



# **Skin Perfusion Pressure (SPP) - Guided Intervention**

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# Conflict of Interest


Speaker name : *Osami Kawarada, MD*

I have the following potential conflicts of interest to report:

- Consulting:
- Employment in industry
- Stockholder of a healthcare company
- Owner of a healthcare company
- Others: Honorarium of lectures and advisory board fees from Boston Scientific Corporation  
Research grants, honorarium of lectures and advisory board fees from Terumo



## Contemporary critical limb ischemia: Asian multidisciplinary consensus statement on the collaboration between endovascular therapy and wound care

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# Which is CLI

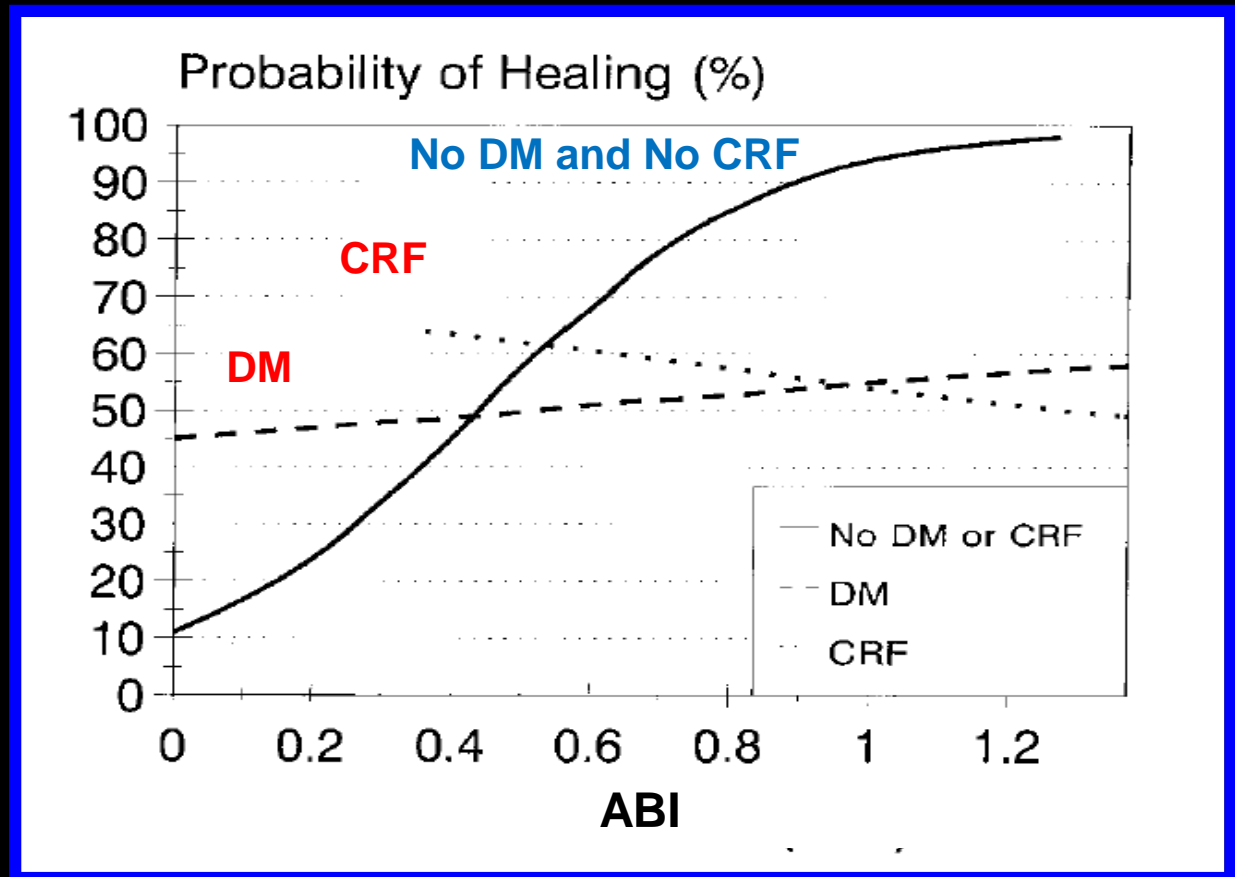
60 y/o Male, DM, HD  
ABI: 1.08



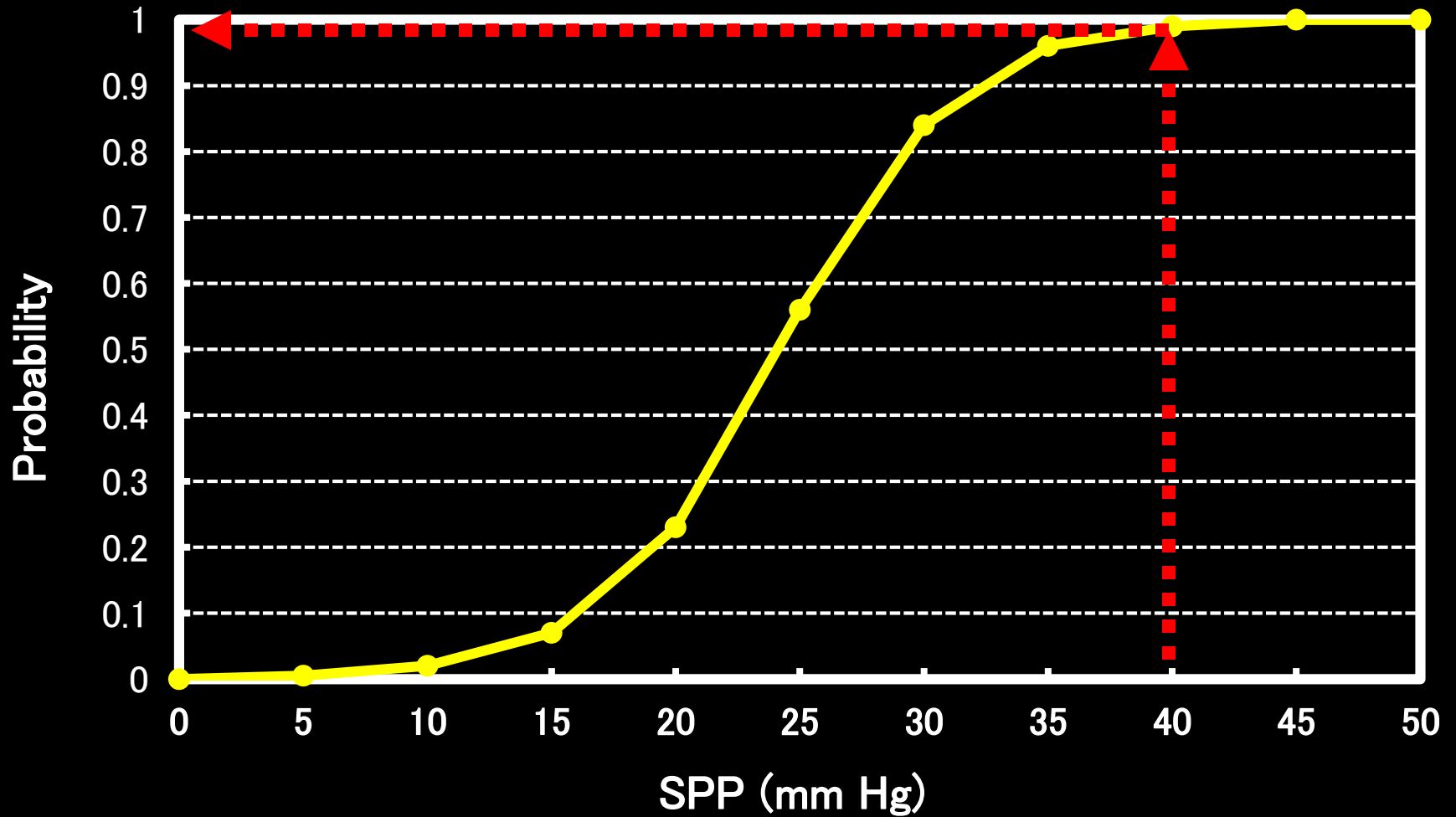
64 y/o Male, DM, HD  
ABI: 1.10



# Limited Utility of ABI in CLI



# Skin Perfusion Pressure (SPP) and Wound Healing



# Diabetic foot

*SPP: 62/58 mmHg*



# CLI

*SPP: 38/32 mmHg*

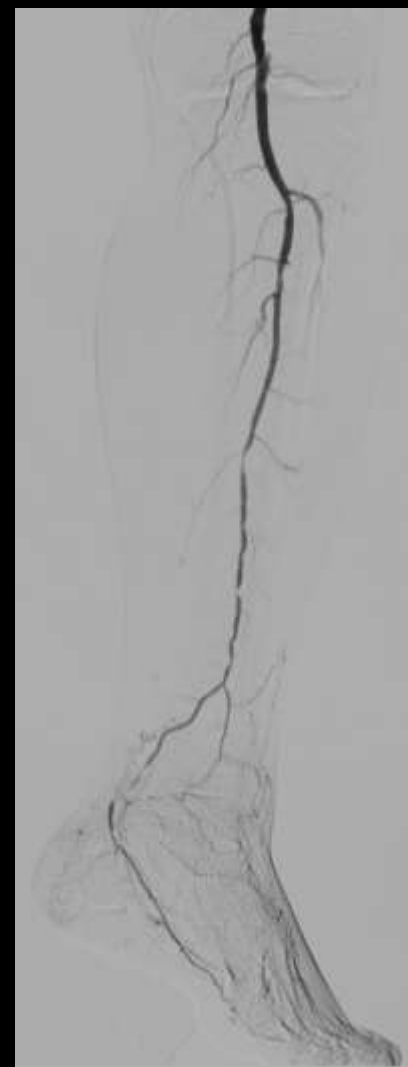


Microcirculation assessment with SPP is an integral part

**One Straight-Line**



# Which Vessel Should We Treat?



## Peripheral Vascular Disease

### Effect of Single Tibial Artery Revascularization on Microcirculation in the Setting of Critical Limb Ischemia

Osami Kawarada, MD; Satoshi Yasuda, MD, PhD; Kunihiro Nishimura, MD, PhD;  
Shingo Sakamoto, MD; Miyuki Noguchi, RN; Yasuomi Takahi, MD, PhD;  
Koichiro Harada, MD, PhD; Masaharu Ishihara, MD, PhD; Hisao Ogawa, MD, PhD

**Conclusions**—Single tibial artery revascularization, whether of the ATA or PTA, yielded comparable improvements in microcirculation of the dorsal and plantar foot. Approximately half of the feet revascularized had a change in microcirculation that was not consistent with the 2D angiosome theory. (*Circ Cardiovasc Interv.* 2014;7:684-691.)

**Key Words:** angioplasty ■ angiosome ■ microcirculation ■ peripheral arterial disease ■ reperfusion

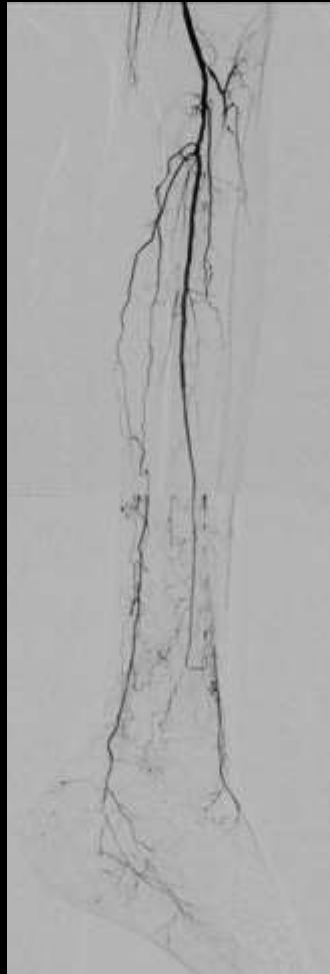
SPP increased significantly, from 33 (IQR 23–40.5) to 52 (IQR 32.5–65) mmHg ( $P<0.0001$ ) and  $31.6\pm 16.1$  to  $44.8\pm 19.2$  mmHg ( $P=0.001$ ) after ATA revascularization, respectively, and from  $29.3\pm 14.0$  to  $42.4\pm 19.7$  mmHg ( $P=0.003$ ) and  $29.3\pm 9.8$  to  $43.5\pm 15.9$  mmHg ( $P<0.001$ ) after PTA revascularization, respectively. Both ATA and PTA revascularization were not associated with any significant differences in  $\Delta$ SPP between the dorsal and the plantar regions of the foot. Only 64% and 58% of ATA revascularization cases showed higher post-SPP and  $\Delta$ SPP on the dorsal side than on the plantar side, respectively. Also, only 47% and 40% of PTA revascularization cases showed higher post-SPP and  $\Delta$ SPP on the plantar side than on the dorsal side, respectively.

**Conclusions**—Single tibial artery revascularization, whether of the ATA or PTA, yielded comparable improvements in microcirculation of the dorsal and plantar foot. Approximately half of the feet revascularized had a change in microcirculation that was not consistent with the 2D angiosome theory. (*Circ Cardiovasc Interv.* 2014;7:684-691.)

**Key Words:** angioplasty ■ angiosome ■ microcirculation ■ peripheral arterial disease ■ reperfusion

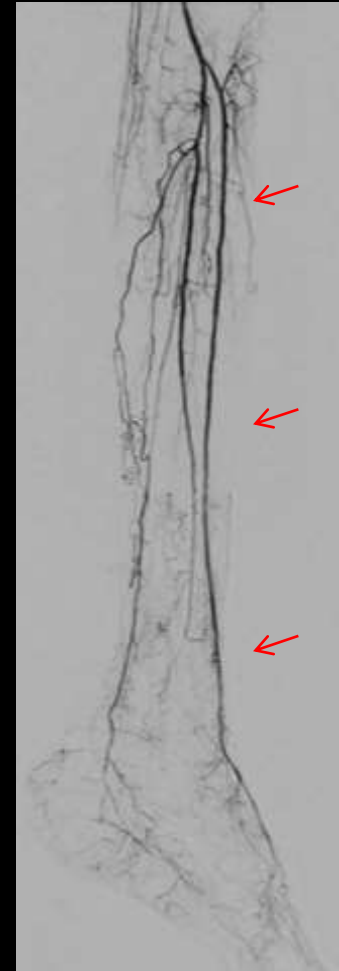
# Representative Case: ATA Intervention

Pre



SPP: 34/15mmHg

Post



SPP: 42/53mmHg

Dorsal  $\Delta$ SPP: 8 mmHg, Plantar  $\Delta$ SPP: 38 mmHg



Take it  
easy!

## Which Vessel Should We Treat?

- **Never mind angiosome**
- **Treat the vessel that is technically feasible**

# Strategy for Infrapopliteal Intervention

SPP < 40-50 mmHg

***Establishment of at least one straight-line flow  
based on angiographic findings  
Never mind angiosome***

SPP > 40-50 mmHg

Debridement or  
minor amputation

SPP < 40-50 mmHg

More tibial/peroneal revascularization or  
Pedal revascularization

# 58 y/o Male, Rutherford 6 × 3 months Infectious ischemic gangrene

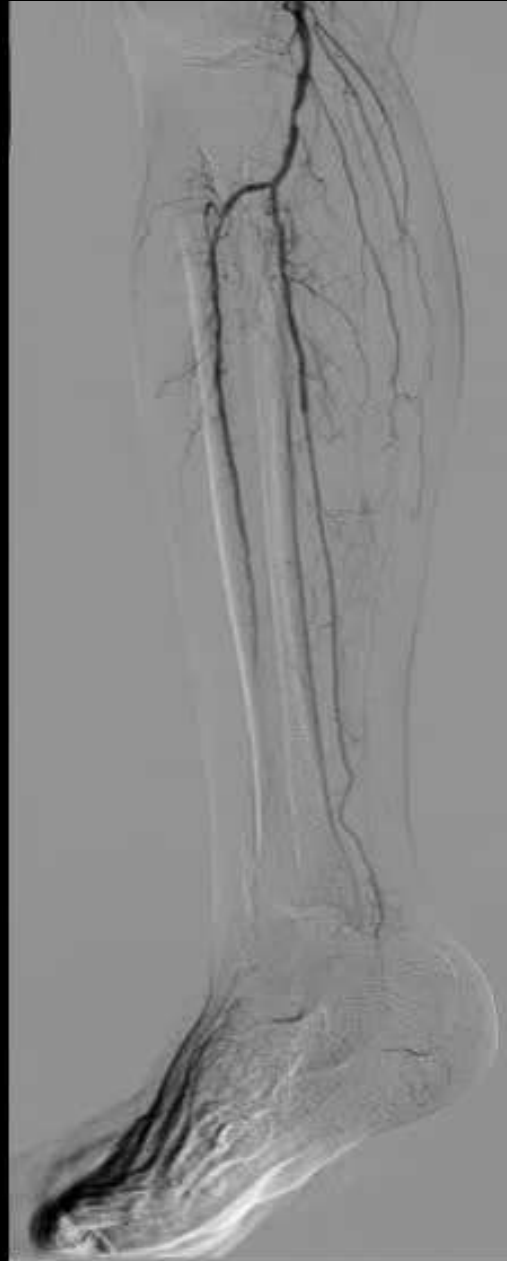
- Risk factors and comorbidity
  - HTN (+), HL (-), **DM (+)**, Smoking (+)
  - CAD (TVD)
- **Hemodialysis** due to diabetic nephropathy
- Noninvasive study
  - ABI: Right 0.54, Left 0.68
  - **SPP: 29 mmHg on the right foot**
- Blood examination
  - WBC12800, **CRP12.7**



# Debridement before revascularization to prevent sepsis



Pre



SPP  
29mmHg

Post



SPP  
59mmHg



9 mo



# Strategy for Infrapopliteal Intervention

SPP < 40-50 mmHg

***Establishment of at least one straight-line flow  
based on angiographic findings***

SPP > 40-50 mmHg

Debridement or  
minor amputation

SPP < 40-50 mmHg

More tibial/peroneal revascularization or  
Pedal revascularization

Post 1<sup>st</sup> intervention

Post 2<sup>nd</sup> intervention



**SPP**

**15/13**

**30/15**

**52/42**

**Below-the-Ankle**

***ISOLATED*** below-the-ankle



Above- and below-the-ankle

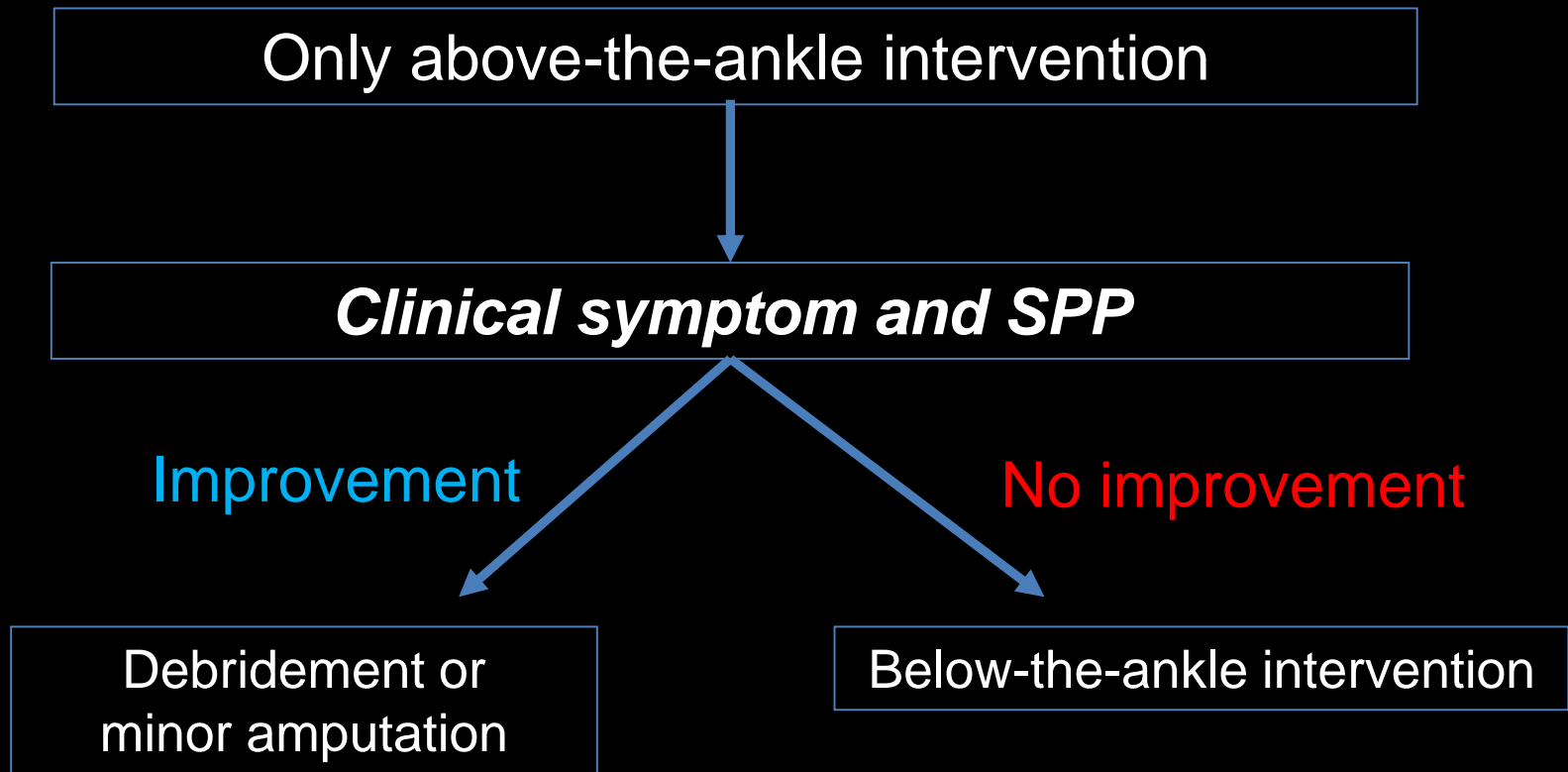
***SERIAL***



***SEPARATE***



# Below-the-Ankle Lesions that do not connect to Above-the-Ankle Lesions

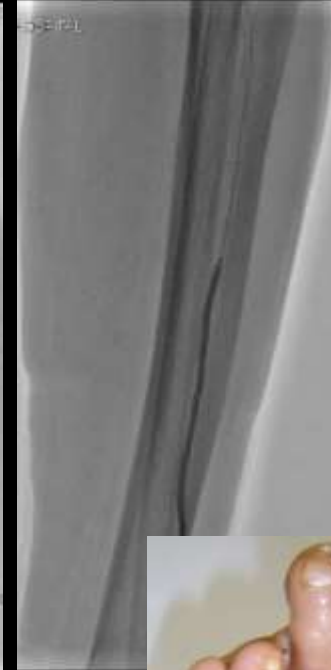
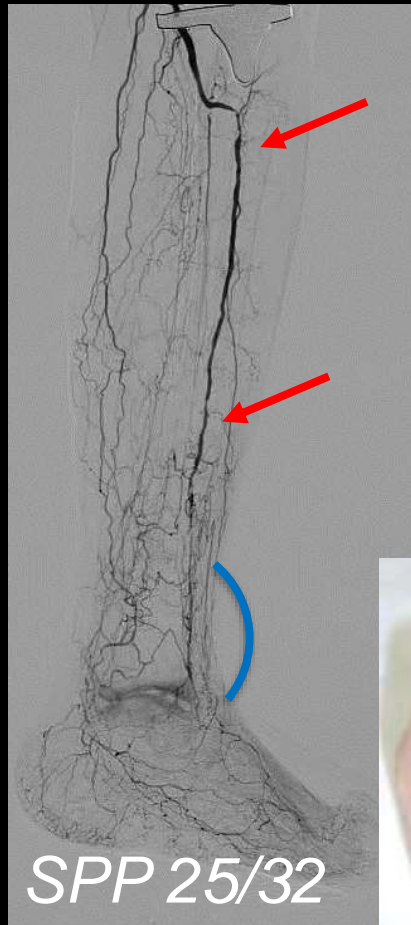


Strict indication of below-the-ankle intervention

# **SEPARATE type**

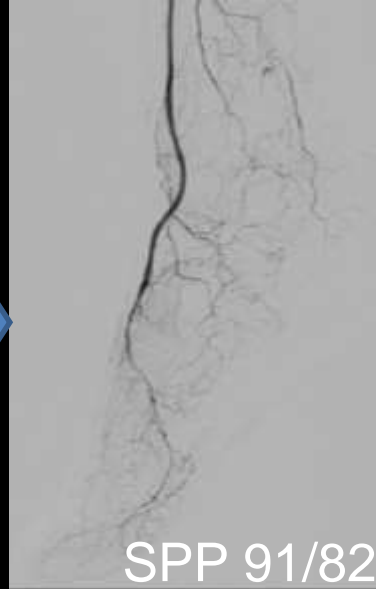
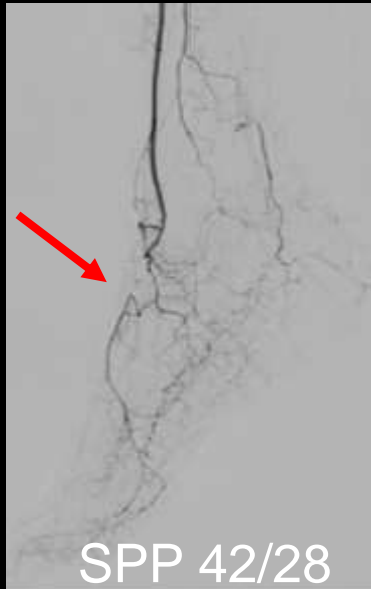
69y/o, Female, DM

Only above-the-ankle intervention



## ***ISOLATED type***

58 y/o, Female, DM, ESRD



## ***SERIAL type***

62 y/o, Male, ESRD







**SPP-guided intervention can  
make a huge difference**