

The Role of Duplex Ultrasound in the Evaluation of Post Thrombotic Syndrome

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Disclosures

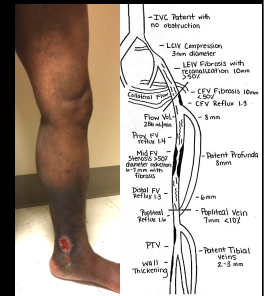
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The Role of Duplex in PTS

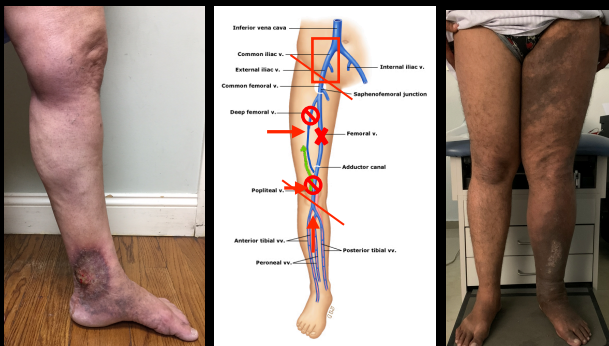
- First-line modality for diagnosing and managing patients with PTS
- Accurately define the extent, location and severity of disease
- Excellent for post intervention follow up

Patient Evaluation

- Review patient history
- Correlate the symptoms and physical findings
- Create a precise deep vein "Road Map"
- Define the characteristics of obstruction
- Anatomical level of obstruction
- Extent of reflux, vein diameters measurements, $\leq 50\%$ or $\geq 50\%$ diameter reduction, collaterals, identify potential access sites, superficial vein involvement?



Post Thrombotic Inflow



Anatomy image courtesy of Mark Garcia MD

Iliac Vein Obstruction

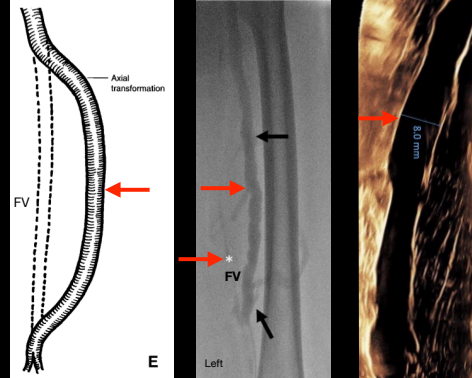
Iliac veins serve as the outflow tract of the lower extremities

- Ilio-femoral DVT is the most common cause of chronic venous outflow obstruction
- **Only 20-30%** of iliac veins completely recanalize after thrombosis, the rest partially recanalize and develop collaterals
- **End result** = significant outflow obstruction with varying degrees of collaterals

- **Infrainguinal obstructions** are better compensated because of robust collaterals
- Femoral-popliteal vein collaterals
- Profunda-popliteal vein collaterals
- Deep muscular tributaries within the thigh
- Sapheno-saphenous venous connections

Atlas of Endovascular Venous Surgery, Almeida, J. 2018

Axial Transformation Profunda Femoris Vein



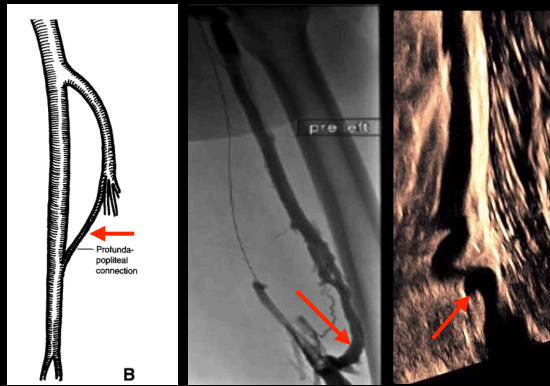
Axial transformation of the profunda femoris vein JVS 1998

Schahdi Rafe, MD, Todd Swanson, BS, Peter Nigam, MD, and M. Dovidio, PhD, Jackson, Miss

Infrainguinal inflow assessment and endovenous stent placement in iliofemoral post-thrombotic obstructions

Ch. Gratz,^{1,2,4} Boris Eskin,¹ Gaurav Sandhu,^{1,4} Gauri Fyfe-Gardner,³ Carl-Jock Skopovik,² Dany Ray,¹ Nils-Einar Klein,^{1,4} and Antonio Ragozzini²

Profunda Popliteal Connection



Axial transformation of the profunda femoris vein JVS 1998

Schahdi Rafe, MD, Todd Swanson, BS, Peter Nigam, MD, and M. Dovidio, PhD, Jackson, Miss

Factors influencing peripheral venous pressure in an experimental model

Seshadri Raju, MD, FACS, William Crim, BA, MS, and William Buck, BBA, MS, Jackson Miss

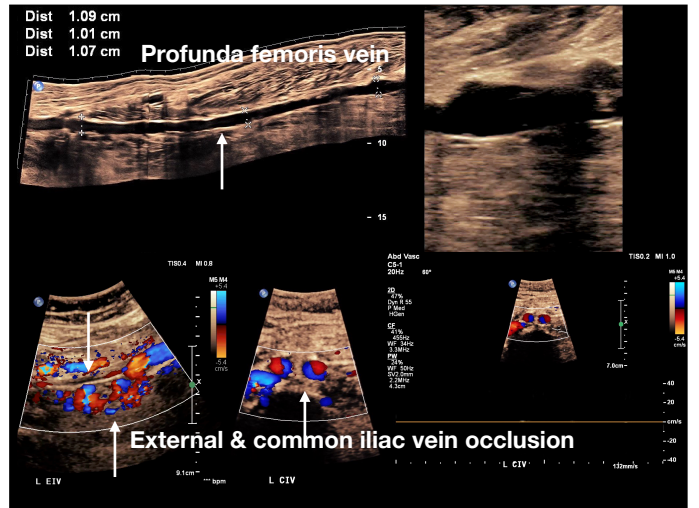
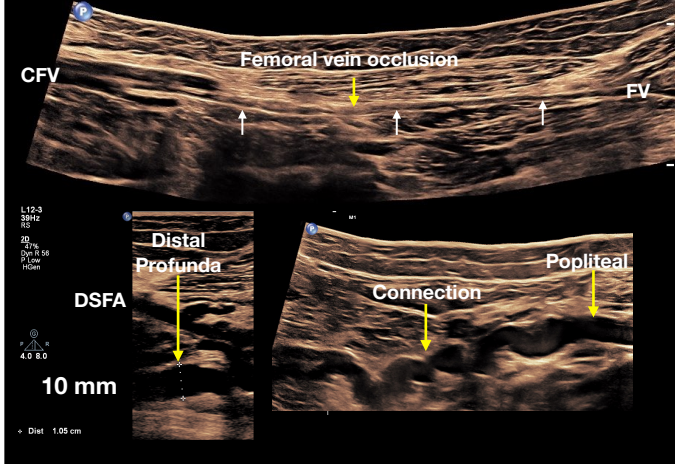
Patient Position: Reverse Trendelenburg, Tilt Table, Sitting & Standing

Standing provides:

- Exam best performed standing to more closely mimic physiologic conditions when pathologic reflux exerts its influence
- Limb being imaged externally rotated and most of the weight ~70% on the contralateral leg
- Patents heel of the limb must be flat on the surface to prevent calf systole
- Manual or cuff inflation for distal calf augmentation
- Provides a 360° view of limb, easy access to all reflux sources and drainage points
- Causes maximal dilation of all veins to obtain accurate diameter measurements & reflux times



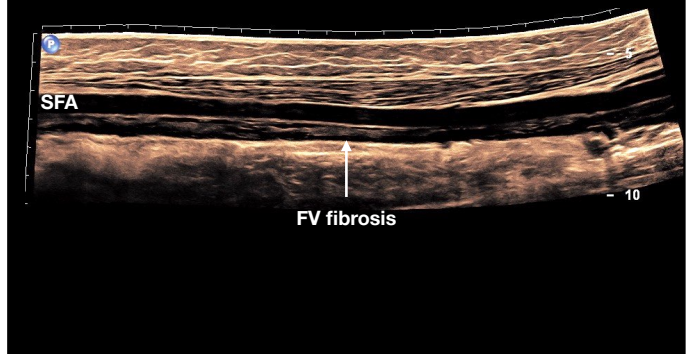
Case 1, 57 YO female, left PTS, & outflow obstruction



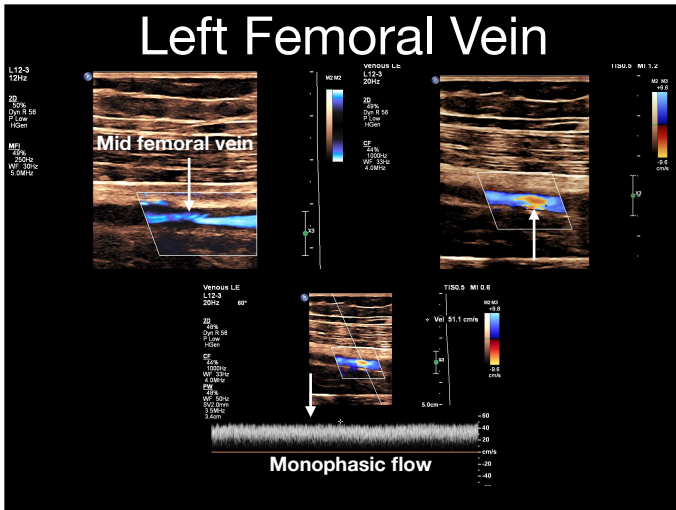
Case 2

- 47 YO female, persistent left lower extremity swelling, hyperpigmentation and uterine fibroids
- 2020, duplex diagnosis of acute left iliofemoral DVT
- CTA confirmed right sub-segment PE
- MR demonstrated mass compression of left common and external iliac veins
- Patient underwent hysterectomy (13lb leiomyoma)
- 2022 edema, skin changes, left lower extremity pain consistent with venous claudication

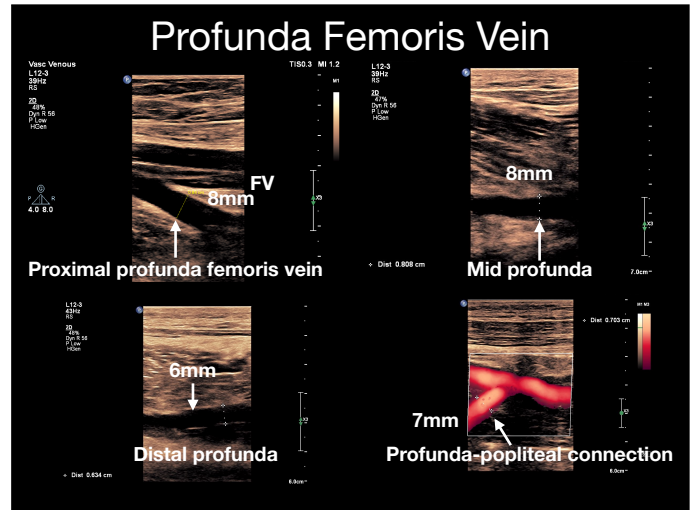
Left Femoral Vein Panoramic View



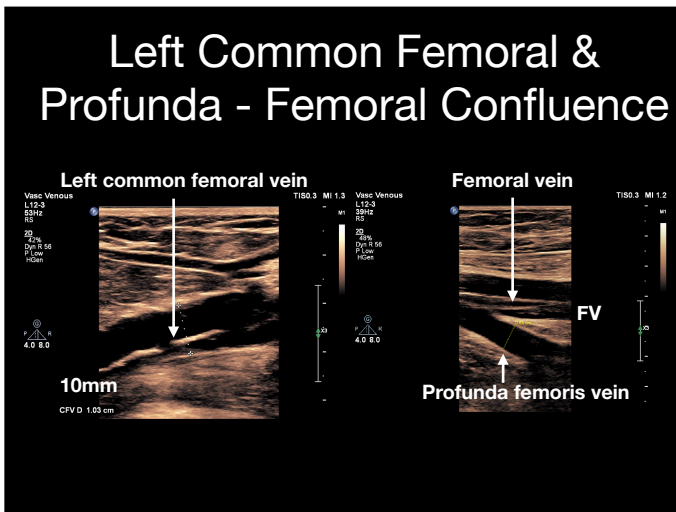
Left Femoral Vein



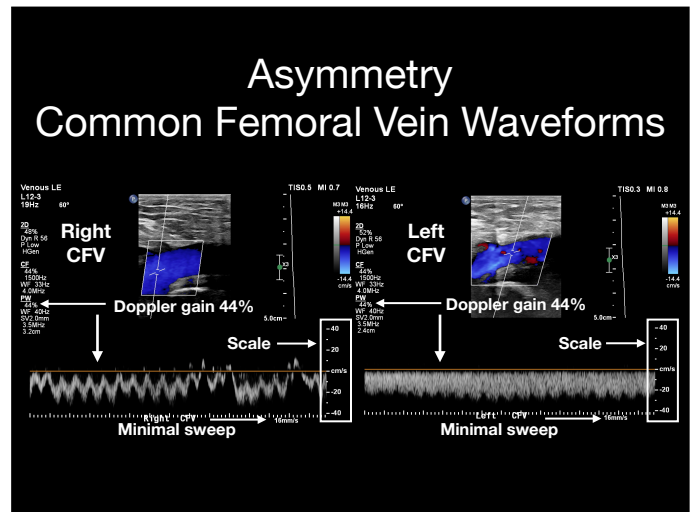
Profunda Femoris Vein

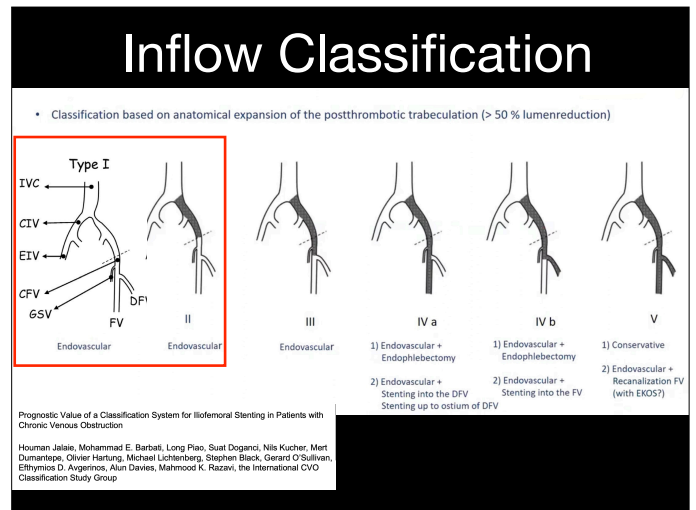
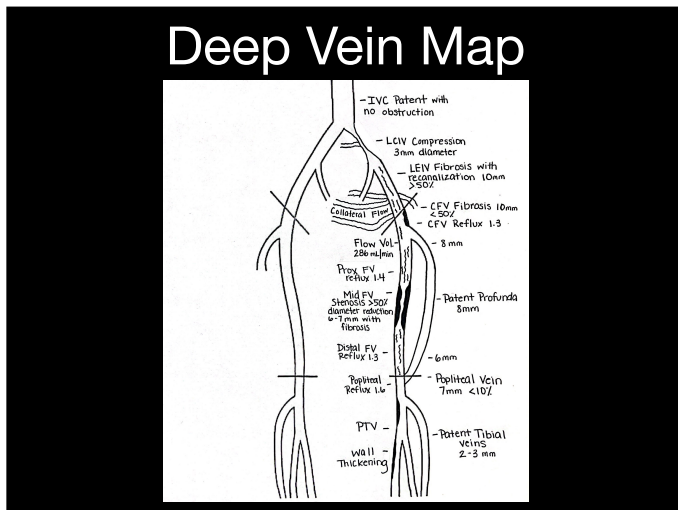
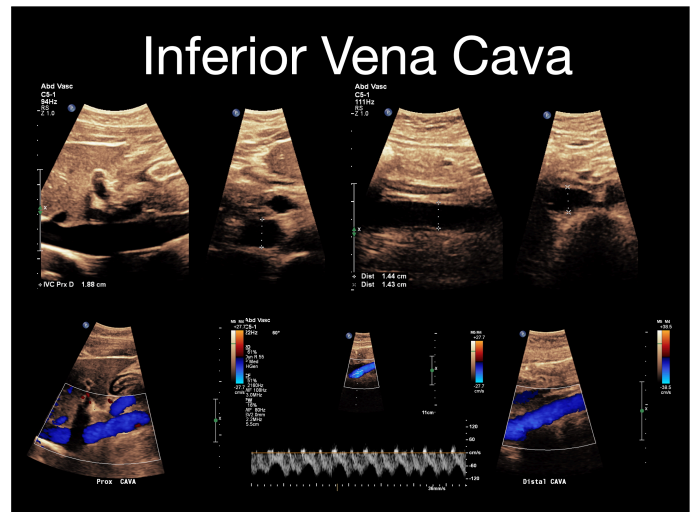
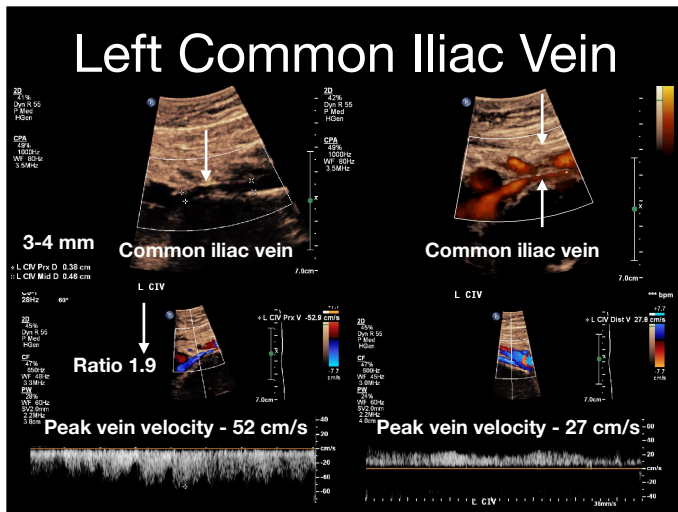
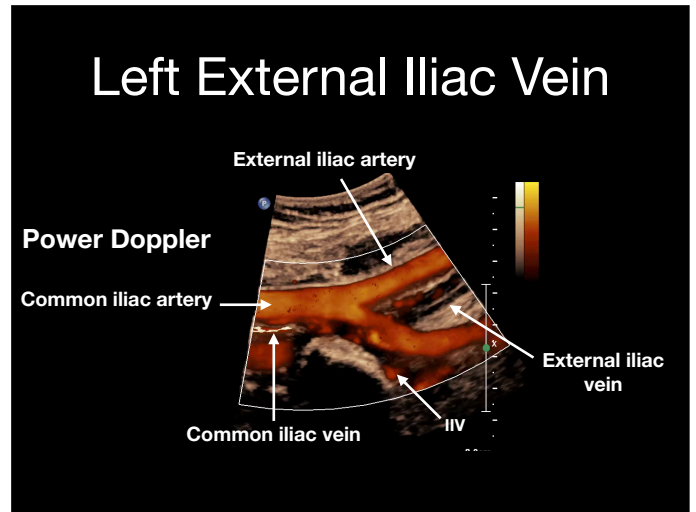
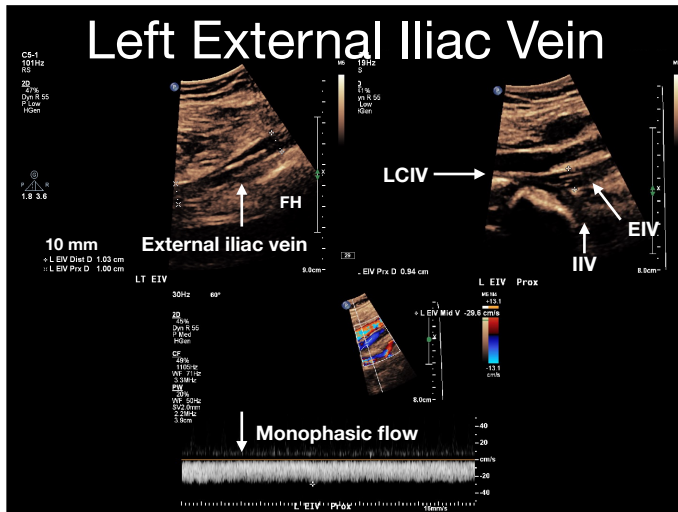


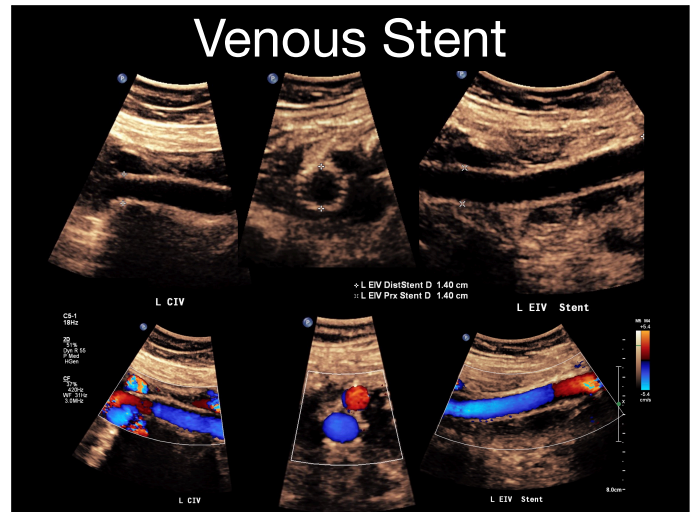
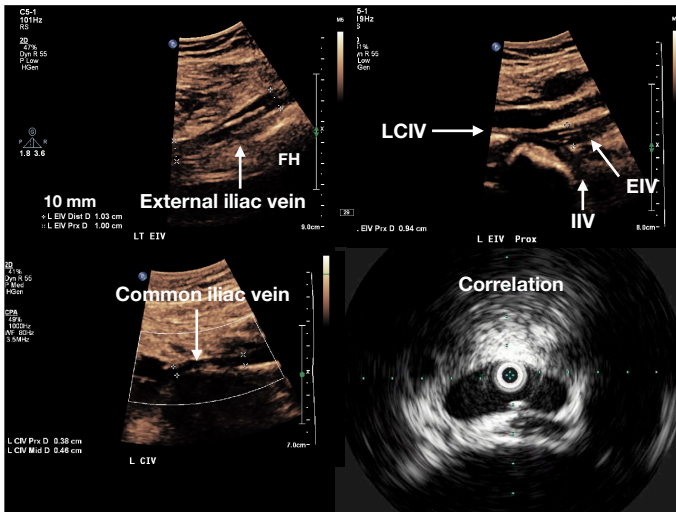
Left Common Femoral & Profunda - Femoral Confluence



Asymmetry Common Femoral Vein Waveforms







Conclusion

- Duplex excellent for diagnosing and managing patients with PTS
- Can define the extent, location and severity of disease
- Best for post intervention follow up
- Exams can be challenging, require time, effort, skill & patience
- Exams are rewarding because these patients have significant quality of life issues



Tuesday, November 19 - Saturday, November 23, 2024

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Thank You