

Venous Duplex Assessment for DVT and Deep Venous Insufficiency of the Lower Limb

Purpose

Duplex ultrasound examination is used to assess the deep and superficial venous system of the lower limb (groin to ankle level) to determine the presence or absence of thrombosis and incompetence. The department will only accept referrals from the vascular surgeons.

Common Indications

Common indications for performance of this examination include:

- Swelling
- Pain
- Tenderness
- ? Source of pulmonary embolism (PE)
- Post Thrombotic Syndrome

Contraindications and Limitations

- Contraindications for lower limb venous duplex ultrasound for the assessment of DVT are unlikely; however, some limitations may preclude a complete examination and may these could include :-
- Obesity
- Casts, dressings, open wounds etc|can limit visualisation.
- Severe oedema/swelling.
- Limited mobility
- Patients who are unable to cooperate due to reduced cognitive functions e.g.
- Alzheimer's or dementia and through involuntary movements Examinations undertaken portably at the patient's bedside maybe limited due to equipment and room dimensions
- Patient discomfort
- When examining the abdominal veins bowel gas

Examination:

The patient is asked to expose the lower limb from groin to ankle. The patient is examined in the supine position with couch in a reversed Trendelenburg position and the leg externally rotated. The calf vessels may be examined with the patient sat on the edge of the couch with the leg dependant.

Start the examination in the groin at the level of the common femoral vein (CFV).

The CFV should be examined to assess for spontaneous flow respiratory and cardiac modulation, augmentation, compressibility and colour filling.

If abnormal/none phasic flow is detected in the CFV the iliac veins and inferior vena cava need to be examined.

If thrombus is detected in the CFV the diameter of the vein and distance the thrombus is from the bifurcation should be recorded.

Continue to examine the lower limb veins distally examining the length of the femoral vein (FV), the proximal profunda femoris vein (PFV), and popliteal vein (PopV) for patency and signs of DVT or thrombotic scarring.

For acute DVT referrals the calf veins (gastrocnemius veins, posterior tibial veins and peroneal veins) should be imaged as above commenting on patency and signs of DVT or thrombotic scarring. This may be performed either with the patient supine or sitting up.

The upper great saphenous (GSV) and small saphenous vein (SSV) should be examined and if thrombus is noted within 5 cm of the sapheno-femoral (SFJ) or sapheno-popliteal junction (SPJ) this should be highlighted on the report. The length of the thrombosed section should be reported.

If thrombus is identified in any of the veins examined the extent of the thrombus should be quantified making reference to the anatomical position of the thrombus and it's upper and lower extent with reference to anatomical landmarks; whether it is occlusive, non-occlusive or free-floating. An attempt should be made to evaluate if the thrombus is acute or chronic, from its echogenicity, attachment and vein dilation.

If the referral is for chronic venous insufficiency then the veins need to be assessed for reflux. A measurement of reflux in the distal PopV with calf augmentation, and with the patient sitting on the edge of the couch with the leg dependant, should be measure as a baseline point for any futures scans on that patient. The reflux should be quantified for duration and high or low volume flow, a pictorial representation of augmented flow and reflux flow with time measurements and peak velocities may be useful.

Reporting:

The reporting should include:

- The presence/absence of phasic flow in the proximal veins
- Which veins have been assessed & record the presence/absence of thrombus
- Where thrombus is identified, the location, length/extent, degree of restriction should be estimated for the CFV, proximal FV, distal FV and the popliteal vein (more or less than 50% restricted) and whether the thrombus is acute or chronic should be documented
- Any limitations encountered during the examination

Venous Duplex Assessment for Incompetence of Lower Limb

Purpose

The test will document the presence of thrombus, the presence and degree of reflux in the deep or superficial venous systems. The anatomy of the varicosities and the presence of incompetent perforators.

The unit will receive referrals from patients with recurrent varicose veins, complicated primary veins, venous ulcers, suspected deep vein thrombosis or deep vein insufficiency. The unit will only receive referrals via a vascular surgeon or the multidisciplinary Leg Ulcer Clinic or Lymphedema clinic.

Procedure

The CFV, FV and Pop V should be assessed as per the **Venous Duplex Assessment for DVT and Deep Venous Insufficiency of the Lower Limb** protocol.

The patient should be positioned supine in the reversed Trendelenburg position, standing with the weight on their contralateral leg or sitting/resting on the edge of the couch with the leg dependant.

- the saphenofemoral junction (SFJ) should be assessed for patency and reflux using distal compression or valsalva.
- the presence and competency of any anterior or posterior tributaries should be noted.
- the great saphenous vein (GSV) is scanned throughout its length and assessed for patency, competency, presence of thrombotic scarring and site of any perforators.
- the diameter of GSV should be noted, if it is incompetent, to help determine the most suitable treatment.
- The patient's position may need to be adjusted to enable the PopV to be accessed for patency, competency and thrombus.
- the saphenopopliteal junction (SPJ) should be assessed for patency and reflux using distal compression. Variations in anatomy such as high junctions and giacomini veins should be noted.
- the small saphenous vein (SSV) is scanned to the lateral aspect of the ankle noting any large tributaries, perforators, thrombus or incompetence.
- If the SSV is incompetent then diameters need to be recorded.

Any varicosities that have not been accounted for by completed the above steps should be imaged directly to determine their origin and diameters of vessels.

Reflux identified should be graded as follows:-

- <0.5 seconds competent
- >0.5 seconds incompetent

Coleridge-Smith et al

The below criteria for treatment suitability should be used.

RF/VNUS ablation

An incompetent segment of GSV or SSV, of at least 10cm in length, through which a catheter would be able to be passed. Veins that are too tortuous or have significant thrombotic scarring are not likely to be suitable for this treatment.

Foam treatment

Veins that are too large are not likely to be suitable for this treatment. GSV where a significant portion of the vein is larger than 9mm in diameter, SSV where a significant portion of the vein is larger than 7mm or where there are numerous large varicosities of greater than 7mm should be flagged as not suitable for foam treatment.

Reference

Coleridge-Smith, P, Labropoulos, N, Partsch H, Myers K, Nicolaides A, Cavezzi A. Duplex ultrasound investigation of the veins in chronic venous disease of the lower limbs –UIP Consensus Document. Part 1 Basic principles. Eur J Vasc Endovasc Surg 2006; 31:83-92,

Nottingham University Hospitals **NHS**

NHS Trust

The Vascular Laboratory

Department of Vascular and Endovascular Surgery

Right Leg Venous Duplex Report

Date: 22.11.2023

Consultant: *WCT*

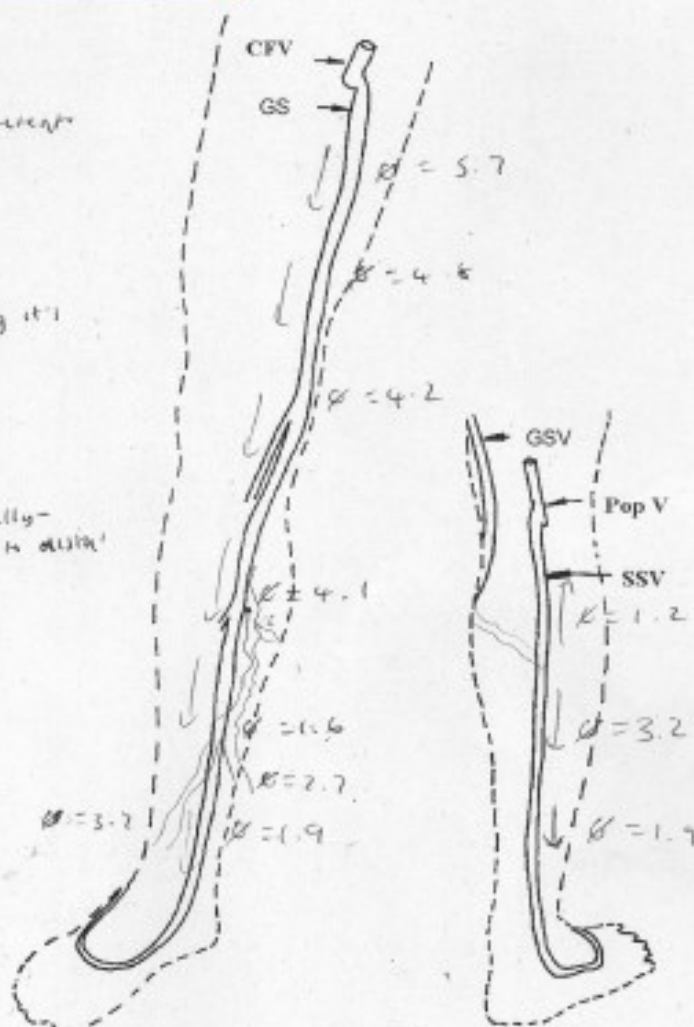
CFV: }
FV: } Patient not competent
PopV: }

SFJn: Incompetent

GSV: Incompetent along its length.

SPJn: Not visualised

SSV: Competent proximally - incompetent in mid to distal calf.



Recurrent?	Y / ☒ N
Radiofrequency Ablation?	☒ Y / N
FOAM?	☒ Y / N

A. [Signature]
Clinical Vascular Scientist

Common Femoral Vein (CFV), Femoral Vein (FV), Popliteal Vein (PopV), Saphenofemoral Junction (SFJn), Great Saphenous Vein (GSV), Saphenopopliteal Junction (SPJn), Small Saphenous Vein (SSV)

Date: 19.12.2023

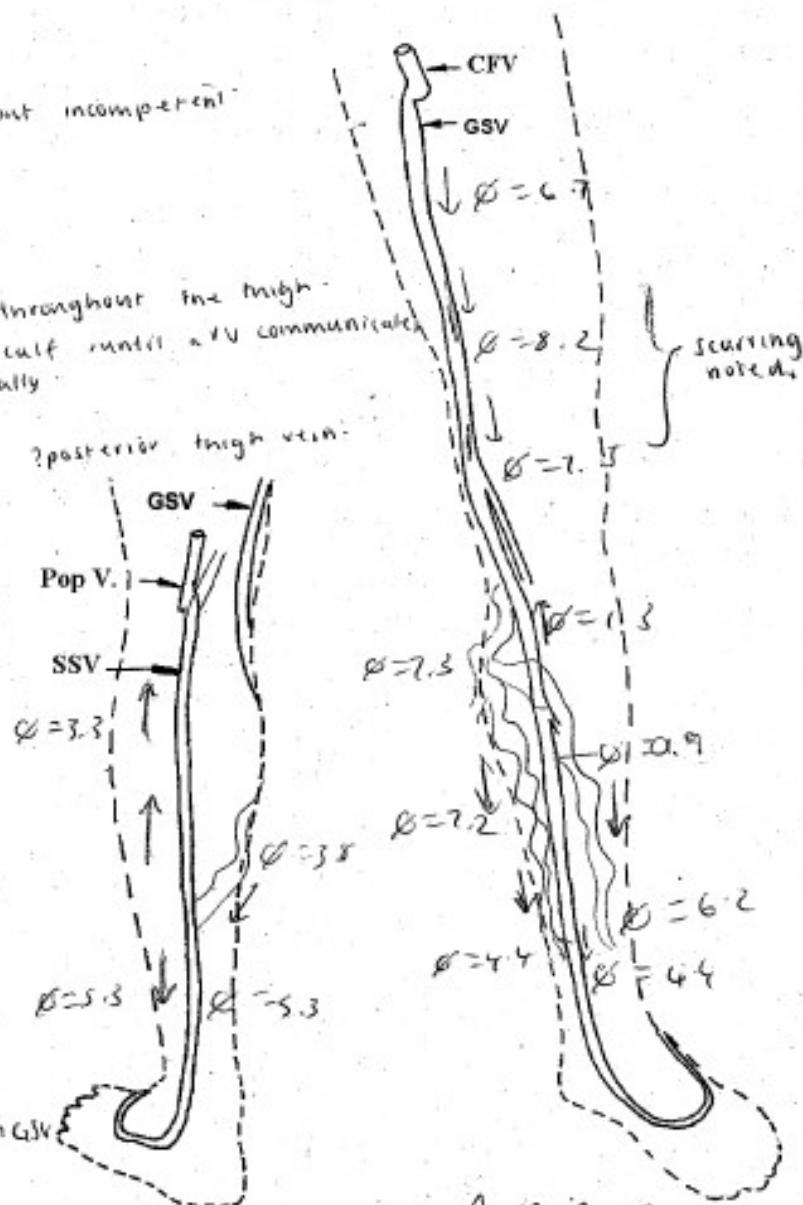
Consultant:

Dr J

CFV: }
FV: } Patient but incompetent
PopV: }

SFJn: incompetent
GSV: incompetent throughout the thigh
Competent in the calf until a JV communicates
with the GSV distally

SPJn: not visualised ? posterior thigh vein
SSV: competent



Recurrent?	Y / ☒ N
Radiofrequency Ablation?	Y / ☒ N
FOAM?	☒ Y / N

A. M. J.
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 13.12.2023

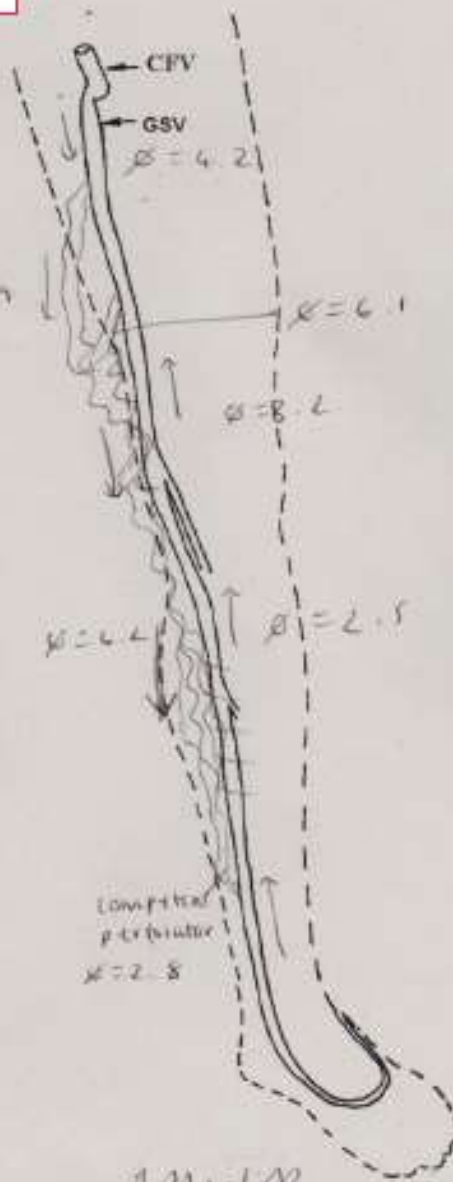
Consultant:

CML

CFV: }
FV: } Parent + Competent
PopV: }

SFJn: Incompetent
GSV: Incompetent in the proximal thigh - competent in the distal thigh - distal calf -

SPJn: Incompetent
SSV: Competent



Recurrent?	Y
Radiofrequency Ablation?	N
FOAM?	Y

A. M. S.
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 22.11.2023

Consultant:

WGT

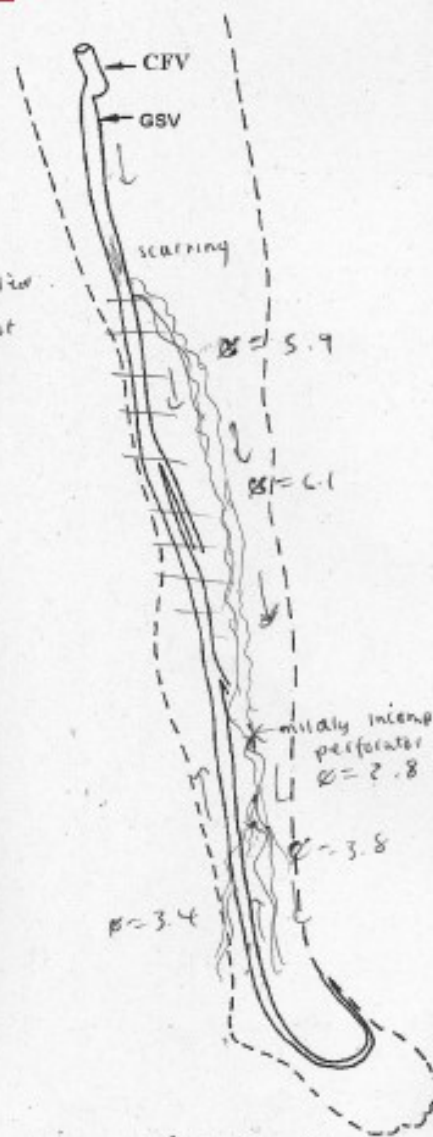
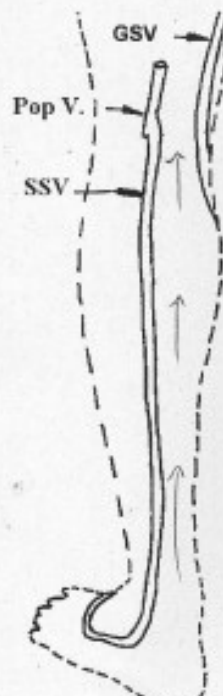
CFV: }
FV: } Patent + competent
PopV: }

SFJn: Incompetent

GSV: Incompetent proximally - not visualised in mid thigh to proximal calf. ? Absent due to previous VV surgery. Refers in calf, appears competent.

SPJn: Not visualised

SSV: Competent



Recurrent?	☒ Y / ☐ N
Radiofrequency Ablation?	☒ Y / ☐ N
FOAM?	☒ Y / ☐ N

A. W. R.
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 01.12.2023

Consultant:

WUT

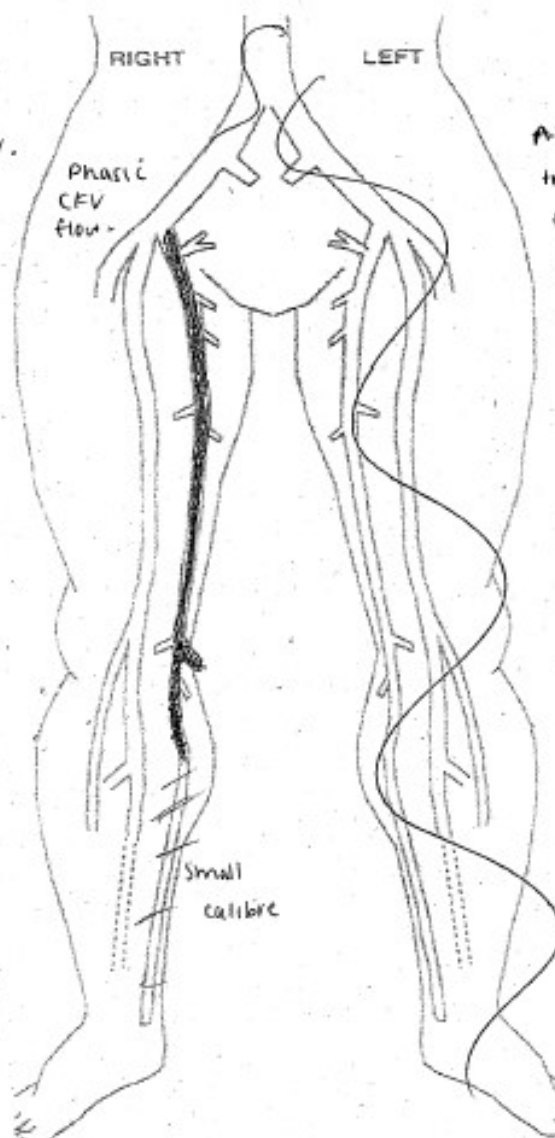
RIGHT LOWER LIMB VEINS ASSESSMENT

Deep venous veins
are patent from
CFV to distal POPV.

The proximal
gastrocnemius veins
are patent &
compressible.

The ATV, PTV &
PEROV are
compressible where
seen.

RIGHT
SSV



Acute or chronic
thrombus noted
throughout the
GSV beginning
at the level
of the SPJ.
This extends into
a VV then the
SSV in the mid
calf.

This does not
extend into the
deep system.

A. Moley BSc
Clinical Vascular Scientist

Date: 21-12-2023

Consultant:

AND

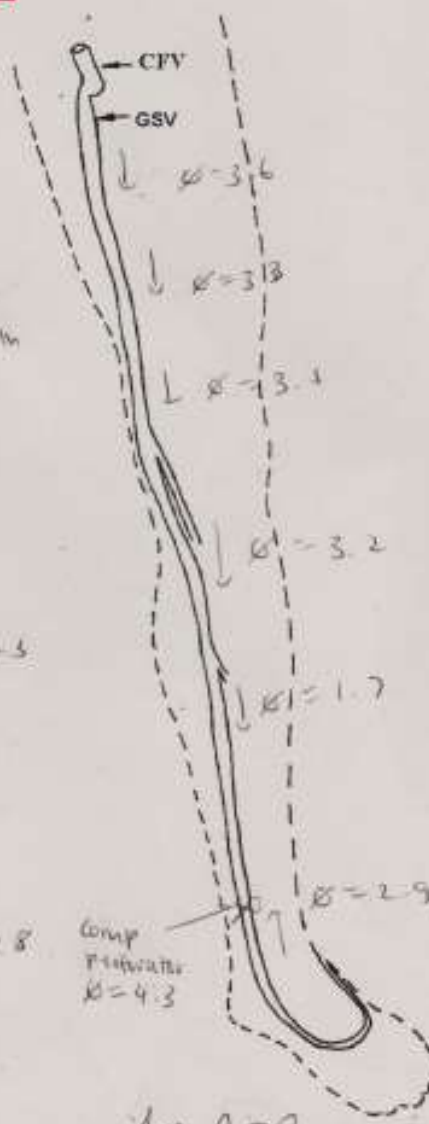
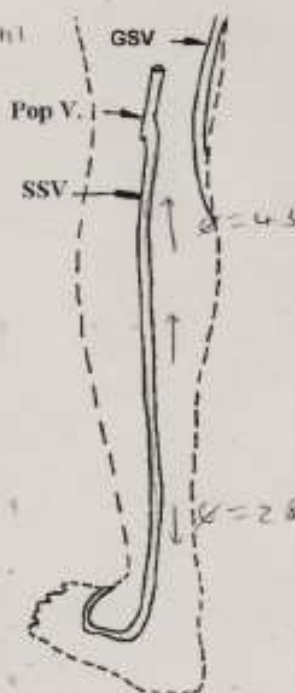
CFV: }
FV: } Patent + competent
PopV: }

SFJn: competent

GSV incompetent throughout thigh to mid calf. Competent following communication with competent perforator.

SPJn: } competent until
SSV: } distal calf.

Scarring noted throughout SSV



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

Comp Perforator
R=4.3

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

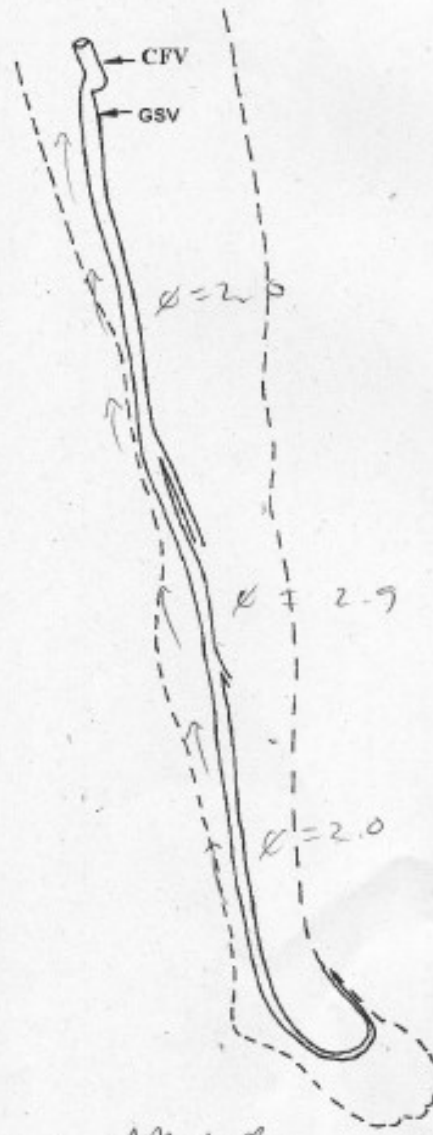
	Date: 22.11.2022
	Consultant:
	WCT

CFV: }
 FV: } Patent + competent
 PopV: }

SFJn: }
 GSV: } Patent + competent

SPJn: not visualised
 SSV: Patent + competent

ATA + PTA are
 rephased at the
 ankle.



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

A. M. J. R.
 Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 22.11.2023

Consultant:

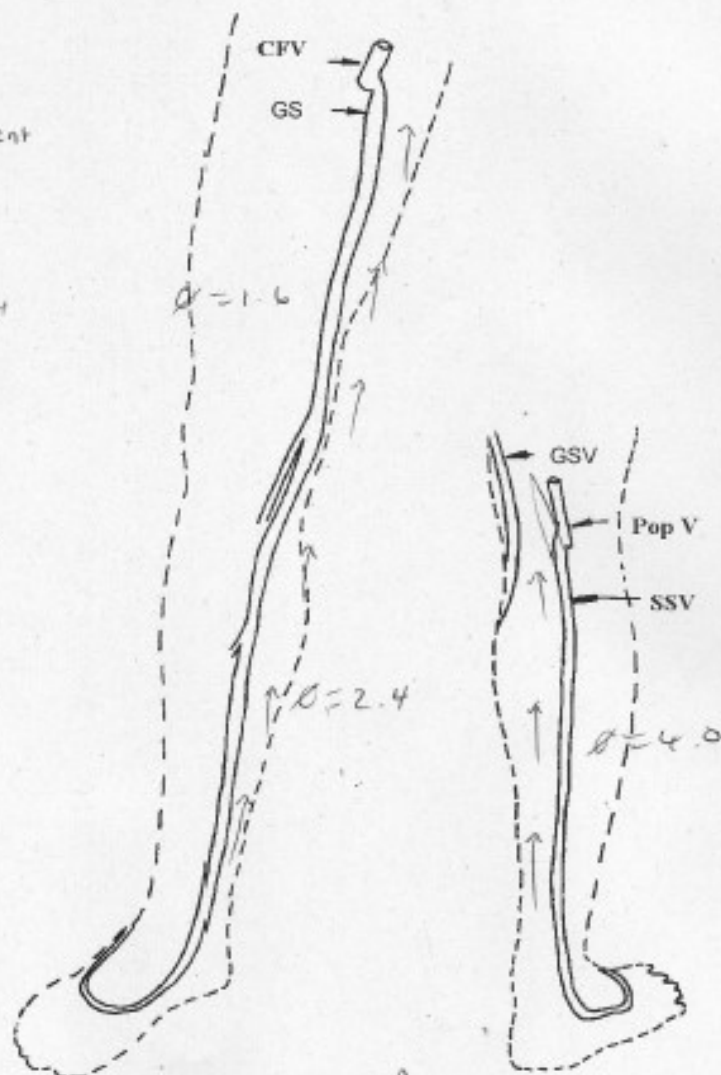
WGT

CFV: }
FV: } Patient + competent
PopV: }

SFJn: }
GSV: } Patient + competent

SPJn: Not visualised
SSV: Patient + competent

MTA + PTA are high at the ankle,



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

[Signature]
Clinical Vascular Scientist

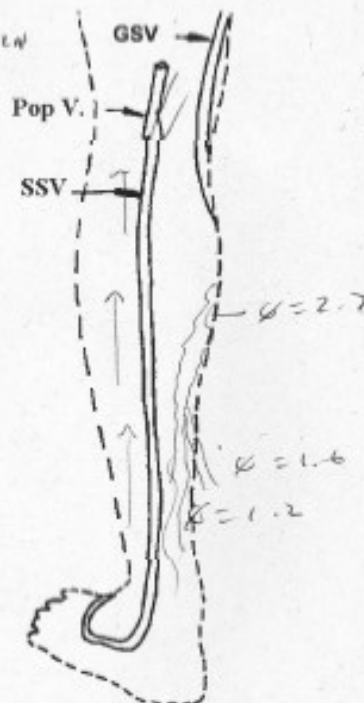
Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 14/12/2023

Consultant:
SLK

CFV: }
FV: } Patent + competent
PopV: Patent, incompetent proximally,
competent distally

SFJn: Incompetent
GSV: Not visualised throughout the
thigh ? absent due to previous surgery
Refills in the proximal calf
incompetent following communication
SPJn: Not visualised
SSV: Competent + patent



Recurrent?	☒ Y
Radiofrequency Ablation?	☒ Y
FOAM?	☒ Y

[Signature]
Clinical Vascular Scientist

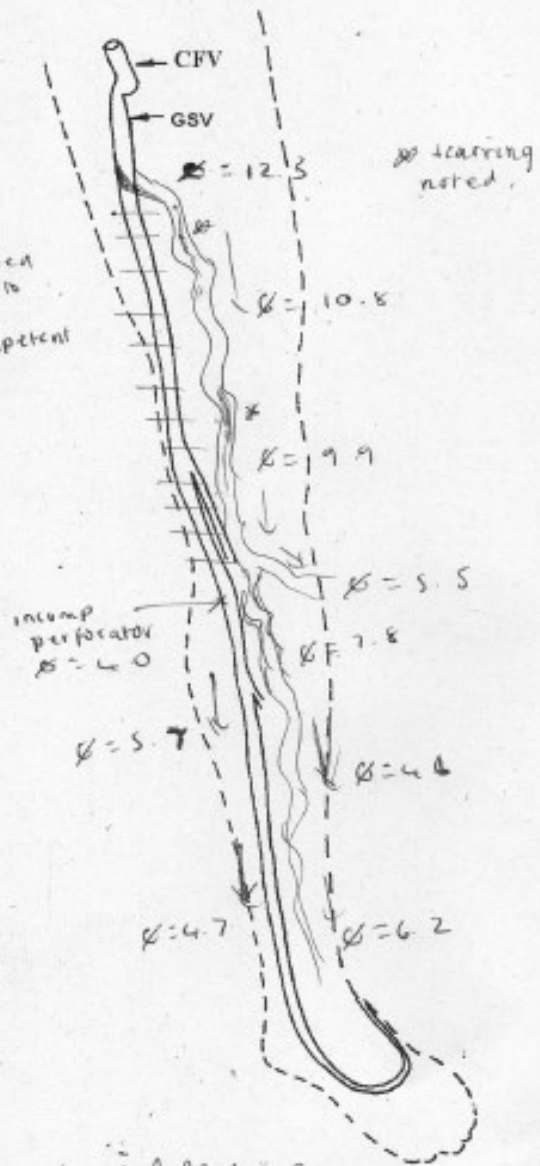
Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

	Date: 04.12.2023
	Consultant:
	SLK

CFV: }
 FV: } Patent + competent
 PopV: }

SFJn: Incompetent.
 GSV: Incompetent proximal. not visualised
 in mid - distal thigh. Absent due to
 previous EV surgery.
 Returns in proximal calf via incompetent
 perforator.

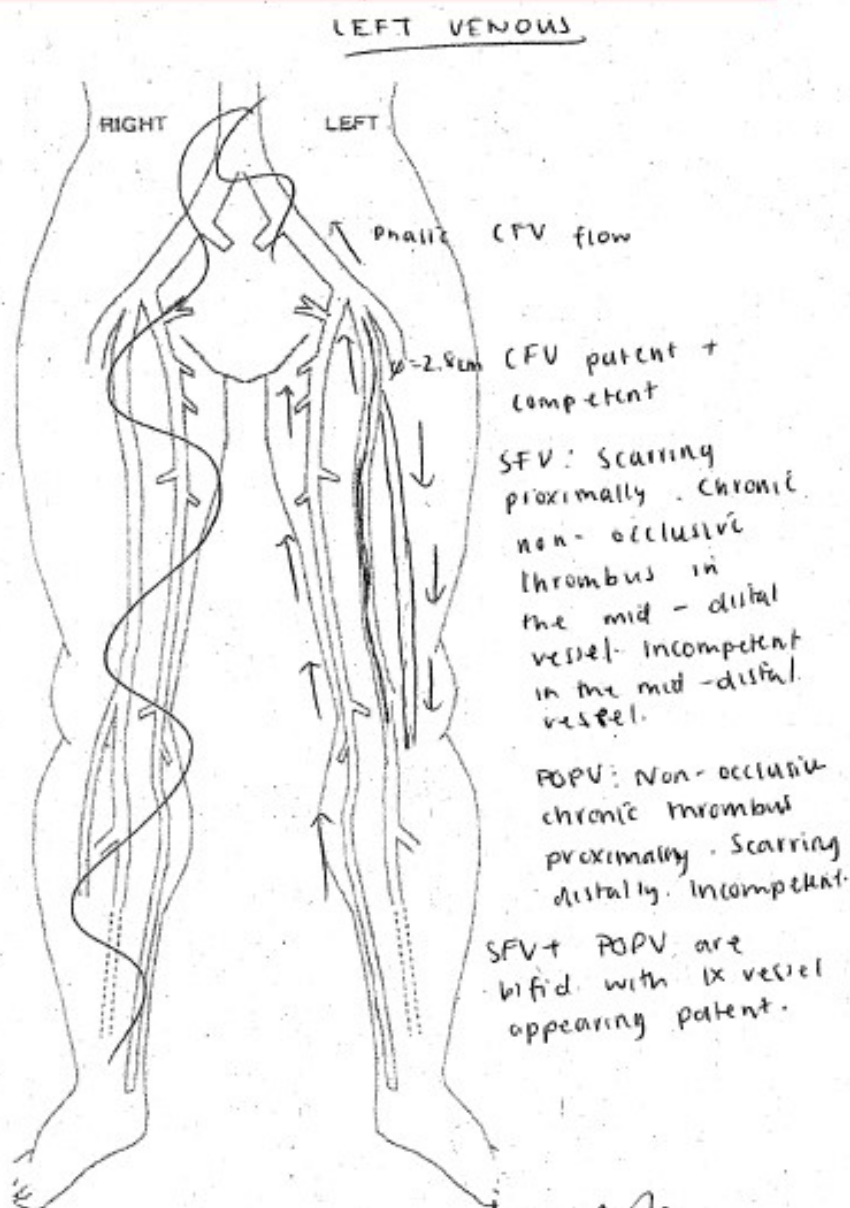
SPJn: Not visualised.
 SSV: Competent.



Recurrent?	☒ Y ☐ N
Radiofrequency Ablation?	☐ Y ☒ N
FOAM?	☒ Y ☐ N

Amal R
 Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)



[Signature]
Clinical Vascular Scientist

2/2

CFV: Competent, phasic + patent.

FV: incompetent in the mid-distal
vein. Scarring proximally. Non-occlusive
chronic thrombus in the mid-
distal vein.

PopV: incompetent, non-occlusive chronic
thrombus proximally. Scarring distally.

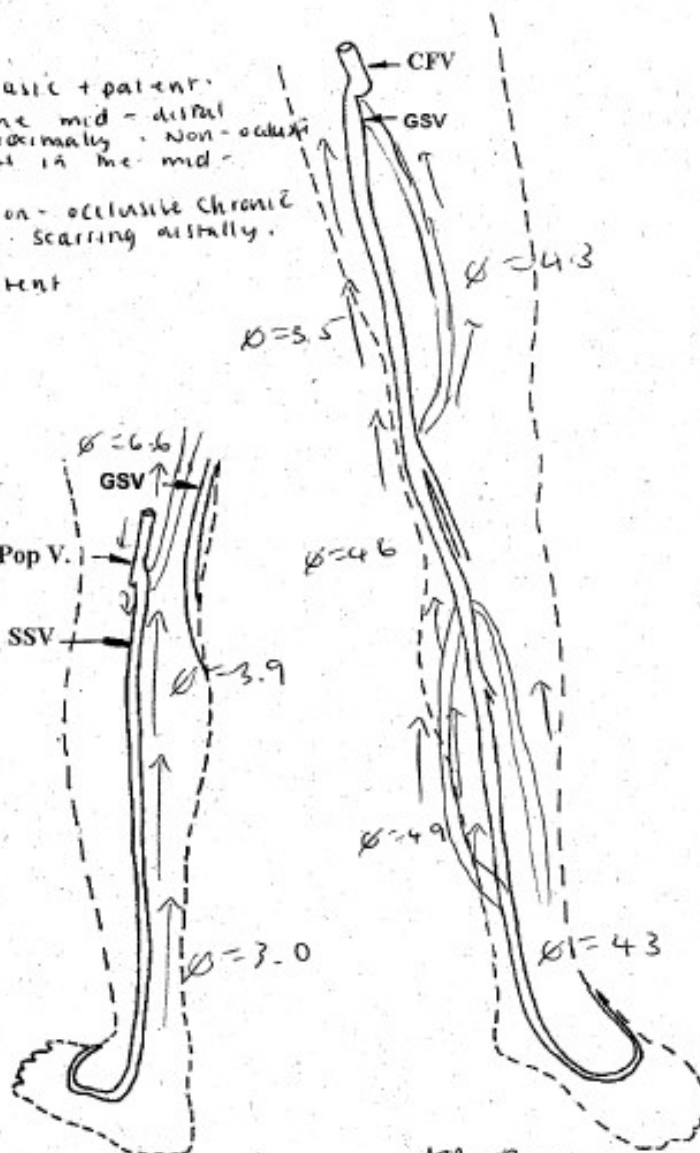
SFJn: } Patent + competent
GSV: }

SPJn: incompetent

SSV: Patent + competent

Competent ? posterior
high vein

Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N



Adrian
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great
Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

1/2

Date: 14.12.2029

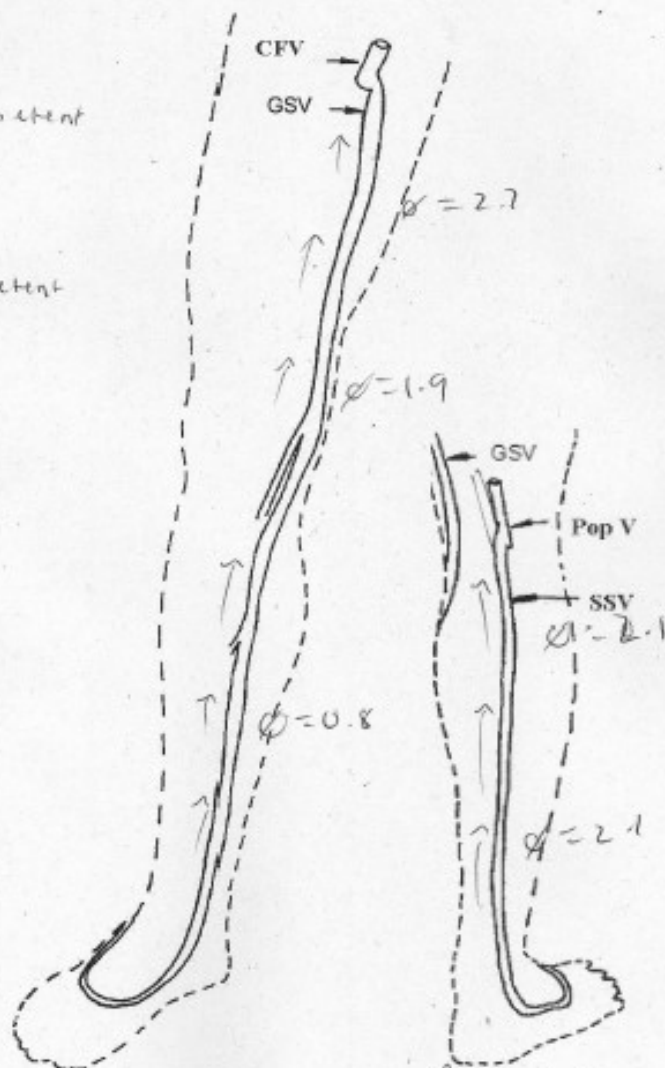
Consultant:

SLK

CFV: } Patent + competent
FV: }
PopV: }

SFJn: } Patent + competent
GSV: }

SPJn: Not visualized
SSV: Patent + competent



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Nottingham University Hospitals **NHS**

NHS Trust

The Vascular Laboratory

Department of Vascular and Endovascular Surgery

Right Leg Venous Duplex Report

Date: 06.12.2023

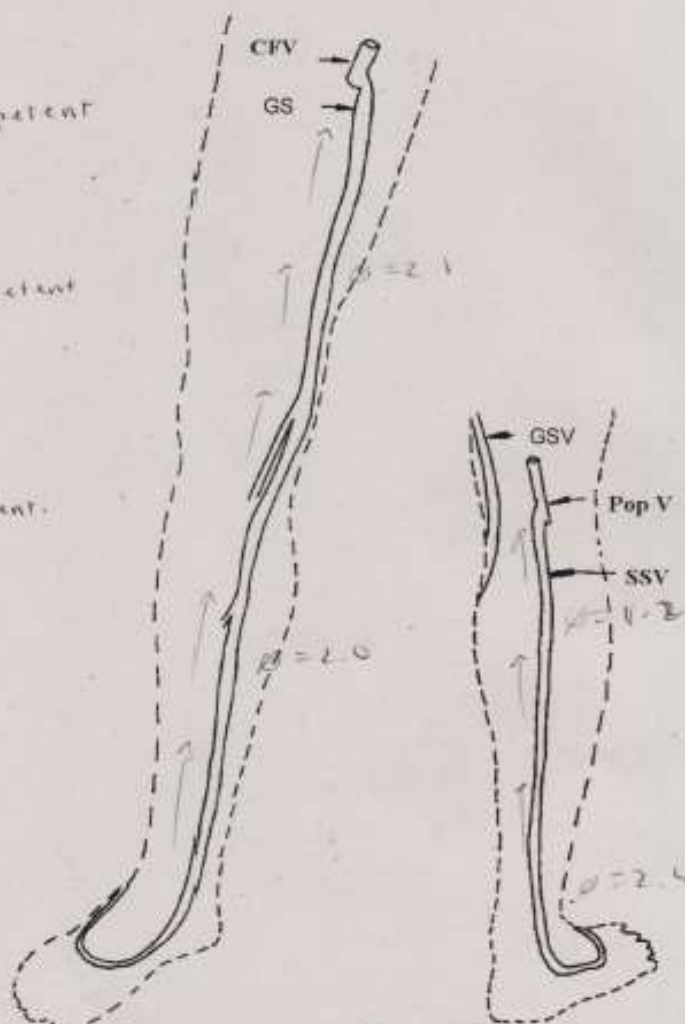
Consultant:

ONJ

CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: not visualised
SSV: Patent + competent



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 06.12.2023

Consultant:

DN

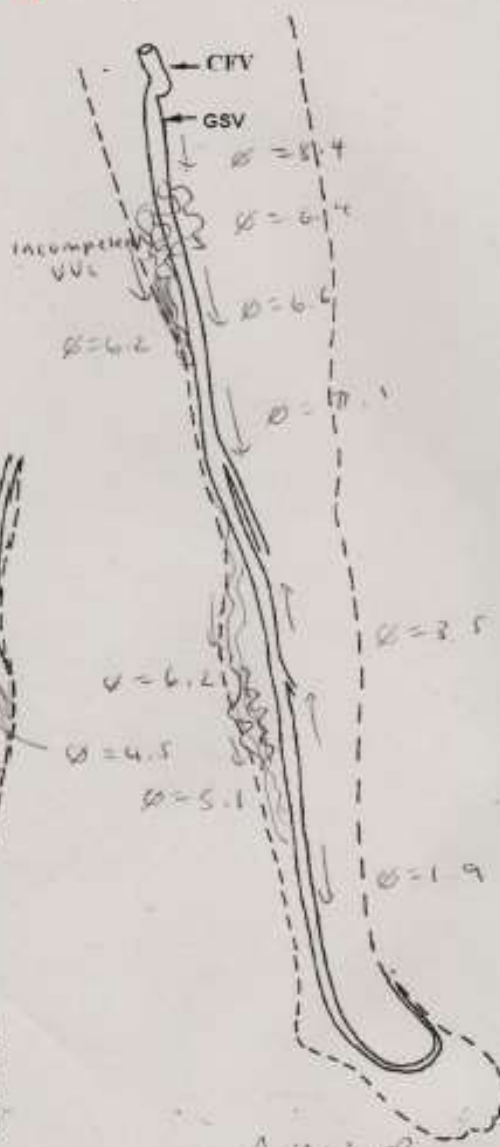
CFV: }
FV: } Patent + competent
PopV: }

SFJn: incompetent

GSV: segmental incompetence
incompetent throughout the
 thigh - competent in the proximal
 as mid calf incompetent distally

SPJn: not visualised

SSV: competent
 throughout



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Nottingham University Hospitals **NHS**

NHS Trust

The Vascular Laboratory

Department of Vascular and Endovascular Surgery

Right Leg Venous Duplex Report

Date: 08.12.2023

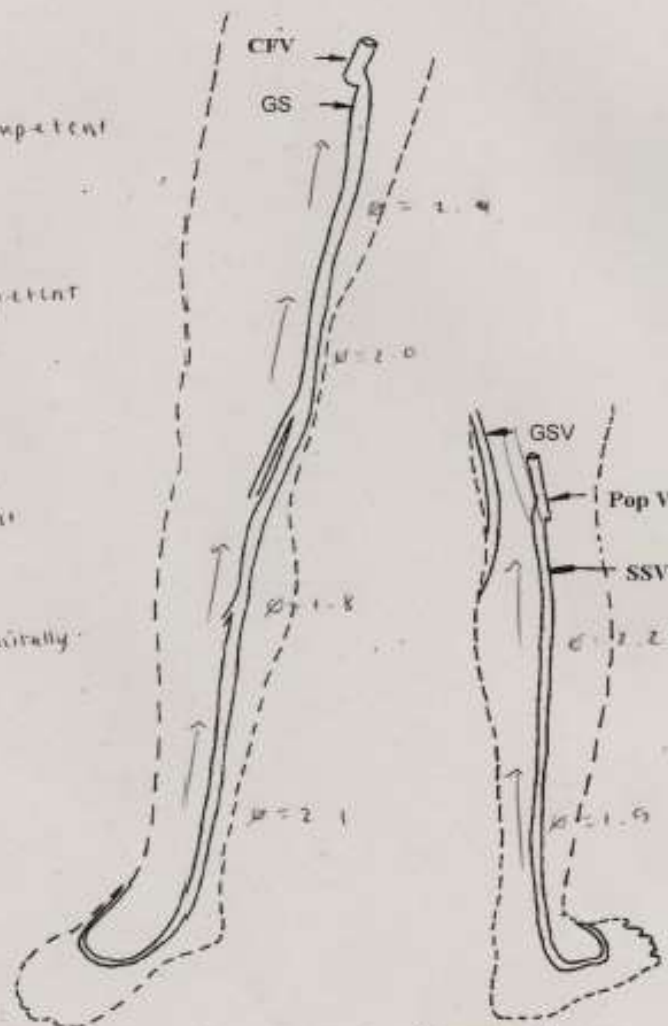
Consultant: Drs

CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: Not visualized
SSV: Patent + competent

Biphasic ATN + RTN distally



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Nottingham University Hospitals **NHS**

NHS Trust

The Vascular Laboratory

Department of Vascular and Endovascular Surgery

Right Leg Venous Duplex Report

Date: 04.12.2023

Consultant: SLK

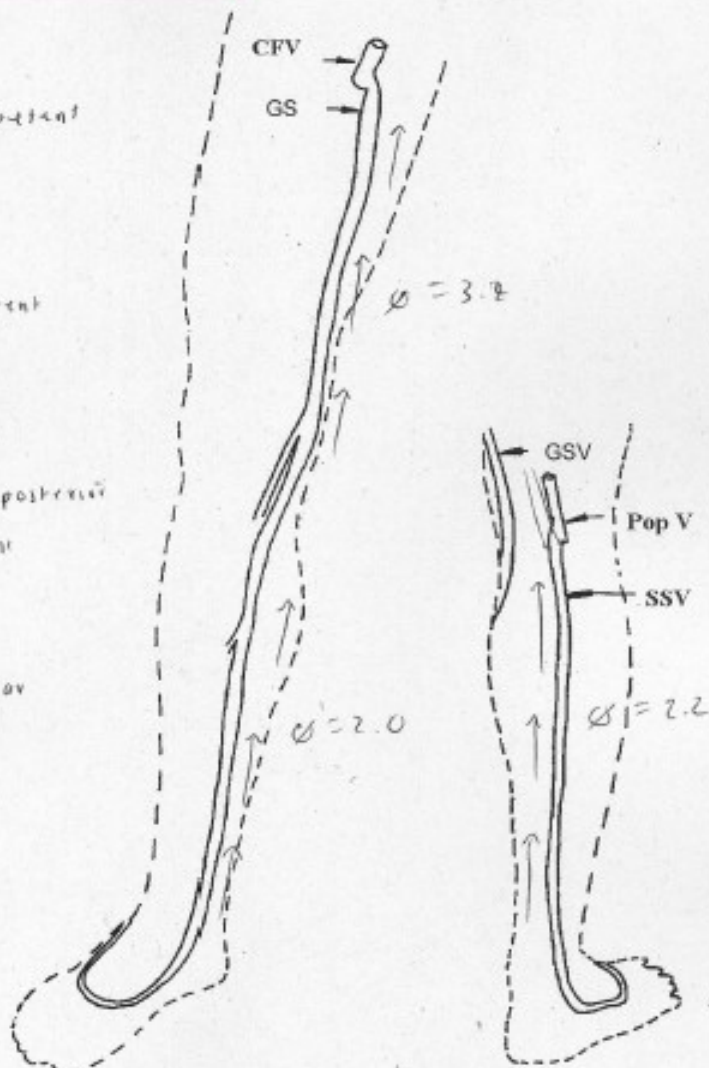
CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: not visualised ? posterior thigh vein
SSV: Patent + competent

Distal ATA + PTA appear occluded: ~~unobscured~~

Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N



Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 21.12.2023

Consultant:

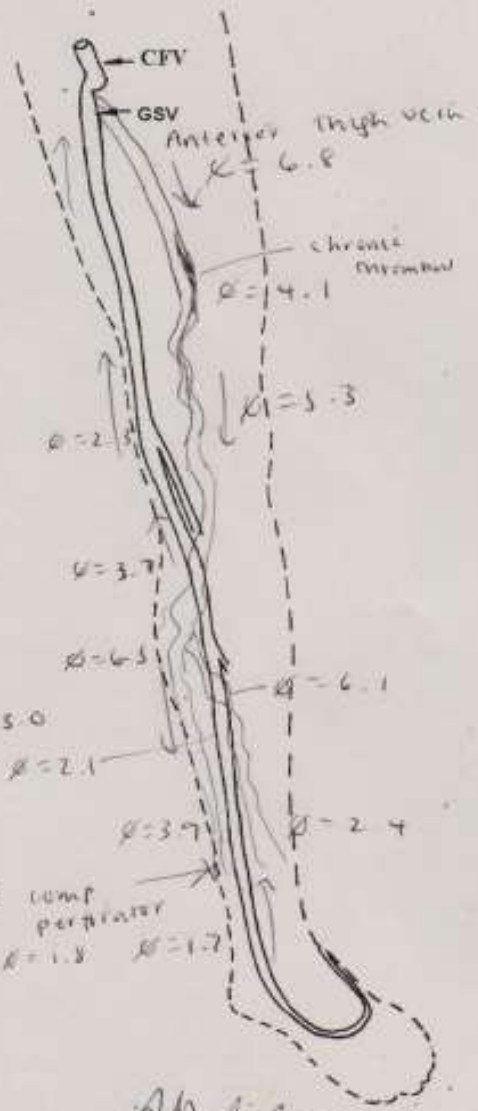
AND

CFV } Patent + competent
FV }
PopV }

SFJn: incompetent
GSV: competent

SPJn: not visualised
SSV: competent

Anterior thigh vein is incompetent starting around mid - distal thigh.



Recurrent?	☒ Y
Radiofrequency Ablation?	☒ Y
FOAM?	☒ Y

Sharon
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 12.12.2023

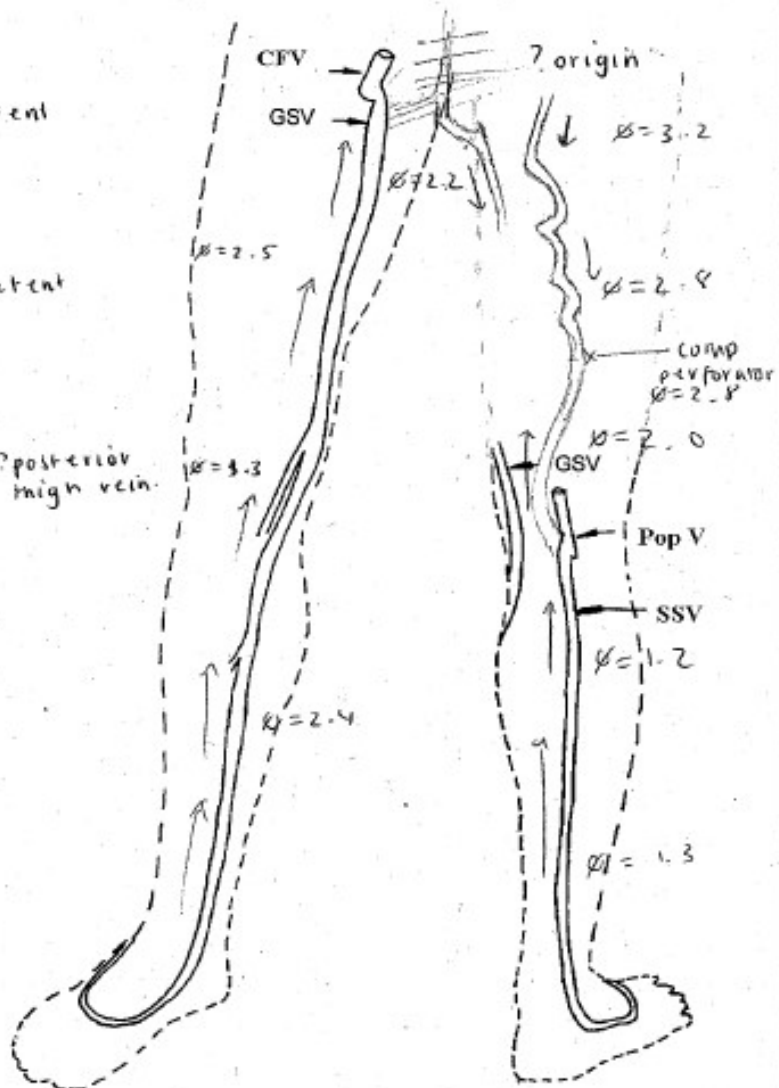
Consultant:

AND.

CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: Not visualised ? posterior thigh vein.
SSV: Patent + competent



Recurrent?	☒ Y / ☐ N
Radiofrequency Ablation?	☒ Y / ☐ N
FOAM?	☒ Y / ☐ N

Amol R
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 23/11/2023

Consultant:

SLK

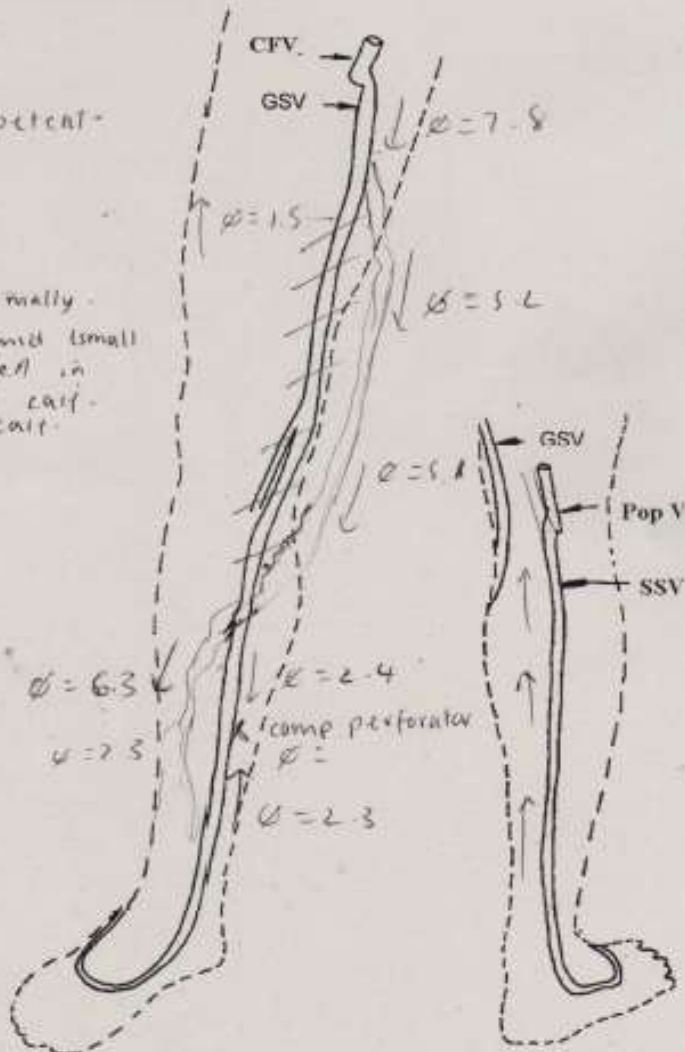
CFV: }
FV: } Parent + competent -
PopV: }

SFJn: Incompetent

GSV: Incompetent proximally.
Competent in the mid (small
caliber). Not visualised in
mid thigh - proximal calf.
Incompetent in mid calf.

SPJn: Not visualised

SSV: competent



Recurrent?	Y / ☒ N
Radiofrequency Ablation?	Y / N
FOAM?	☒ / N

A. M. R.
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 14/12/2023

Consultant:

SLK

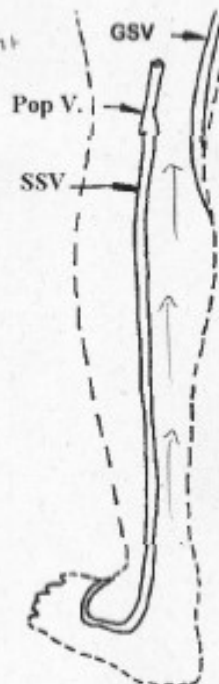
CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: Not visualised

SSV: Patent + competent

TP: 85mmHg



Recurrent?	☒ Y ☒ N
Radiofrequency Ablation?	☒ Y ☒ N
FOAM?	☒ Y ☒ N

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 14.12.2023

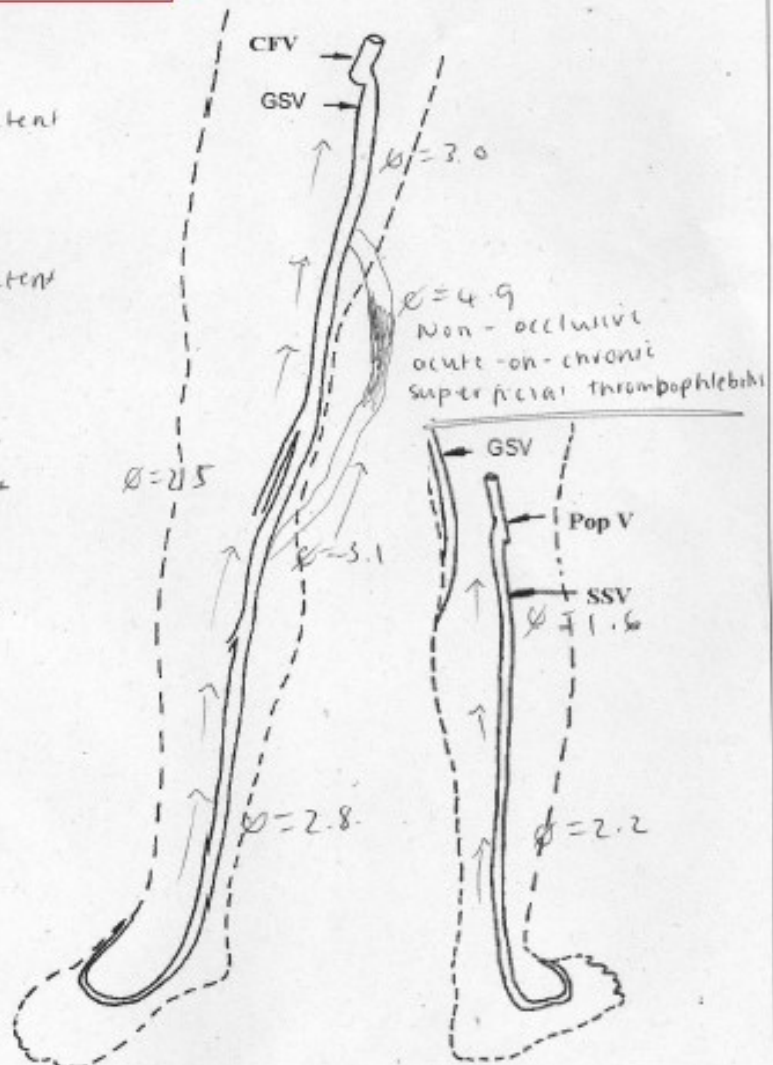
Consultant: SLK

CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: Not visualised
SSV: Patent + competent

TP: 95mmHg



Recurrent?	Y / N
Radiofrequency Ablation?	Y / N
FOAM?	Y / N

Amaly R
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 18.12.2023

Consultant:

AND

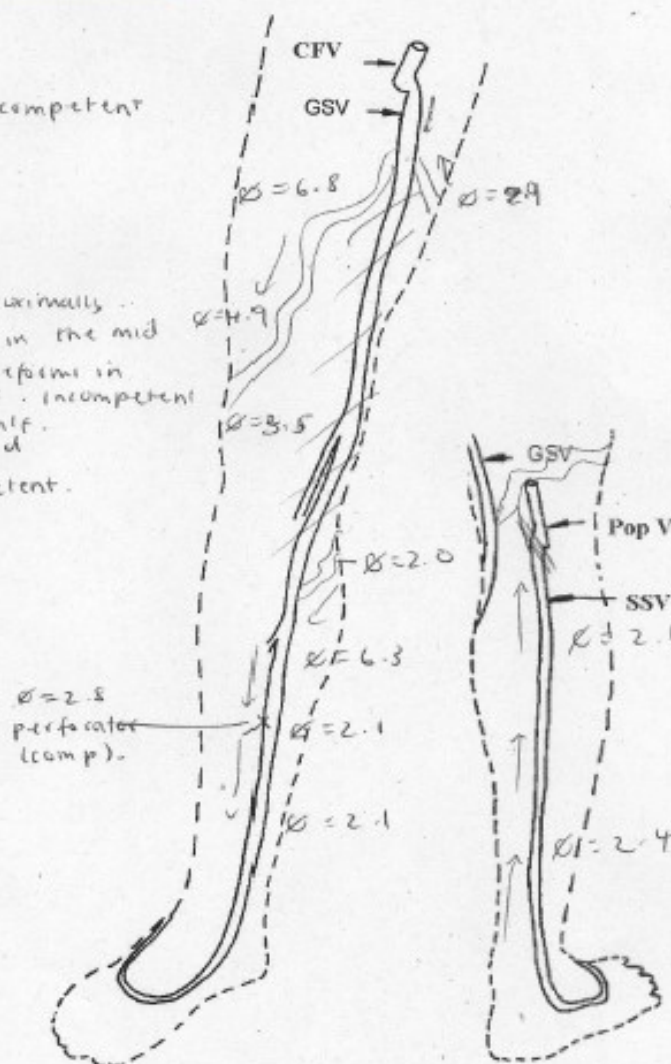
CFV: } Patent + competent
FV: }
PopV: }

SFJn: incompetent

GSV: Incompetent proximally...
Appears absent in the mid
to distal thigh. Reflows in
the proximal calf. Incompetent
throughout the calf.

SPJn: Not visualised

SSV: Patent + competent.



Recurrent?	☒ Y / ☐ N
Radiofrequency Ablation?	☐ Y / ☒ N
FOAM?	☒ Y / ☐ N

A. Morgan
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Nottingham University Hospitals **NHS**

NHS Trust

The Vascular Laboratory

Department of Vascular and Endovascular Surgery

Right Leg Venous Duplex Report

Date: 06-12-2023

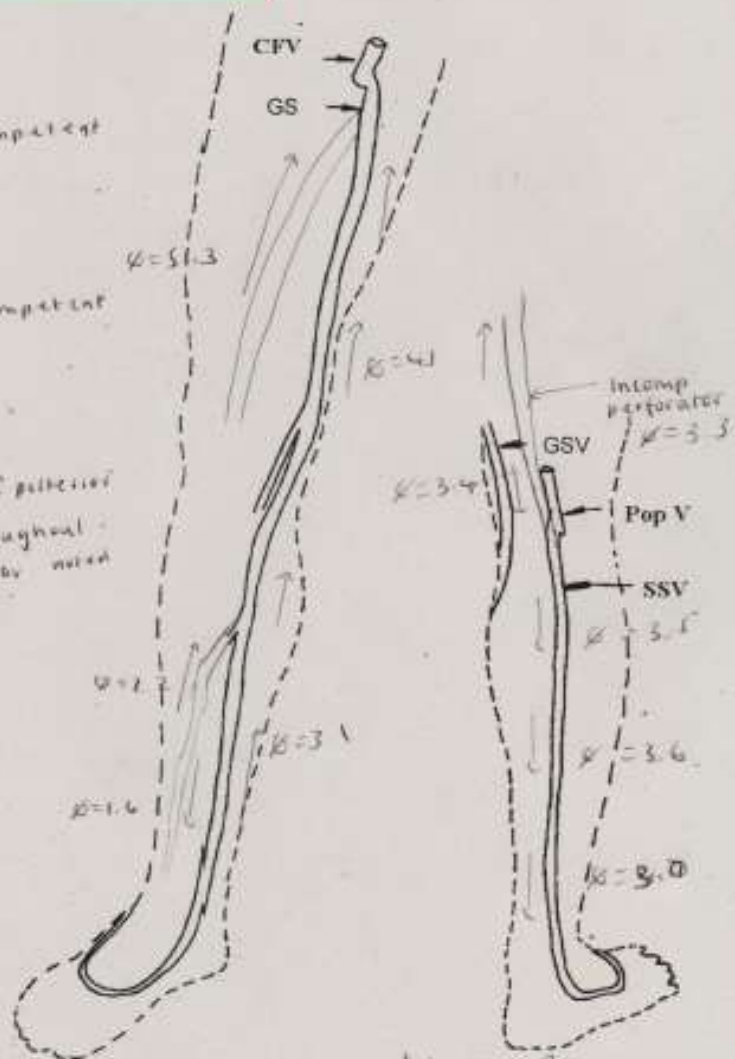
Consultant:

7AB

CFV: }
FV: } Patent + competent
PopV: }

SFJn: }
GSV: } Patent + competent

SPJn: Not visualised 2 posterior thigh vein
SSV: Incompetent throughout - incompetent perforators noted in the distal thigh



Recurrent?	☒ Y / ☐ N
Radiofrequency Ablation?	☒ Y / ☐ N
FOAM?	☒ Y / ☐ N

Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral

Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)

Date: 2.1.2024

Consultant:

AOO

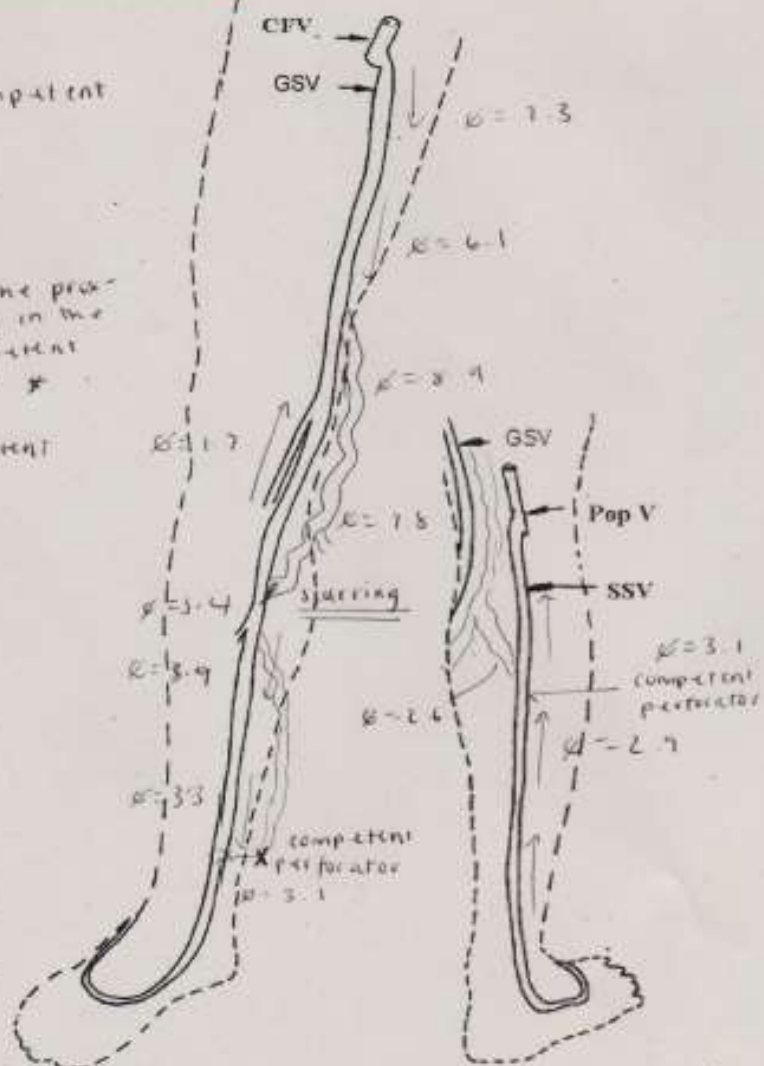
CFV: }
FV: } Patient + competent
PopV: }

SFJn: Incompetent

GSV: Incompetent in the prox-
mid thigh. Competent in the
distal thigh. Incompetent
throughout the calf. *

SPJn: }
SSV: } Patient + competent

* scarring noted in
proximal calf.



Recurrent?	Y / ☒ N
Radiofrequency Ablation?	Y / ☒ N
FOAM?	☒ Y / N

[Signature]
Clinical Vascular Scientist

Common Femoral Vein(CFV), Femoral Vein (FV), Popliteal Vein(PopV), Saphenofemoral Junction(SFJn), Great Saphenous Vein(GSV), Saphenopopliteal junction(SPJn), Small Saphenous Vein(SSV)