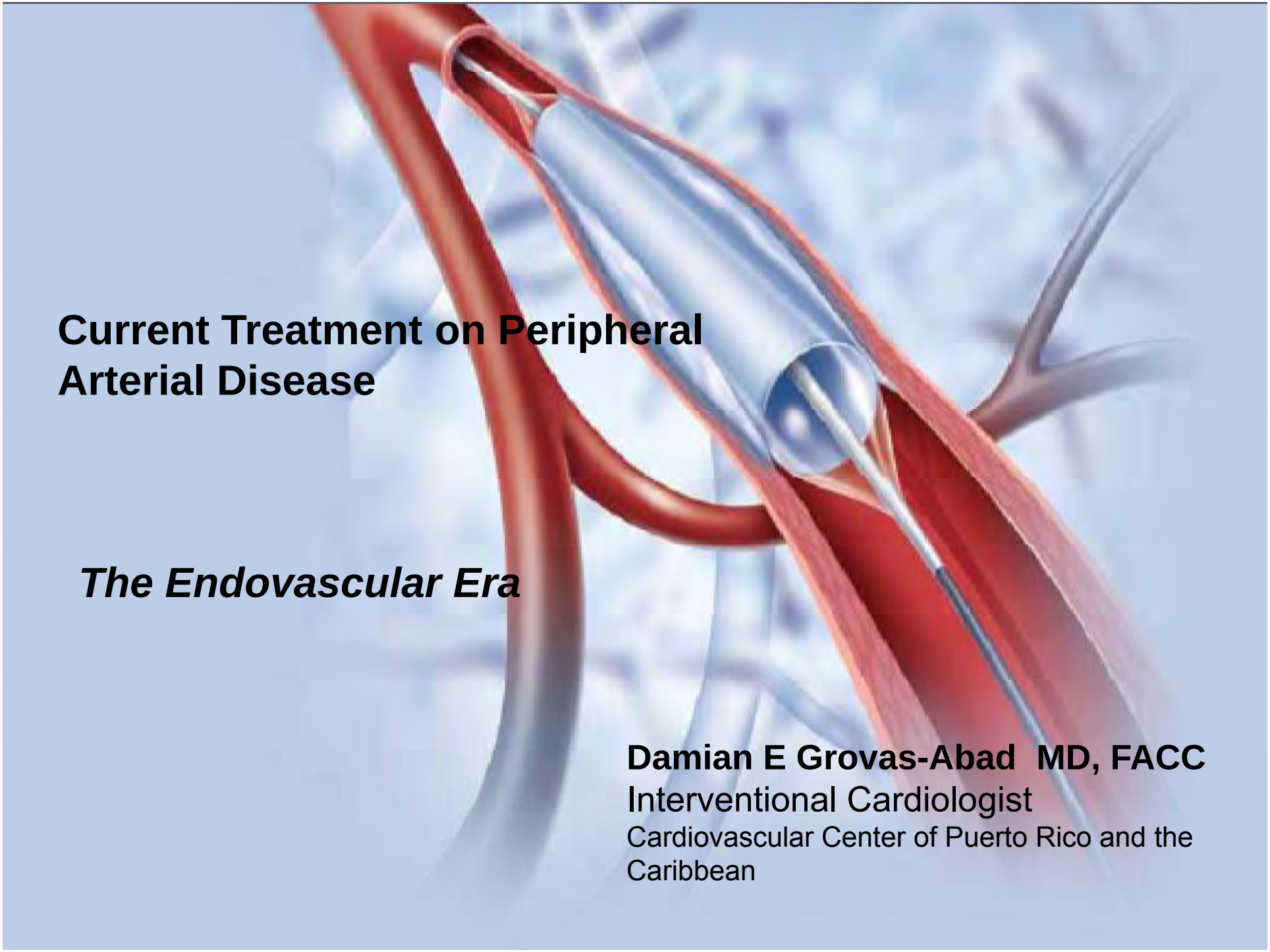


Current Treatment on Peripheral Arterial Disease

The Endovascular Era

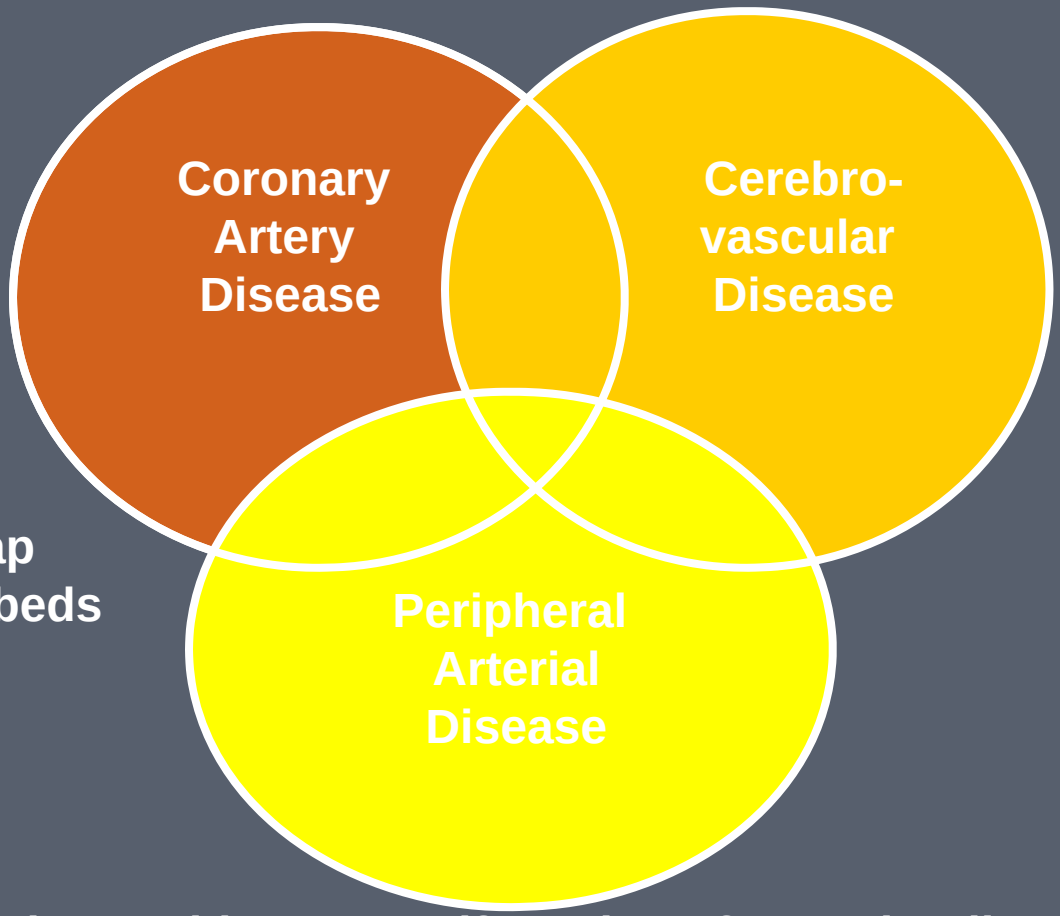
Damian E Grovas-Abad MD, FACC
Interventional Cardiologist
Cardiovascular Center of Puerto Rico and the Caribbean

Outlines

- Basic Vascular Anatomy
  - Inflow vessels: Aorta and Iliac vessels
  - Outflow vessels: Femoral and popliteal vessels
  - Run off vessels: Trifurcation, tibial and peroneal vessels
- Advanced Vascular Anatomy and Intervention

  Carotid and Cerebral anatomy.
- Renal Arteries Stenting
- Guidelines
- Treatments

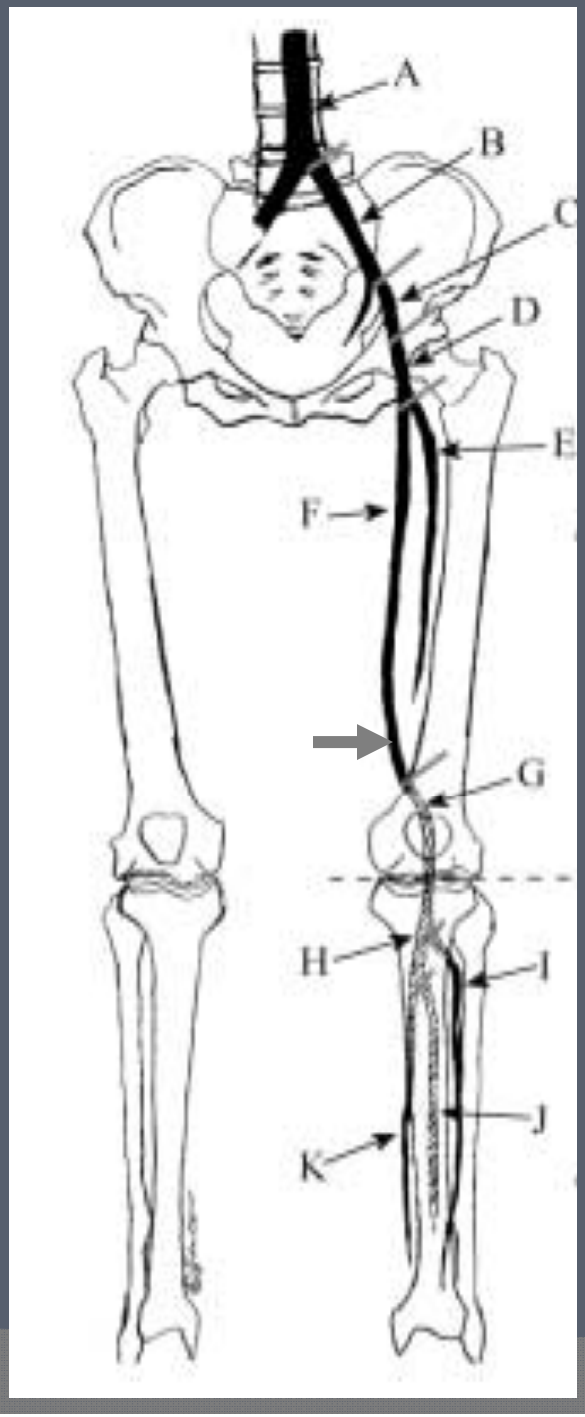
'The Vascular Patient'
The Overlap of Atherosclerotic Diseases



38% overlap
≥ 2 vascular beds

Patients with one manifestation of vascular disease often have coexistent disease in other vascular beds

Ness J, Aronow WS. ***J Am Geriatr Soc***. 1999;47:1255-1256.



Abdominal Aorta and Peripheral Vessels

A	Aorta
B	Common Iliac
C	External Iliac
D	Common Femoral
E	Profunda Femoralis
F	Superficial Femoral
G	Popliteal
H	Tibial Peroneal Trunk
I	Anterior Tibial
J	Peroneal
K	Posterior Tibial

Describing the Anatomy

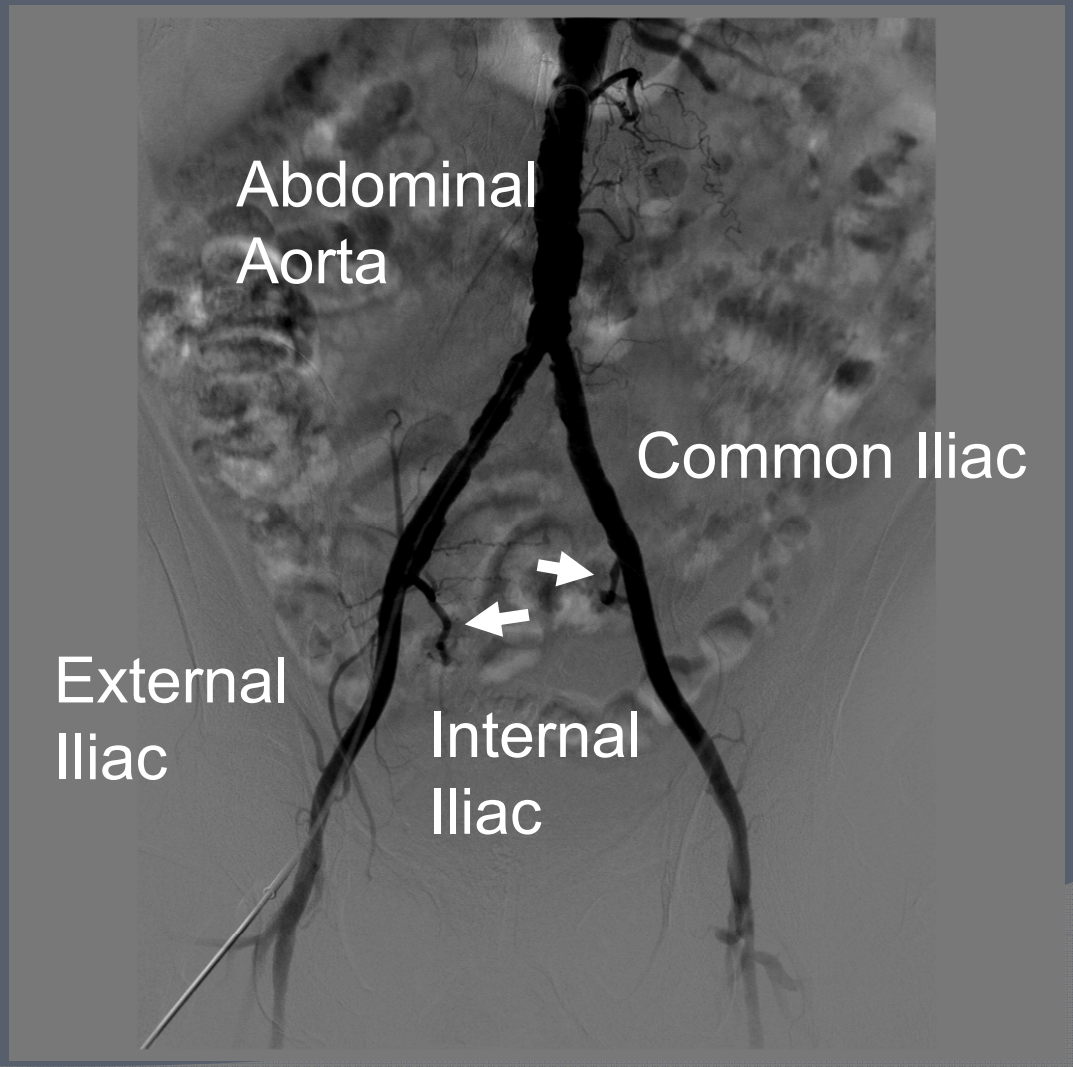
Zone 1: Inflow
- Aorta
- Common Iliac
- External Iliac

Zone 2: Outflow
- Common Femoral
- Superficial Femoral
- Popliteal

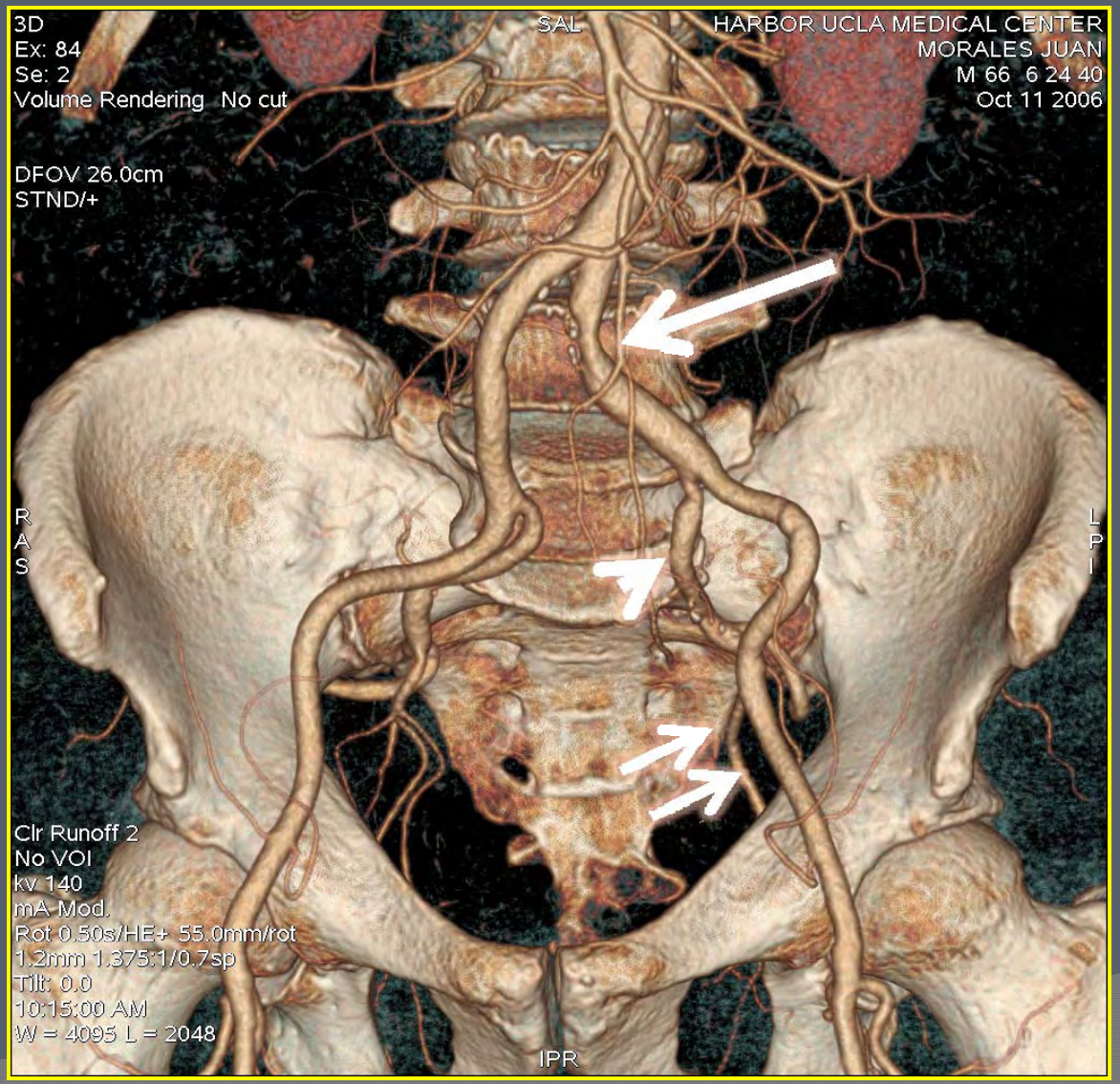
Zone 3: Runoff
- Anterior Tibial
- Tibioperoneal Trunk
- Posterior Tibial
- Peroneal

inflow Vessels: Aorta; common; and external iliacs arteries

Abdominal Aorta and Iliac System



Iliac system: Common, External and Internal



Moderate (~50%) stenosis of left common iliac artery

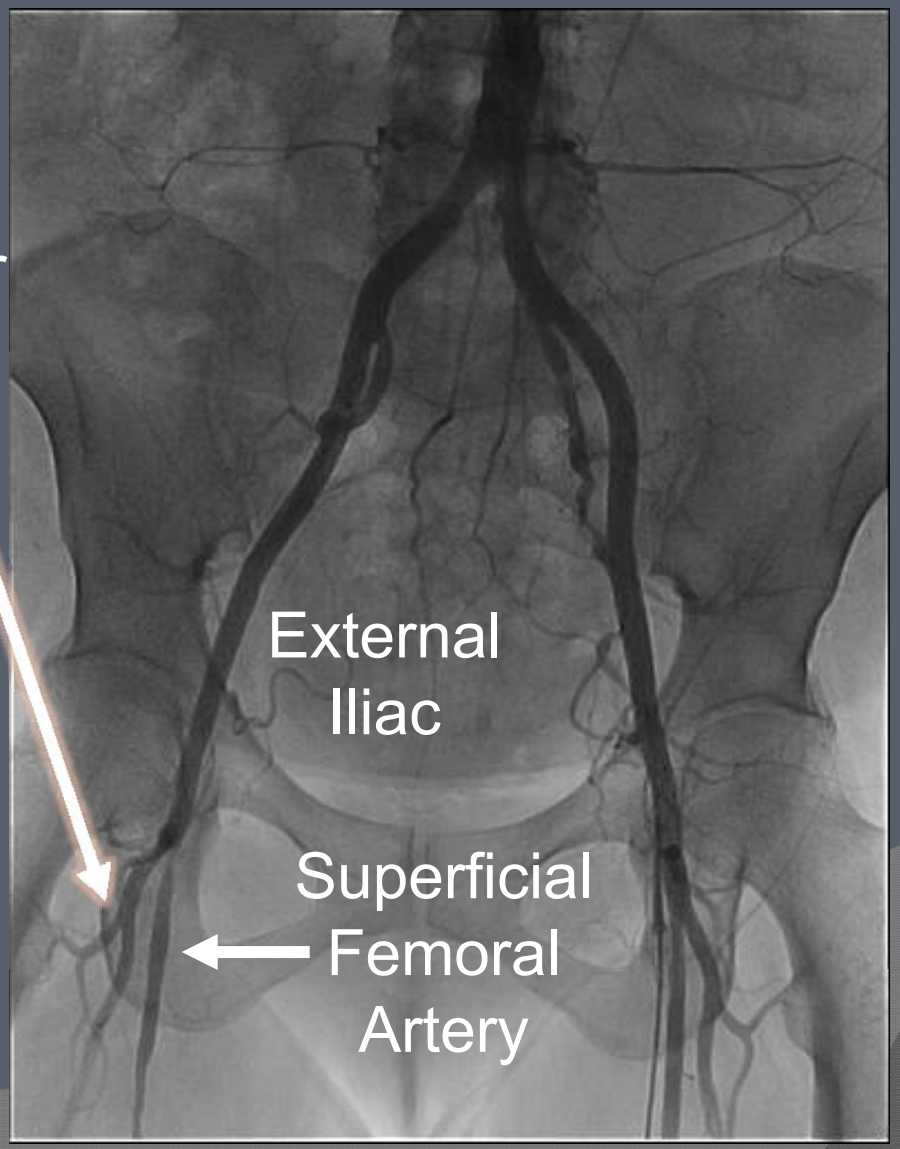
Internal iliac (arrowhead)

External iliac (double arrow)

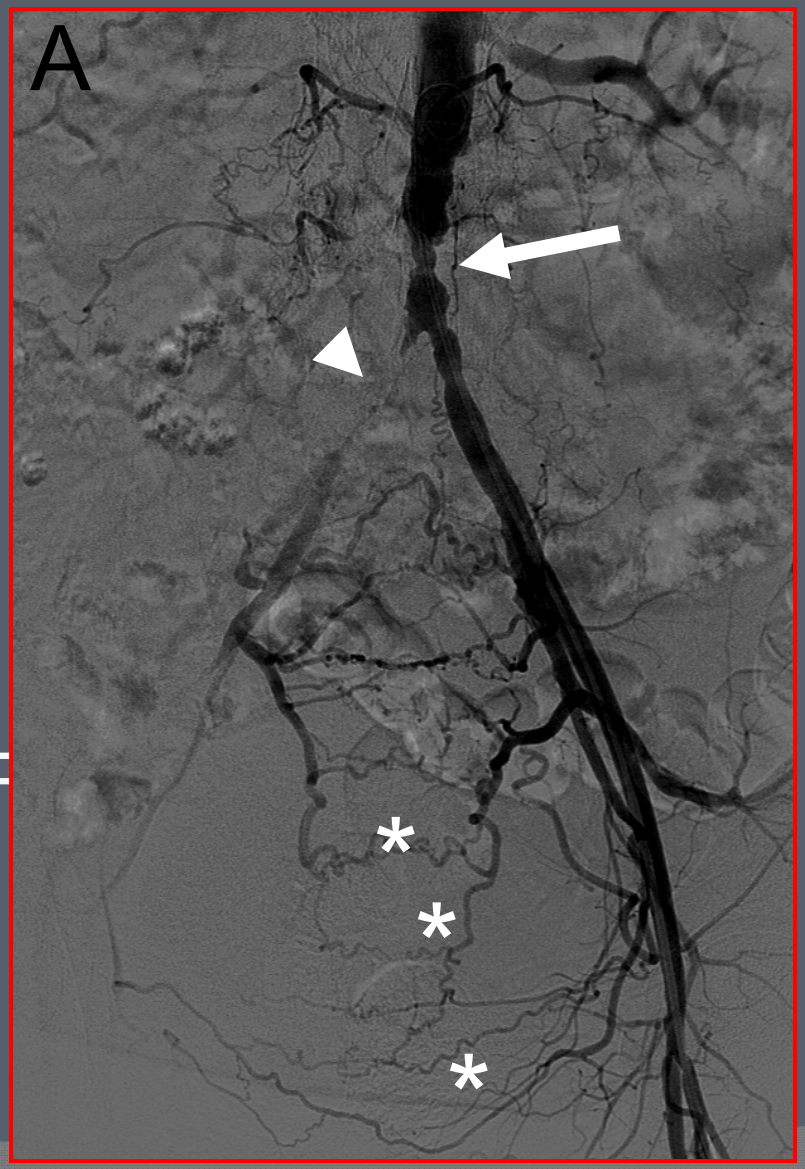
Abdominal Aorta and Iliac System

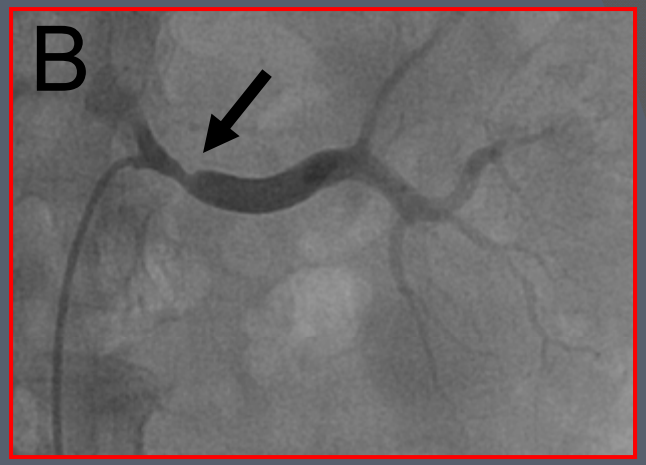
Deep Femoral Artery or Profunda Femoralis
- Lateral
- Multiple branches

Superficial Femoral Artery
- Medial
- No branches
- Straight course



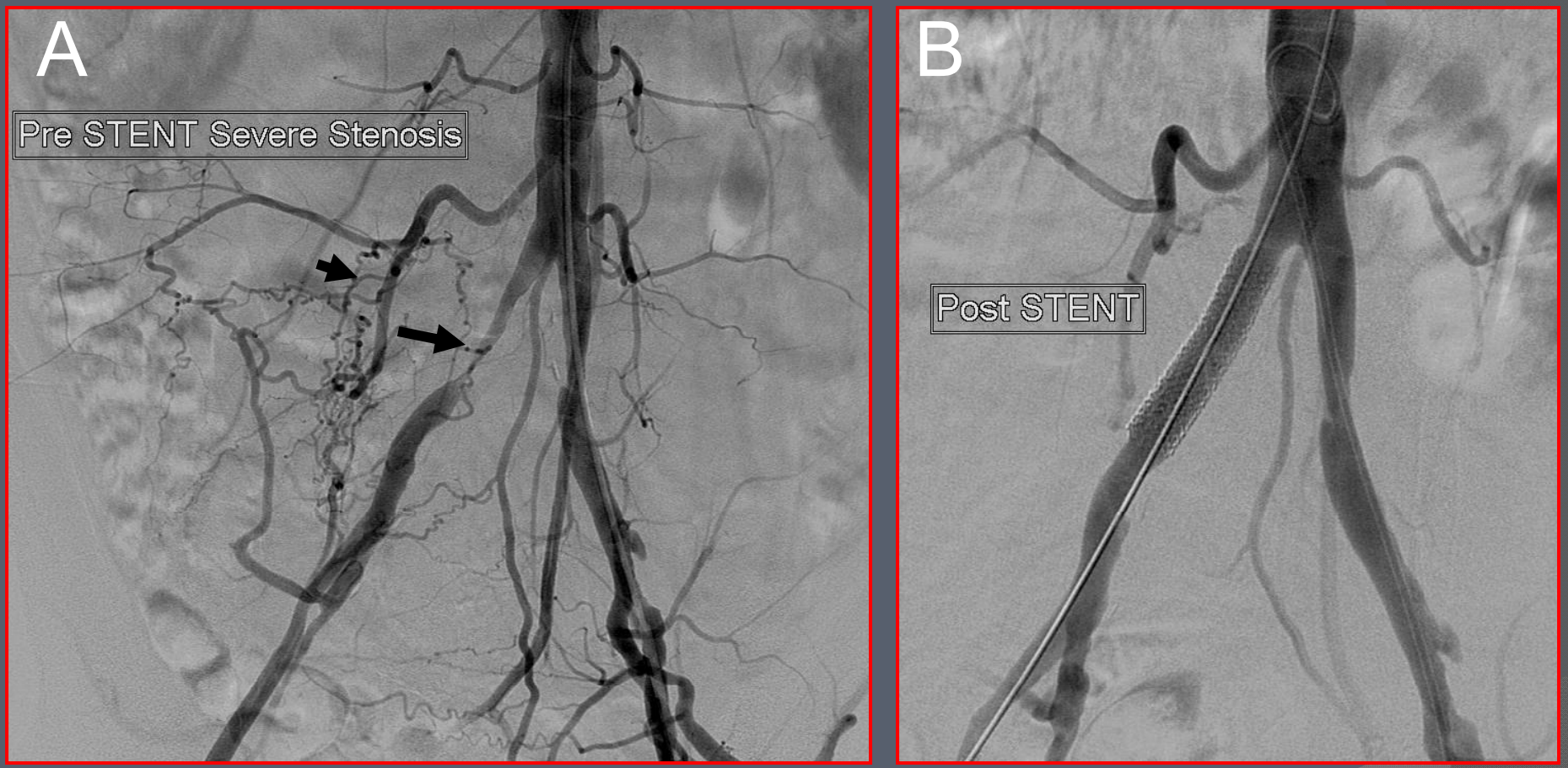
100% right common iliac, left RA stenosis





A. Disease of the distal abdominal aorta (arrow). Complete occlusion of the right common iliac artery (arrowhead). Extensive trans-pelvic collaterals (*) B. Severe proximal left renal artery stenosis (arrow).

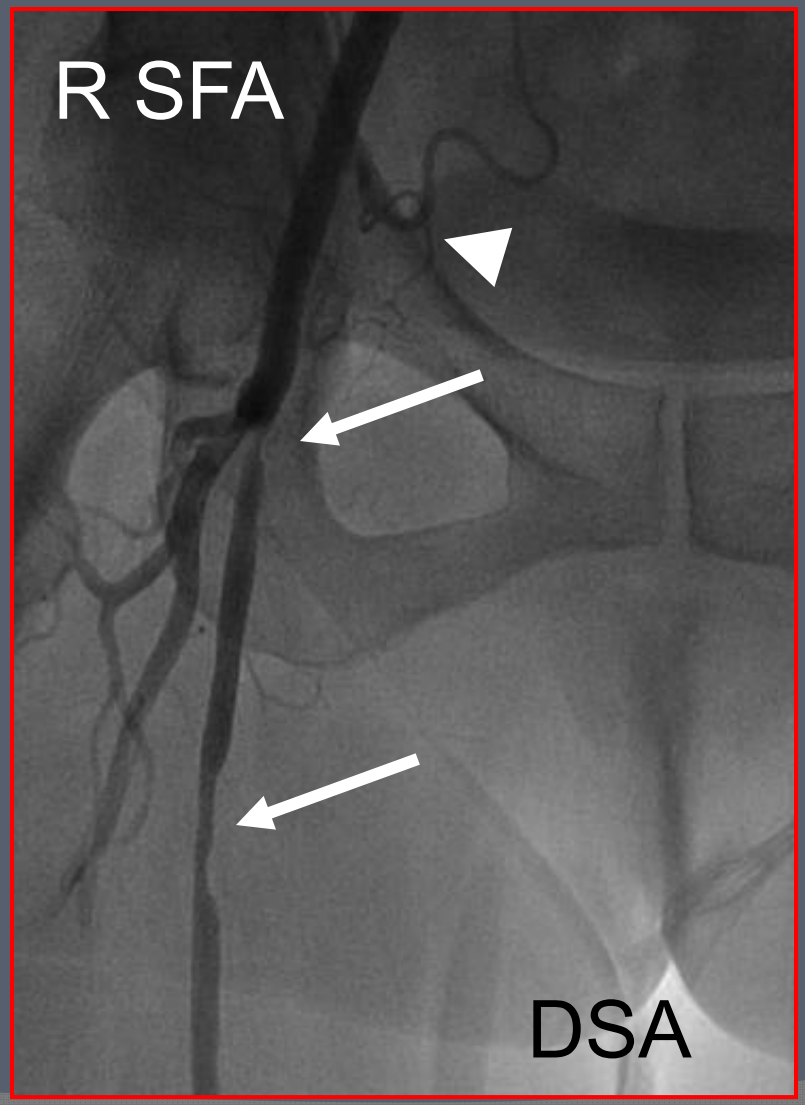
Severe common iliac disease

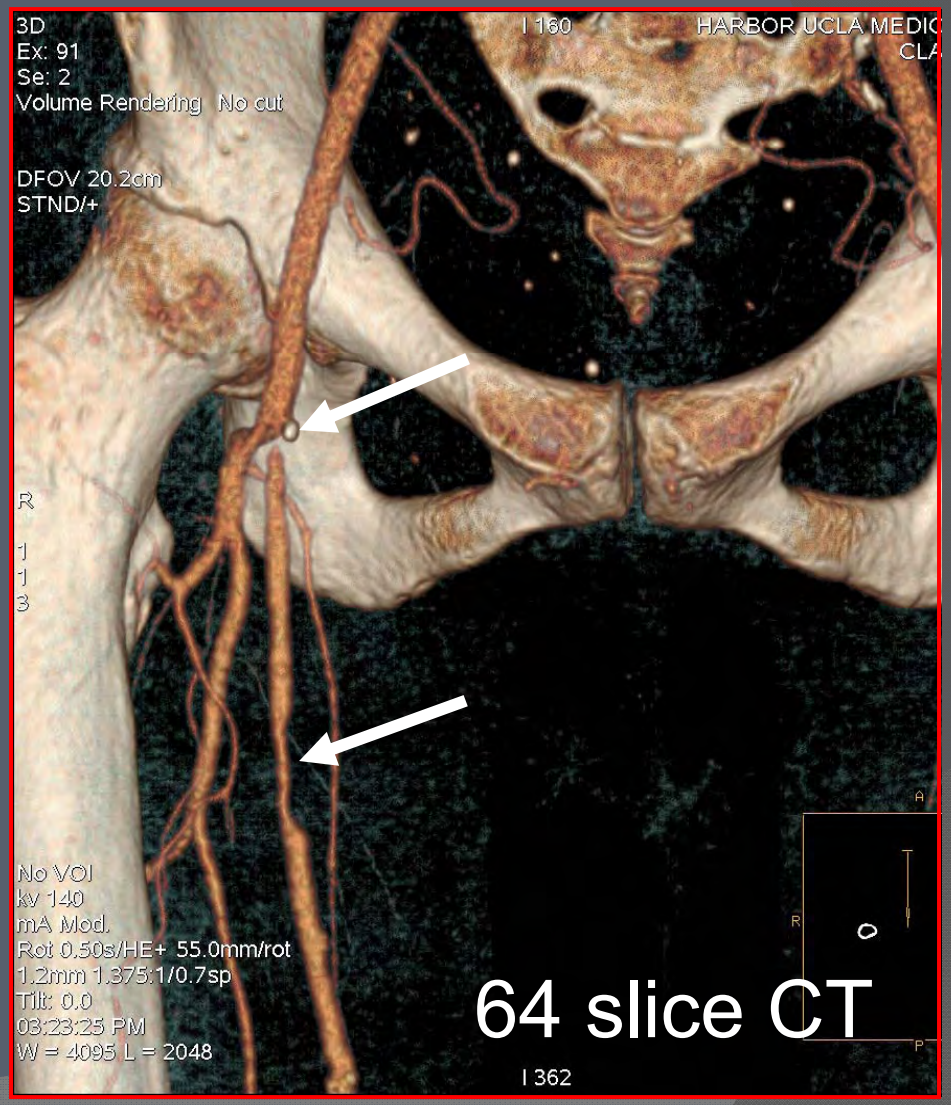


A. Severe right common iliac artery stenosis (arrow). Large collaterals around area of stenosis (arrowhead). Prior to stent placement. B. Following angioplasty and stent placement. Note collaterals are no longer apparent.

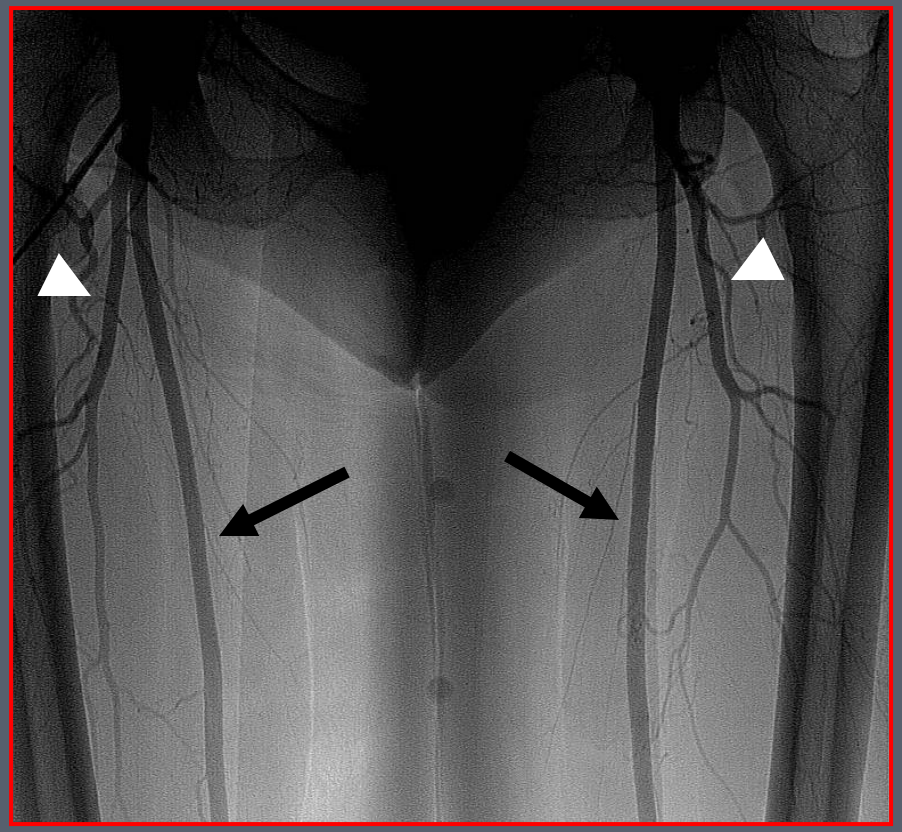
OUTFLOW VESSELS: COMMON FEMORAL; SFA AND POPLITEAL ARTERIES

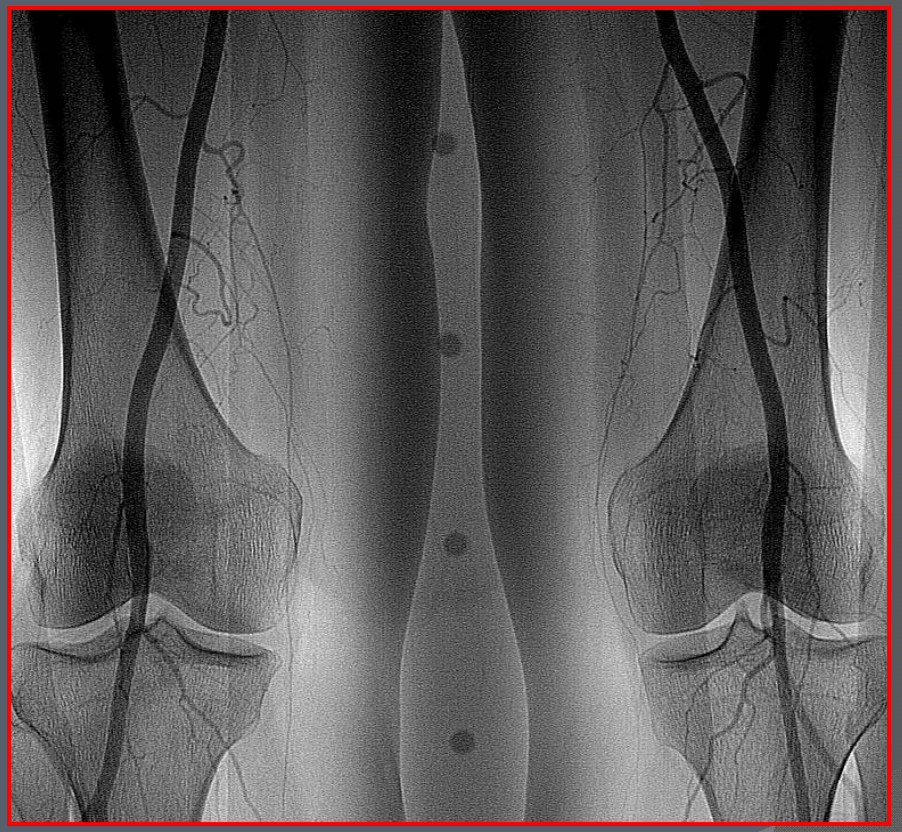
Ostial SFA Disease





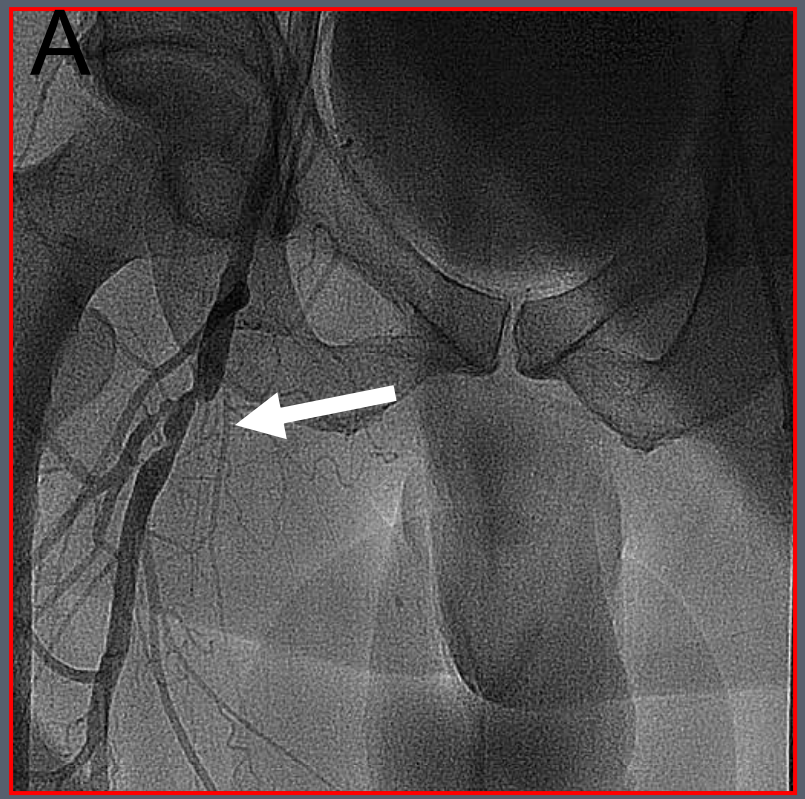
Normal Arteries





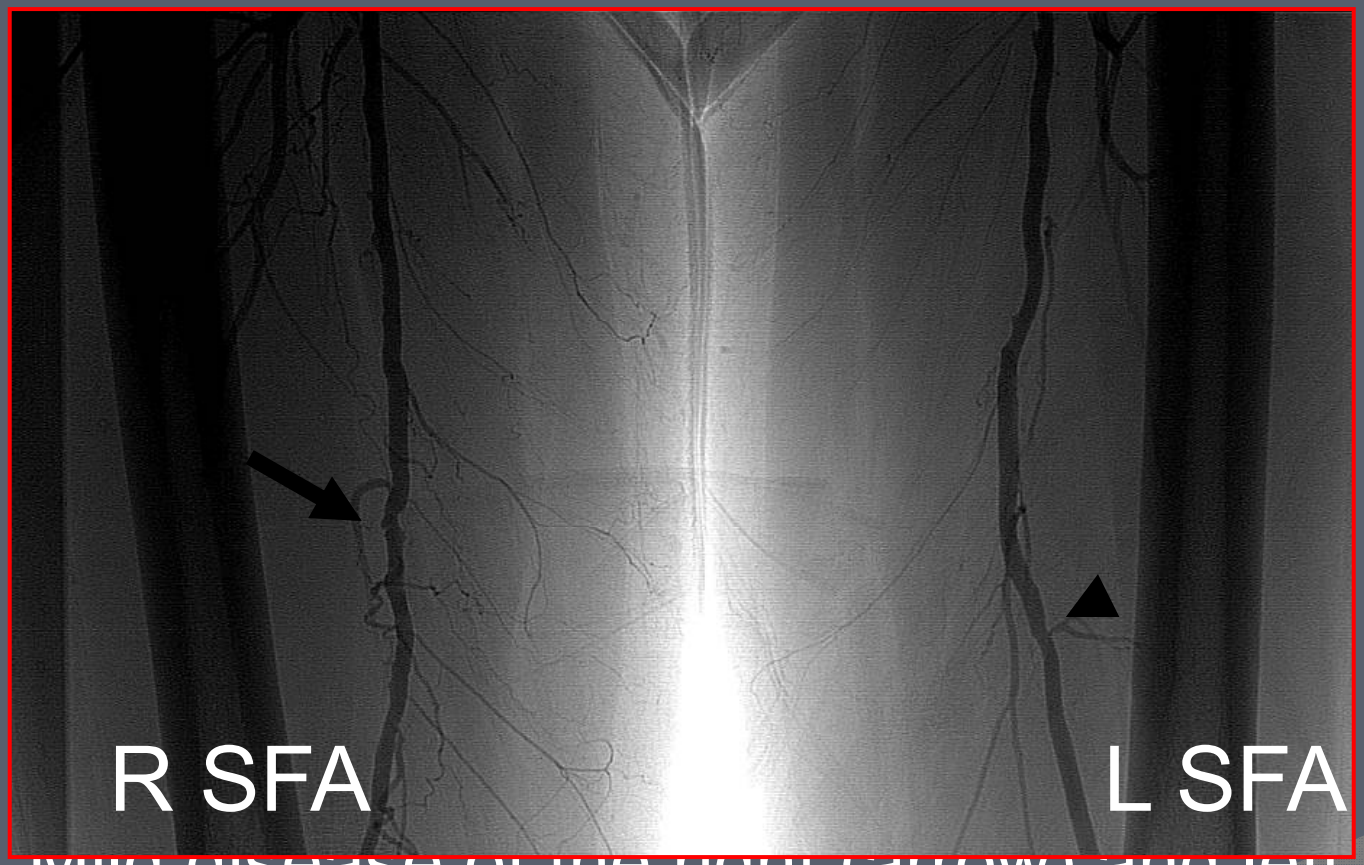
Normal bilateral superficial femoral arteries (arrow), deep femoral arteries (profunda femoralis, arrowhead) and popliteal arteries. Note the SFA extends down the leg in a straight line, is medical and has no significant branches. The deep femoral is lateral and has multiple branches. These anatomic distinctions can be important when the SFA is occluded at the ostium.

Ostial right SFA occlusion



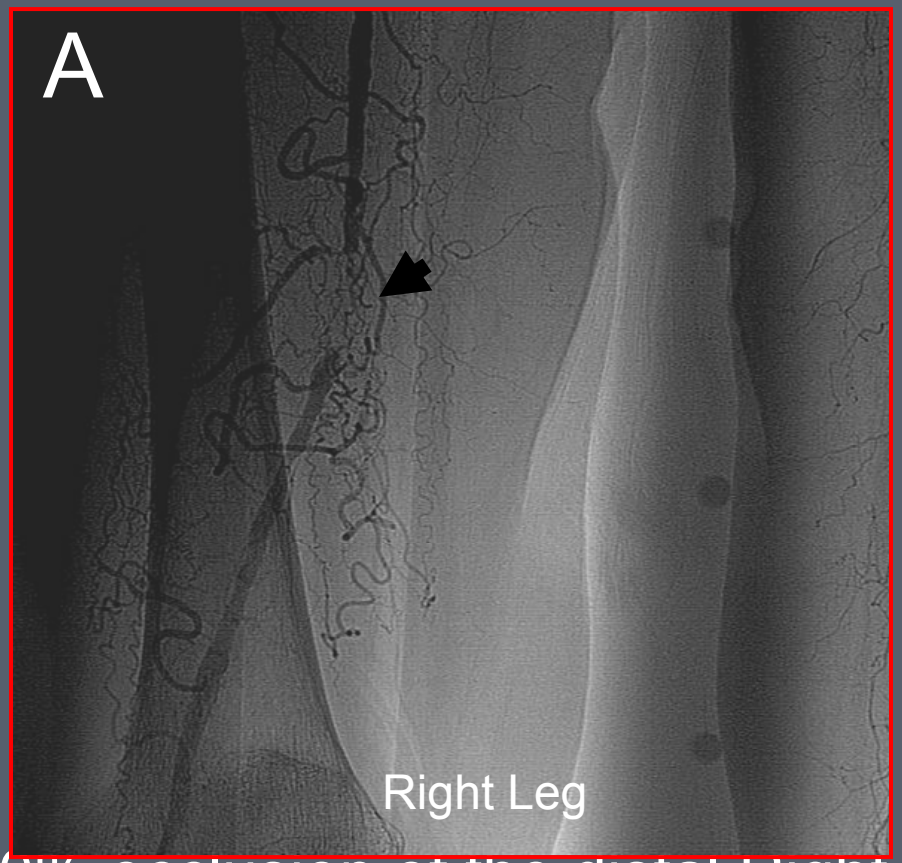
A. 100% occlusion of the ostial right SFA (arrow).
B. Mild disease of the proximal left SFA (arrowhead).

Mild irregularities (<10%) of the Superficial Femoral Arteries



Mild disease of the right (arrow) and left (arrowhead) superficial femoral arteries (SFA).

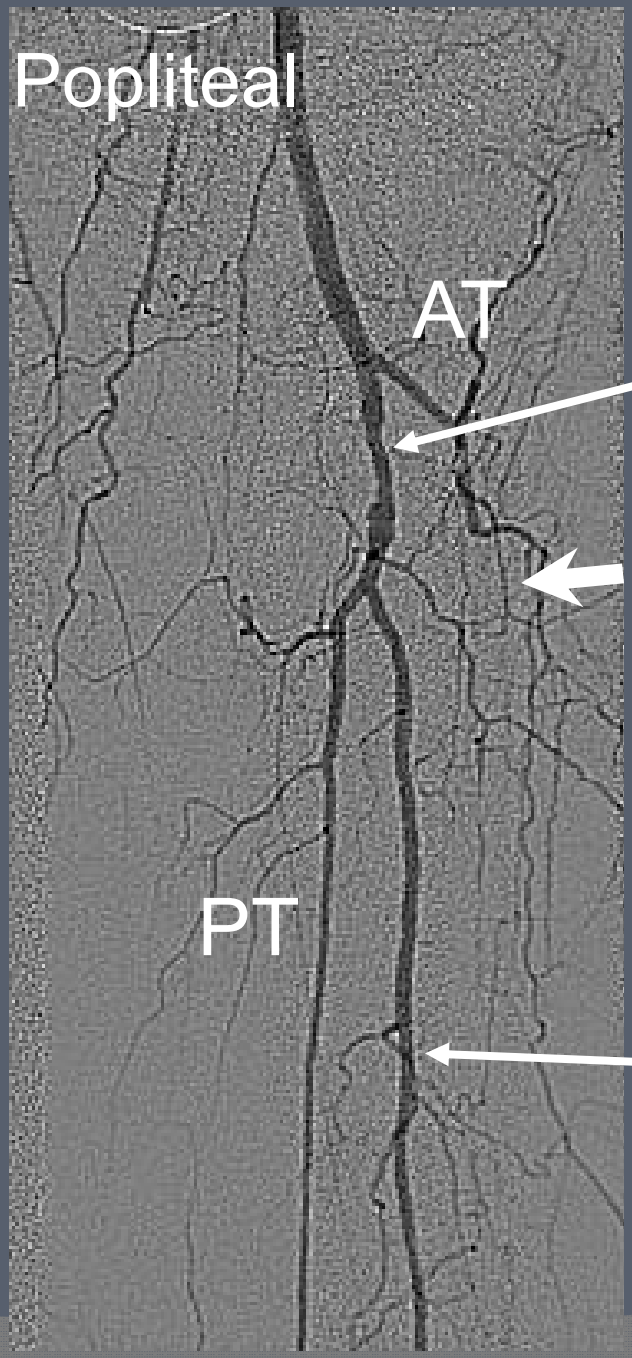
Distal SFA Disease



A.100% occlusion of the distal Right SFA (arr
area of

the adductor canal. B. Post PTA/STENT with no residual stenosis.

RUNOFF VESSELS: TRIFURCATION AND TIBIAL ARTERIES



Popliteal and Trifurcation (Left)

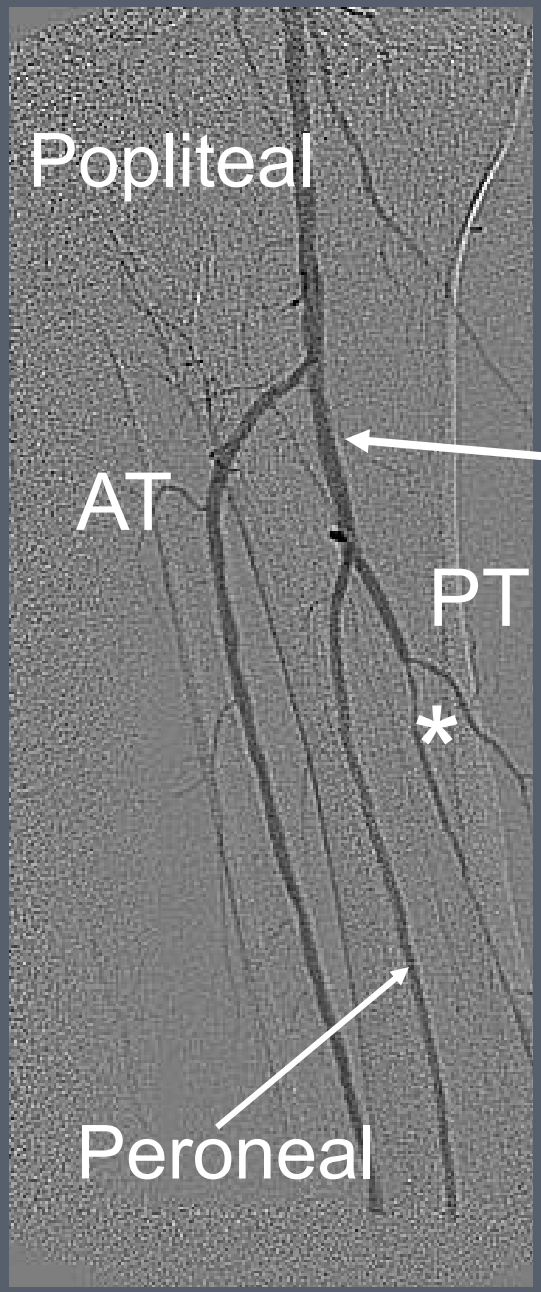
Tibioperoneal Trunk

AT occluded in prox segment

Good Quality DSA: Digital Subtraction Angiography

Peroneal

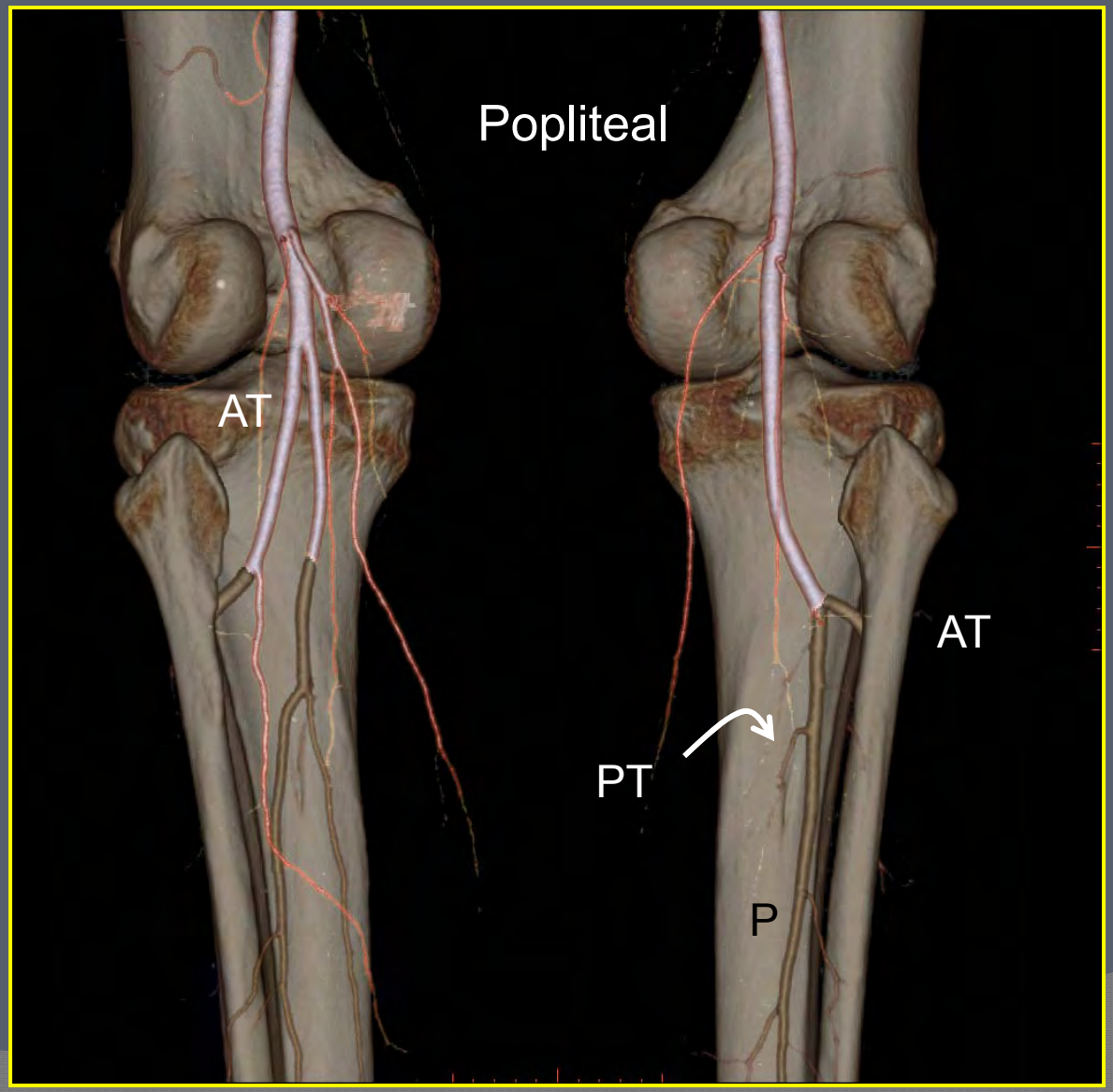
Popliteal and Trifurcation (Right)



Tibioperoneal Trunk

PT: proximal disease with collateral vessel beginning proximal to area of disease (*)

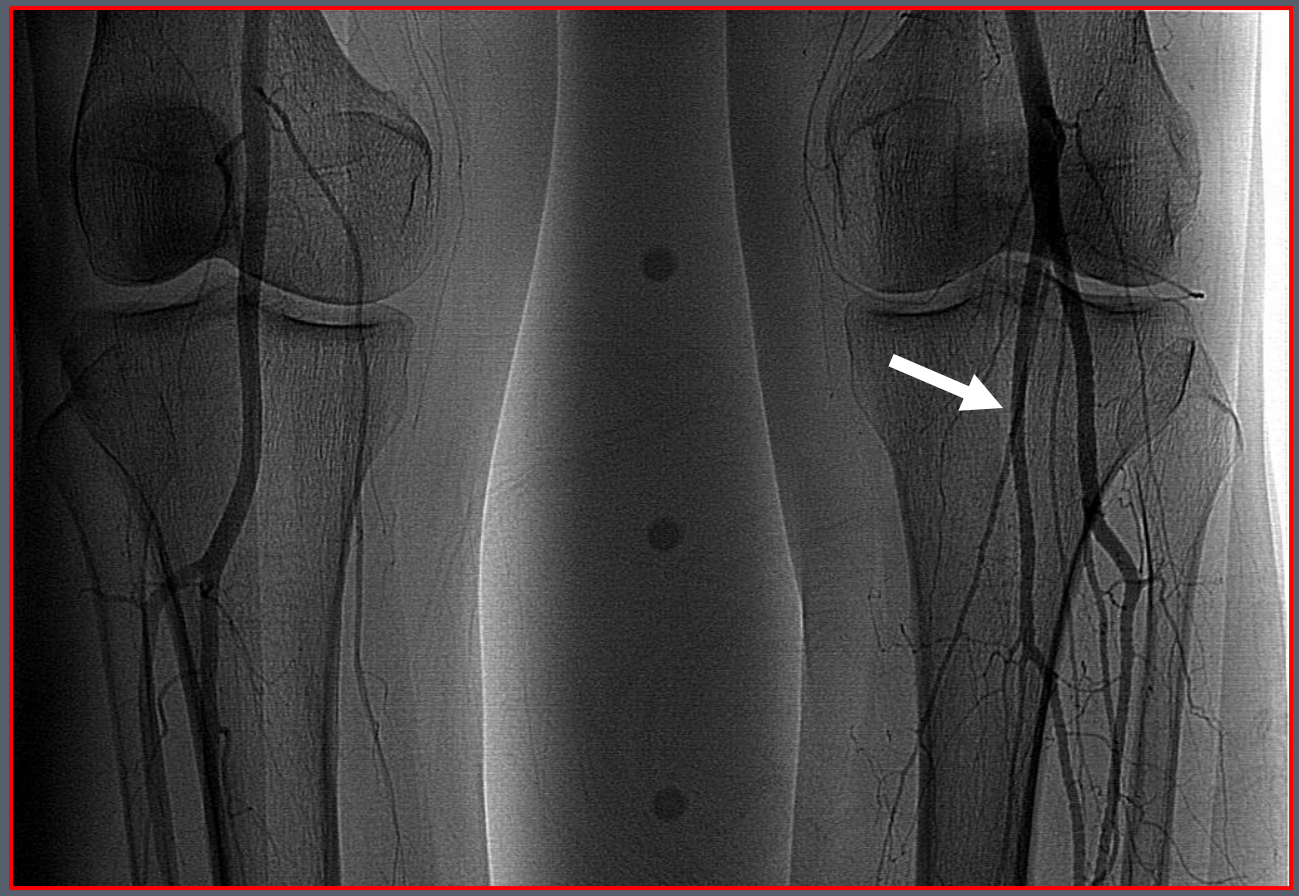
Popliteal artery and Trifurcation Vessels



Note variation in branching pattern of right and left legs. Left AT originates from the mid popliteal artery as opposed to the distal popliteal artery.

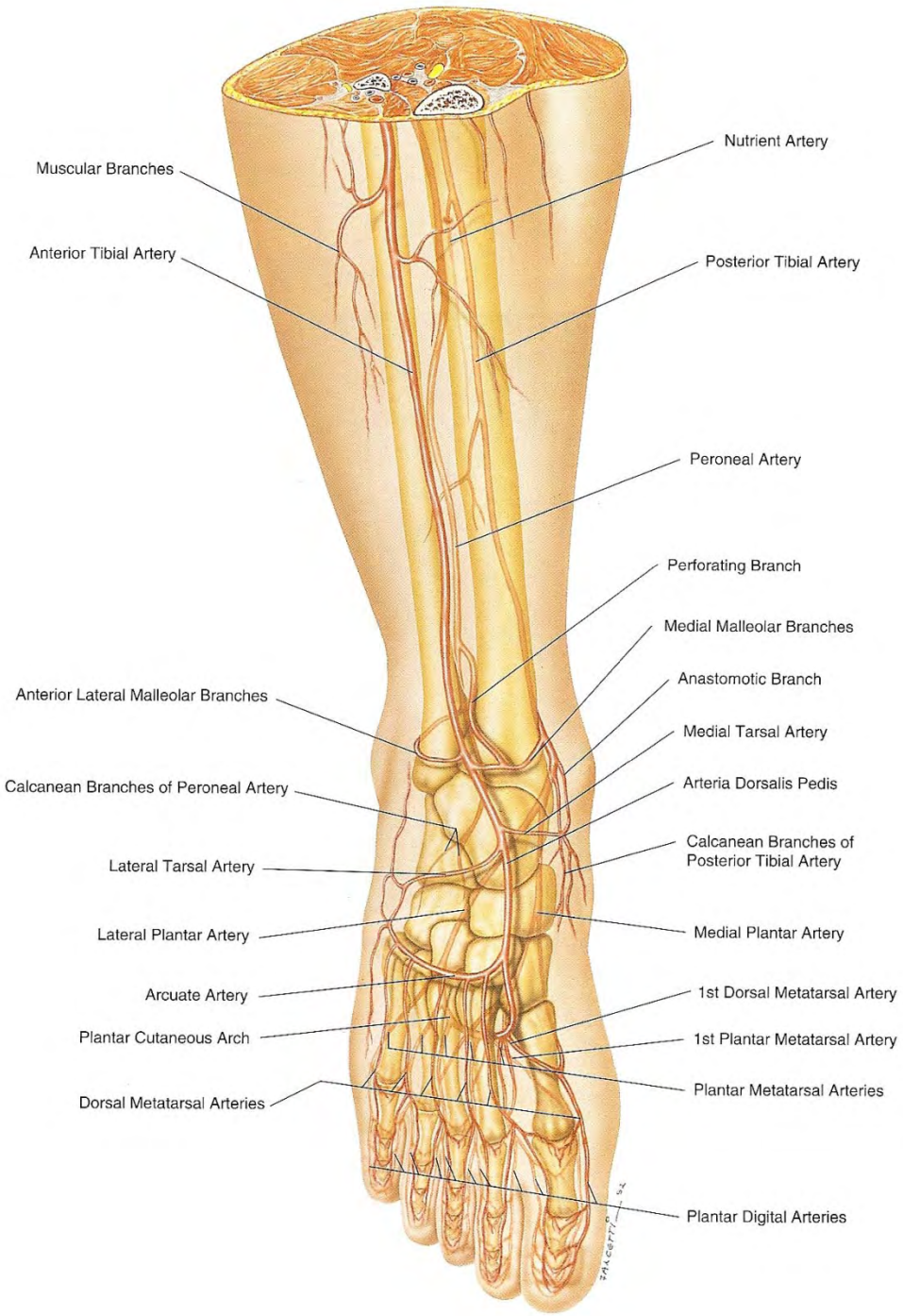
P = peroneal
AT = anterior tibial
PT = posterior tibial

Normal popliteal arteries



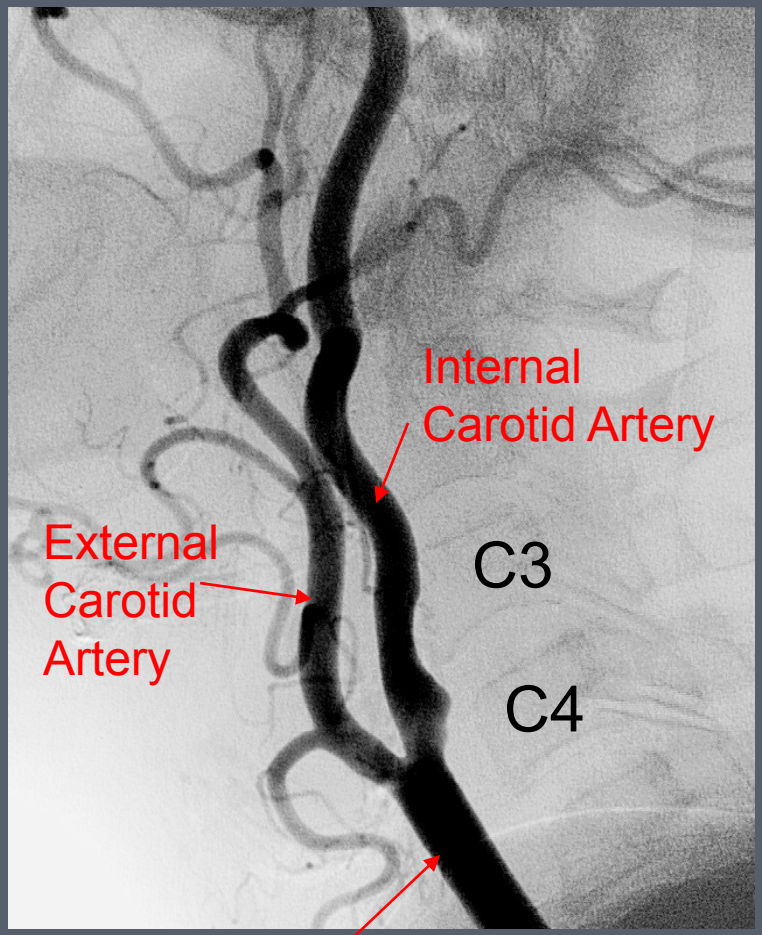
Normal bilateral popliteal arteries and trifurcation. Note the variation in branching at the trifurcation between the right and left legs. The left leg essentially has a long tibial peroneal trunk (arrow) and the right leg has a normal branching pattern.

Arteries of the lower leg and foot



PERIPHERAL VASCULAR ANATOMY CAROTIDS AND CEREBRALS ARTERIES

Carotid Artery Bifurcation



Lateral view

- Usually at the level of the C3 - C4 vertebral bodies
- External carotid artery - smaller branch with multiple branches
- Internal carotid artery - larger branch

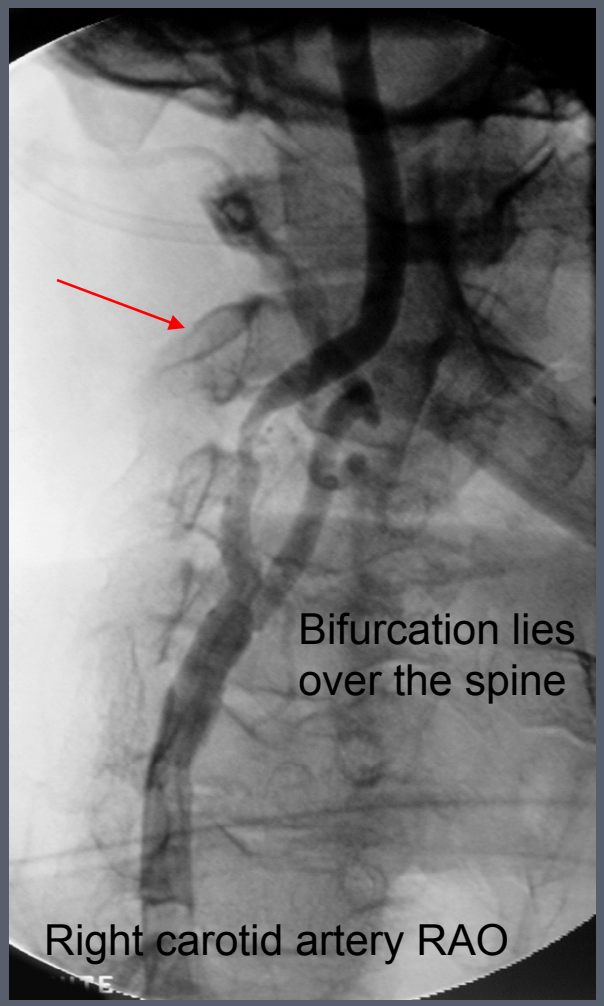
Carotid Bifurcation - Imaging

LAO view of left carotid bifurcation

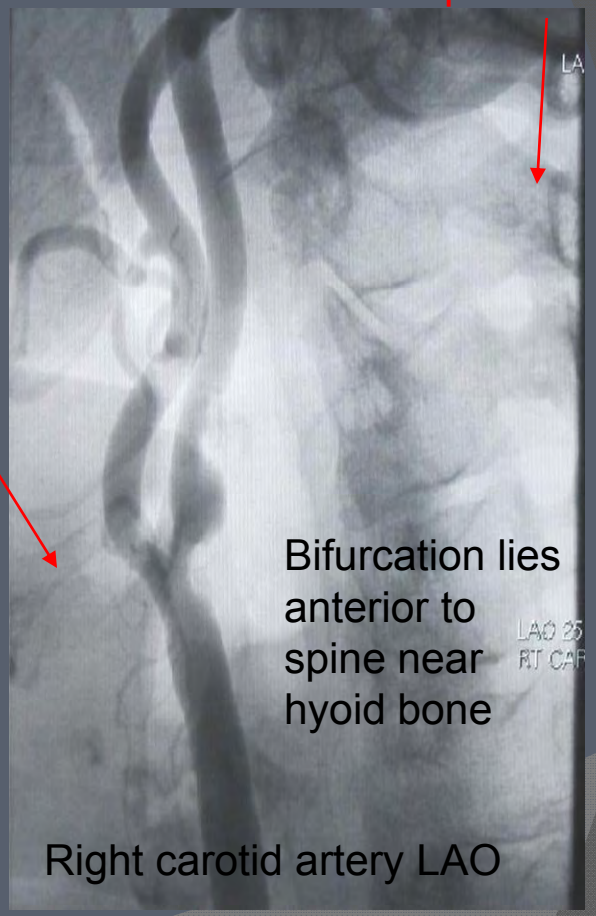
Lateral bifurcation view

- Selective catheterization:
  - **Use arch image as guide for views**
  - **Ipsilateral oblique and lateral views**
    - Most likely to open bifurcation
  - **If additional views needed:**
    - PA
    - Contralateral oblique

Carotid Bifurcation - Imaging

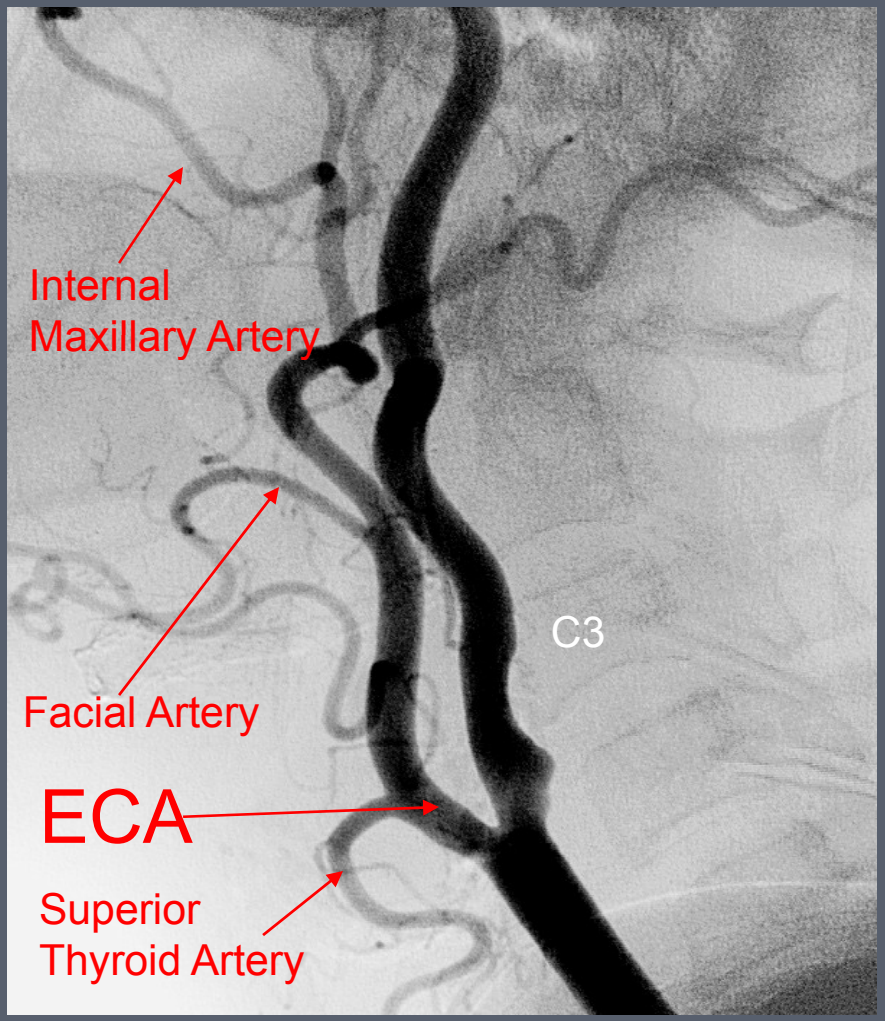


IPSILATERAL OBLIQUE



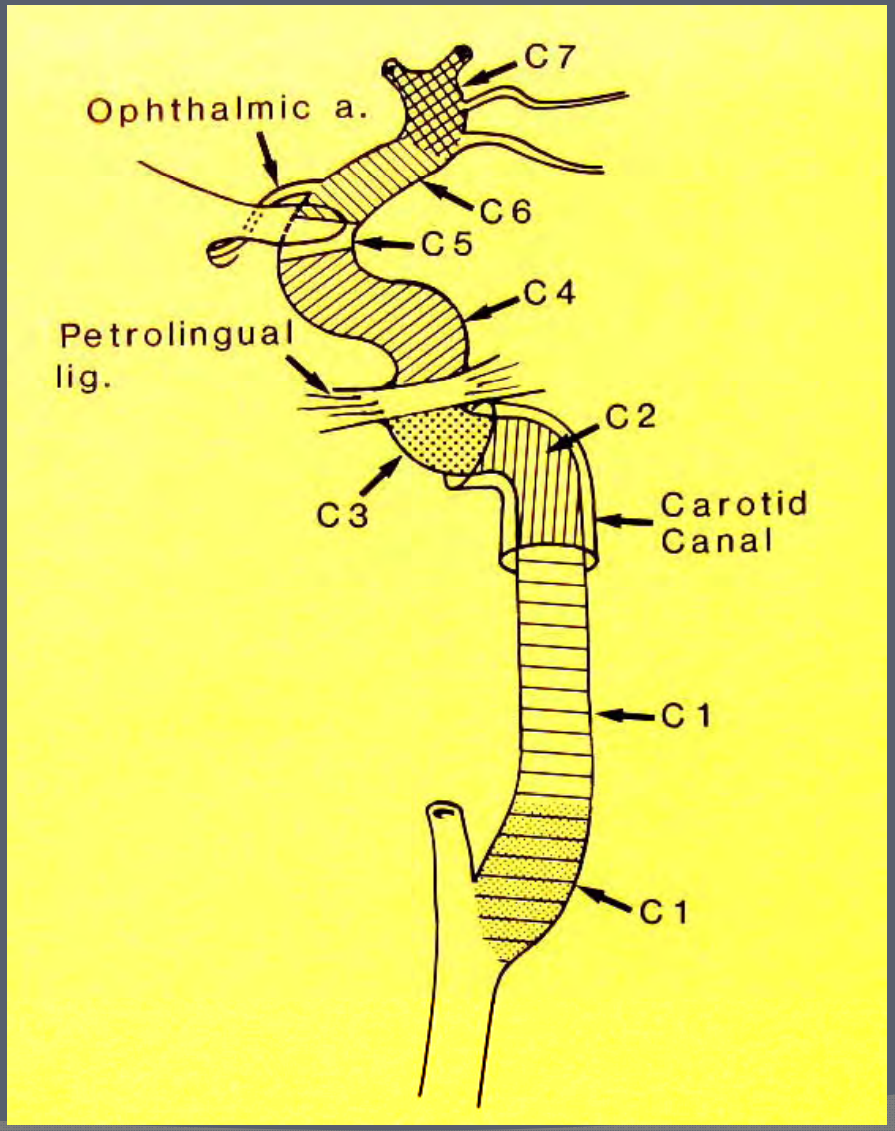
CONTRALATERAL OBLIQUE

External Carotid Artery



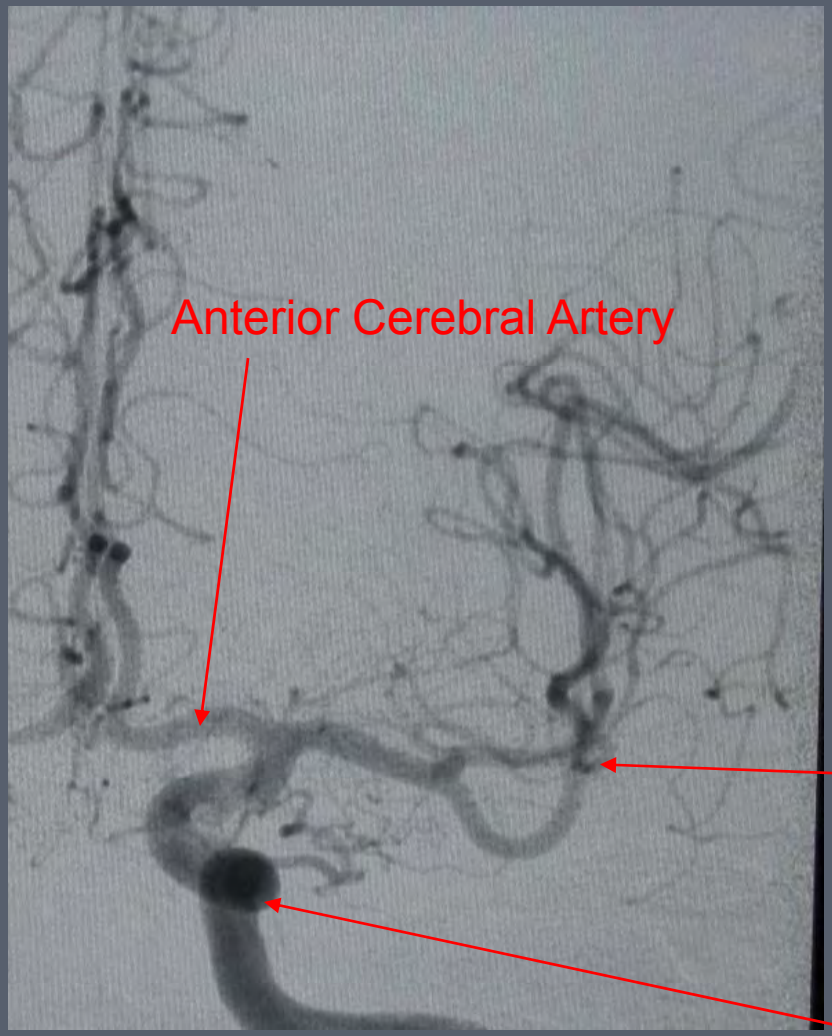
- Supplies most head and neck structures (excluding the eye and brain)
- Initially lies *anterior and medial* to the internal carotid artery
- Has 8 major branches - Use the branches to help identify the ECA vs. the ICA
- Rapidly decreases in diameter as it gives off branches
- Disease in the ECA is rarely treated

Internal Carotid Artery



- C1 - Cervical Segment
- C2 - Petrous Segment
- C3 - Lacerum Segment
- C4 - Cavernous Segment
- C5 - Clinoid Segment
- C6 - Ophthalmic Segment
- C7 – Communicating Segment

Internal Carotid Artery



- Internal carotid bifurcation:
  - Anterior cerebral artery (ACA)
  - Middle cerebral artery (MCA)

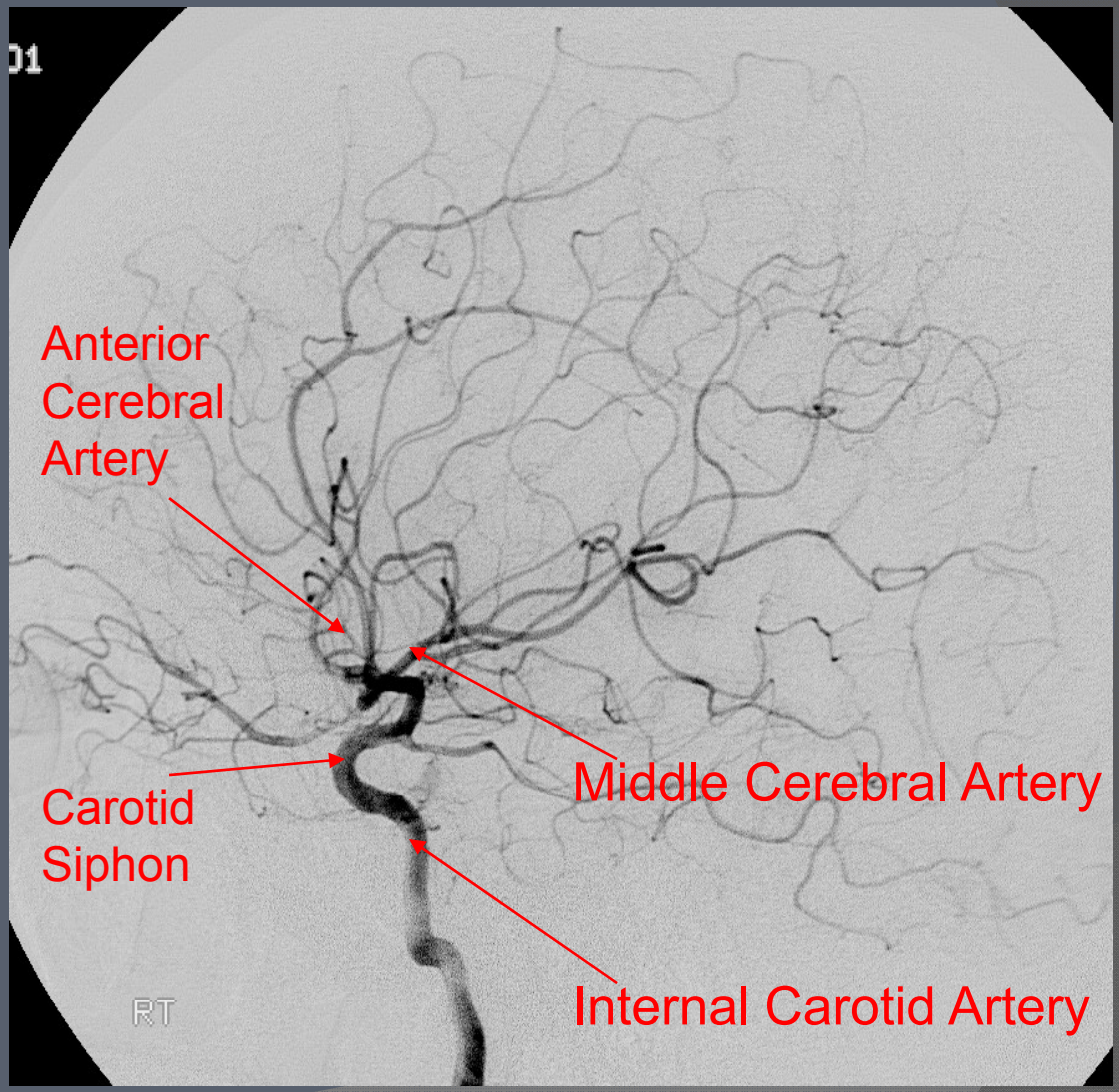
Circle of Willis - Anterior Circulation

- Left ICA is stenotic
- Blood flow to left carotid artery system is not optimal
- Lower pressure allows for some filling across AcoA

Internal Carotid Artery

Lateral view:

- Important in evaluation of the carotid siphon which is a site of carotid artery disease



GUIDELINE

This guideline recognizes that:

Individuals With PAD Present in Clinical Practice With Distinct Syndromes

Asymptomatic: Without obvious symptomatic complaint (but usually with a functional impairment).

Classic claudication: Lower extremity symptoms confined to the muscles with a consistent (reproducible) onset with exercise and relief with rest.

"Atypical" leg pain: Lower extremity discomfort that is exertional but that does not consistently resolve with rest, consistently limit exercise at a reproducible distance, or meet all "Rose questionnaire" criteria.

This guideline recognizes that:

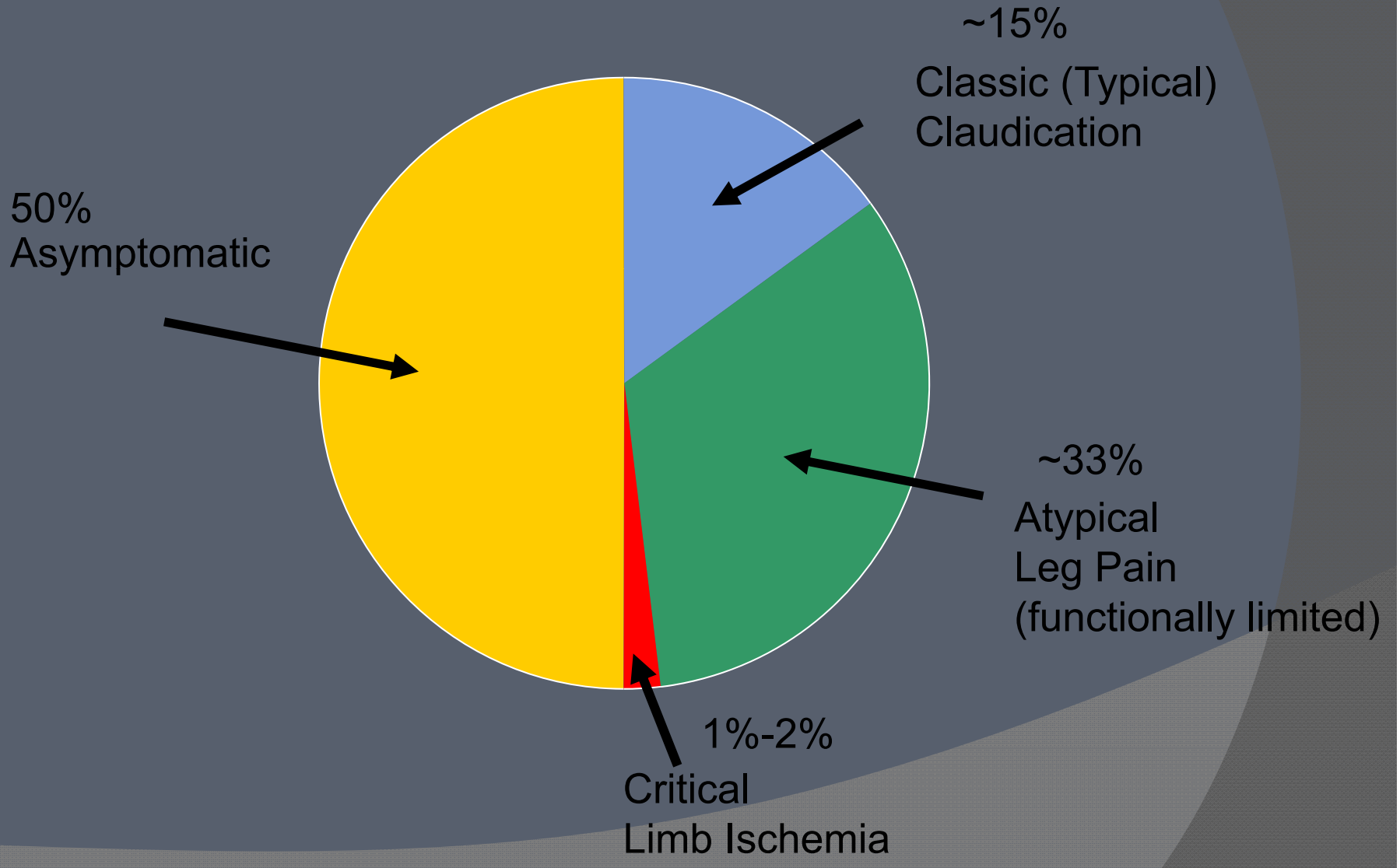
Individuals With PAD Present in Clinical Practice With Distinct Syndromes

Critical limb Ischemia: Ischemic rest pain, nonhealing wound, or gangrene.

Acute limb ischemia: The five "P"s, defined by the clinical symptoms and signs that suggest potential limb jeopardy:

- Pain
- Pulselessness
- Pallor
- Paresthesias
- Paralysis (& polar, as a sixth "P").

Clinical Presentations of PAD



The Clinical Approach to the Patient With, or at Risk for, PAD

Clinicians who care for individuals with PAD should be able to provide:

- A vascular review of symptoms
- A vascular-focused physical examination
- Use of the noninvasive vascular diagnostic laboratory (ABI and toe-brachial index [TBI], exercise ABI, Duplex ultrasound, magnetic resonance angiography [MRA], and computed tomographic angiography [CTA])
- When required, use of diagnostic catheter-based angiography

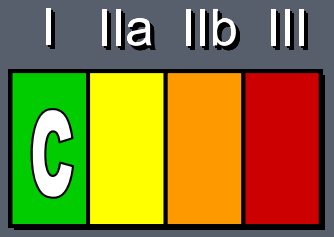
The Vascular Review of Symptoms:

An Essential Component of the Vascular History

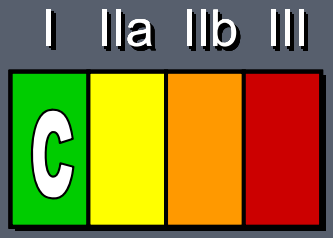
Key components are the following:

- Any exertional limitation of the lower extremity muscles or any history of walking impairment. The characteristics of this limitation may be described as fatigue, numbness, or pain. The primary site(s) of discomfort in the buttock, thigh, calf, or foot should be recorded, along with the relation of such discomfort to rest or exertion.
- Any poorly healing or nonhealing wounds of the legs or feet.
- Any pain at rest localized to the lower leg or foot and its association with the upright or recumbent positions.
- Post-prandial abdominal pain that reproducibly is provoked by eating and is associated with weight loss.
- Family history of a first-degree relative with an abdominal aortic aneurysm.

The Vascular History and Physical Examination

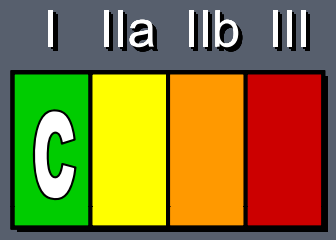


Individuals at risk for lower extremity PAD should undergo a vascular review of symptoms to assess walking impairment, claudication, ischemic rest pain, and/or the presence of nonhealing wounds.

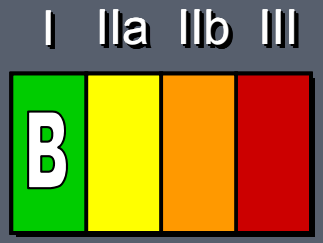


Individuals at risk for lower extremity PAD should undergo comprehensive pulse examination and inspection of the feet.

Identification of the Asymptomatic Patient With PAD



A history of walking impairment, claudication, and ischemic rest pain is recommended as a required component of a standard review of systems for adults ≥50 years who have atherosclerosis risk factors, or for adults ≥70 years.



Individuals with asymptomatic PAD should be identified in order to offer therapeutic interventions known to diminish their increased risk of myocardial infarction, stroke, and death.

The First Tool to Establish the PAD Diagnosis: *A Standardized Physical Examination*

Pulse intensity should be assessed and should be recorded numerically as follows:

- 0, absent
- 1, diminished
- 2, normal
- 3, bounding

Use of a standard examination should facilitate clinical communication

Comprehensive Vascular Examination

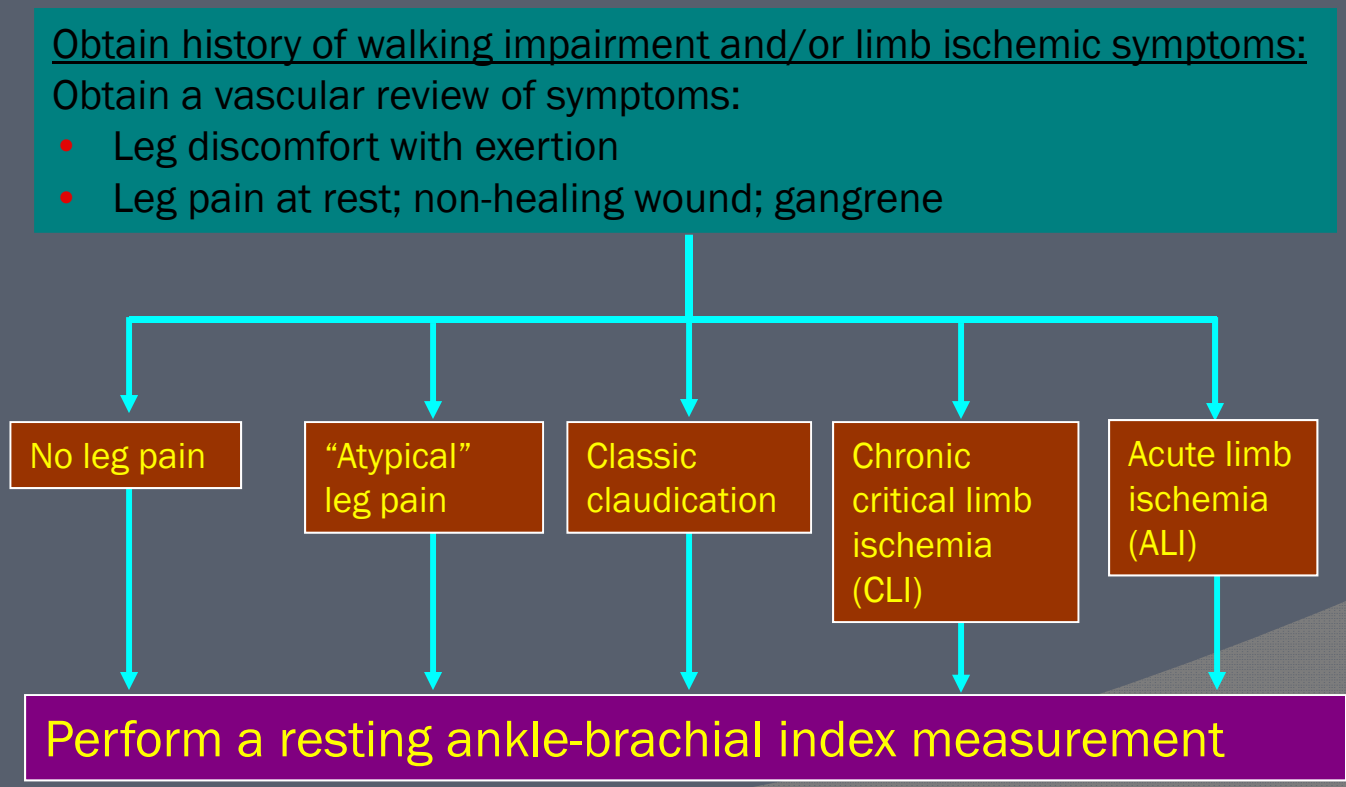
Key components of the vascular physical examination include:

- Bilateral arm blood pressure (BP)
- Cardiac examination
- Palpation of the abdomen for aneurysmal disease
- Auscultation for bruits
- Examination of legs and feet

- Pulse Examination
  - Carotid
  - Radial/ulnar
  - Femoral
  - Popliteal
  - Dorsalis pedis
  - Posterior tibial
- Scale:
  - 0=Absent
  - 1=Diminished
  - 2=Normal
  - 3=Bounding (aneurysm or AI)

ACC/AHA Guideline for the Management of PAD: Steps Toward the Diagnosis of PAD

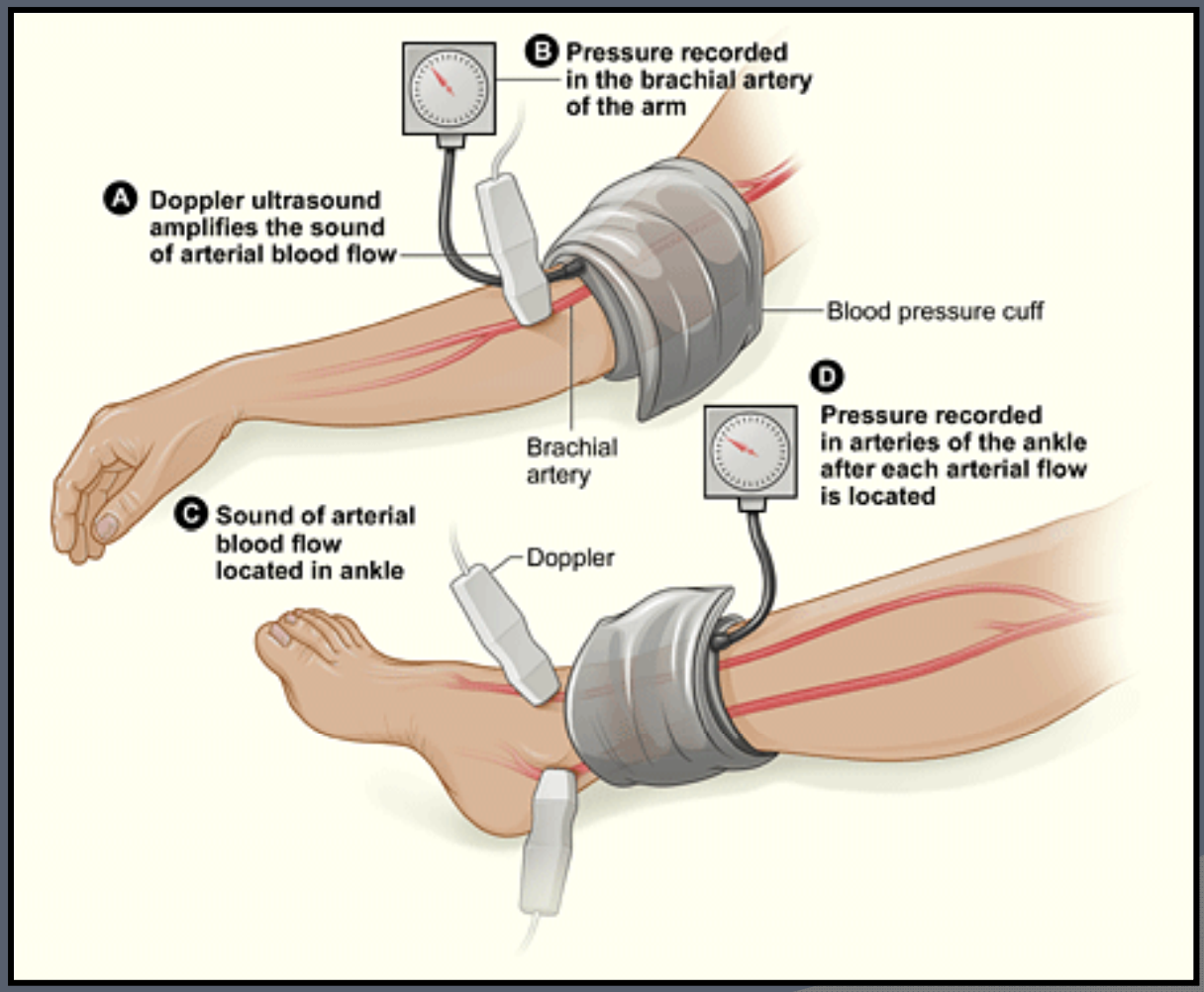
Recognizing the "at risk" groups leads to recognition of the five main PAD clinical syndromes:



ABI Procedure

- Step 1: Apply the appropriately sized blood pressure cuff on the arm above the elbow (either arm).
- Step 2: Apply Doppler gel to skin surface.
- Step 3: Turn on the Doppler and place the probe in the area of the pulse at a 45-60° angle to the surface of the skin, pointing to the shoulder.
- Step 4: Move the probe around until the clearest arterial signal is heard.

ABI Procedure



http://www.nhlbi.nih.gov/health/dci/Diseases/pad/pad_diagnosis.html

ABI Procedure

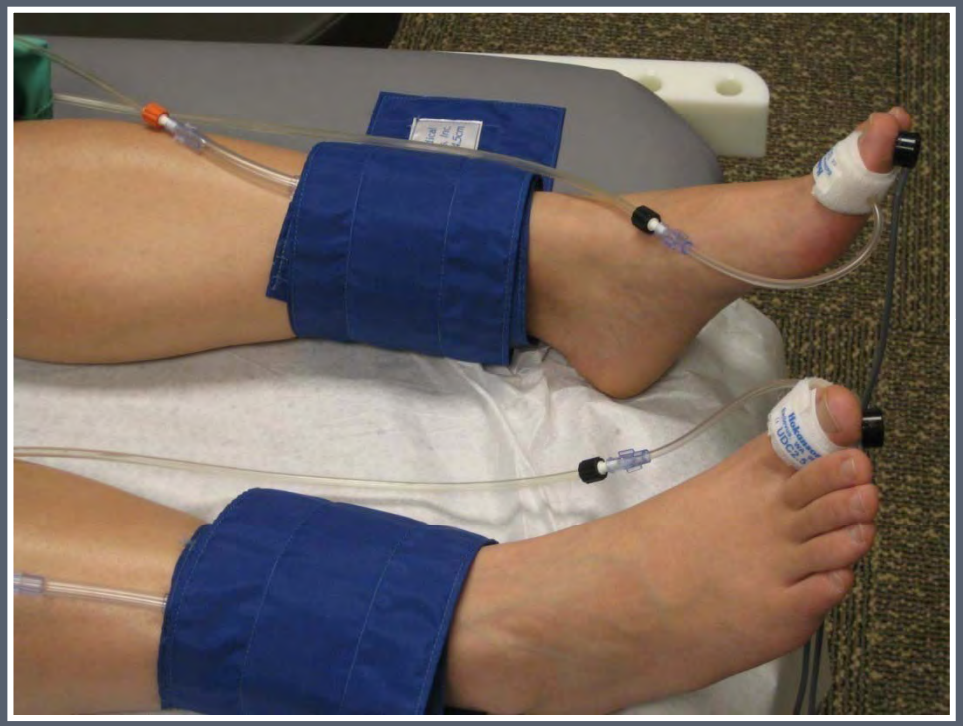
- Step 5: Inflate the blood pressure cuff to approximately 20 mmHg above the point where systolic sounds are no longer heard.
- Step 6: Gradually deflate until the arterial signal returns. Record the pressure reading.
- Step 7: Repeat the procedure for the right and left posterior tibial and dorsalis pedis arteries. Place the probe on the pulse and angle the probe at 45^{o} toward the knee.
- Step 8: Record the systolic blood pressure of the contralateral arm.

Understanding the ABI

The ratio of the higher brachial systolic pressure and the higher ankle systolic pressure for each leg:

$$\text{ABI} = \frac{\text{Ankle systolic pressure}}{\text{Higher brachial artery systolic pressure}}$$

Toe-Brachial Index Measurement



- The toe-brachial index (TBI) is calculated by dividing the toe pressure by the higher of the two brachial pressures.
- TBI values remain accurate when ABI values are not possible due to non-compressible pedal pulses.
- TBI values ≤ 0.7 are usually considered diagnostic for lower extremity PAD.

	Supine Resting ABI	Post-Exercise ABI
Normal	> 1.0	No Change or increase
Mild Disease	0.8 – 0.9	> 0.5
Moderate Disease	0.5 – 0.8	> 0.2
Severe Disease	< 0.5	< 0.2

1-2 mph, 10 % grade, 5 minutes or symptom-limited

Ankle Brachial Index

- Normal > 0.95
- Intermittent claudication 0.95 to 0.4
- Rest pain 0.4 to 0.2
- Impending gangrene 0.2 to 0
- Usually pulse not palpable ABI < 0.6

Hemodynamic Noninvasive Tests

- Resting Ankle-Brachial Index (ABI)
- Exercise ABI
- Segmental pressure examination
- Pulse volume recordings

These traditional tests continue to provide a simple, risk-free, and cost-effective approach to establishing the PAD diagnosis as well as to follow PAD status after procedures.

Exercise ABI Testing

- Confirms the PAD diagnosis
- Assesses the functional severity of claudication
- May “unmask” PAD when resting the ABI is normal
- Aids differentiation of intermittent claudication vs. pseudoclaudication diagnoses

The Plantar Flexion Exercise ABI

Benefits:

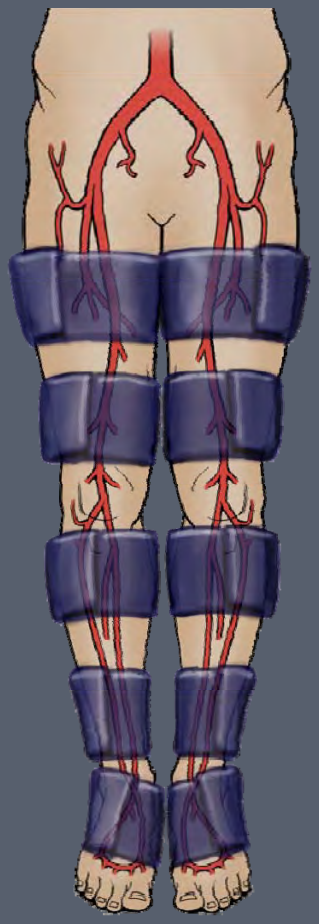
- Reproduces treadmill-derived fall in ABI
- Can be performed anywhere
- Inexpensive

Limitation:

- Does not measure functional capacity

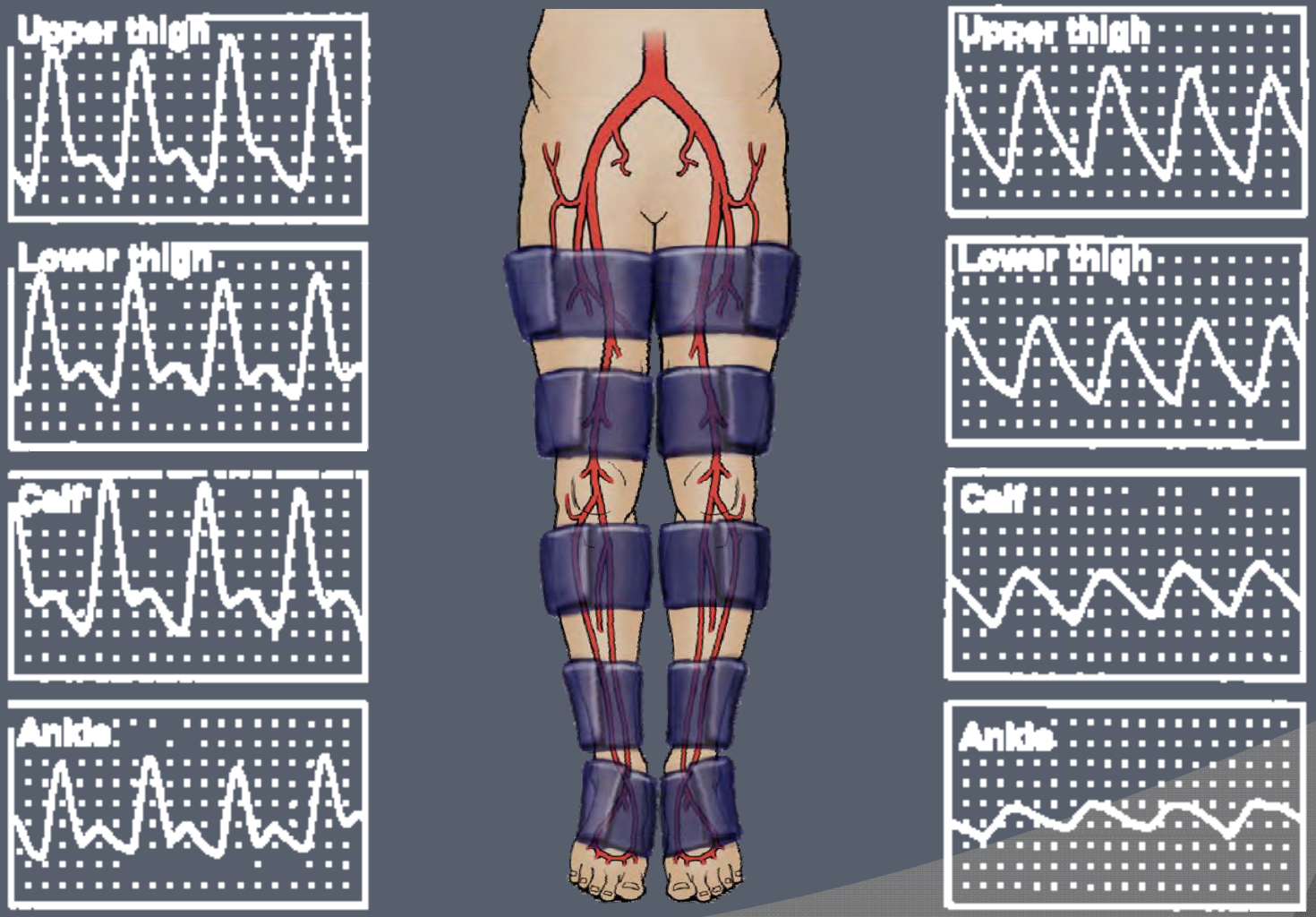
Reprinted with permission from McPhail, IR et al. J Am Coll Cardiol. 2001;37:1381.

Segmental Pressures (mm Hg)

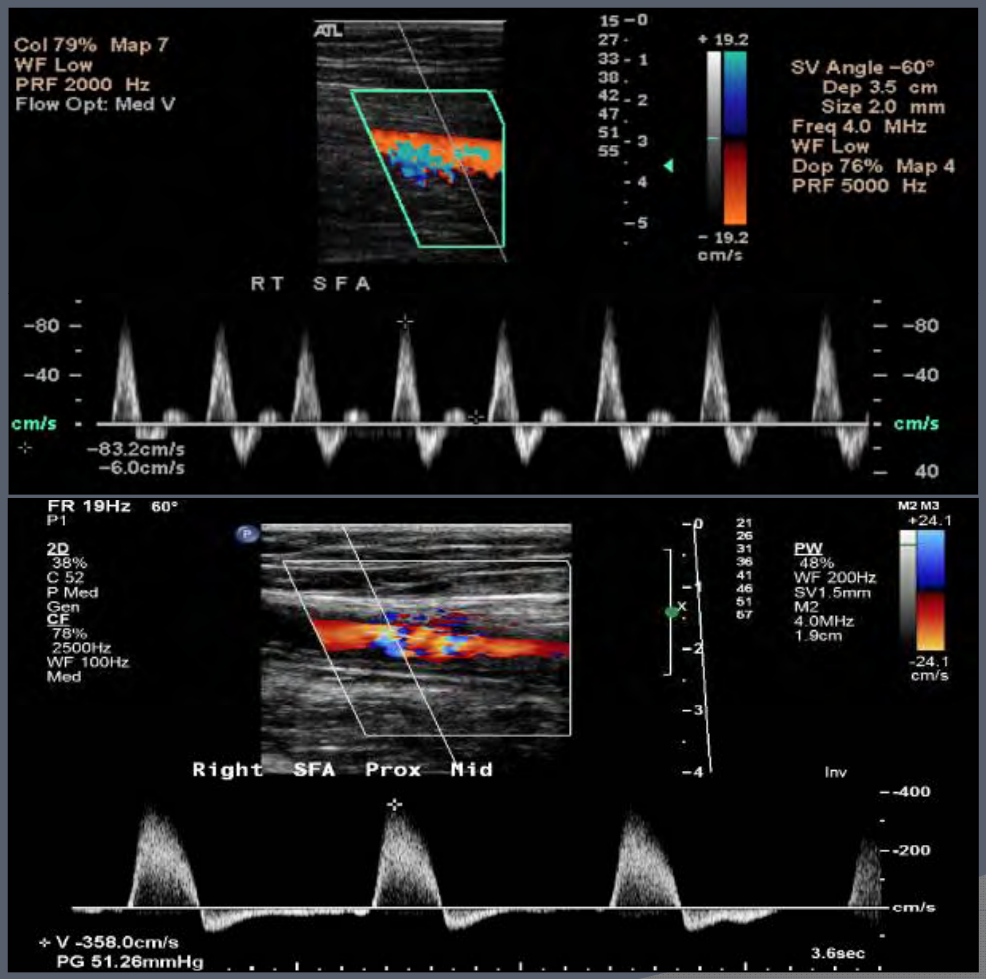


150	Brachial	150
150		150
110		146
108		100
62		84
0.54	ABI	0.44

Pulse Volume Recordings

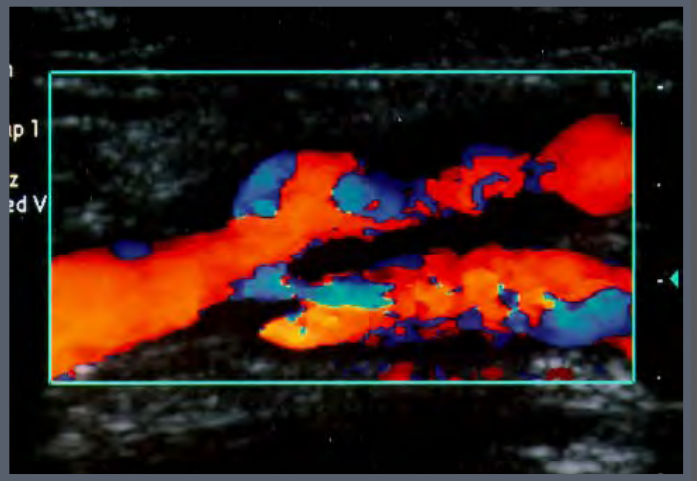


Color Duplex Ultrasonography



Arterial Duplex Ultrasound Testing

- Duplex ultrasound of the extremities is useful to diagnose anatomic location and degree of stenosis of peripheral arterial disease.
- Duplex ultrasound is useful to provide surveillance following femoral-popliteal bypass using venous conduit (but not prosthetic grafts).
- Duplex ultrasound of the extremities can be used to select candidates for:
  (a) endovascular intervention
  (b) surgical bypass, and
  (c) to select the sites of surgical anastomosis.

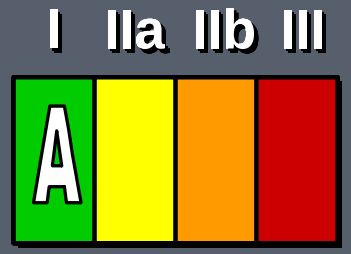


However, the data that might support use of duplex ultrasound to assess long-term patency of PTA is not robust.

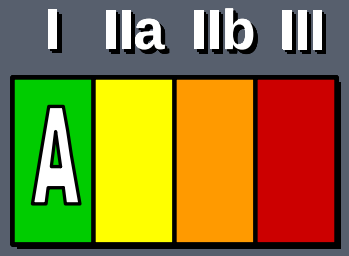
PTA=percutaneous transluminal angioplasty.

Noninvasive Imaging Tests

Duplex Ultrasound



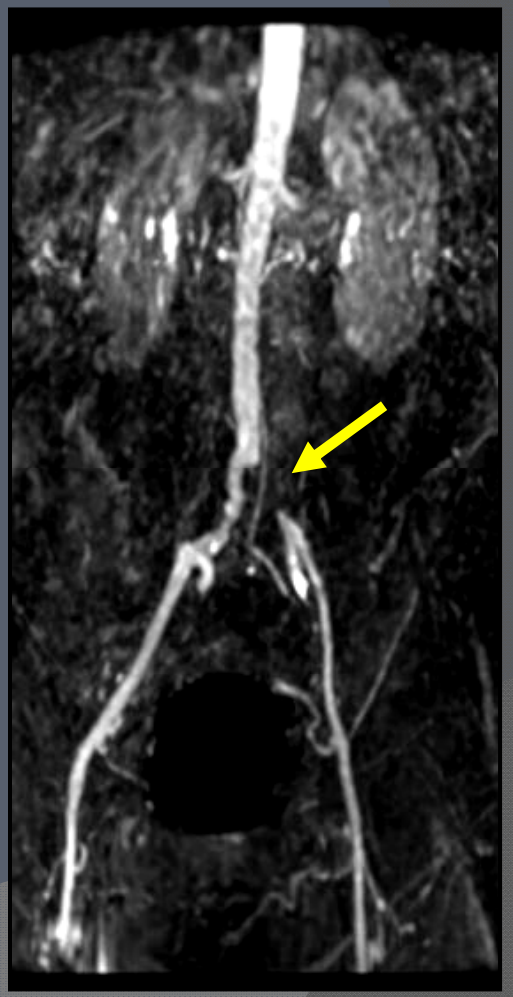
Duplex ultrasound of the extremities is useful to diagnose the anatomic location and degree of stenosis of PAD.



Duplex ultrasound is recommended for routine surveillance after femoral-popliteal or femoral-tibial-pedal bypass with a venous conduit. Minimum surveillance intervals are approximately 3, 6, and 12 months, and then yearly after graft placement.

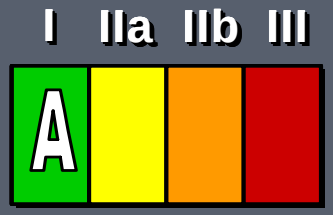
Magnetic Resonance Angiography (MRA)

- MRA has virtually replaced contrast arteriography for PAD diagnosis
- Excellent arterial picture
- No ionizing radiation
- Noniodine–based intravenous contrast medium rarely causes renal insufficiency or allergic reaction
- ~10% of patients cannot utilize MRA because of:
  - Claustrophobia
  - Pacemaker/implantable cardioverter-defibrillator
  - Obesity
- Gadolinium use in individuals with an eGFR <60 mL/min has been associated with nephrogenic systemic fibrosis (NSF)/nephrogenic fibrosing dermopathy

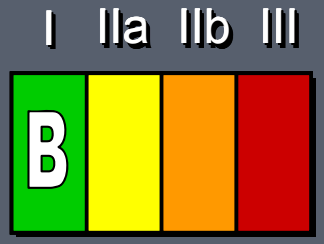


Noninvasive Imaging Tests

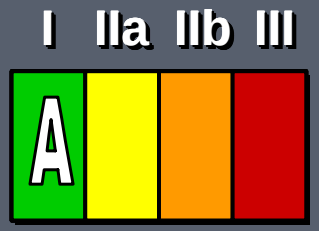
Magnetic Resonance Angiography (MRA)



MRA of the extremities is useful to diagnose anatomic location and degree of stenosis of PAD.



MRA of the extremities should be performed with gadolinium enhancement.



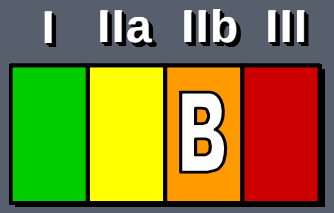
MRA of the extremities is useful in selecting patients with lower extremity PAD as candidates for endovascular intervention.

Computed Tomographic Angiography (CTA)

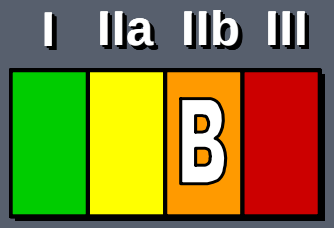
- Requires iodinated contrast
- Requires ionizing radiation
- Produces an excellent arterial picture

Noninvasive Imaging Tests

Computed Tomographic Angiography (CTA)



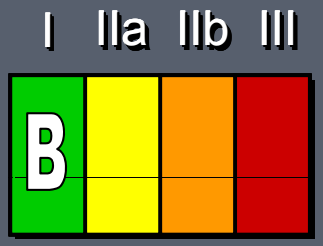
CTA of the extremities may be considered to diagnose anatomic location and presence of significant stenosis in patients with lower extremity PAD.



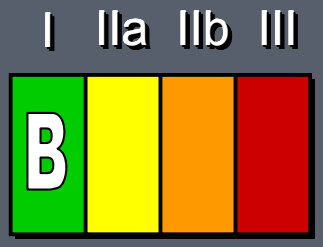
CTA of the extremities may be considered as a substitute for MRA for those patients with contraindications to MRA.

PATIENT WITH INTERMITTENT CLAUDICATION

Identification of the Symptomatic Patient With Intermittent Claudication

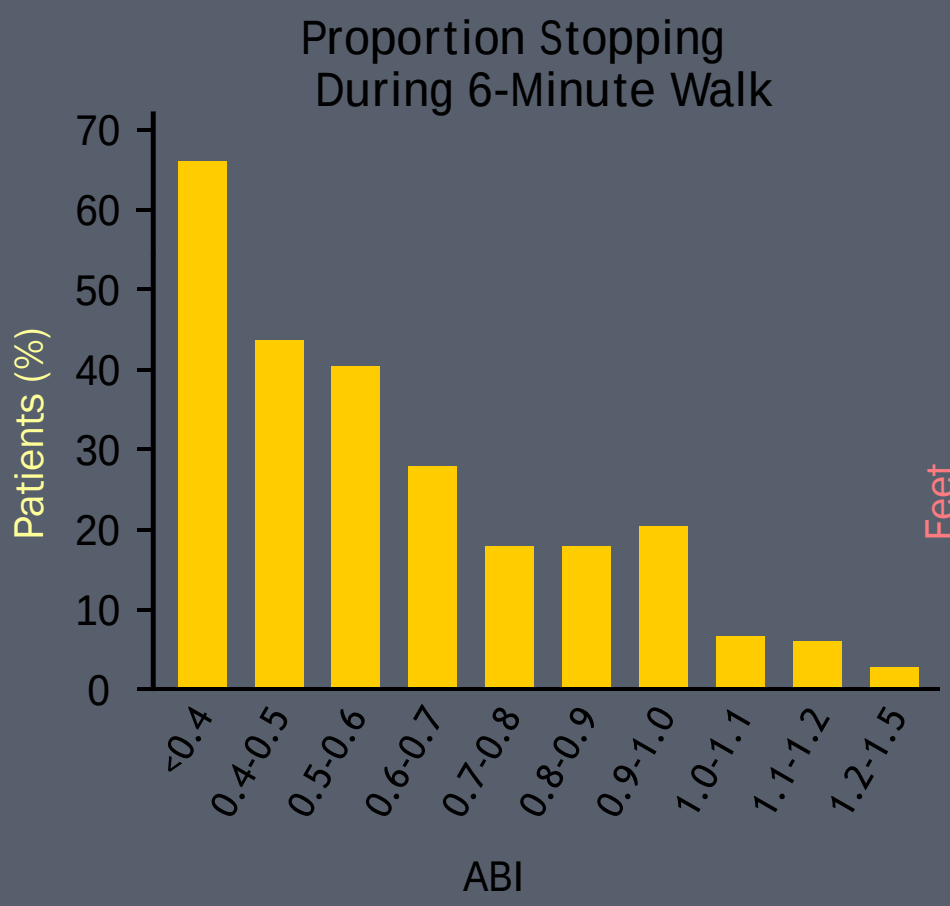


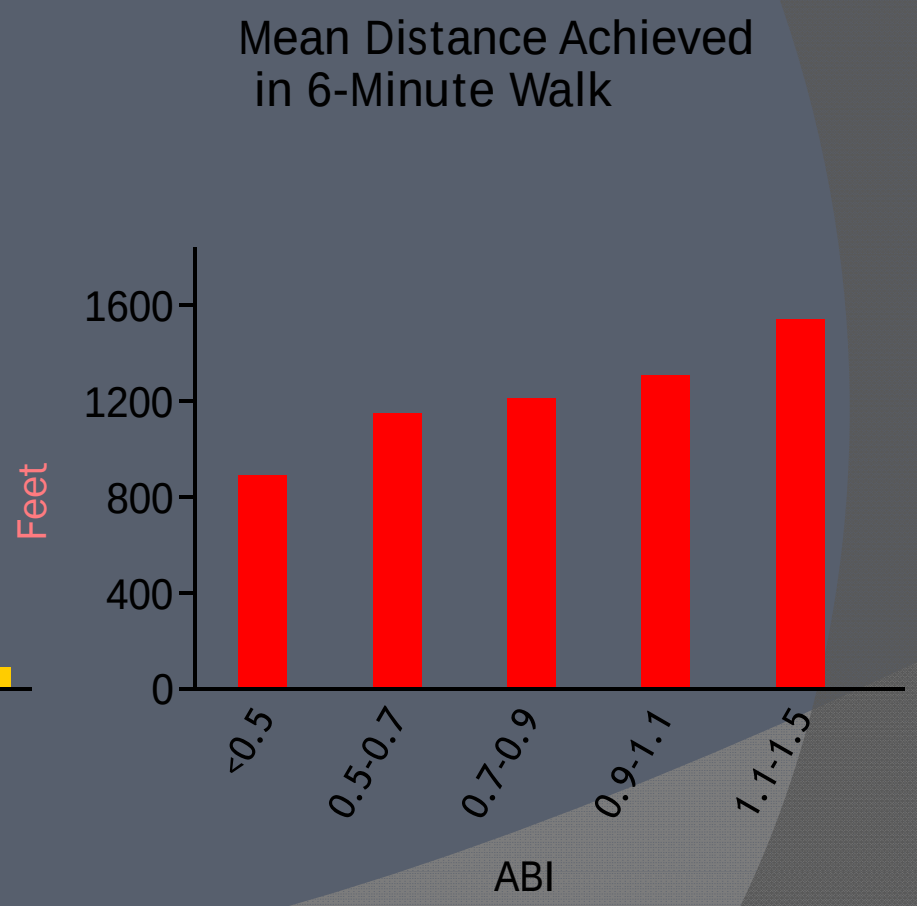
Patients with symptoms of intermittent claudication should undergo a vascular physical examination, including measurement of the ABI.



In patients with symptoms of intermittent claudication, the ABI should be measured after exercise if the resting index is normal.

ABI and Functional Outcomes

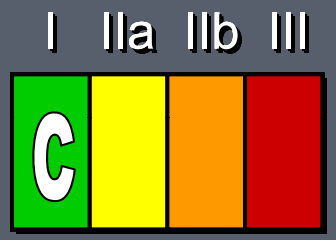




ABI=ankle-brachial index

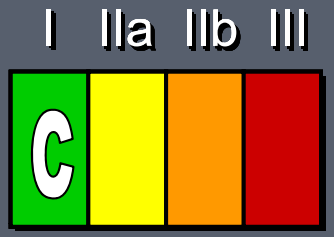
McDermott MM, et al. Ann Intern Med. 2002;136:873-883.

Identification of the Symptomatic Patient With Intermittent Claudication



Patients with intermittent claudication should have significant functional impairment with a reasonable likelihood of symptomatic improvement and absence of other disease that would comparably limit exercise even if the claudication was improved (e.g., angina, heart failure, chronic respiratory disease, or orthopedic limitations) before undergoing an evaluation for revascularization.

Revascularization of the Patient With Intermittent Claudication



Individuals with intermittent claudication who are offered the option of endovascular or surgical therapies should:

- be provided information regarding supervised claudication exercise therapy and pharmacotherapy (Pentoxifylline (trental), Cilostazol (Pletal).
- receive comprehensive risk factor modification and antiplatelet therapy (ASA, and Plavix " Caprie")

When to Revascularize and How

Significant disability " Quality of Life"

- Lower extremity PAD lesion anatomy such that the revascularization procedure would have low risk and a high probability of initial and long-term success.

In The Board

Which Revascularization Modality?

- Iliac disease: PTA and Stent reasonable
- CFA; SFA; and Infrapopliteal disease:

  Surgical revascularization

Peripheral Vascular Intervention:

Transatlantic Intersocietal Commission (TASC) Morphologic Stratification

TASC Class	*Characteristics*
A	Single Stenosis, <3 cm of SFA or popliteal artery
B	Single stenosis, 3-10 cm, not involving popliteal Heavily calcified stenosis up to 3 cm Multiple lesions, each <3 cm Single or multiple lesions in absence of tibial runoff
C	Single stenosis or occlusion > 5 cm Multiple stenosis or occlusion each 3-5 cm
D	Complete occlusion CFA, SFA or popliteal

TASC Working Group. *Eur J Vasc Surg* 2000;19:S1-244.

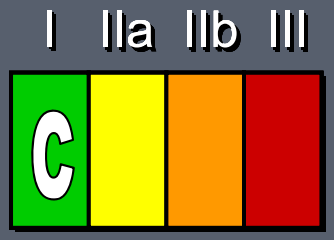
Peripheral Vascular Intervention: Optimal Medical Management

Area	*Intervention Goals*
Smoking	Complete Cessation
BP control	<140/90 mm Hg all patients <130/85 mm Hg if renal insufficiency or CHF <130/80 mm Hg if diabetes mellitus
Dietary	Overall healthy eating pattern
Lipids	LDL<70 mg/dL
Physical activity	30 mins of moderate intensity 5 days/week
Diabetes	Hg A1C < 7%

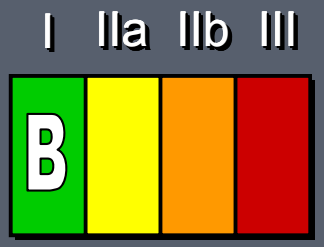
Davies MG. *J Am Coll Surg* 2005;201:275-296.

PATIENT WITH CRITICAL LIMB ISCHIMIA.

Evaluation of the Patient With Critical Limb Ischemia



Patients with CLI should undergo expedited evaluation and treatment of factors that are known to increase the risk of amputation.



Patients with CLI in whom open surgical repair Is anticipated should undergo assessment of cardiovascular risk.

Factors That Increase Risk of Limb Loss in Patients With Critical Limb Ischemia

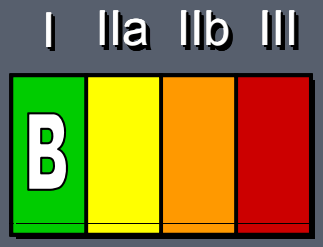
- Factors that reduce blood flow to the microvascular bed
  - Diabetes
  - Severe renal failure
  - Severely decreased cardiac output (severe heart failure or shock)
  - Vasospastic diseases or concomitant conditions (e.g., Raynaud's phenomenon, prolonged cold exposure)
  - Smoking and tobacco use
- Factors that increase demand for blood flow to the microvascular bed
  - Infection (e.g., cellulitis, osteomyelitis)
  - Skin breakdown or traumatic injury

Also see Table 5 of Hirsch AT, et al. J Am Coll Cardiol. 2006;47:e1-e192.

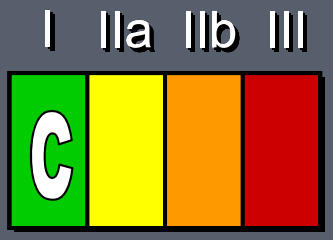
Differential Diagnosis of Common Foot Ulcers

Neuropathic Ulcer	Neuroischemic Ulcer
Painless	Painful
Normal pulses	Absent pulses
Typically punches-out appearance	Irregular margins
Often located on sole or edge of foot or metatarsal head	Commonly located on toes
Presence of calluses	Calluses absent or infrequent
Loss of sensation, reflexes, and vibration sense	Variable sensory findings
Increase in blood flow (arteriovenous shunting)	Decrease in blood flow
Dilated veins	Collapsed veins
Dry, warm foot	Cold foot
Bone deformities	No bony deformities
Red appearance	Pale, cyanotic

Evaluation of the Patient With Critical Limb Ischemia

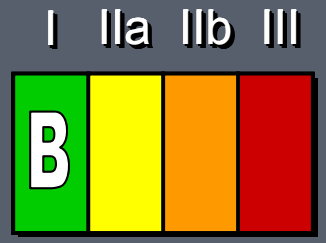


Patients at risk of CLI (ABI less than 0.4 in a nondiabetic individual, or any diabetic individual with known lower extremity PAD) should undergo regular inspection of the feet to detect objective signs of CLI (3 months).

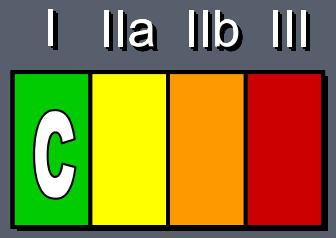


The feet should be examined directly, with shoes and socks removed, at regular intervals after successful treatment of CLI.

Evaluation of the Patient With Critical Limb Ischemia



Patients with CLI and skin breakdown should be referred to healthcare providers with specialized expertise in wound care.



Patients at risk for CLI (those with diabetes, neuropathy, chronic renal failure, or infection) who develop acute limb symptoms represent potential vascular emergencies and should be assessed immediately and treated by a specialist competent in treating vascular Disease (Dupplex/Doppler, and Angiogram).

CAROTID ARTERIES DISEASE

AHA (American Heart Ass.) recommendation

- CEA is a proven recommendation in symptomatic pts with ipsilateral carotid stenosis > 70%
- It is acceptable recommendation in symptomatic pts with ipsilateral carotid stenosis of 50 -70%
- Contraindicative in pts symptomatic with < 30%
- Asymptomatic pts: Carotid with > 60% is criteria for CEA

  If Sx risk < 3% and > 5 year life expectancy

  If Sx risk 3 – 5% ,it is acceptable with bilateral 75% stenosis

  If Sx risk > 5 – 10% should not be Sx

Criteria Used to Define "High-Risk" Population

Clinical Criteria

- Age >75-80 yr
- Congestive heart failure (Class III/IV)
- LV dysfunction EF <30-35%
- Planned CABG or heart valve surgery
- Recent MI (>24 hr and <4-6 wk)
- Unstable Angine (CCS class III/IV)
- Severe COPD(pO2 < 60%,FEV1 <30-50%)
- Contralateral cranial nerve injury

Criteria Used to Define "High-Risk" Population

Anatomic Criteria

- Previous CEA with recurrent stenosis
- Surgically inaccessible lesion
- High cervical lesion (at or above C2)
- Below the clavicle
- Contralateral carotid occlusion
- Radiation Therapy to the neck
- Prior radical neck surgery
- Severe tandem lesions
- Spinal inmobility of the neck

RENOVASCULAR DISEASE

Medical Treatment

- ACE inh are effective medications for HTN associated with unilateral RAS (LOE: A).
- ARB are effective medications for HTN associated with unilateral RAS (LOE: B).
- CCB are effective medications for HTN associated with unilateral RAS (LOE: A).
- BB are effective medications for HTN associated with unilateral RAS (LOE: A).

Indication for Revascularization (Class IIb)

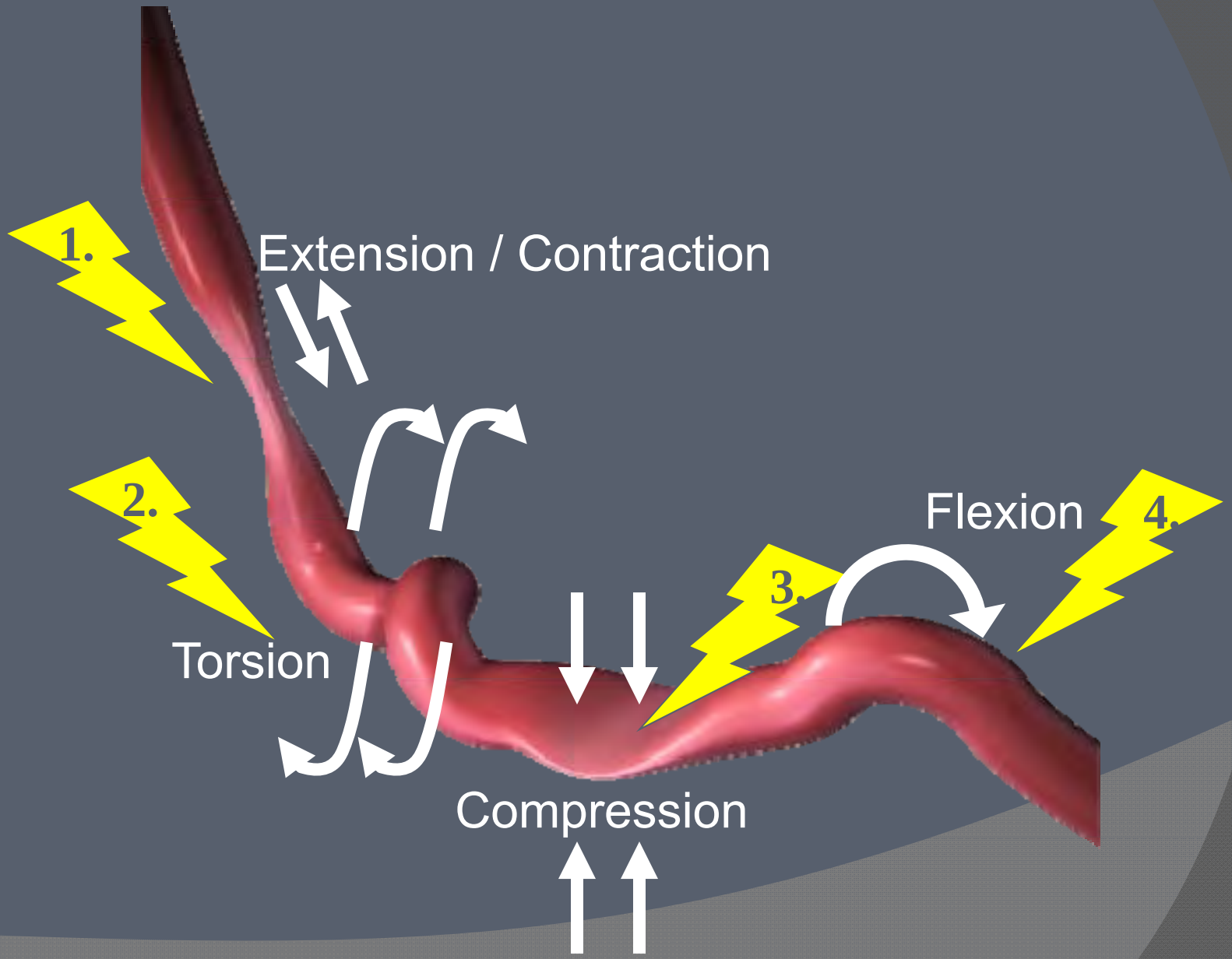
- Percutaneous revascularization may be considered for treatment of an asymptomatic bilateral or solitary viable kidney with hemodynamically significative RAS
  - 50-70% RAS with > 20 mmHg gradient, or mean gradient of > 10 mmHg)
  - Any stenosis > 70%
  - Any stenosis found with IVUS > 70 %

Indication for Revascularization (Class IIa)

- Hemodynamically significant RAS and accelerated HTN, resistant HTN, malignant HTN, HTN with unexplained unilateral small kidney; and HTN with intolerance to medication.
- Revascularization in pts with RAS and progressive chronic kidney disease with bilateral RAS or RAS in a solitary functioning kidney.
- Percutaneous revascularization may be considered for pts with RAS and CRI with unilateral RAS (Class IIb)

CONCLUSIONS

Forces Exerted on Stents in SFA



Factors affecting Primary & Long-Term Patency

- Short segment disease
- Large vessel involvement (Iliac>SFA>TPT)
- Stenosis rather than Occlusion
- Good peripheral run-off
- Claudication rather than rest pain
- Minimal Coronary Disease with good renal function
- Absence of Diabetes Mellitus

Factors affecting Primary & Long-Term Patency

- Short segment disease
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- Stenosis rather than Occlusion
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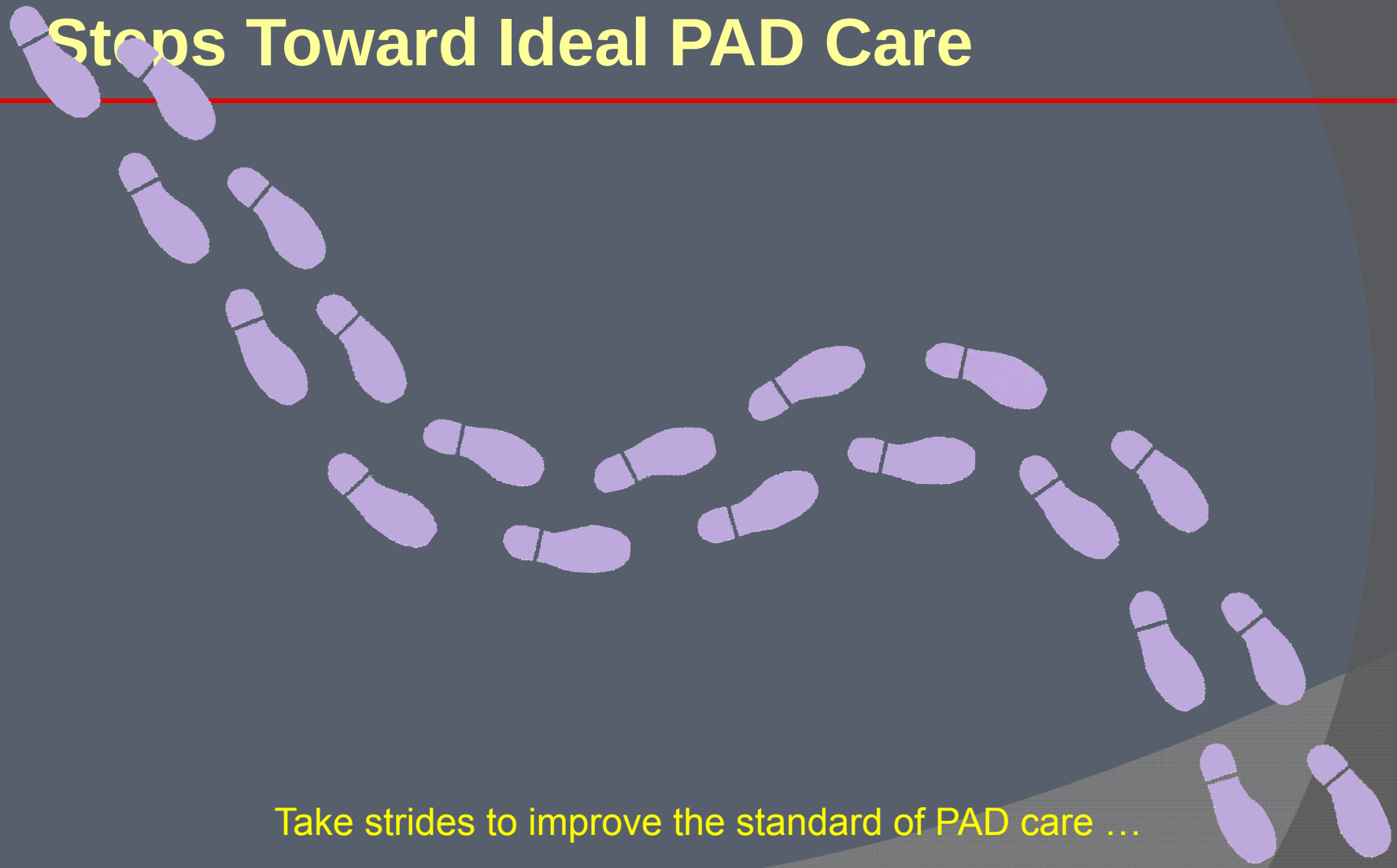
The PAD Guideline Provides Steps Toward Ideal PAD Care



Take strides to improve the standard of PAD care …

Conventional PAD Treatments Are Ineffective

Lifestyle/ Drugs

- Limited efficacy, low compliance
- Trental, Pletal, Exercise

Angioplasty/ Stent

- 1-year patency as low as 60%
- High stent fracture rates reported

Bypass Surgery

- Gold standard
- 8-19% complication rate
- Unfavorable economics

Amputation

- 25% mortality at 1 year
- Severe impact on quality of life
- 150,000 amputations performed annually

Current Interventions Offer Sub-Optimal Results for Fem-Pop Disease

	WEIGHTED AVERAGES		
	Patients/Limbs	Tech Success	1-Yr. Primary Patency
PTA (8 studies)	1,241 pts 1469 limbs	90%	61%
Stents (11 studies)	585 pts 600 limbs	98%	67%

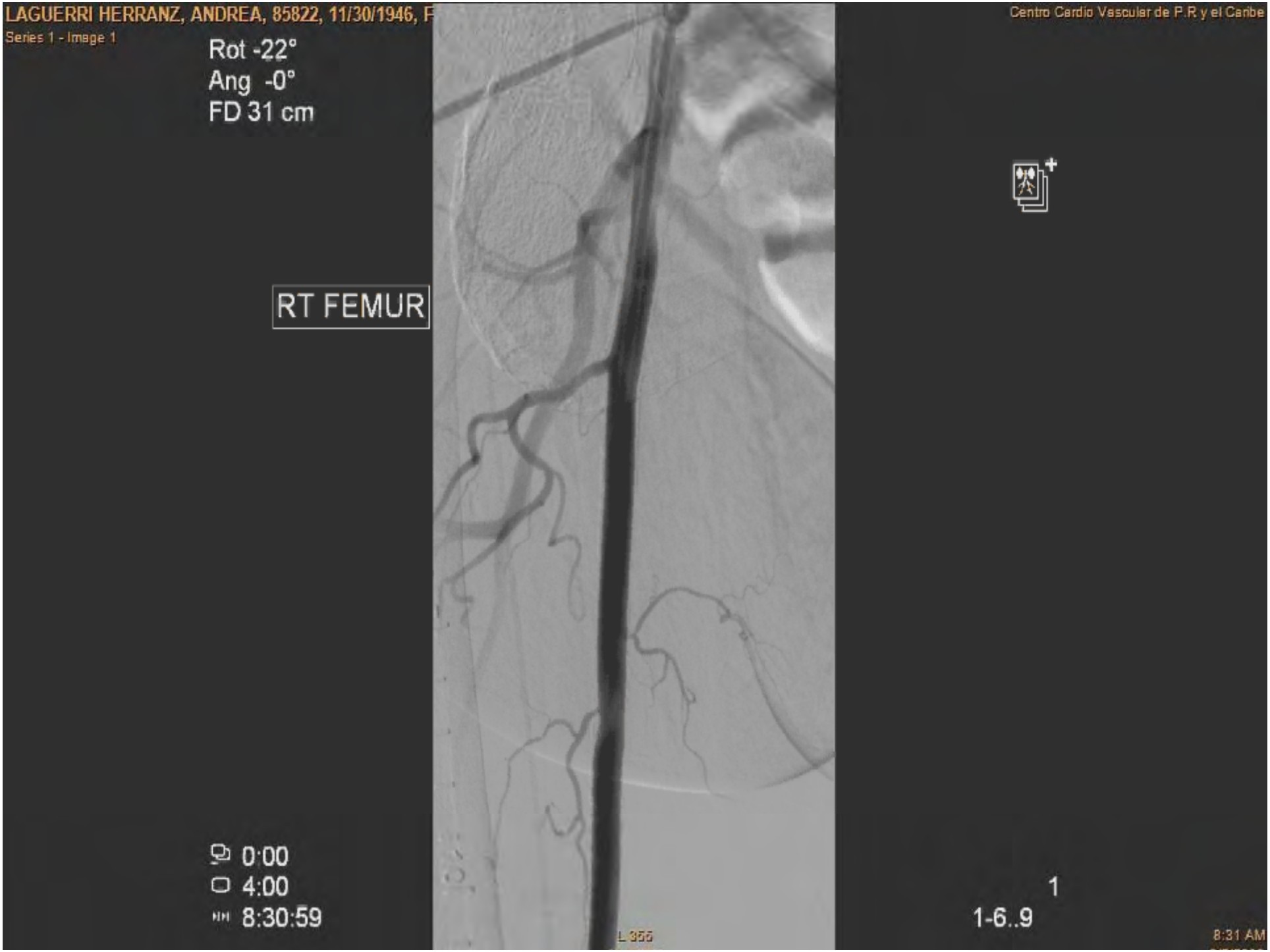
TASC, J Vasc Surg, Jan 2000

L.A

- Patient of 61 year old female complaint of leg pain on exercion after walk 2 to 3 block, relief at rest. Patient was found with decreased ABI and multiple obstruction in both legs bilateral on Doppler.
- Allergie: None.
- PMHx: HTN, Dyslipidemia.
- Med: Hyzaar, Crestor, ASA, Plavix.
- FHx: CAD.
- Toxic: None.

Physical Examination

- BP 153/78 P 72 R 18 T 36
- Neck: No carotid bruit.
- HEENT: Well hydrate. No thrush.
- Heart: RRR. No murmur
- Lung: CTA
- Abd: B/S +, No bruit or mass.
- Extremities: No pulses bilateral. Loss of hairs.


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 1 - Image 1
Rot -22°
Ang -0°
FD 31 cm
RT FEMUR
Centro Cardio Vascular de P.R y el Caribe
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4:00
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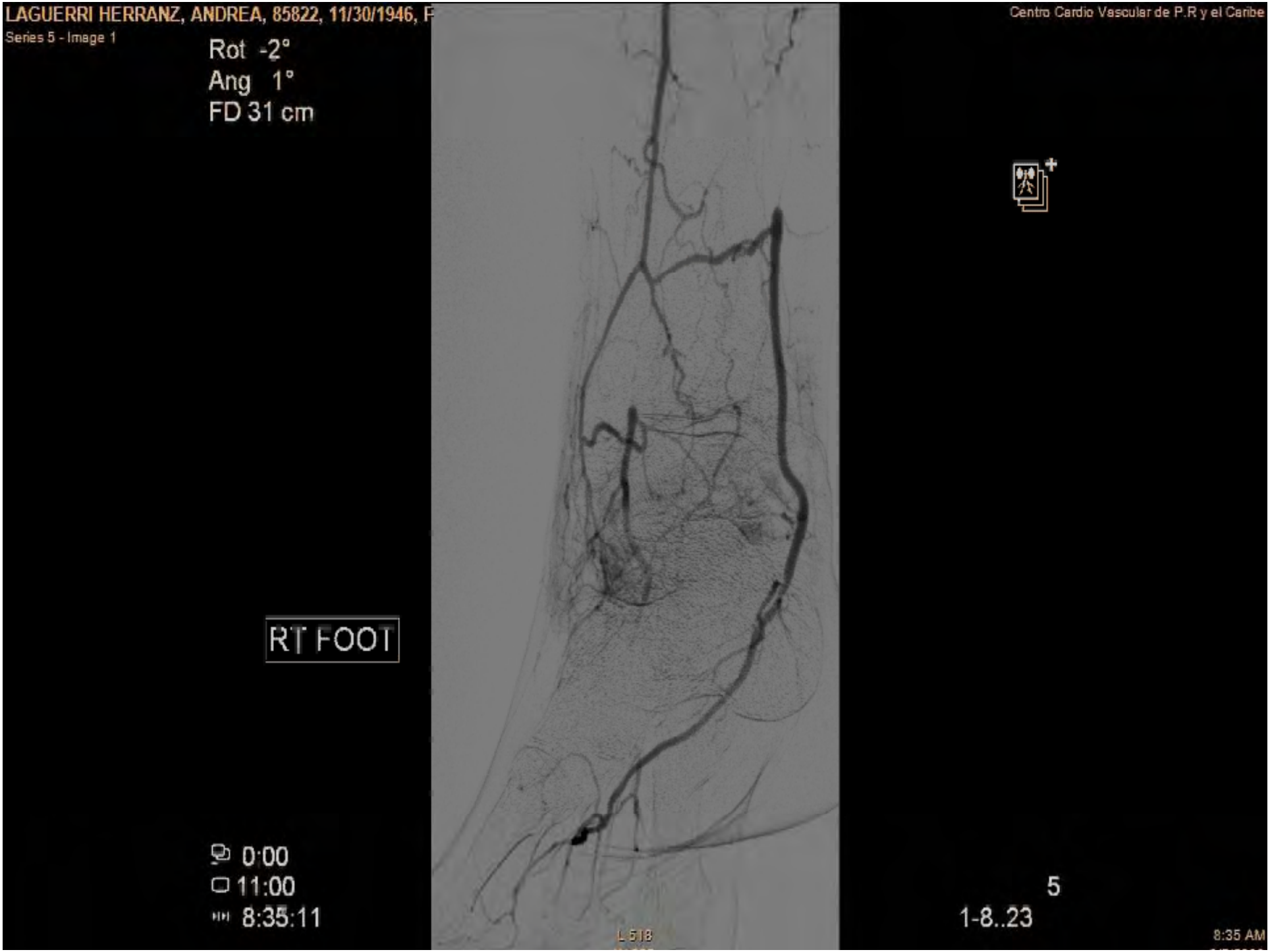
1
1-6..9
8:31 AM


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 3 - Image 20
Rot -2°
Ang -0°
FD 31 cm
RT KNEE
0:00
9:50
8:32:20
Centro Cardio Vascular de P.R y el Caribe
3
1-20
8:32 AM


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 5 - Image 1
Rot -2°
Ang 1°
FD 31 cm
Centro Cardio Vascular de P.R y el Caribe
RT FOOT
0:00
11:00
8:35:11
5
1-8..23
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LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Run 7 - Frame 1 / 68
Centro Cardio Vascular de P.R y el Caribe
63kV, 181mA, 3s
tent Guide
40 . 270
LAO -2.3°
L 128


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Run 10 - Frame 1 / 41
Centro Cardio Vascular de P.R y el Caribe
62kV, 177mA, 3s
Stent Guide
240
270
LAO -2.3°
L 129


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 26 - Image 67
Rot -2°
Ang 1°
FD 15 cm
Centro Cardio Vascular de P.R y el Caribe
RT LEG
4:40
10:00:32
26
67
L 440
10:00 AM


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 23 - Image 123
Rot -2°
Ang 1°
FD 15 cm
120
150
180
RT LEG
Centro Cardio Vascular de P.R y el Caribe
8:13
9:51:37
23
123
9:51 AM


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Series 29 - Image 27
Rot -2°
Ang 1°
FD 15 cm
Centro Cardio Vascular de P.R y el Caribe
RT LEG
3:47
10:04:27
29
27
L 512
W 1024
10:04 AM
9/5/2008


AGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
n 48 - Frame 1 / 18
Centro Cardio Vascular de P.R y el Caribe
65kV, 78mAs
O -2.3°
L 663


LAGUERRI HERRANZ, ANDREA, 85822, 11/30/1946, F
Run 51 - Frame 1 / 14
Centro Cardio Vascular de P.R y el Caribe
65kV, 70mAs
LAO -2.3°
L 563

E.C

9/8/2008

- Patient of 51 year old male who started to complaint of severe right leg pain, decreased on temperature and pallor. Patient agree to haven visited his local Hospital due to back, and legs pain, but he was treated with NSAID.
- PMHx: HTN.
- Med: Unknown
- Toxic: Smoker
- F.Hx: CAD
- Sx: None

Physical Examination

BP: 157/67 P: 107 R: 23 T:37.4

- General: Patient on extreme pain, very anxious.
- Neck: No JVD or Carotid bruit.
- HEENT: NC. Red mucosa. No oral thrush.
- Heart: Tachycardia. No murmur. No S3 or S4 gallop.
- Lung: Clear to auscultation.
- Abd: B/S+. Mild globulos. Mild tenderness. No bruit to auscultation.
- Extremities: Left leg no pulse.

  Right leg: Cyanotic change (livedo reticularis). Cold with areas of necrosis (Dark pigmentation). No evidence of pulse. Thigh warn to palpation.


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 1 - Frame 1 / 12
Centro Cardio Vascular de P.R. y el Caribe
79kV, 113mAs
LAO -0.2°
L 509


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 4 - Frame 1 / 75
Centro Cardio Vascular de P.R. y el Caribe
69kV, 505mA, 5s
LAO -0.2°
L 103


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 13 - Frame 1 / 17
Centro Cardio Vascular de P.R. y el Caribe
69kV, 474mA, 4s
LAO -0.2°
L 12B


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 3 - Frame 1 / 18
Centro Cardio Vascular de P.R y el Caribe
70kV, 95mAs
LAO -27.6°
L 553


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 31 - Frame 1 / 70
Centro Cardio Vascular de P.R. y el Caribe
72kV, 635mA, 5s
LAO -0.2°
L 12B


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 1 - Frame 1 / 18
Centro Cardio Vascular de P.R y el Caribe
70kV, 116mAs
RAO 0.0°
L 668


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 2 - Frame 1 / 17
Centro Cardio Vascular de P.R y el Caribe
70kV, 108mAs
RAO 0.0°
L 663

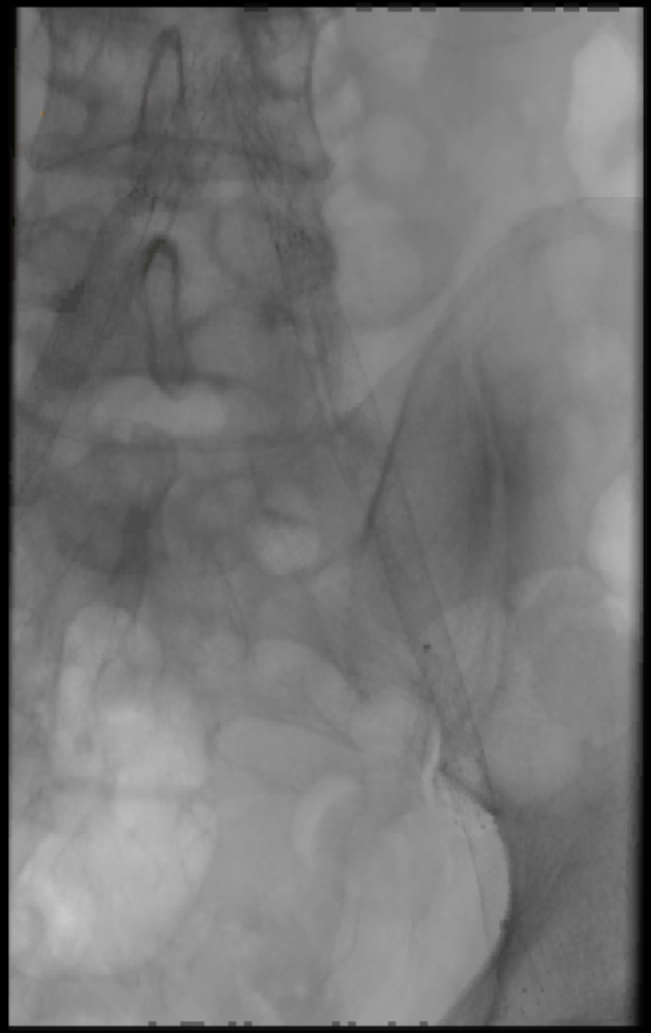

CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 3 - Frame 1 / 18
Centro Cardio Vascular de P.R y el Caribe
70kV, 95mAs
LAO -27.6°
L 553


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 6 - Frame 1 / 25
Centro Cardio Vascular de P.R y el Caribe
70kV, 49mAs
RAO 0.4°
L 563


CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 31 - Frame 1 / 70
Centro Cardio Vascular de P.R. y el Caribe
72kV, 635mA, 5s
LAO -0.2°
L 12B

CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 1 - Frame 1 / 14

Centro Cardio Vascular de PR y del Caribe
74kV, 128mAs



RAO 0.0°

L 509

CRUZ CASILLAS, ELIEZER, 86214, 8/16/1956, M
Run 4 - Frame 1 / 13

Centro Cardio Vascular de PR y del Caribe
70kV, 134mAs

RAO 0.5°

L 509