A Primer of the Pedal Circulation

-Relevance to Revascularization Strategies-

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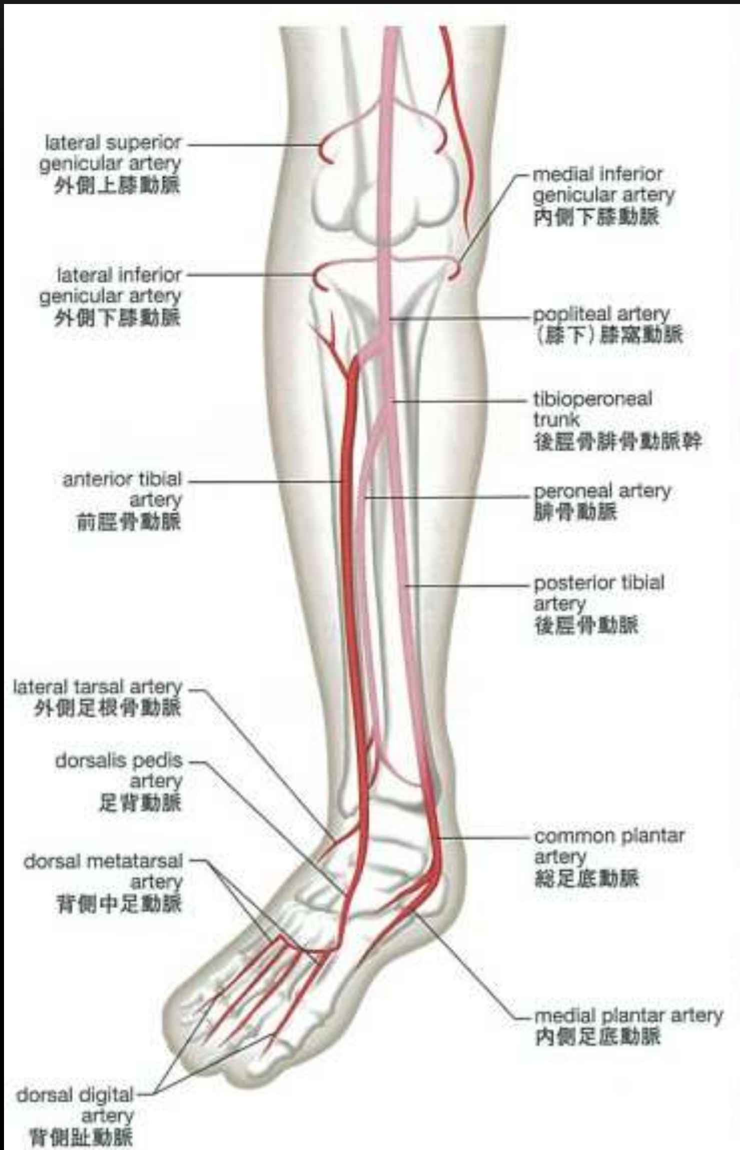
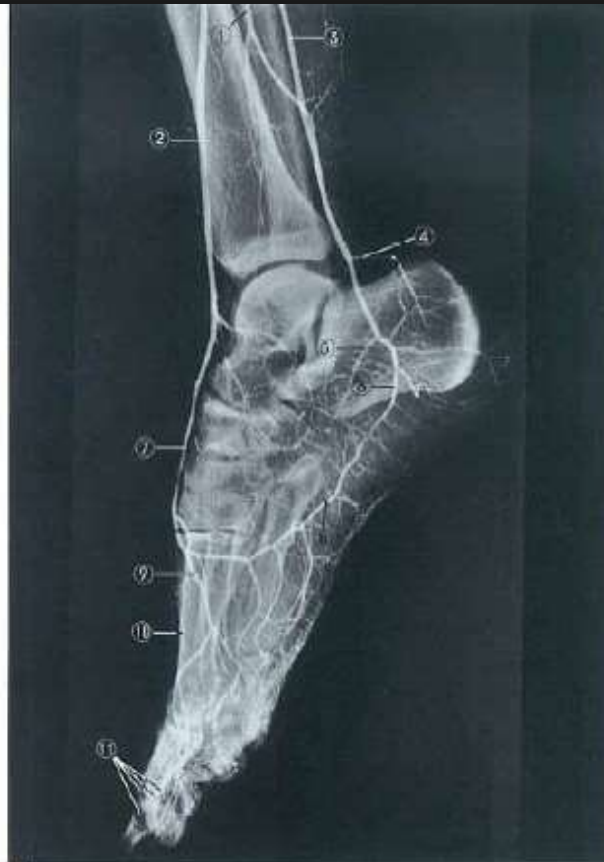
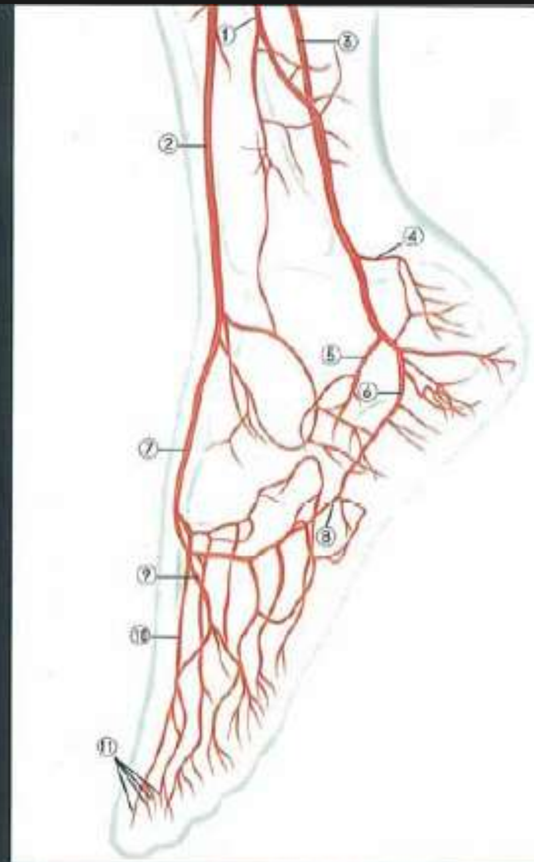
Anatomy of Below the Knee Arteries







① 腓骨動脈 fibular a.
② 前脛骨動脈 anterior tibial a.
③ 後脛骨動脈 posterior tibial a.
④ 踵骨枝 calcanear branch
⑤ 内側足底動脈 medial plantar a.
⑥ 外側足底動脈 lateral plantar a.
⑦ 足背動脈 dorsalis pedis a.
⑧ 足底動脈弓 plantar arch
⑨ 弓状動脈 arcuate a.
⑩ 足背中足動脈 dorsal metatarsal a.
⑪ 背側趾動脈及び足底趾動脈 dorsal digital a. and plantar digital a.

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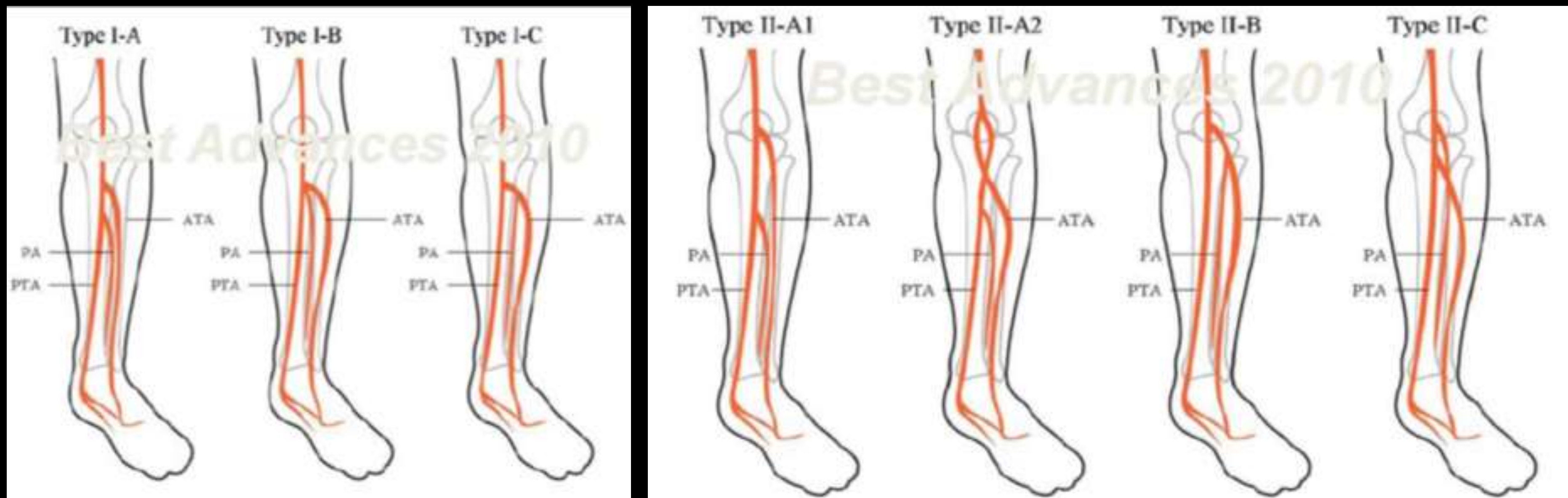

Kawarada O, et al. Catheter Cardiovasc Interv 2010; 76: 888-894

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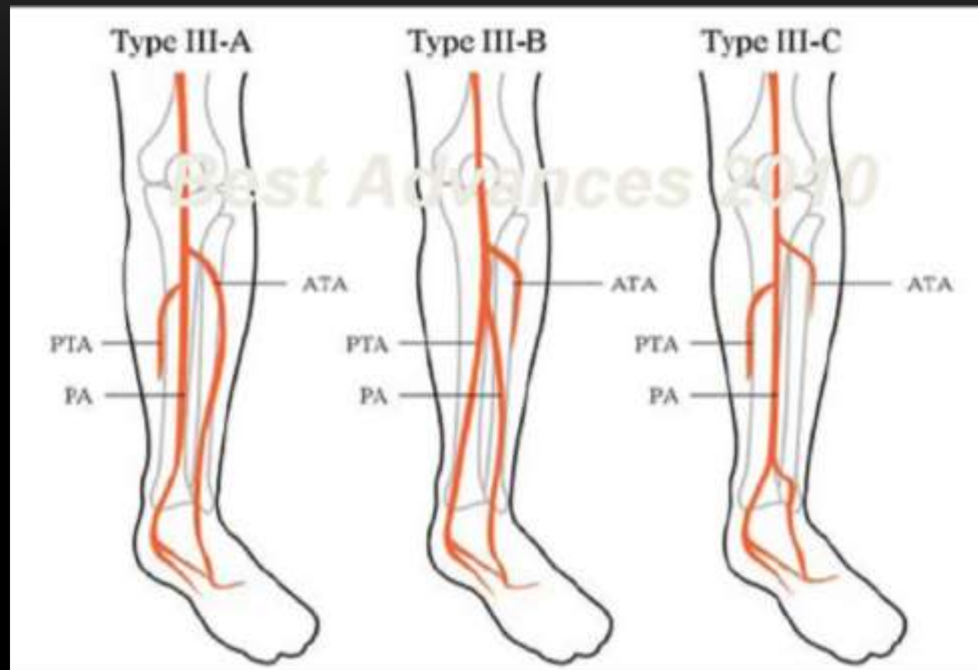

TABLE 1. Reports of Variations of Branching Pattern in the Popliteal Artery

	Angiography			Cadaveric
	Kim et al. (1989)	Day et al. (2006)	Kil et al. (2009)	Ozgun et al. (2009)
Type 1. Normal level of popliteal arterial branching				
A: Usual pattern (%)	92.2	90.7	89.2	90
B: Trifurcation (%)	2	3.2	1.5	2.5
C: Anterior tibioperoneal trunk (%)	1.2	0.3	0.1	NA
Type 2. High division of popliteal artery				
A: AT arises at or above the knee joint (%)	3.7	4.5	1.2	5
B: PT arises at or above the knee joint (%)	0.8	1.1	0.4	2.5
C: PR arises at or above the knee joint (%)	0.16	0.2	0	NA
Type 3. Hypoplastic or aplastic branching with altered distal supply				
A: Hypoplastic-aplastic PT (%)	3.8	0.8	5.1	NA
B: Hypoplastic-aplastic AT (%)	1.6	0.1	1.7	NA
C: Hypoplastic-aplastic PT and AT (%)	0.2	0.1	0.8	NA

AT, anterior tibial artery; PT, posterior tibial artery; PR, peroneal artery; NA, not available.

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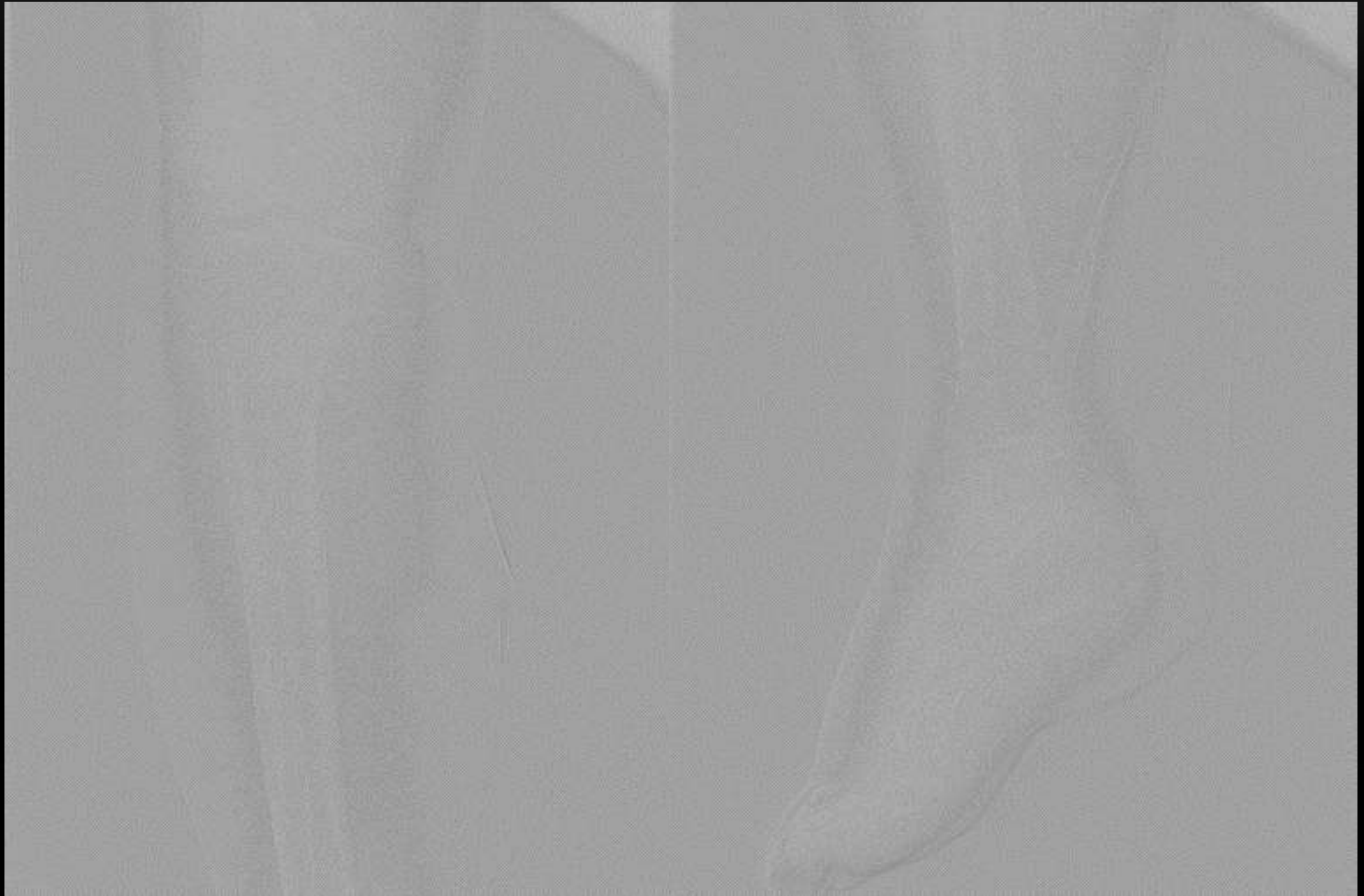
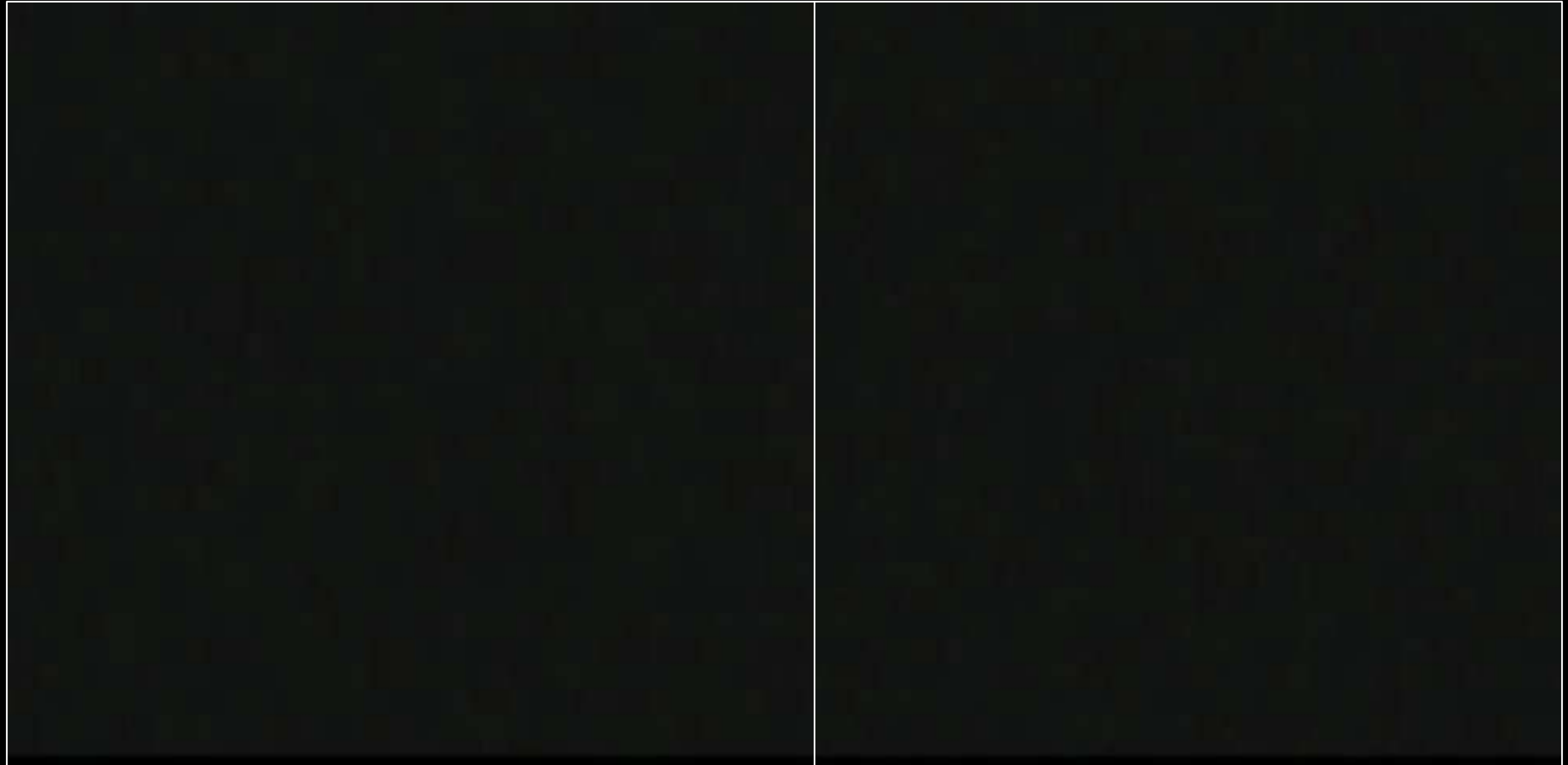
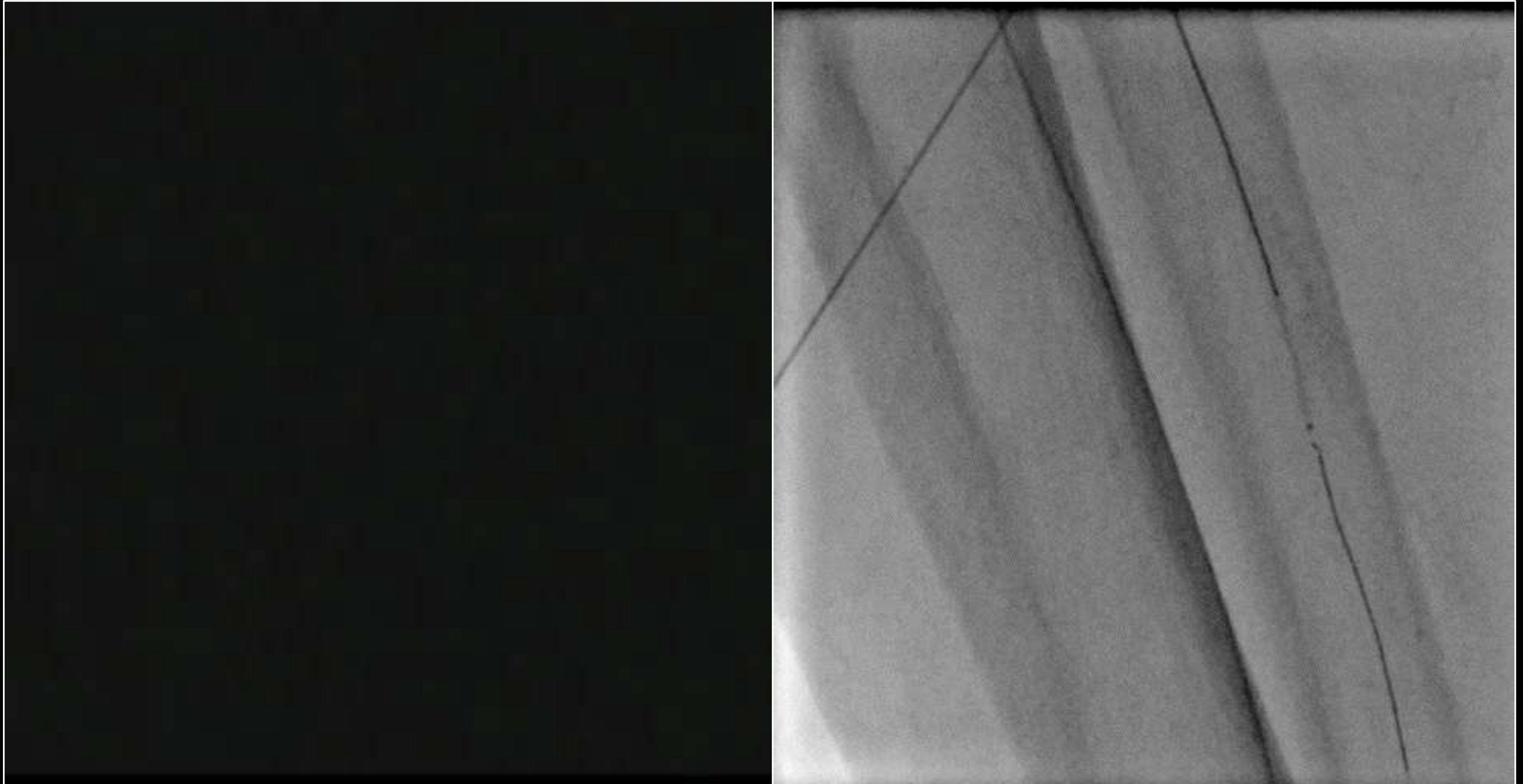


Anatomy of Below the Knee Arteries



Anatomy of Below the Knee Arteries



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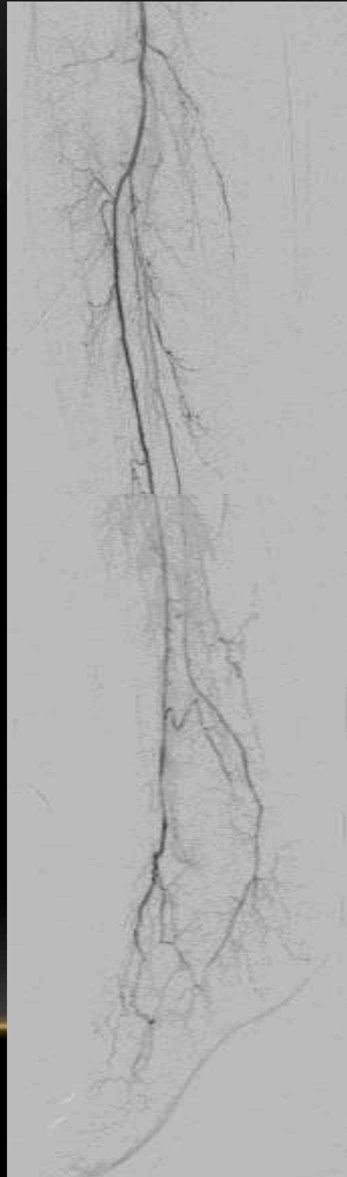
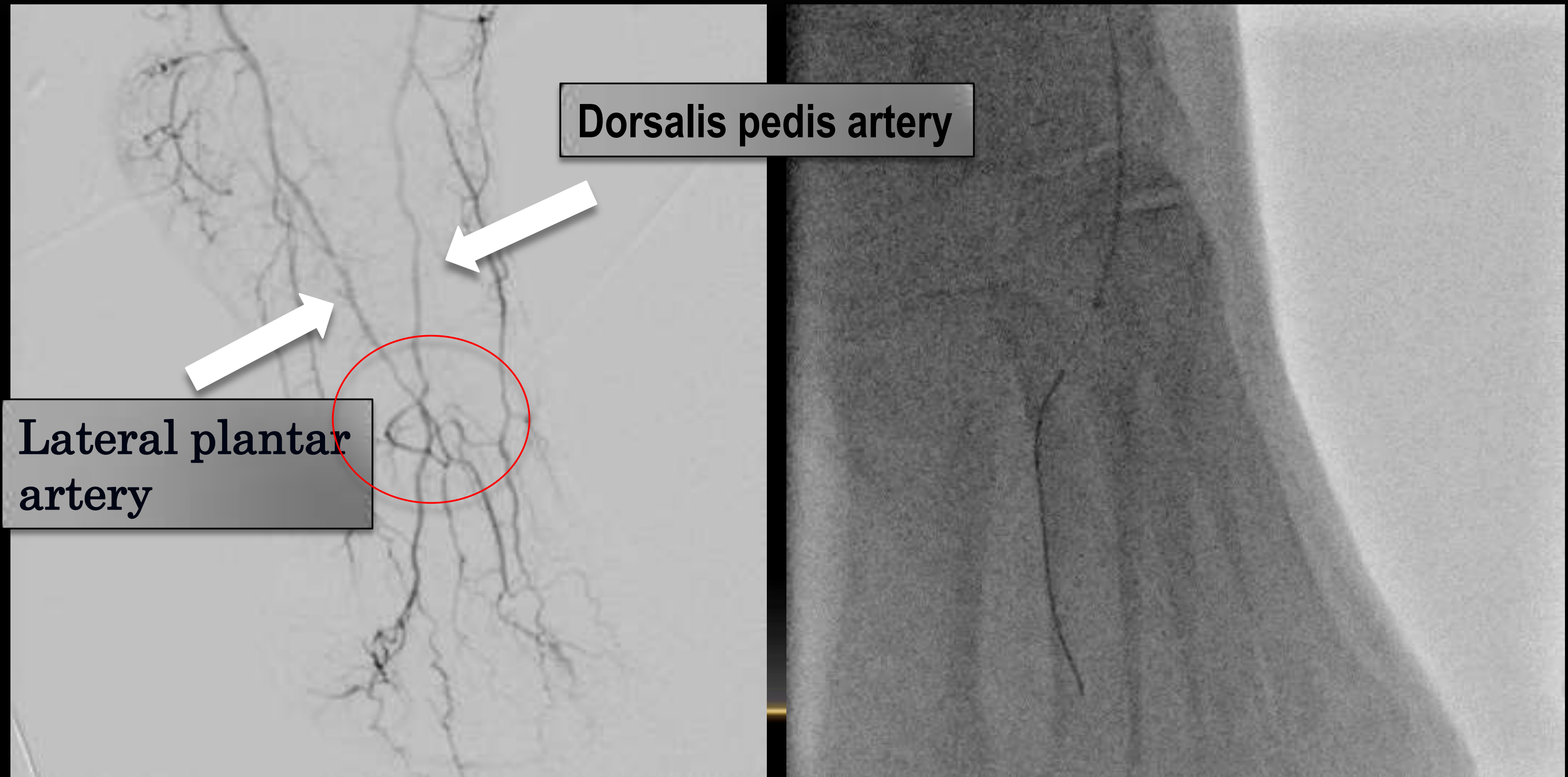


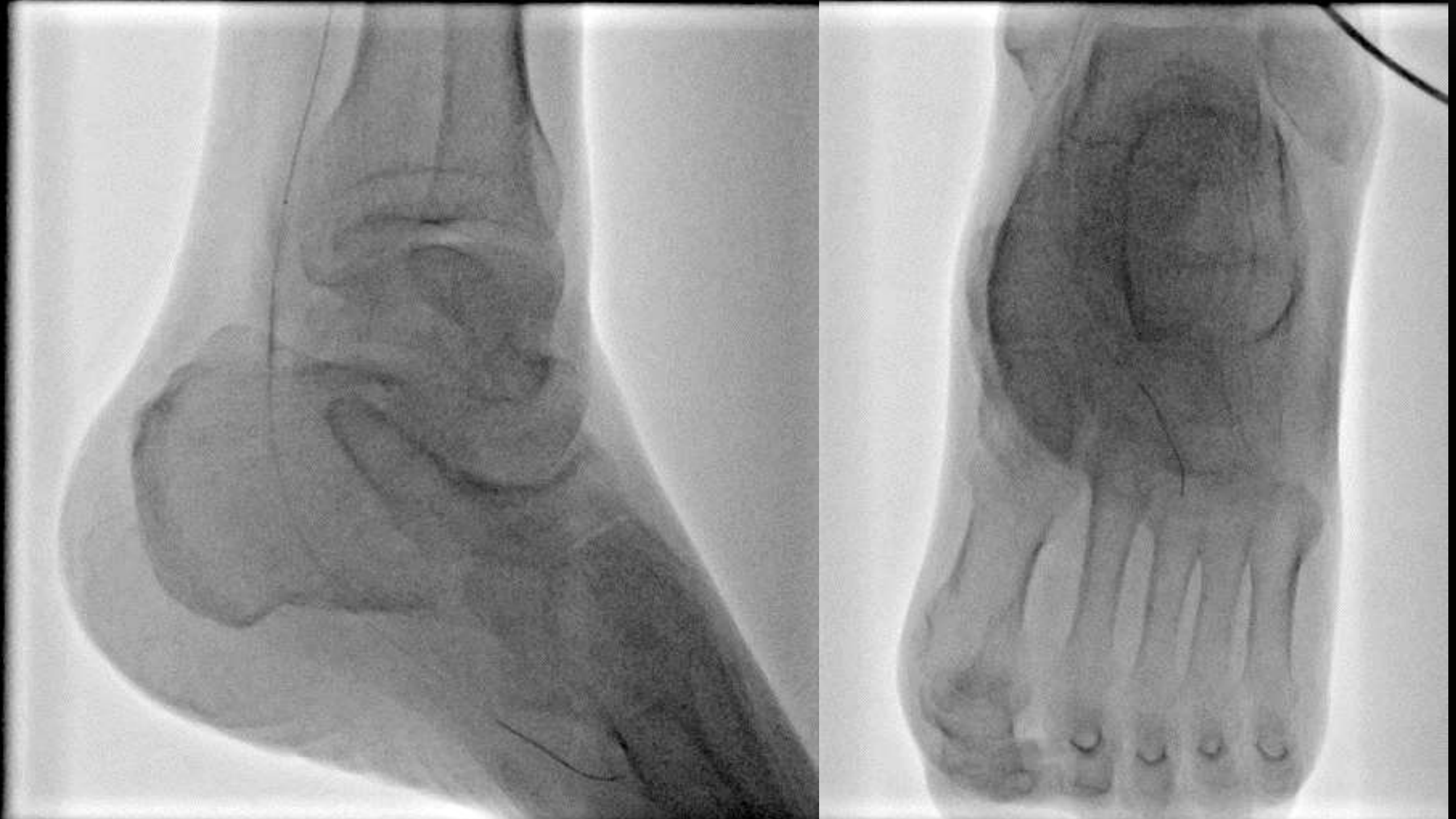
Trans-pedal Arch Approach

" Figure-of-Eight "

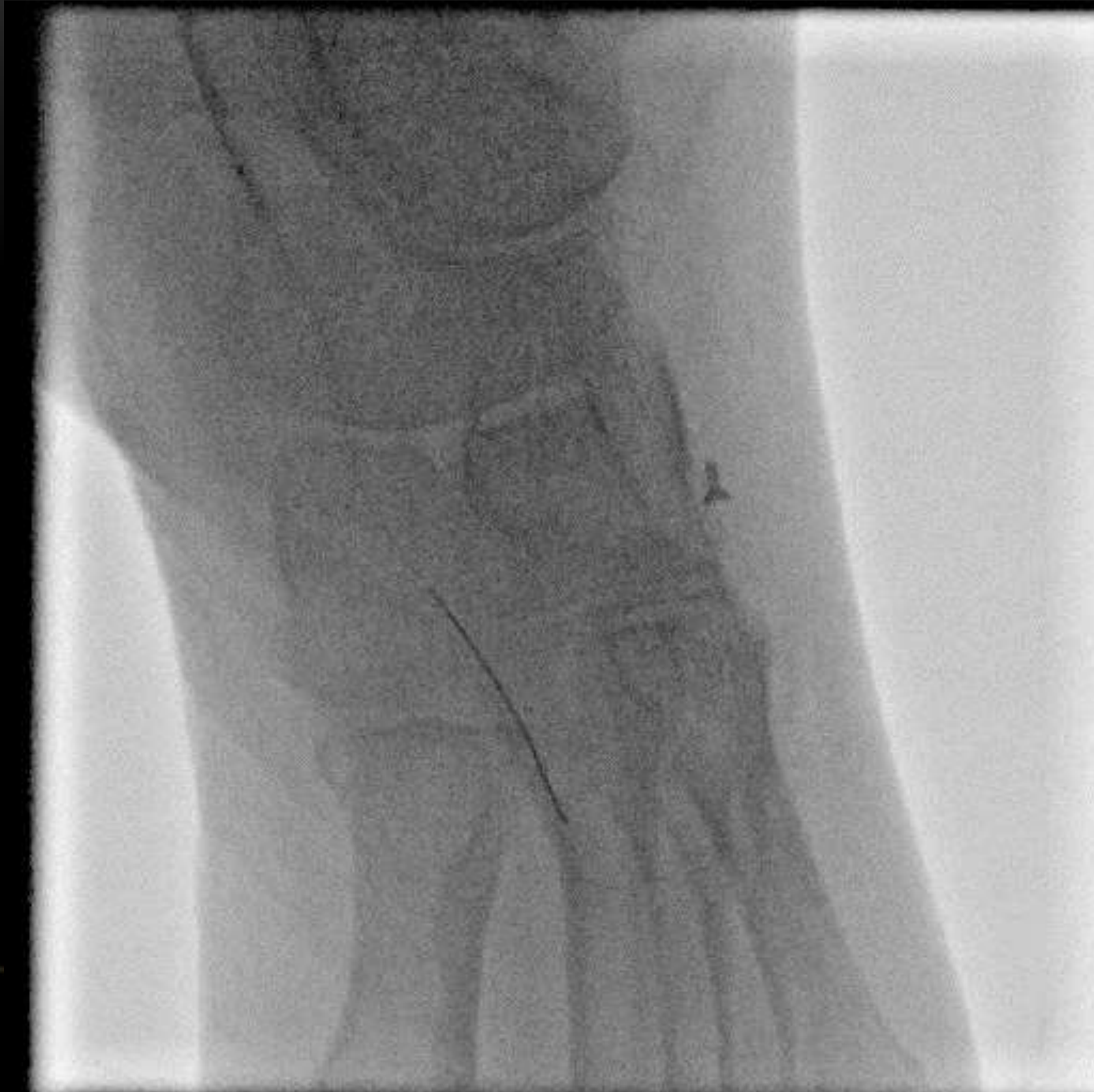
Lt. Foot



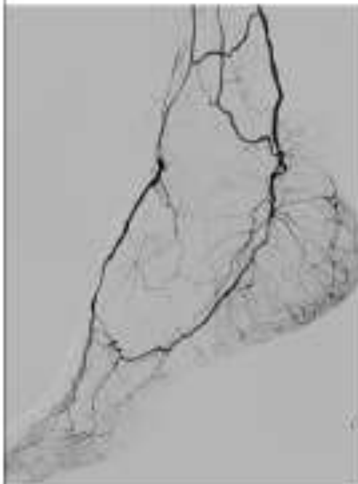
Trans-pedal arch approach

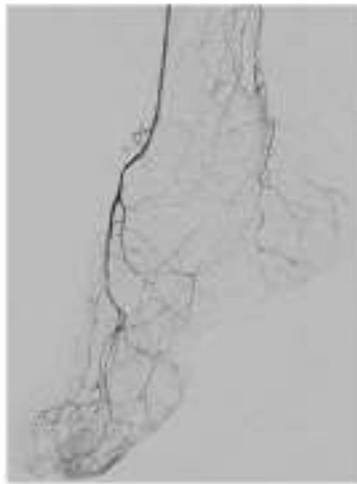


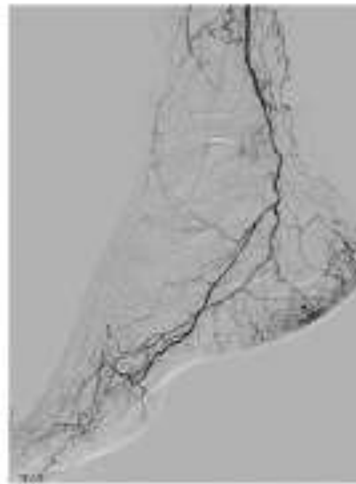
Trans-pedal arch approach

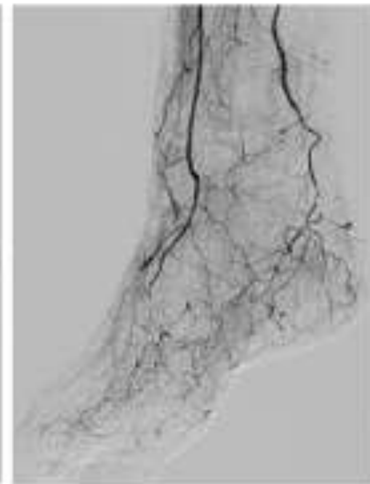


Pedal Arch Classification



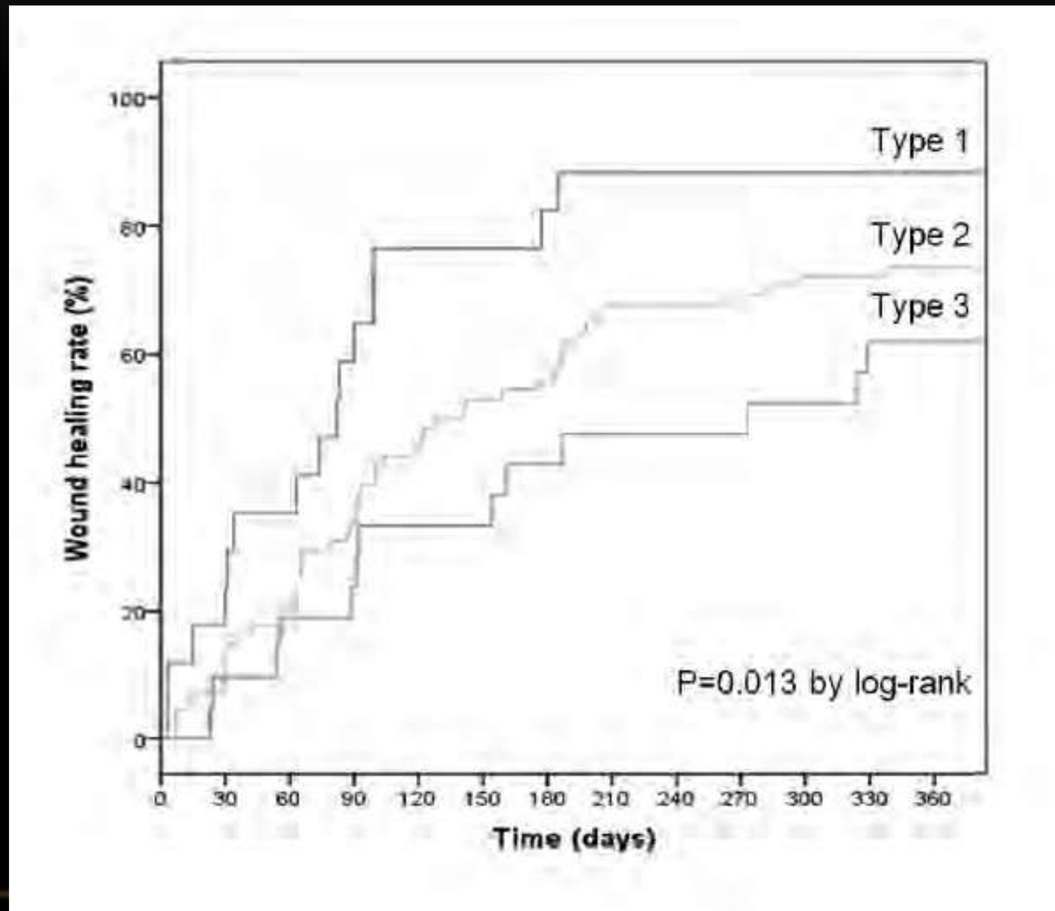






Kawarada O, et al. Catheter Cardiovasc Interv 2012; 80: 861-871

Wound Healing Rate stratified by the Pedal Arch Classification



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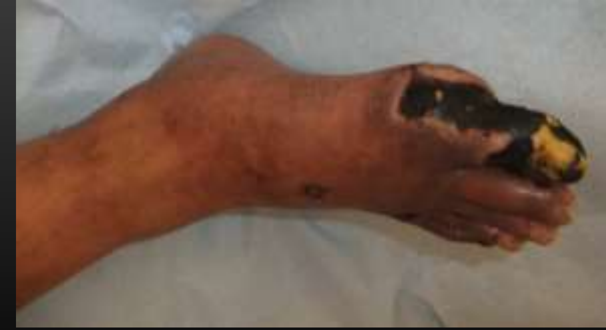
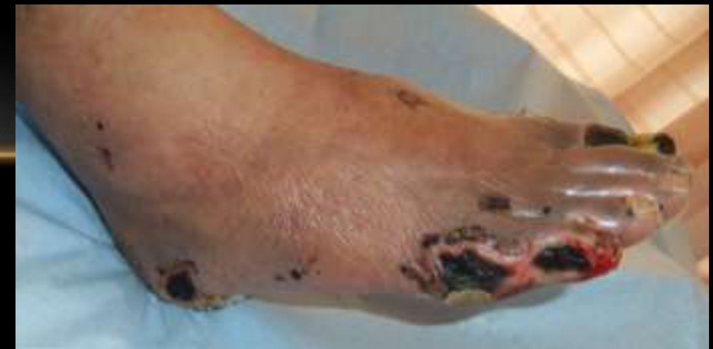
Case1 ： 69y.o., Male



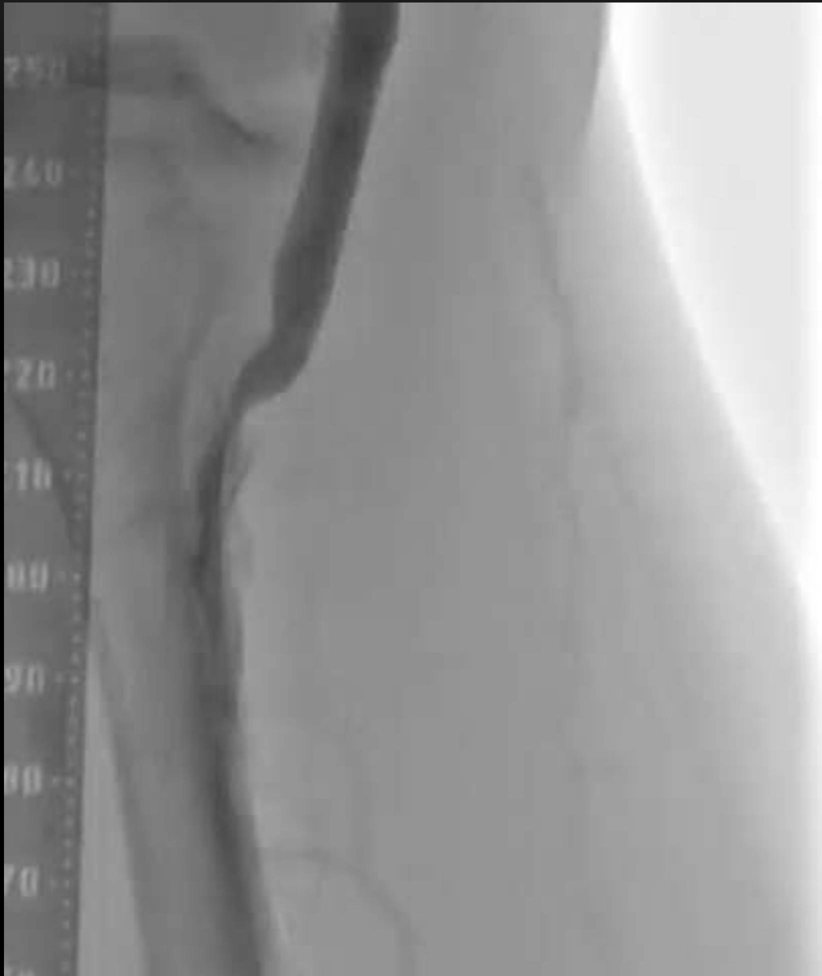
Rt. ATA, PA, LP occlusion, PTA 99%

Clinical data:

PAOD, Rutherford 6, lt. multiple gangrenes
Post EVT: SFA, pop, BK many times at former hospital
ABI: 0.54
SPP: ummeasurable because of pain
OMI, Post PCI, CHF
ESRD(HD)
DM

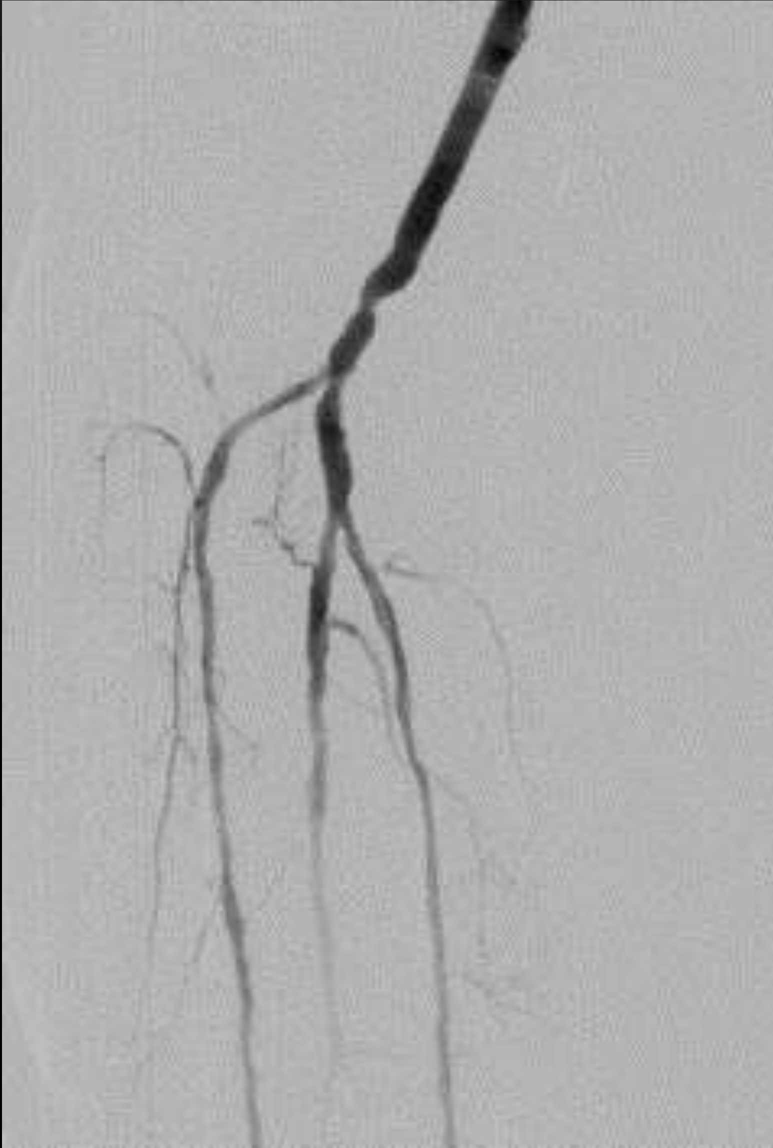


Which vessel should we open?

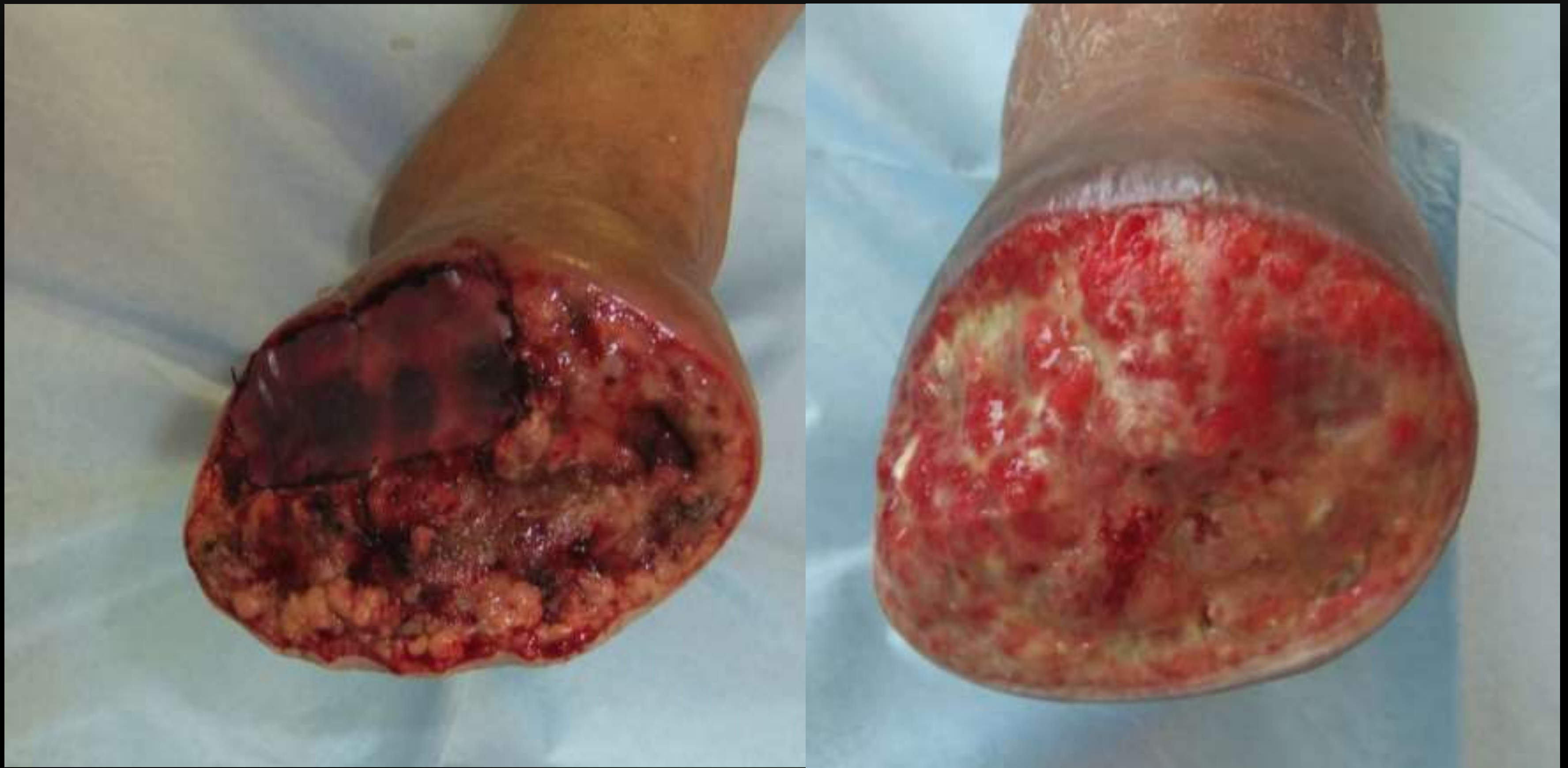


ATA: CTO　PTA: 99% stenosis
PA: CTO　Lateral plantar: CTO

Which vessel should we open?

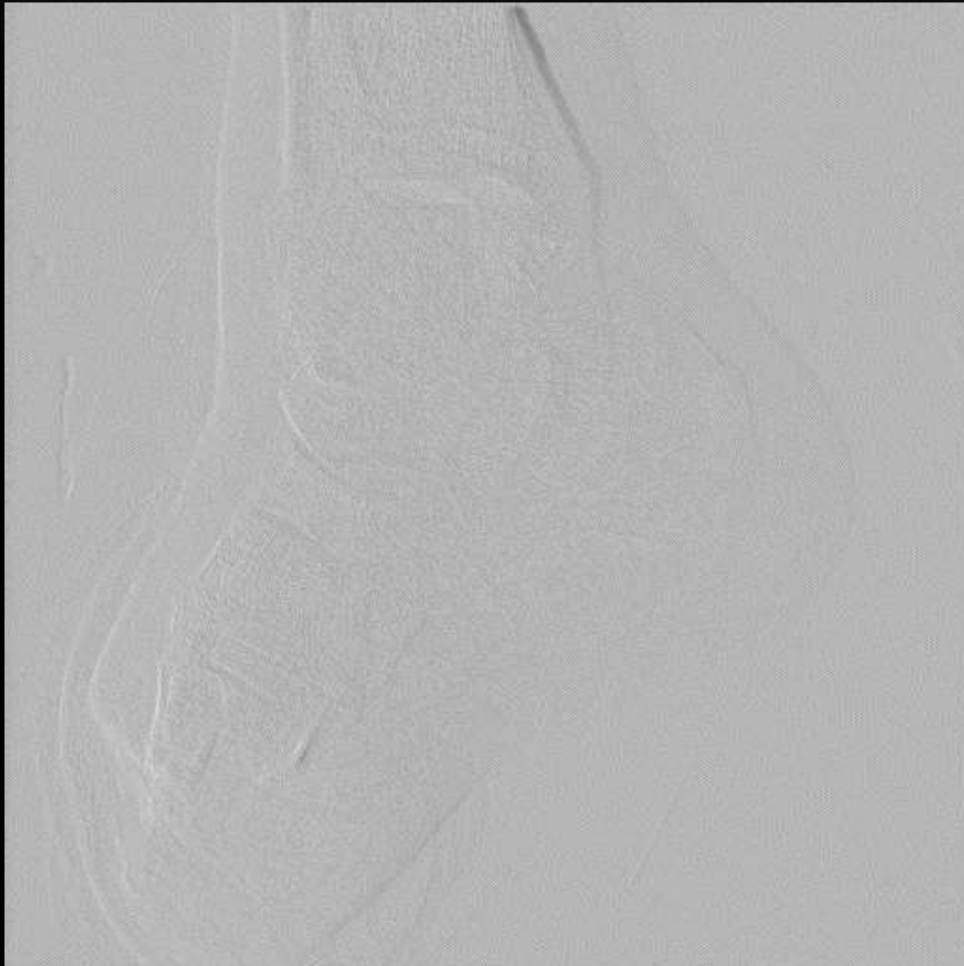


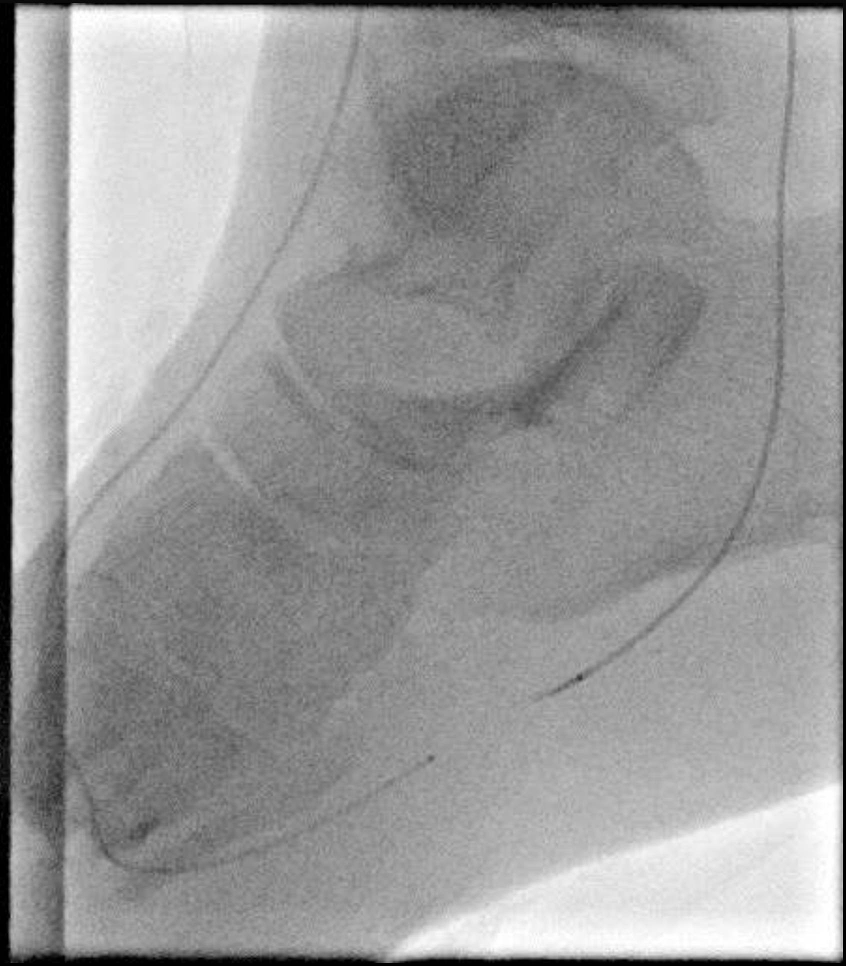
Which vessel should we open?



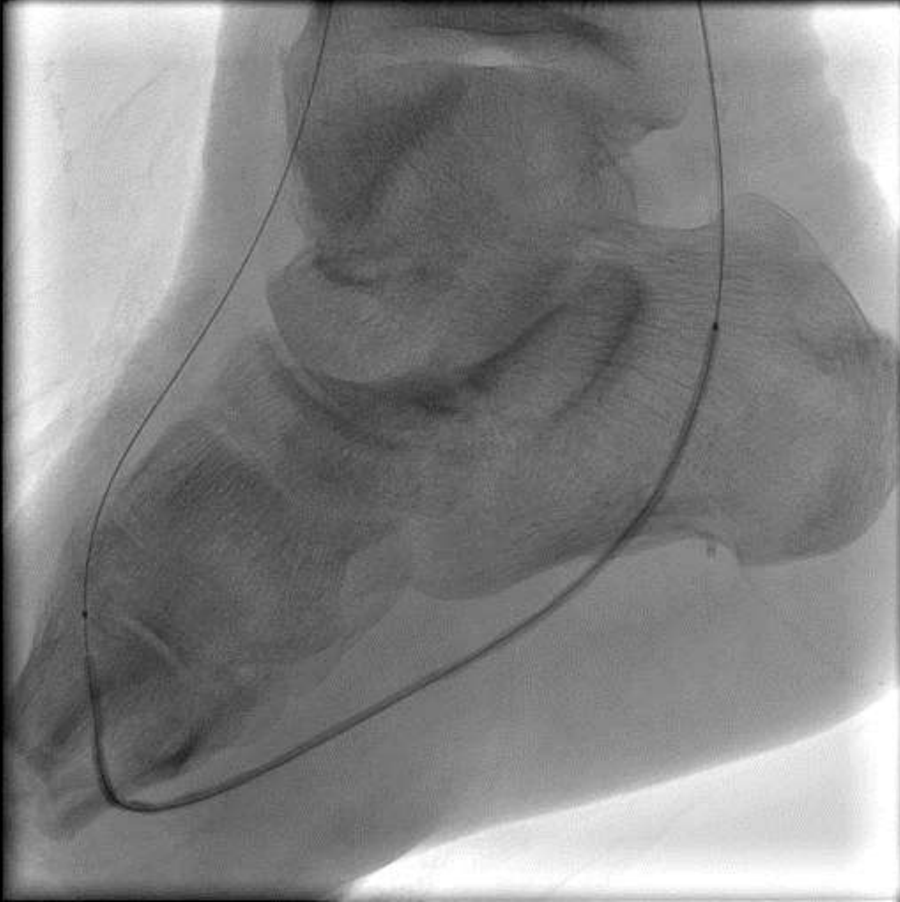
SPP Dorsal 56, Plantar 36mmHg

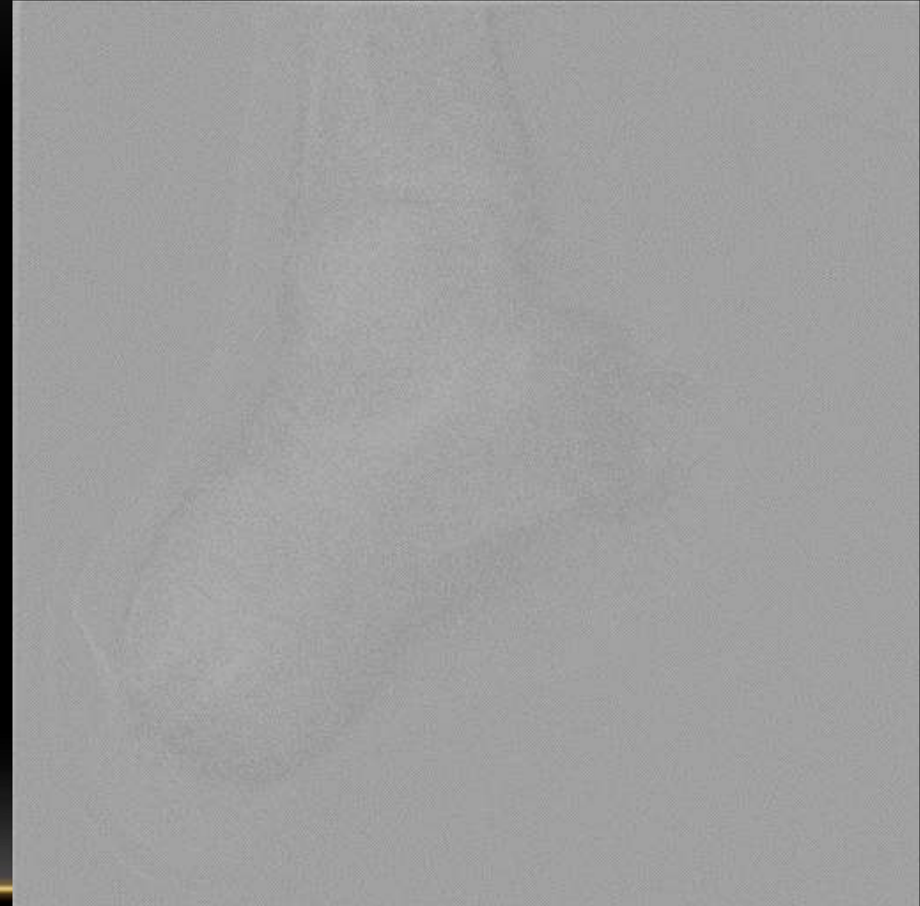
Which vessel should we open?



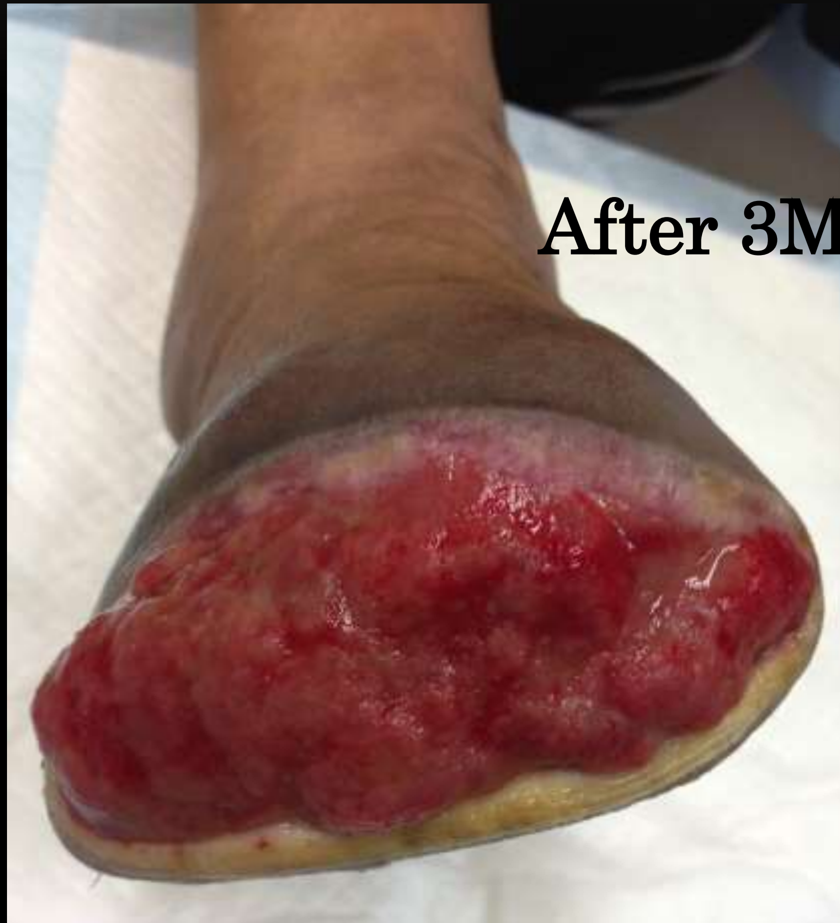


Which vessel should we open?

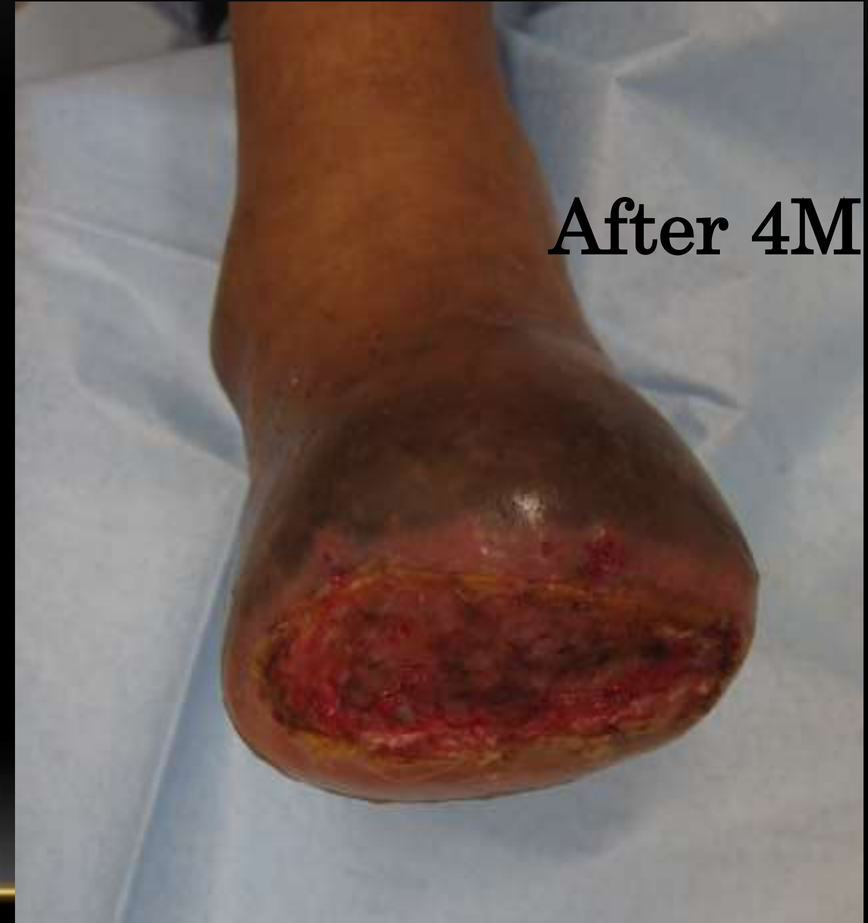




Which vessel should we open?

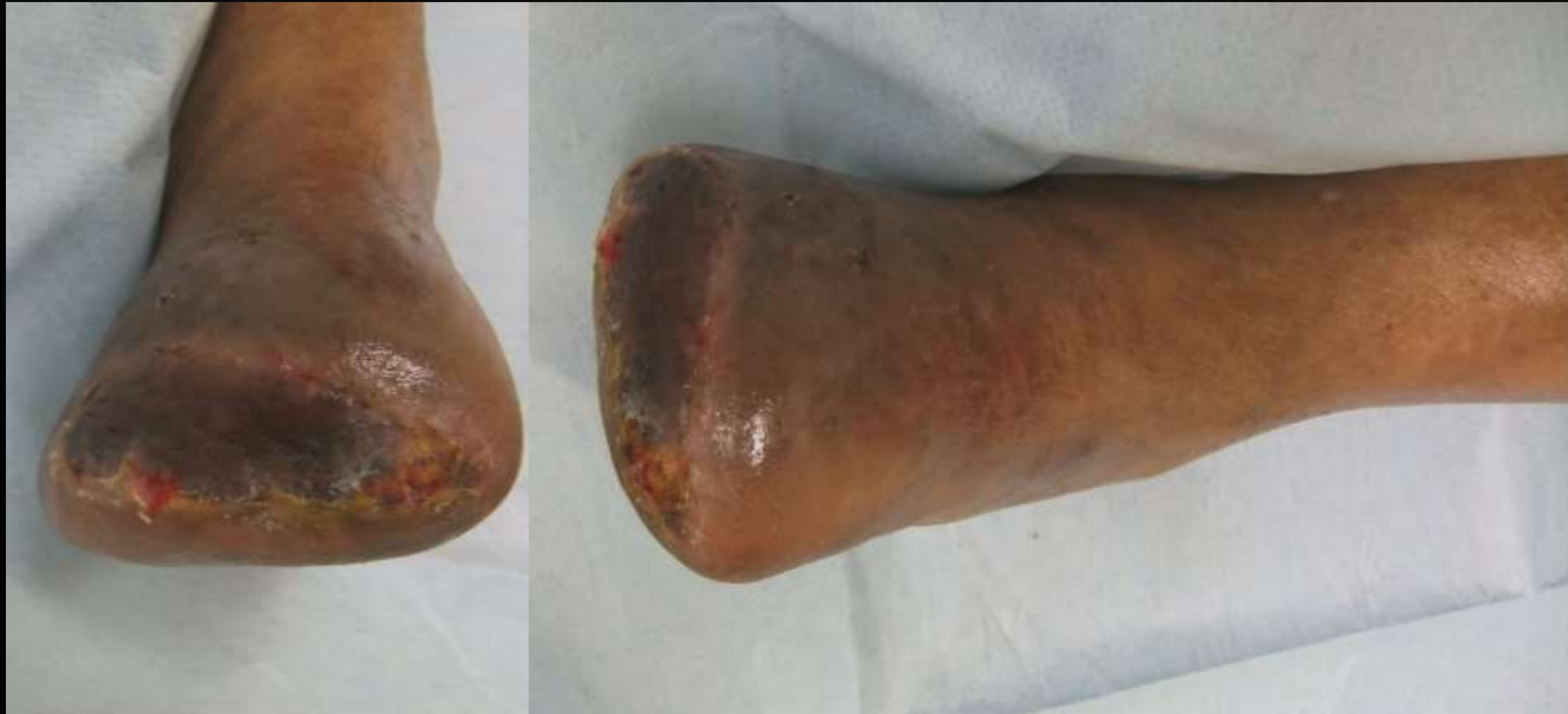


SPP Dorsal 48, Plantar 79mmHg



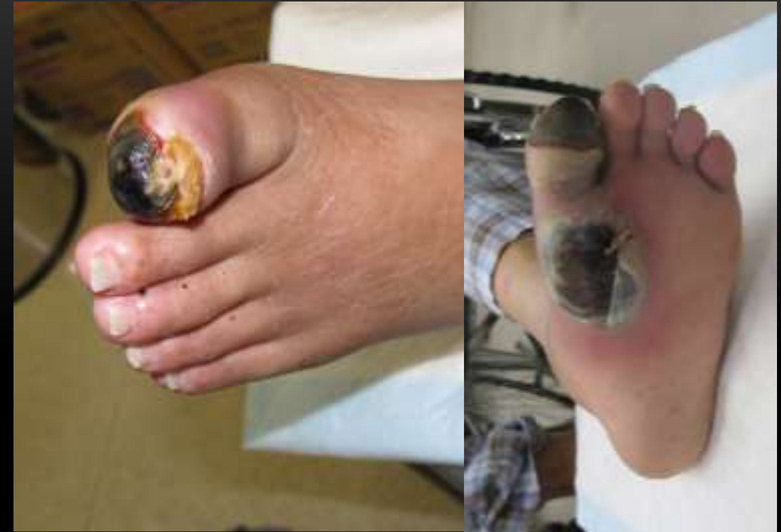
Skin grafting

Which vessel should we open?



After 6M

Case2 ： 63y.o., Male

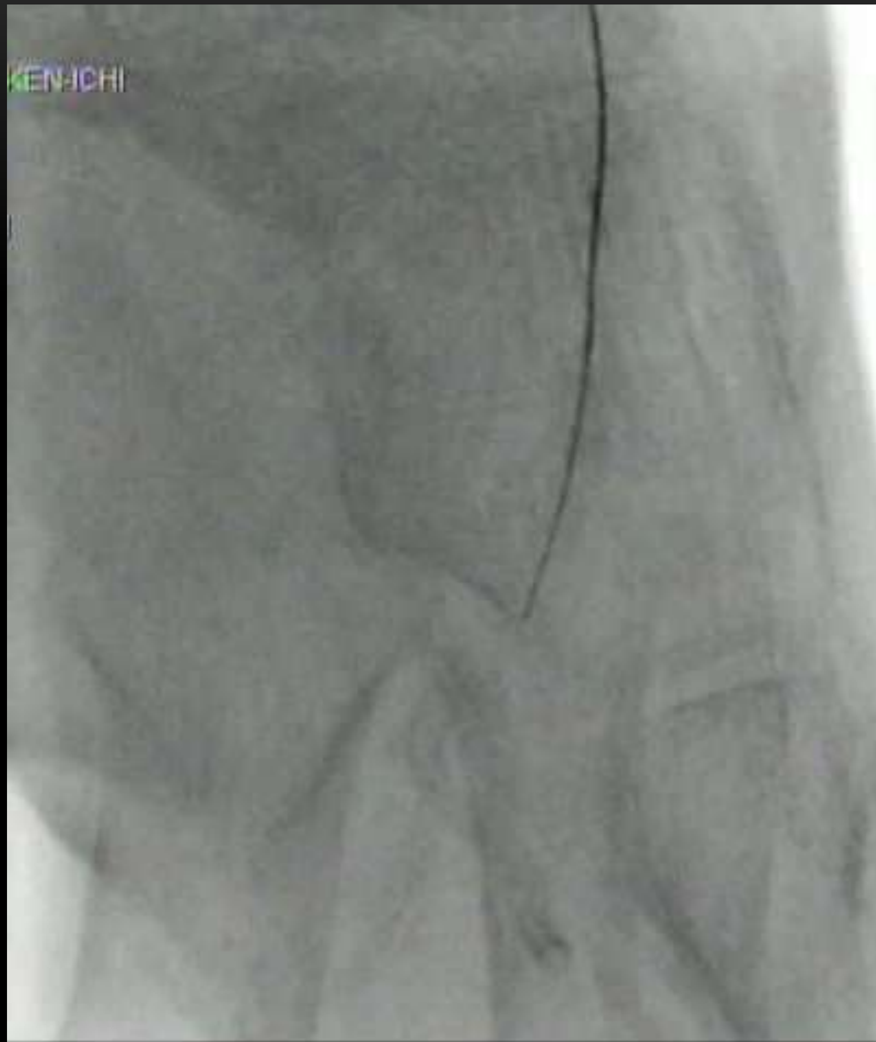


Lt. PTA, DPA occlusion

Clinical data:

PAOD, Rutherford 6, lt. 1st toe gangrene
Post EVT to ATA: Failed antegrade recanalization attempt to DPA at former hospital
ABI: 0.91
SPP: lt. D 16/P 18mmHg
Post CABG, CHF(-)
ESRD(HD)
DM,HT

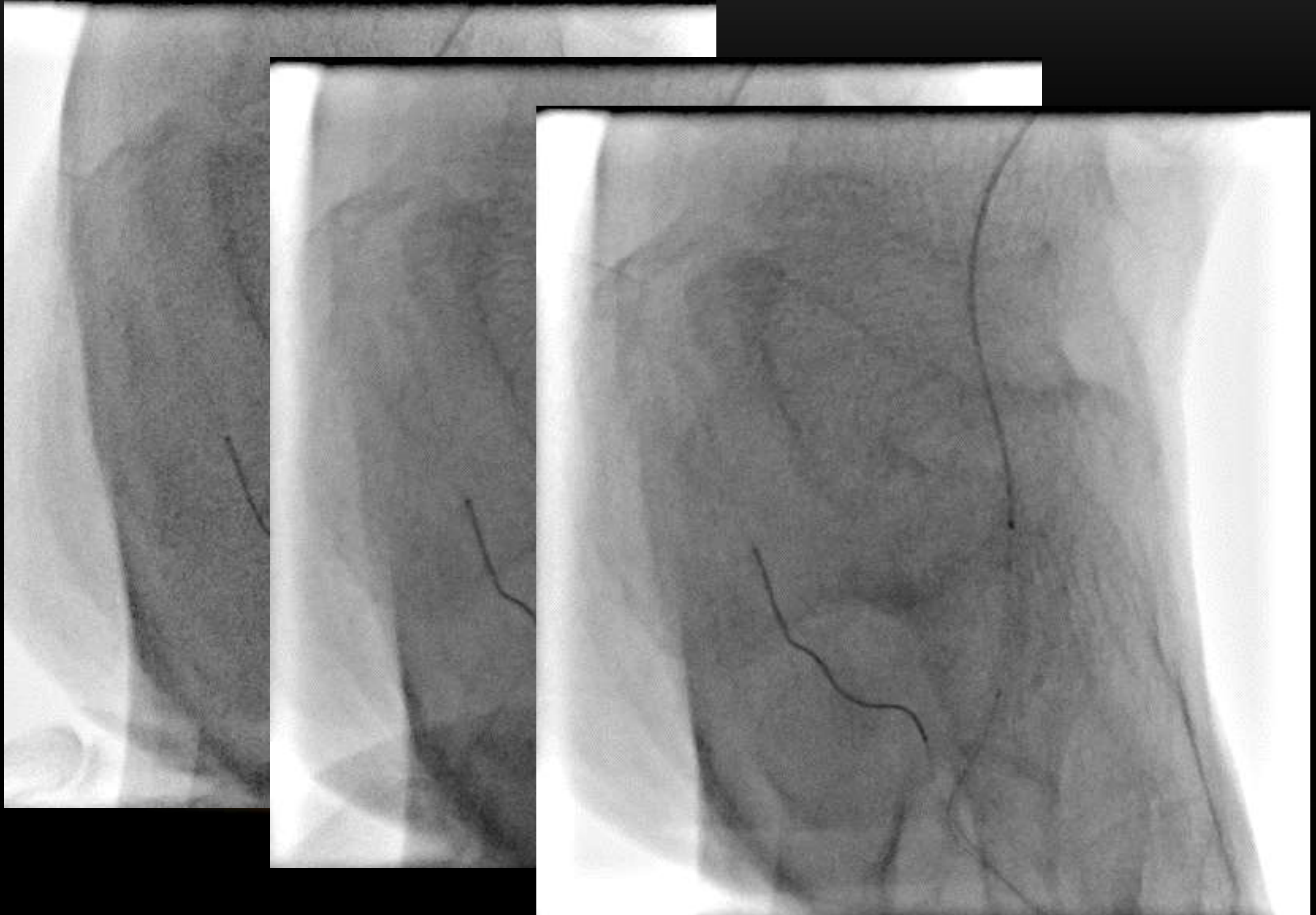
Control Angiography



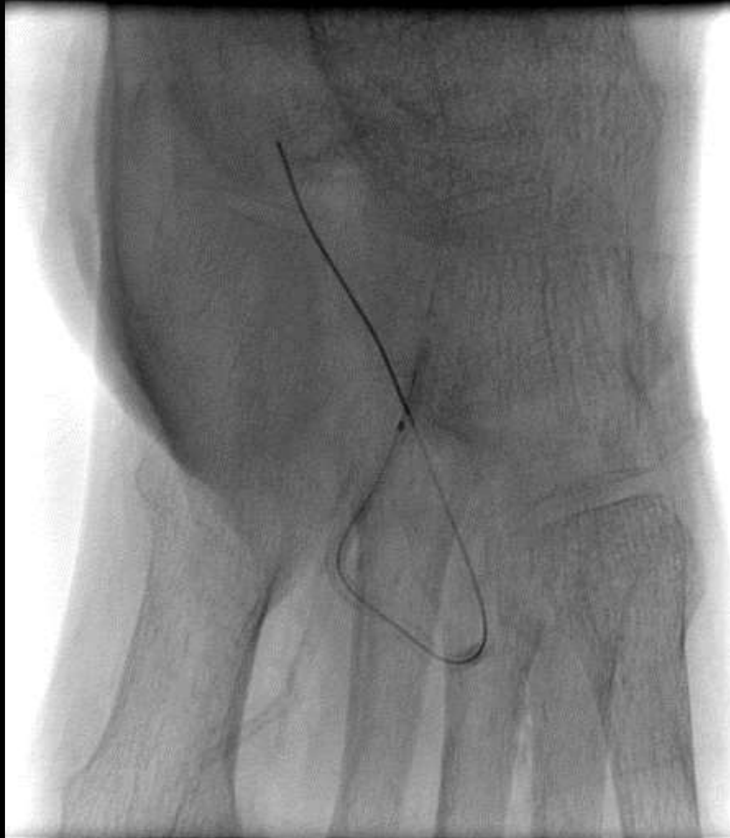
Astato XS 9-40

Chevalier floppy

Needle Cracking Technique

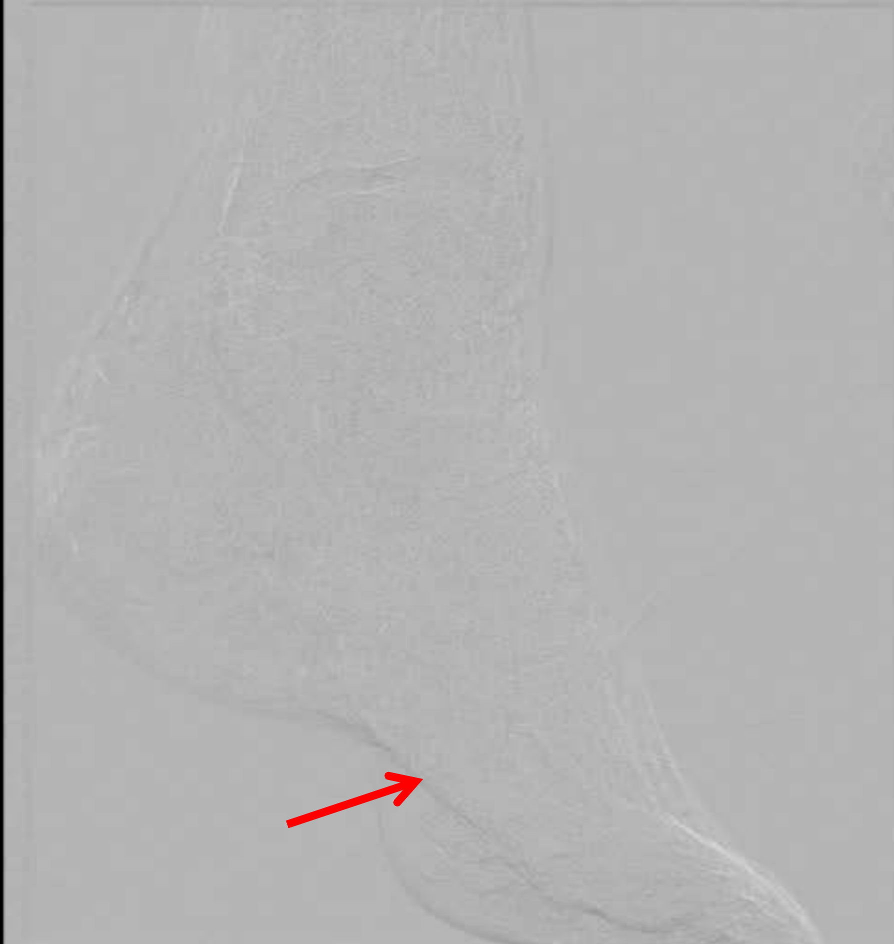


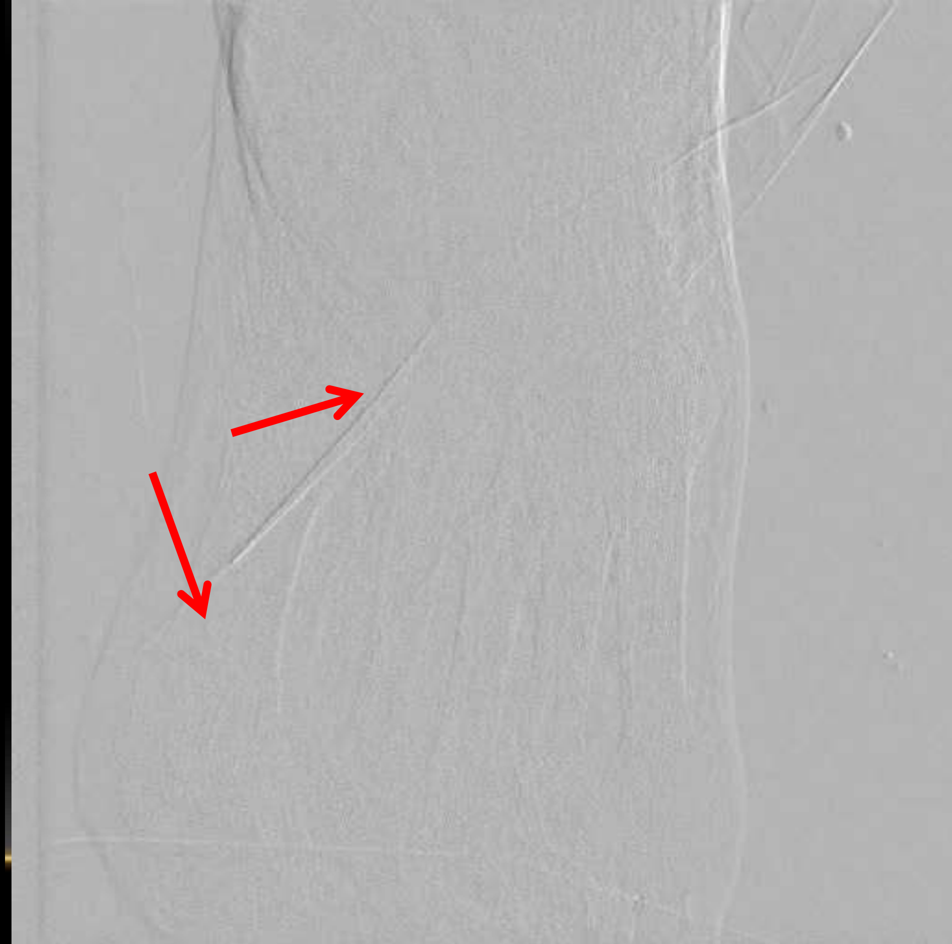
Needle Cracking Technique



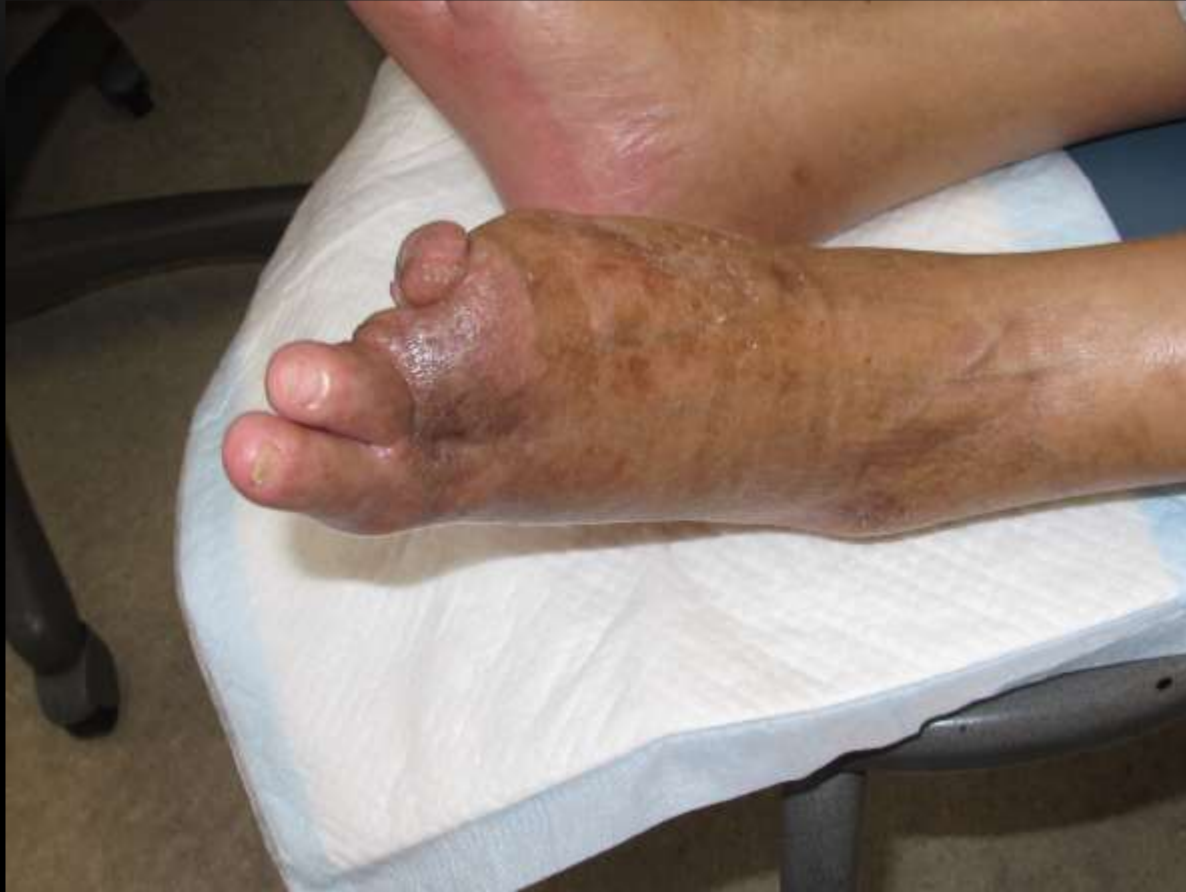
RAPIDSTREAM 2.0*20mm

Completion Angiography





Wound healing



SPP: Dorsal 16→48
Plantar 18→28

Conclusion

- We should be familiar with an anatomy of below the knee arteries and also these anatomic variation.

- Reconstruction of pedal arch is the key of wound healing.

- Establishment of straight line toward the wound is important.

WHERE THERE'S A WILL THERE'S A WAY

Thank you for your attention.