

VEINS

the next frontier

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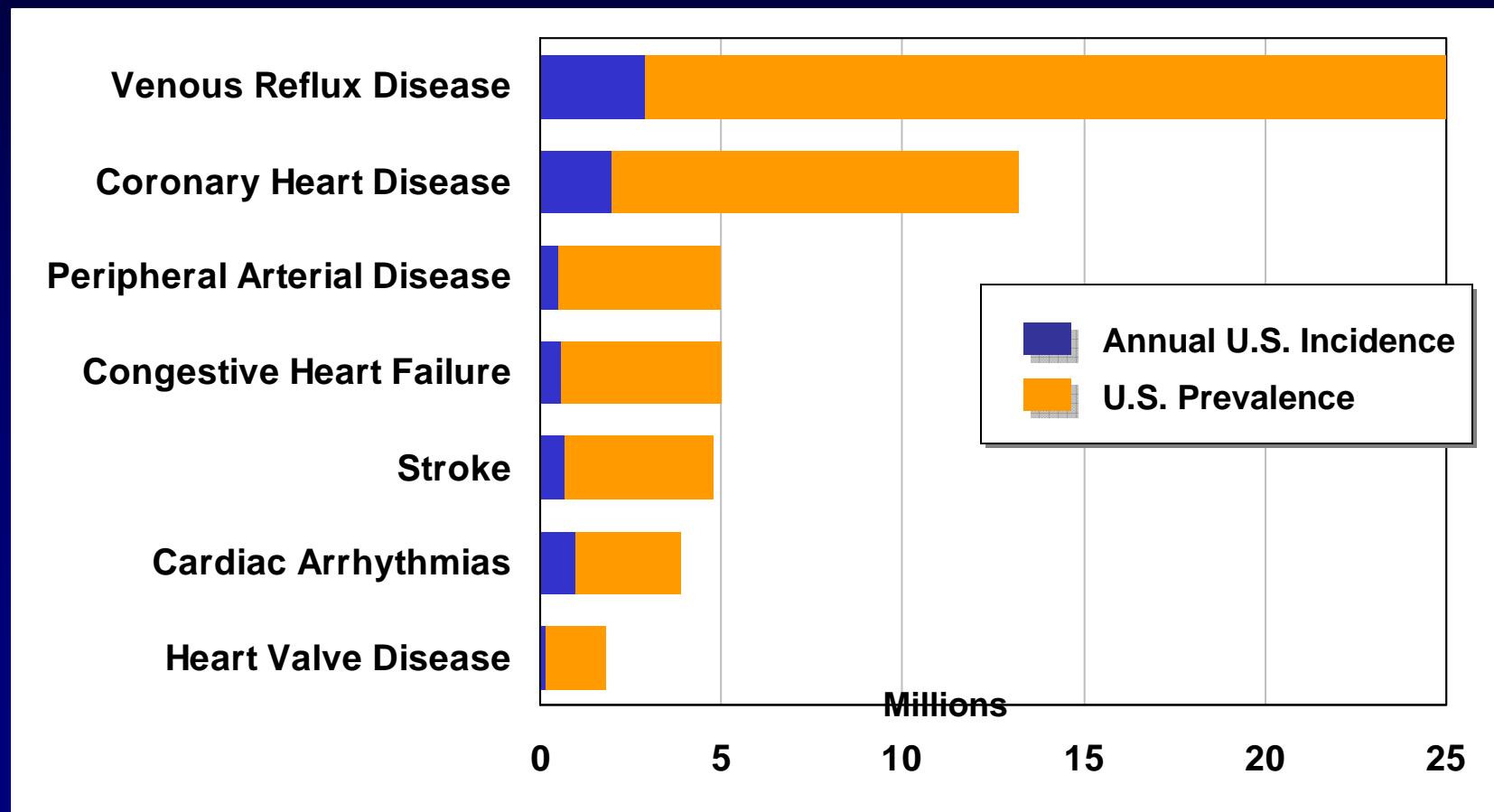
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Interventional Cardiologist, Cardiovascular Medicine, PC

Relevant Conflict of Interest

- Research and Educational grants to the Midwest Cardiovascular Research Foundation from Covidien
- www.mcrfmd.com

Prevalence and Etiology of Venous Insufficiency

CVI is 2x more prevalent than coronary heart disease (CHD) and 5x more prevalent than peripheral arterial disease (PAD)



Prevalence and Etiology of Venous Insufficiency

Of the estimated 25 million people with symptomatic superficial venous reflux¹ :

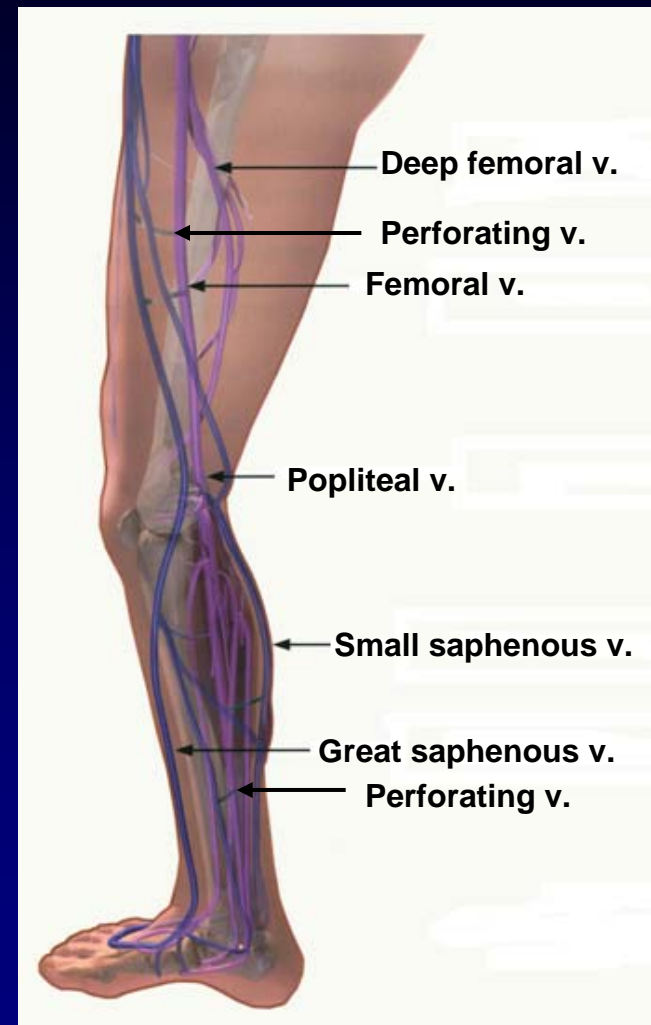
- Only 1.7 million seek treatment annually²
- Over 23 million go untreated

Prevalence by Age and Gender^{3,4}

<u>Age</u>	<u>Female</u>	<u>Male</u>
20 - 29	8%	1%
40 - 49	41%	24%
60 - 69	72%	43%

Venous System

- Venous blood flows from the capillaries to the heart
- Flow occurs against gravity
 - Muscular compression of the veins
 - Negative intra-thoracic pressure
 - Calf muscle pump
- Low flow, low pressure system
 - Deep System (FV, PV, infrapopliteal vein)
 - Superficial venous system



Superficial Venous System - GSV

- Often runs a superficial subcutaneous course from thigh-knee
- May enter and exit the saphenous sheath at various locations
- Closely associated with saphenous nerve below mid-calf



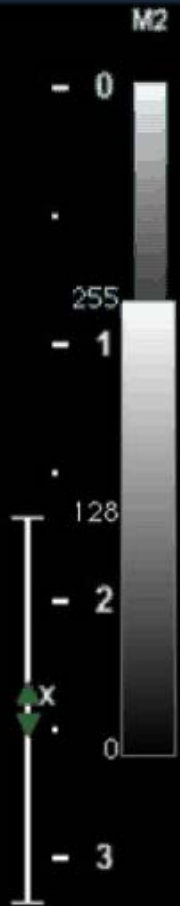
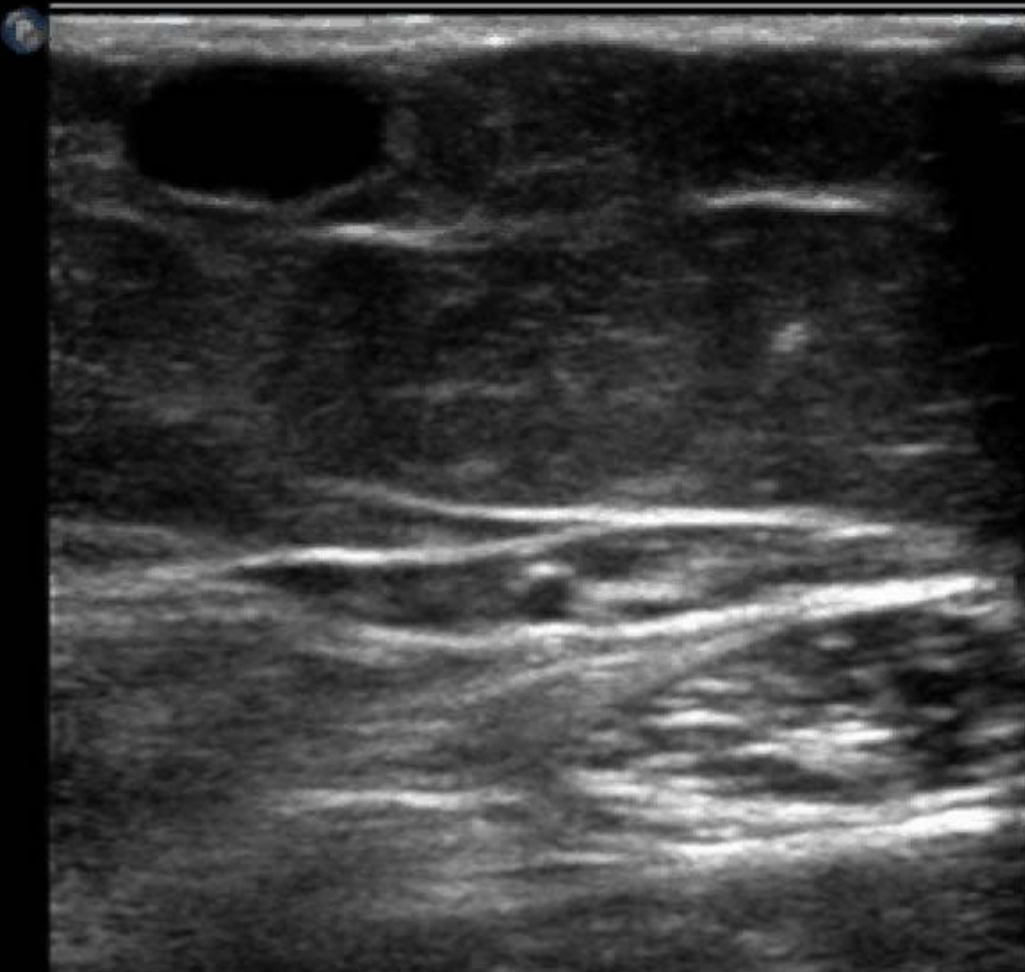
WL: 127 WW: 255 PCCV-0488851

L8-4/Vasc Ven

20100917.075227

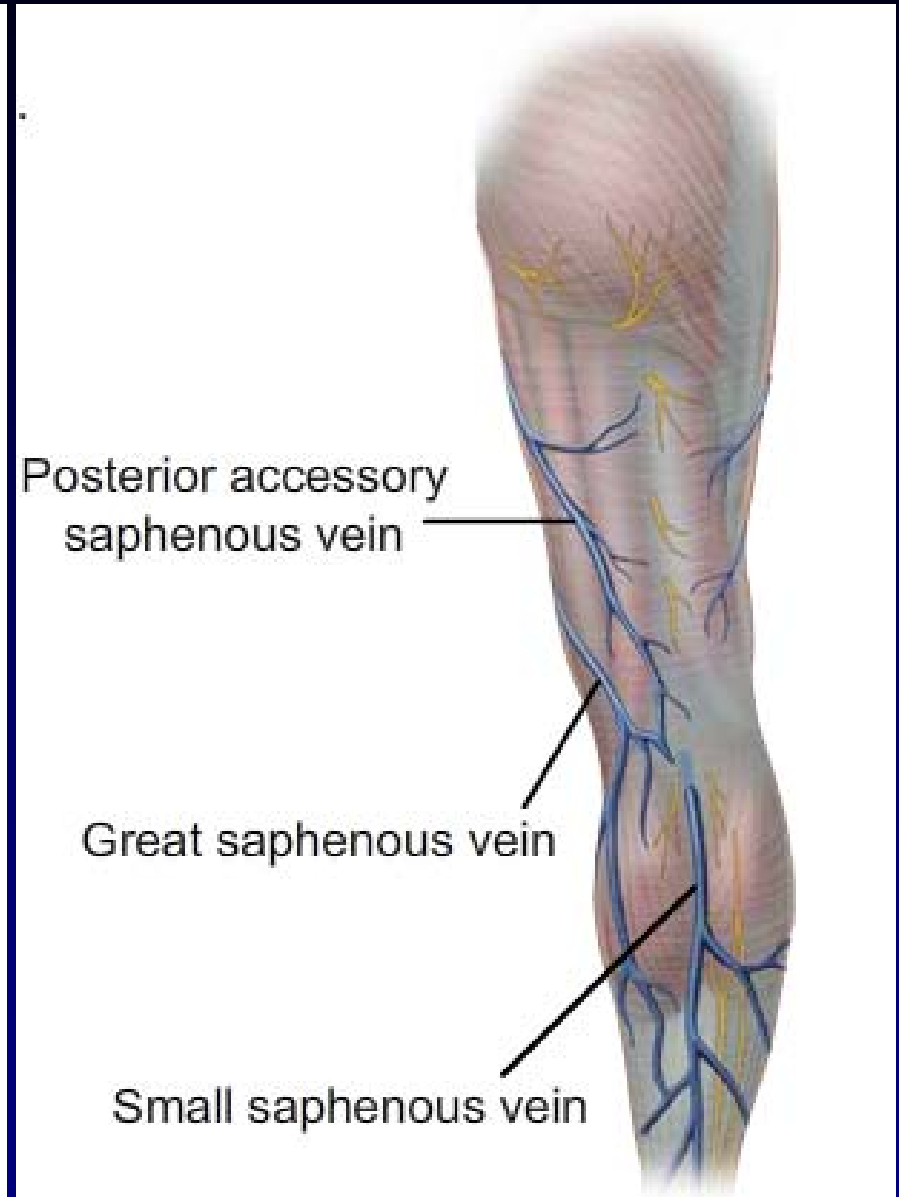
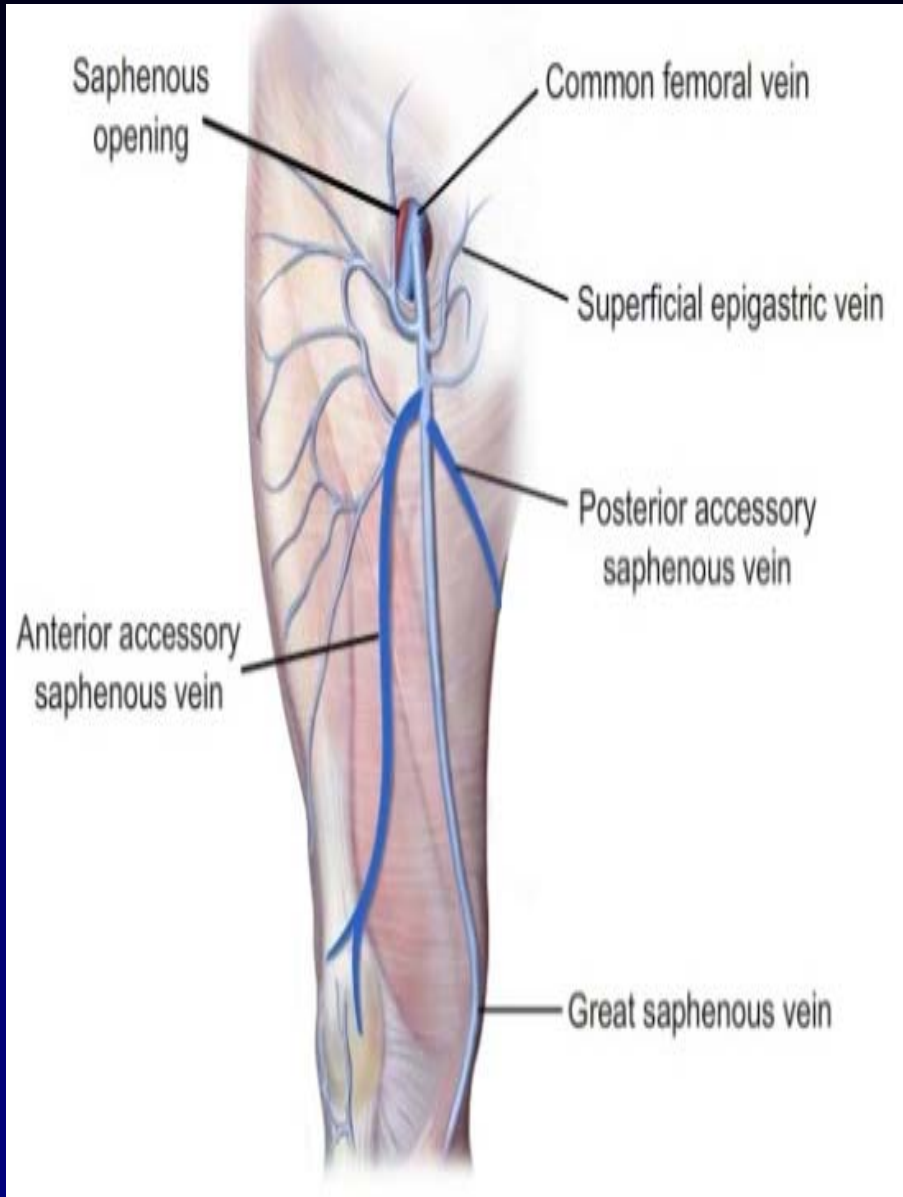
FR 48Hz
RS

2D
52%
C 54
P Low
HGen



M2

1



SSV Termination Variations



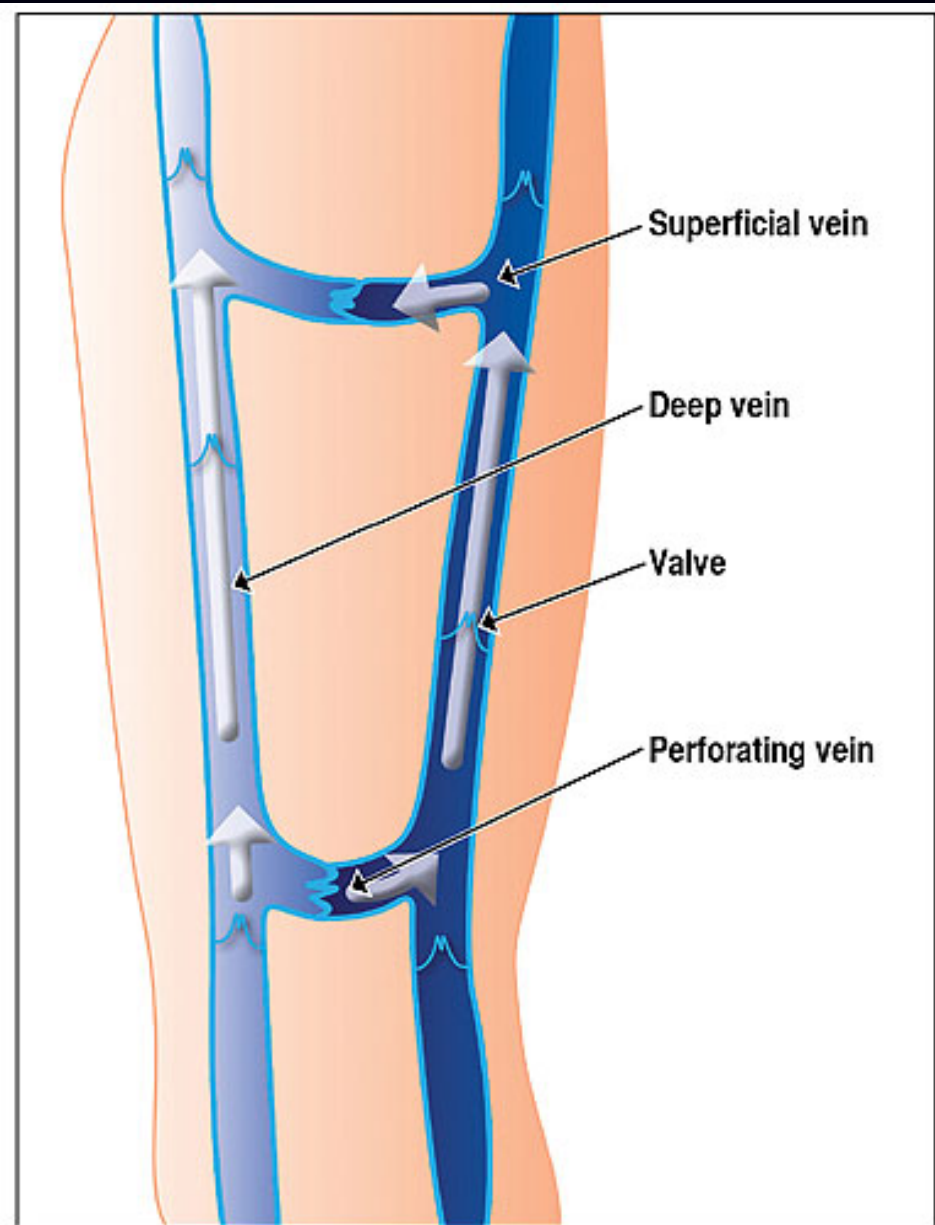


Figure 1. The relationship between deep, perforating, and superficial veins in the leg.

WL: 127 WW: 255 PCCV-0293470

L9-3/Vasc Ven

20100917.080342

FR 38Hz

S
Z 0.8

2D
51%

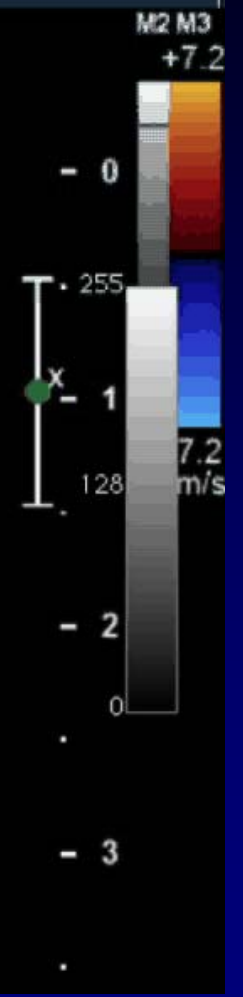
C 50
P Low

Gen

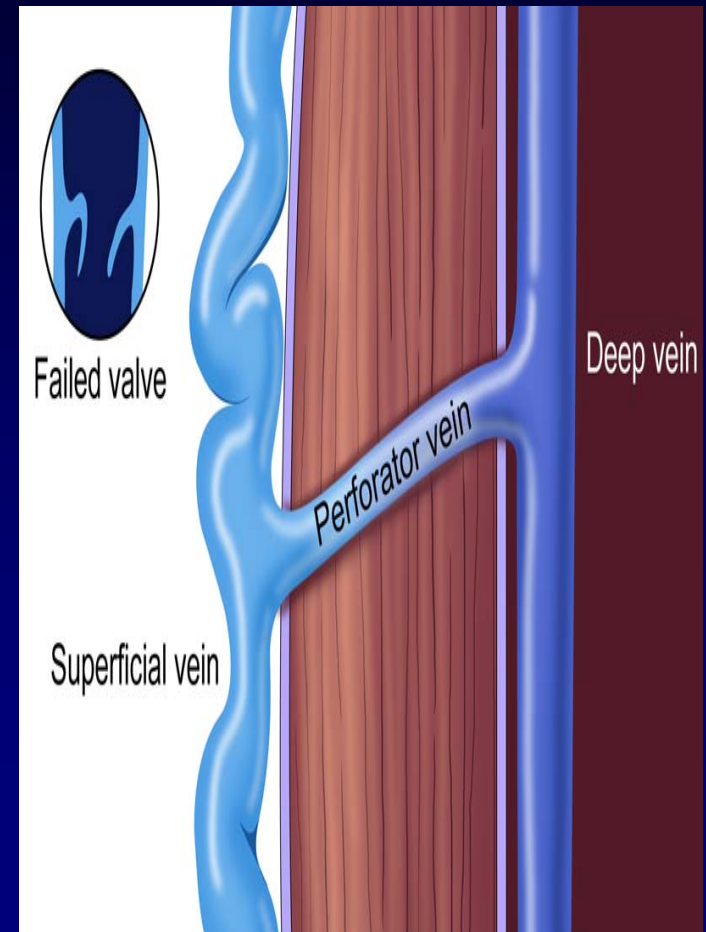
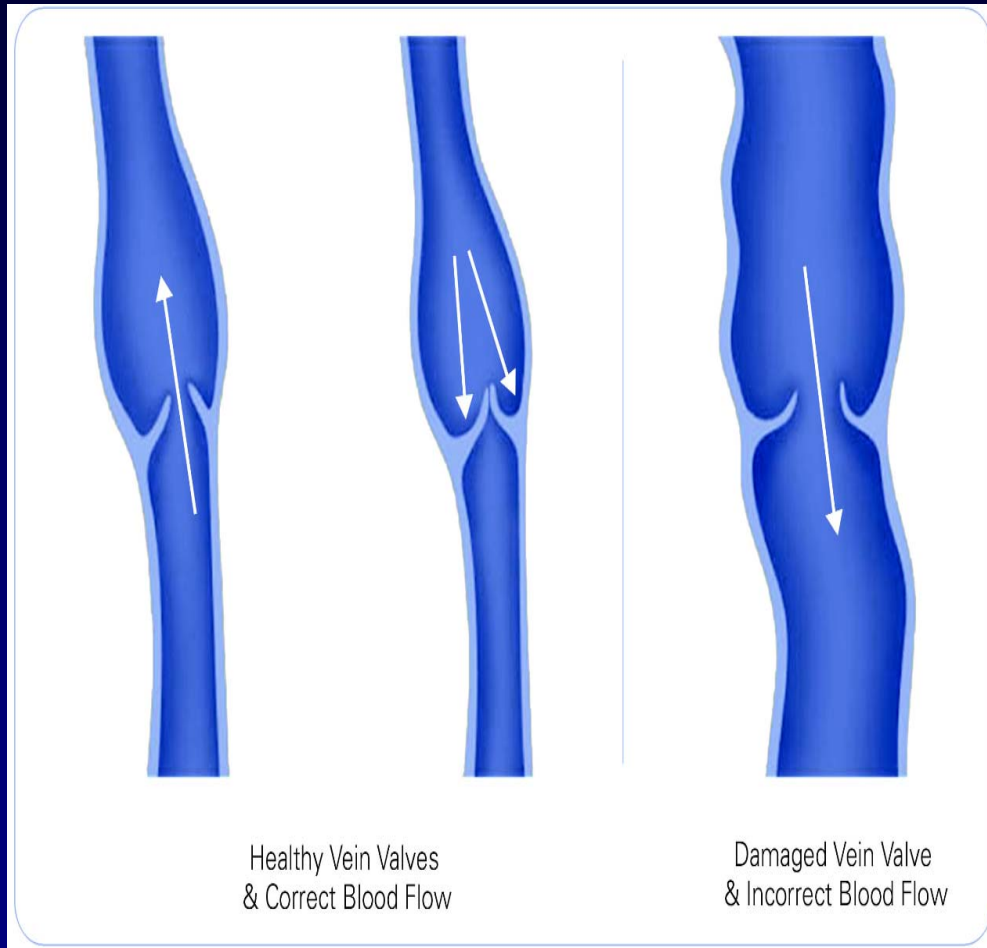
CF
49%

750Hz
WF 26Hz

Low



Pathophysiology of Venous Insufficiency



Risk Factors and Symptoms of Venous Insufficiency

Risk factors of venous insufficiency:

- Gender
- Age
- Heredity
- Pregnancy
- Standing occupation
- Obesity
- Prior injury or surgery
- Sedentary lifestyle

Symptoms of venous insufficiency:

- Leg pain, aching, or cramping
- Burning or itching of the skin
- Leg or ankle swelling
- “Heavy” feeling in legs
- Skin discoloration or texture changes
- Open wounds or sores
- Restless legs
- Varicose Veins

Manifestations of Venous Insufficiency

Superficial venous reflux is progressive and if left untreated, may worsen over time.

Below are manifestations of the disease.

Varicose Veins



20+ million

Swollen Legs



2 to 6 million

Skin Changes



Skin Ulcers



500,000

CEAP Classifications

"snap shot of CVI"

Clinical Classifications of Venous Insufficiency (CEAP)

- Class 0 - No visible or palpable signs of venous disease
- Class 1 - Telangiectasias or reticular veins
- Class 2 - Varicose veins
- Class 3 - Edema
- Class 4 - Skin changes
 - (4a) Skin changes including pigmentation or venous eczema
 - (4b) Skin changes with lipodermatosclerosis
- Class 5 - Healed venous ulceration
- Class 6 - Active venous ulceration

Treatment Options

Conservative Therapies:

- Exercise
- Leg elevation
- Compression Stockings
- Unna Boot Bandage



These therapies treat the symptoms, not the underlying cause...

Systemic Reflux in Venous Ulceration



Sources of Reflux in Venous Ulcer Patients ⁸		
Superficial	Perforating	Deep
79%	63%	50%

Incompetent perforators found in 63% of venous ulcer patients

Comprehensive care treats all sources of reflux

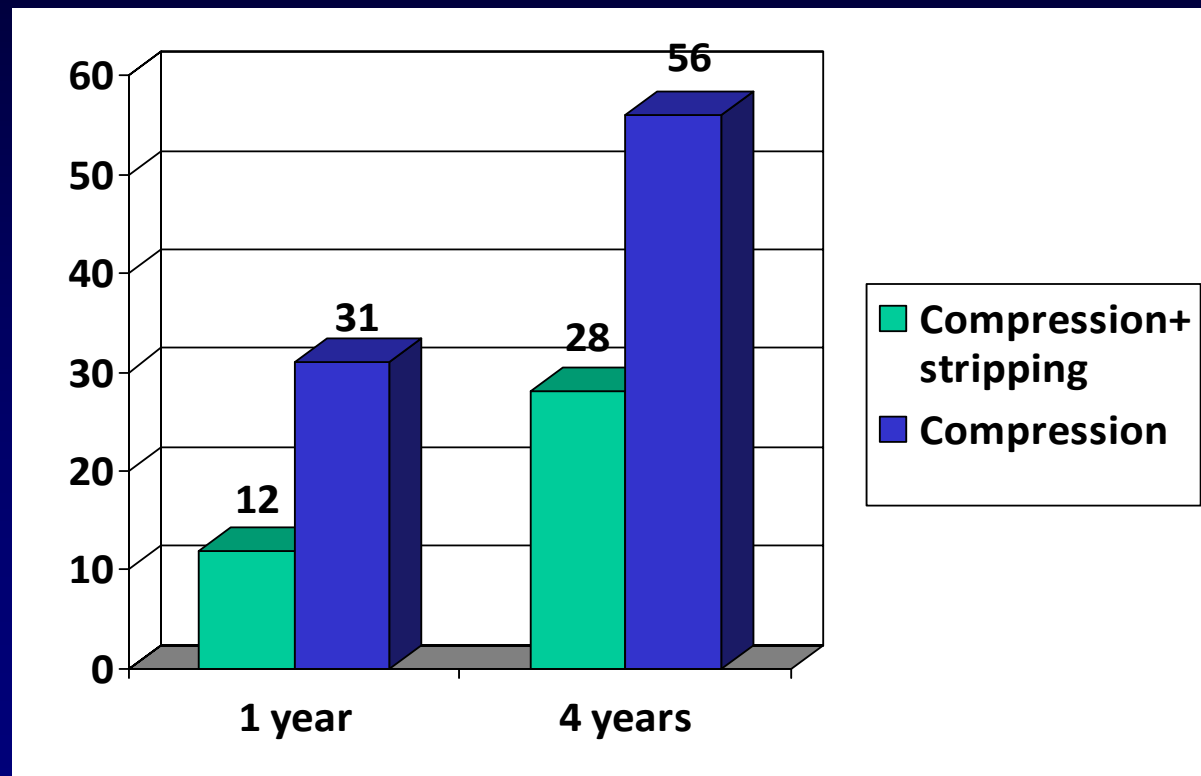
Conservative treatment

Mean healing time is 5.3
months

40% heal by 3 weeks

70% heal eventually

Venous Ulcer Recurrence (ESCHAR RCT)



Gloviczki et al. J Vasc Surg 1997; 25:94-105

Consensus Guidelines

- American Venous Forum
 - We recommend superficial venous surgery to decrease ulcer recurrence in patients with superficial venous reflux
- American College of Phlebology
 - Endovenous thermal ablation is the new standard of care
- Wound Healing Society
 - “Superficial venous ablation ...can be useful in decreasing the recurrence of venous leg ulcers”

Treatment Options (continued)

Non-Surgical Treatments:

- Endovenous ablation
 - RF ablation
 - Laser ablation



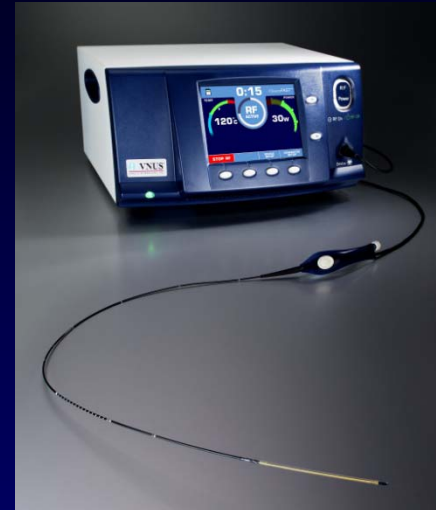
Ultrasound Diagnostic Study

- Required in order to determine the source of reflux
- Evaluate for venous occlusion or thrombus
- Map the course of the incompetent superficial veins

Venefit Targeted Endovascular therapy

(previously known as The VNUS Closure™ Procedure)

- The Venefit Targeted Endovascular Therapy is a minimally invasive treatment
- Using a catheter-based approach, the VNUS RFG Plus™ generator delivers radiofrequency (RF) energy to the ClosureFAST™ catheter
- The catheter heats the vein wall and contracts the vein wall collagen, thereby occluding the vein



Disposable catheter
inserted into vein



Vein heats
and collapses



Catheter withdrawn,
closing vein

Venefit Targeted Endovascular therapy

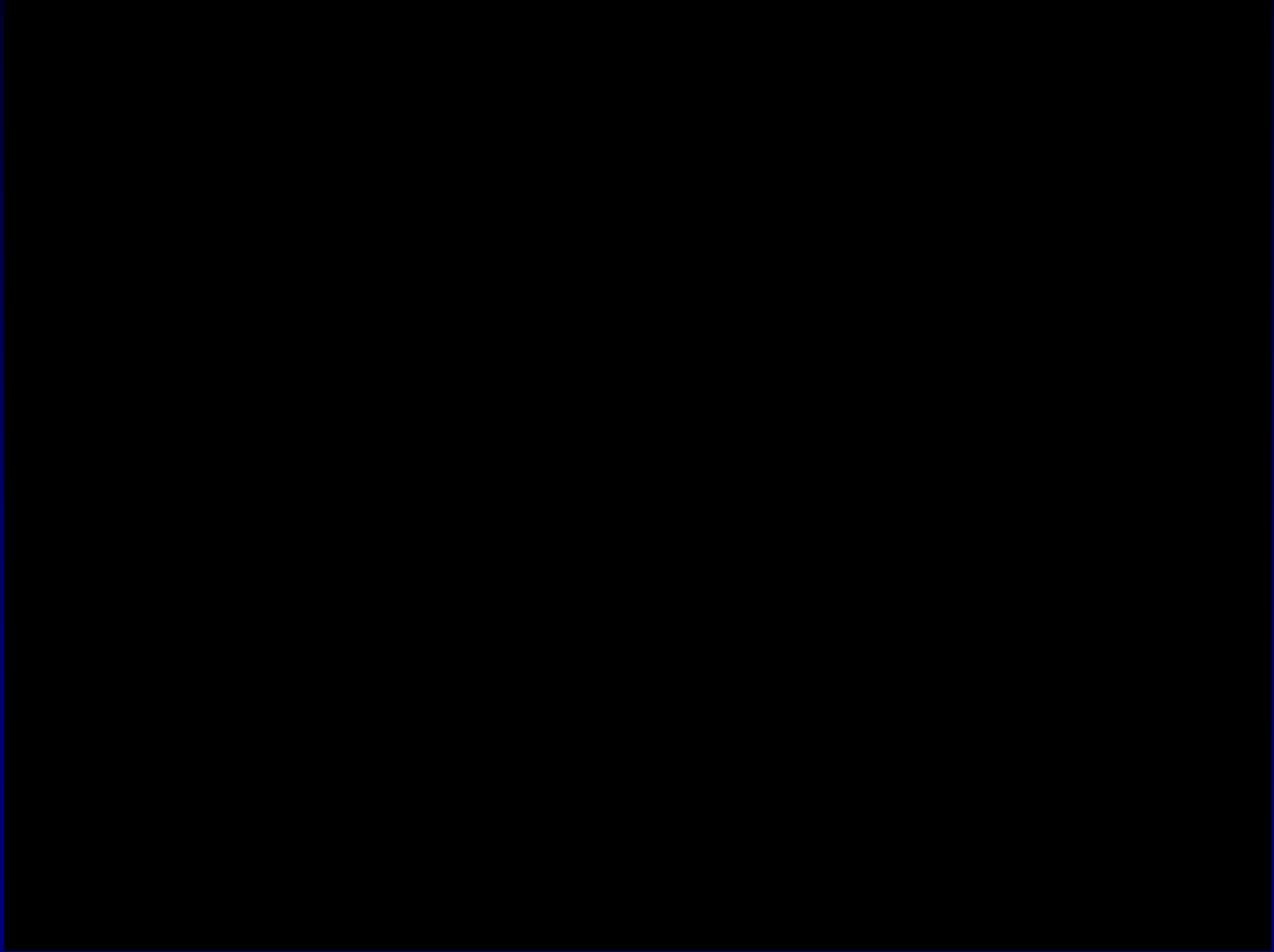


Perforating Veins

Grade 2b recommendation to treat perforators:

- Pathologic = ≥ 3.5 mm in size, outward flow ≥ 500 ms duration and located beneath chronic venous stasis skin changes/ulcer, CEAP 5 & 6

Perforator Vein Ablation

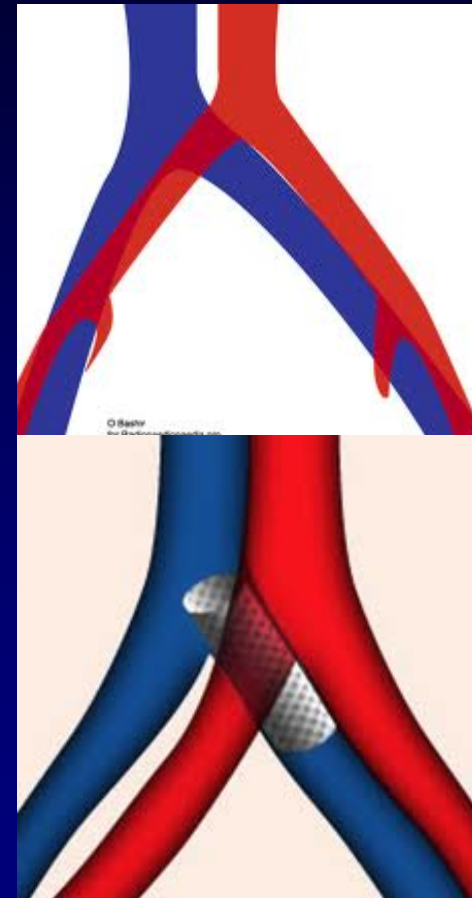


How does RF ablation works?

- Temperature controlled heating to the vessel wall
 - Endothelial destruction
 - Collagen contraction
 - New collagen synthesis
 - Further vein wall thickening
 - Eventual fibrotic sealing

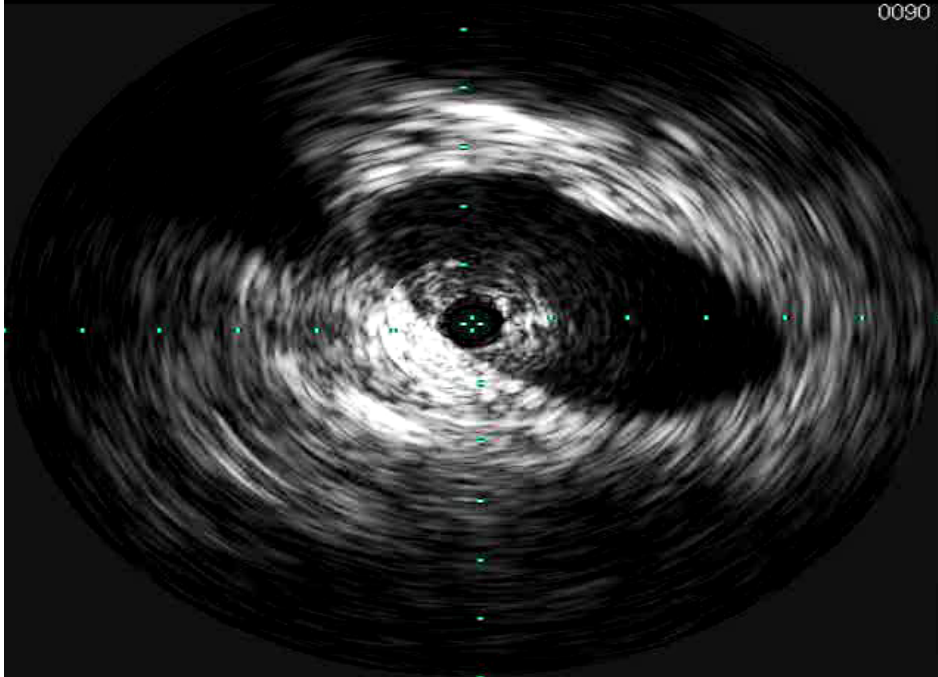
Left leg unilateral swelling

- May-Thurner Syndrome



Lossy compression - not intended for diagnosis

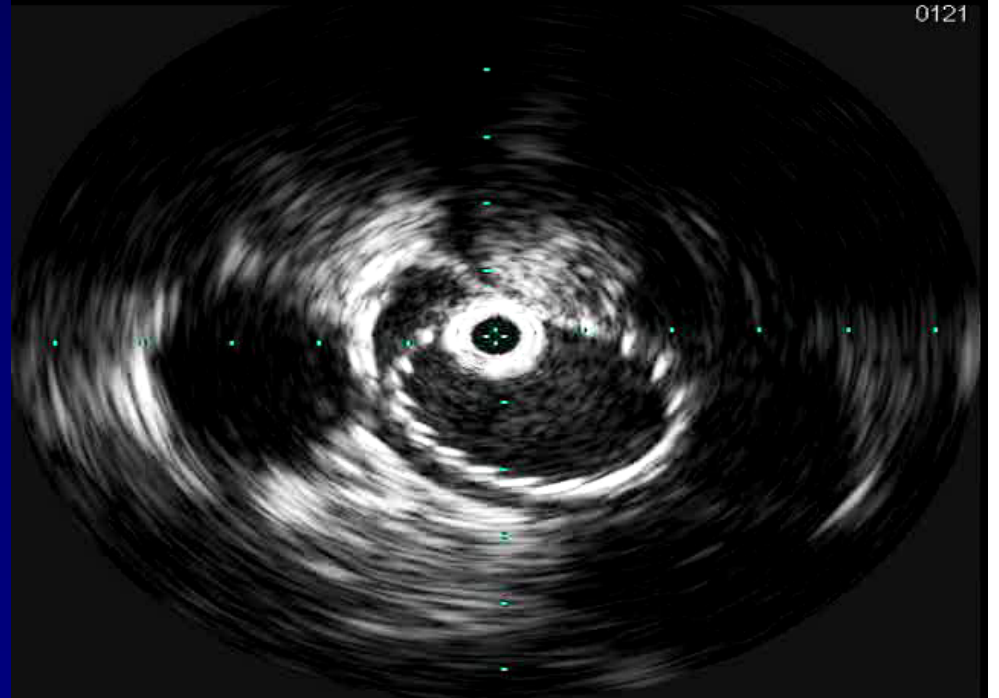
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Prestenting

Lossy compression - not intended for diagnosis

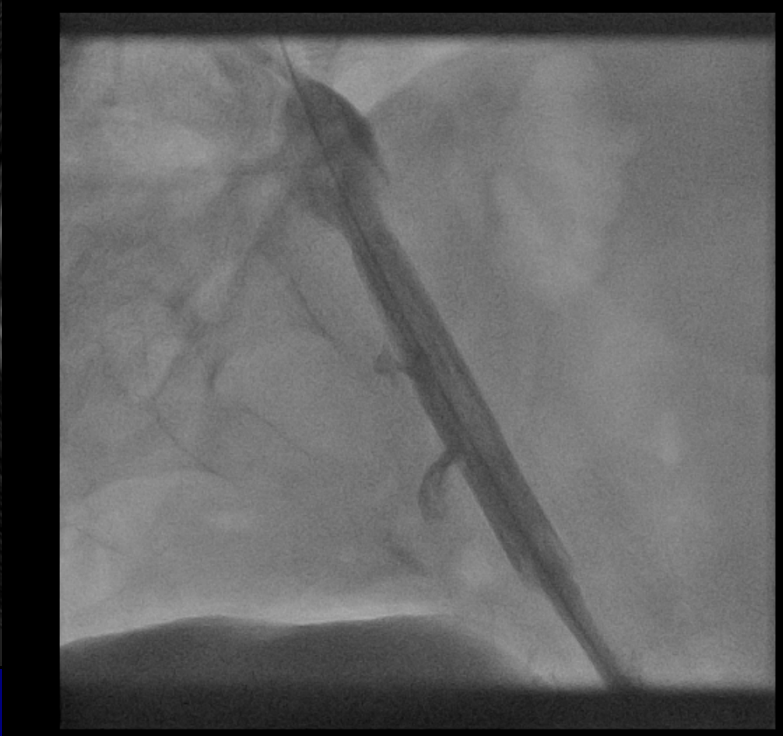
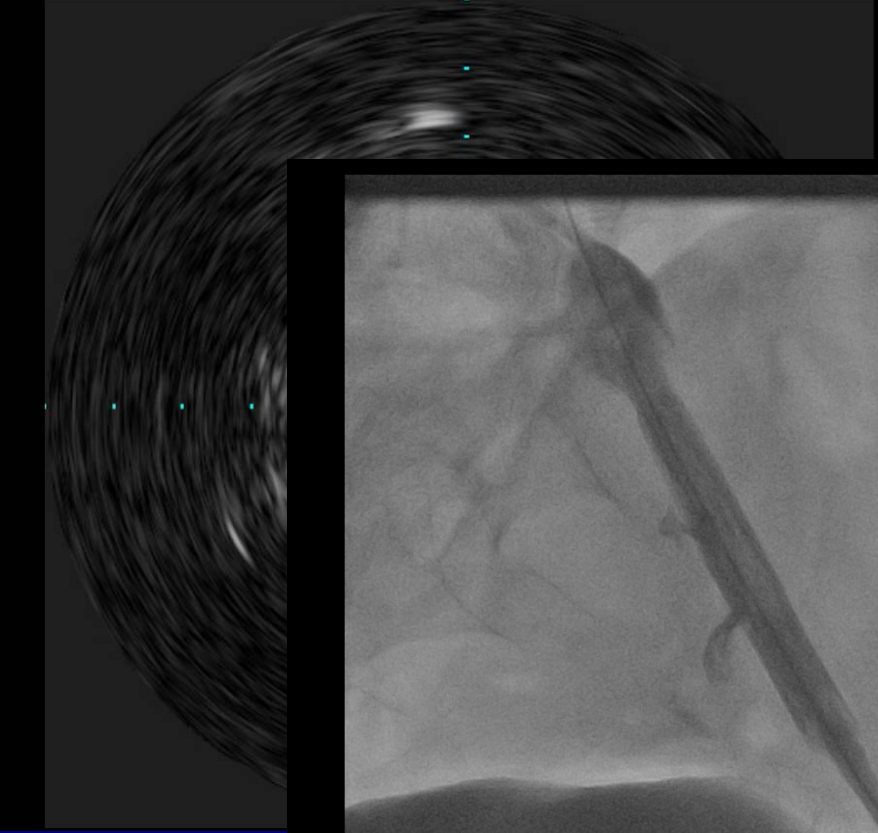
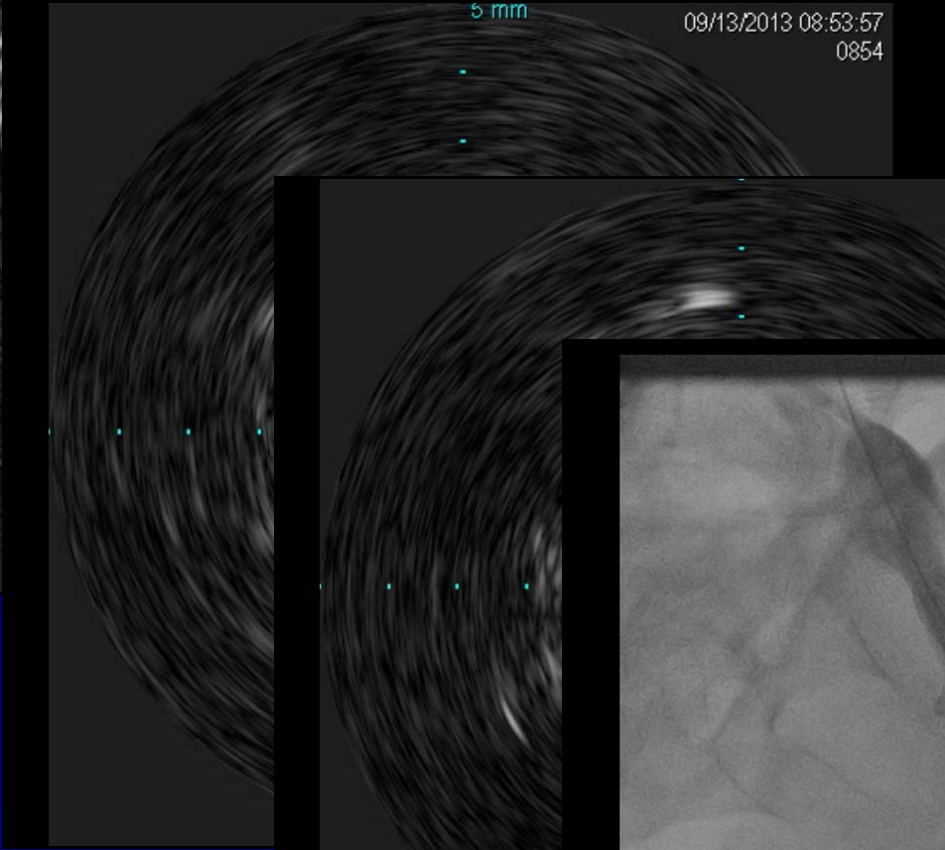
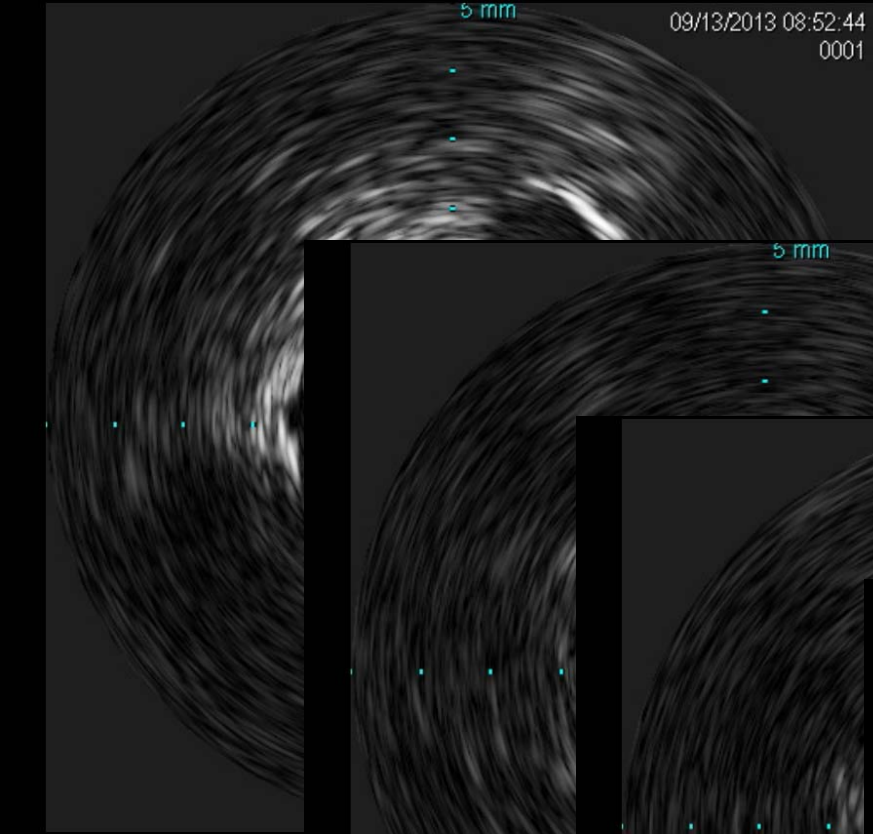
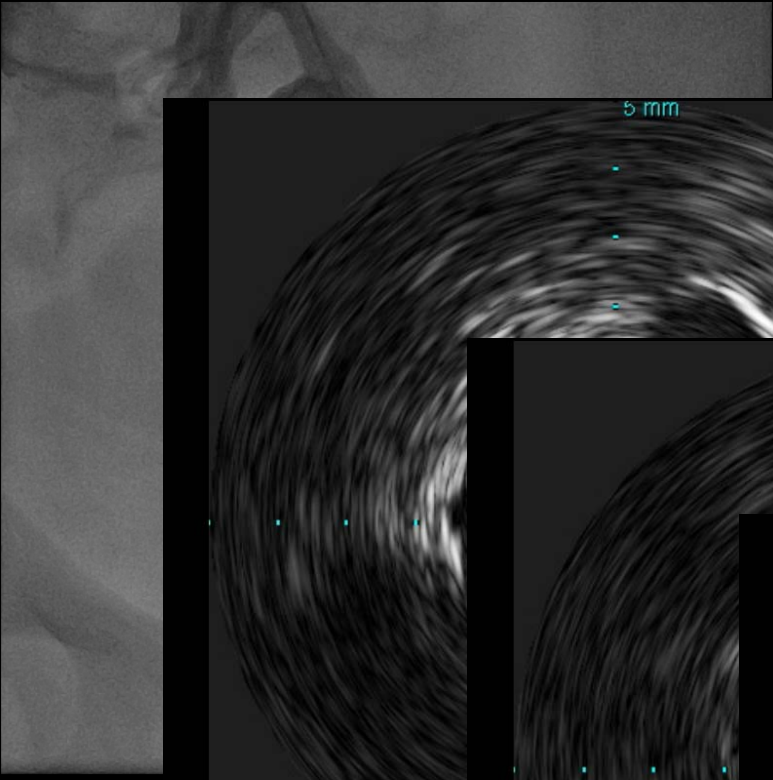
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Poststenting

Case Presentation

- 31 year-old with left leg venous ulceration
- DVTx2 and PEx2
- On chronic coumadin
- Exam with left leg swelling and left shin ulceration. Good pedal pulses
- Referred for non healing ulceration
- CT suggested iliac compression/narrowing
- Hypercoag panel was negative



Thank you

The circulatory system is a complete circle, half red and half blue.

As a cardiovascular specialist, you should be passionate about both.

Nicolas Shammam