

# Plantar-Pedal Loop Methodology: Tools and Technique

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GVM Care and Research

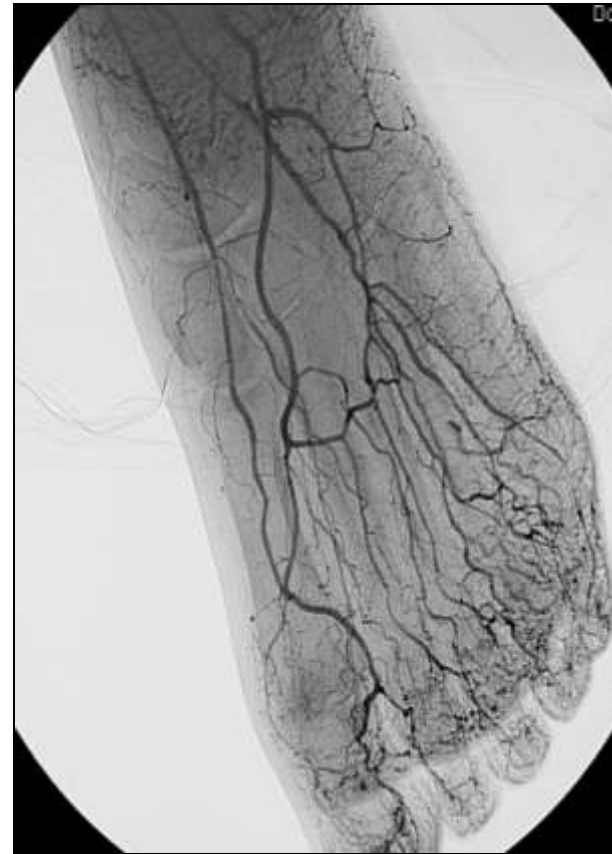
Palermo

## Foot Vessels Distribution

- Balanced Circulation
- Dominant DPA
- Dominant LPA
- Tarsal loop
- Absence of the pedal-plantar loop
- Other abnormalities

[Alson et al. 1997; Manzi et al. 2011; Standring 2008].

# Balanced Circulation



79,15%

## Dominant DPA



**The dorsalis pedis artery supplies I metatarsal artery;**

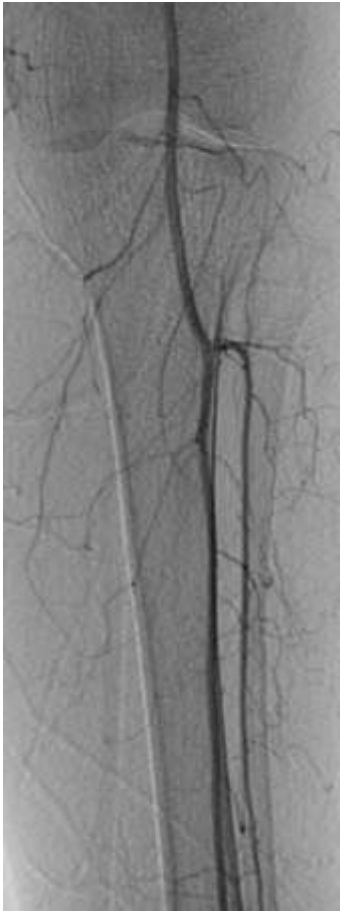
**in this patient the medial and lateral plantar arteries are hypoplastic.**

**0,4%**

## Dominant LPA

The dorsalis pedis artery is absent in 12% of cases;

in this patient the lateral plantar artery is the predominant artery for the arch.



13,2%



[6-12%, Yamada et al. 1993]

## Tarsal Loop



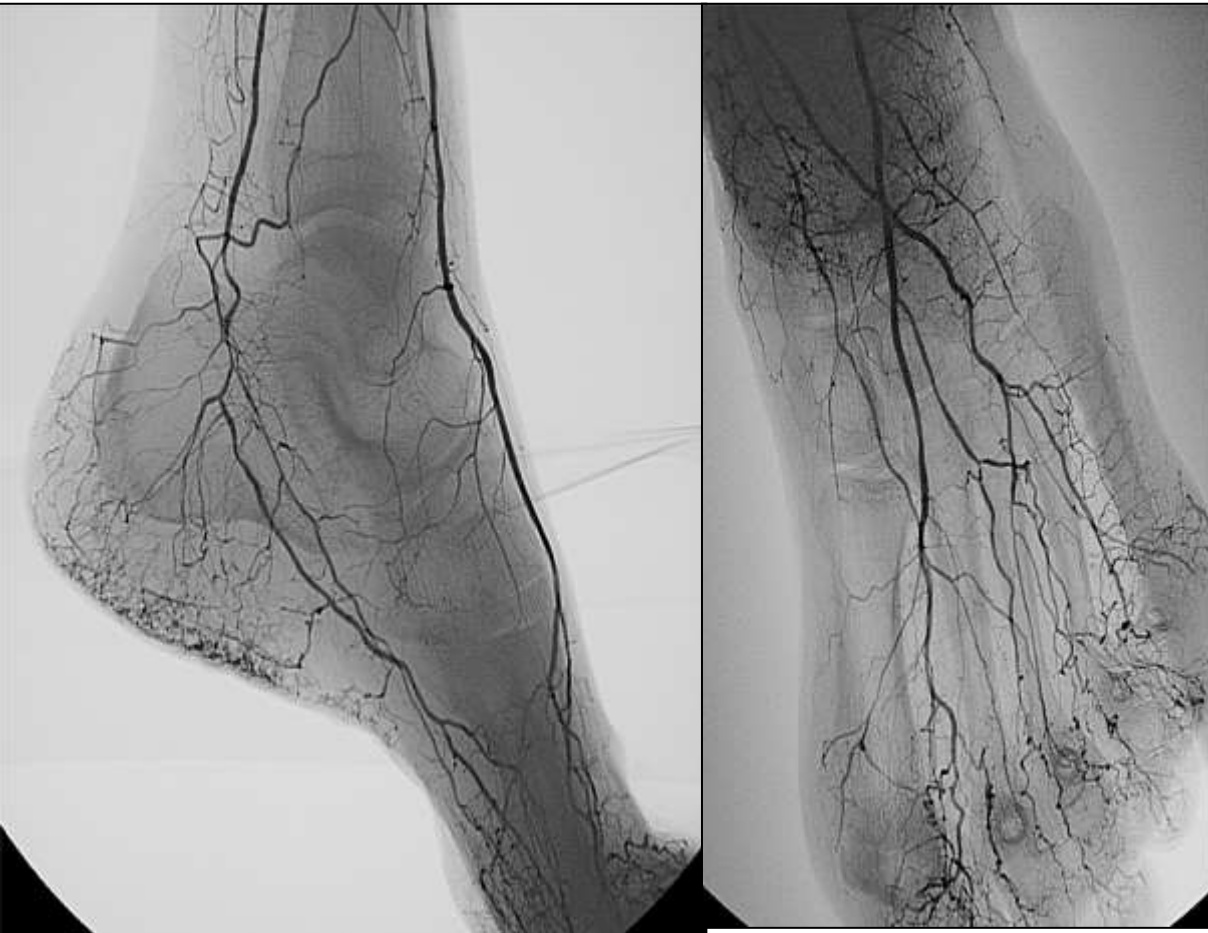
7,2%



The dorsalis pedis artery is absent in 12% of cases;

in these patients the lateral tarsal artery is the predominant artery for the I toe.

## Absence of the Pedal-Plantar Loop



### Absence of plantar arch.

The dorsalis pedis is the predominant artery for the I and II toe.

The lateral plantar artery, is the predominant artery supplying the III, IV and V toe.

0,2%

# Targets and Strategies in CLI Revascularization

- **Wound Related Artery (Angiosome)**
- **Well demarcated and isolated foot wounds (Toes, Heel, Dorsum)**

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## • **Complete Revascularization**

- **Huge wounds and TMA needs more than one Angiosome**

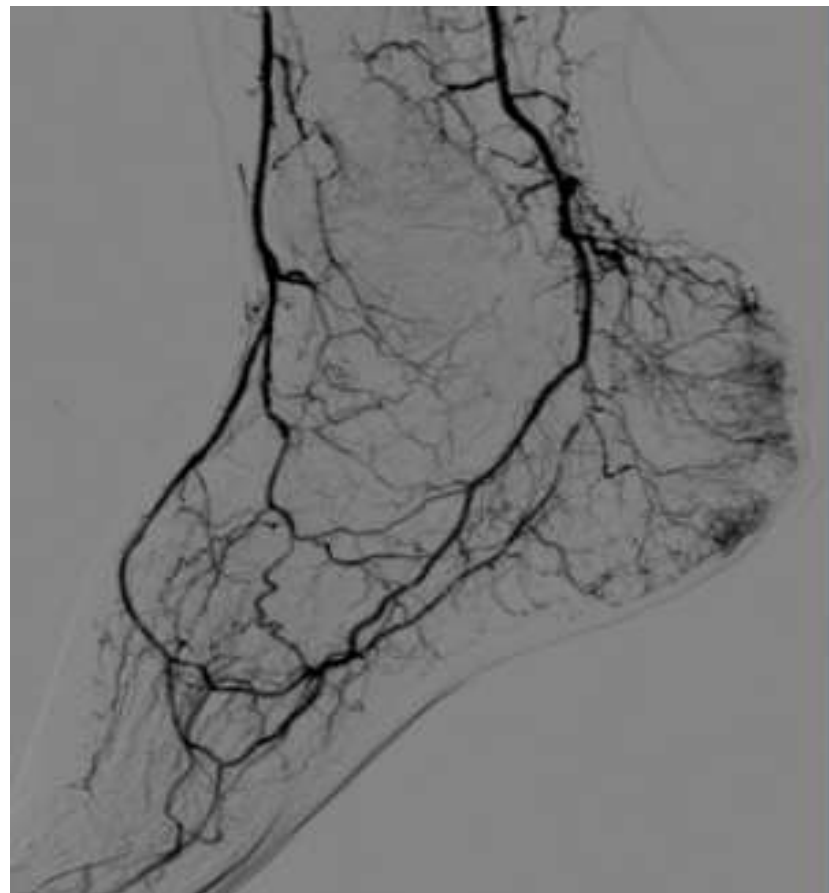


# *Fix minimum objective and maximum time*

- Minimum objective is ONE VESSEL;*
- Maximum is THREE + Foot;*
- After two hours, complications may increase...  
... exponentially;*

# Pedal Plantar Loop Technique

- Recanalization of both the pedal and plantar arteries and their anatomical anastomoses.<sup>1</sup>



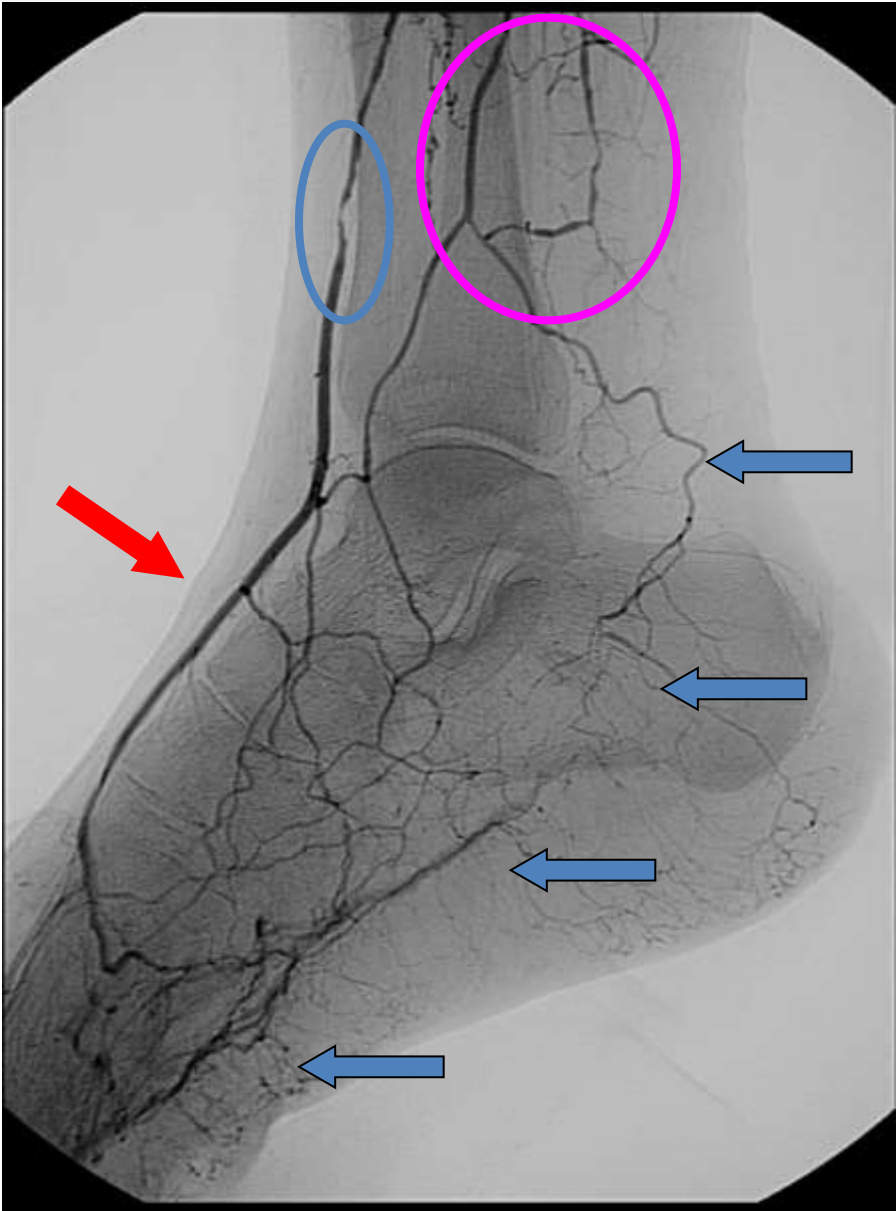
# Pedal Planter Loop Technique

- Antegrade femoral, common femoral or proximal SFA puncture with an 18 gauge needle.
- Insertion of 11cm long sheath after wiring the SFA
- Baseline angio performed

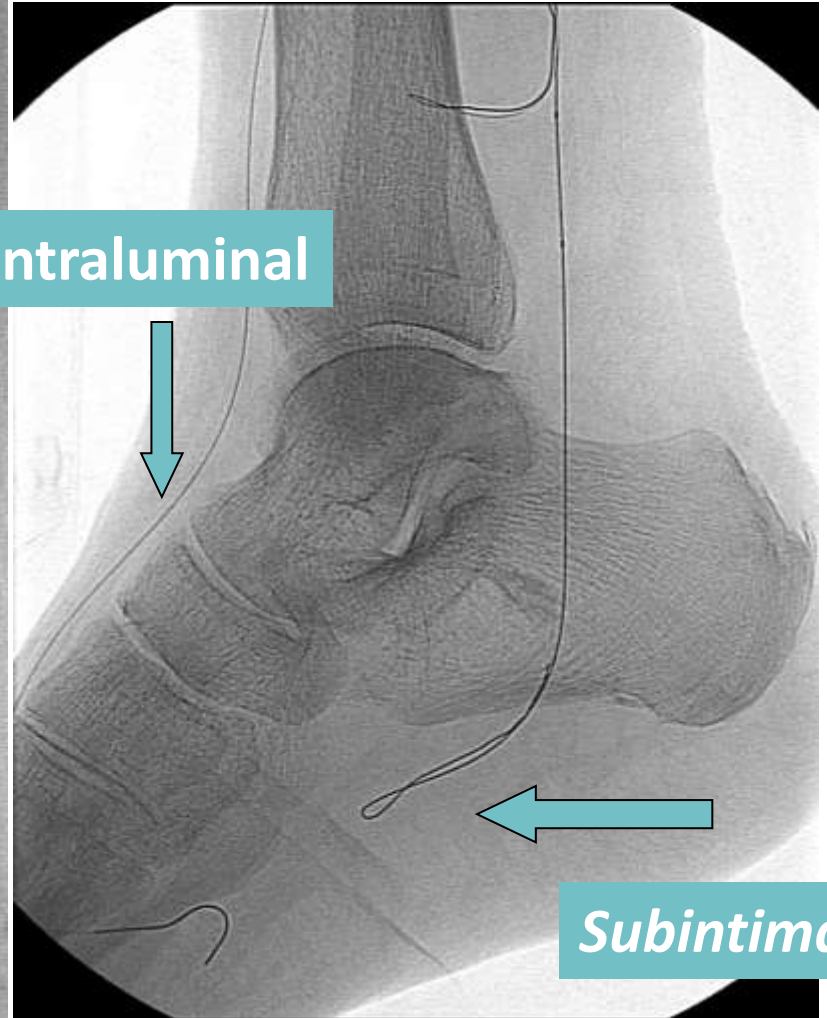
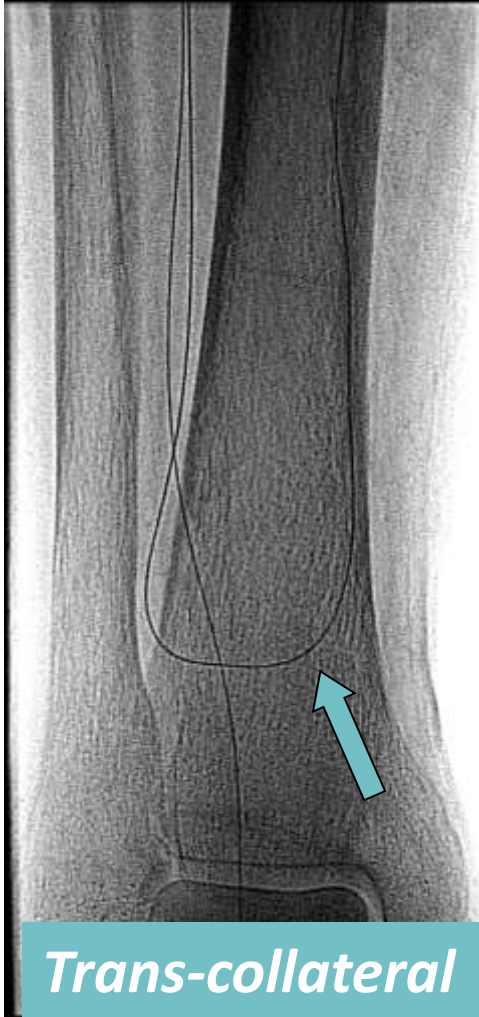
Two approaches:

- Antegrade recanalization of the anterior tibial artery and the dorsalis pedis followed by retrograde recanalization of the plantar artery and then of the distal posterior artery  
OR
- Antegrade recanalization of the posterior tibial artery followed by retrograde recanalization of the dorsalis pedis and then of the distal anterior tibial artery.

# Baseline Angiography



# POOR Calcifications: Subintimal First



# Angiographic and Clinical Results



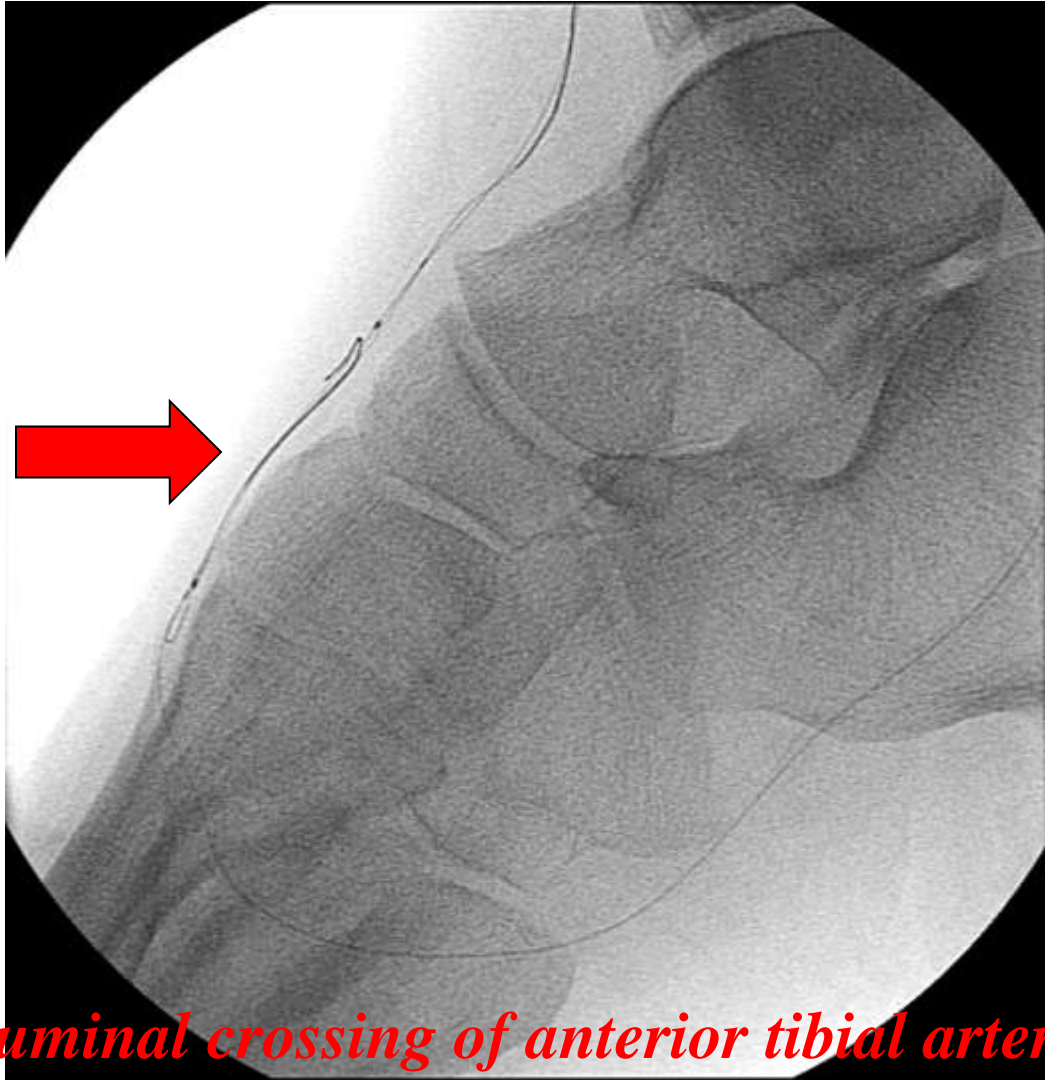
**TcPO<sub>2</sub>=  
51 mmHg**

# ***INTERVENTION***



**Gently wiring with 0,014 Pilot 50, Abbott, of posterior tibial artery and plantar arch**

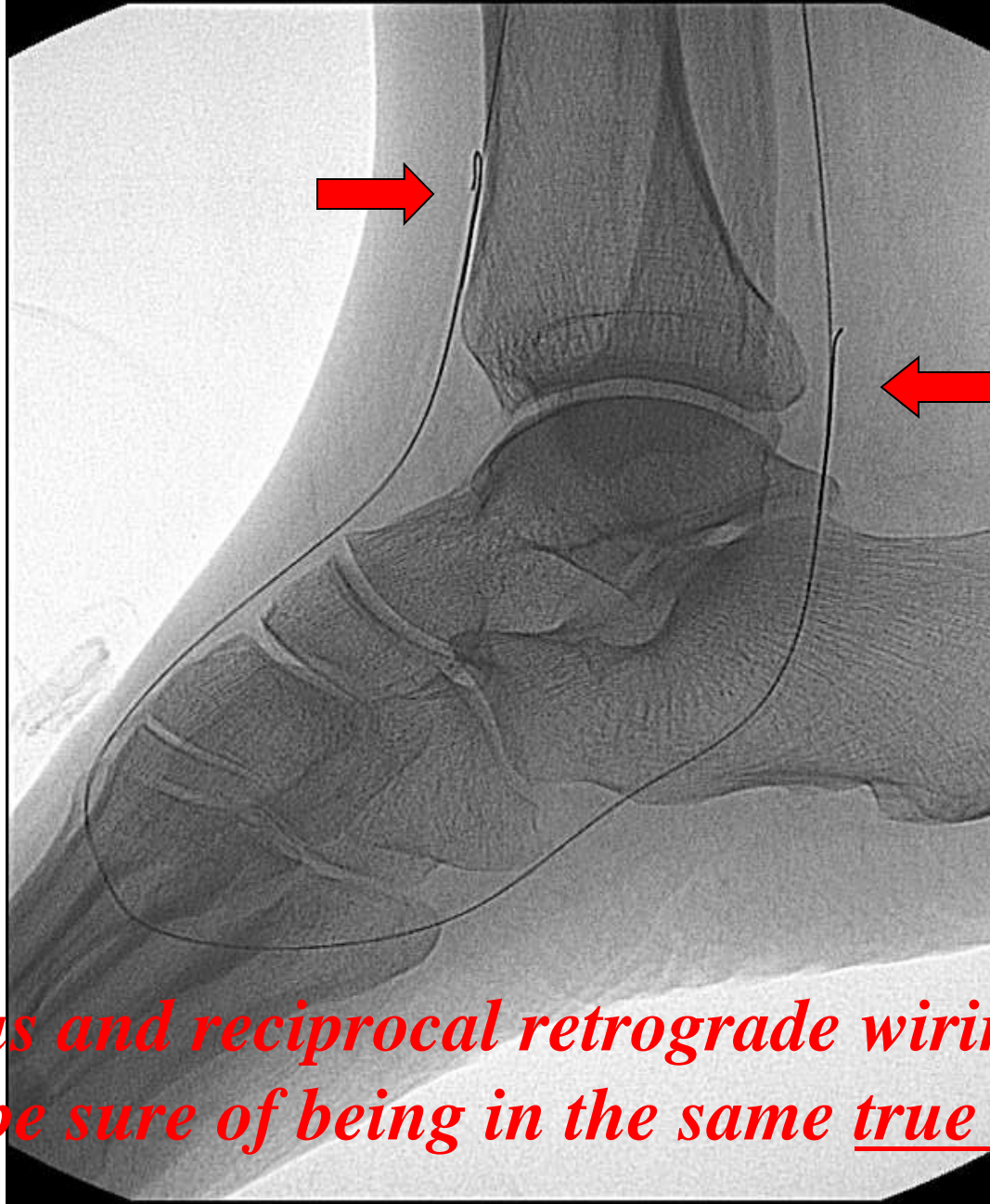
# ***INTERVENTION***



***Prudent endoluminal crossing of anterior tibial artery long occlusion with a second 0,014 Pilot wire. Use short and low profile Balloon. Avoid spasm***



# ***INTERVENTION***



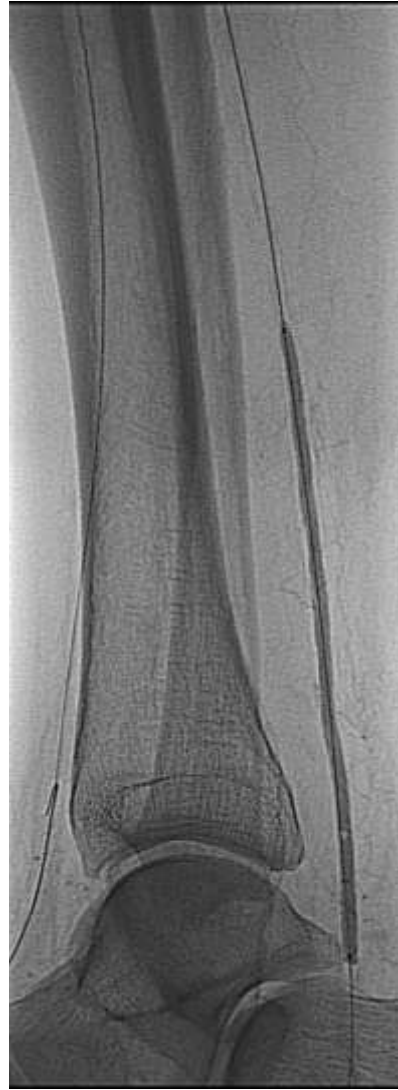
***Rendez-vous and reciprocal retrograde wiring of tibial arteries to be sure of being in the same true lumen***

# ***INTERVENTION***



***2.5 mm x 80 mm balloon inflated for 2 mins.***

***NTION***

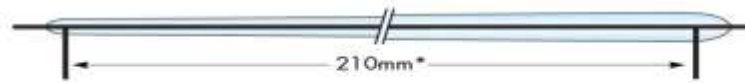


***Treatment of distal tibial arteries occlusion and Inject vasodilators***

# ***FINAL RESULT***



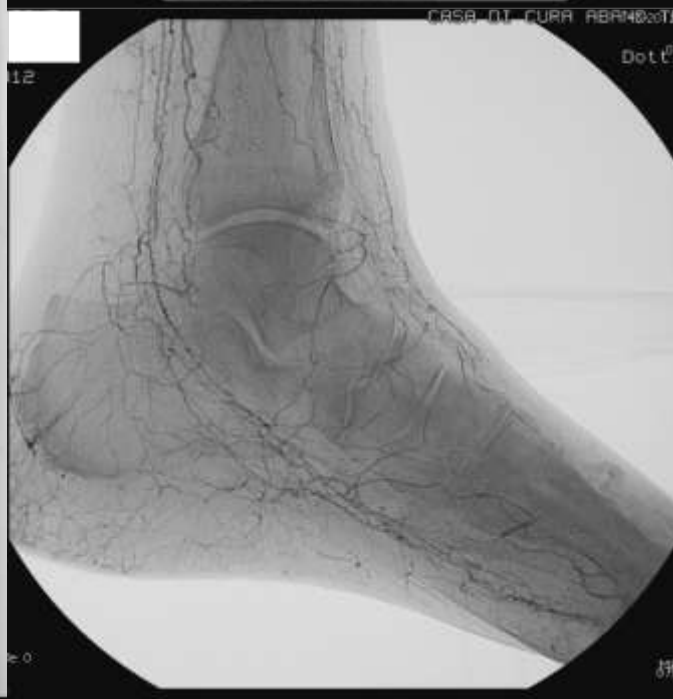
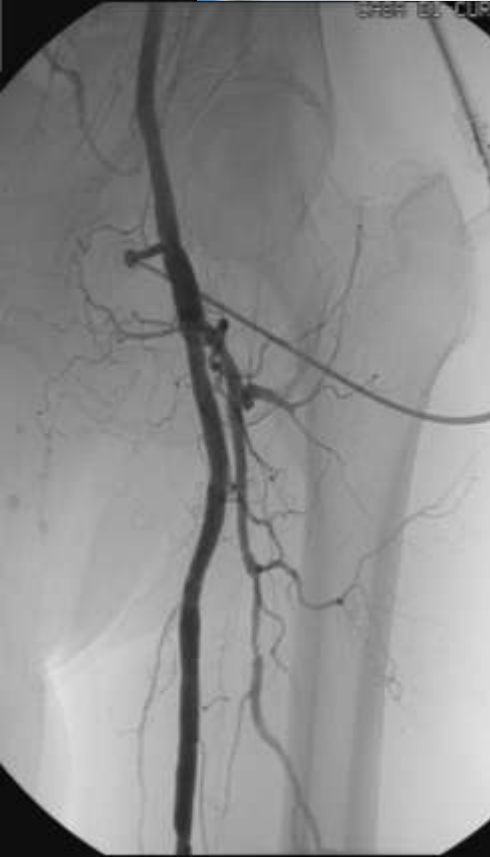
# Transcollateral Approach and Balloon Flexibility

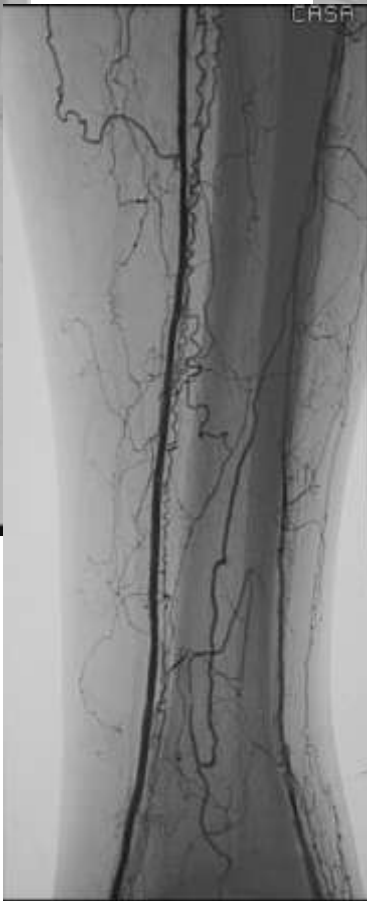
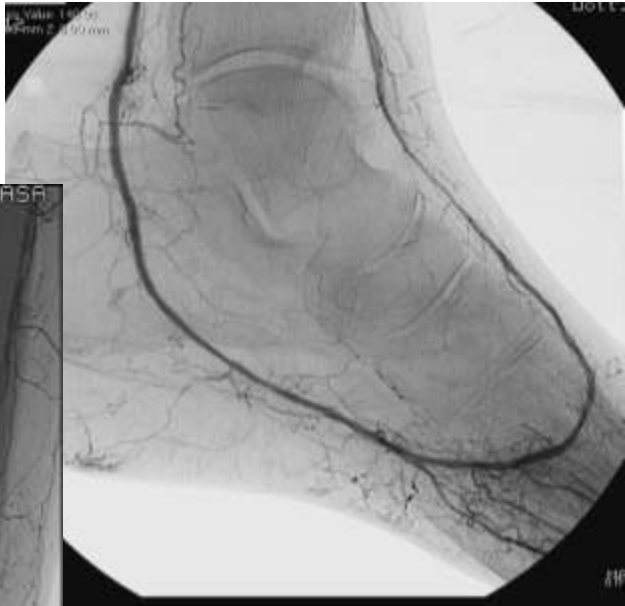
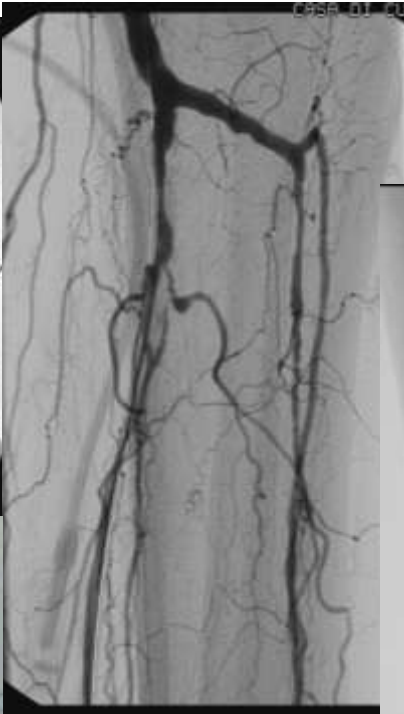


Courtesy of Dr. Marco Manzi  
Policlinico Abano Terme, ITALY

Balloon flexibility and conformability in challenging anatomy

# EXTREME SOLUTIONS





Retrograde Distal Loop Puncture

# RETROGRADE DIGITAL PUNCTURE





# Revascularization Strategies Affecting CLI Outcomes

## *Targets in BTK PTA: complete vs. selected revascularization*

1. The most important factor affecting Limb Salvage is the number of patent arteries post-PTA [1;2]

1. 1 vessel better than 0
2. 2-3 vessels better than 1

Tibials better than peroneal

The angiosome specific to the anatomy of the wound leads to a higher rate of healing and limb salvage [3]

Plantal loop revascularization probably increase mid term patency and healing

2. Trade-off exists between 1) procedural time and cost, and 2) technical access / success in treating the angiosome specific vessel

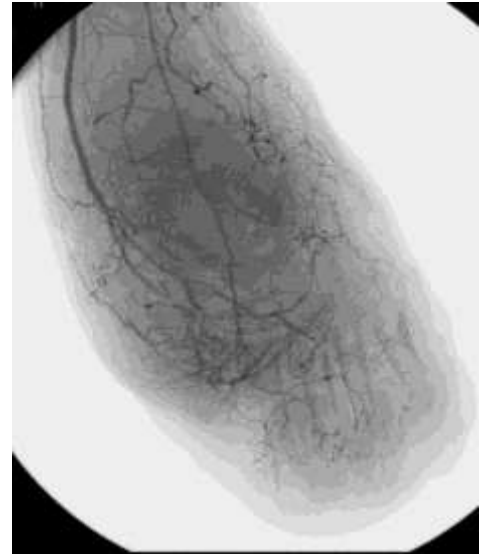
1. Peregrin et al. PTA of Infrapopliteal Arteries: Long-term Clinical Follow-up and Analysis of Factors Influencing Clinical Outcome Cardiovasc Intervent Radiol (2010) 33:720–725
2. Faglia et al. When is a technically successful peripheral angioplasty effective in preventing above-the-ankle amputation in diabetic patients with critical limb ischaemia Diabet Med. 2007 Aug;24(8):823-9
3. Neville et al. Revascularization of a Specific Angiosome for Limb Salvage: Does the Target Artery Matter? Ann Vasc Surg 2009; 23: 367-373

# Wound Related Artery

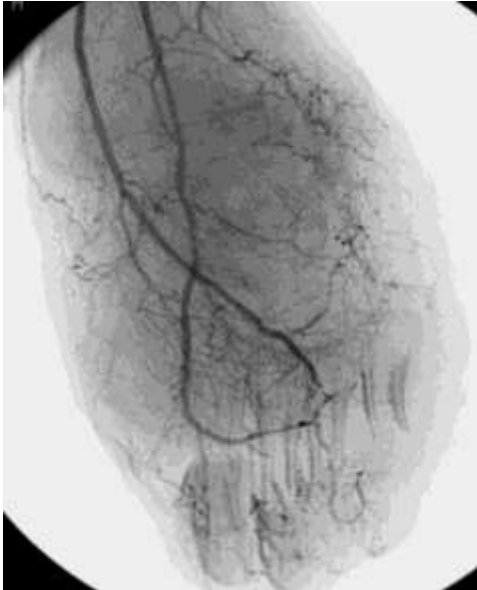
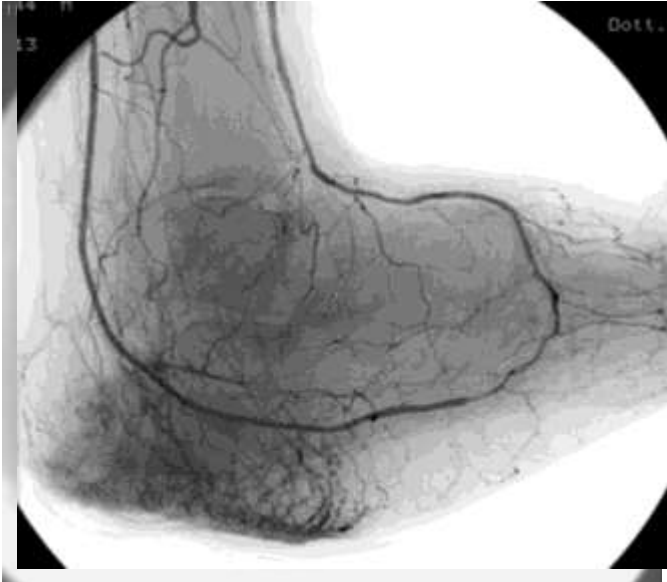
Male, 76 yo.

DM, CLI , TUC 3c in Left  
heel;  
Previous I° toe  
amputation





# Angiographic & Clinical Result



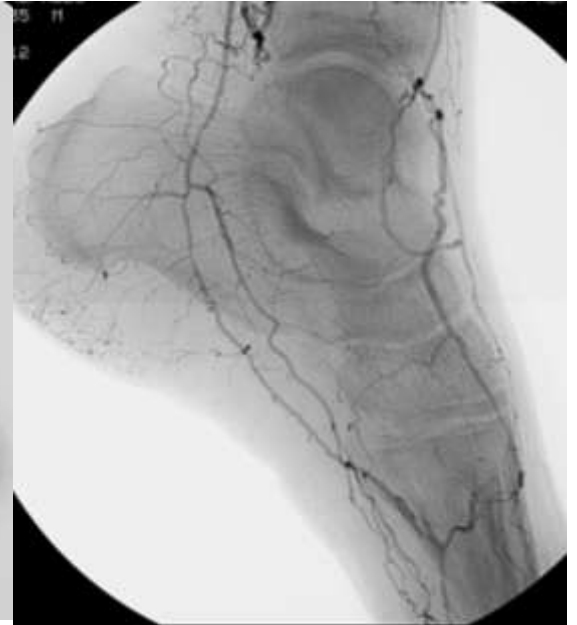
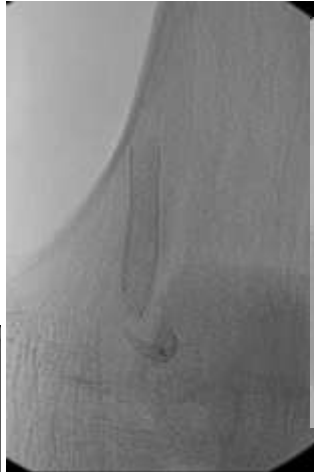
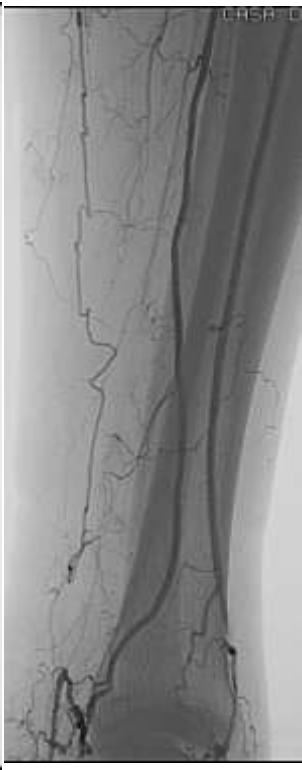
# Wound Related Artery

Male, 72 yo.

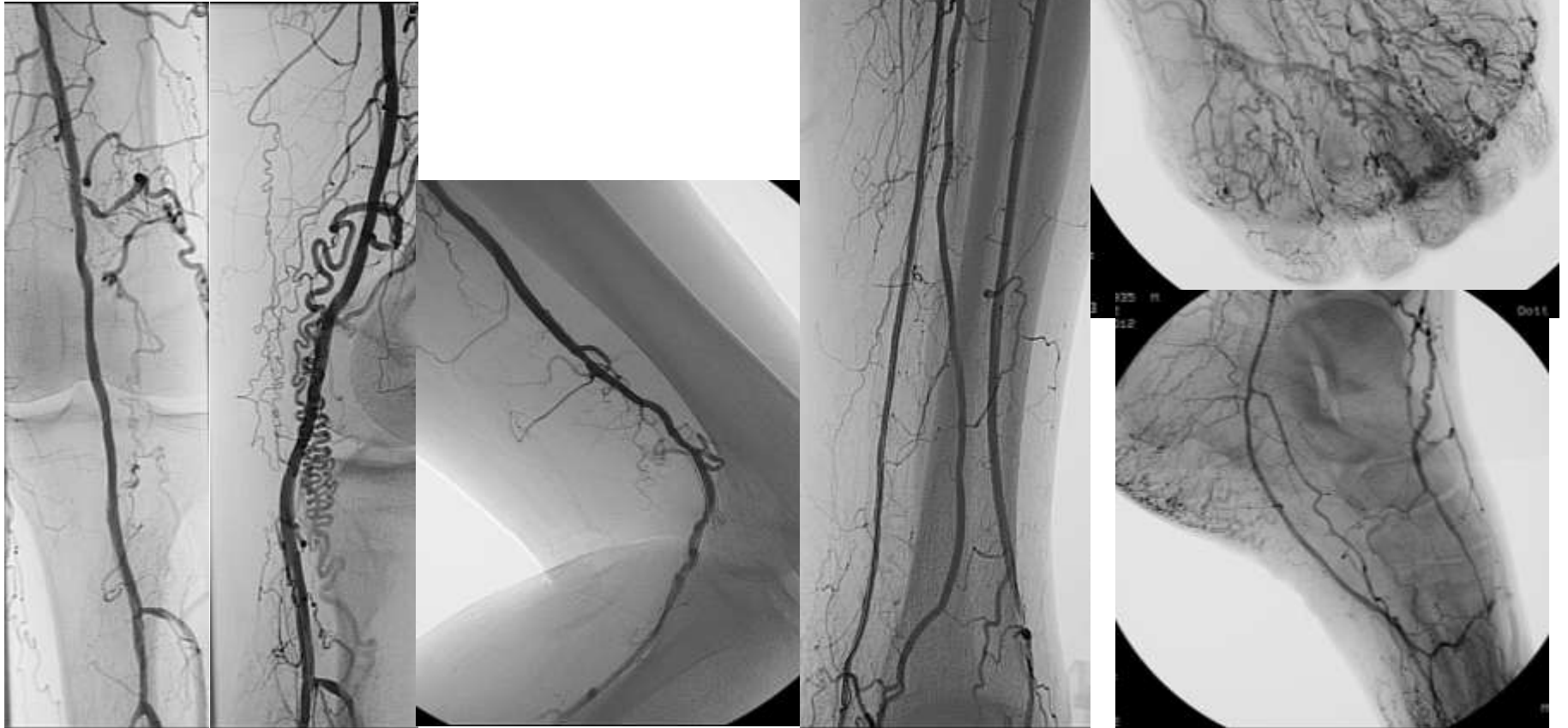
DM, CLI , TUC 3D in Left  
III<sup>o</sup> toe;



# Tarsal Loop



PT is the wound related artery



# Complete Revascularization

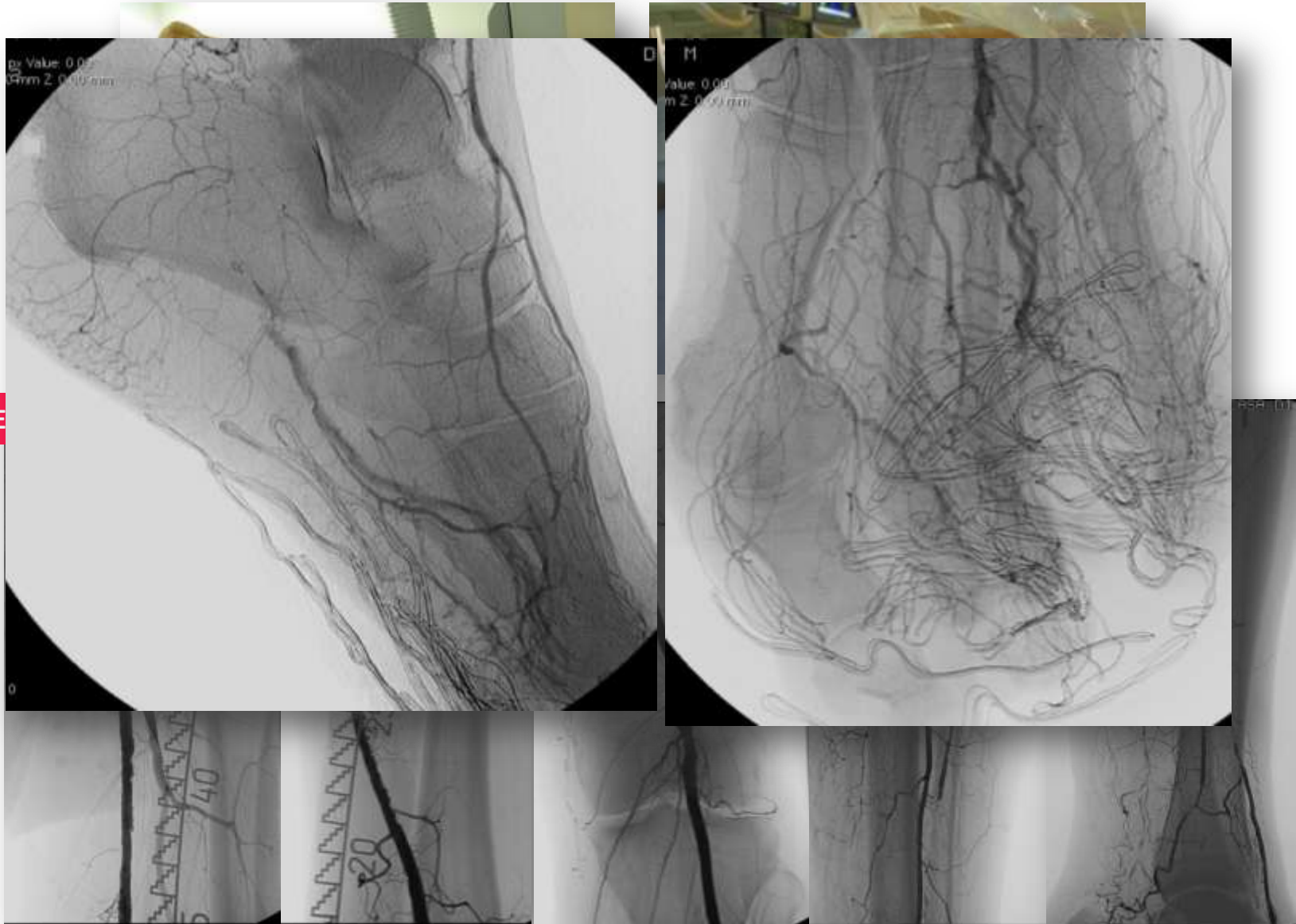
**B.V., male 71 years old**

- DM, Hypertension, Coronaric Disease;
- CLI, TcPO2 = 18 mm Hg;
- Infected Gangrene IV Toe TUC 3D;
- In emergency Amputation and Disarticulation IV Ray;



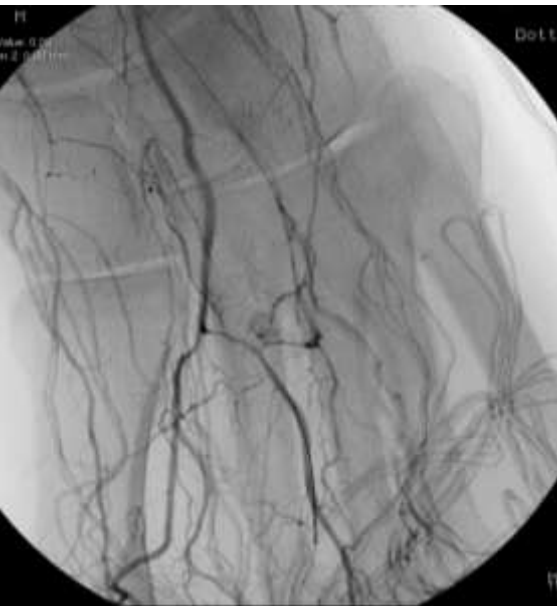


# 9/7/2012, Endovascular Procedure

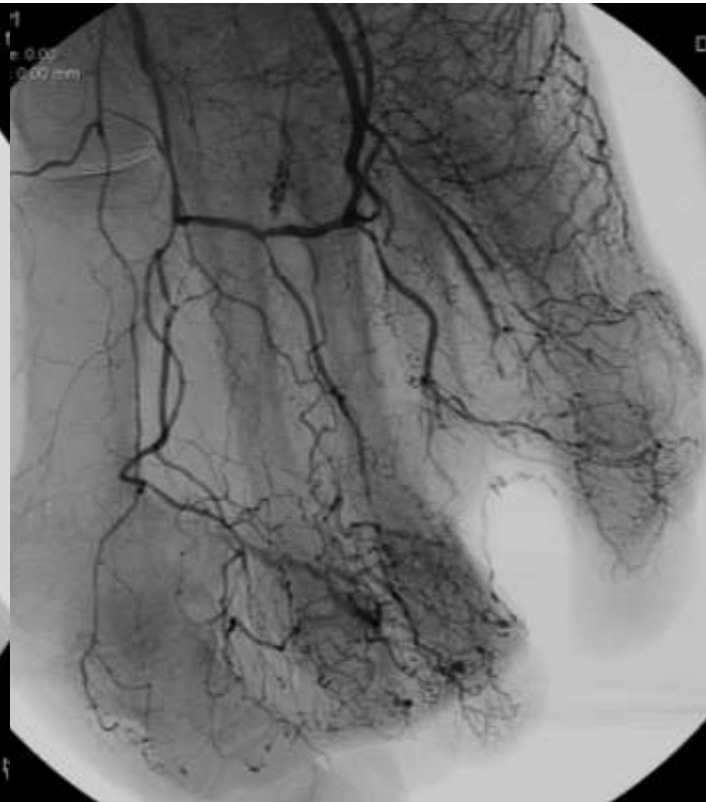
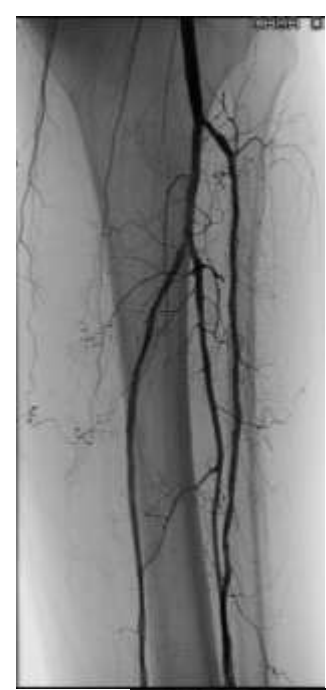




# Protected Loop Technique



# FINAL RESULTS



# Clinical FU



## CONCLUSIONS

- The Knowledge of the normal and variant foot vessels anatomy is mandatory for a correct endo treatment
- Pay attention to the calcifications “natural roadmap” to discover or suspect variants