

How DOs are Saving Lives and Limbs! Impact of an Interdisciplinary Approach to Limb Salvage

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Atherosclerotic Disease is a Pan Vascular Process

Coronary Artery Disease (CAD)

Non-coronary Atherosclerosis

- **Peripheral Artery Disease (PAD)**
- Lower extremity
- Upper extremity (subclavian stenosis)

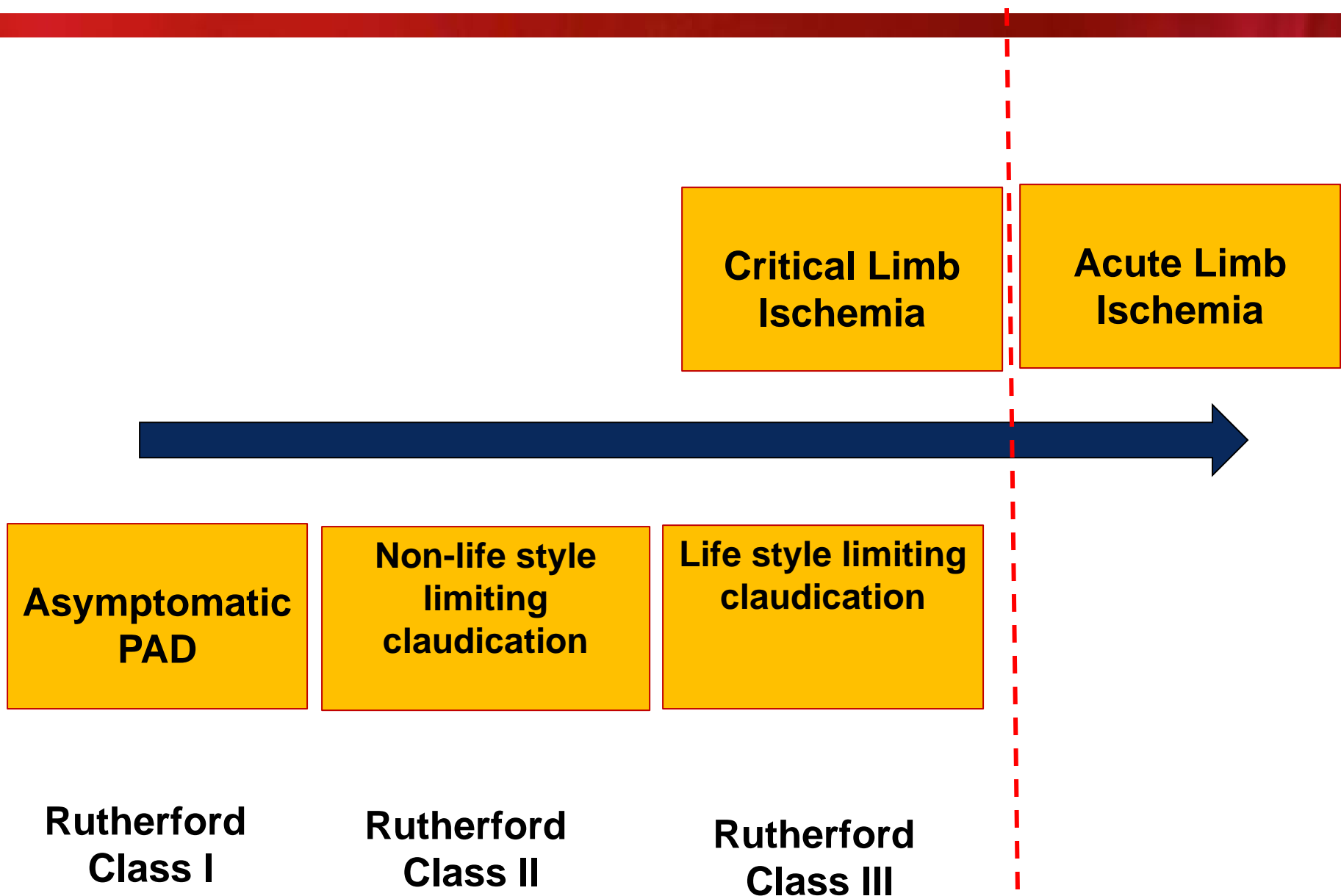
**Vascular disease is
there...**



**but it may need to be
discovered**

- Aortic aneurysm
- Vasculogenic Erectile Dysfunction





Intermittent Claudication



Recurring burning, aching, fatigue, or heaviness in the leg muscles with predictable level of walking, that resolves with a predictable duration of rest (< 10 minutes)

Simple Screening Tool for Claudication

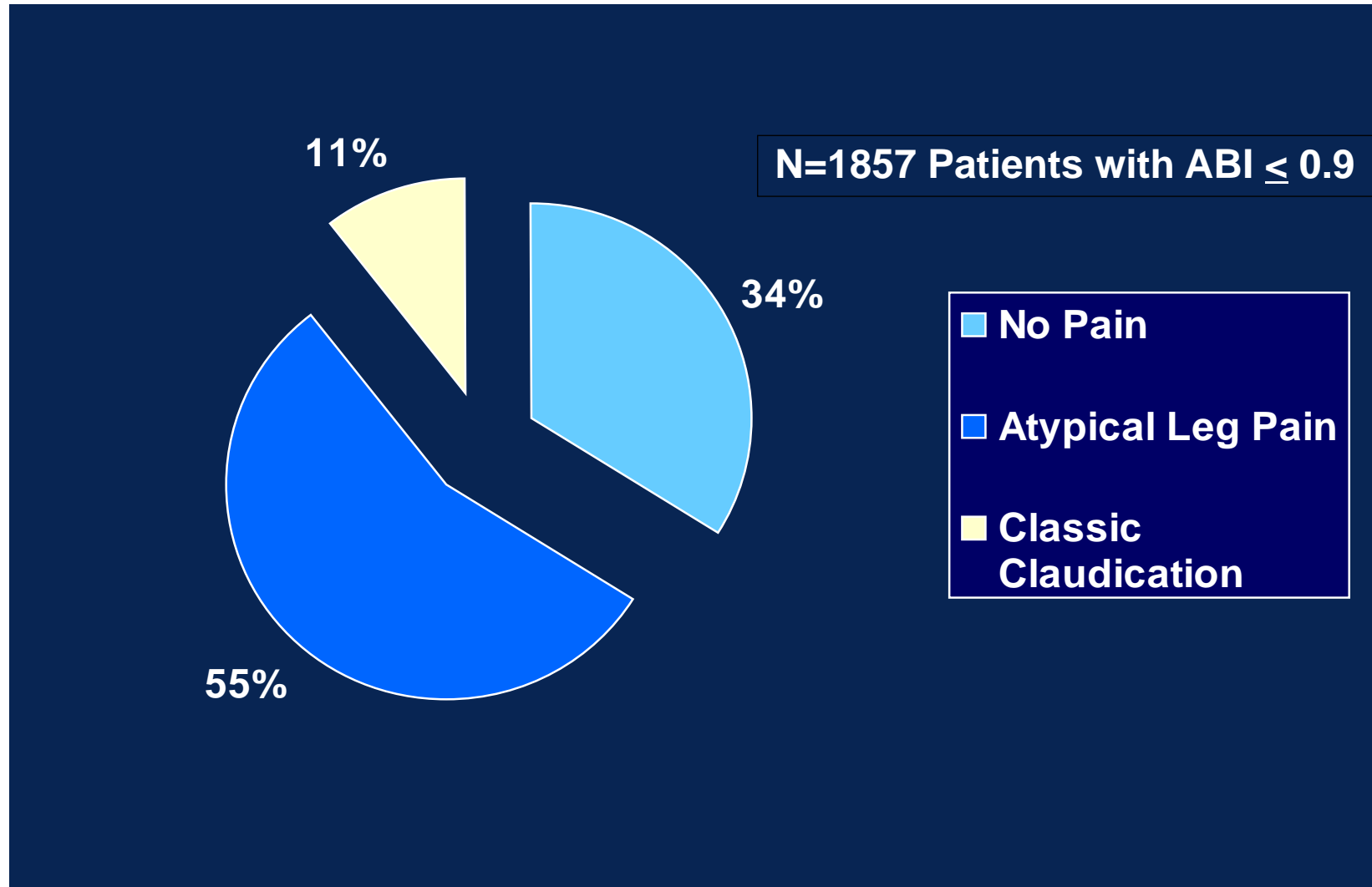
#1 Do you get pain in either leg when you walk?

#2 Does the pain go away when you stop walking (within 10 minutes)?

If answers are “Yes” to both questions, the likelihood of PAD is > 95%

Adapted from Rose, FA. Bulletin of the WHO. 1962;27:645

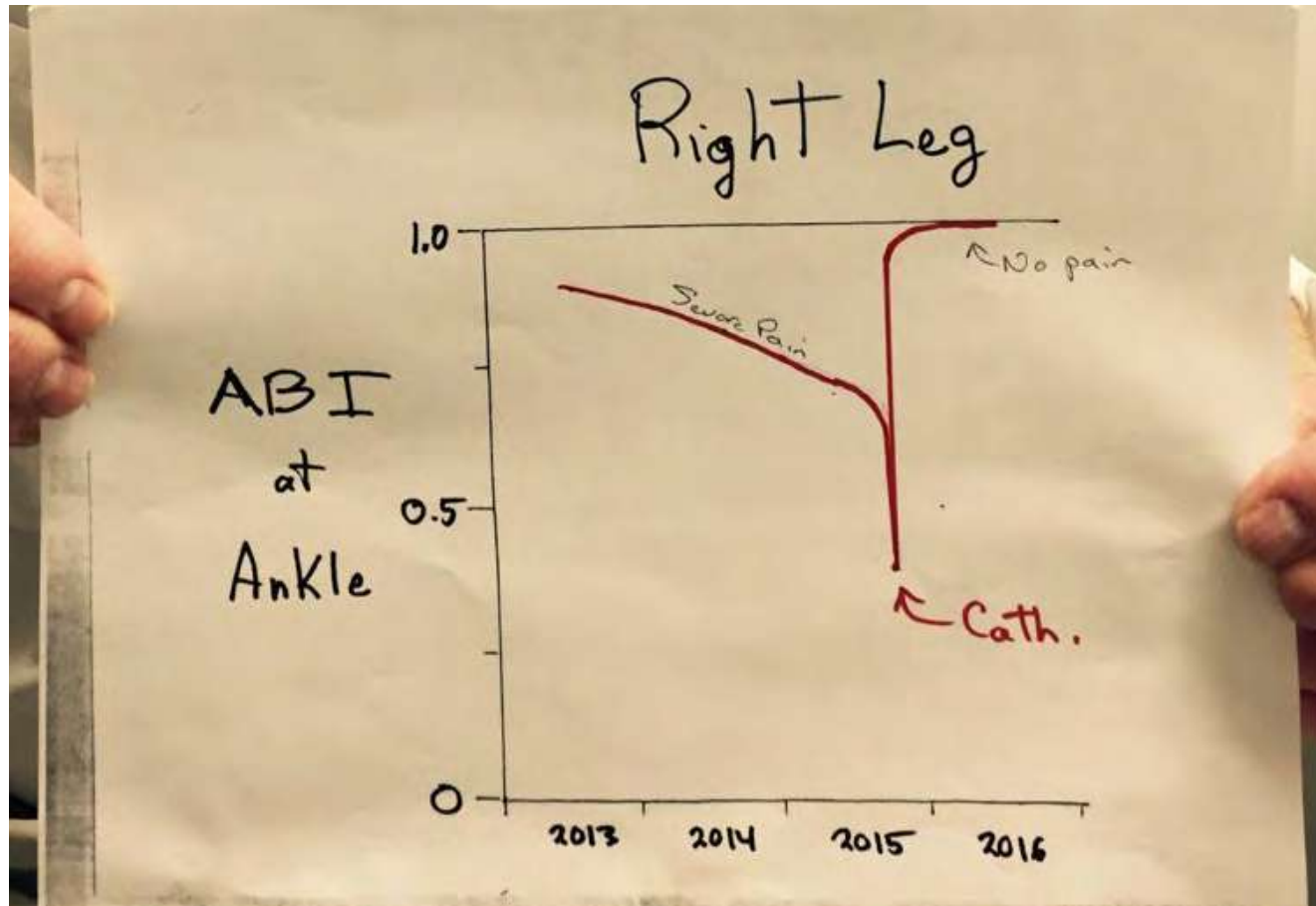
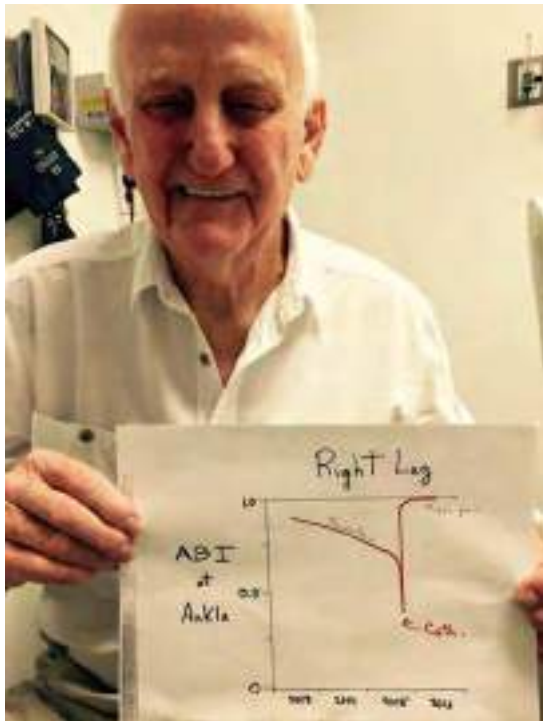
Claudication is the Exception Rather than the Rule: PARTNERS Study



Question?

69 yo male with know CAD presents with severe bilateral calf pain. An exercise ABI reveals severe PAD. After endovascular revascularizations 6 months ago he feels better. At this point you recommend?

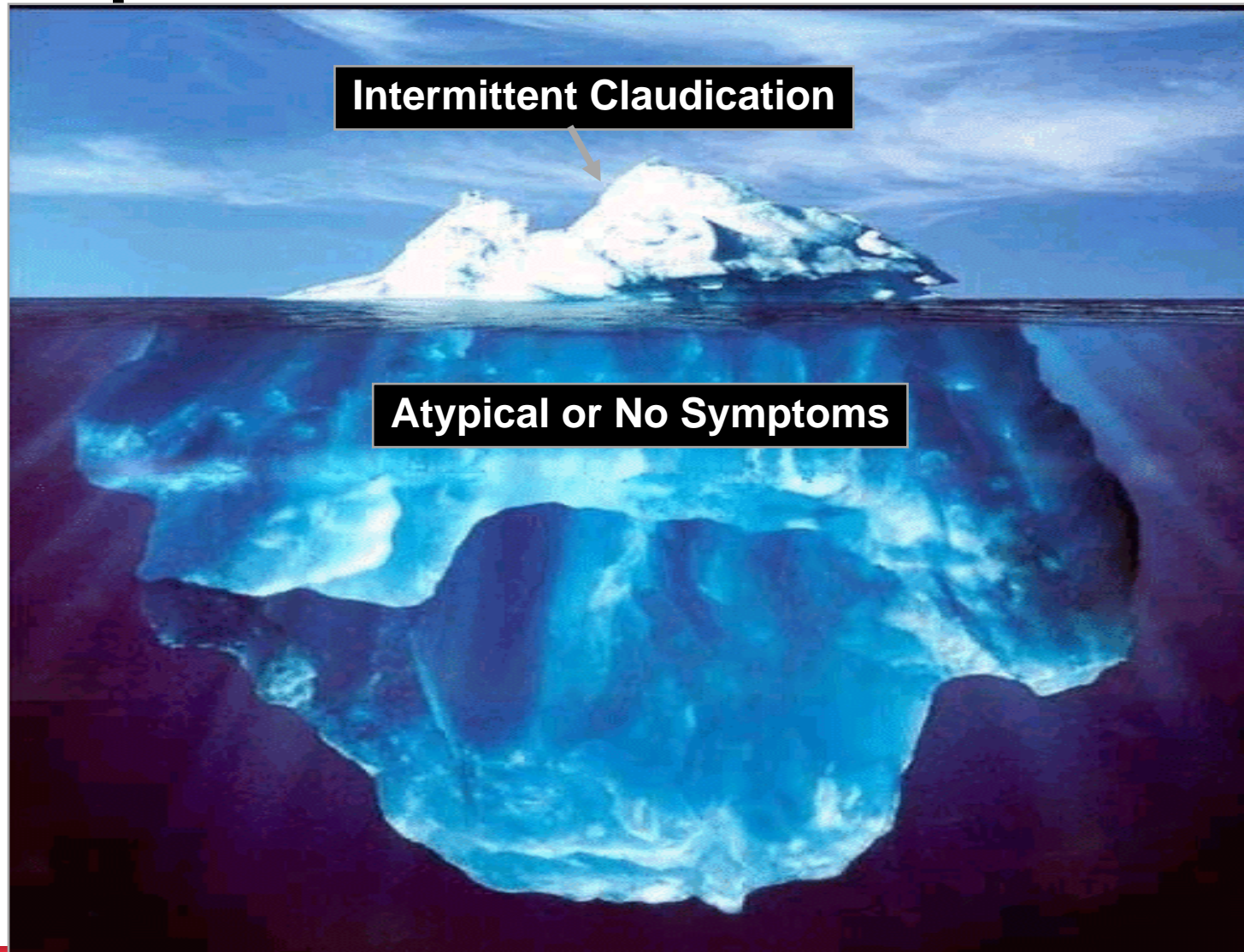
- a) Aspirin alone
- b) Aspirin plus high dose statin therapy
- c) Aspirin plus Ticagrelor
- d) Aspirin plus Clopidogrel
- e) Aspirin plus Cilostazol



4 major medical therapy recommendations to reduce CV events:

- Statins (Class I)
- Smoking cessation (Class I)
- Antiplatelet therapy (Class I)
- ACE inhibitors (Class IIa)
- Supervised exercise

Screening for Claudication Alone is Inadequate to Detect PAD

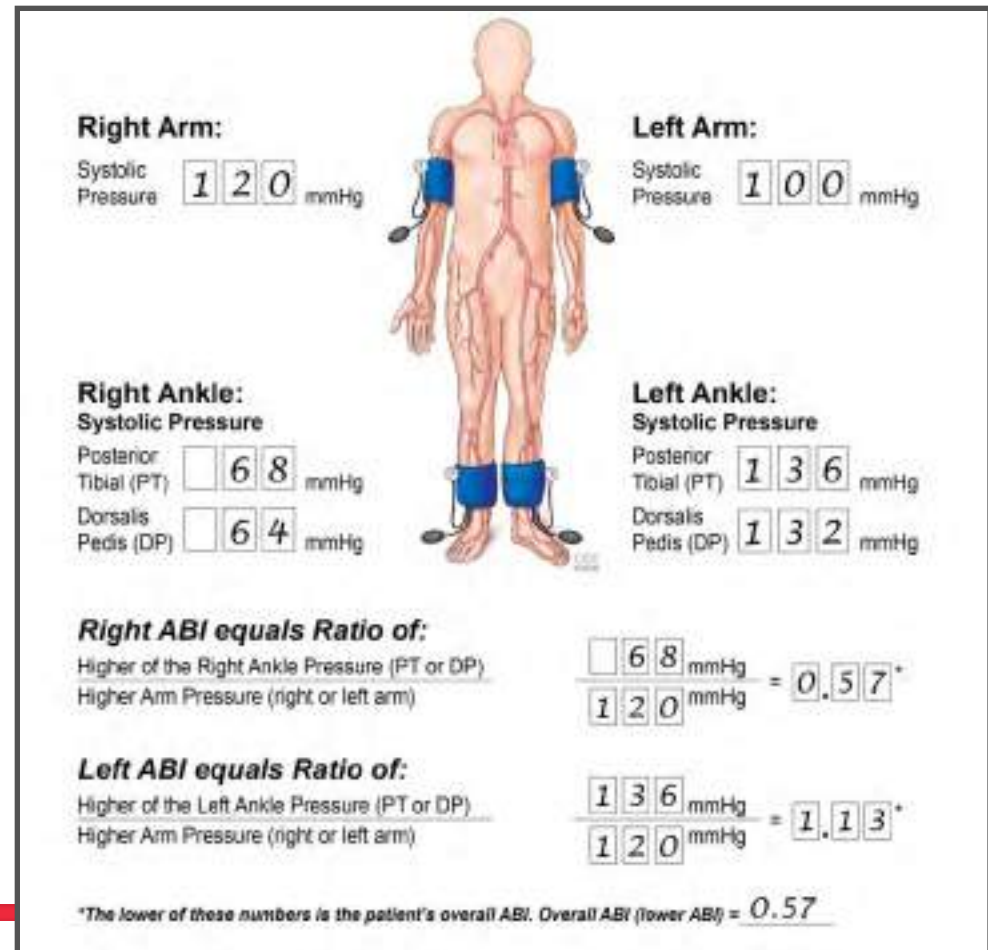


The Ankle-Brachial Index



$$\text{ABI} = \frac{\text{Ankle systolic pressure}}{\text{Brachial systolic pressure}}$$

- Cornerstone of PAD Diagnosis



Critical Limb Ischemia

- Rutherford 4-6
or
•Fontaine III, IV



Rest Pain

Tissue Loss or Gangrene

Critical Limb Ischemia

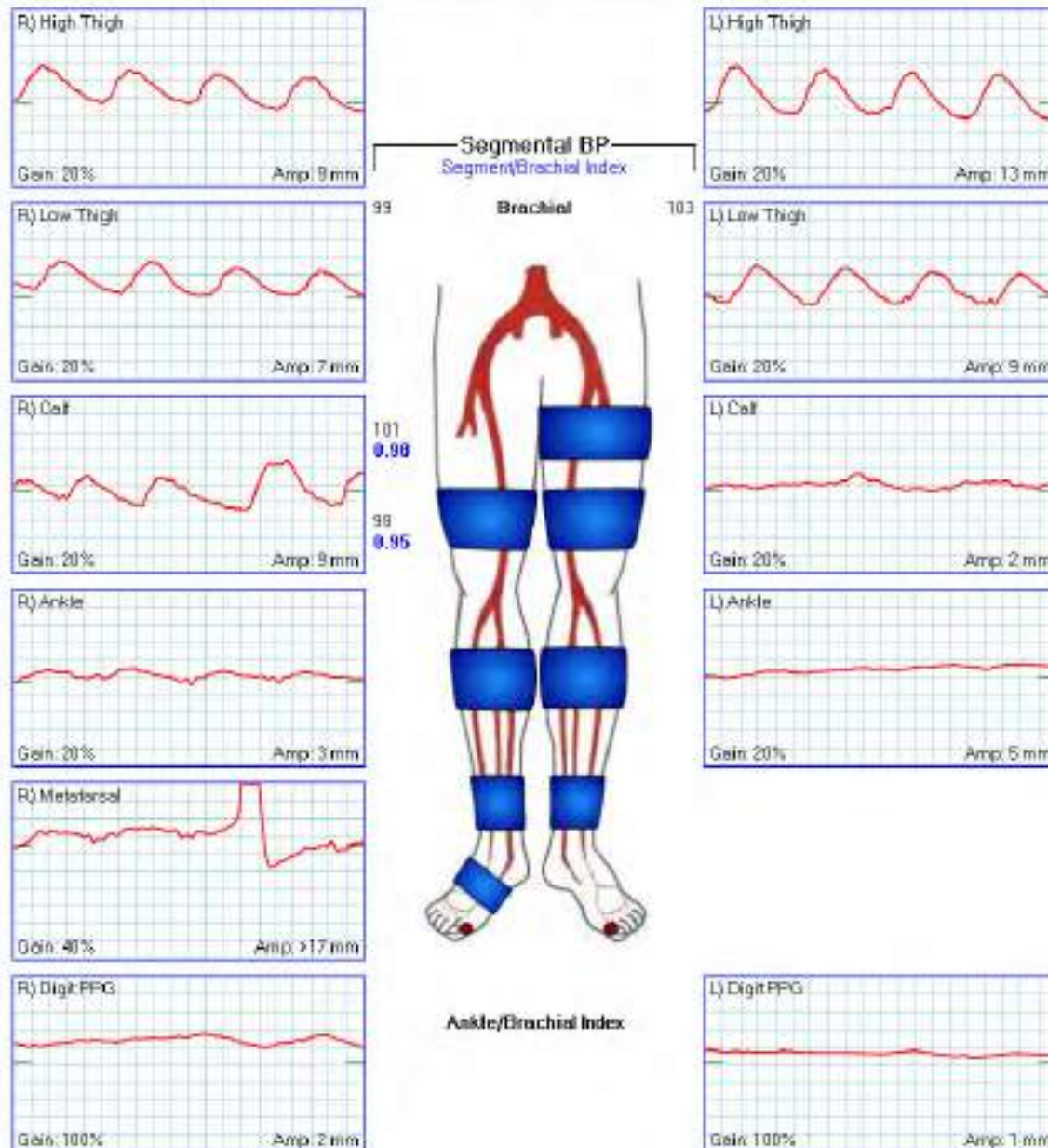


■ 68 year old man with ischemic cardiomyopathy, CHF, MI, A-fib, CAD s/p CABG x 4, and mitral valve disease presented with painful ulcers on the L foot for 2 years



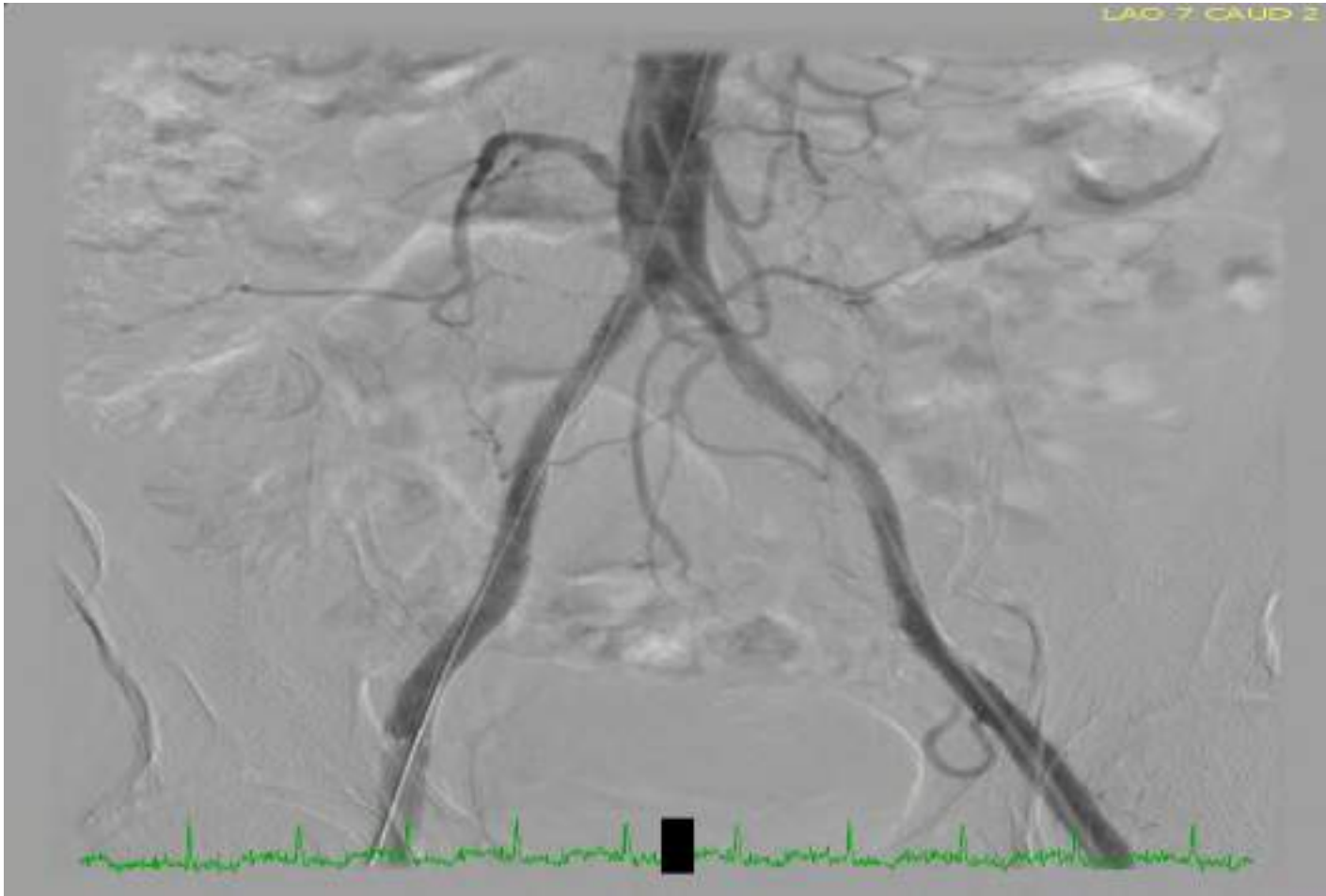
■ Pain attributed to multifactorial lower extremity edema

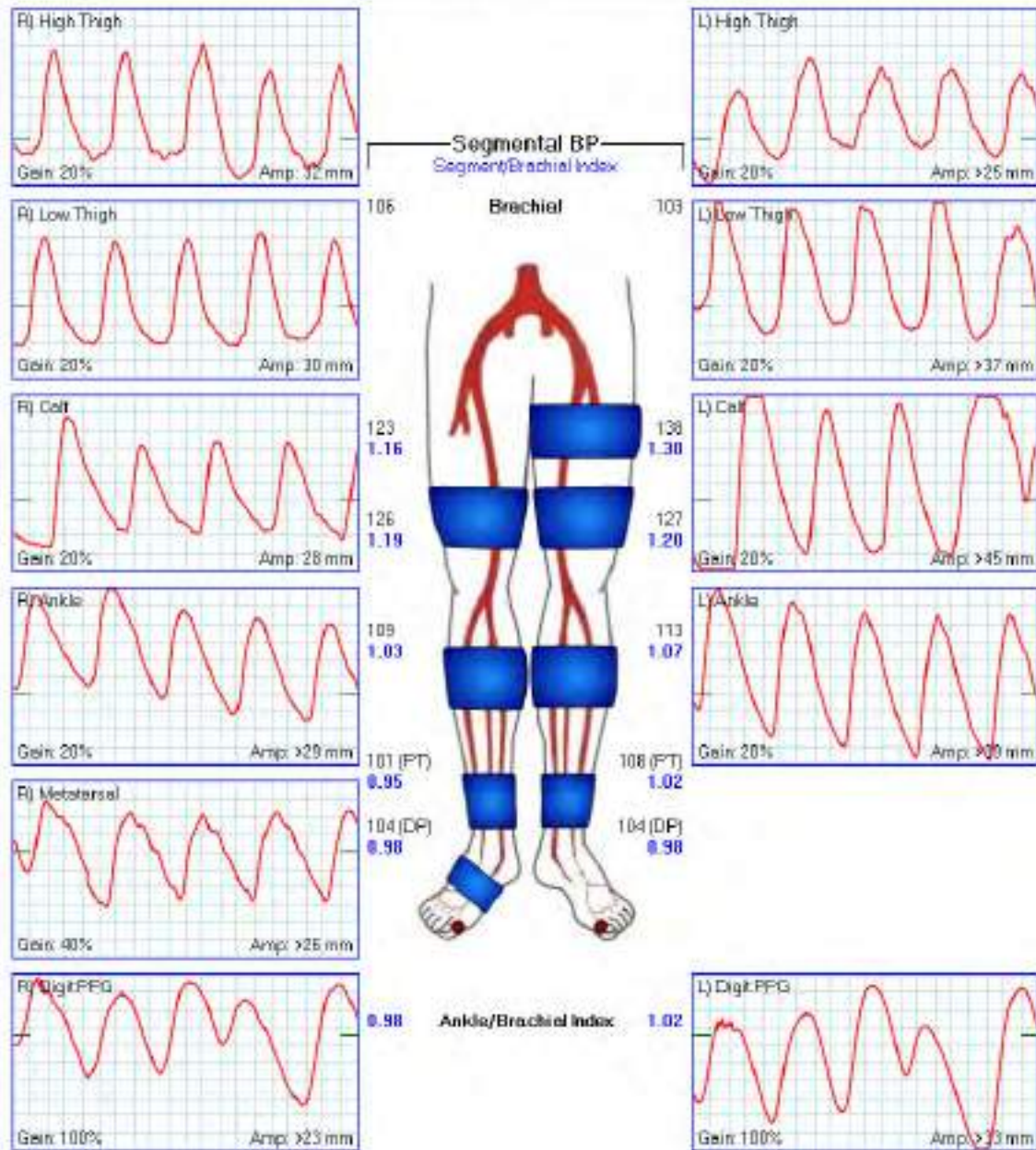
■ On exam, cool skin temperature and absent pulses





Aortoiliac Reconstruction





Always Assume There is an Underlying Arterial Component



Critical Limb Ischemia (CLI)



Knowledge

Nationwide Trends of Hospital Admission and Outcomes Among Critical Limb Ischemia Patients During 2003–2011

Shikhar Agarwal, MD, MPH, Karan Sud, MD, Mehdi H. Shishehbor, DO, MPH, PhD

RESULTS We included a total of 642,433 admissions with CLI across 2003 to 2011. The annual rate of CLI admissions has been relatively constant across 2003 to 2011 (~150 per 100,000 people in the United States). There has been a

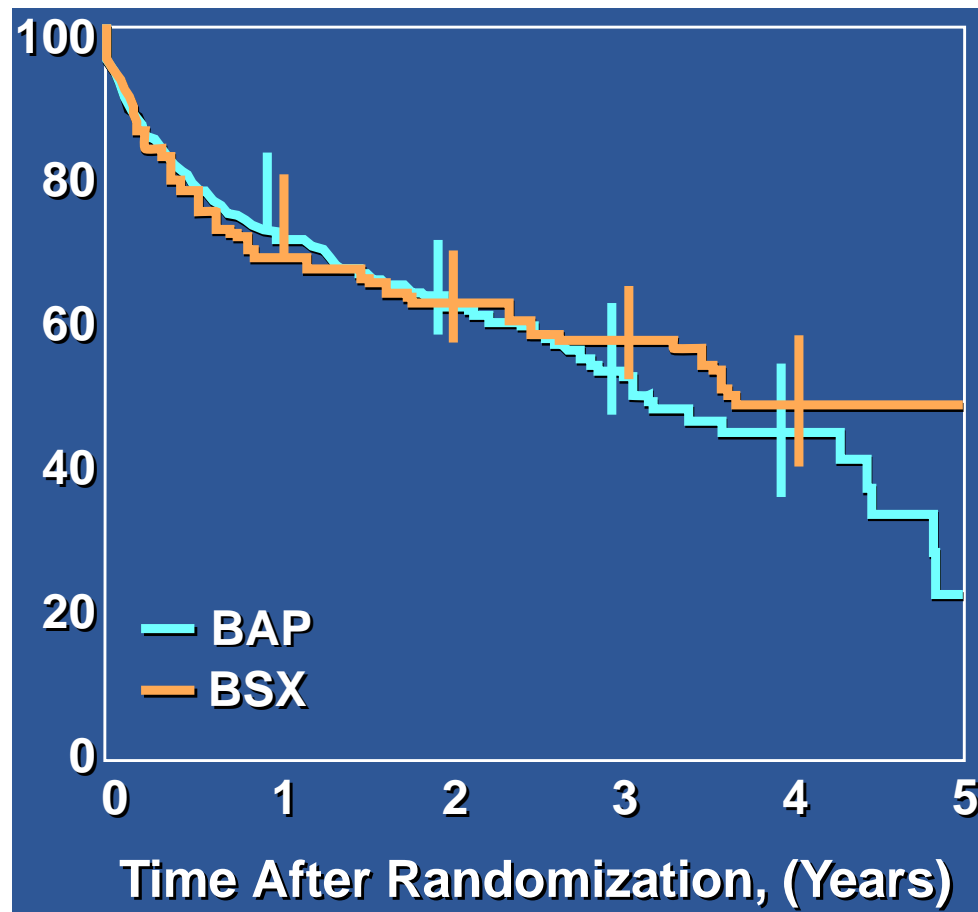
642,433 patients with CLI

Very Sick Group of Patients

TABLE 1 Trend of Cardiovascular Risk Factors in the Study Cohort Across 2003 to 2011

Year	Hypertension	Obesity	Diabetes	Chronic Kidney Disease	Prior Amputation
2003	59.3	4.6	50.8	20.7	11.5
2004	61.2	5.1	50.1	21.4	12.3
2005	62.2	5.5	49.8	23.2	11.3
2006	65.5	6.6	50.5	30.2	12.3
2007	66.1	7.8	52.3	31.7	12.2
2008	69.7	9.9	52.2	31.3	12.6
2009	71.4	11.7	54.1	34.8	16.2
2010	73.0	12.3	54.3	36.0	16.2
2011	75.2	15.0	56.7	37.8	17.8

CLI is a Deadly Disease



Bypass versus angioplasty in severe ischaemia of the leg (BASIL): multicentre, randomised controlled trial



BASIL trial participants*

CLI is Associated with the Highest Rates of Readmission

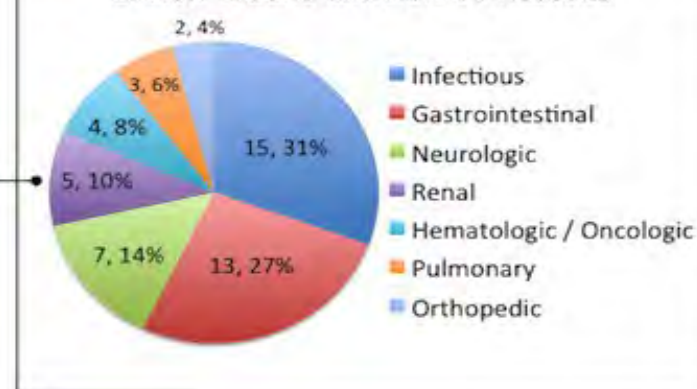
46.5%
READMIT IN 90-
DAYS POST
DISCHARGE*

\$15K
INPATIENT
HOSPITAL SPEND
PER
READMISSION*

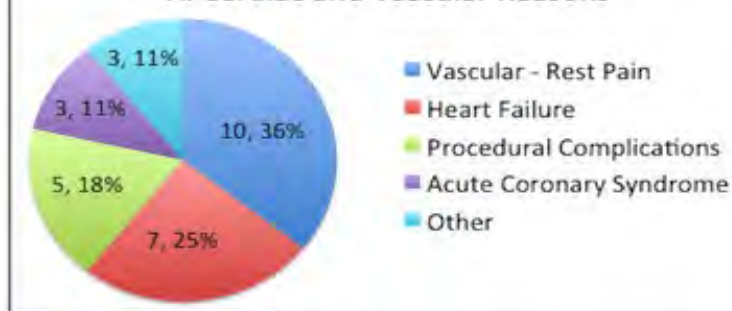
Reason for Readmission, All Patients



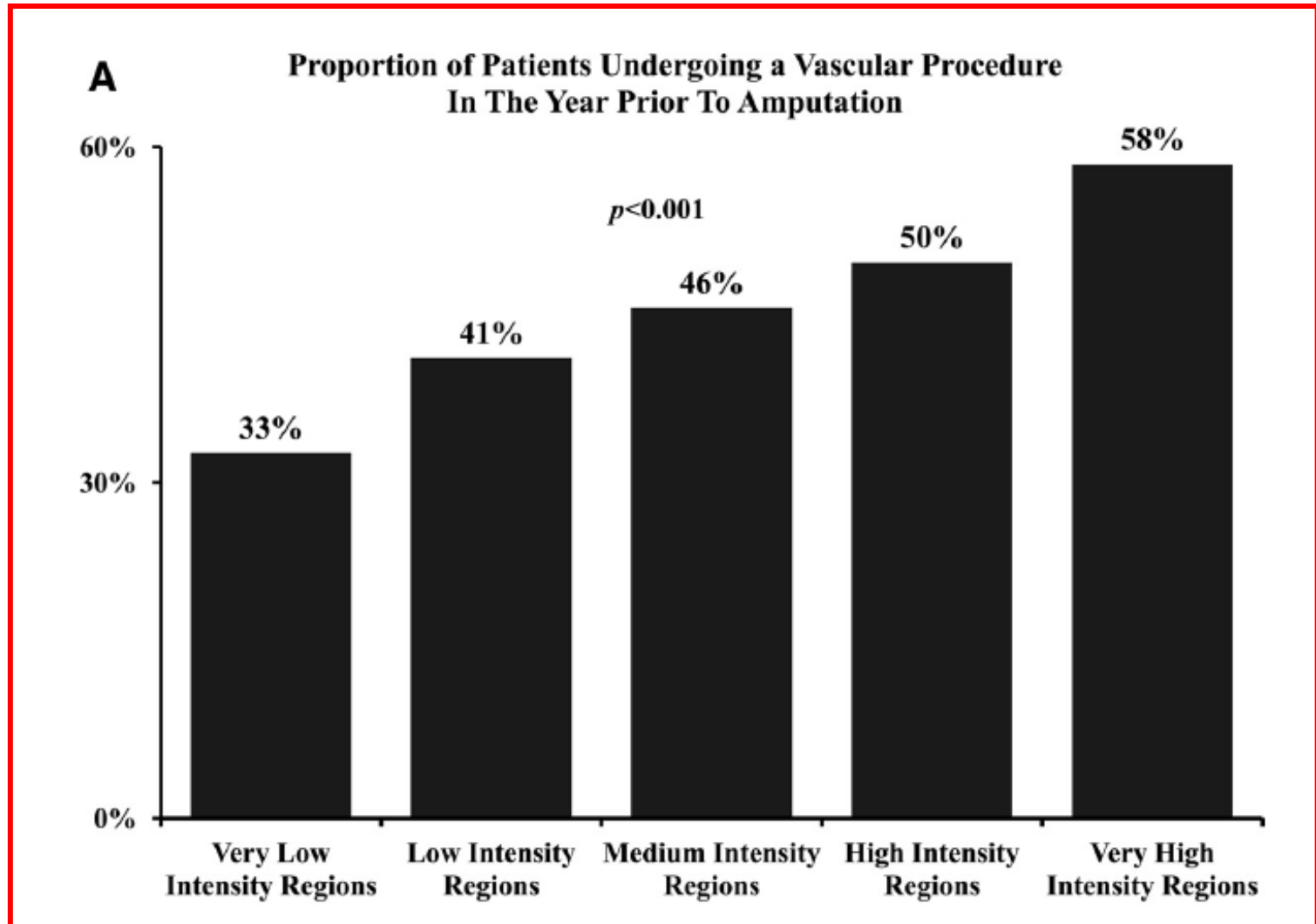
B. Non-Wound and Non-CV Reasons



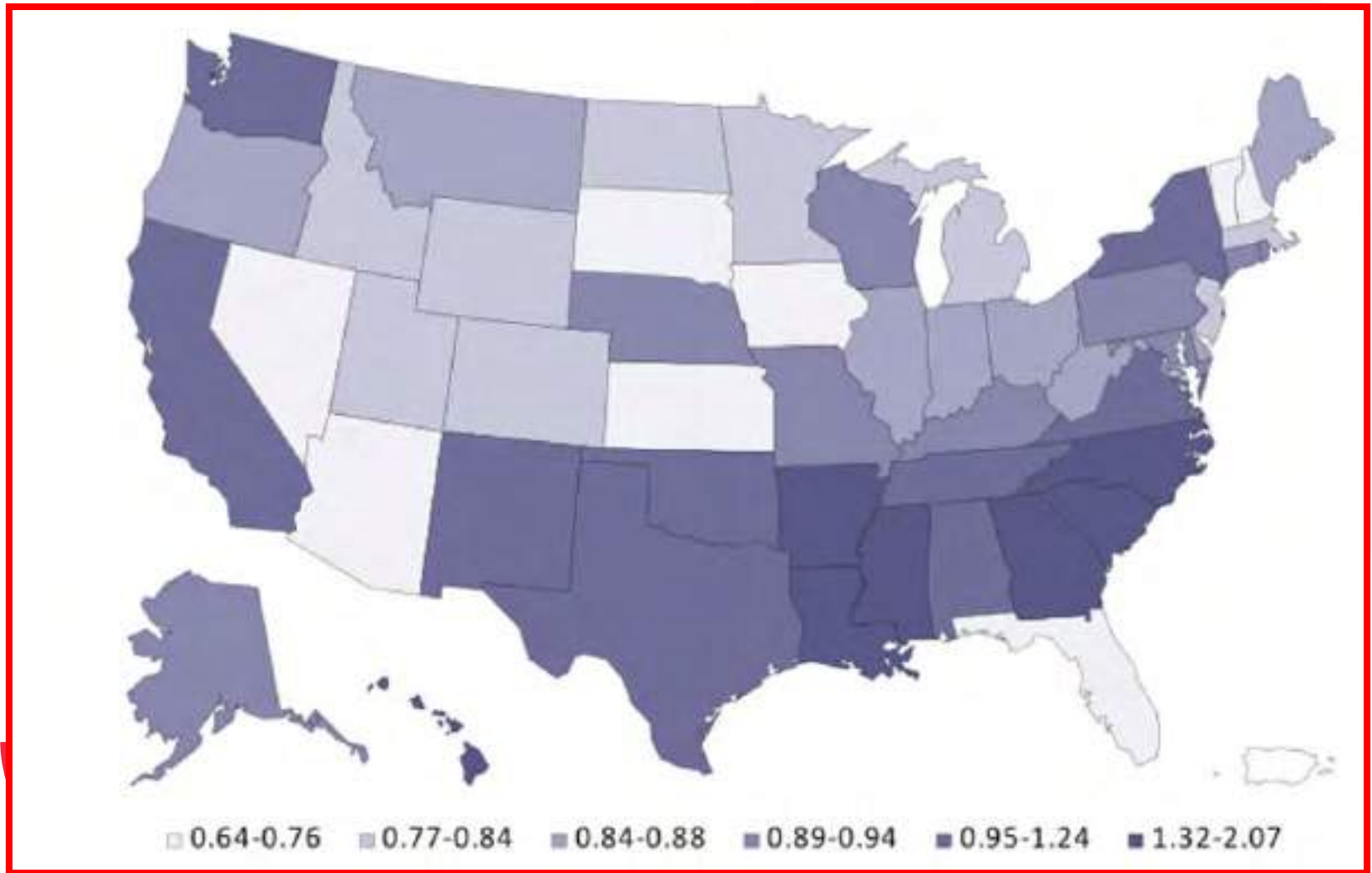
A. Cardiac and Vascular Reasons



CLI is Extremely Under Treated



Significant Disparities in Outcomes (Amputations)

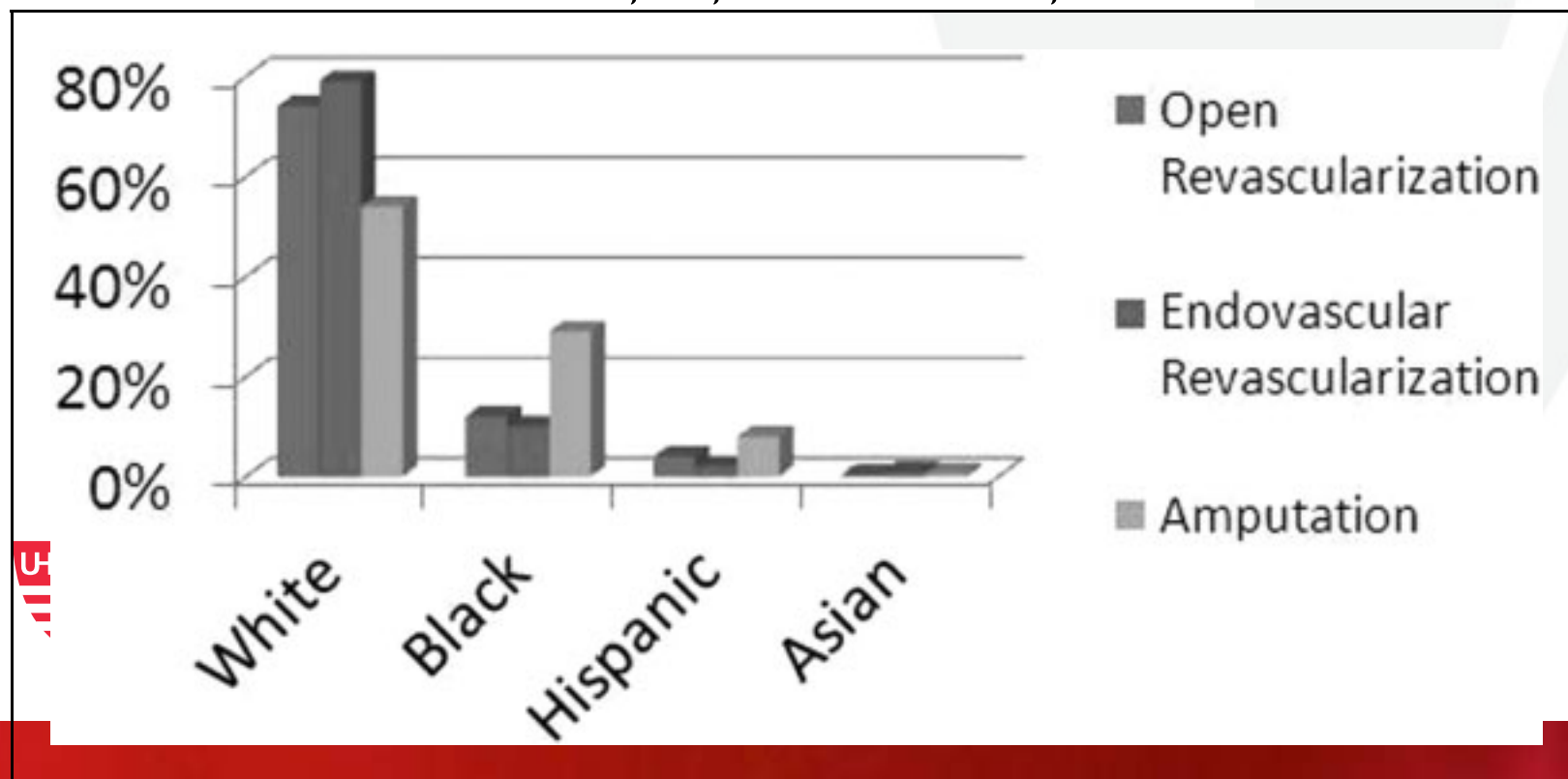


Racial/Ethnic Disparities in Revascularization for Limb Salvage: An Analysis of the National Surgical Quality Improvement Program Database

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DOI: 10.1177/1538574414543276
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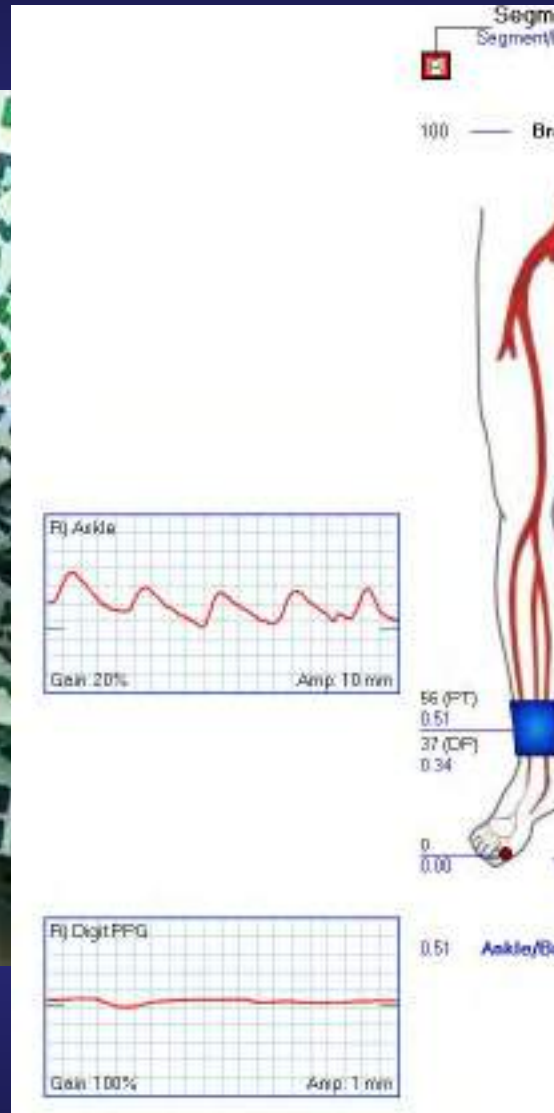


Kakra Hughes, MD, FACS¹, Christopher Boyd, MD¹,
Tolulope Oyetunji, MD¹, Daniel Tran, MD¹, David Chang, MD²,
David Rose, MD¹, Suryanarayan Siram, MD¹,
Edward Cornwell III, MD¹, and Thomas Obisesan, MD³



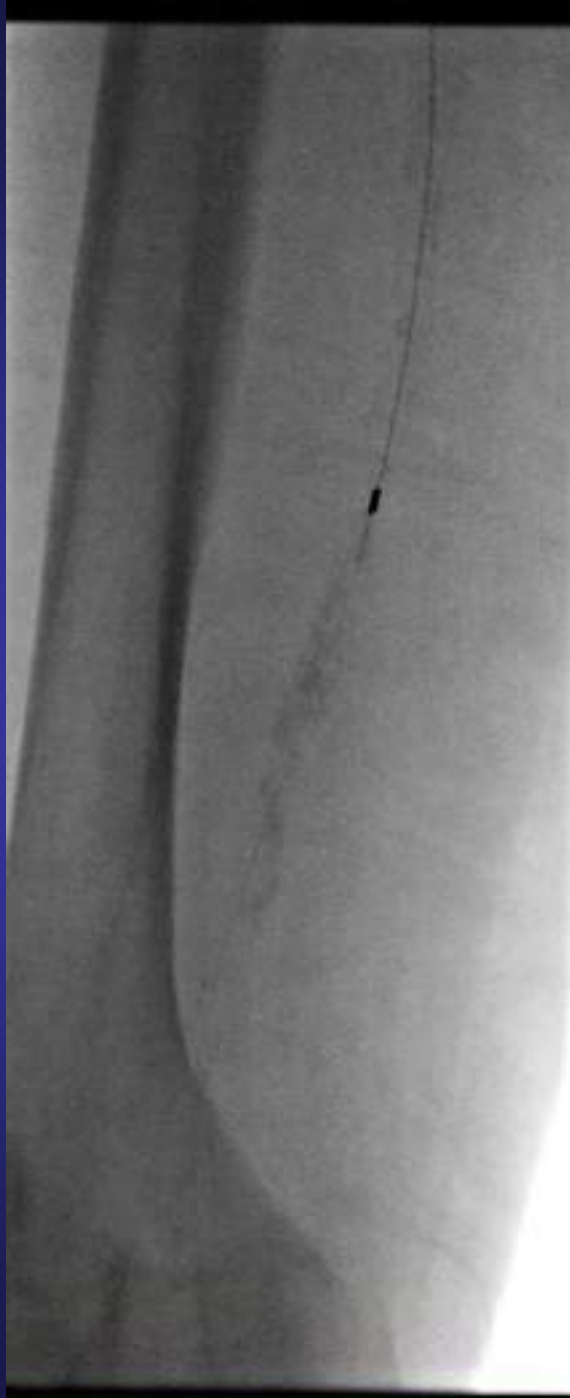
Technique

96 years old with right foot ulcers



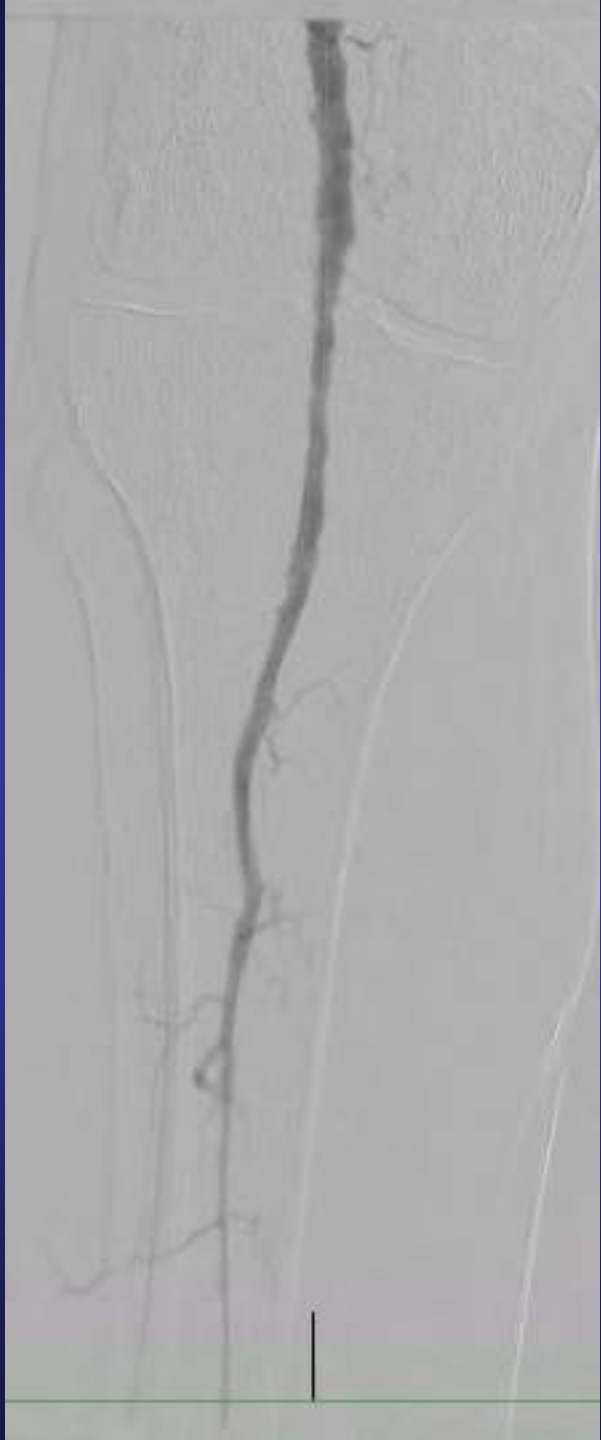
96 years old with right foot ulcers



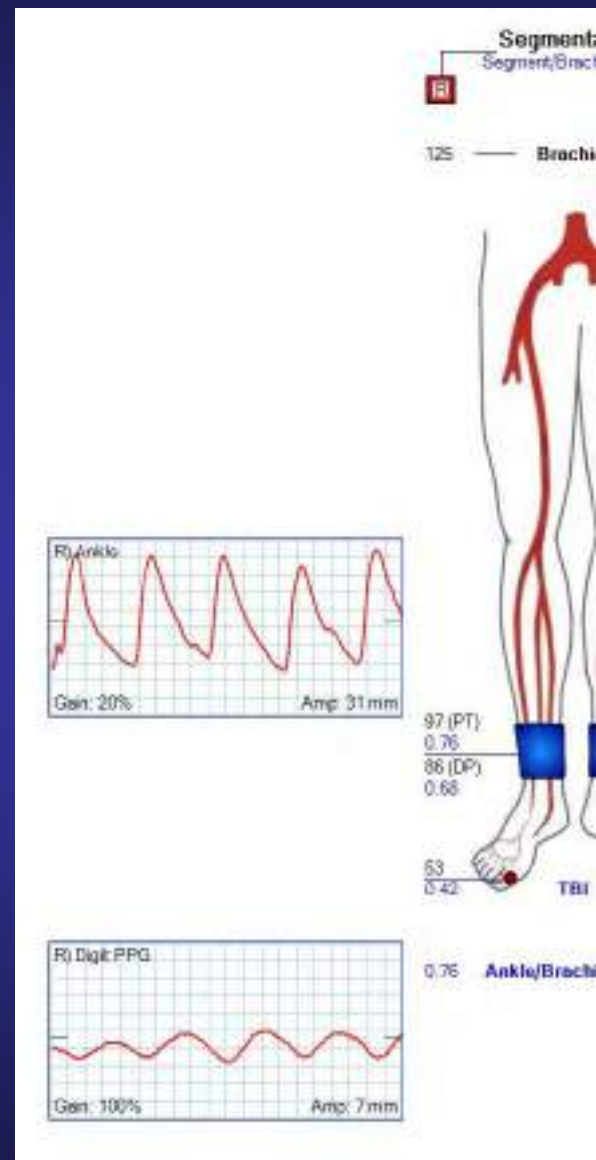
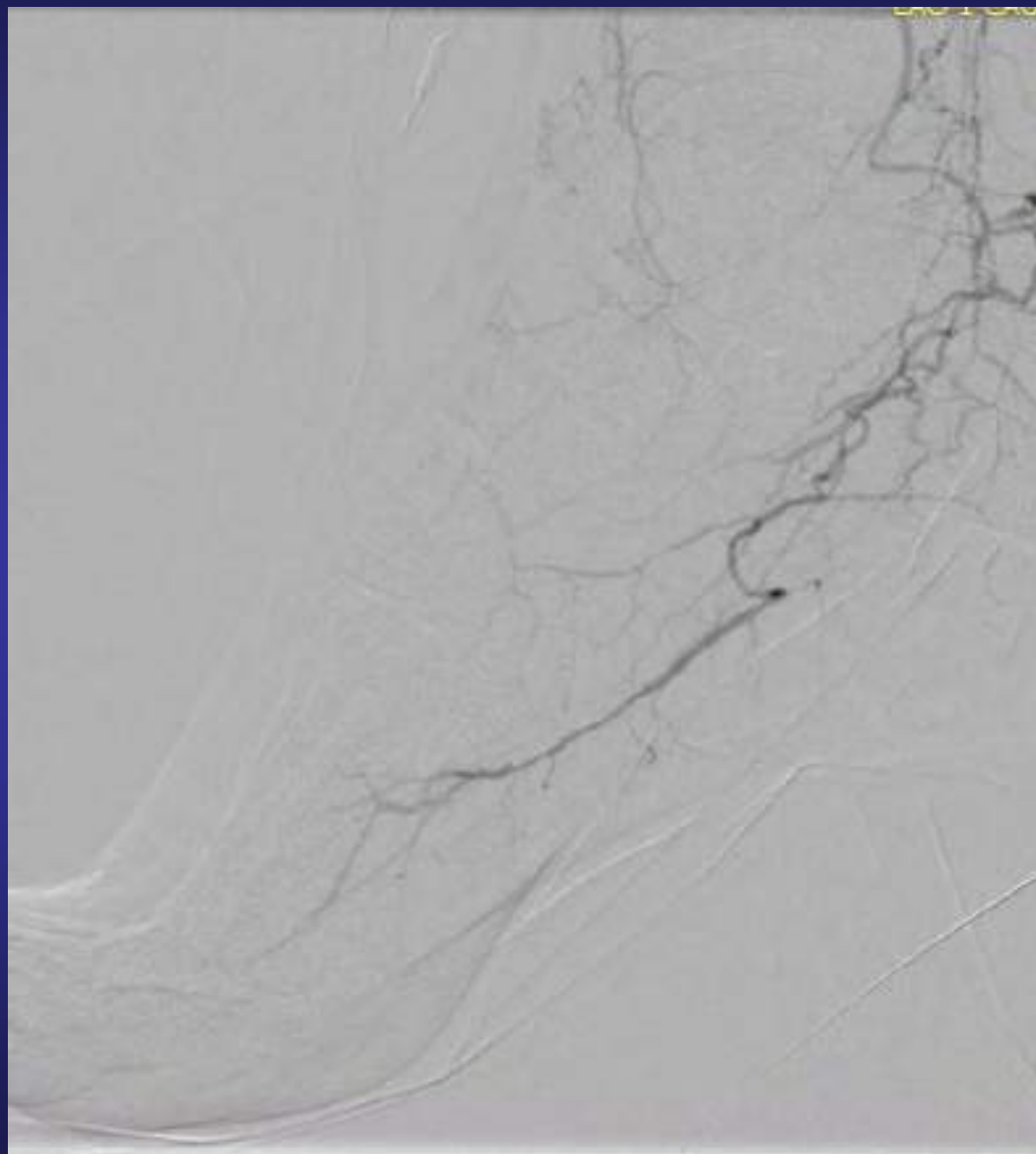


LA







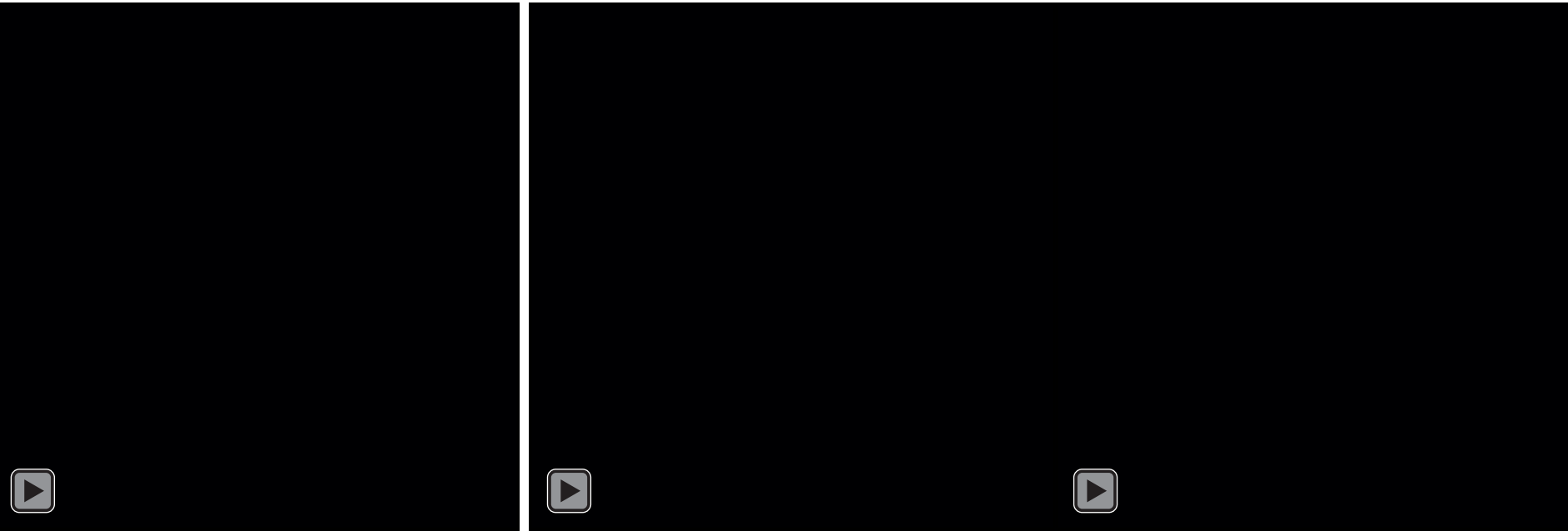




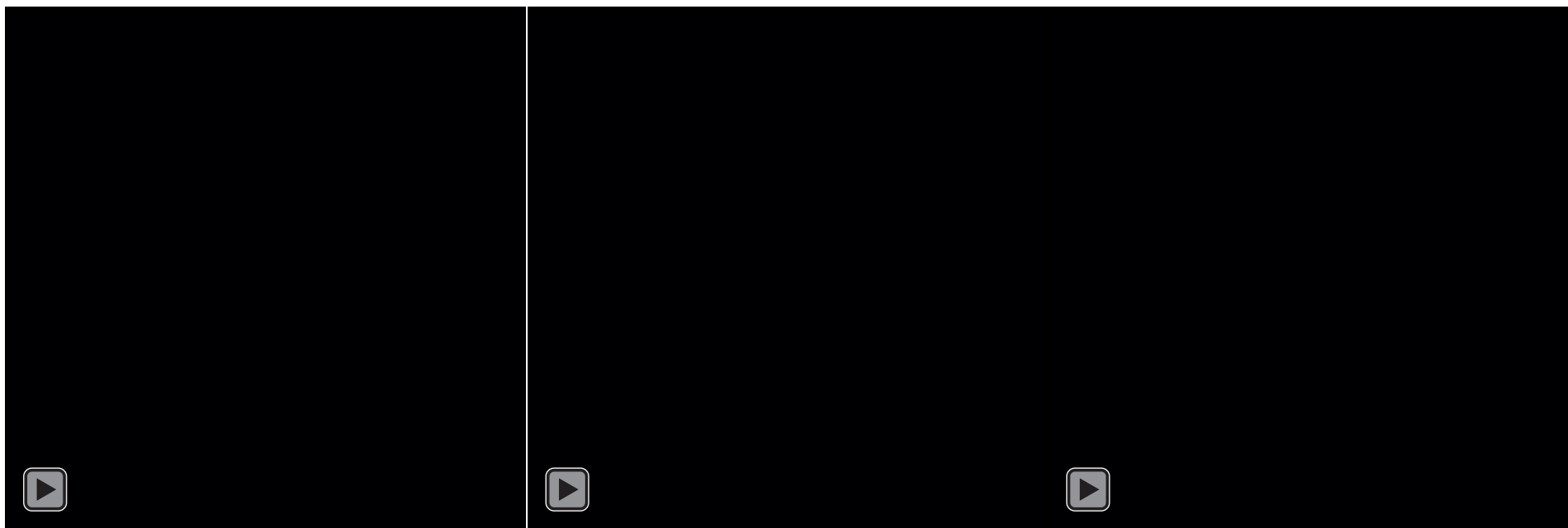
Devices

- 59 y/o female with PAD, **churg-strauss syndrome**, prior **LLE BKA**. She was doing well until recently. She developed an ulcer on the right 2nd and right great toe since September 2017.
- Follows with podiatrist who referred for evaluation prior to intervention on the right 2ed and great toes.

RLE Angiogram 1/24/2018



RLE Angiogram 1/24/2018



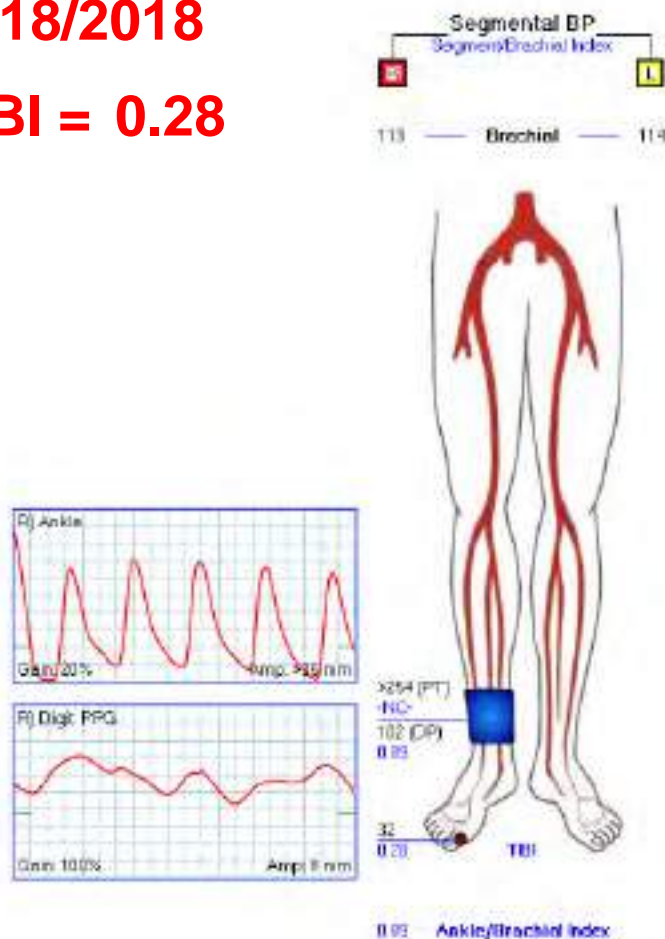
Right PT angioplasty.
Unsuccessful revascularization of the pedal arteries.

1/18/2018



1/18/2018

TBI = 0.28



2/15/2018



2/15/2018

- Continues to have pain and non healing ischemic ulcers of the right foot that were worsening.
- Patient is taking vicodin for pain.

LimFlow Procedure for limb salvage 4/11/2018

Pre LimFlow



Post LimFlow

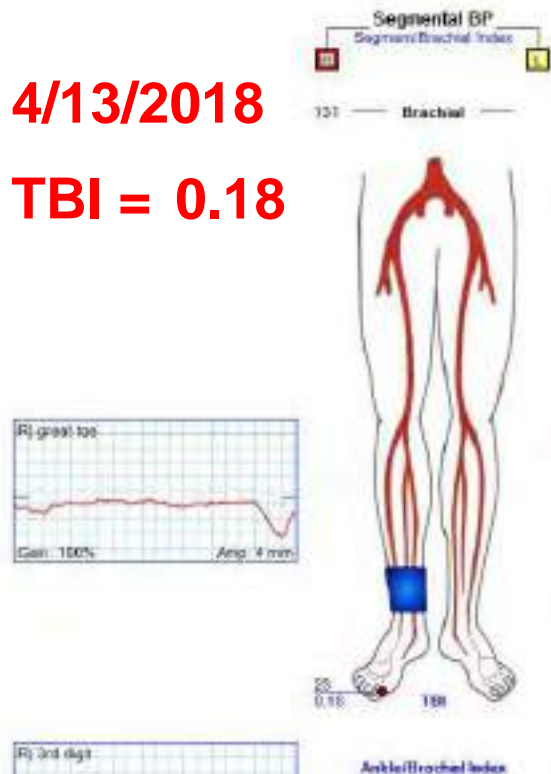


Pre LimFlow



4/13/2018

TBI = 0.18

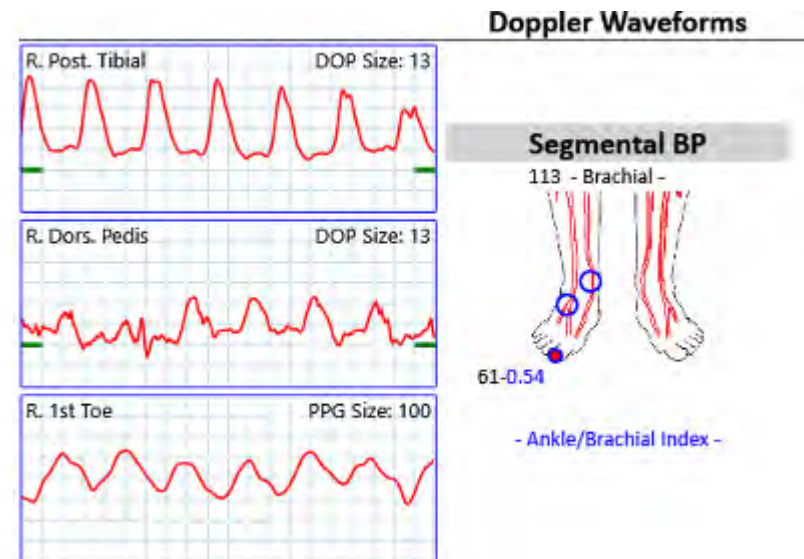


Post LimFlow



11/27/2018

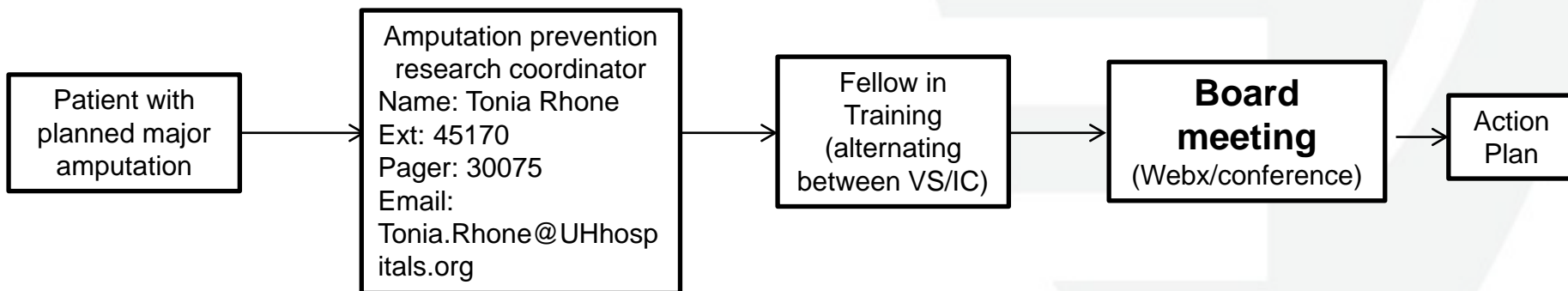
TBI = 0.54



Commitment and Passion

Limb Salvage Advisory Council

Multidisciplinary Team: Vascular Medicine,
Vascular Surgery, Podiatry, Wound Care,
Interventional Cardiology





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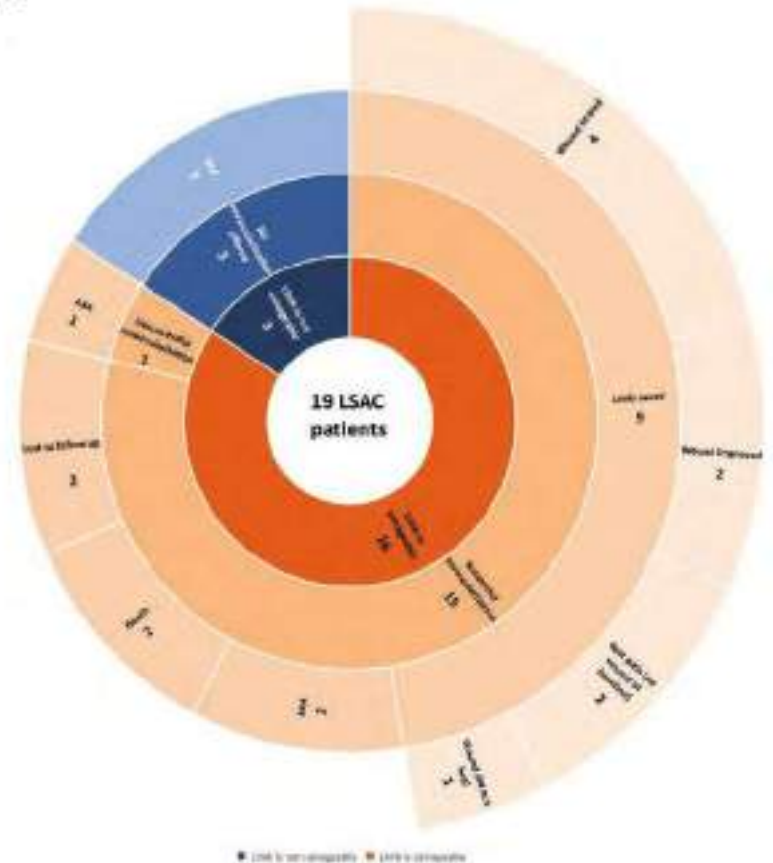
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RESEARCH LETTER

Impact of Interdisciplinary System-Wide Salvage Advisory Council on Lower Limb Major Amputation

Mehdi H. Shishehbor, DO, MPH, PhD; Tarek A. Hammad, MD; Tonia J. Rhone, MS; Ahmad Your Norman Kumins, MD; Abdullah Abdullah , MD; Jun Li, MD; Karem Harth, MD; Teresa L. Carmichael, MD; Heather L. Gornik, MD; Peter J. Pronovost, MD, PhD; Vikram Kashyap , MD

Panel B



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In launching a successful interdisciplinary limb salvage team, a culture of patient-centered cooperation and education, is essential, with mutual trust and respect among various specialties, rather than competition and judging. Using CPT codes, we identified 80 patients with CLTI on whom LSAC was not activated and underwent major amputation during the same time period.



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Thank you!
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