

# Peripheral Arterial Studies in the Upper Extremity

for

*Clinical Approach to Vascular Ultrasound and Registered Physician in Vascular  
Interpretation (RPVI) Prep Course*

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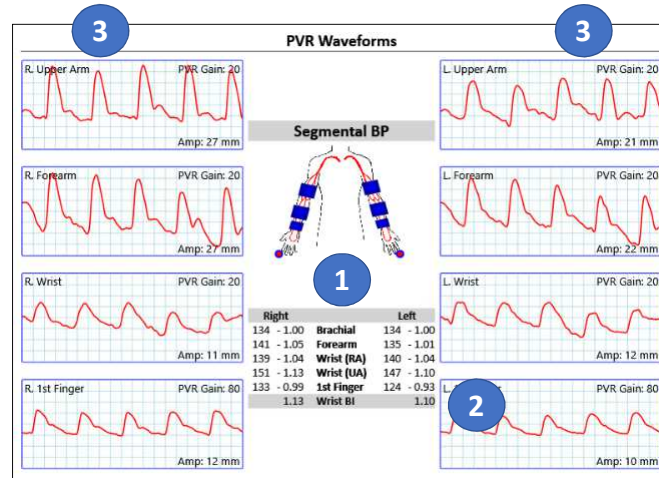
## Disclosures

- Magneto Thrombectomy Solutions - Consultant
- Penumbra, Inc., - Consultant

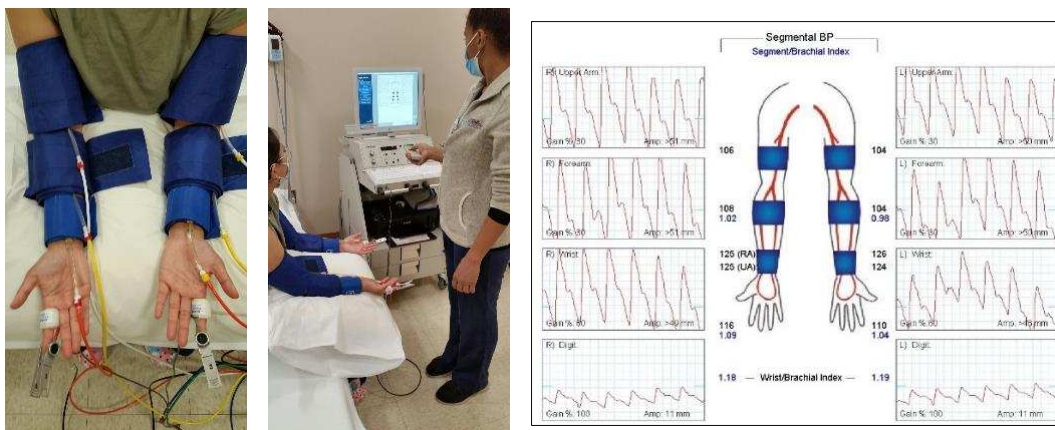
# Upper Extremity Arterial Anatomy

Normal

# Pulse Volume Recordings and Segmental Pressures



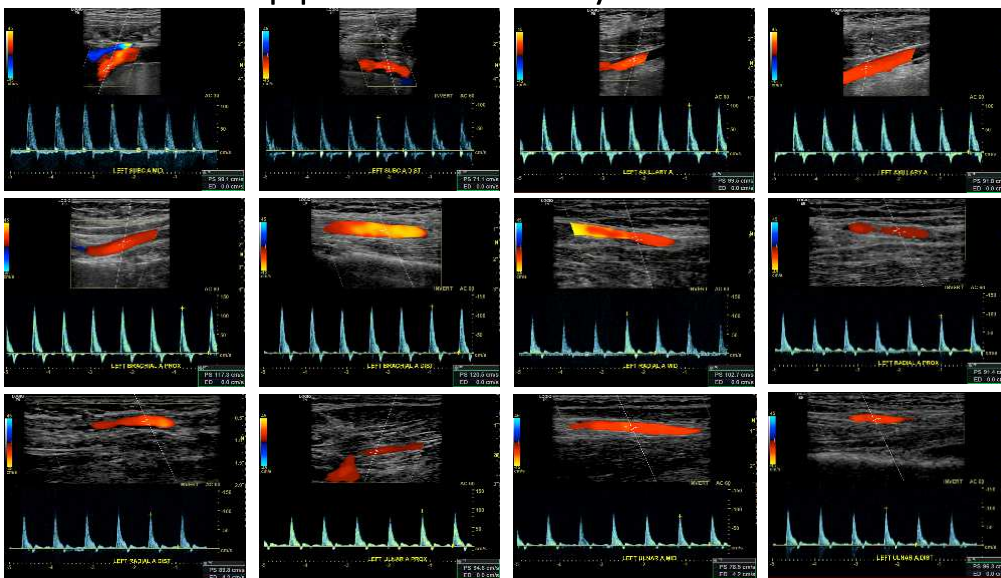
# Finger photoplethysmography



## Duplex Ultrasonography – Positioning is Key

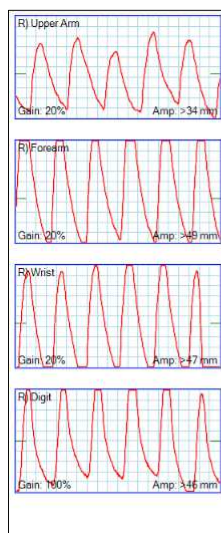


## Normal Upper Extremity Arterial DUS:



# Subclavian artery – Evaluation and Challenges

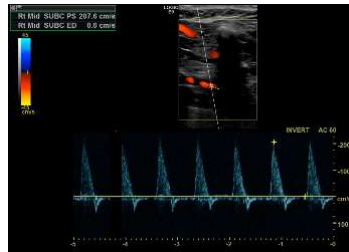
## Subclavian Artery Stenosis



PVR's Look Great, No?

Always compare!

## Subclavian Artery Stenosis – Same Patient

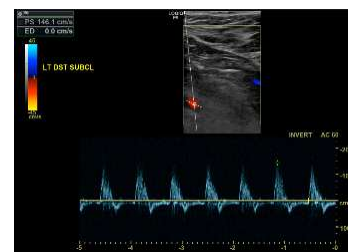
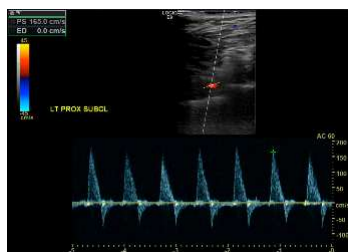


Is this the whole story?

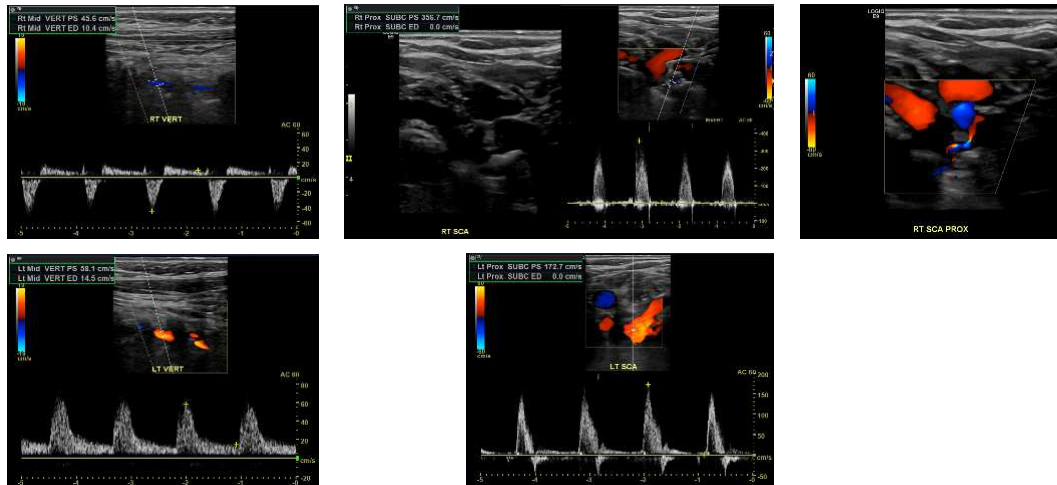


Further interrogation...

## Subclavian Artery Stenosis – Compare to the Contralateral Side!



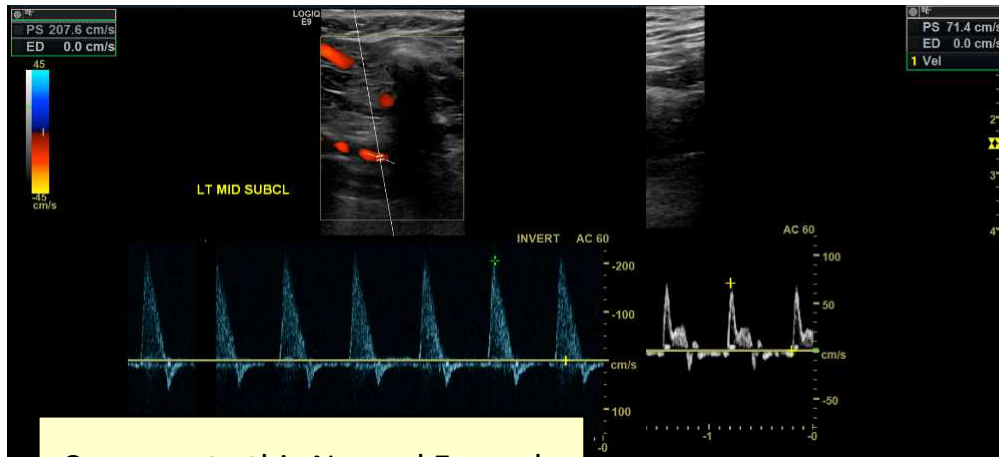
## Reversed Vertebral Artery Flow Can Suggest Subclavian Artery Stenosis



## Arterial Occlusion



## Proximal, High Resistance, Abnormal Flow



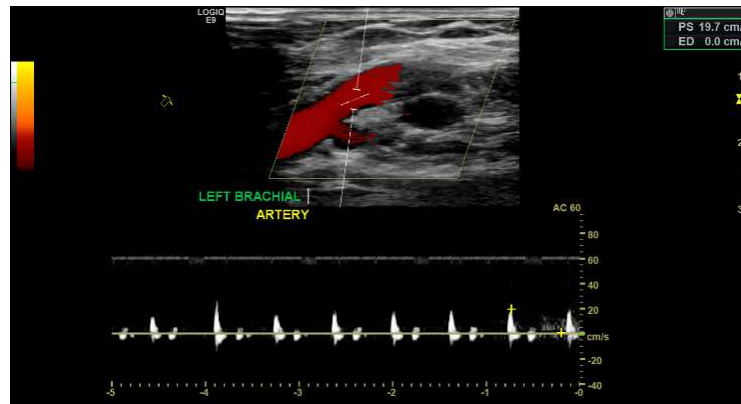
## Often Thrombus is Visible



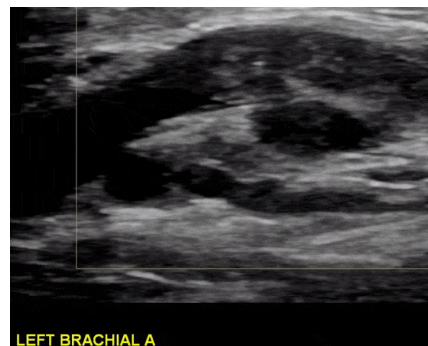
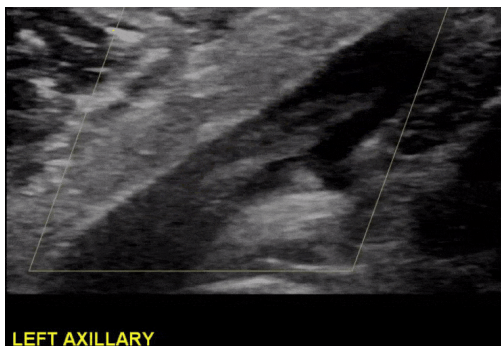
Tip: Check the flow velocity before determining flow voids...



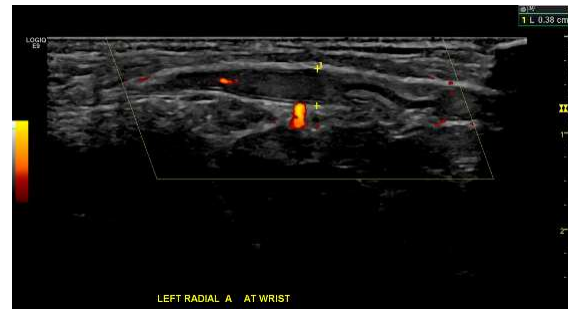
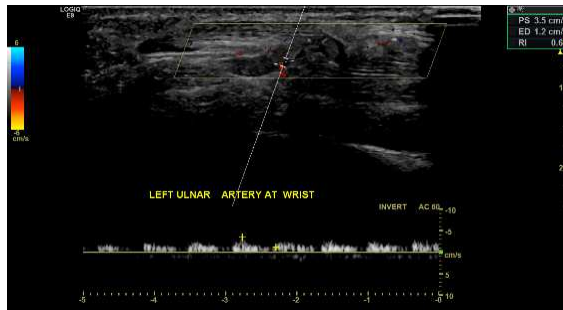
## Beyond Grayscale and Color-Flow. Assess Flow Pattern



## CINI Loops are Very Useful

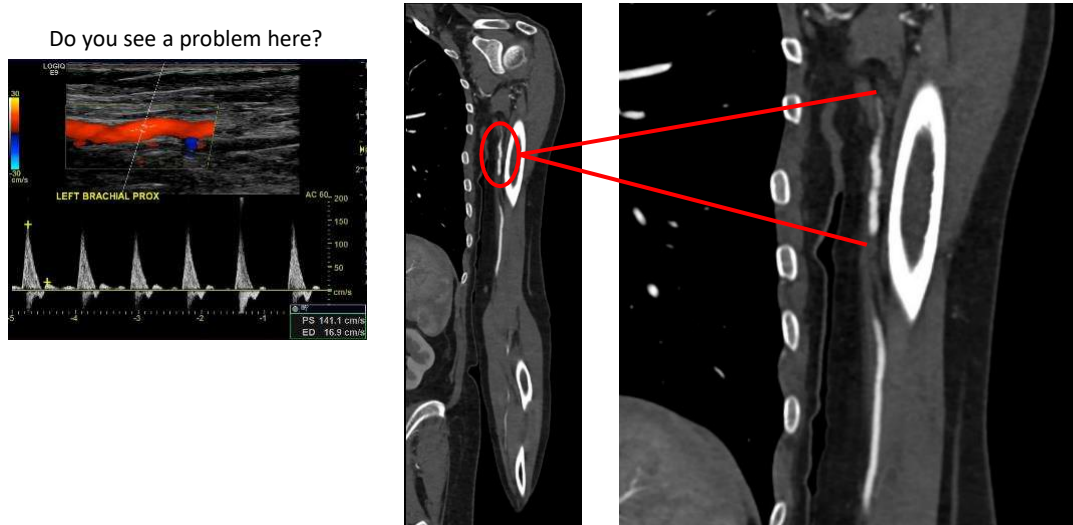


## Confirm Occlusion: Optimize Velocity Scale and Utilize Power Doppler



Fibromuscular Dysplasia

## Upper Extremity FMD (Brachial)



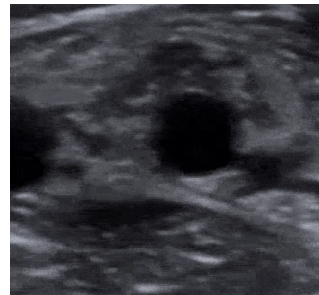
Aneurysms and Pseudoaneurysms

## Patient Experiences Pain After Angioplasty

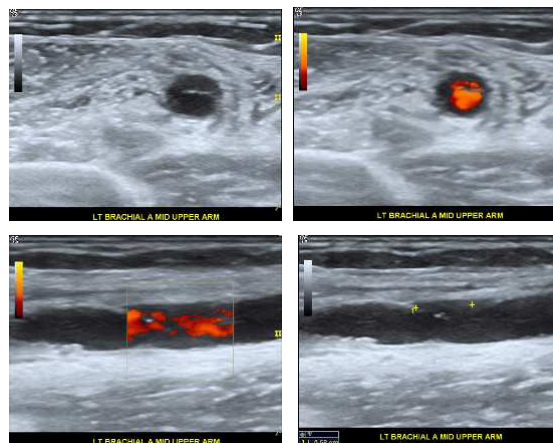
Post angioplasty changes



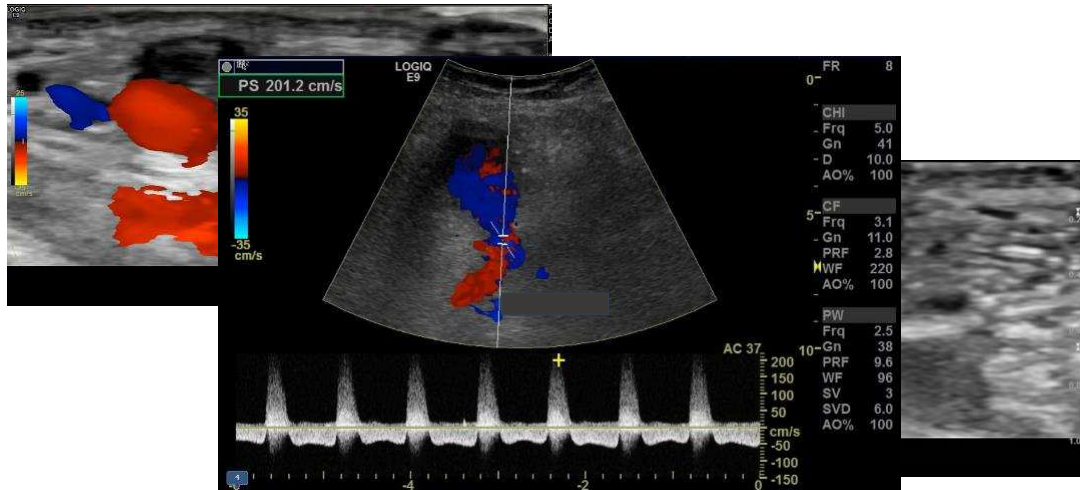
Do you see any other problems?



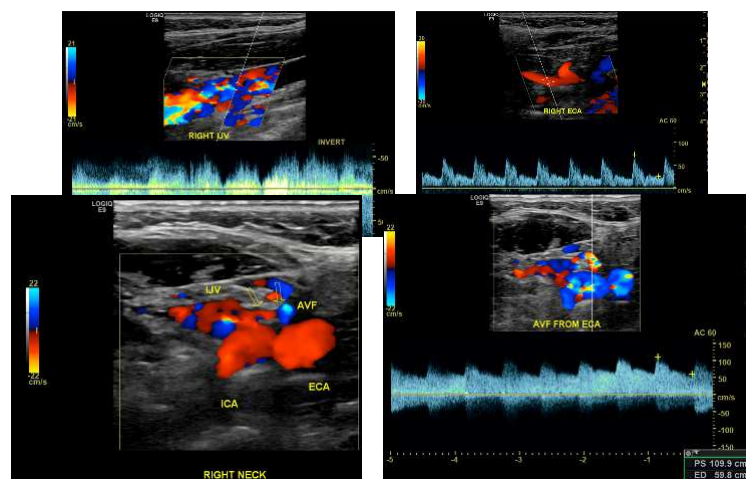
## Upper Extremity – Post Angioplasty Dissection



## Upper Extremity PSA

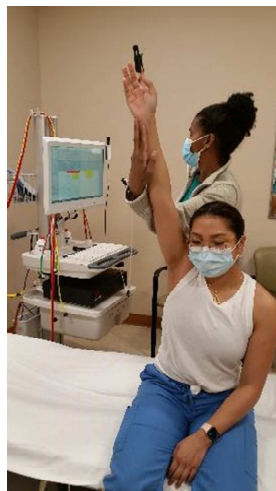


## Upper Extremity Iatrogenic Arterio-Venous Fistula



# Thoracic Outlet Syndrome Evaluation

## Patient Positioning

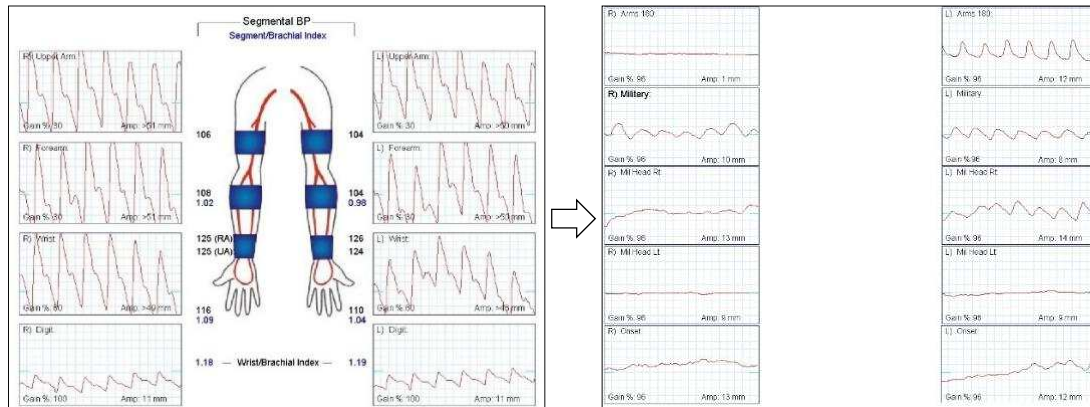


Do you know  
what this is?

Military Position



Normal Flow At Rest, Becomes (More)  
Abnormal with Arm Positioning:



Vasospastic Condition Evaluation



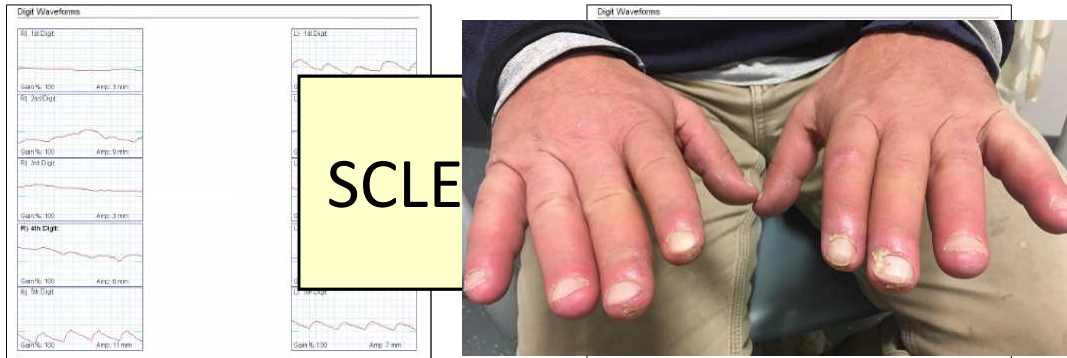
## Cold Immersion and Rewarming



## Reversible Vasoconstriction with Rewarming:



## Fixed, Blunted, Finger Waveforms:



## Summary

- Vascular laboratory evaluation of upper extremity arteries includes physiological studies and duplex ultrasonography
- Maneuvers are central to patient evaluation:
  - Thoracic outlet
  - Temperature
- As always, clinical correlation is key. Images cannot stand on their own (e.g. subclavian artery evaluation)
- Communication with the vascular laboratory is crucial (e.g. when you are looking for a procedural complication)