VENOUS INSUFFICIENCY & VARICOSE VEINS

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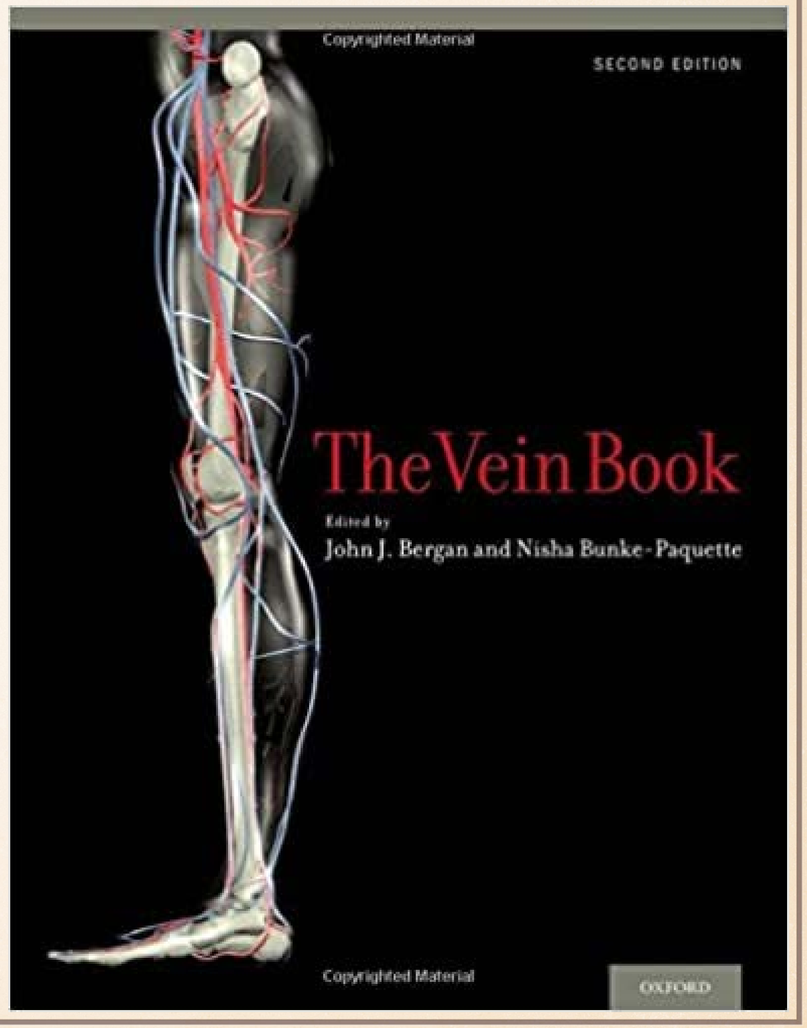
Oklahoma Osteopathic Association Convention 2021

DISCLOSURE

- I have nothing to disclose for this presentation.

OUTLINE

- Definitions
- Venous Anatomy
- Venous Disease
- Diagnosis
- Treatment



OBJECTIVES

- Be familiar with venous anatomy.
- Understanding difference diagnostic modalities for venous disease.
- Knowledge of different ways to treat varicose veins.
- Be on the look out for venous complications (treated or untreated).

DEFINITIONS

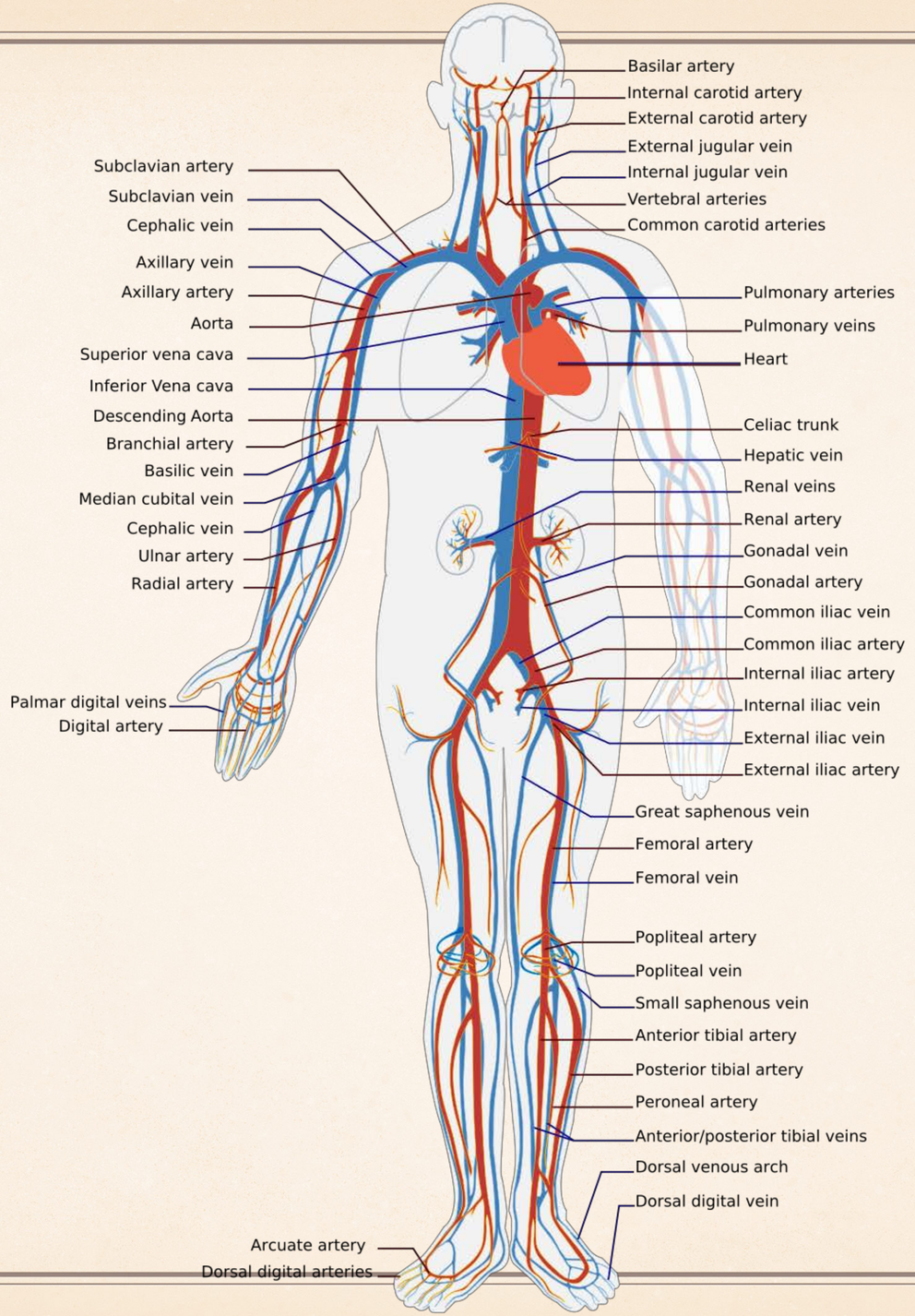
- ***Venous insufficiency:*** Failure of the veins to circulate blood in antegrade fashion.
- ***Venous disease:*** Spectrum of disorder that affects the veins of the legs.
- ***Varicose veins:*** Dilated elongated, tortuous, subcutaneous veins > 3 mm.
- ***Corona phlebectatica:*** Crown of spider veins on medial aspect of the ankle.
- ***Thrombophlebitis:*** Blood clots in the superficial veins.
- ***Deep venous thrombosis:*** Blood clots in the deep veins.

VENOUS ANATOMY

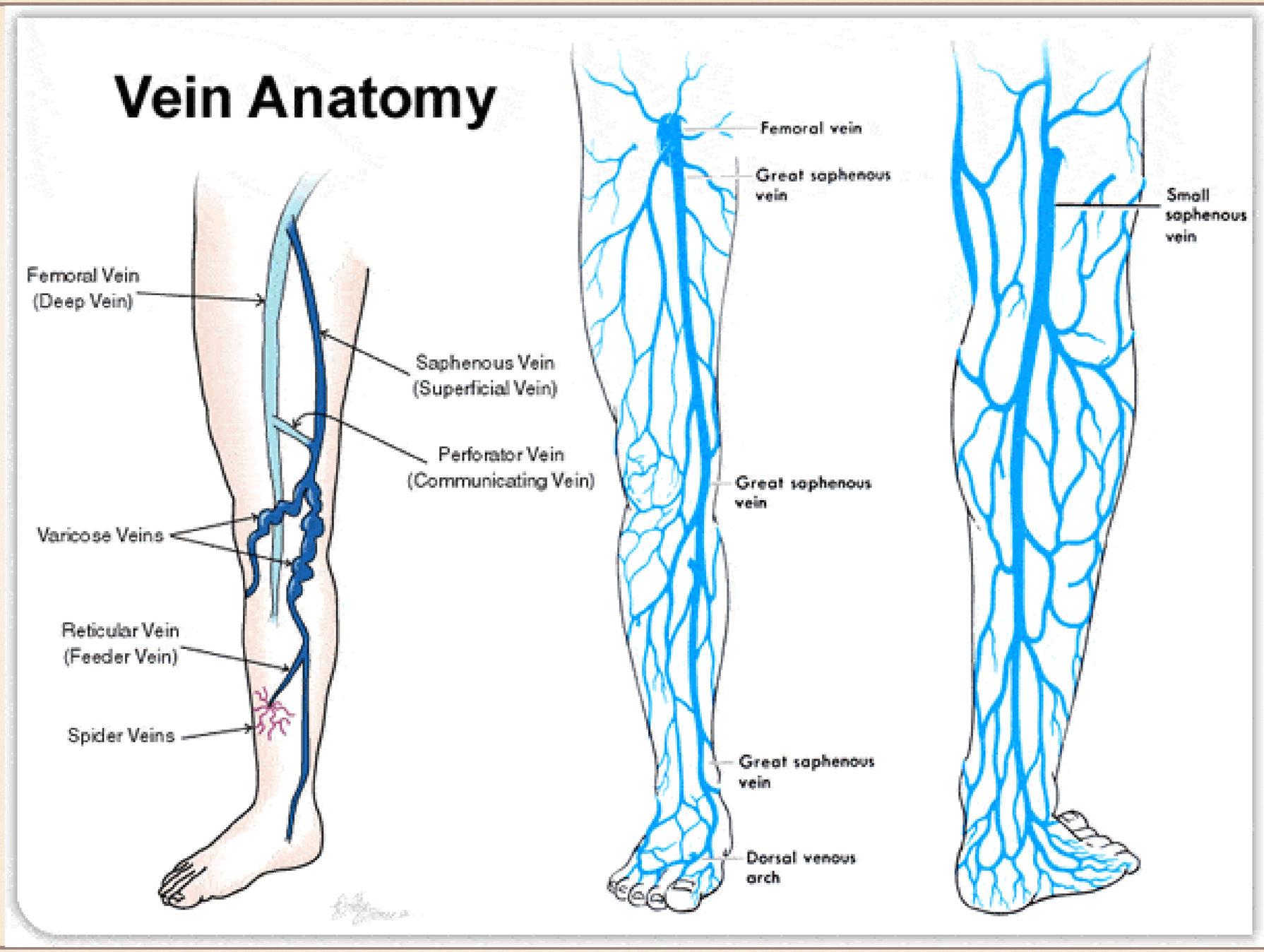
- Superficial venous system - great saphenous, small saphenous, accessory, and tributary veins.
- Deep venous system
  - Lower extremity veins: calf veins, popliteal, femoral, common femoral, iliac veins, IVC.
    - *Femoral veins - NO LONGER “Superficial Femoral Vein” as named parallel to “Superficial Femoral Artery”*
    - *Deep femoral veins (profunda femoris) - rarely discussed, important in treatment of iliac thrombosis.*
  - Upper extremity veins: brachial, axillary, subclavian, brachiocephalic, IJ, and SVC.
- Perforators - connect superficial venous system to deep venous system. Important in venous ulcers.

VEINS

- Hold 75% of blood volume.
  - *90% are in deep veins vs. 10% in superficial veins.*
- Have valves for unidirectional flow.
- Low pressure system (10-15 mmHg).
- Have thin walls.
- ***Named parallel to corresponding arteries but behave completely different.***


Basilar artery
Internal carotid artery
External carotid artery
External jugular vein
Internal jugular vein
Vertebral arteries
Common carotid arteries
Subclavian artery
Subclavian vein
Cephalic vein
Axillary vein
Axillary artery
Aorta
Superior vena cava
Inferior Vena cava
Descending Aorta
Branchial artery
Basilic vein
Median cubital vein
Cephalic vein
Ulnar artery
Radial artery
Pulmonary arteries
Pulmonary veins
Heart
Celiac trunk
Hepatic vein
Renal veins
Renal artery
Gonadal vein
Gonadal artery
Common iliac vein
Common iliac artery
Internal iliac artery
Internal iliac vein
External iliac vein
External iliac artery
Palmar digital veins
Digital artery
Great saphenous vein
Femoral artery
Femoral vein
Popliteal artery
Popliteal vein
Small saphenous vein
Anterior tibial artery
Posterior tibial artery
Peroneal artery
Anterior/posterior tibial veins
Dorsal venous arch
Dorsal digital vein
Arcuate artery
Dorsal digital arteries

Vein Anatomy



TYPE OF VEINS

- Telangectasia or spider veins (< 1 mm)
- Reticular veins (1-3 mm)
- Varicose veins (> 3mm)
- Perforator veins
- Deep veins

SUPERFICIAL VENOUS DISEASE

- Seven million Americans suffer from venous insufficiency.
- One to 3 percent suffer from venous ulcers.
- Healthcare burden - One billion dollars in the US.
- Providers: Vein specialist, vascular surgeon, IR, cardiologist, internist, wound care, pain management.

VENOUS INSUFFICIENCY

- Reverse flow to normal direction (against gravity).
- Due to valvular incompetence and venous obstruction (DVT).
- Other causes: venous hypertension, lymphatic drainage impairment, other risk factors.
- *Chronic venous insufficiency CVI* leads to dilation of capillary beds, fibrinogen leak, WBC trap in cap wall, inflammatory reaction, skin pigmentation, fibrosis, ultimately, ***ulcer development.***

RISK FACTORS FOR CVI

- Family history (1 parent 75%, both 95%)
- Age
- Female gender
- Pregnancy
- Obesity
- Leg injuries (crush, burn, fracture)
- Phlebitis
- Deep venous thrombosis
- Prolonged sitting or standing
- Heart failure
- Hypertension
- Renal disease

SIGNS AND SYMPTOMS

- **Signs**
  - Stasis dermatitis
  - Eczema
  - Varicosities
  - Corona Phlebectatica
  - Lipodermatosclerosis
  - Venous ulcers

EVALUATION

- Documentation of history and physical examination including venous and arterial findings.
- Duplex assessment
  - *Truncal venous insufficiency with reflux > 500 msec*
  - *Documentation of no deep venous thrombosis.*

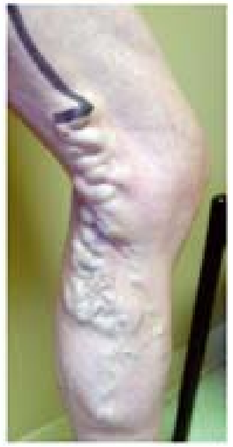
MORE DOCUMENTATION

- **CEAP Classification**
  - *Clinical, Etiology, Anatomy, Pathophysiology*
- **VCSS - Venous Clinical Severity Score**
  - *Previously a research tool*
  - *Currently required documentation by Medicare*

Classification of CVD: CEAP Class 0-6

CEAP Class	0	1	2	3	4	5	6
Description	No visual or palpable signs of CVD	Telangiectasia or reticular veins	Varicose Veins	Edema	Pigmentation: Skin changes assigned to venous disease	Skin changes with healed ulceration	Skin changes with active ulceration
Visual							

Wittens C, Davies AH, Baekgaard N, et al. Clinical Practice Guidelines from the ESVS, *Eur J Vasc Endovasc Surg* 2015;49:678-737



Attribute	Absent (0)	Mild (1)	Moderate (2)	Severe (3)
Pain	None	Occasional	**Daily**	Daily w/meds
Varicose Veins	None	Few	**Multiple**	Extensive
Venous Edema	None	Evening only	**Afternoon**	Morning
Skin Pigmentation	None	Limited, old	Diffuse, more recent	Wider, recent
Inflammation	None	Mild cellulitis	Mod cellulitis	Severe
Induration	None	Focal <5 cm	<1/3 gaiter	> 1/3 gaiter
No. Active Ulcers	None	1	2	>2
Active Ulcer Size	None	<2 cm	2-6 cm	>6 cm
Ulcer Duration	None	<3 mo	3-12 mo	>1 yr
Compression Therapy	None	Intermittent	**Most days**	Fully comply

Pain=2, VV=2, Edema=2, Pigmentation=0, Inflammation=0, Induration=0, Active ulcers, size, duration=0, Compression therapy=2. Total VCSS=8

Attribute	Absent (0)	Mild (1)	Moderate (2)	Severe (3)
Pain	**None**	Occasional	Daily	Daily w/meds
Varicose Veins	None	**Few**	Multiple	Extensive
Venous Edema	None	**Evening only**	Afternoon	Morning
Skin Pigmentation	None	Limited, old	Diffuse, more recent	Wider, recent
Inflammation	None	Mild cellulitis	Mod cellulitis	Severe
Induration	None	Focal <5 cm	<1/3 gaiter	>1/3 gaiter
No. Active Ulcers	None	1	2	>2
Active Ulcer Size	None	<2 cm	2-6 cm	>6 cm
Ulcer Duration	None	<3 mo	3-12 mo	>1 yr
Compression	None	Intermittent	**Most days**	Fully comply

Pain=0, VV=1, Edema=1, Pigmentation=0, Inflammation=0, Induration=0, Active ulcers, size, duration=0, Compression therapy=2. Total VCSS=4

TREATMENT

- Medical management - minimum of 3 months
  - Leg resting, elevation, exercise, regular use of fitted compression stockings (Class I, II, III), weight loss, medications (diuretic, diosmin).
- Compression stocking is the key in my practice.
- Treatment is based on life-style limiting symptoms.

COMPRESSION STOCKINGS

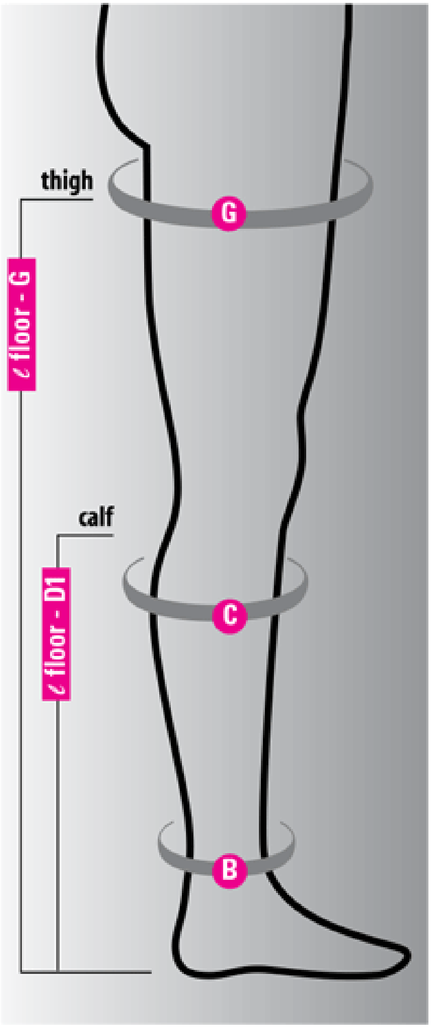
- Compression is the cornerstone of treatment
- Range of 15-60 mmHg (TED is 18 mmHg).
- Knee-high as good as Thigh-high
- Open or closed toe per patient’s preference
- Elastic stockings vs. Inelastic compression wraps
- Caution with severe arterial disease, heart failure, infections
- Compliance is difficult, depending on practitioners, price, orthopedic limitation, body habitus…

MEASURING INSTRUCTIONS

1. Select product/style from measuring chart. 2. Measure at indicated locations on diagram. 3. Locate proper product size based on measurements.

mediven plus, 20–30, 30–40, 40–50 mmHg

Circumference	I	II	III	IV	V	VI	VII
G **PANTY & THIGH**	15″ – 22½″ 38–57 cm	16″ – 24¼″ 41–62 cm	17¼″ – 26¼″ 44–67 cm	18½″ – 28¼″ 47–72 cm	19¾″ – 30¼″ 50–77 cm	21″ – 32¼″ 53–82 cm	22¼″ – 34¼″ 56–87 cm
G **THIGH** w/Silicone Top Band	16½″ – 19¼″ 42–49 cm	17¾″ – 20¾″ 45–53 cm	19″ – 22¼″ 48–57 cm	20½″ – 24″ 52–61 cm	22″ – 25¾″ 56–65 cm	23½″ – 27½″ 60–70 cm	25″ – 29″ 64–74 cm
C **EXTRA-WIDE CALF** w/Silicone Top Band w/out Silicone Top Band	13¼″ – 15″ 34–38 cm	14½″ – 16½″ 37–42 cm	15¾″ – 18″ 40–46 cm	17″ – 19½″ 43–50 cm	18″ – 21″ 46–54 cm	19¼″ – 22¾″ 49–58 cm	20½″ – 24½″ 52–62 cm
C **CALF & CALF** w/Silicone Top Band w/out Silicone Top Band	10¼″ – 13¼″ 26–34 cm	11″ – 14½″ 28–37 cm	11¾″ – 15¾″ 30–40 cm	12½″ – 17″ 32–43 cm	13¼″ – 18″ 34–46 cm	14¼″ – 19¼″ 36–49 cm	15″ – 20½″ 38–52 cm
B **ANKLE**	6½″ – 7¼″ 16.5–18.5 cm	7½″ – 8¼″ 19–21 cm	8½″ – 9¼″ 21.5–23.5 cm	9½″ – 10¼″ 24–26 cm	10½″ – 11¼″ 26.5–28.5 cm	11½″ – 12½″ 29–32 cm	12¾″ – 13¾″ 32.5–35 cm
LEG LENGTH	ℓ floor - D1 **CALF** ▸ **STANDARD:** 15″ – 19″ (38–47.5 cm) PETITE: 12″ – 15″ (31–38 cm) ℓ floor - G **PANTY & THIGH** ▸ **STANDARD:** 28″ – 34″ (71–86.5 cm) PETITE: 23″ – 28″ (58.5–71 cm)						

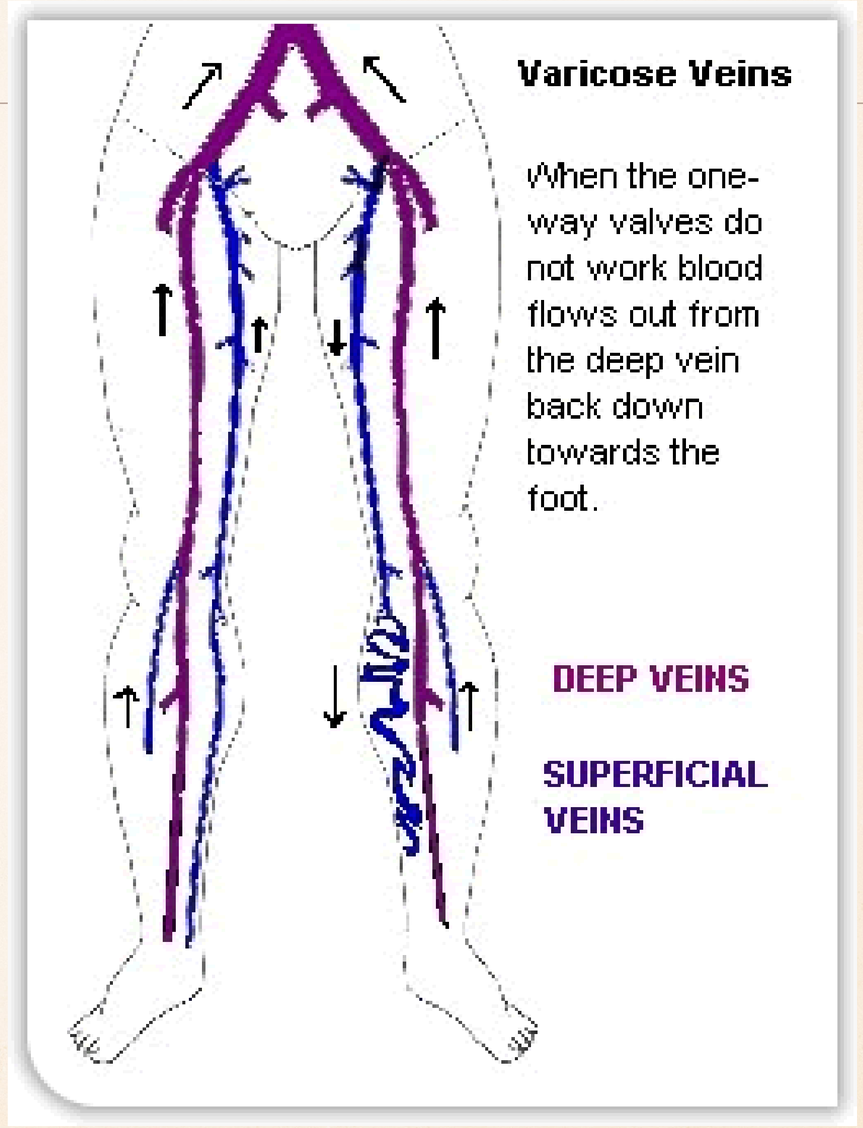


CHALLENGES TO COMPRESSION

ENDOVENOUS TREATMENT

- If patient fails medical management, treatment is recommended.
- Truncal venous ablation
- Foam sclerotherapy
- Phlebectomy
- “Vein stripping” “Vein surgeries” are no longer used.

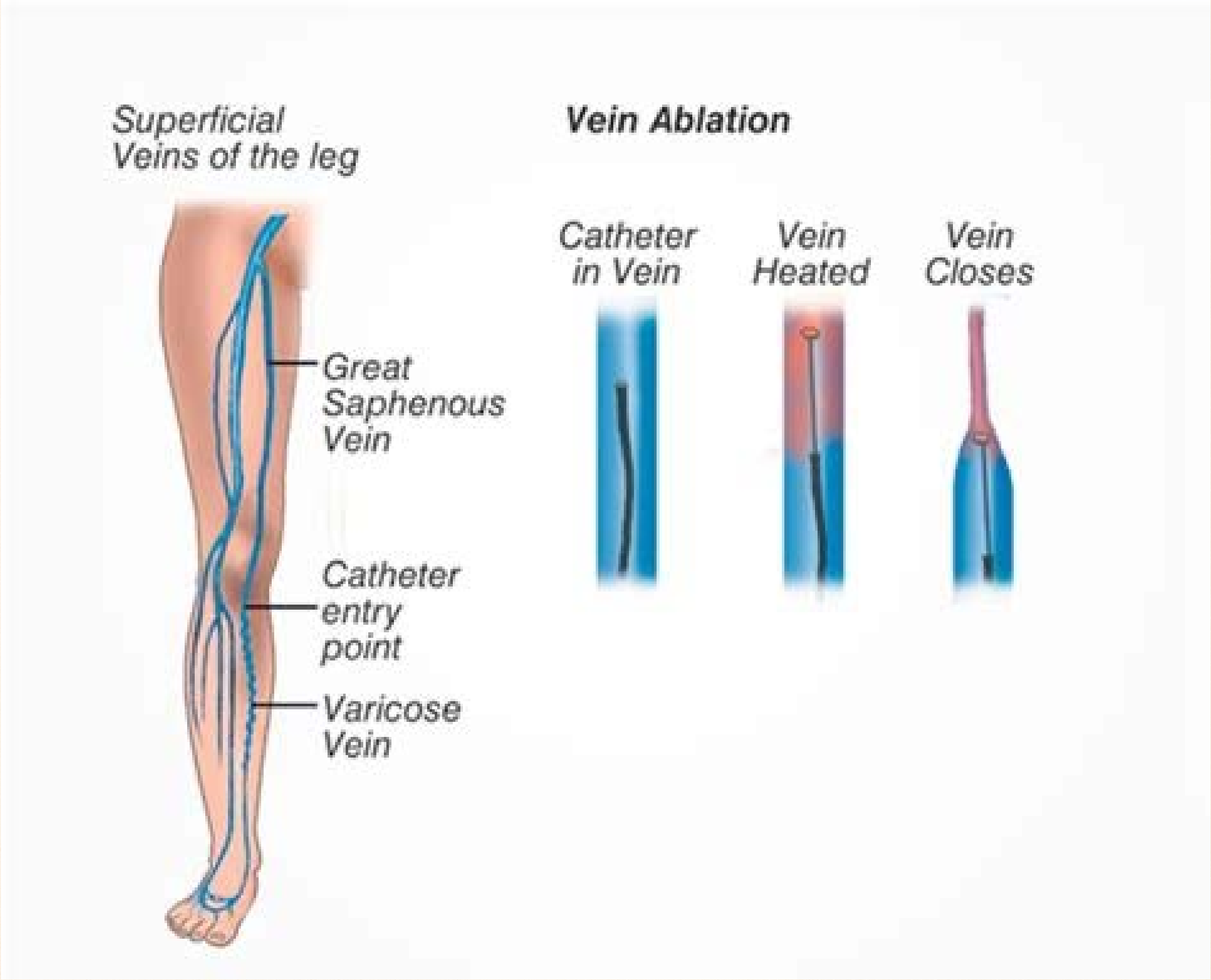
ENDOVENOUS ABLATION



“OUCH” VEIN STRIPPING

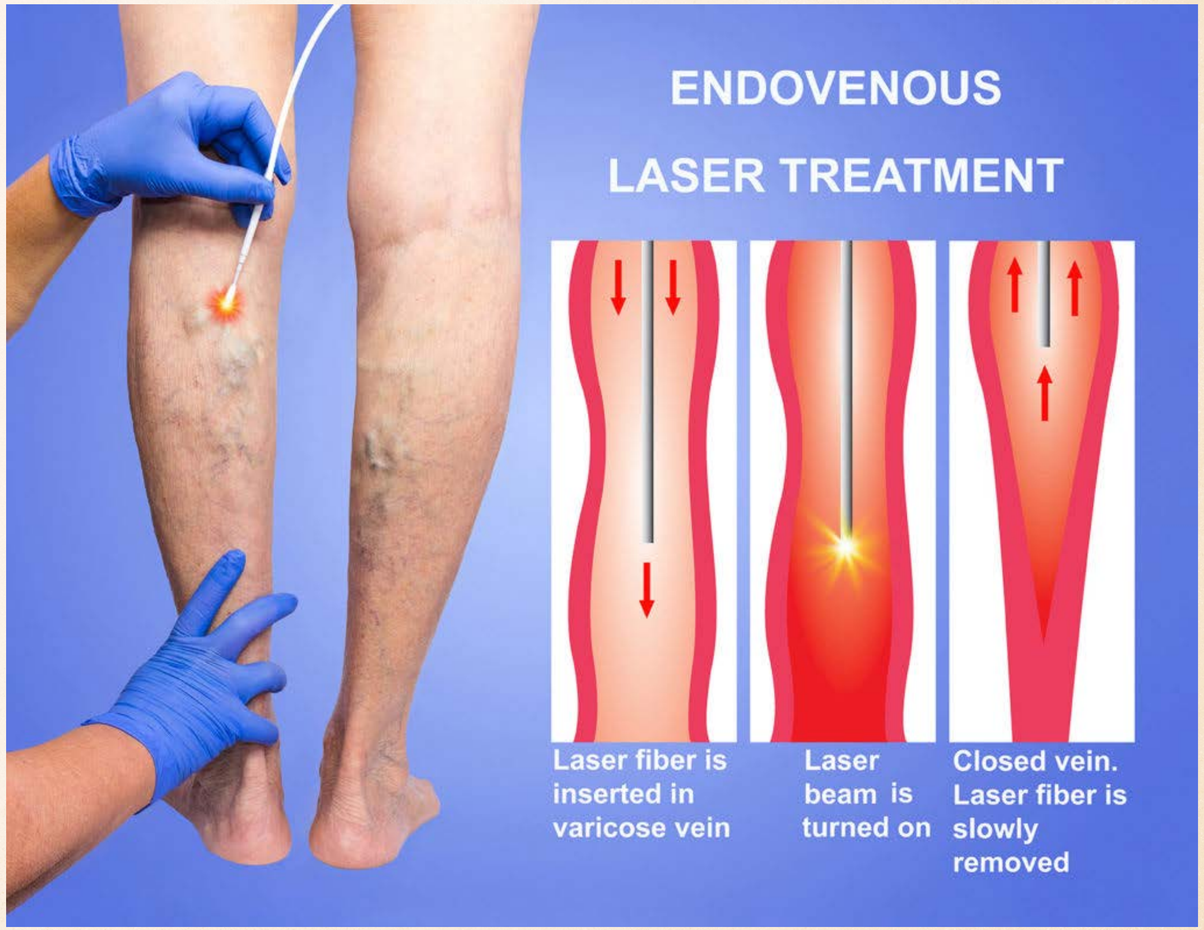
ENDOVENOUS ABLATION

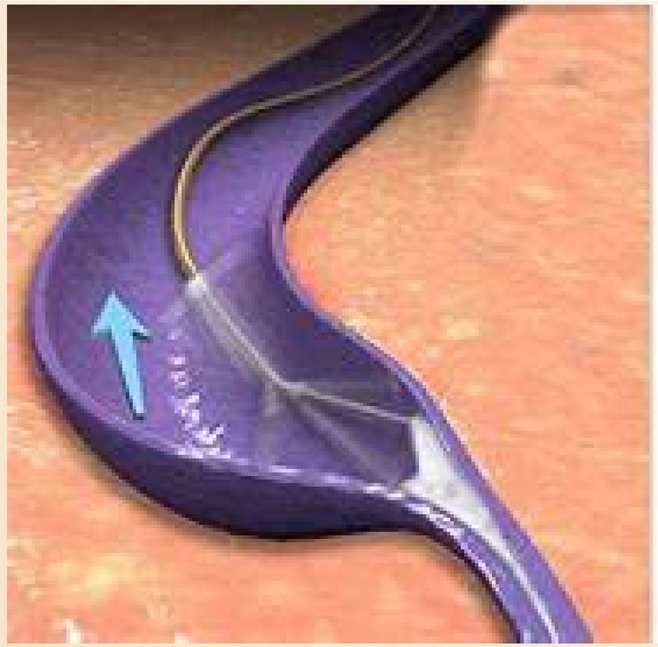
- Radiofrequency ablation
- Laser (EVLT)
- Foam (Mechanico-Chemical)
- Clue (VenaSeal)

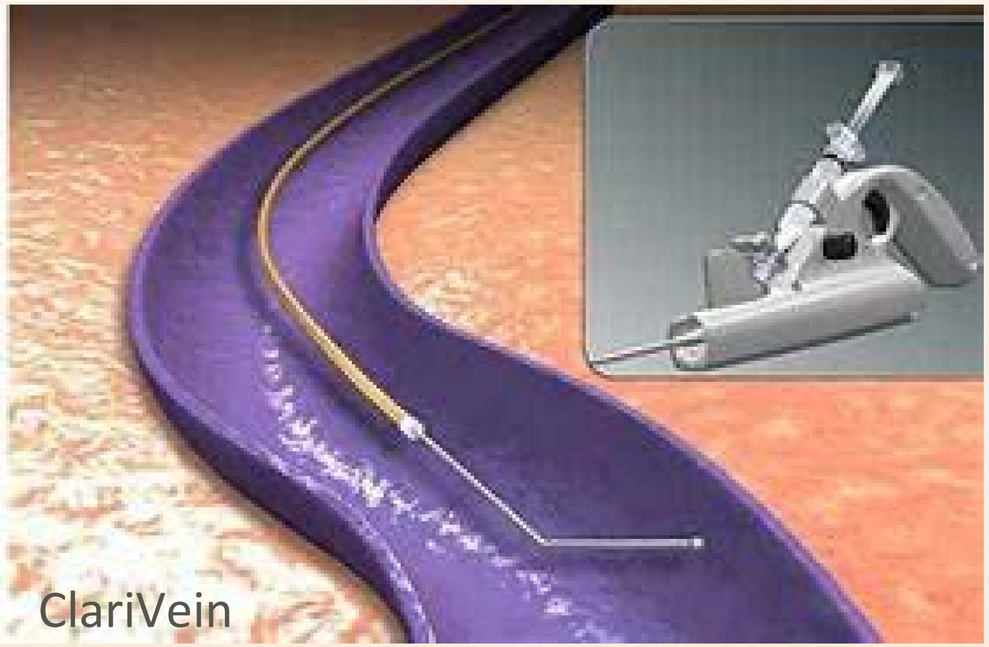


ENDOVENOUS RADIO FREQUENCY ABLATION

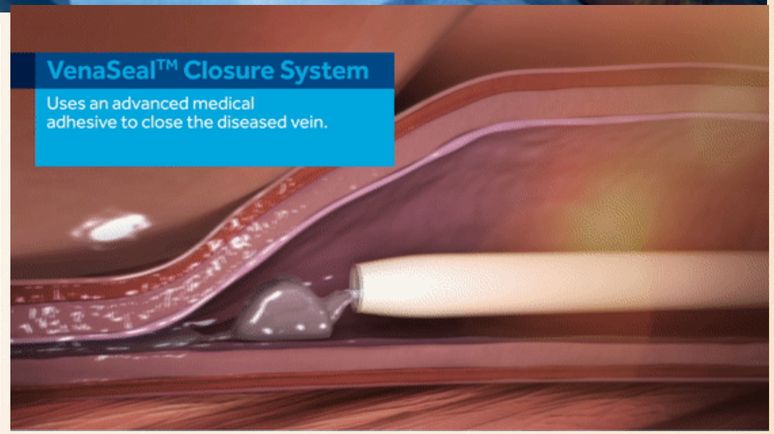
Tumescent Anesthesia







ClariVein



Nonthermal

No Tumescent

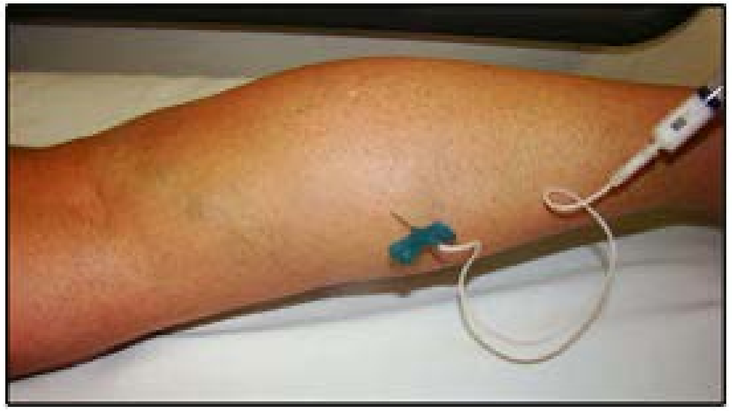
NEXT STEP

- Once truncal veins (GSV and SSV) are ablated, the patient is seen back in clinic after 6 weeks to assess for changes in varicosities.
- If the patient still has symptoms from varicosities > 3 mm by follow-up duplex then treatment of varicosities is warranted.
- Foam sclerotherapy alone vs. phlebectomy with adjunctive foam sclerotherapy.

FOAM SCLEROTHERAPY

- Injection of a sclerosant agent into a vein to cause closure of that vein.
- Solution mixed with air (4:1 ratio).
- Usually done with US guidance (to avoid injecting into arteries).
- Can have side effects.

- Tessari Method



FOAM SCLEROTHERAPY

Spider veins (telangectasias or reticular veins)

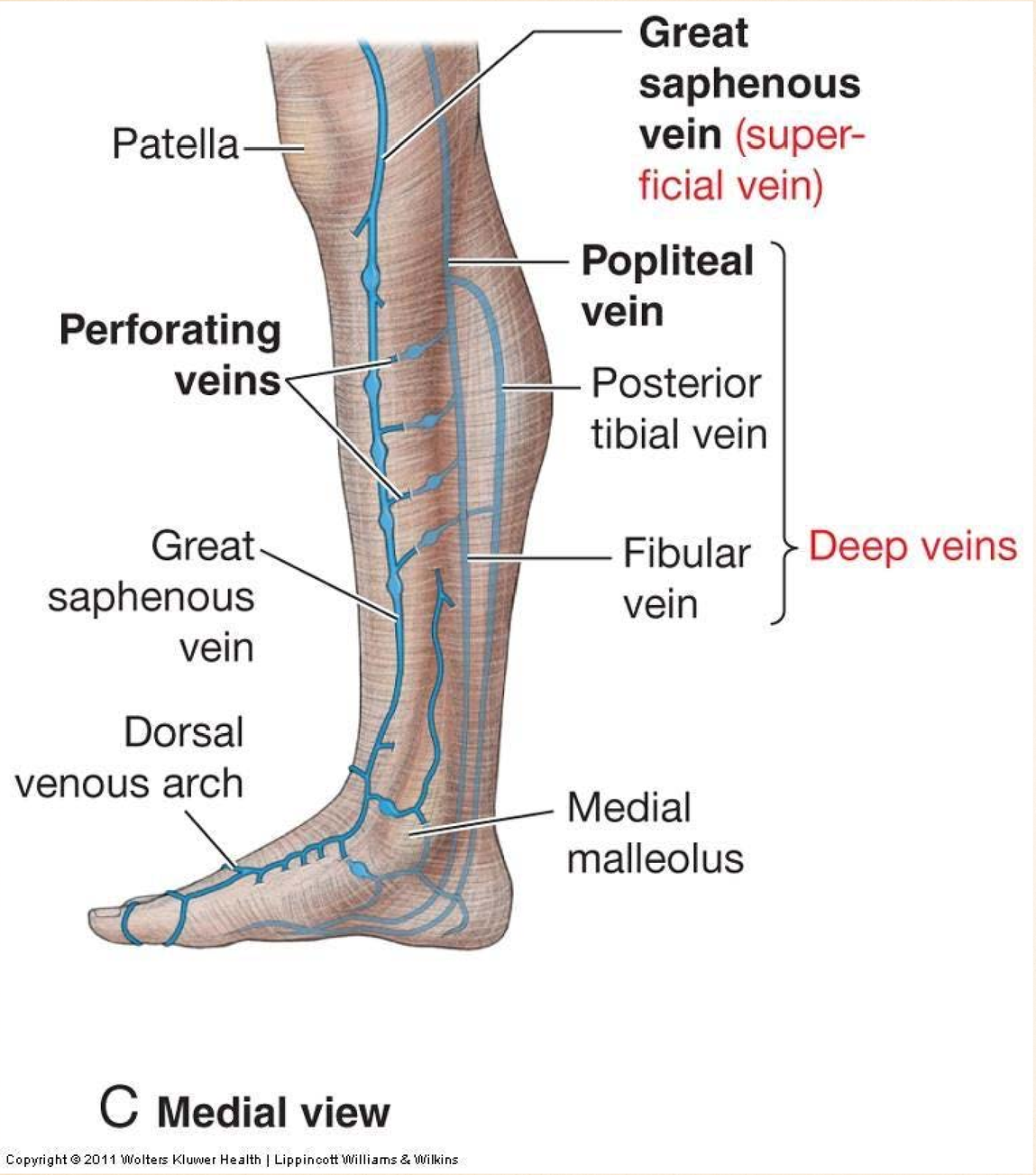
Venous ulcer healing

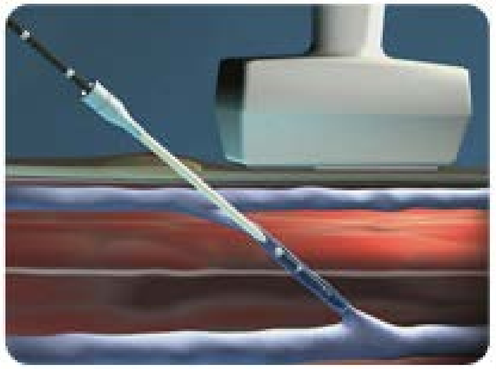
PHLEBECTOMY
WITH ADJUNCTIVE FOAM SCLEROTHERAPY

- Works best for large bulging varicosities.
- Venous map is drawn.
- Foam sclerotherapy.
- Tumescent anesthesia.
- Phlebectomy - It’s all about technique.

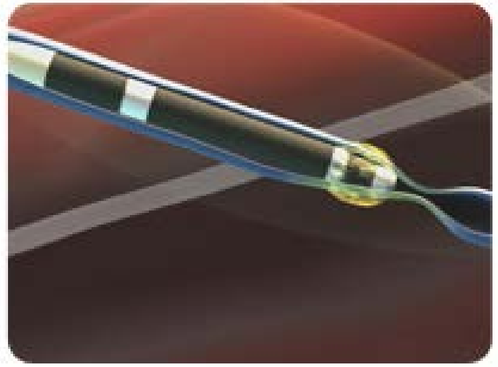
PERFORATOR ABLATION

- Indicated for ulcers or refractory varicosities.
- Technically challenging.
- Takes up to 6 weeks to see results.

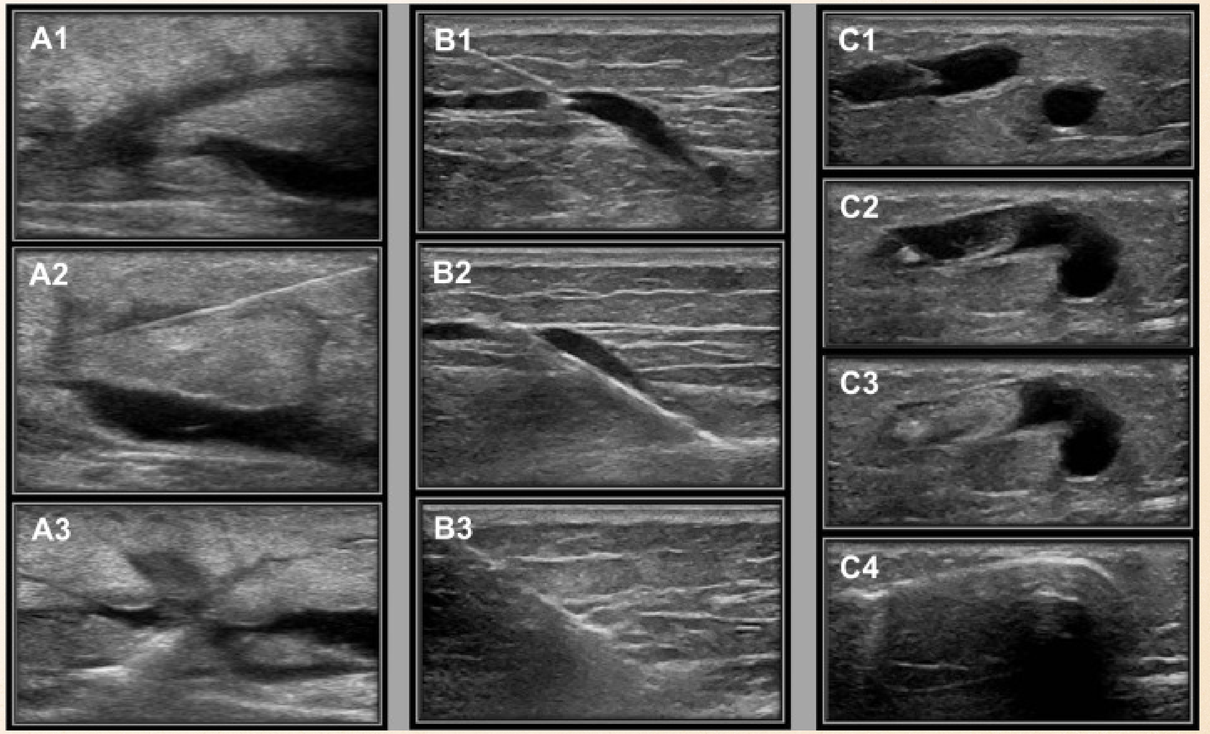




ClosureRFS™ accessing perforator vein



ClosureRFS™ treating perforator vein



COMPLICATIONS

- “If you don’t have complications you haven’t treated enough veins.”
- Usually not life-threatening.
- Short-term pain, skin pigmentation, phlebitis, allergic reaction, DVT, migraine, embolism (stroke, MI very rare).

FOLLOW UP

- Duplex 72 hours after venous ablation is routine.
- Close follow-up required during treatment period.
- Once symptoms resolved or ulcers healed, longer period of surveillance follow-up appropriate.
- I usually don’t perform routine surveillance US at follow-up unless the patient is symptomatic.

THANK YOU FOR YOUR ATTENTION.