

The Angiosome Approach to Critical Limb Ischemia

Mehdi H. Shishehbor, DO, MPH

Director, Endovascular Services

Staff, Interventional Cardiology and Vascular Medicine



Cleveland Clinic

Disclosure

**Education and Consulting for Abbott
Vascular, Medtronic, Bard, and
Spectranetics but **do not** take any
Compensation**

Will be discussing Off-label products

Critical Limb Ischemia

- Rutherford 4-6
or
- Fontaine III, IV



Rest Pain



Tissue Loss or Gangrene

Hemodynamic Definition

- **Ankle pressure < 50-70 mm Hg**
 - **ABI < 0.4**
- **Reduced toe pressure (<30-50 mm Hg)**
- **Reduced TCPO₂ (<30-50 mm Hg)**



Inter-Society Consensus for the Management of PAD

Recommendation 24. Optimal treatment for patients with critical limb ischemia (CLI)

- Revascularization is the optimal treatment for patients with CLI [B].

ACC/AHA GUIDELINES

ACC/AHA Guidelines for the Management of Patients With Peripheral Arterial Disease (Lower Extremity, Renal, Mesenteric, and Abdominal Aortic)

4. The tibial or pedal artery that is capable of providing continuous and uncompromised outflow to the foot should be used as the site of distal anastomosis.
(Level of Evidence: B)



ATA Angiosome



PTA Angiosome



PA Angiosome

Selective Primary Angioplasty Following an Angiosome Model of Reperfusion in the Treatment of Wagner 1–4 Diabetic Foot Lesions: Practice in a Multidisciplinary Diabetic Limb Service

Vlad-Adrian Alexandrescu, MD¹; Gerard Hubermont, MD²; Yvan Philips, MD²; Benoit Guillaumie, MD¹; Christian Ngongang, MD¹; Pierre Vandebossche, MD³;

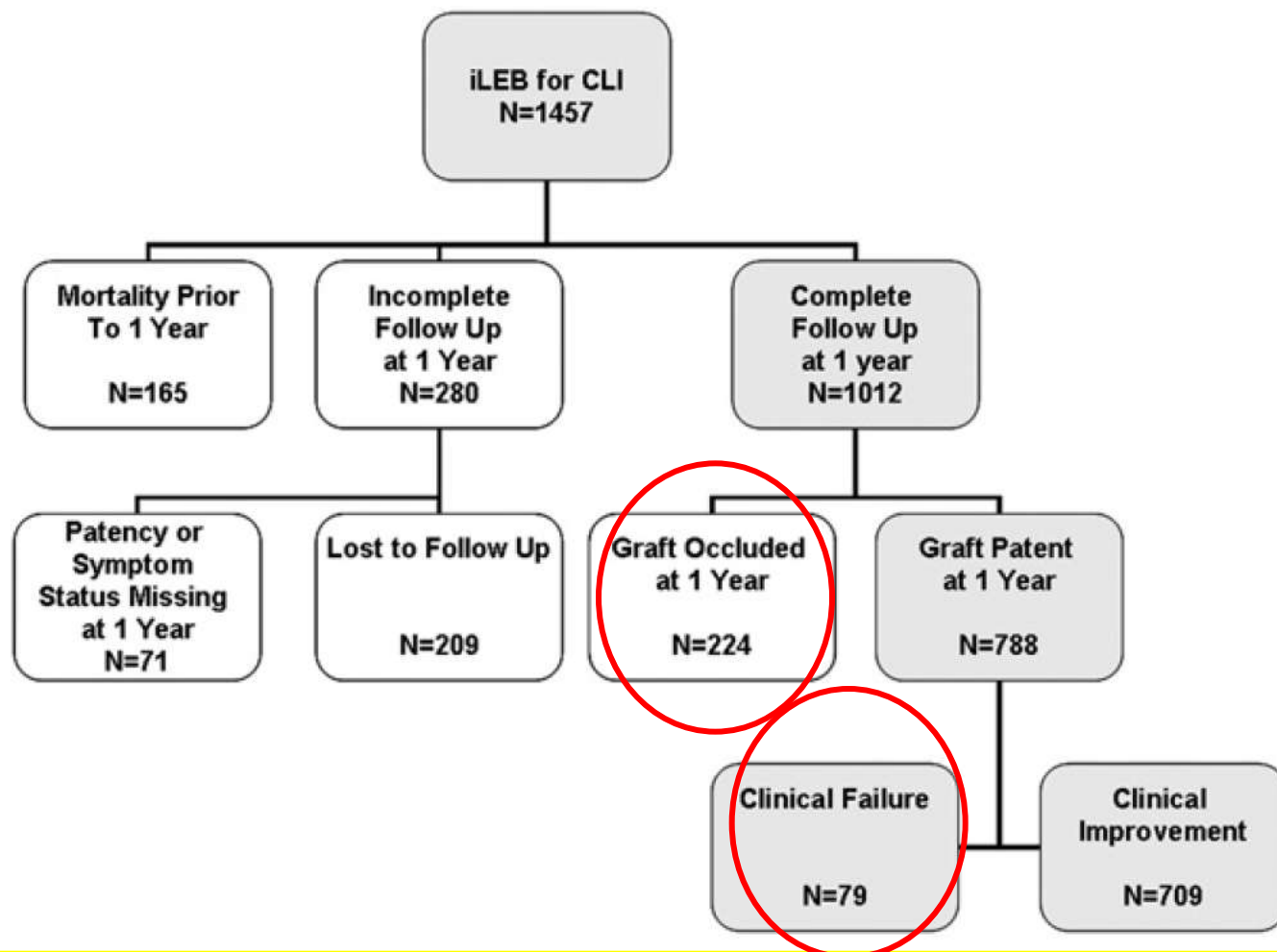
Revascularization of a Specific Angiosome for Limb Salvage: Does the Target Artery Matter?

Richard F. Neville,¹ Christopher E. Attinger,² Erwin J. Bulan,² Ivica Ducic,² Michael Thomassen,² and Anton N. Sidawy,³ Washington, D.C.

Method of Revascularization	Appropriate Angiosome	Boundary Angiosome
Endovascular	83%	59%
Bypass	91%	62%

Failure to achieve clinical improvement despite graft patency in patients undergoing infrainguinal lower extremity bypass for critical limb ischemia

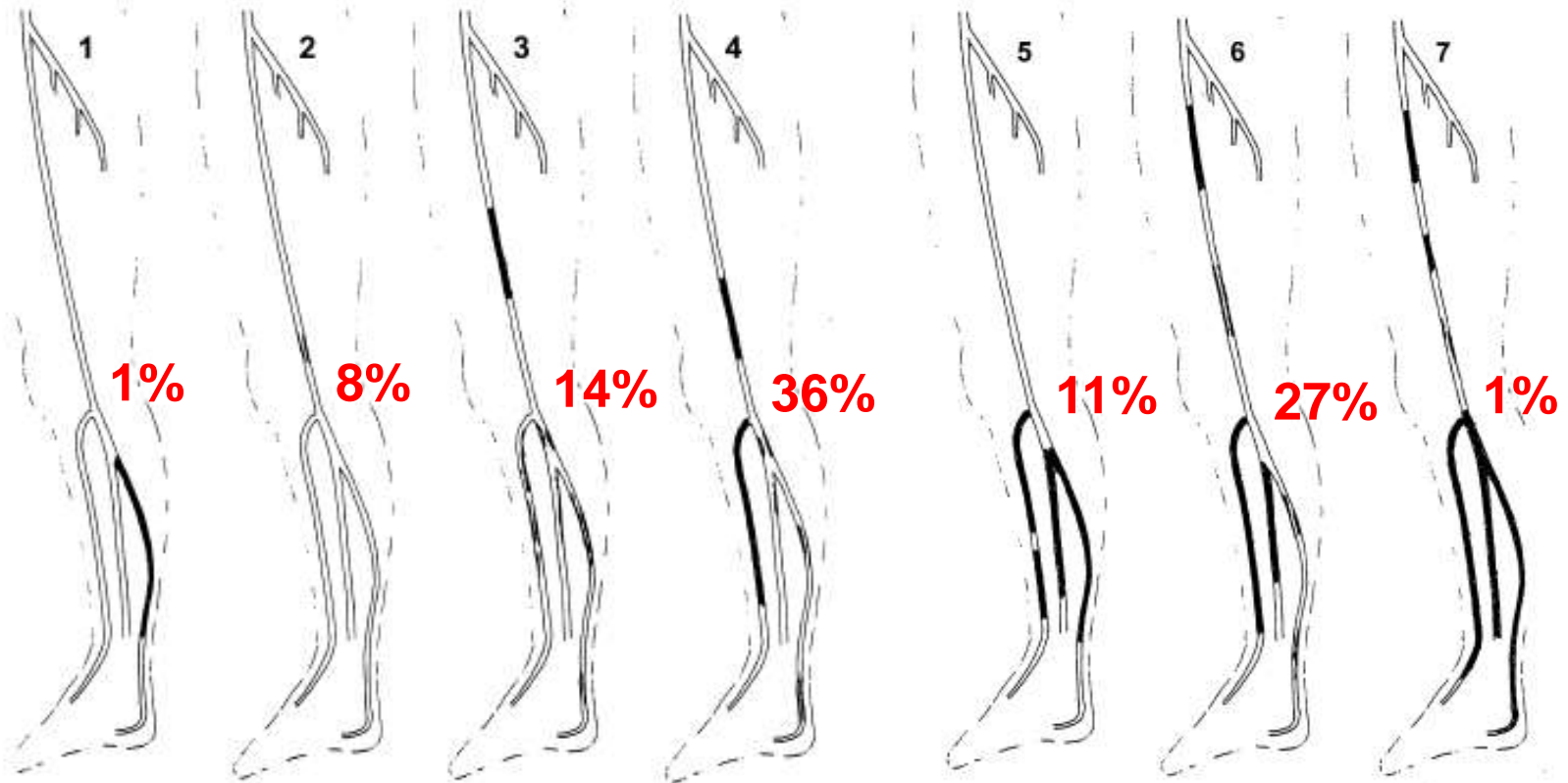
Jessica P. Simons, MD, MPH,^a Philip P. Goodney, MD, MS,^{b,c} Brian W. Nolan, MD, MS,^{b,c}
Jack L. Cronenwett, MD,^b Louis M. Messina, MD,^a and Andres Schanzer, MD,^a on behalf of the



Vascular Involvement in Diabetic Subjects with Ischemic Foot Ulcer: A New Morphologic Categorization of Disease Severity

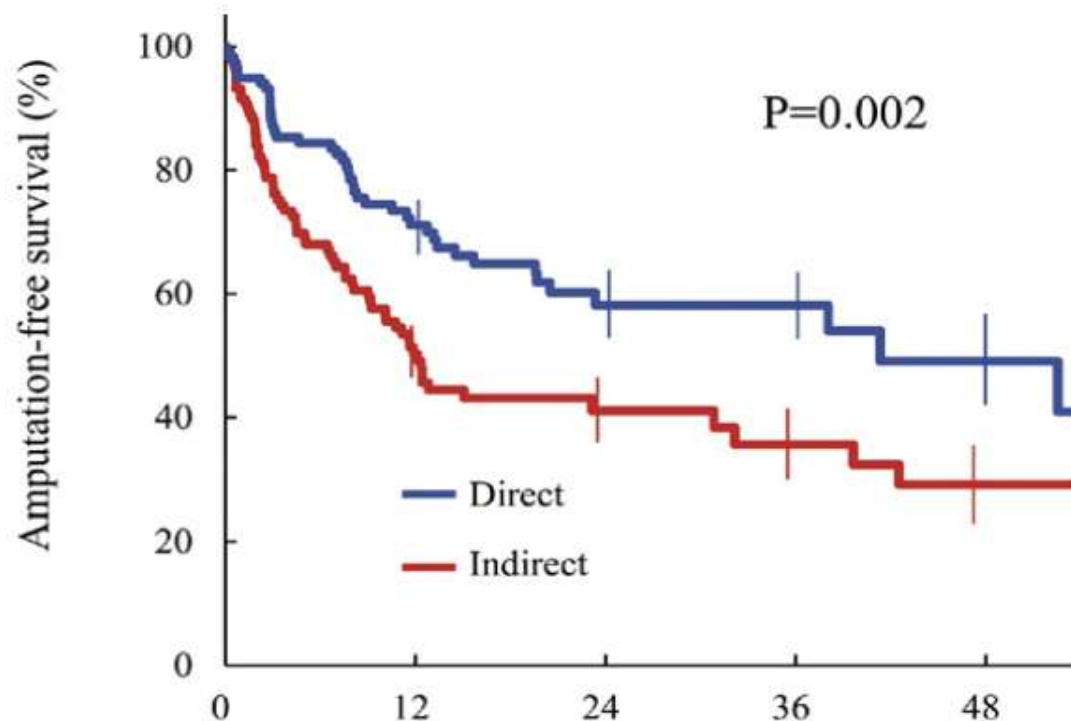
L. Graziani,^{1*} A. Silvestro,¹ V. Bertone,² E. Manara,³ R. Andreini,⁴
A. Sigala,⁵ R. Mingardi⁶ and R. De Giglio⁷

¹Servizio di Emodinamica, Istituto Clinico "Città di Brescia", Brescia, Italy, ²Unità di Diabetologia, Casa di Cura Clinica Castelli, Bergamo, Italy, ³Unità Operativa di Medicina e Oncologia, Istituti Ospedalieri di Cremona, Cremona, Italy, ⁴Unità Operativa di Medicina, Presidio Ospedaliero Pontedera, Pisa, Italy, ⁵Dipartimento di Farmacologia Clinica, Università di Brescia, Brescia, Italy, ⁶Unità Piede Diabetico e Medicina Vascolare, Casa di Cura Villa Berica, Vicenza, Italy, and ⁷Unità Operativa di Medicina Generale, Presidio Ospedaliero Abbiategrasso, Milano, Italy



Long-term results of direct and indirect endovascular revascularization based on the angiosome concept in patients with critical limb ischemia presenting with isolated below-the-knee lesions

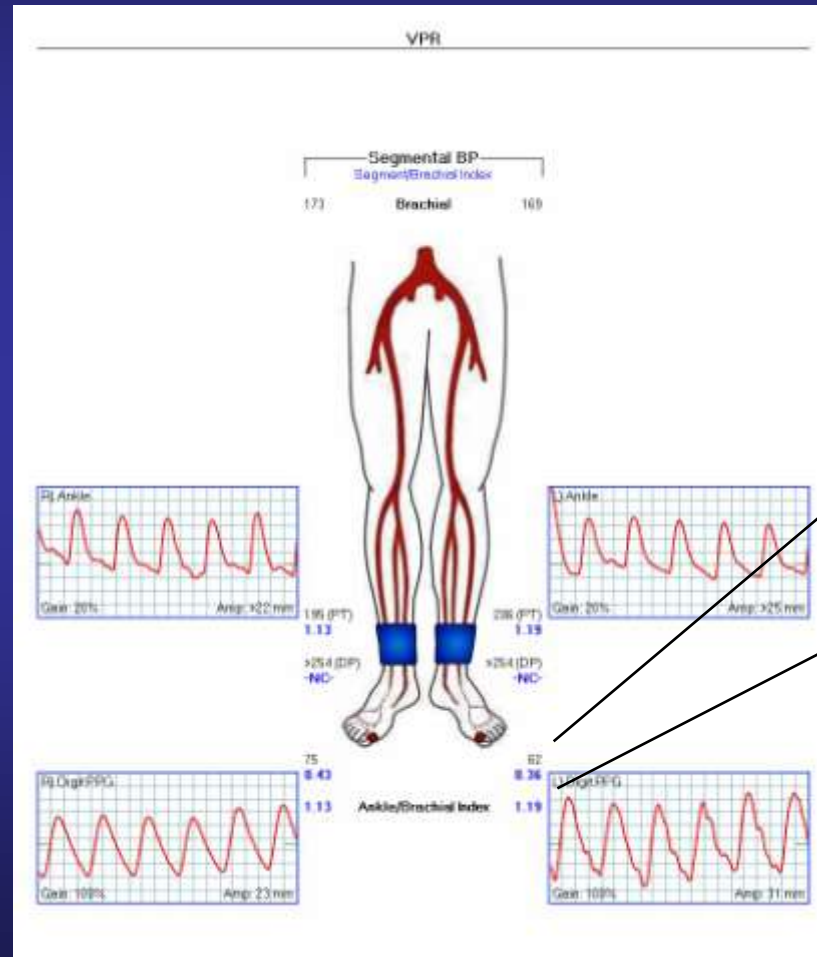
Osamu Iida, MD,^a Yoshimitsu Soga, MD,^b Keisuke Hirano, MD,^c Daizo Kawasaki, MD,^d



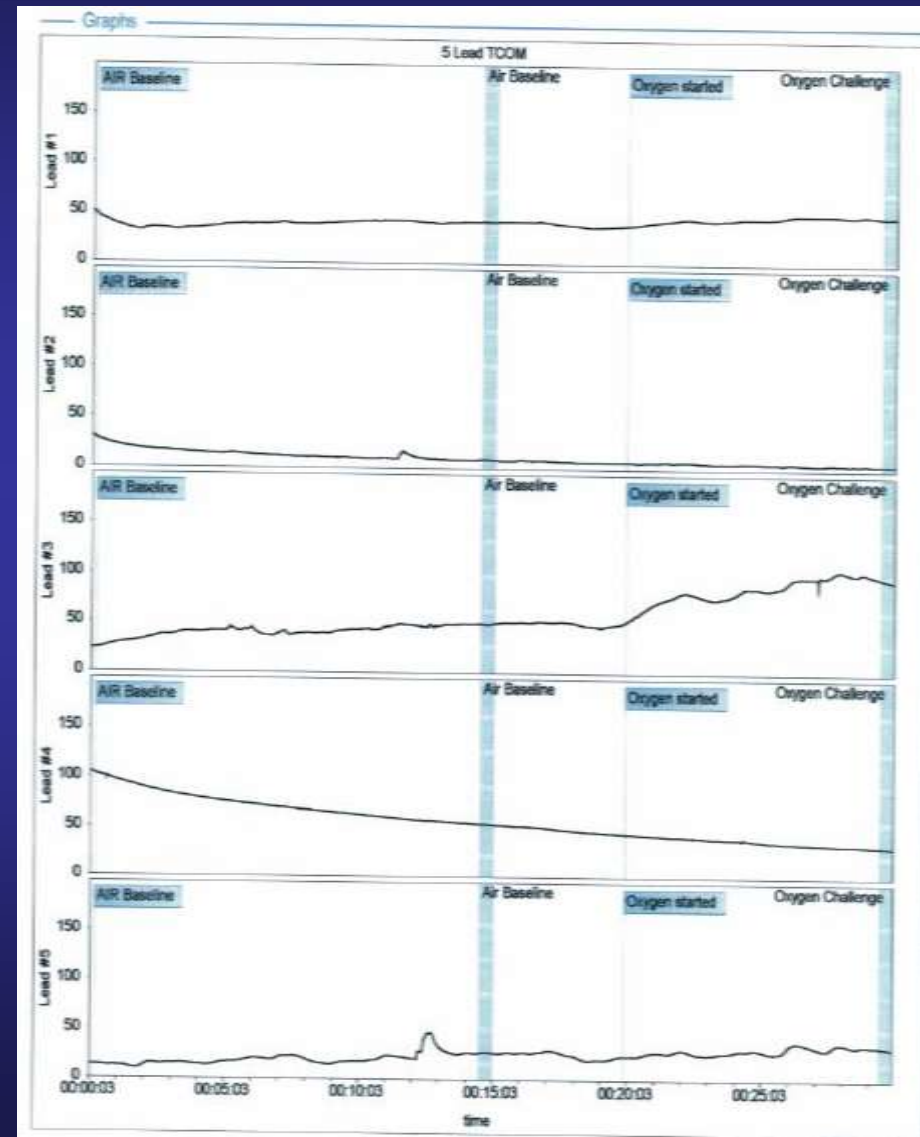
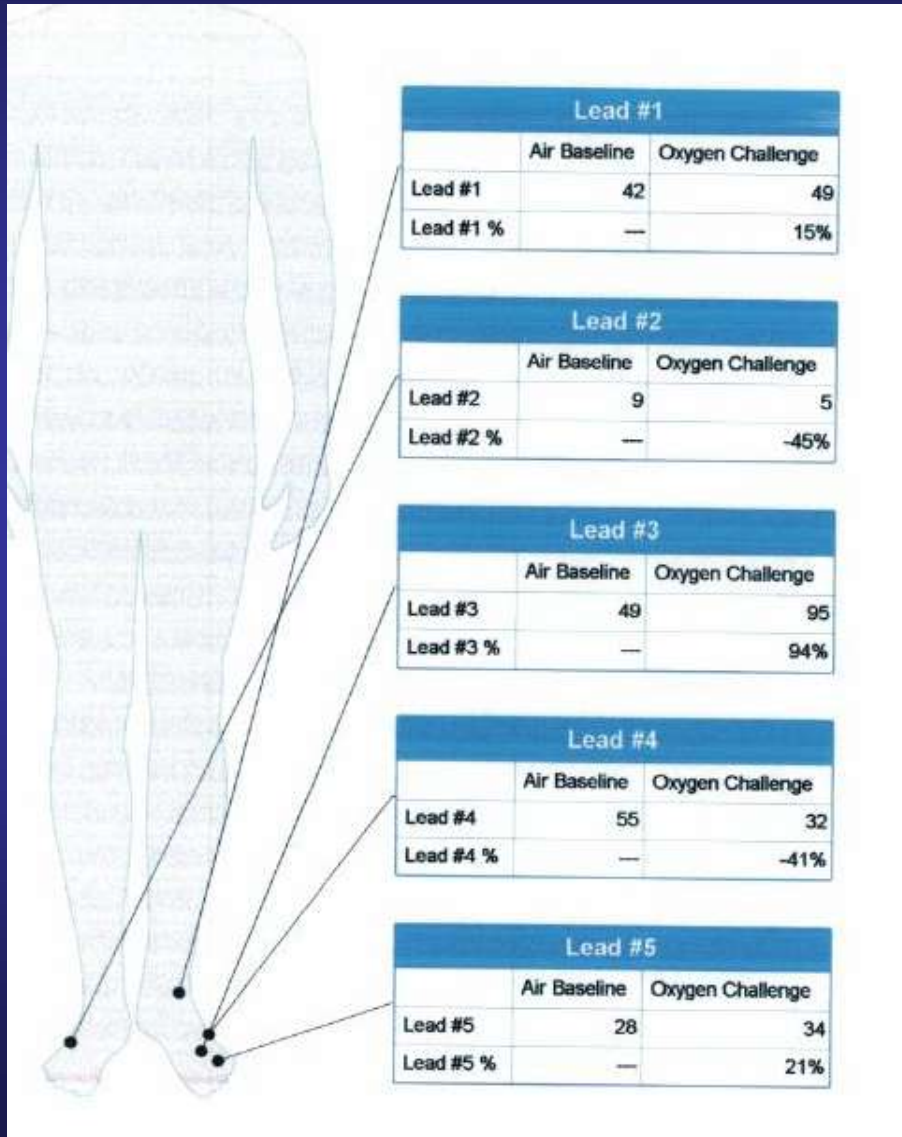


- 52 year old man with uncontrolled DM (HbA1C: 13), HTN, HL

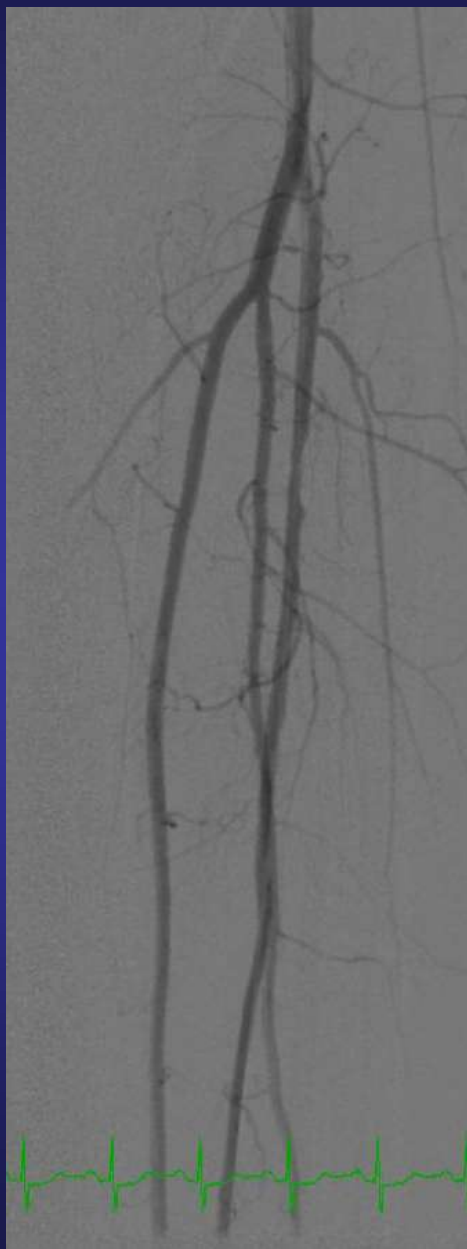
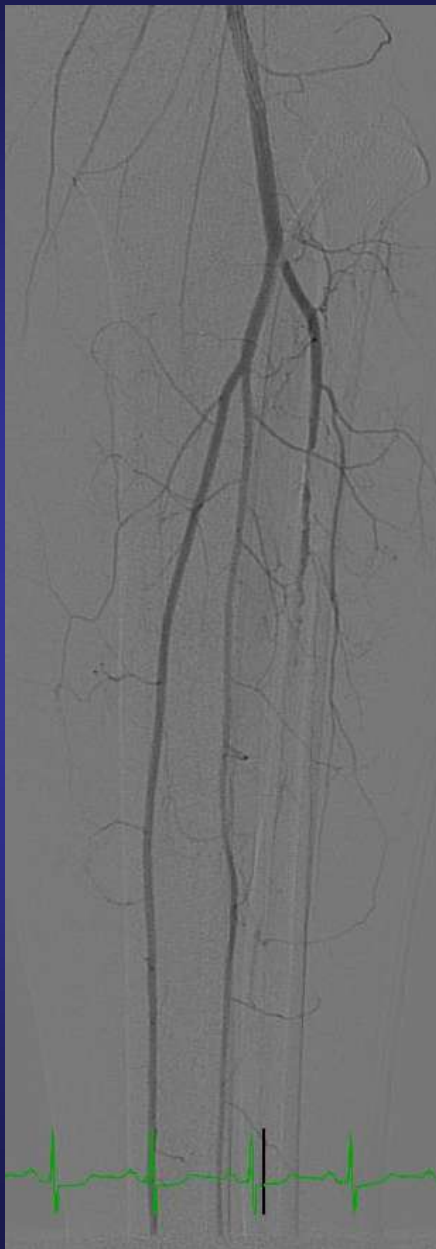
ABI and TBI



TcPO₂



Angiogram





3 Weeks Post-intervention

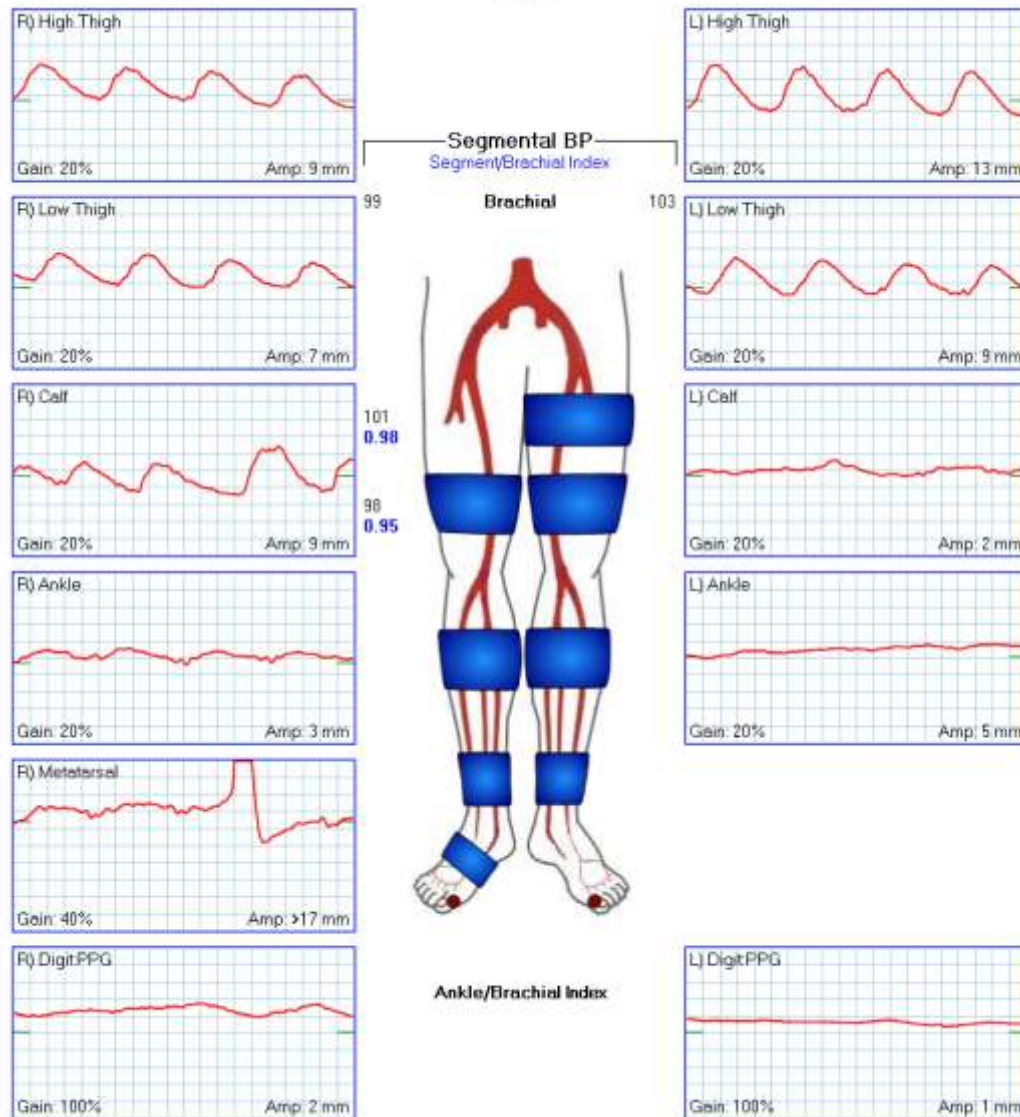


6 Weeks Post-intervention

- 68 year old man with ischemic cardiomyopathy, CHF, MI, A-fib, CAD s/p CABG x 4, and mitral valve disease

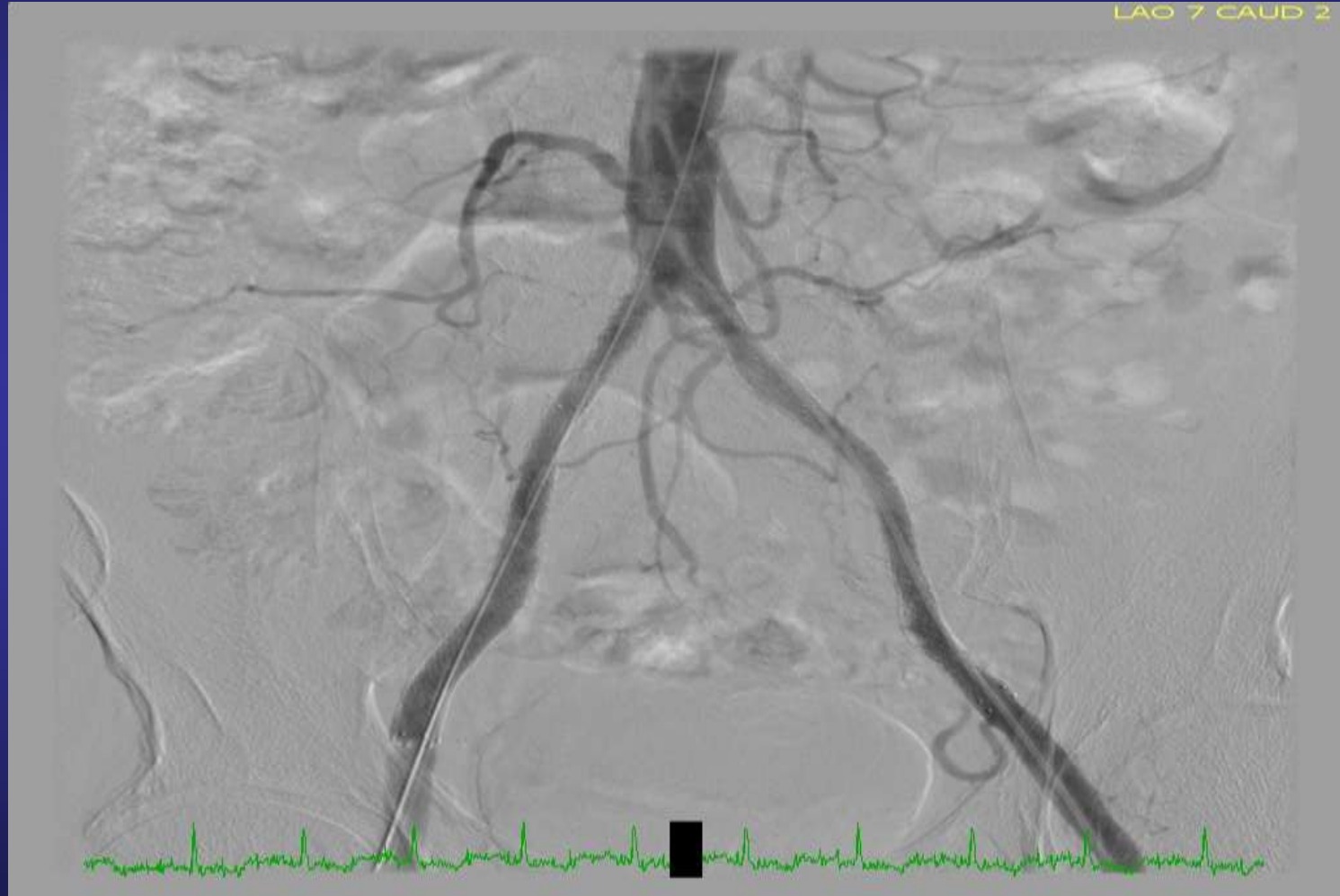


VPR

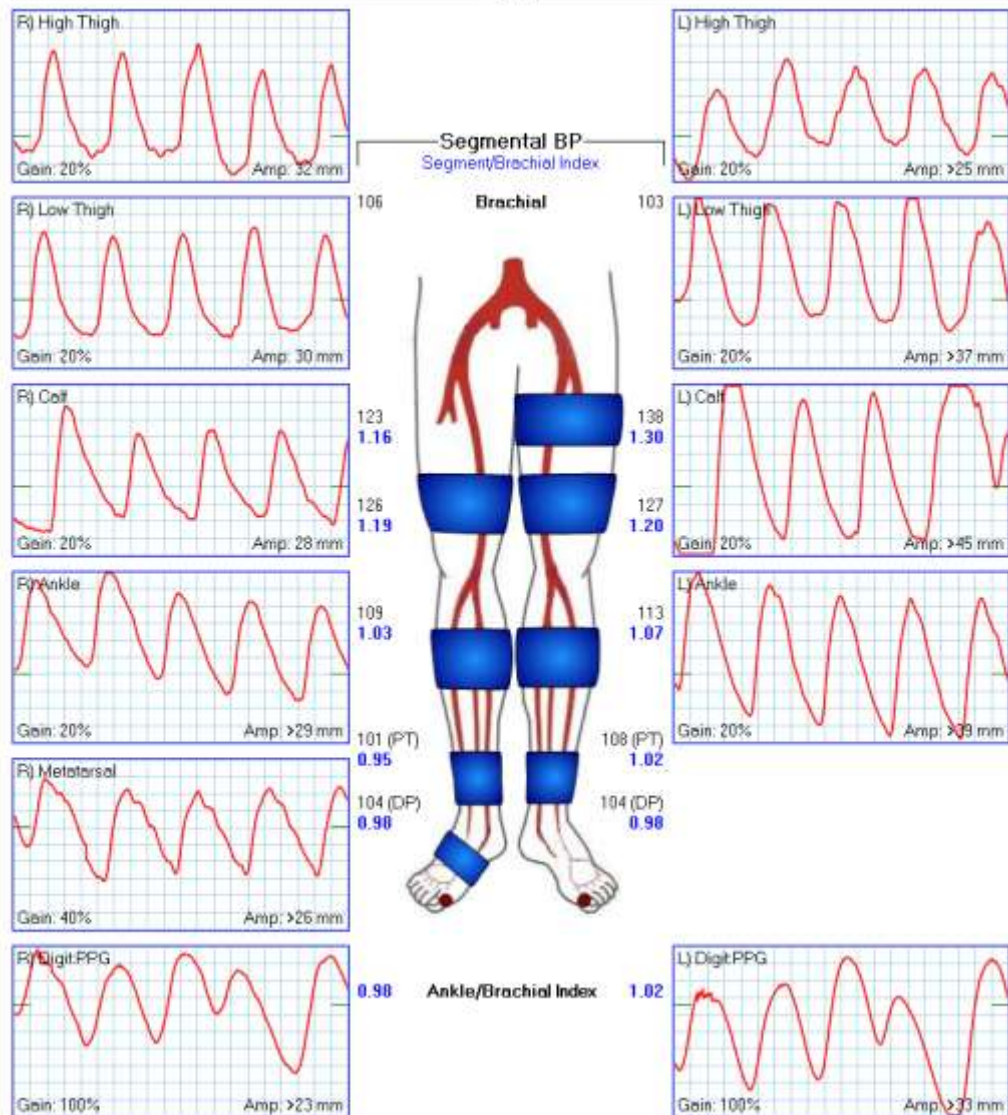




Aortoiliac Reconstruction



VPR



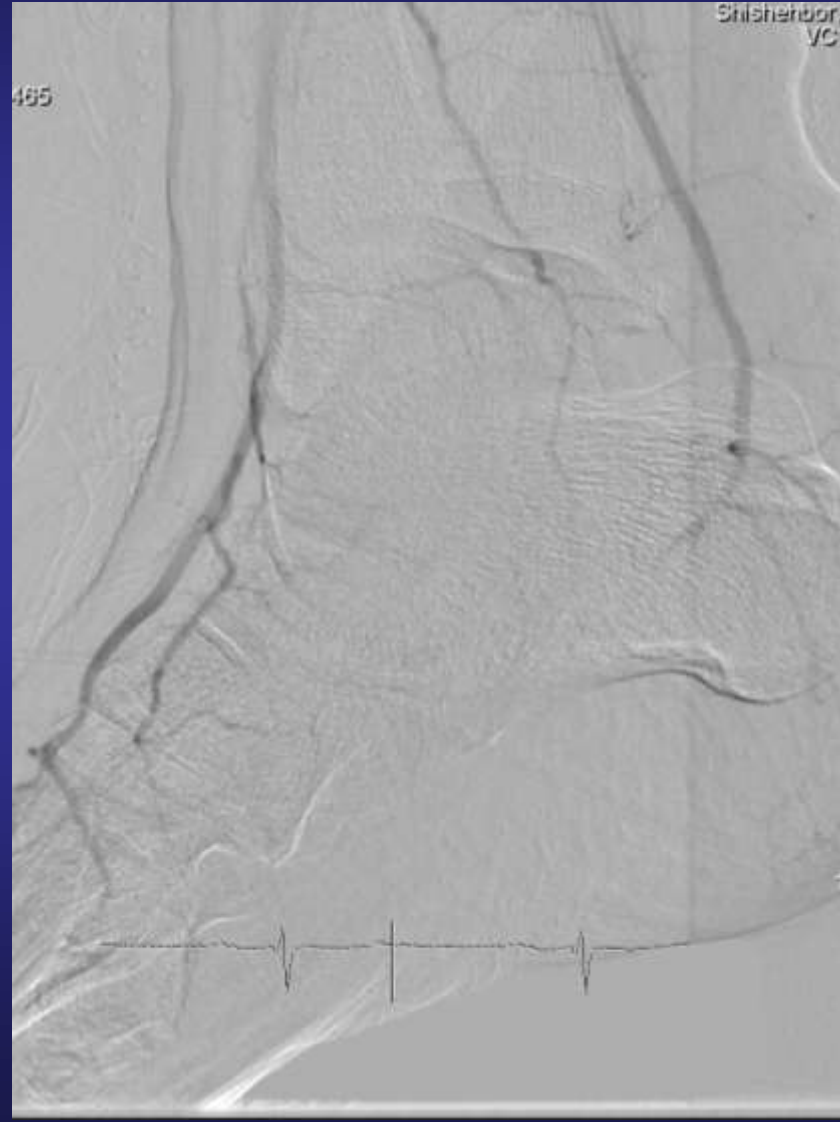
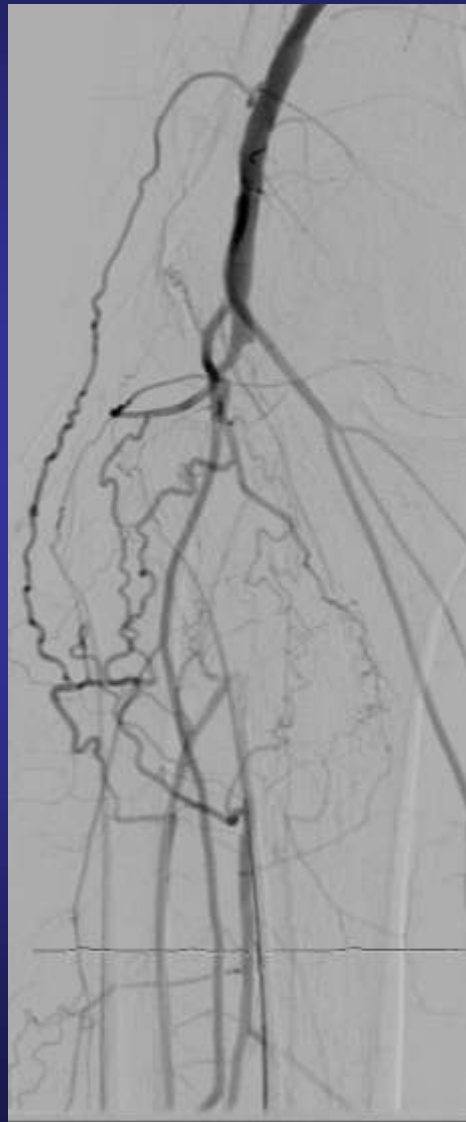


14 Weeks Post-intervention

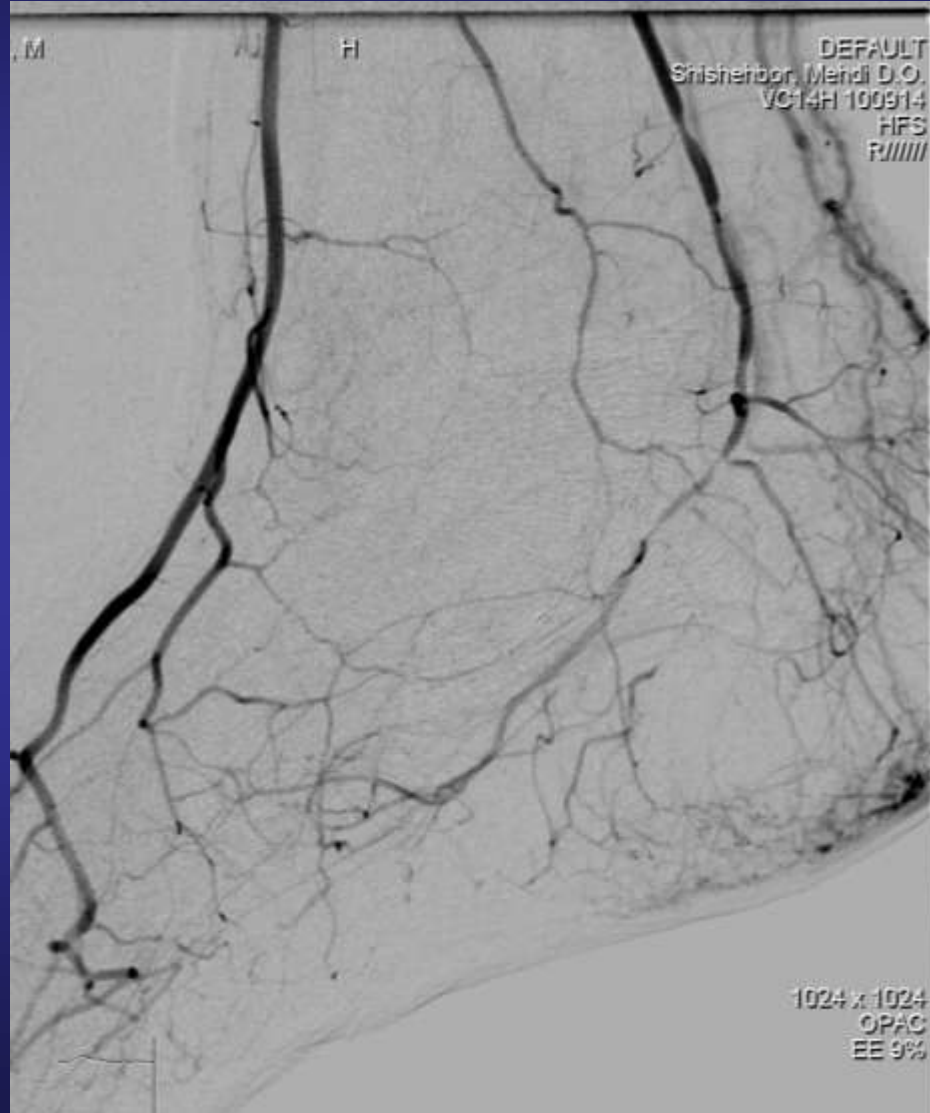
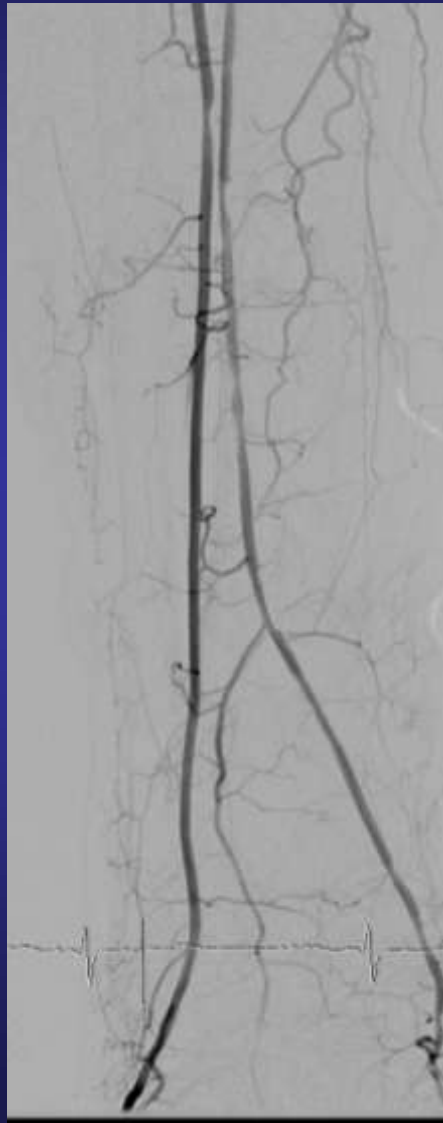
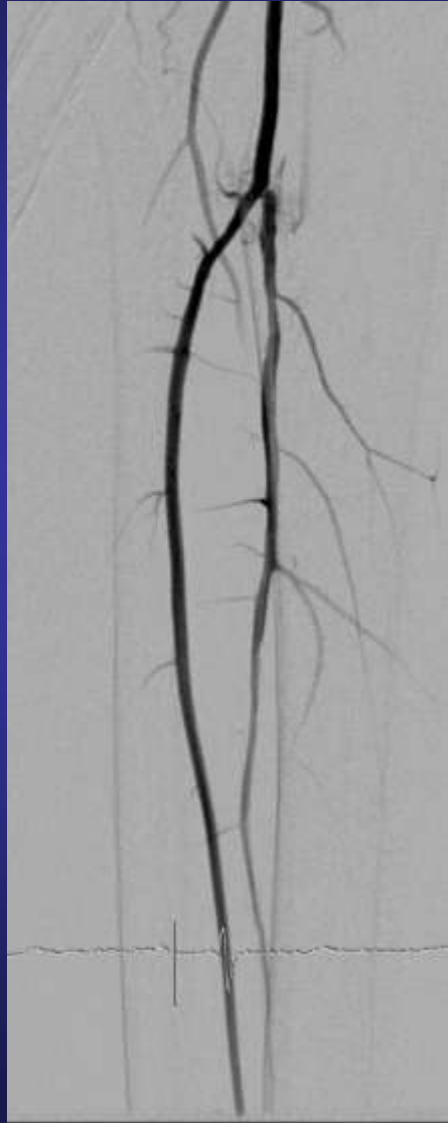




Diagnostic Angiogram



Post Intervention Angiogram

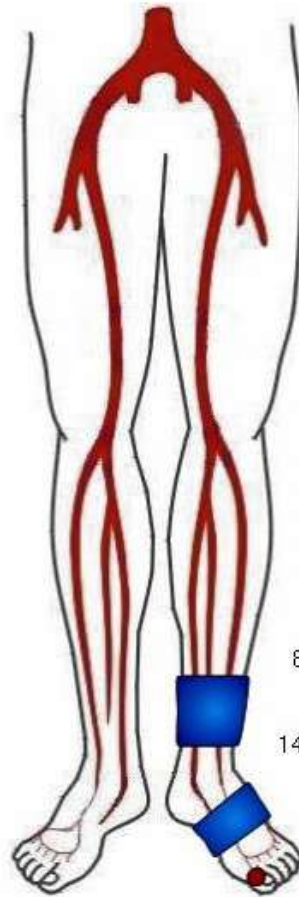


- 62 year old man
- Severe diabetes, HTN, HL, borderline CKD (CR 1.4)
- Non-traumatic right BKA
- Calcaneal osteomyelitis
- Treated with IV Vanco + Zosyn
- Aggressive wound treatment
 - HBOT



Segmental BP
Segment/Brachial Index

110 **Brachial** 121



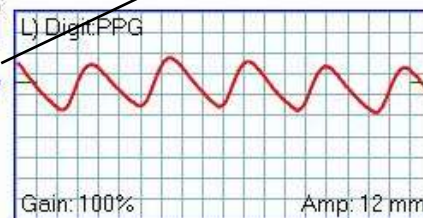
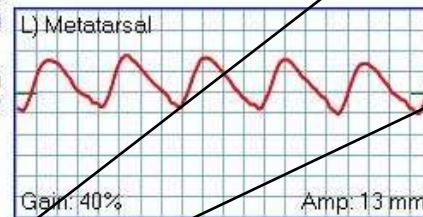
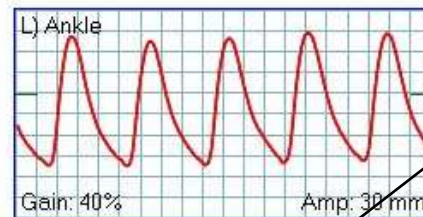
83 (PT)
0.69

141 (DP)
1.17

25
0.21

1.17

Ankle/Brachial Index



TBI: 0.21

ABI: 1.17

Clinical Course



3 weeks

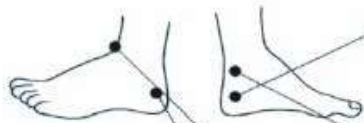


7 weeks



10 weeks

TcPO₂

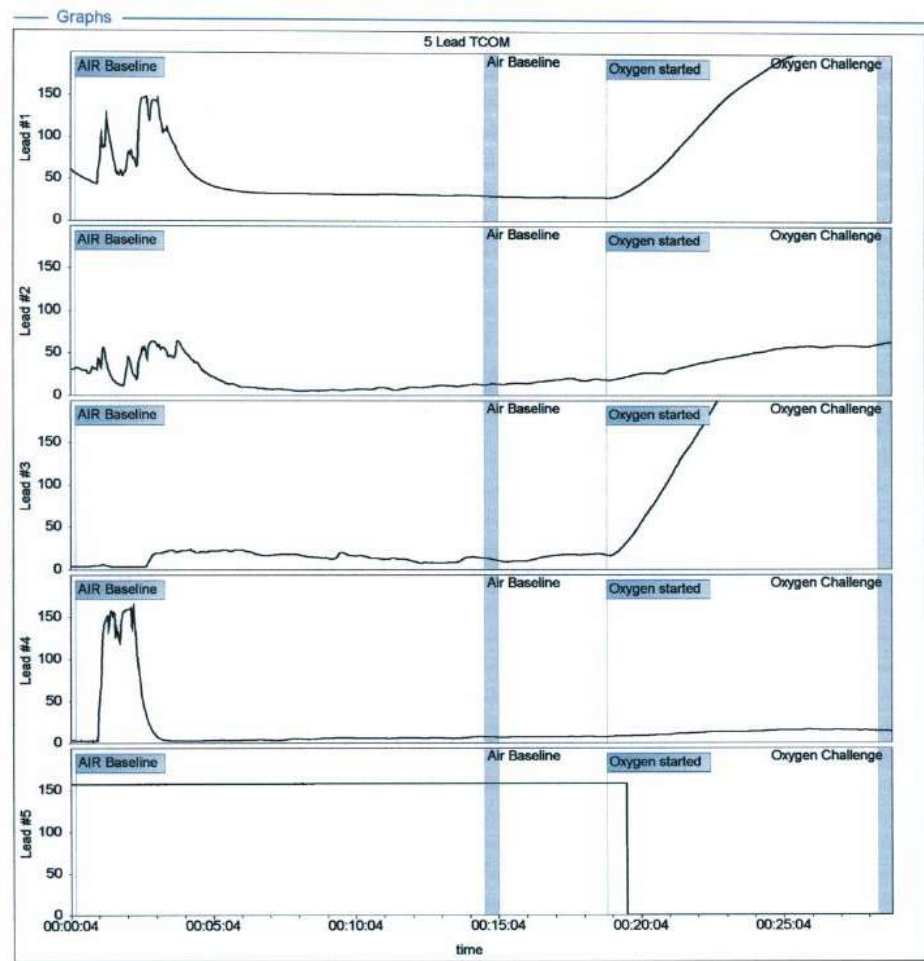


Lead #1		
	Air Baseline	Oxygen Challenge
Lead #1	30	219
Lead #1 %	—	632%

Lead #2		
	Air Baseline	Oxygen Challenge
Lead #2	14	62
Lead #2 %	—	354%

Lead #3		
	Air Baseline	Oxygen Challenge
Lead #3	13	309
Lead #3 %	—	2,338%

Lead #4		
	Air Baseline	Oxygen Challenge
Lead #4	7	14
Lead #4 %	—	102%



Angiogram





2 Weeks Post-intervention



6 Weeks Post-intervention



10 Weeks Post-intervention



14 Weeks Post-intervention



19 Weeks Post-intervention



22 Weeks Post-intervention

- 85 year old diabetic lady
- Open guillotine amputation of the R 2nd digit



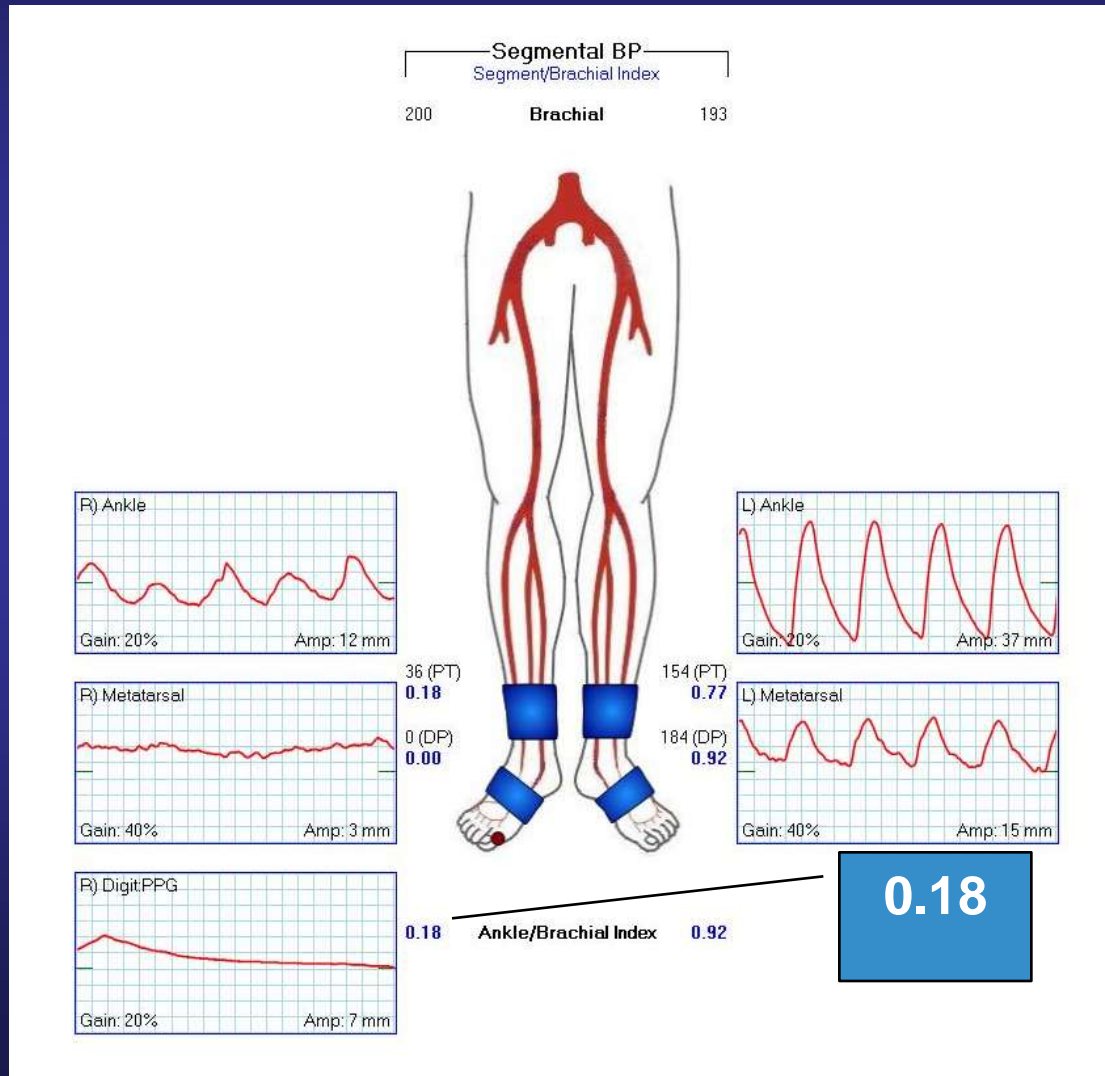
EVENTS

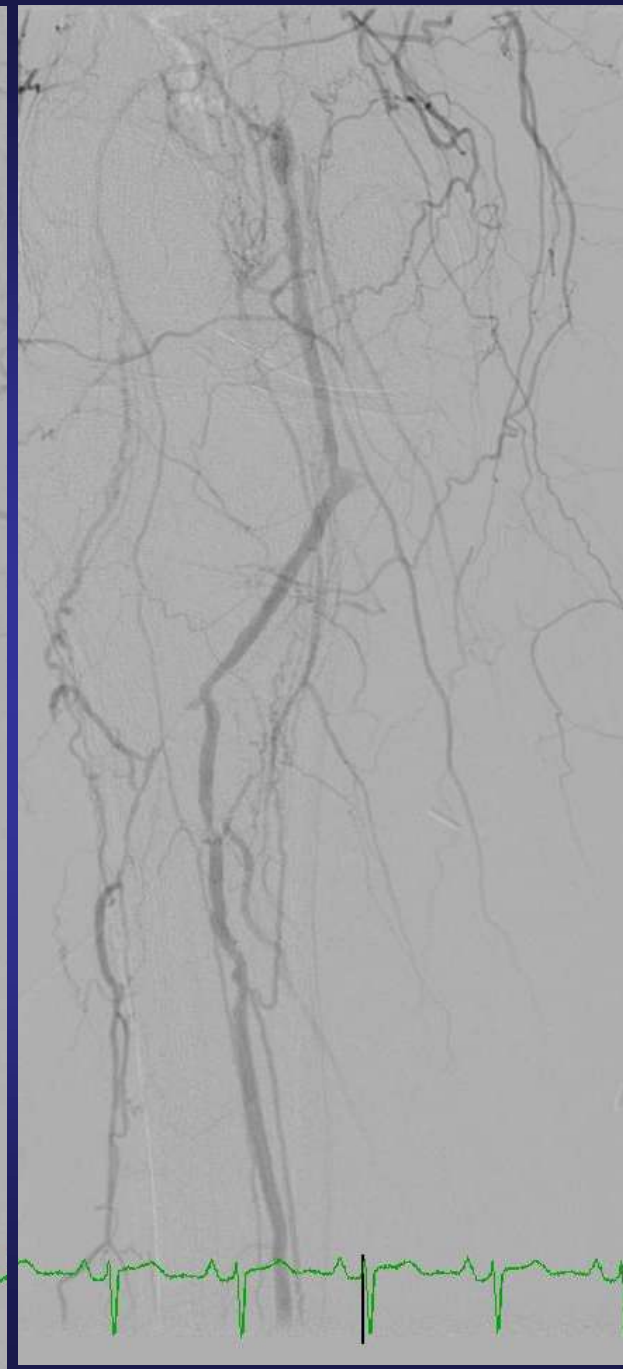
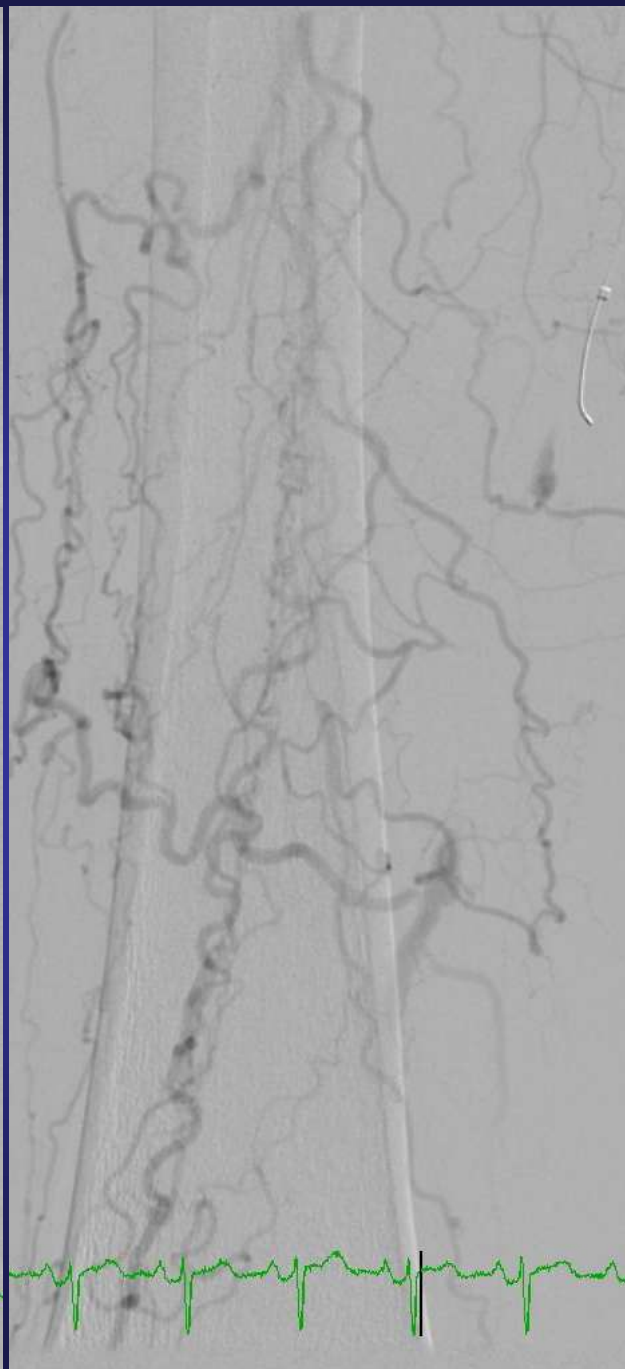
- Evaluated by vascular surgery March, 2012
- Offered Fem-BK bypass and TMA
- Refused TMA
- Late March: Fem-BK bypass using vein
- Early April with severe rest pain
- Graft occluded – long TPA and angioplasty

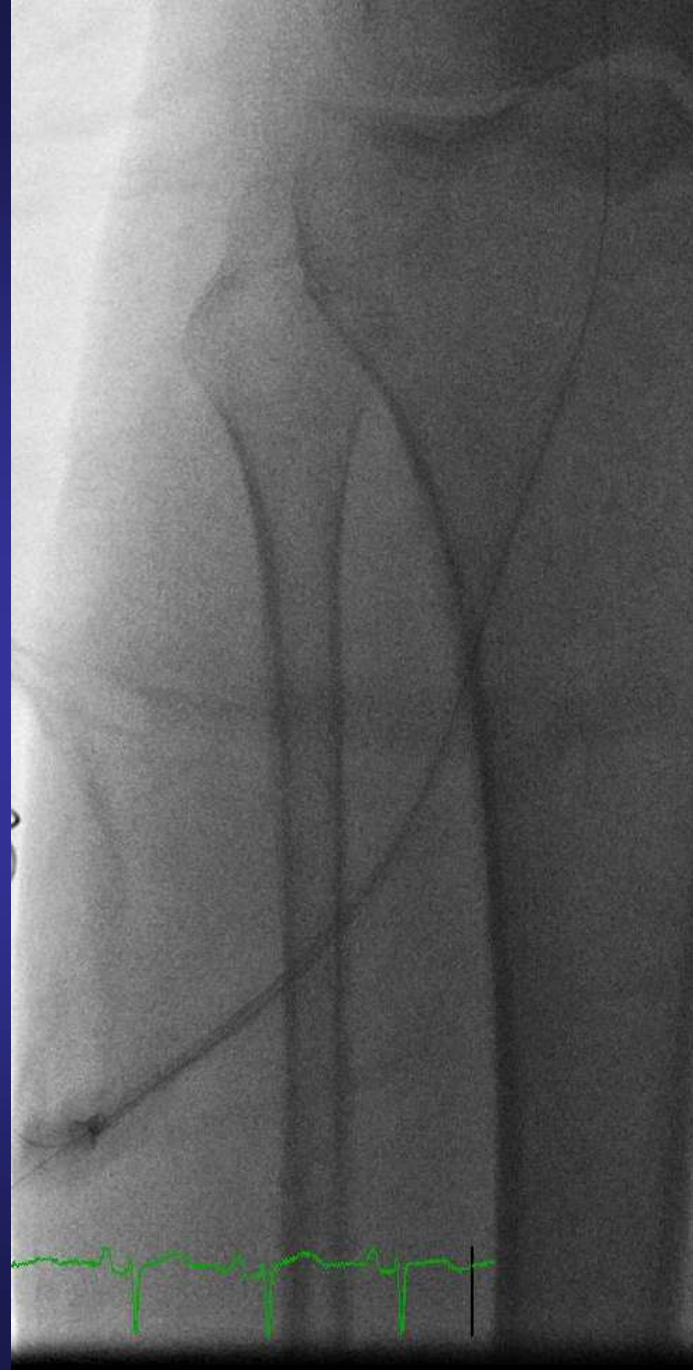
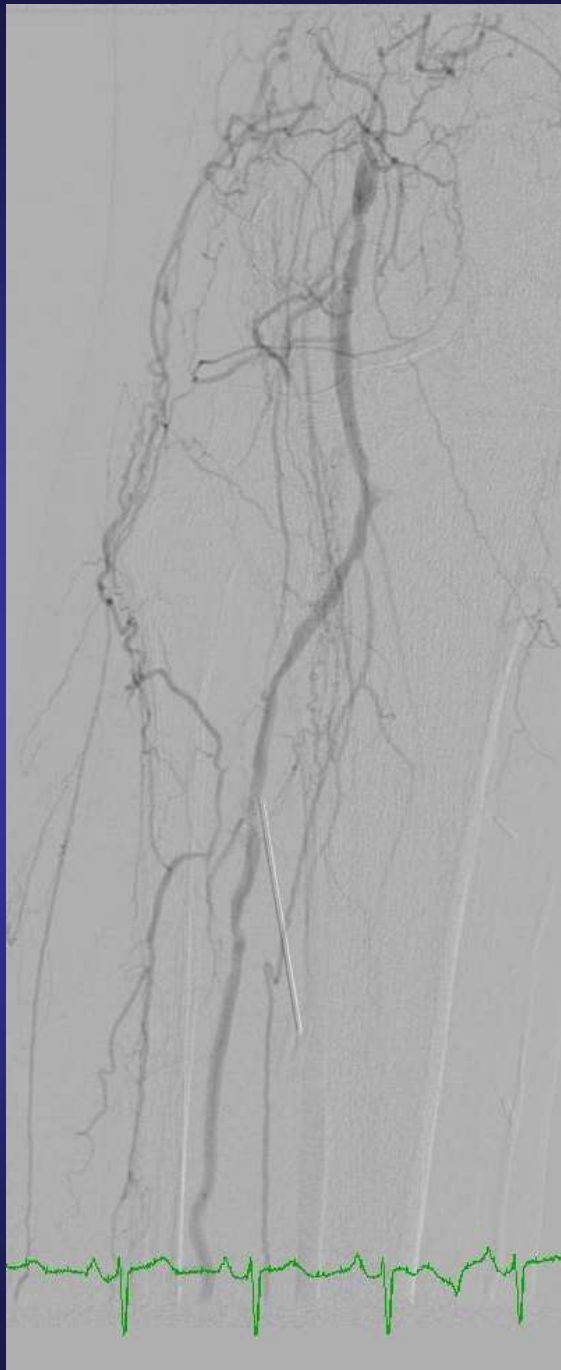
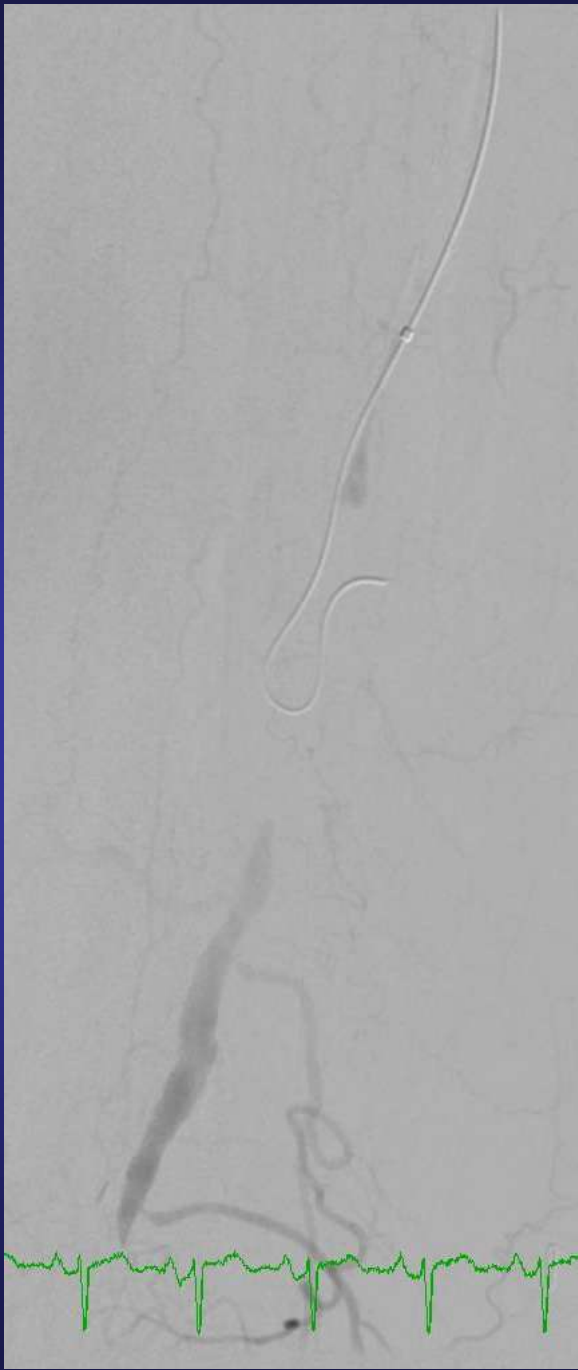
EVENTS

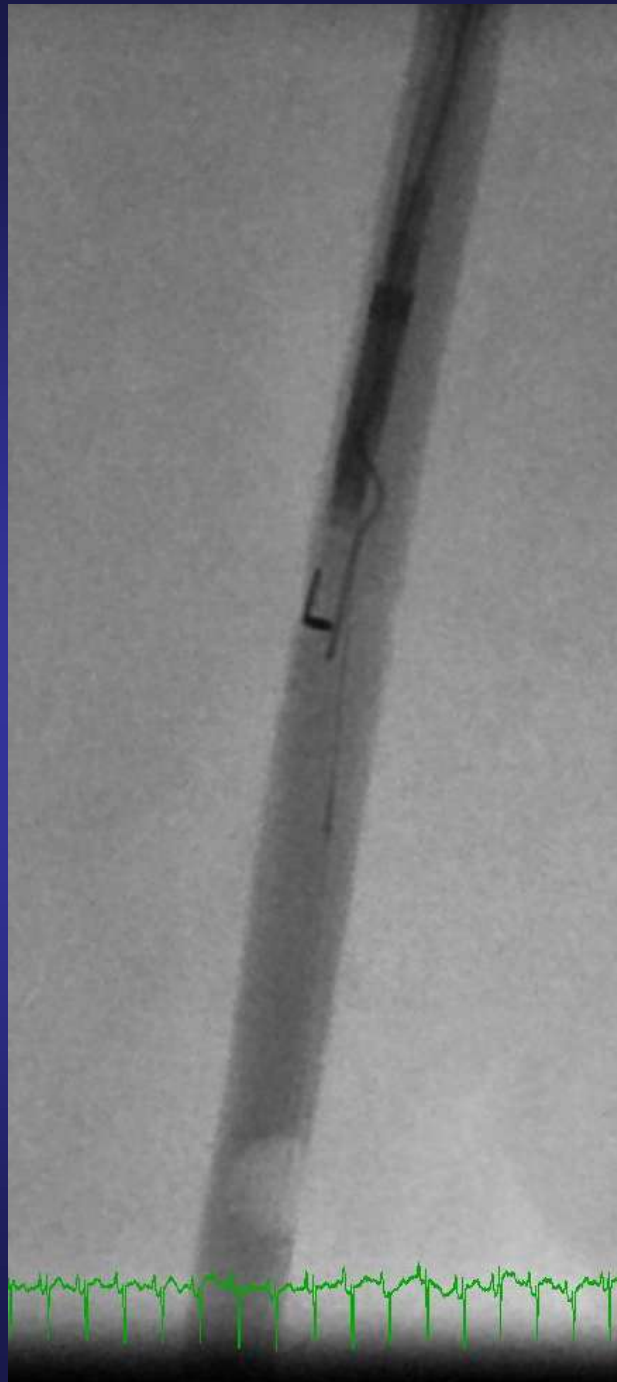
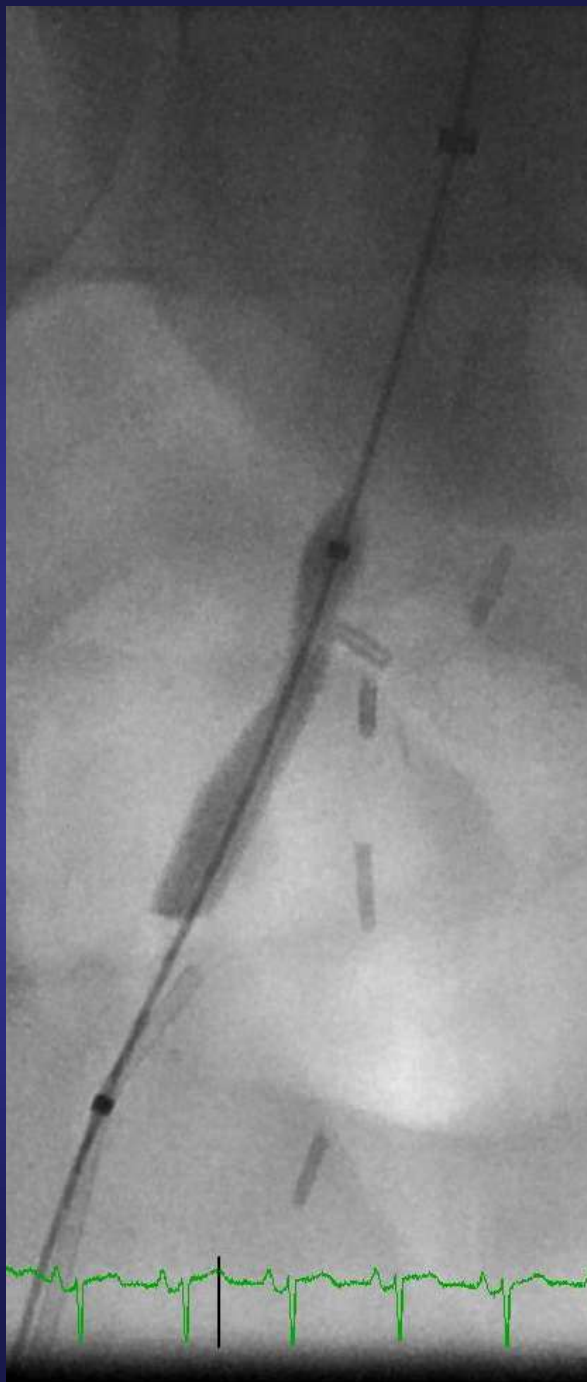
- A few hours later with no pulse in the foot
- Repeat angiogram shows graft is occluded
- Again angioplasty and Lovenox
- Offered BKA but she refused
- Discharged home
- Mid-April came to see me crying in rest pain

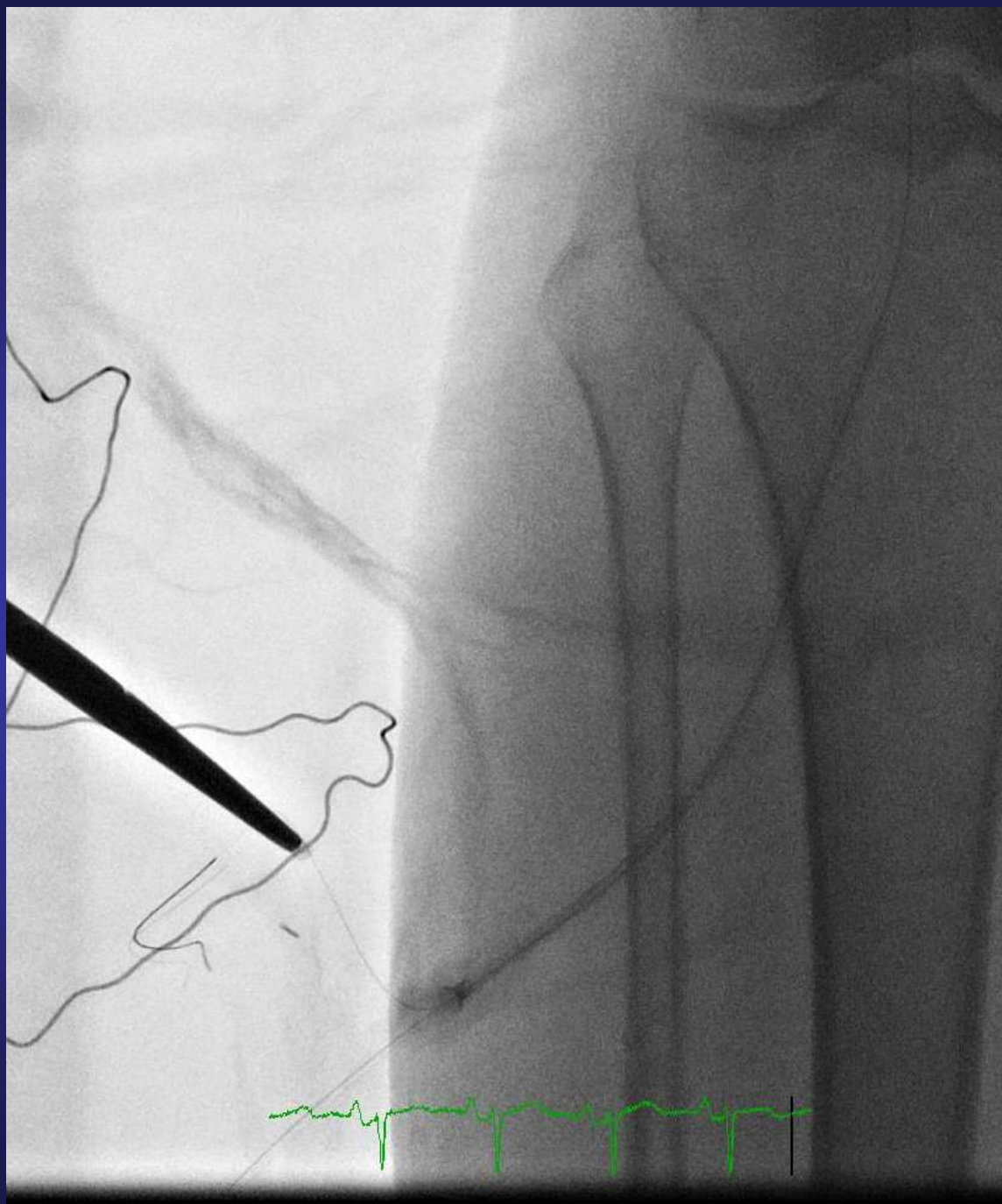
Pre Procedure

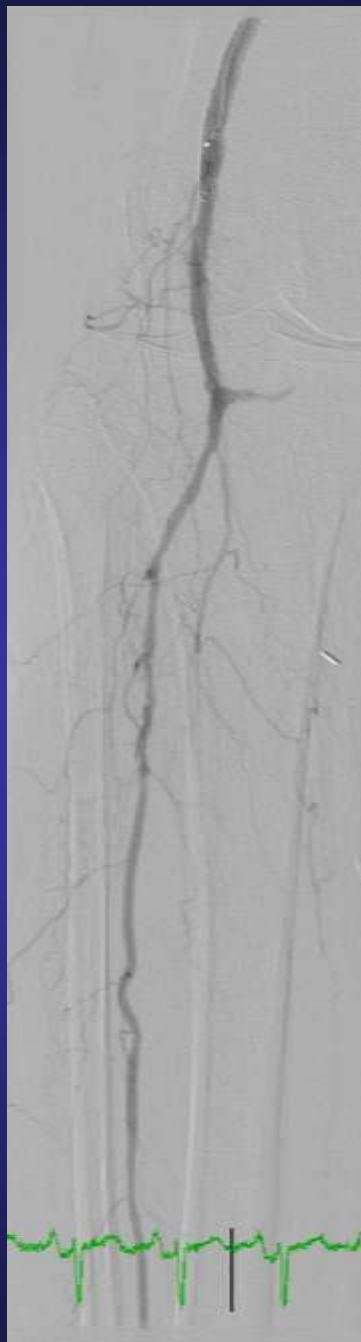
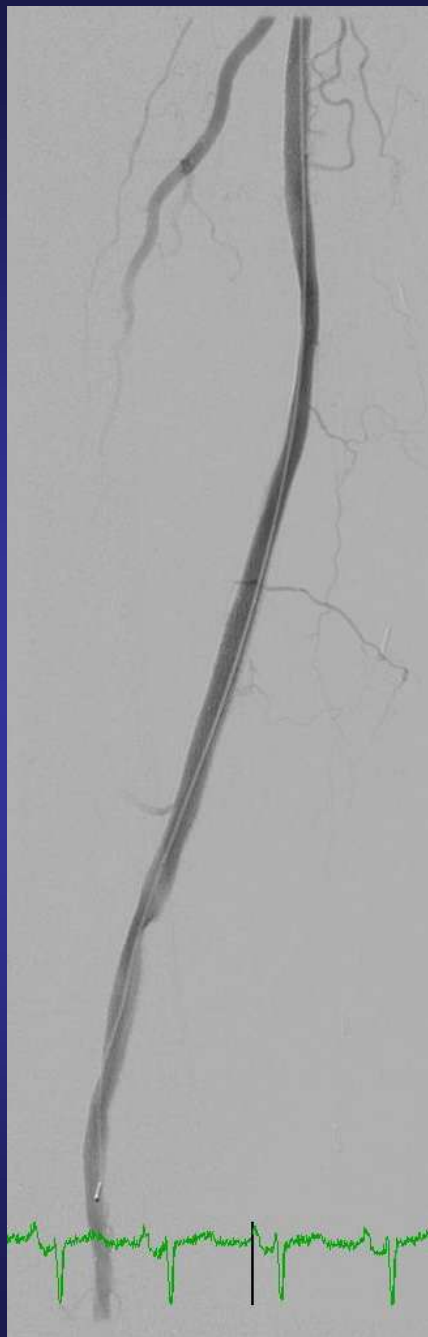




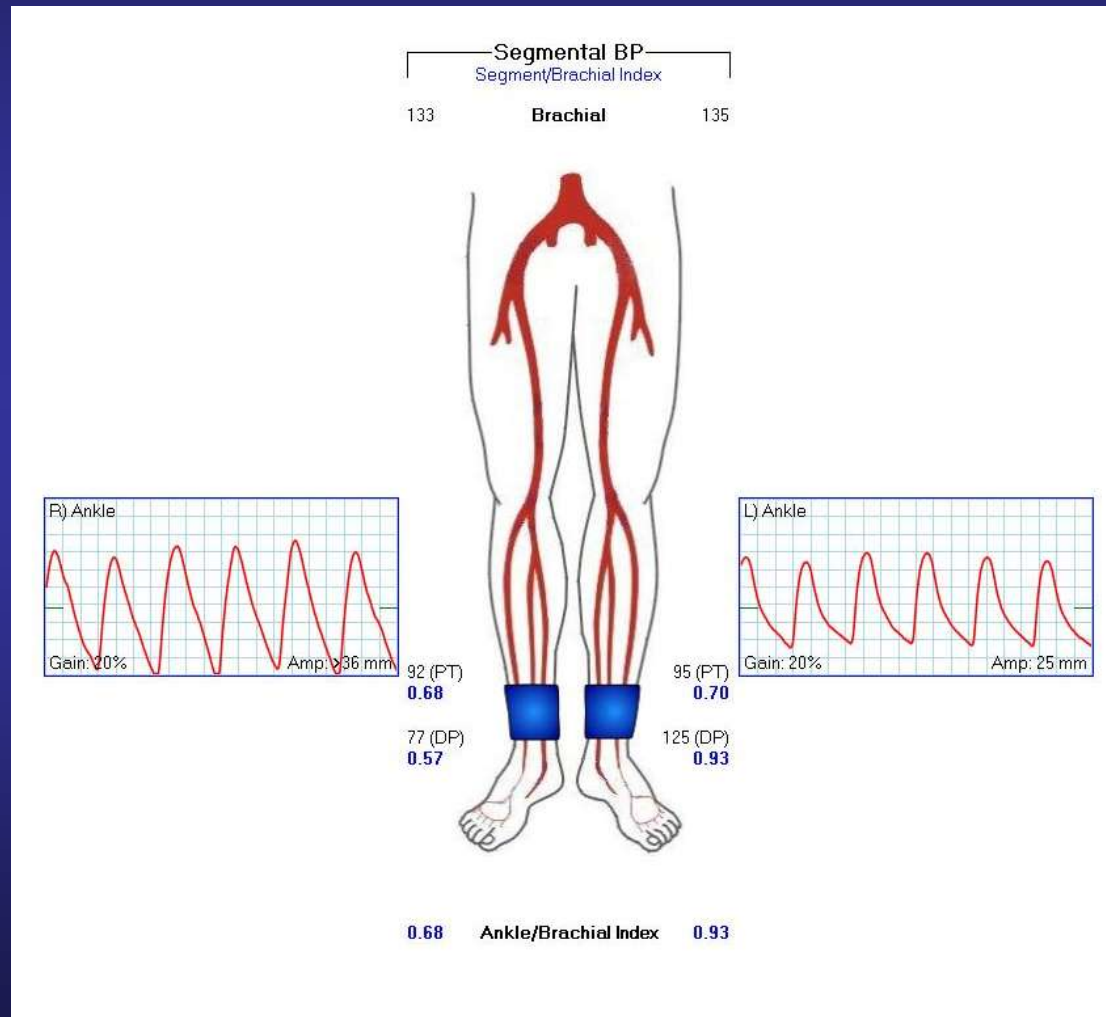








Post Procedure





4 Weeks Post-intervention

Utilize All of Your Resources to Assess Perfusion to the Wound

- ABI/PVR
- TBI
- Ultrasound
- TcPO₂
- CTA/Angiography
- Index of suspicion

Thank You!