

Venous Disease Update

Prevalence



Abnormal venous anatomy:

- 15% of males and 30% of females
- Familial tendency
- Standing vocation
- Associated with pregnancy (varicose veins)
- Leg injury or surgery
- Generally progressive
- Often symptomatic
 - Tired, aching legs
 - Leg swelling
 - Phlebitis and thrombosis

Prevalence of Venous Disease



Varicose Veins
20+ million



Swollen Leg
6 million



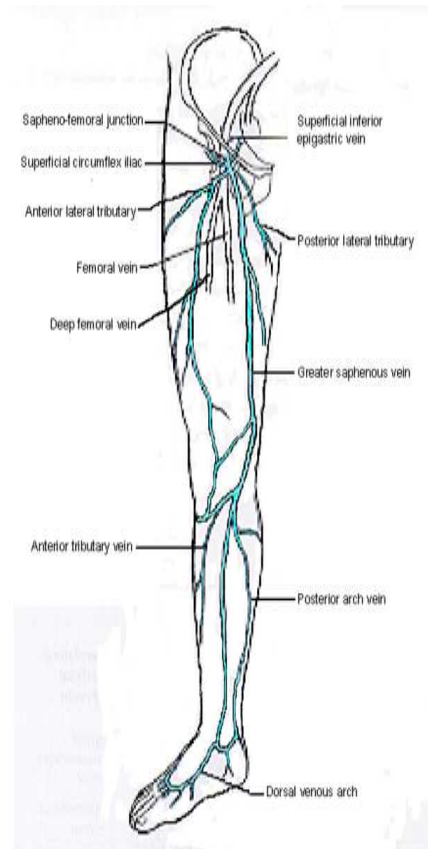
Skin Changes
1 million



Skin Ulcer
500,000

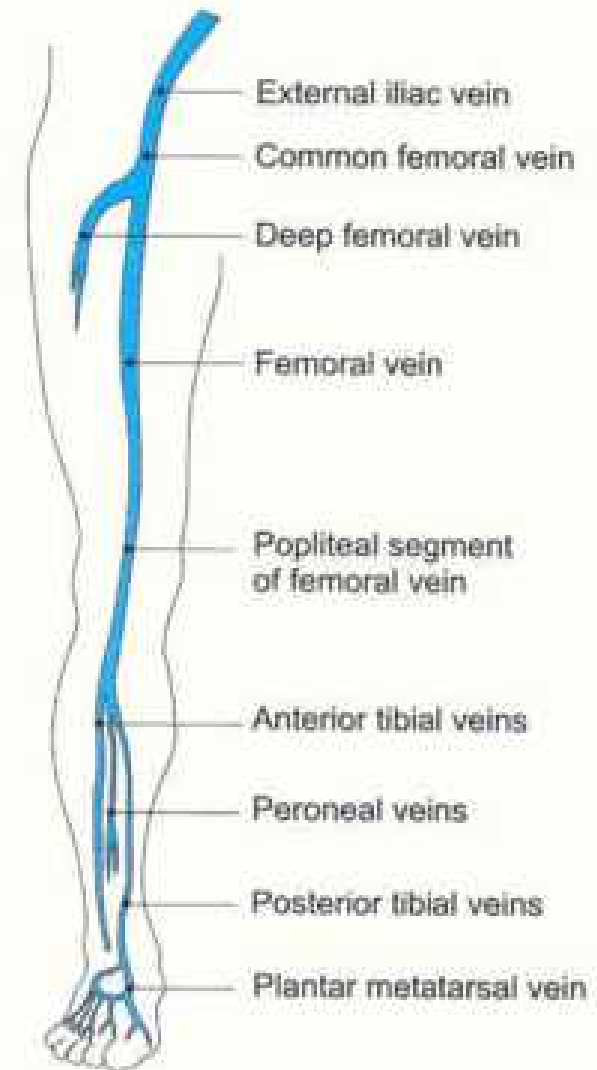
Saphenofemoral Reflux and Venous Hypertension

Venous insufficiency, or venous reflux, is the impaired return of venous blood from the legs or feet caused by dilated venous vessels in the legs or damaged/absent vein valves



Anatomy Review

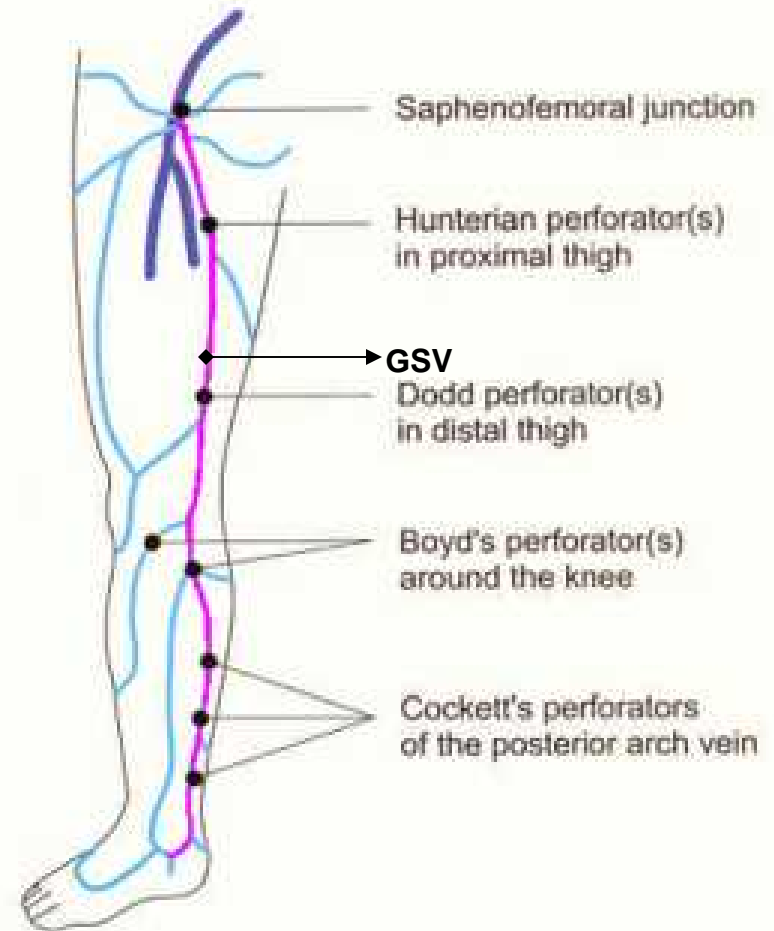
- Deep Venous System
 - Common femoral vein
 - Femoral vein
 - Popliteal vein
 - Gastrocnemius veins
 - Tibial veins



Anatomy Review

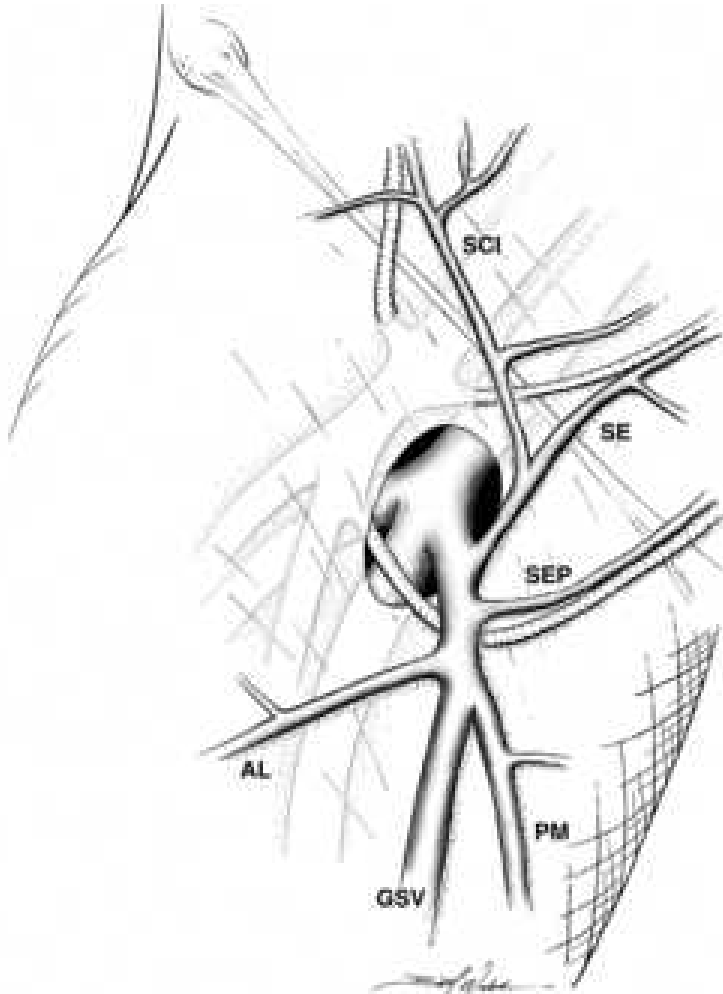
Great Saphenous Vein

- Courses from medial ankle to groin
- Joins the common femoral vein proximally at the saphenofemoral junction



Anatomy Review

SFJ Tributaries



AL – Anterolateral

PM – Posteromedial

SEP – Superficial external pudendal

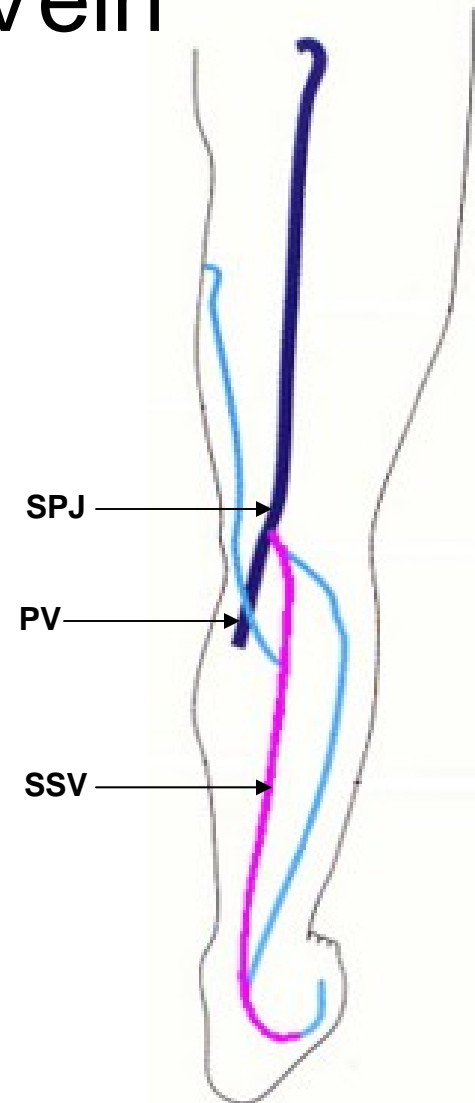
SE – Superficial epigastric

SCI – Superficial circumflex iliac

Anatomy Review

Small Saphenous Vein

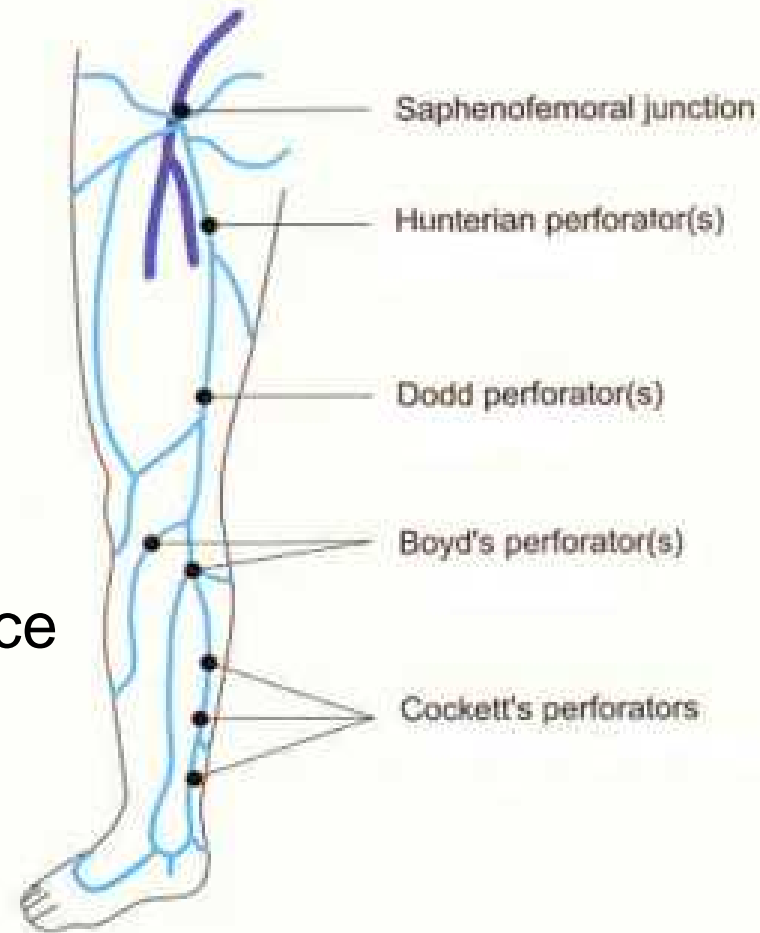
- Courses from the lateral ankle up the posterior calf
 - Terminates near the popliteal fossa at the saphenopopliteal junction (SPJ)
 - Confluence with the popliteal vein (PV) is variable
 - Proximal portion lies between superficial & deep fascial layers



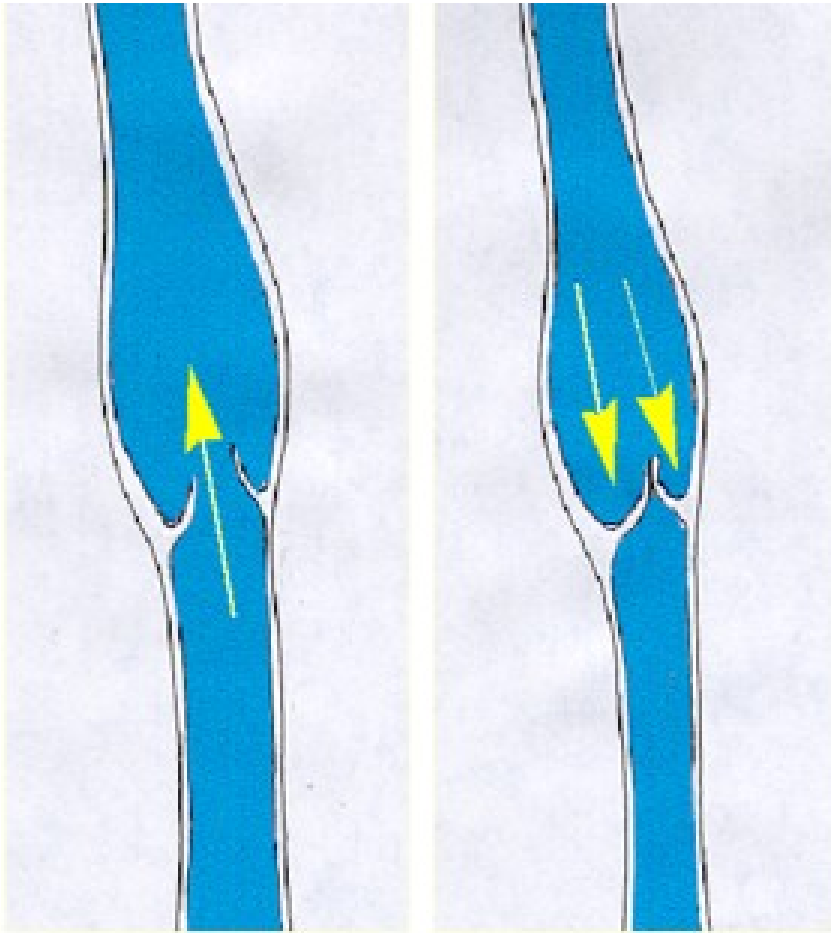
Anatomy Review

Perforators

- Connect superficial to deep veins
- Locations
 - Proximal thigh - Hunterian
 - Distal thigh - Dodd's
 - Knee - Boyd's
 - Ankle/Calf - Cockett's
- Incompetent perforators often source of venous stasis ulcers at medial ankle



Pathophysiology



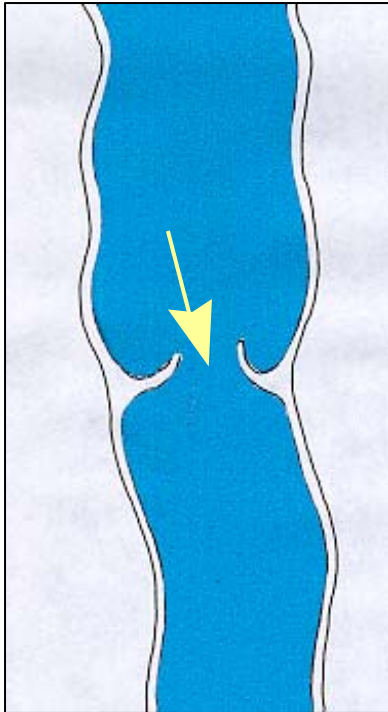
Valve Open

Valve Closed

- Vein Valves
 - Blood propelled by calf muscle pump opens the valve in one direction
 - Blood moving with gravity closes the normal valve

Venous Reflux

Incompetent vein valves
allow retrograde flow,
known as venous reflux



Venous reflux can lead to
varicose veins and other more
severe signs and symptoms



Image courtesy of Michael

Signs of Venous Insufficiency



Edema



Varicose
Veins



Skin Changes
and
Discoloration



Stasis
Ulcers

Ultrasound Diagnostic Study

- Must be performed to determine the sources of reflux.
- Evaluate for venous occlusion or thrombus
- Map the course of the incompetent superficial veins
- Localize sites for treatment with minimally invasive techniques



Venous Insufficiency Exam

Pulsed Wave Doppler

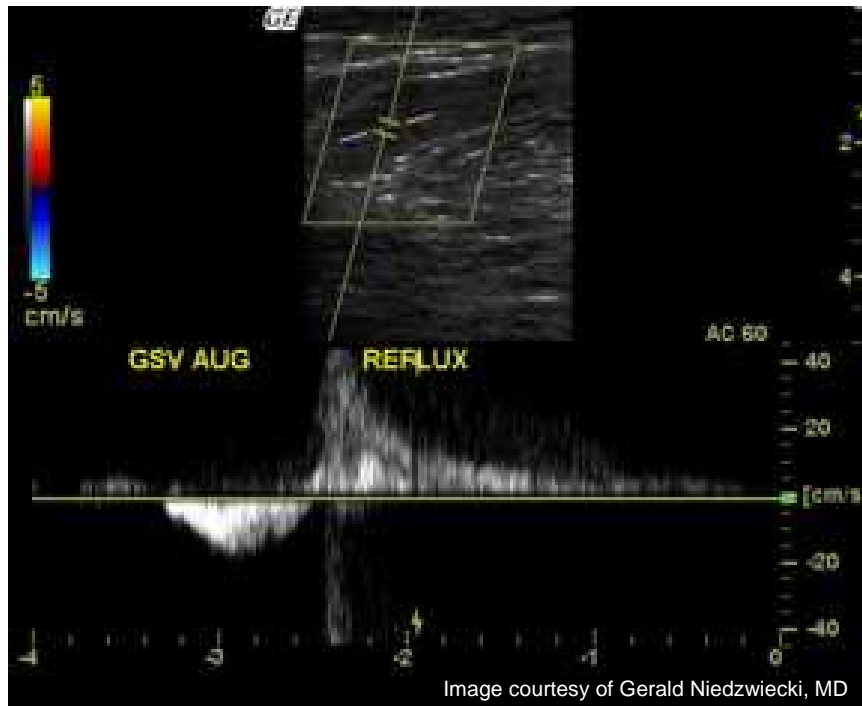


Image courtesy of Gerald Niedzwiecki, MD

GSV at the SFJ:
Test is positive for reflux

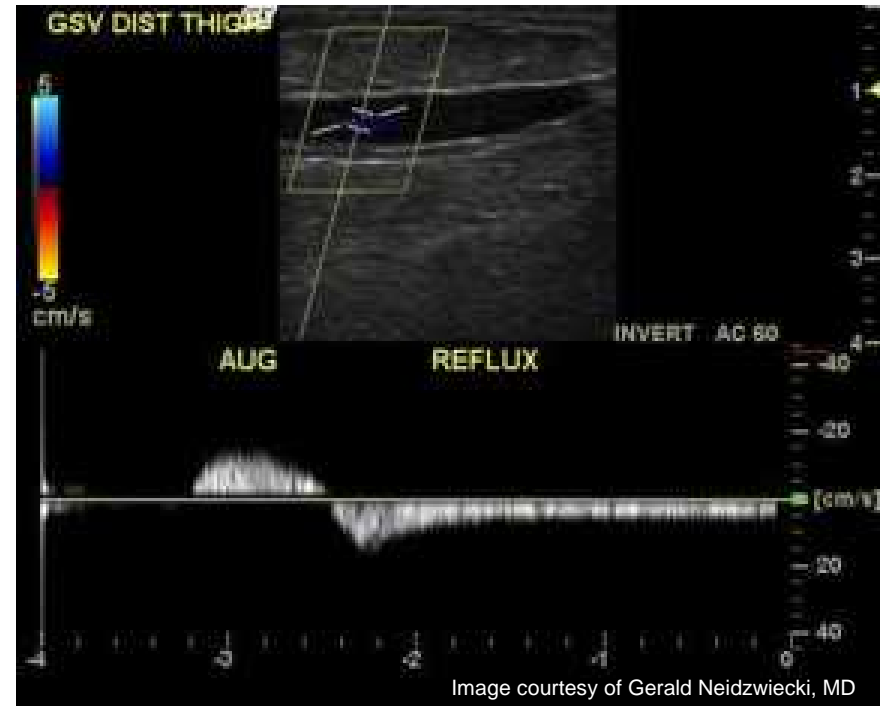


Image courtesy of Gerald Niedzwiecki, MD

GSV distal thigh-reflux
after augmentation

Venous Insufficiency Exam

Perforators



Perforator passing through deep fascia

Treatment Options

- Pressure Garment Use
- Compression Wraps
- Surgical Ligation/Stripping
- Chemical Sclerotherapy
- Endovenous Ablation RF/Laser
- Perforator Ablation (RF)

Pressure Garments

- Class I 20 to 30 mmHg aching, swelling
small varicose vein changes
- Class II 30 to 40 mmHg symptomatic
Varicose veins, Chronic venous
insufficiency, post ulcer
- Class III 40 to 50 mmHg Chronic venous
insufficiency, post ulcer, lymphedema
- Class IV 50 to 60 mmHg (same as III)

Compression Wraps

- Multi-Layer Wraps
- Una Boot
- Unna Sleeve (ACI Medical): cotton sock that laces up the front for fit
- “Circ Aid” (Circ-Aid corp.): series of straps that circle the leg with Velcro tension adjustment

Surgical Ligation/Stripping

- Performed in the OR
- Historically the “Gold Standard”
- Invasive, Prolonged Recovery, Nerve Injuries
- Occasionally the only option for patients

Chemical Sclerotherapy

- Used in smaller reticular veins and spider veins
- Poor results when used in larger veins
- Products include: Polidocanol, Hypertonic Saline, Sotradecol, Glycerine

Endovenous Ablation (RF)



Catheter inserted in refluxing vein



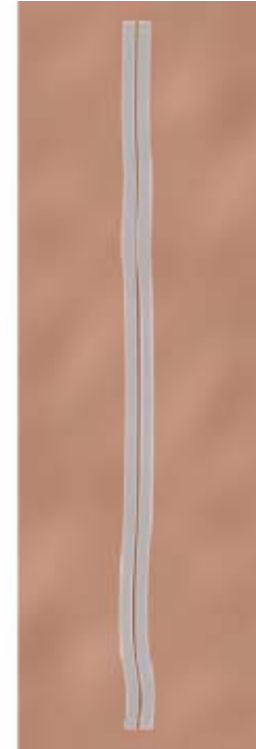
Catheter positioned, electrodes deployed



RF energy heats and contracts vein wall



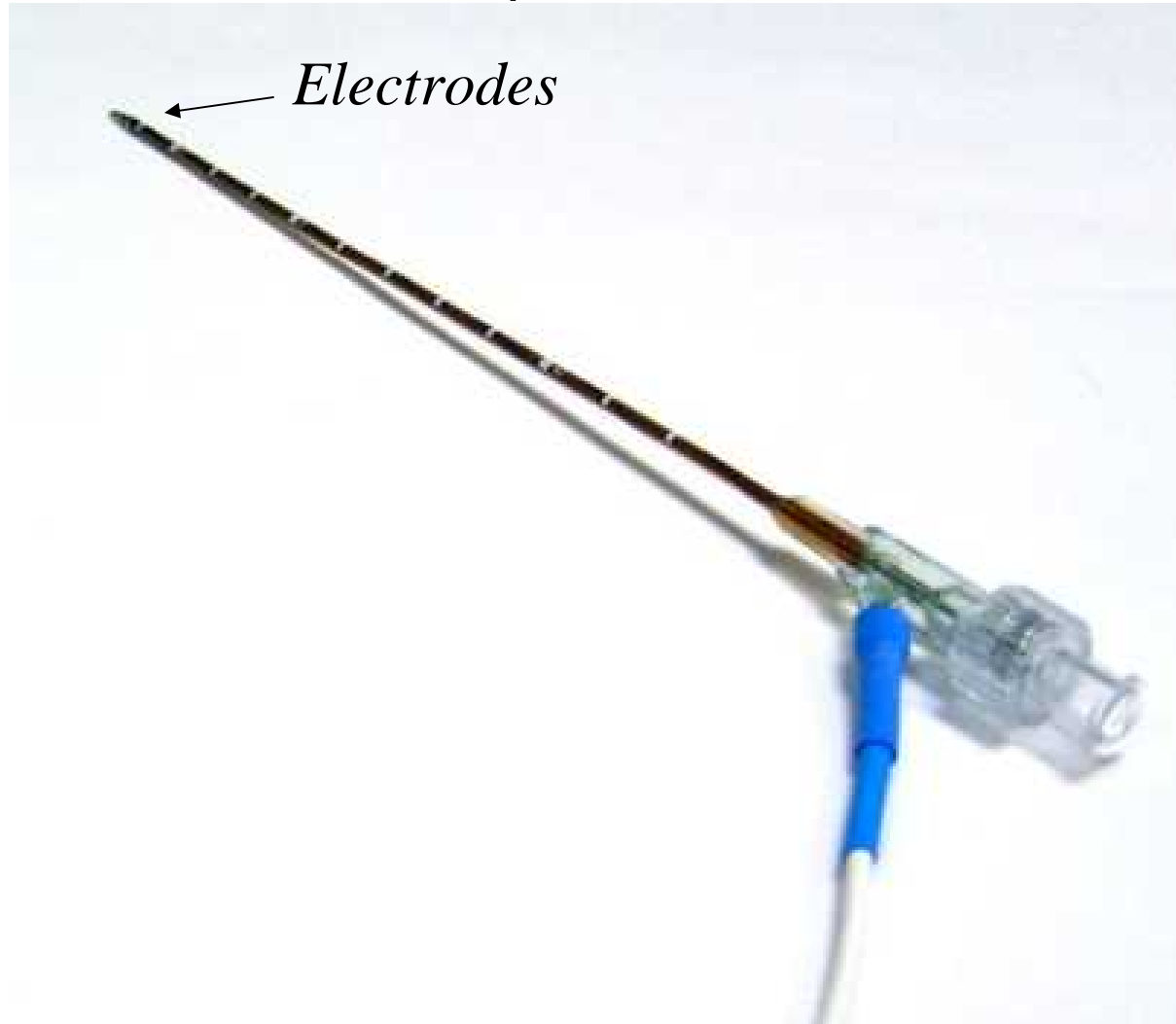
Catheter withdrawn, closing vein



Denuded vein is physically narrowed

RF Ablation Stylet

For Incompetent Perforators

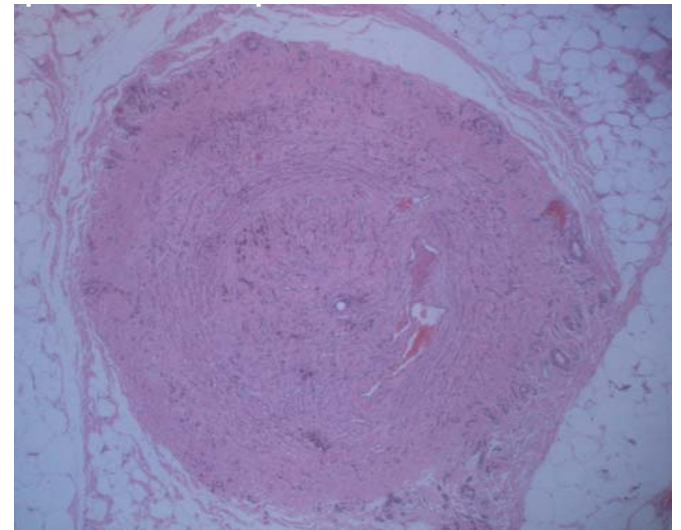
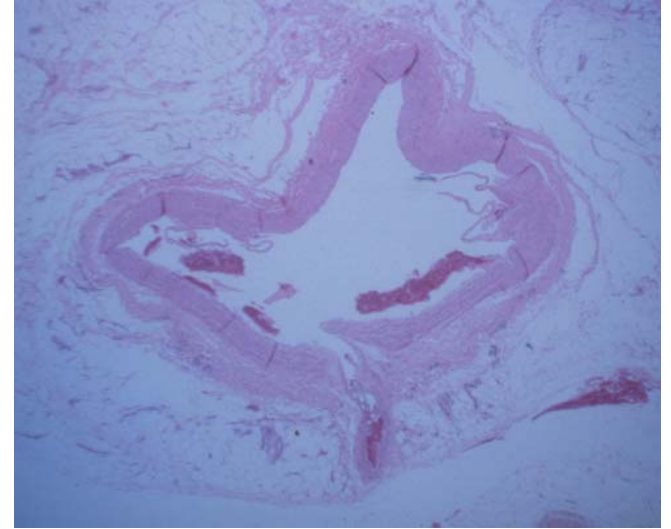


How does Vein Ablation
Work?

Collagen Contraction

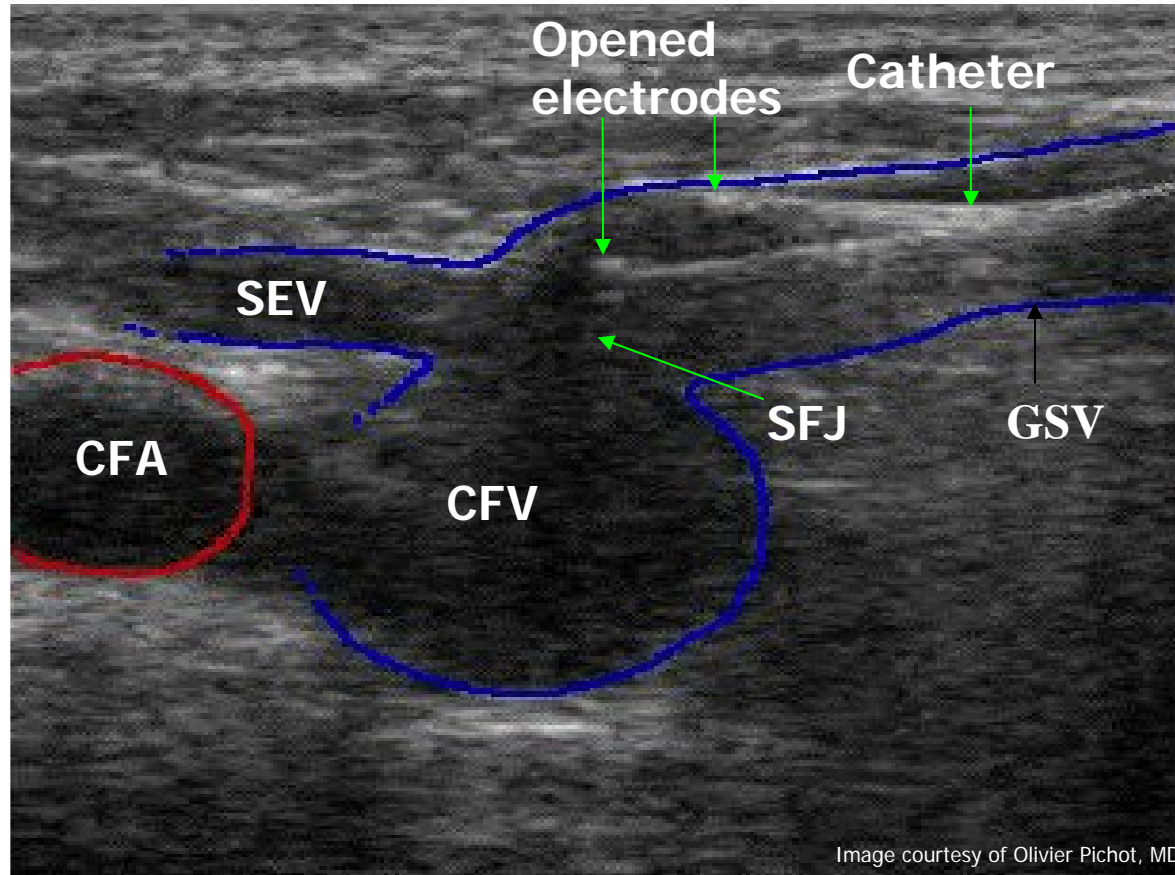
Controlled heating of the vein wall causes:

- Shortening and thickening of collagen fibrils
- Vein lumen diameter shrinkage
- Fibrotic sealing of the vessel

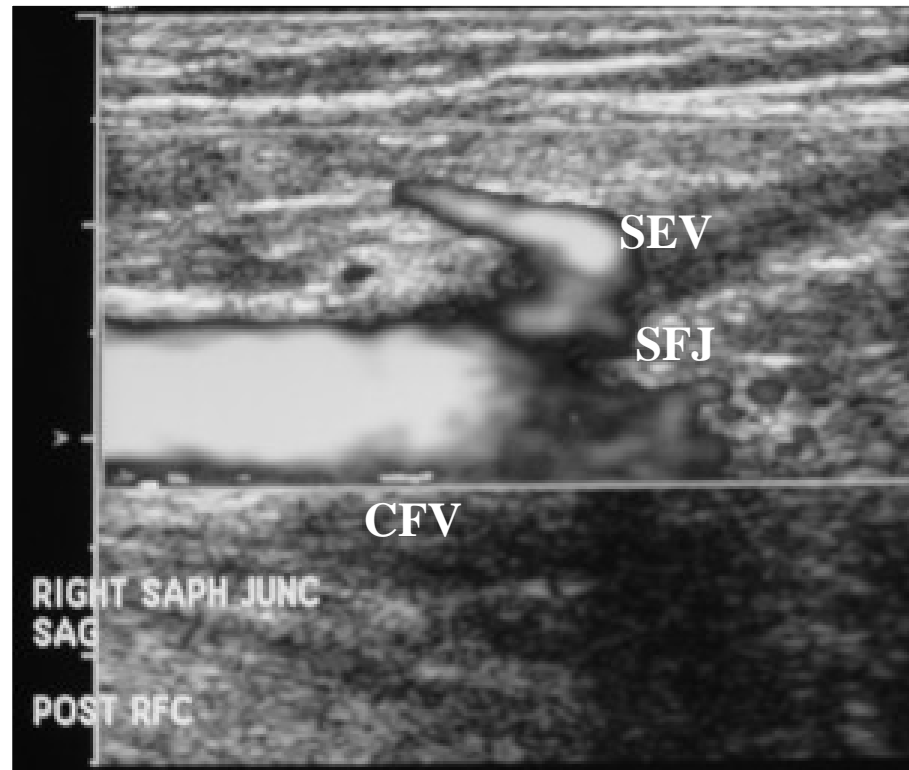


Caprine vein 6 weeks post-treatment

RF Catheter Positioned at SFJ

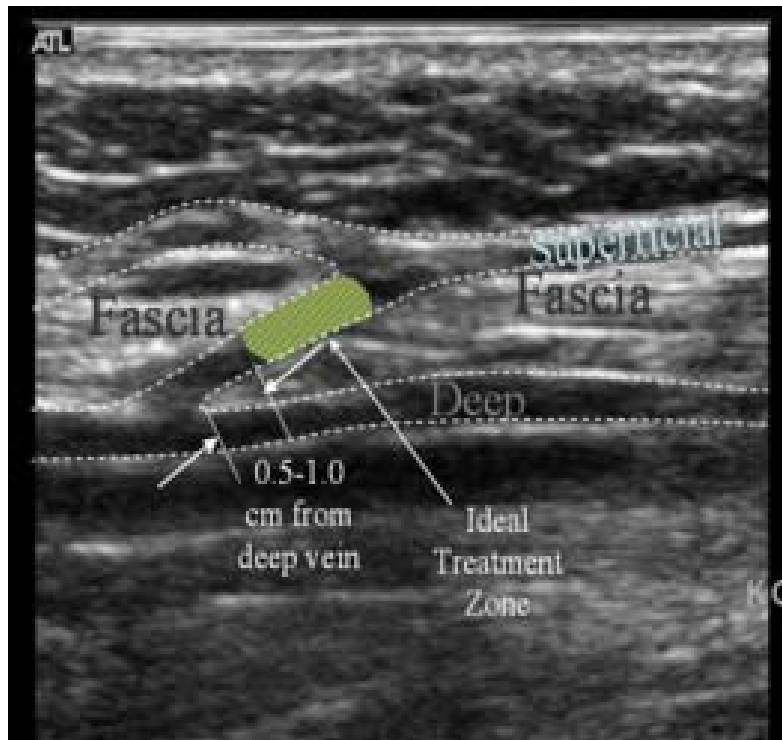


RF Treated SFJ

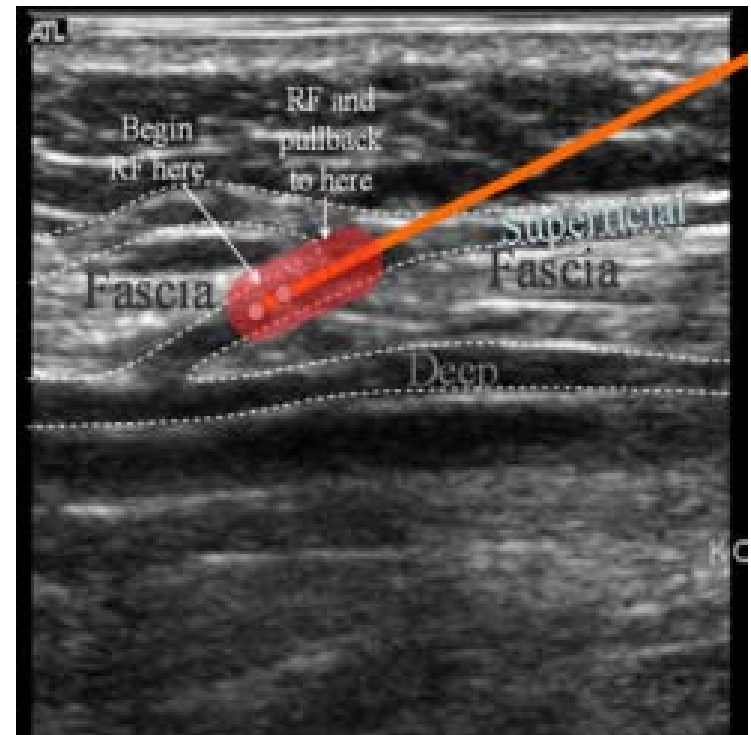


**Post-Treatment
No flow in GSV**

Perforator (RF) Treatment



Perforator Identified



Treatment with Stylet

Case Presentations

Venous Stasis Ulcer Perforator Treatment Only (RF)



- **57 y/o male**
- **Ulcer has been present for 4 years**
- **Treated with Compression Wraps & Stockings**

Post Treatment – RF Stylet



- **2 months after Perforator Ablation Procedure**
- **Patient wore compression stockings only**
- **Patient will be treated for GSV incompetence as well**

Venous Stasis Ulcer GSV Treatment Only



Pre Procedure



Post Procedure – 6wks

- **35 y/o Male – Venous Stasis Ulcer & Varicose Veins**
- **SFJ & GSV Incompetence discovered**
- **Treated GSV with RF Vein Ablation Procedure**
- **No incompetent perforators found**

Venous Stasis Ulcer SSV Treatment Only



Pre Procedure (5/25/06)
Procedure Performed (6/9/06)



Post Procedure (7/11/06)

- 65 y/o Female – Venous Stasis Ulcer, Varicose Veins, Significant Edema
- SSV & Cockett Perforator Incompetence
- Treated SSV with RF Vein Ablation Procedure