.
* Which side and vessels were examined, their patency and AP lumen diameter size. Any atheroma/thrombus identified within the vessels.
* Any aneurysmal dilation within the veins i.e., AP lumen diameter greater than 0.6cm and its anatomical location
* Any veins draining either the GSV or SSV and their anatomical location must be documented
* State if a suitable sized vein was marked.
* Any limitations encountered during exam for example, extremely tortuous and aneurysmal veins
* Recommendations for further imaging in the event of a limited examination
* An appropriate amount of annotated images that represent the entire ultrasound examination in accordance with department protocol
* Any significant or unexpected findings should be recorded using the PACS peervue system
* The referring doctor/team must be contacted at time of examination referring them to the report findings in the patient’s chart so that a treatment plan can be developed or expedited.