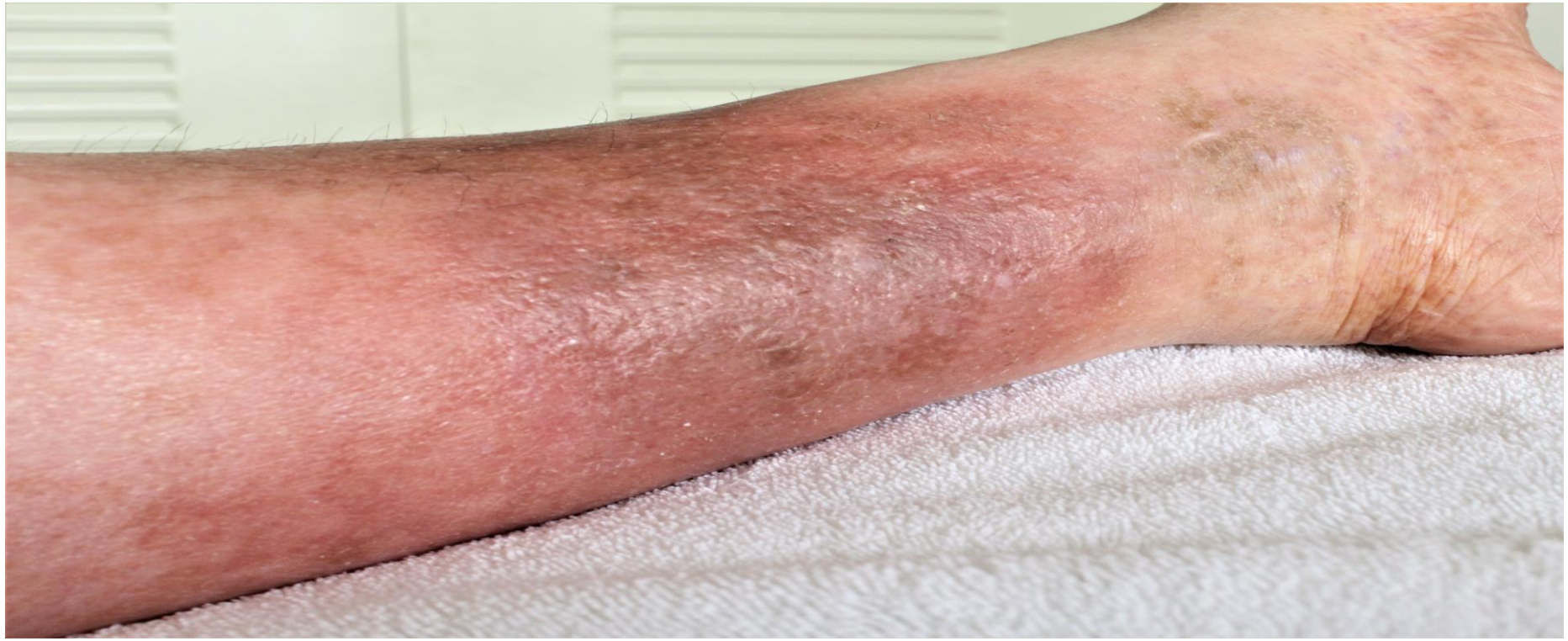


PAD vs Venous Disease:
A Primer for the Trainee & Young Attending

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360 Vascular Institute

April 11, 2025

OHIO OSTEOPATHIC SYMPOSIUM
Convene. Learn. Lead.

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Objectives

- Differentiate the clinical presentations of peripheral arterial disease (PAD) and chronic venous disease (CVD) to improve diagnostic accuracy in primary care settings.
- Recognize when and how to initiate appropriate diagnostic testing for PAD, venous insufficiency, or both, including when to refer for specialized vascular evaluation.
- Implement first-line management strategies and patient education techniques to optimize outcomes, prevent complications, and reduce unnecessary delays in care for patients with lower extremity vascular disease.

Penn Medicine



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	PAD/CLI	CVI	Severe CVI & Phlebolymphedema
Signs & Symptoms	Claudication, rest pain, gangrene, nonhealing wound	Throbbing, cramps, restless legs, heaviness, swelling, neuropathy	Morbid obesity, nonhealing ulcers, decreased mobility
Pulses	Decreased/absent	Normal	Normal or decreased
Temperature	Cool	Normal	Normal or cool
Edema	Absent/mild	Present	Severe, involves dorsum of foot, lymphatic drainage
Skin Changes	Thin, shiny, loss of hair	Thin, loss of hair, skin discoloration	Lipodermatosclerosis, loss of hair
Ulcers	Discrete edges, deep, painful	Sides of ankles and extending to calf	Large, irregular, painful
Compression	Minimal	>20 mmHg stockings	Pneumatic
Ambulation	Pain worsens	Pain improves	Pain worsens

Prevalence of PAD Increases with Age



93 yo M with RLE pain



- 1 block claudication
- Former smoker
- A1C ~ 6.8
- No pain, no gain mentality

The Benefits of the Ankle-Brachial Index (ABI)

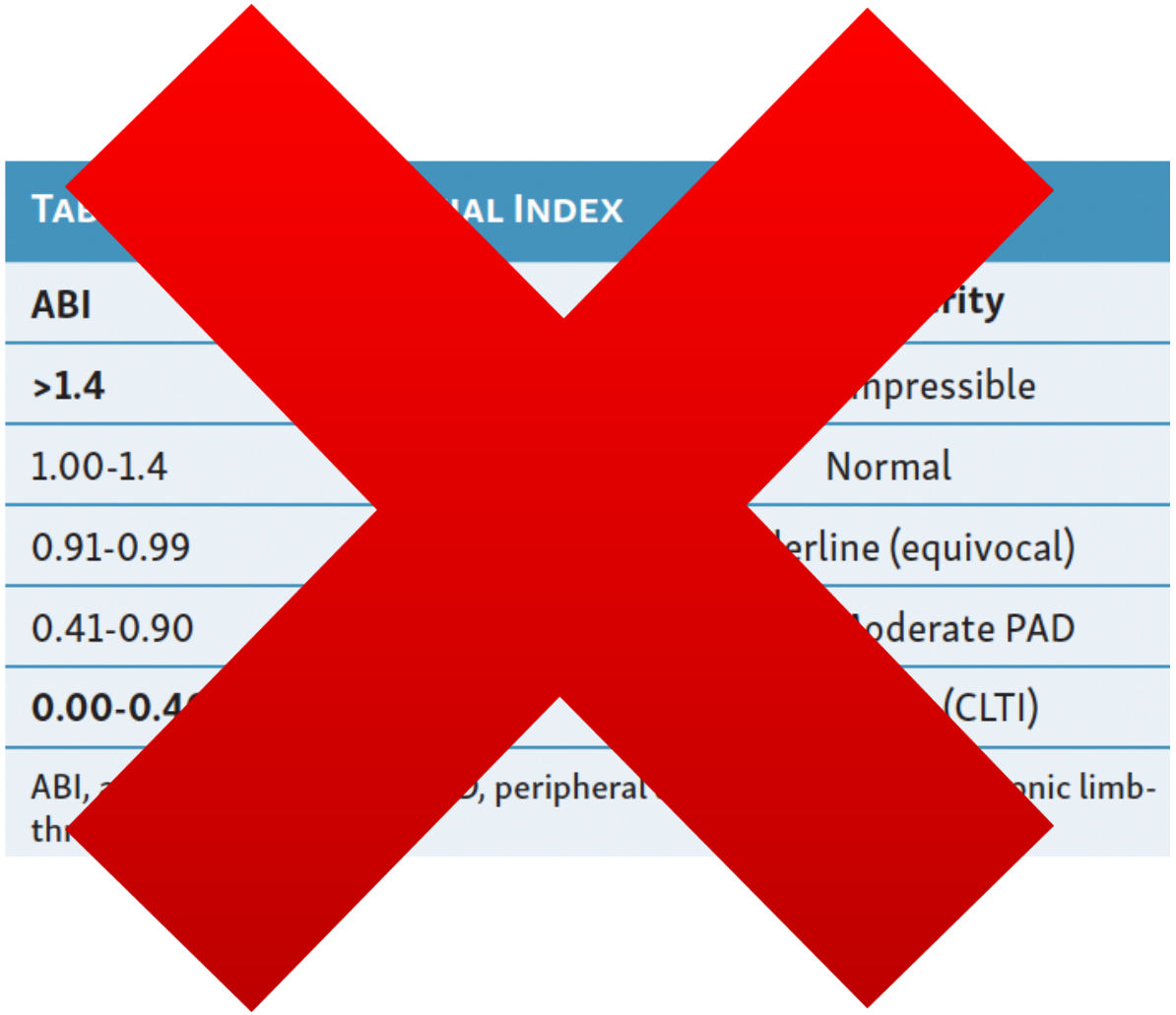
TABLE 1. ANKLE-BRACHIAL INDEX

ABI	PAD Severity
>1.4	Noncompressible
1.00-1.4	Normal
0.91-0.99	Borderline (equivocal)
0.41-0.90	Mild or Moderate PAD
0.00-0.40	Severe PAD (CLTI)

ABI, ankle-brachial index; PAD, peripheral artery disease; CLTI, chronic limb-threatening ischemia.

- Widely used for assessing arterial perfusion
- Non-invasive
- Cost-effective
- High sensitivity & specificity for PAD
- Quantitative measurement for risk stratification
- Functional assessment
- Serial monitoring

The Limitations of the Ankle-Brachial Index (ABI)



ABI	
>1.4	mpressible
1.00-1.4	Normal
0.91-0.99	derline (equivocal)
0.41-0.90	oderate PAD
0.00-0.4	(CLTI)

- Calcification
- Non-compressible vessels
- PAD location
- Venous congestion
- Ankle artery selection
- Dynamic obstruction

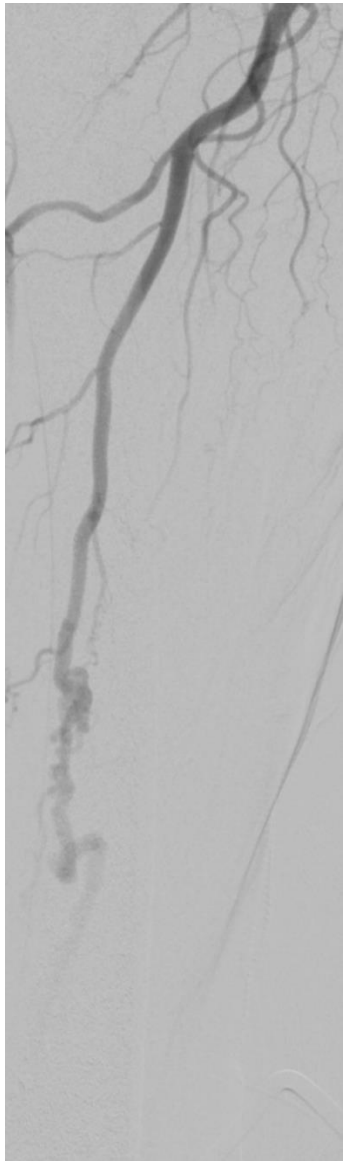
93 yo M from FL with RLE rest pain







93 yo M with RLE rest pain







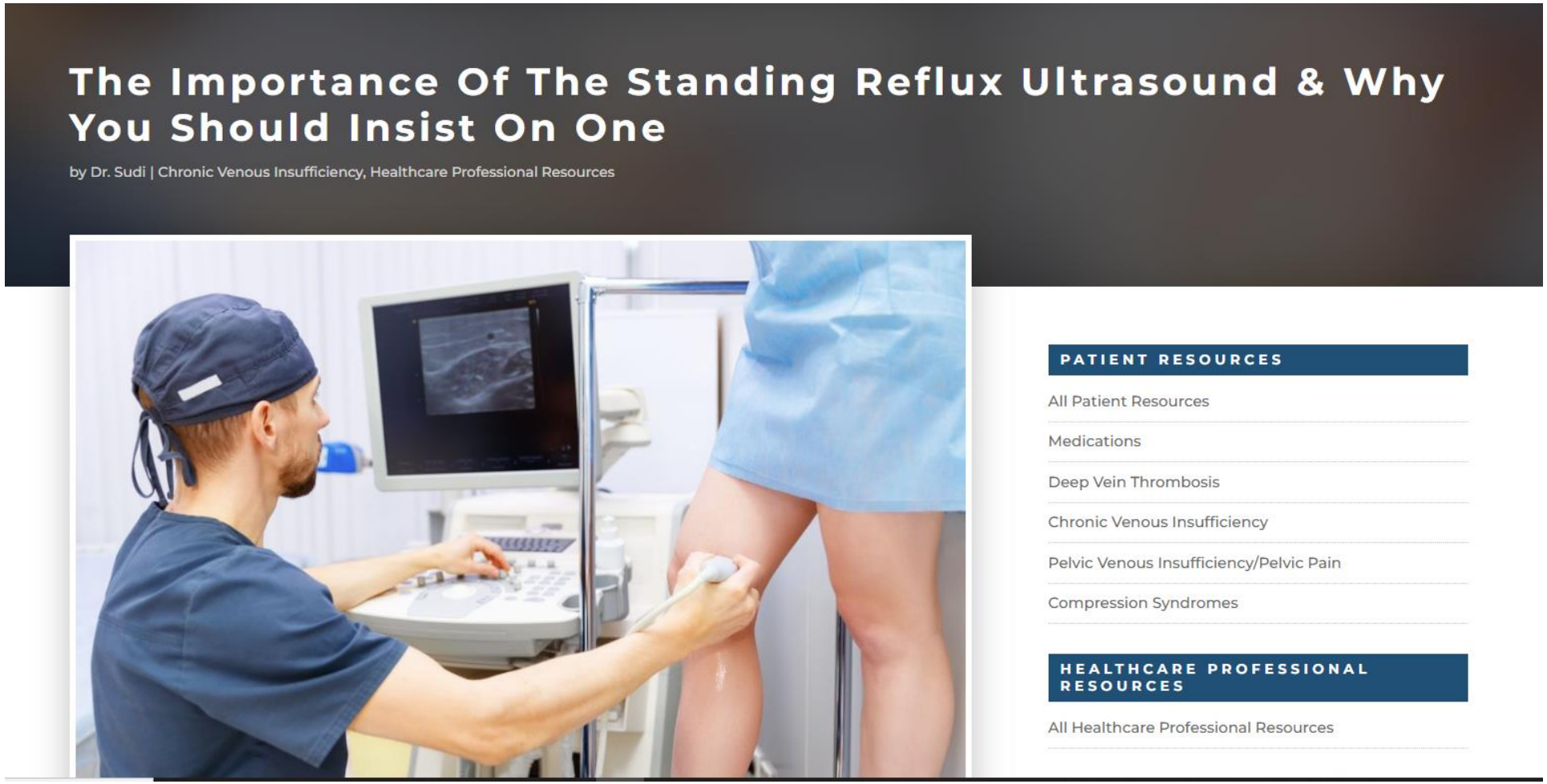


93 yo M with RLE after SFA revascularization



- 3 block claudication
- Calf tightness
- Cramps
- Neuropathy

CVI Diagnosis



www.GetHealthyVeins.com

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42 yo M with toe gangrene, calf & forearm pain w/erythema



What questions would you ask the patient?

Buerger's Disease (thromboangiitis obliterans) – vasculitis involving small and medium sized vessels.

- Onset before age 50
- Associated with heavy smoking
- Phlebitis migrans ***
- Below knee popliteal artery disease
- Absence of atherosclerotic risk factors

61 yo M h/o bariatric surg 15 yrs ago, 110 lbs wt loss, & nonhealing ulcers



61 yo M with venous ulcers

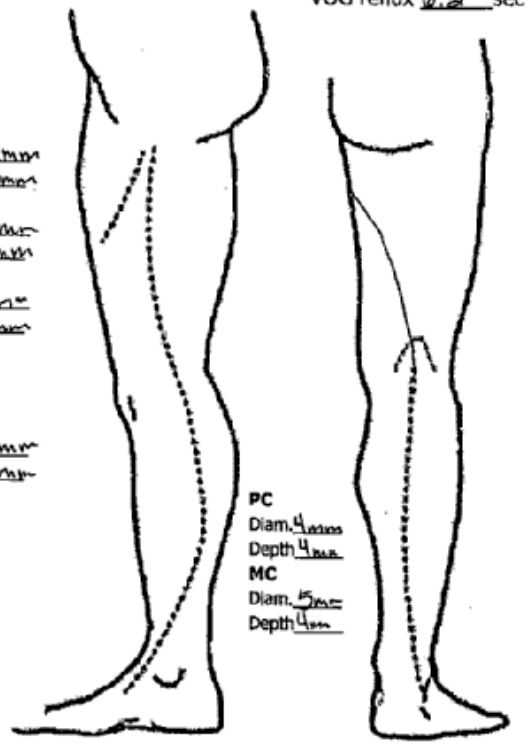
LOWER EXTREMITY INITIAL VENOUS MAPPING

Right

SFJ reflux 5.1 sec
GSV reflux 6.1 sec
AAGSV reflux Ø sec
POP reflux 1.8 sec
CFV reflux 1.7 sec
SSV reflux 5.9 sec
VOG reflux 6.2 sec

AAGSV
PT
Diam. lower
Depth 8mm
MT
Diam. 4 mm
Depth 7mm
DT
Diam. 2mm
Depth 2mm
PC
Diam. ____
Depth ____

GSV
PT
Diam. 9mm
Depth 10mm
MT
Diam. 4mm
Depth 11mm
DT
Diam. 4mm
Depth 8mm
PC
Diam. 3mm
Depth 2mm



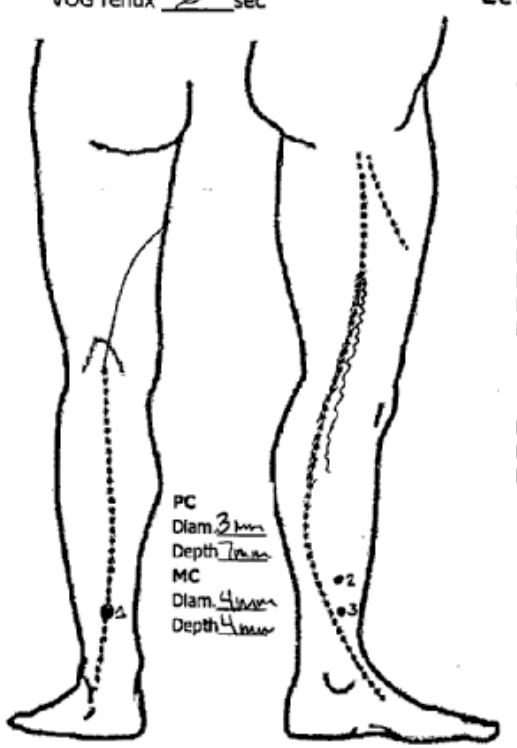
PC
Diam. 4mm
Depth 4mm
MC
Diam. 5mm
Depth 4mm

Left

SFJ reflux Ø sec
GSV reflux 5.8 sec
AAGSV reflux 5.9 sec
CFV reflux 1.2 sec
SSV reflux Ø sec
VOG reflux Ø sec

GSV
PT
Diam. 5mm
Depth 11mm
MT Recurrent
Diam. 3mm
Depth 12mm
DT Neovasc.
Diam. 2mm
Depth 3mm
PC Neovasc.
Diam. 1mm
Depth 2mm

AAGSV
PT
Diam. 5mm
Depth 10mm
MT
Diam. 2mm
Depth 8mm
DT
Diam. 2mm
Depth 2mm
PC
Diam. 2mm
Depth 2mm



PC
Diam. 3mm
Depth 7mm
MC
Diam. 4mm
Depth 4mm

- patent prox mid (L) GSV with neovascularization starting at mid thigh where remaining GSV is ablated and neovascularization both show reflux — GSV
- No vessels feeding active ulcer (wound 1). Vessels with reflux seen @ areas of wounds 2+3

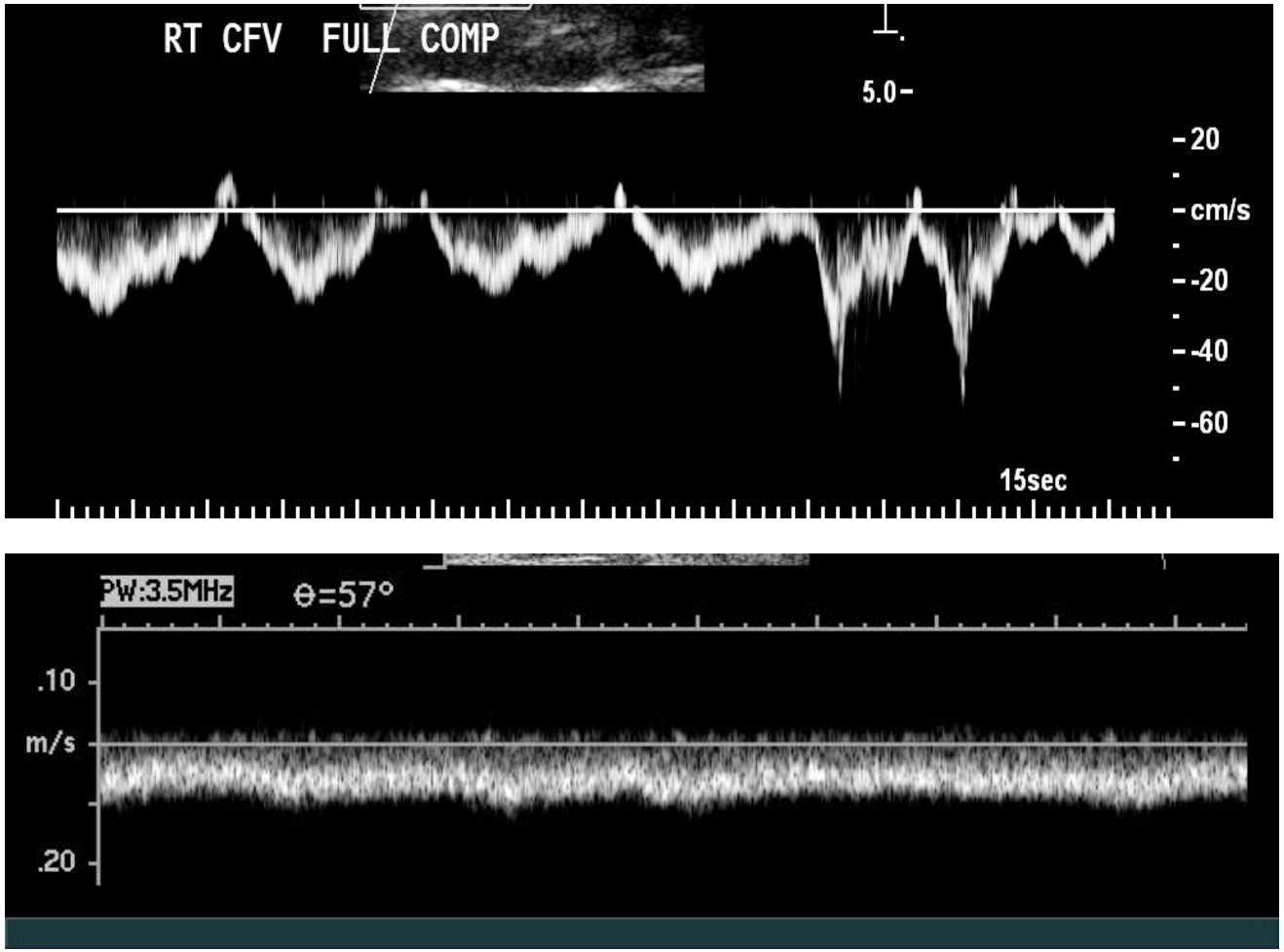
COMMENTS: _____

61 yo M with nonhealing ulcers



6 weeks post UGS & vein ablation

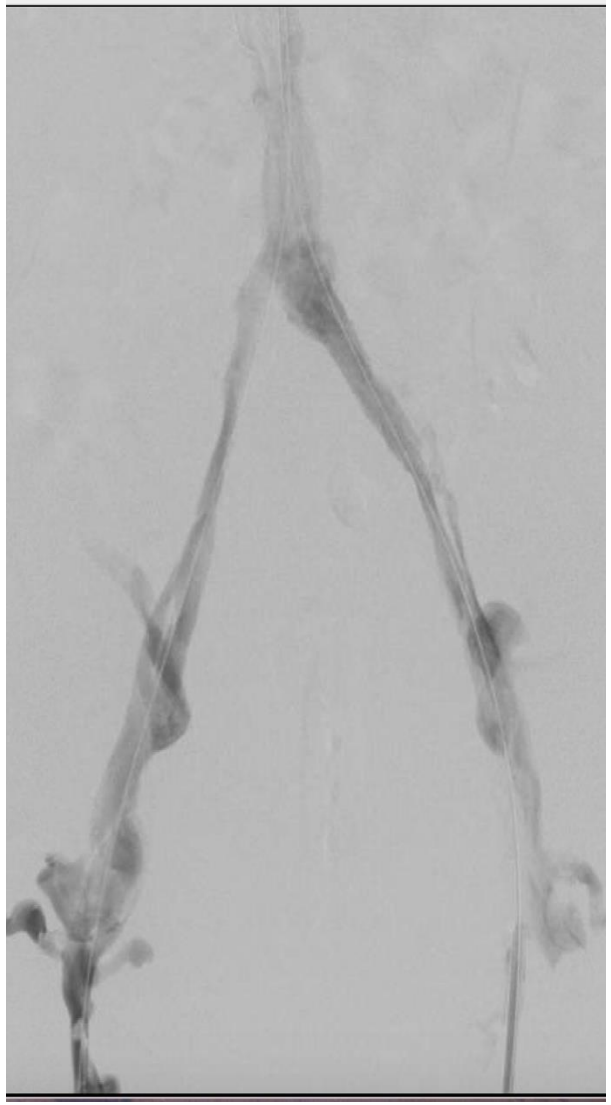
61 yo M with nonhealing ulcers

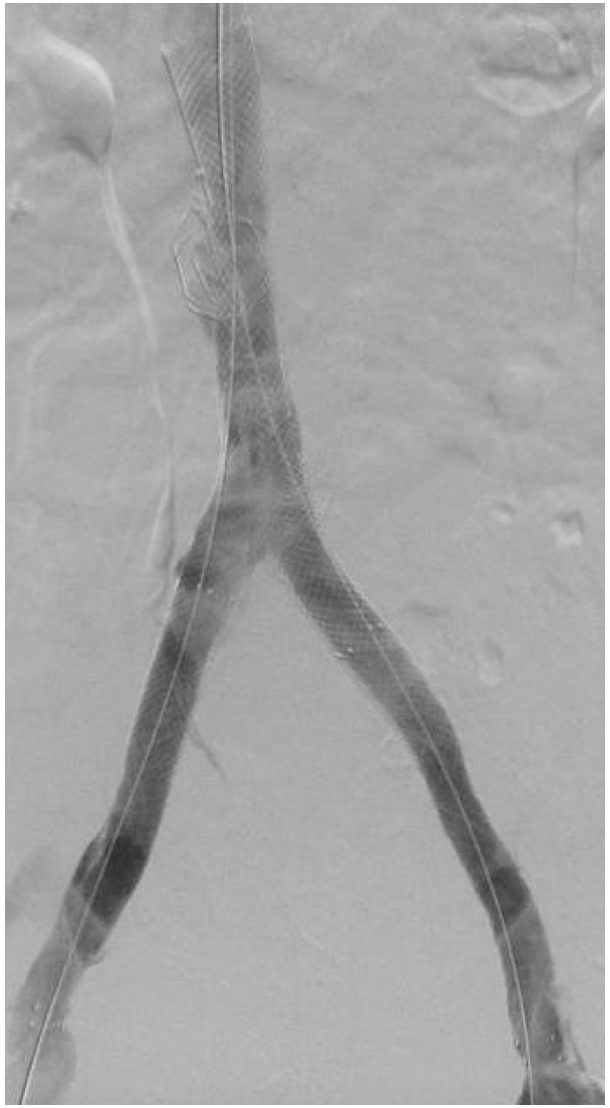


Common femoral vein waveforms studied for evidence of iliac obstruction

- Lack of respiratory variation
- No change in velocity with augmentation maneuvers

61 yo M with venous ulcers







41 yo M h/o left renal vein thrombosis c/b retroperitoneal bleed. h/o IVC filter





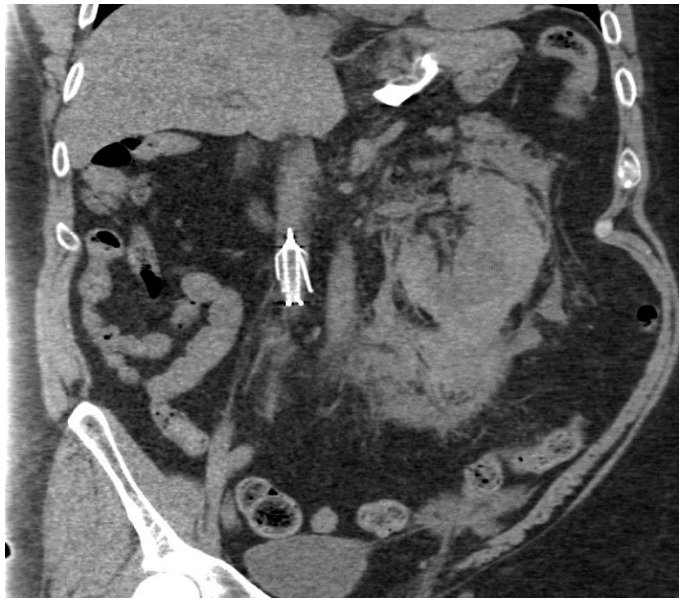
CT Venogram at HUP on 11/12/15

a.



a.) Axial images showing thrombosed IVC filter

b.

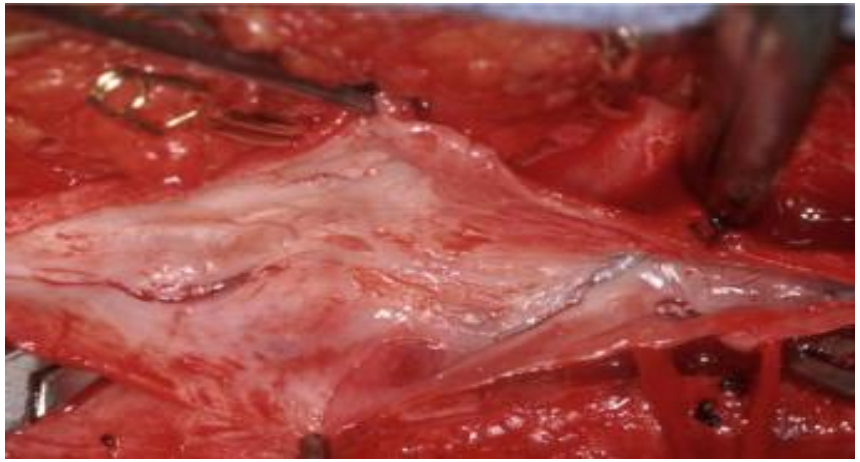


b.) Coronal imaging showing similar findings

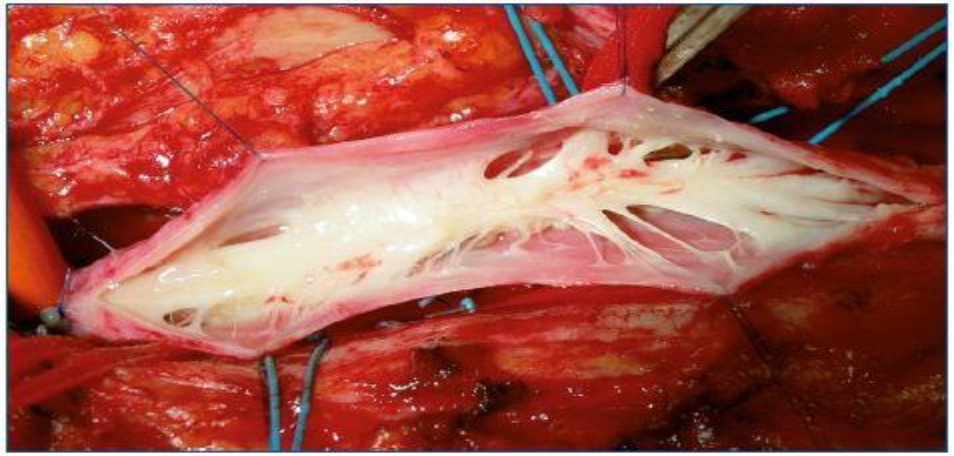
Deep Venous Reconstruction



What does PTS look like INSIDE the vein?



Healthy vein



Post thrombotic vein

HUP IR procedure – 2/3/16







1 Month Post Treatment



Before DVT treatment



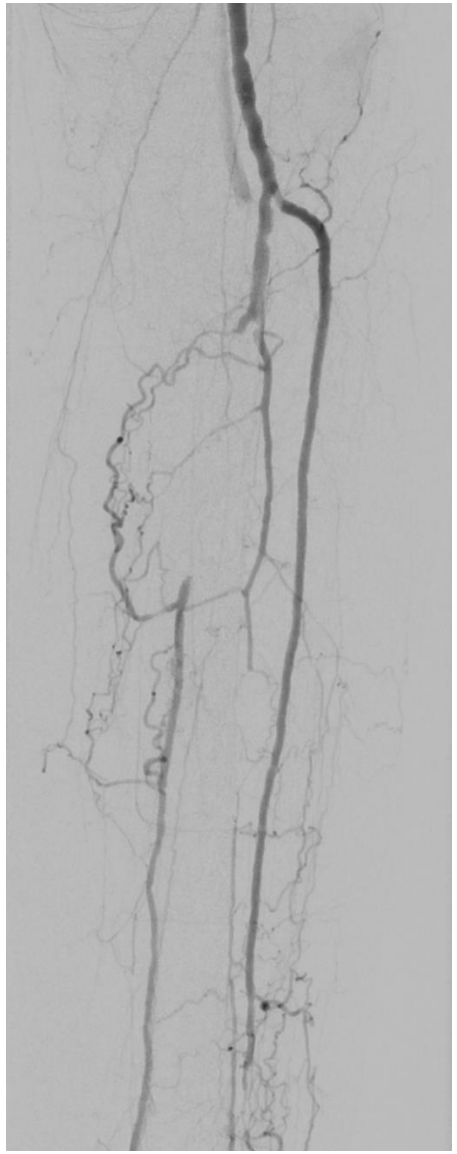
1 month after DVT treatment

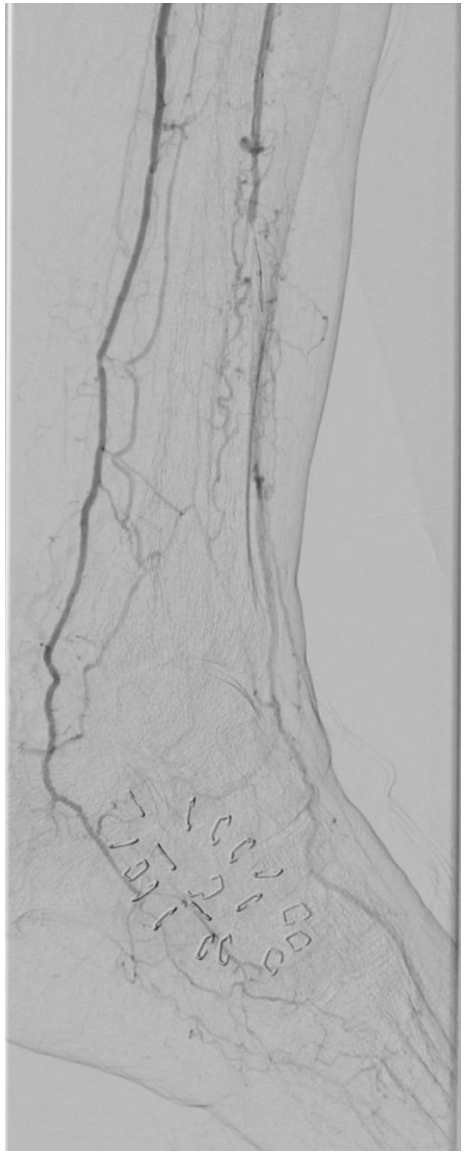
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75 yo M with CLI

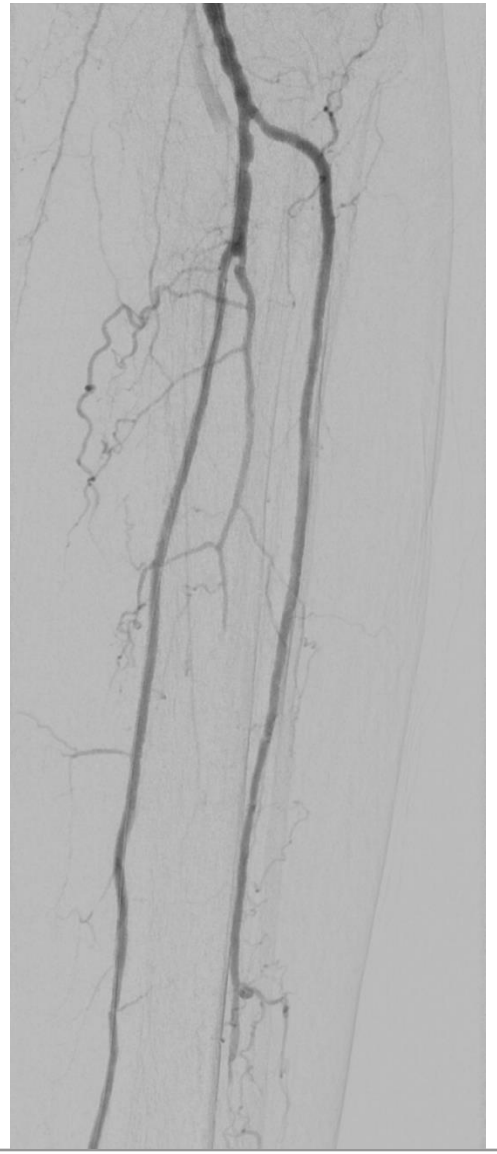






75 yo M with CLI





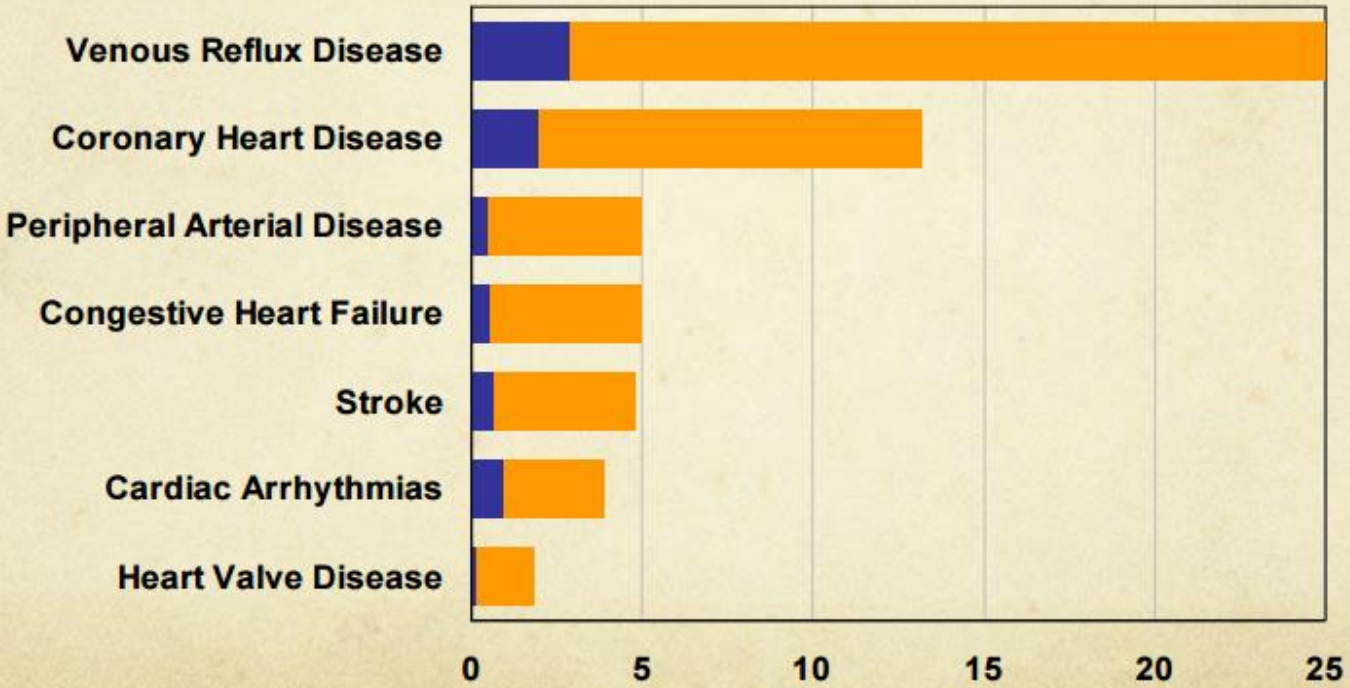


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Prevalence and Etiology of Venous Insufficiency

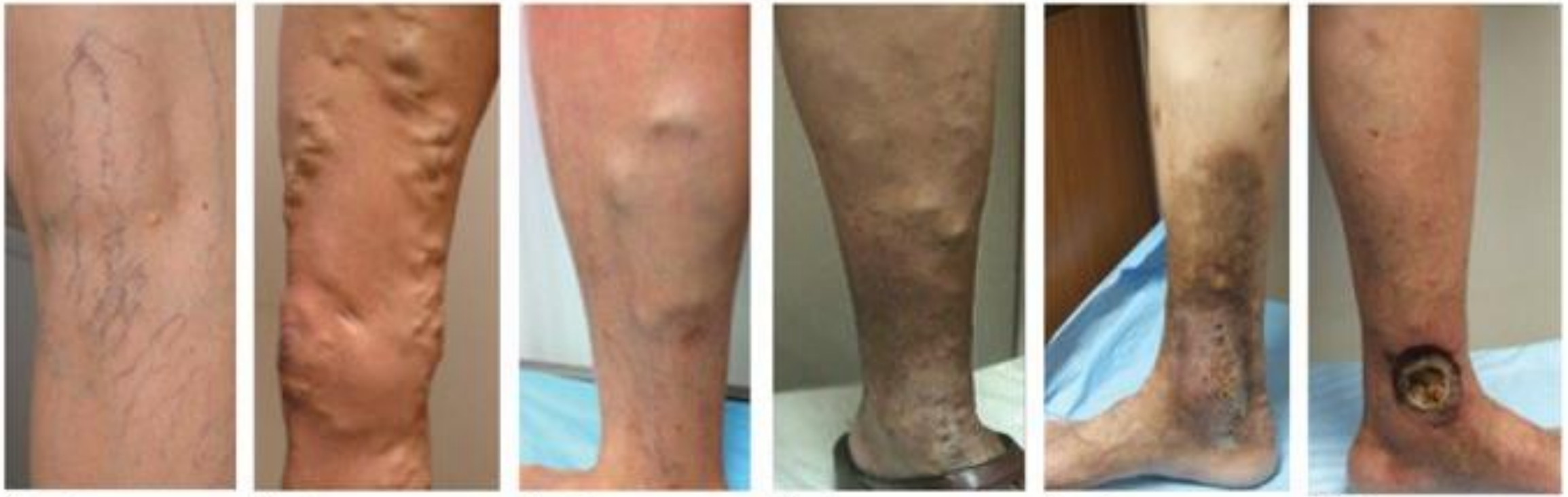
Venous reflux disease is 2x more prevalent than coronary heart disease (CHD) and 5x more prevalent than peripheral arterial disease (PAD)[1]



Brand FN, Dannenberg AL, Abbott RD, Kannel WB. The epidemiology of varicose veins: the Framingham Study. Am J Prev Med 1988; 4(2):96-101

CEAP Classification

Clinical classification



Class 1:
Telangiectasia.

Class 2:
Varicose vein.

Class 3:
Edema.

Class 4:
Pigmentation /
Eczema.

Class 5:
Healed Ulcer.

Class 6:
Venous Ulcer.

72 yo M w/20 yo h/o recurring ulcers. Wound care ctr for 6 yrs



Left leg BEFORE treatment



Right leg BEFORE treatment

Treatment Results





- Outpatient procedure ~ 30 min
- Local anesthesia
- Closure of ~ 98% saphenous veins at 2 yrs
- FDA-approved for RX of Superficial Venous Insufficiency

72 yo M w/20 yo h/o recurring ulcers. Wound care ctr for 6 yrs



Left leg BEFORE treatment



Right leg BEFORE treatment



Left leg 6 weeks after laser ablation



Right leg 6 weeks after laser ablation



Venogram performed for nonhealing ulcers & leg swelling. No h/o DVT.

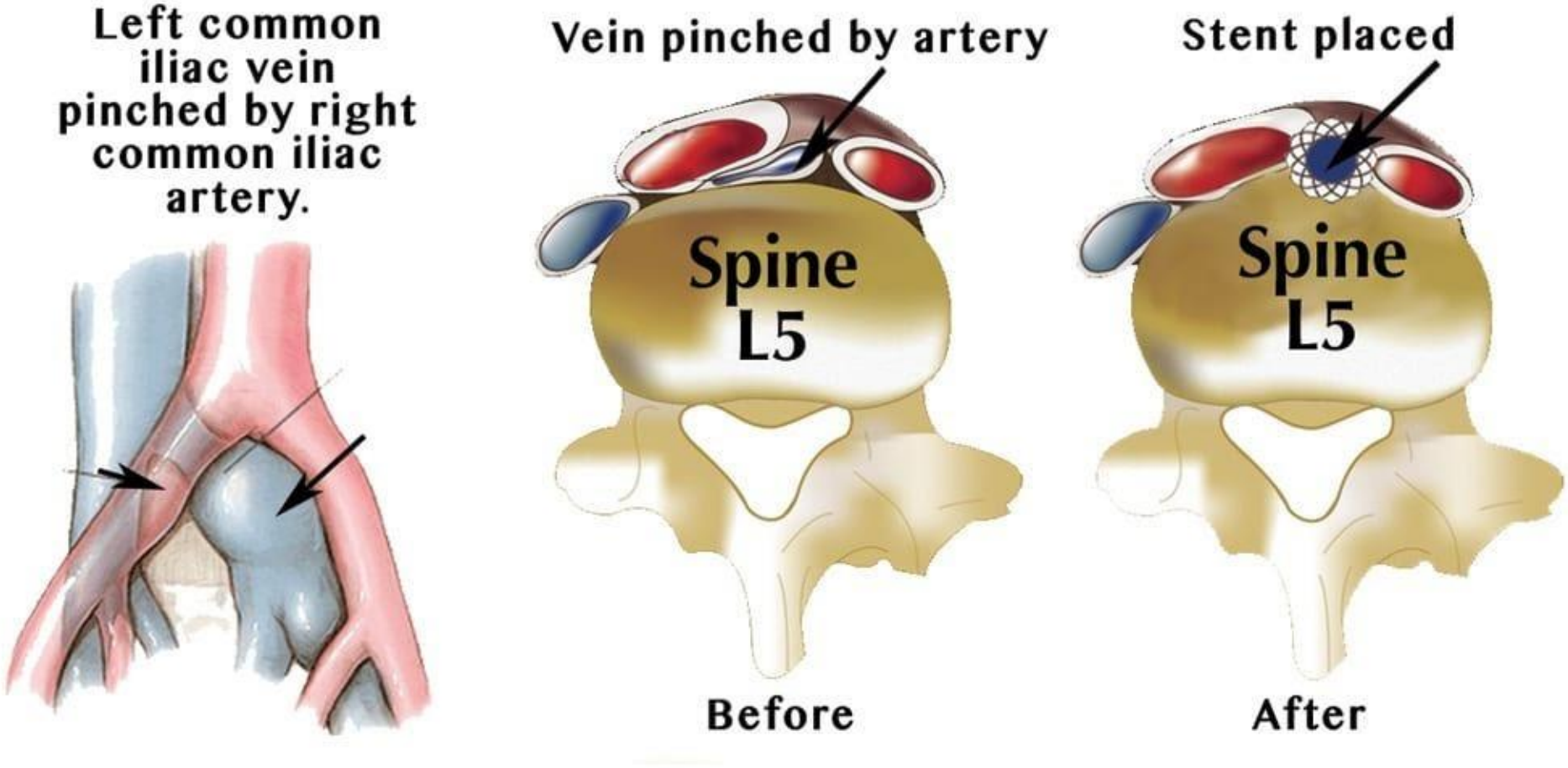


Venogram after IVUS showing compression of left CIV by large osteophyte & compression of right CIV by right iliac artery. 18mm x 9 cm Wallstents placed in bilateral iliac veins.

6 months after EVLT & iliac vein stenting



May Thurner Syndrome
(aka Iliac Vein Compression Syndrome)



May Thurner Syndrome
(aka Iliac Vein Compression Syndrome)

Wound Repair Regen. 2023 Mar;31(2):193-198.

Iliac vein recanalization and stenting accelerate healing of venous leg ulcers associated with severe venous outflow obstruction



66yo M h/o HTN/DM referred by podiatry for ABI & PAD treatment







66yo M h/o HTN/DM referred by podiatry for ABI & PAD treatment



- ABI ~ 1.1
- CTA shows 2 vessel runoff in both legs with high grade stenosis of left AT artery
- 2 block claudication
- Compression? How much?

66yo M h/o HTN/DM referred by podiatry for ABI & PAD treatment





66yo M h/o HTN/DM referred by podiatry for ABI & PAD treatment







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Take Home Points

- Screen for **both** PAD and venous disease — many patients suffer silently, and YOU may be their only opportunity to receive timely vascular care.
- Limb salvage starts with you. Managing chronic limb-threatening ischemia (CLTI) requires early recognition by the PCP and coordination with a vascular specialist, along with podiatry and wound care teams.
- PAD and venous disease often overlap. Symptoms can mimic one another; treating one condition may unmask the true severity of the other.
- ABIs are helpful—but not definitive. A normal ABI doesn’t rule out disease. Always correlate with clinical findings and consider duplex ultrasound or vascular referral when in doubt.
- Venous reflux studies must be performed UPRIGHT. If the study isn't done in the standing position, it's not diagnostically valid—advocate for proper testing.

Contact Info

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