



Chronic Lower Extremity Venous Disease



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Disclosures



Cook Medical – Paid educator and trainer for peripheral arterial disease, no venous disclosures

Becton-Dickenson – Assistance with presentation, no financial disclosures

Veins - "My Way"



The Chairman of the Board



Sid Vicious



The Mouse

Signs and Symptoms of Chronic Venous Disease

Protean manifestations including:

- Varicose/spider veins
- Heaviness/fatigue
- Restless legs
- Venous stasis edema
- Dermatosclerosis/skin staining
- Venous ulcers
- Phlebo-lymphedema
- Venous claudication



Images courtesy of Matthew Wise, MD (Advanced Vein Center, Orange, CA)

Chronic Venous Disease Risk Factors^{1,2}



Age



Family History of
Varicose Veins



DVT



History of Phlebitis



Obesity



Standing
Occupation



Multiple
Pregnancies



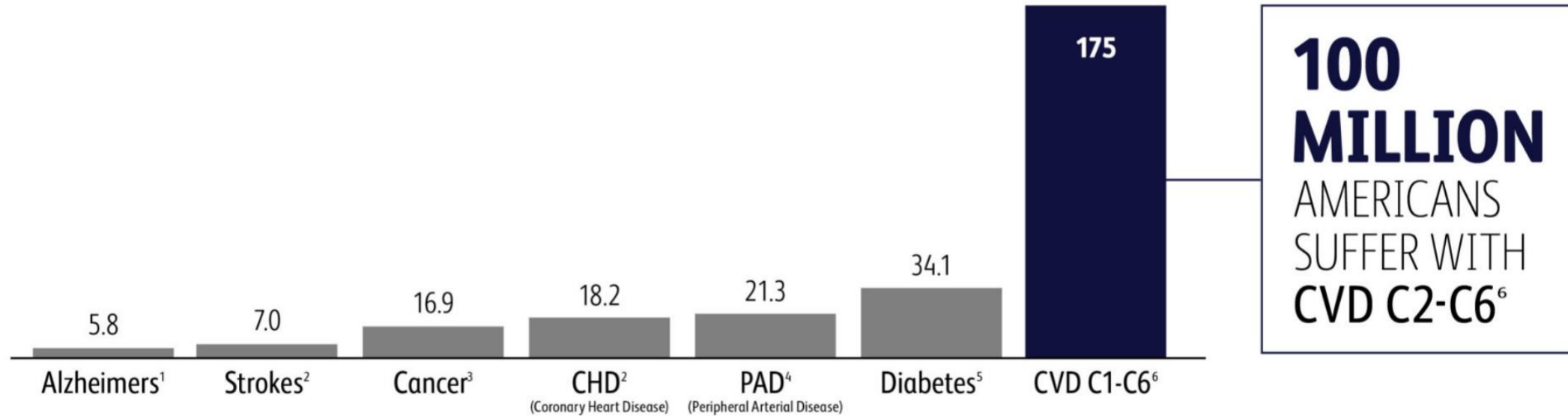
Female Sex

¹ Eberhardt RT, Raffetto JD. Chronic venous insufficiency. *Circulation*. July 22, 2014;130(4):333-346.

² Gloviczki P, et al. The care of patients with varicose veins and associated chronic venous diseases: clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum. *J Vasc Surg*. 2011 May;53(5 Suppl):2S-48S

Venous Disease Affects Millions of Lives

2020 U.S. Prevalence of Selected Chronic Diseases (Millions)*



CVD is a progressive disease. Without treatment, signs and symptoms may worsen.⁷

* Age ranges differ for prevalence population based on disease state, rates reported for years ranging from 2015 to 2020.

1 Alzheimer's Association. 2020 Alzheimer's Disease Facts and Figures. *Alzheimers Dement.* 2020;16(3):391-460.

2 American Heart Association. Heart Disease and Stroke Statistics-2020 Update. *Circulation.* 2020;141:e139-e596.

3 American Cancer Society. *Cancer Facts and Figures 2020.* Atlanta: American Cancer Society; 2020.

4 Yost ML. *United States Critical Limb Ischemia by Rutherford Category Prevalence and Markets in Patients and Limbs.* Beaufort, SC: The Sage Group 2017.

5 Centers for Disease Control and Prevention. *National Diabetes Statistics Report, 2020.* Atlanta: Centers for Disease Control and Prevention, U.S. Dept of Health and Human Services; 2020.

6 Yost ML. *Chronic Venous Disease (CVD): Epidemiology, costs, and consequences.* Beaufort, SC: The Sage Group 2016.

7 Eberhardt RT, Raffetto JD. Chronic venous insufficiency. *Circulation.* 2014;130(4):333-346.

Chronic Venous Disease Prevalence & Stats

- An estimated **175 million** Americans are affected by CVD in the U.S.¹
- Risk of CVD **increases with age**, but can begin as early as adolescence²
- Visible venous disease is **far more** than a cosmetic problem^{1,3}

CVD represents a **significant and growing need** within our healthcare system.

The annual medical cost of venous disease is estimated at **\$30-\$90 Billion** in the U.S.¹

¹ Yost ML. *Chronic venous disease (CVD): Epidemiology, costs, and consequences*. Beaufort, SC: The Sage Group; 2016.

² Schultz-Ehrenburg U, Reich-Schupke S, Robak-Pawelczyk B, et al. Prospective epidemiological study on the beginning of varicose veins. *Phlebologi*. 2009;38(01):17-25. doi: 10.1055/s-0037-1622252

³ Criqui MH, Denenberg JO, Langer RD, Kaplan RM, Fronck A. Epidemiology of chronic peripheral venous disease. In Bergan J, ed. *The Vein Book*, 1st ed. Academic Press; 2006.

Venous Ulcer Prevalence & Stats

In the U.S., **4.8 million** people are estimated to suffer from venous ulcers with direct medical costs representing about **\$38 billion** per year.¹

Venous leg ulcers are estimated to recur in 60%-70% of patients⁴

70-90%
OF ALL LOWER
EXTREMITY ULCERS
ARE ESTIMATED
TO BE VENOUS^{2,3}

¹ Yost ML. *Chronic venous disease (CVD): Epidemiology, costs, and consequences*. Beaufort, SC: The Sage Group; 2016.

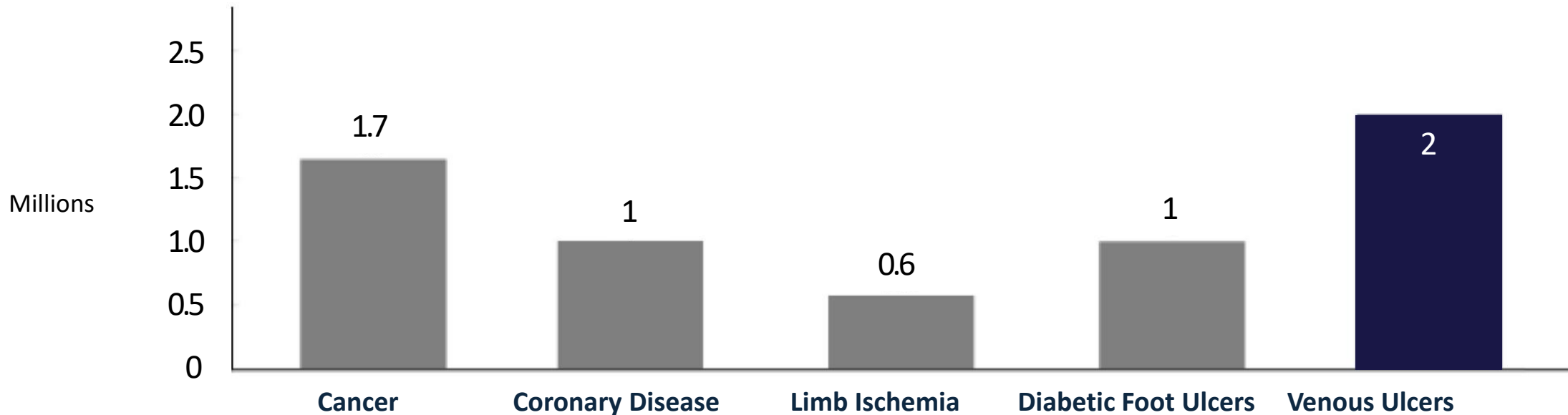
² Rice J, Desai U, Cummings AKG, Birnbaum HG, Skornicki M, Parsons N. Burden of venous leg ulcers in the United States. *J Med Econ*. 2014;17(5):347-356.

³ O'Donnell TF, Passman MA, Marston WA, et al. Management of venous leg ulcers: clinical practice guidelines of the Society for Vascular Surgery(R) and the American Venous Forum. *J Vasc Surg*. 2014;60:3S-59S.

⁴ Parker CN, Finlayson KJ, Edwards HE. Predicting the likelihood of delayed venous leg ulcer healing and recurrence: development and reliability testing of risk assessment tools. *Ostomy Wound Manage*. 2017;63(10):16-33.

Incidence of New Venous Ulcer Cases

Incidence of Various Chronic Diseases (US)



At **2.0 million** the annual number of new venous ulcer cases exceeds that of other chronic diseases including the 1.7 million new cases of all cancers combined and diabetic foot ulcers at 1.0 million new cases⁵

1 American Cancer Society. *Cancer Facts & Figures 2016*. Accessed September 2016, at <http://www.cancer.org/research/cancerfactsstatistics/cancerfactsfigures2016>.

2 Mozaffarian D, Benjamin EJ, Go AS, et al. Heart Disease and Stroke Statistics-2016 Update: A Report From the American Heart Association. *Circulation*. 2016;133(4):e38-e360. doi: 10.1161/CIR.0000000000000350

3 Nehler MR, Duval S, Diao L, et al. Epidemiology of peripheral arterial disease and critical limb ischemia in an insured national population. *J Vasc Surg*. 2014;60(3):686-695.e2. doi: 10.1016/j.jvs.2014.03.290

4 American Diabetes Association. *Statistics about Diabetes*. Accessed September 2016, at <http://www.diabetes.org/diabetes-basics/statistics>.

5 Yost M. *Chronic venous disease (CVD): Epidemiology, costs, and consequences*. Beaufort, SC: The Sage Group; 2016.

Venous Pathophysiology

Venous reflux occurs when the valves stop working properly and allow blood to flow backward and pool in the lower leg veins.

Without treatment, signs and symptoms may worsen. CVD can develop into a more serious form of vein disease called chronic venous insufficiency (CVI) that includes leg swelling, skin changes and, in severe cases, ulcerations.¹

Healthy Valves



Blood moves in one direction
-up the legs to the heart

Diseased Valves



Blood leaks back through
the diseased valves

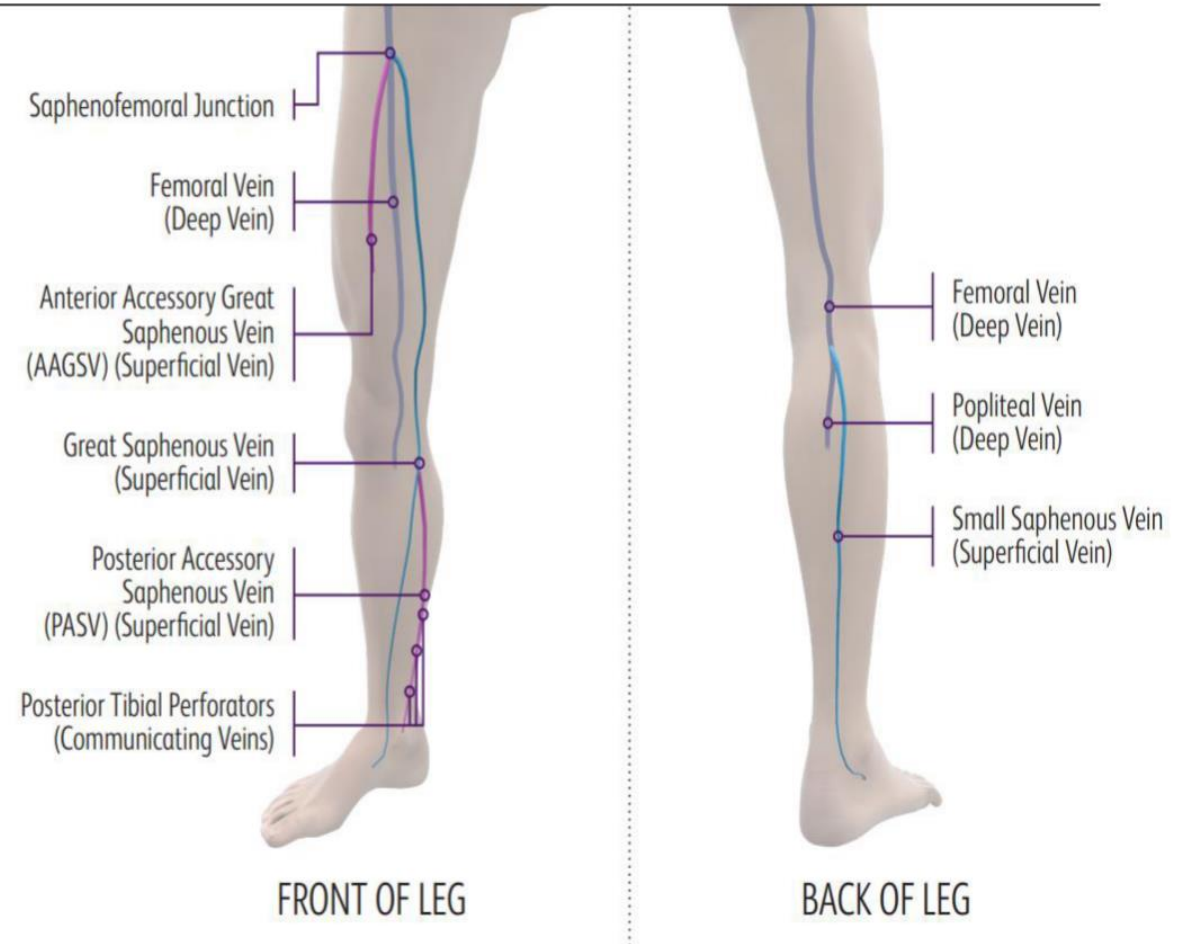
Great Saphenous and Small Saphenous Vein

GSV

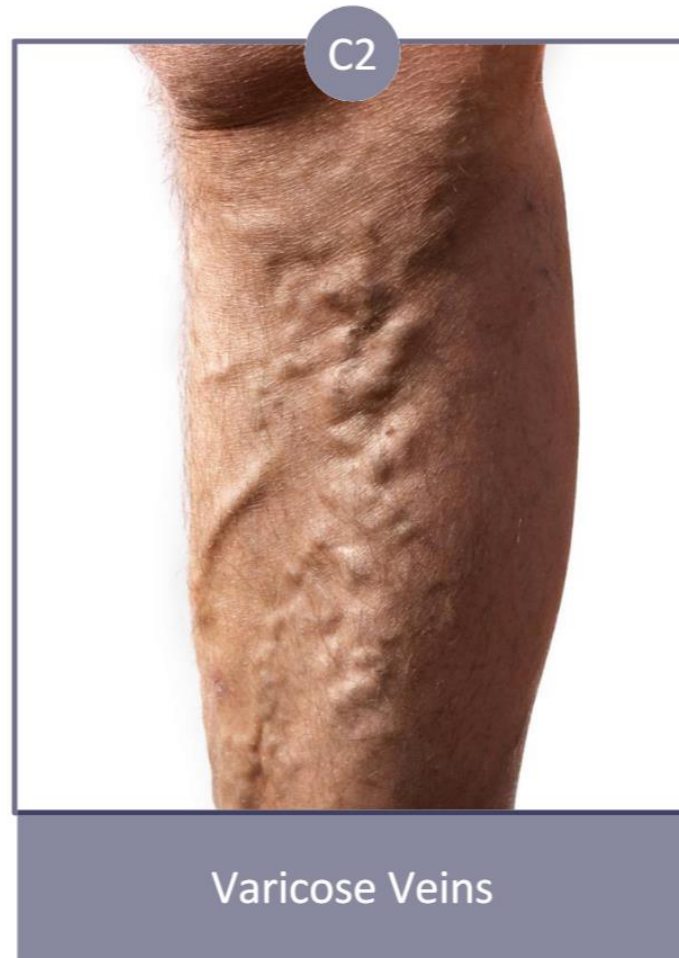
- The longest vein in the body
- Typically runs a superficial subcutaneous course from mid thigh to knee
- Closely associated with saphenous nerve below mid-calf

SSV

- Begins posterior to the lateral malleolus
- Travels up calf between two heads of gastrocnemius muscle
- May have thigh extension
- Usually drains into the Sapheno-popliteal Junction (SPJ)



CEAP Classification for CVD¹



¹ Lurie F, Passman M, Meisner M, et al. The 2020 update of the CEAP classification system and reporting standards. *J Vasc Surg: Venous and Lym Dis.* 2020;8:342-352.

CEAP Classification for CVD¹



Pigmentation
or Eczema



Lipodermatosclerosis
or Atrophie Blanche



Healed Venous Ulcer



Active Venous Ulcer

Image courtesy of Dr. Steven Elias

Treatment

Conservative treatments all aim to decrease pooled blood volume in the legs:



Elevation



Compression



Exercise

Rational for Procedural Treatment

When conservative measures aren't enough or when more freedom from conservative measures is desired, consider intervention

As Jazz season winds down, it is what it is — and it's not good

The team isn't doing anything that hasn't been done before in the NBA, which is part of the problem

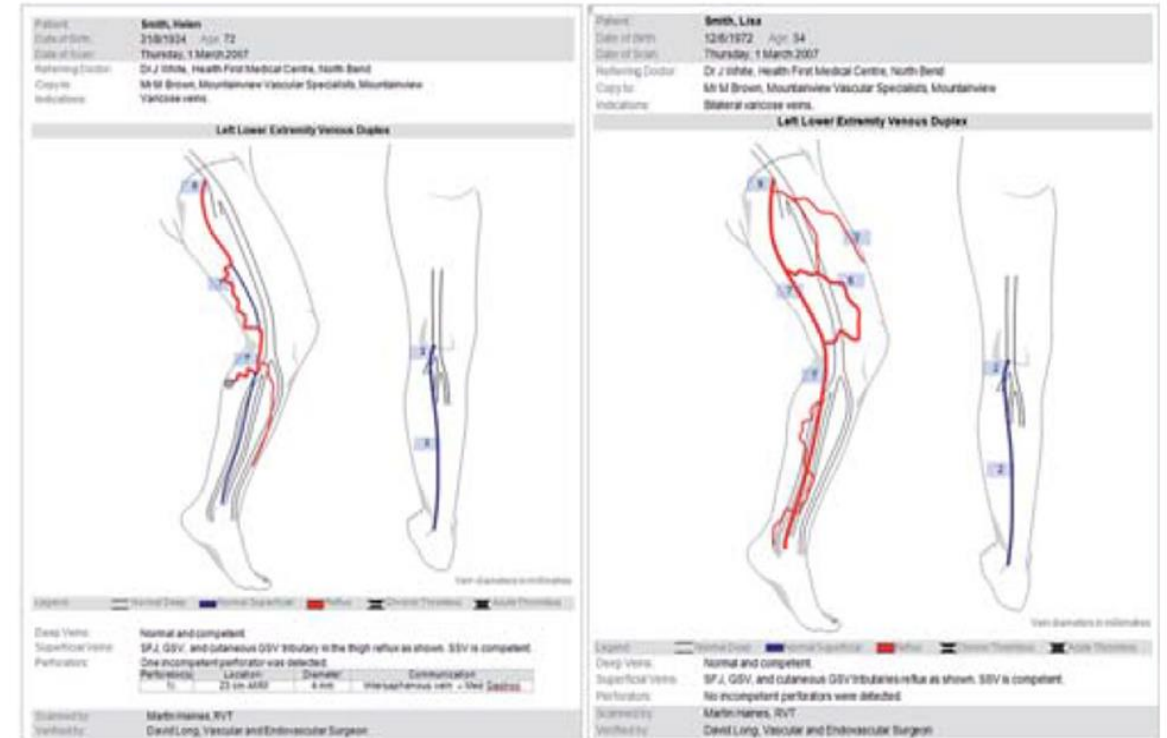
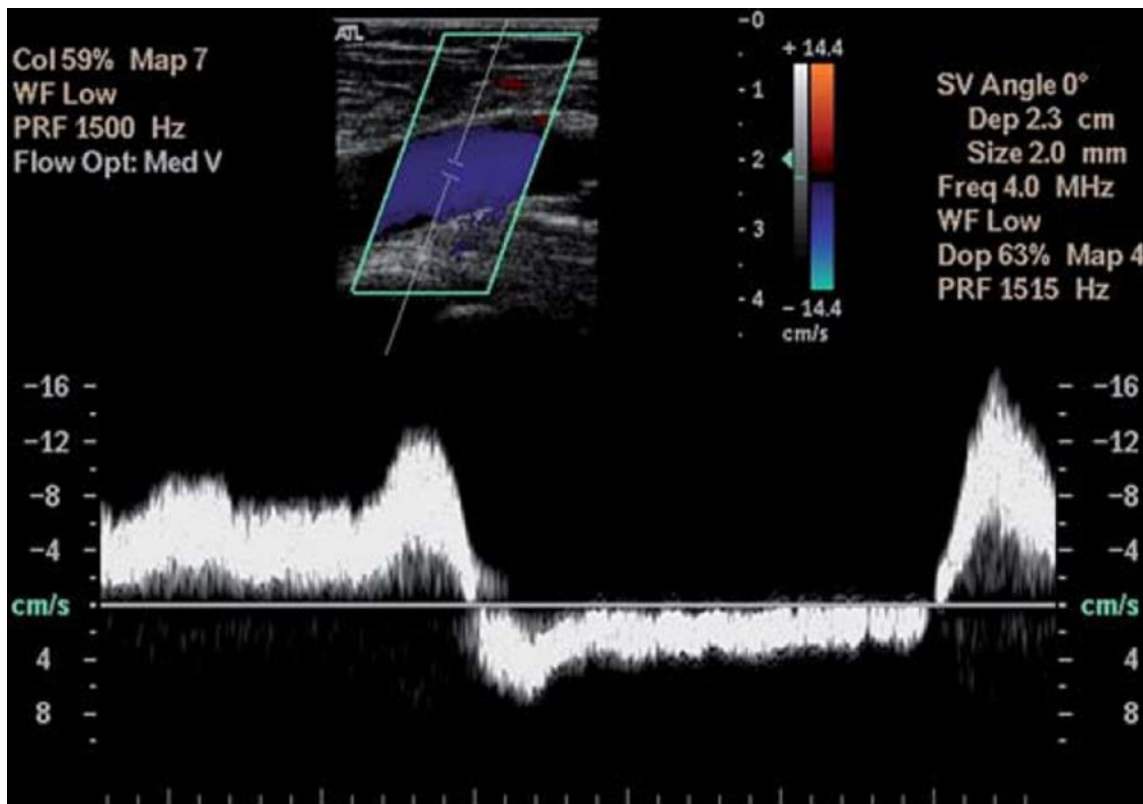
Published: April 12, 2024.



Imaging Diagnosis

Necessary for confirmation of diagnosis (and insurance coverage!)

Dedicated venous insufficiency study to evaluate for degree of insufficiency and rule out DVT



SELECT Historical Timeline OF VARICOSE VEIN Treatment

1550 BCE



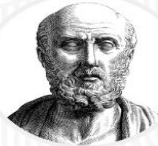
The **papyrus of Ebers** describes varicose veins as “torturous, solid with many knots, as if blown up by air.” The author recommends against surgery.



400

The **first illustration** of varicose veins appears in a votive tablet found at the base of the Acropolis.

400



Hippocrates, the ‘Father of Medicine,’ recognizes the correlation between varicose veins and leg ulcers. He recommends making small punctures in varicose veins, vein cauterly, and using compression bandages.

270

Herophilus and **Erasistratus**, two Egyptian physicians of the Alexandrian School of Medicine, invent forceps to ligate blood vessels to control bleeding, making surgery possible.



0 CE



Celsus, a Roman encyclopedist, describes the first phlebectomy procedure. It was performed using no anesthesia or pain relief measures. Caius Marius (157-86 BCE), a notorious Roman warlord, underwent phlebectomy on one leg and then refused surgery for his other leg, saying “I see the cure is not worth the pain.”

600



A Greek surgeon, **Aegineta**, realizes the importance of ligation and removal of the great saphenous in treating varicose veins of the leg.

1485

Da Vinci draws remarkably accurate anatomical drawings of the superficial veins of the lower limbs.



1682

Zollikofer reports the first documented attempt at sclerotherapy by **injecting acid** into a vein to create thrombus.

1841



Pravaz develops a working **injection syringe**. His syringe was made of glass and hard rubber with a leather piston.

1844

Rynd, surgeon at Dublin's Meath Hospital, invents the **hypodermic (hollow steel) needle**.



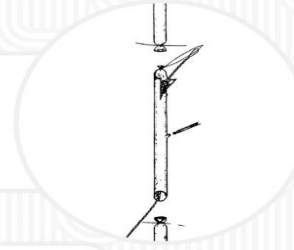
1864



Pravaz publishes his experience with early attempts at sclerosing varicose veins using perchloride of iron.

1905

Keller describes the process of stripping the saphenous veins prior to ligation.



1938



Linton describes ligation of perforating veins to treat venous stasis ulcers.

1939

McAusland uses foamed sodium morrhuate as a sclerosing agent for **closing varicose veins**.

1949

Taylor reports link between **pelvic varices** and **chronic pelvic pain** – also known as **pelvic venous congestion syndrome** or **pelvic venous congestion**.



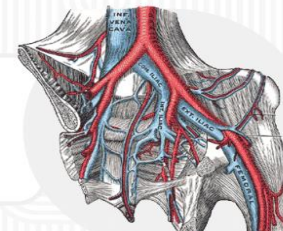
1952



Seldinger, a Swedish radiologist, invents a novel method for **accessing blood vessels**, now called the '**Seldinger Technique**.'

1956

May and **Thurner** describe compression of the iliac vein by the adjacent right iliac artery. Associated symptoms are referred to as the **May-Thurner syndrome**.



1964



Dotter, regarded as the 'Father of Interventional Radiology,' percutaneously dilates a tight narrowing of a leg artery, launching the modern era of treating of vascular disease using guidewires, catheters, angioplasty and stents.

1980

Introduction and evolution of **Duplex ultrasound scanning** (DUS). DUS has now become an essential tool in the evaluation and management of vein disease.



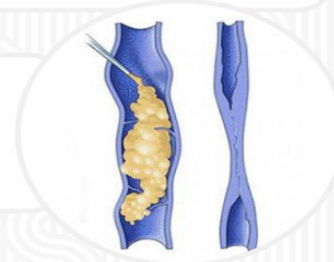
1999



Radiofrequency ablation (RFA) is approved by the FDA for treatment of varicose veins. The RFA catheter is inserted into the vein under ultrasound guidance.

2000

Tessari reports a novel technique for improving the quality of **foam sclerotherapy**.

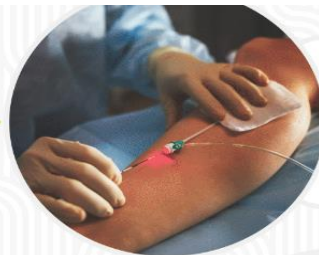


2001



Navarro, Min, and Bone publish early observations using an 810nm **diode laser** to treat varicose veins.

2001



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2008



ClariVein, a mechanochemical ablation (MOCA) device, is approved by the FDA for treating varicose veins. MOCA is performed without tumescent anesthesia.

2010

FDA approves **Asclera**, a form of polidocanol sclerosant, for closing small veins.



2015



The FDA approves **VenaSeal**, a system that seals varicose veins using an adhesive agent. Does not require tumescent anesthesia.

Summary of Methods of Treatment

- Surgery (vein stripping)
- Chemical Sclerosis
- Rf Ablation
- Laser
- Chemical Sclerosis plus Mechanical Glue

RF ablation has wide acceptance and is the predominant approach used for the treatment of refluxing veins in the U.S.¹

RF ablation technology can potentially reduce postoperative pain and bruising in patients compared to vein stripping or laser therapy treatment.²

1. Decision Resources Group. Varicose Vein Treatment Devices: Medtech 360: Market Analysis: US: 2019. Canada: Millennium Research Group, Inc.; 2018.

2. Scovell S. Techniques for radiofrequency ablation for the treatment of lower extremity chronic venous disease. In: UpToDate, Post TW (Ed), UpToDate, Waltham, MA. <https://www.uptodate.com/contents/techniques-for-radiofrequency-ablation-for-the-treatment-of-lower-extremity-chronic-venous-disease>. Accessed on October 27, 2022

Poll: Veins – “My Way”

