



Endovascular Intervention

BtK Intervention in Patients with Chronic Dialysis

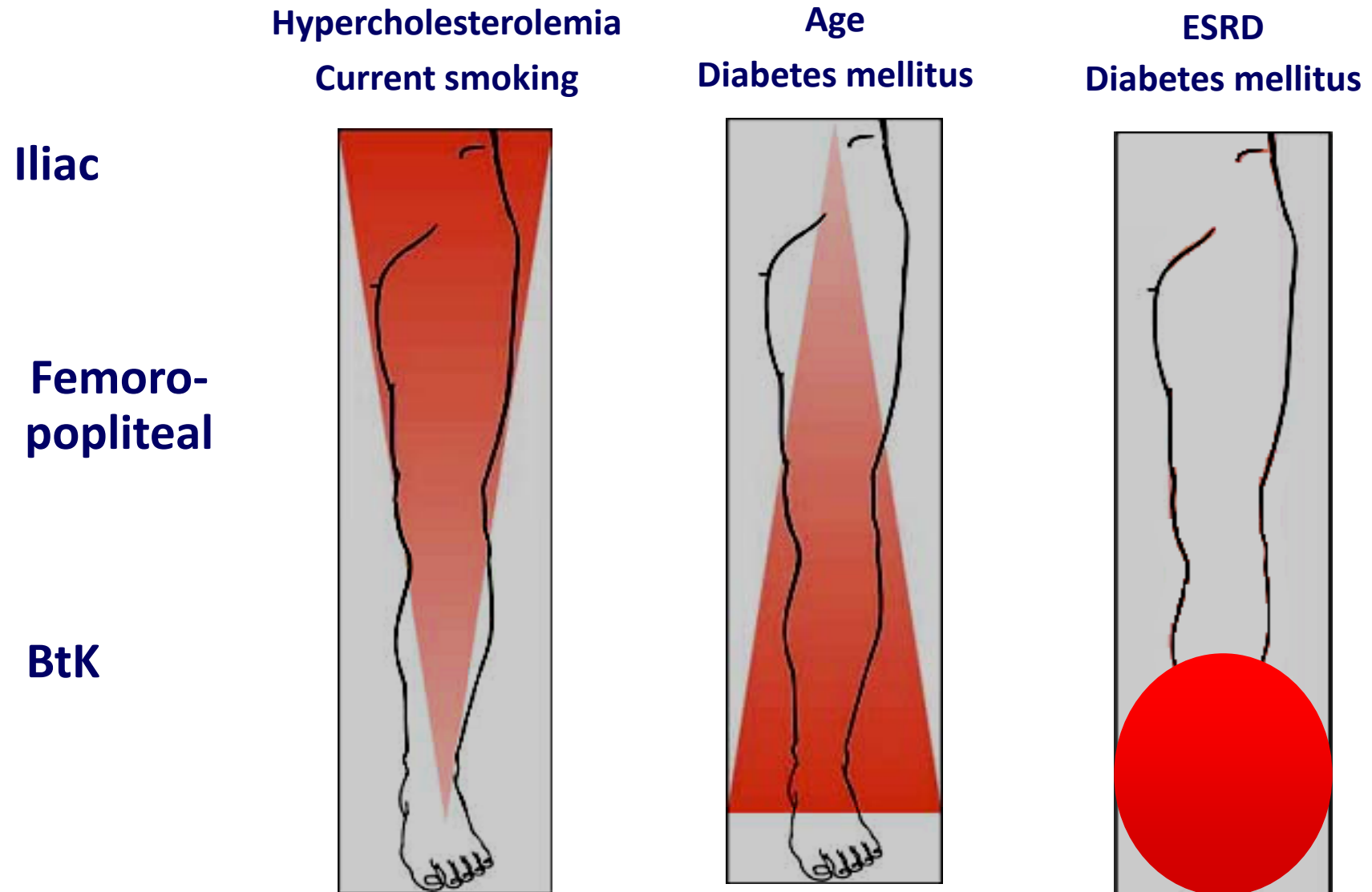
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Milan - Italy



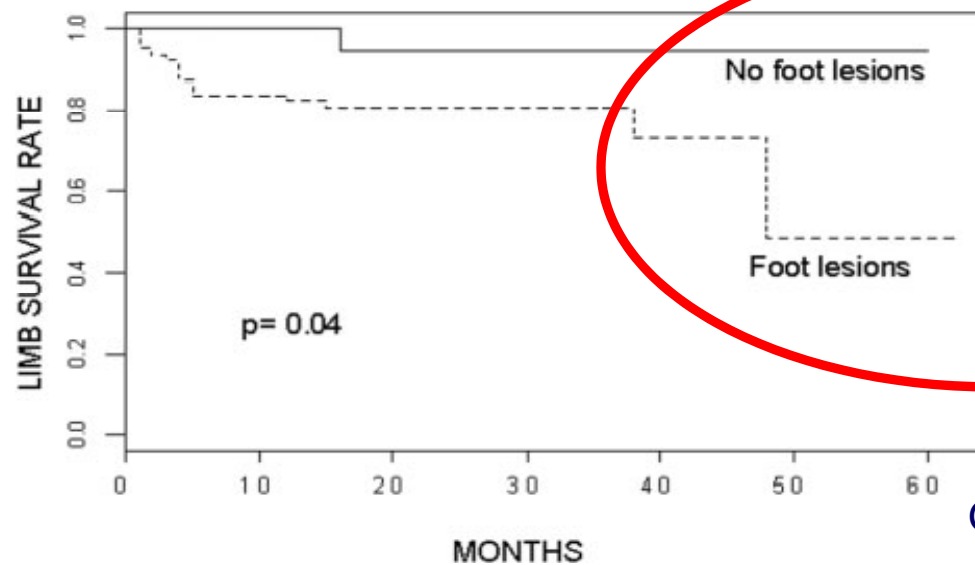
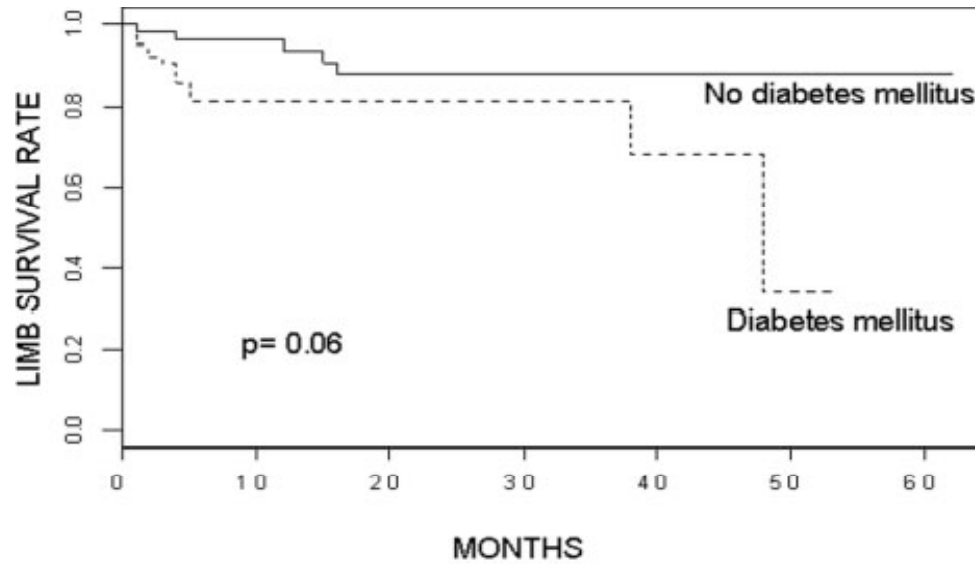
Disease Pattern in PAD





BtK PTA in Patients with Chronic Dialysis

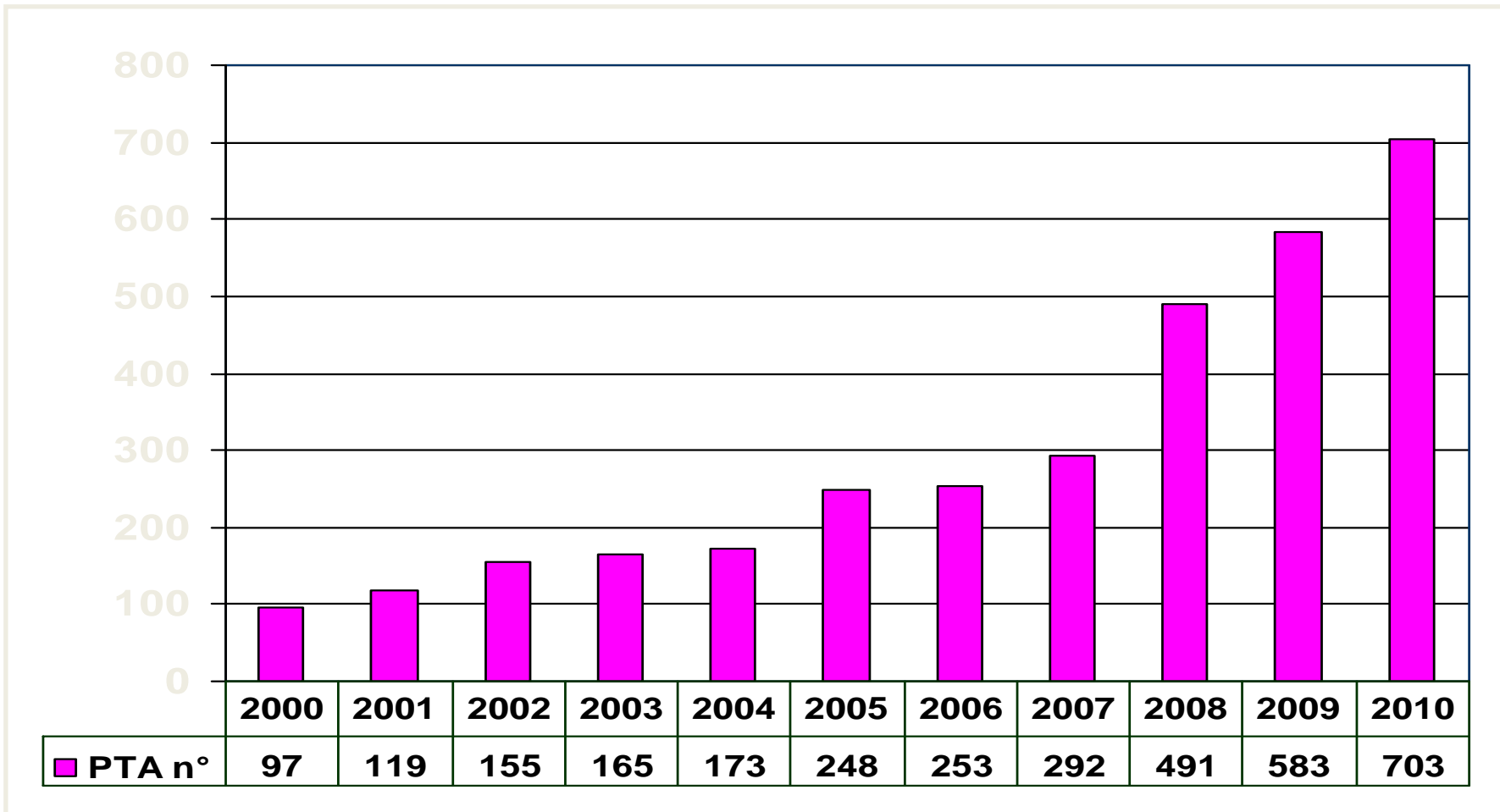
Amputation-free time for limbs





BTK Endovascular Interventions

Milano Experience (2000-2010)

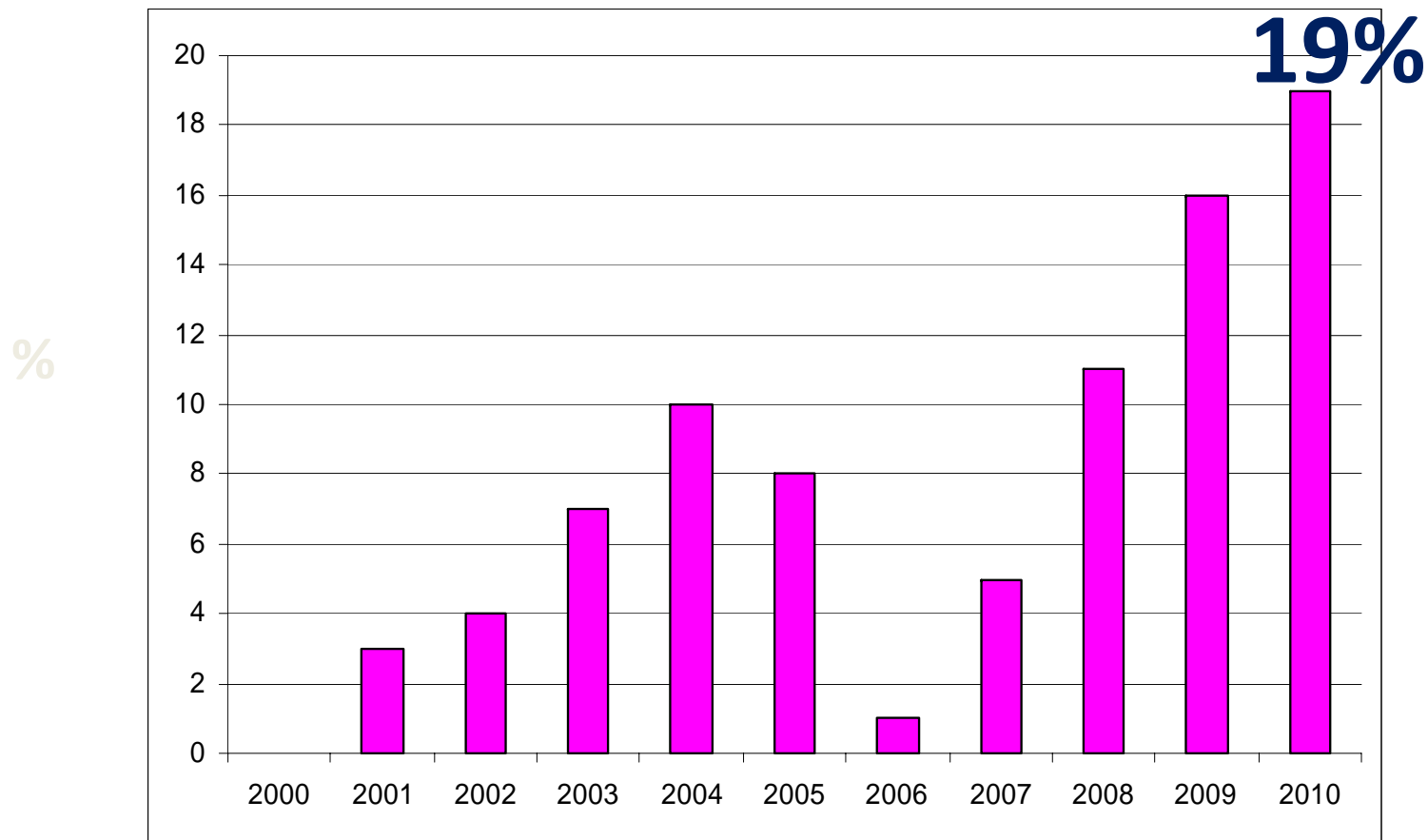




BTK Endovascular Interventions

Milano Experience (2000-2010)

ESRD and Chronic Dialysis





BtK Interventions: *Key Issues*

- **Advanced CTO techniques**
 - *Sub-intimal approach*
 - *Trans-collateral approach*
 - *Retrograde (double) approach*
- **Treatment of calcified lesions**
 - *Cutting balloon*
 - *Rotablator*
- **Plantar and pedal arteries recanalization**



Calcified Arteries and Small Vessels Disease

- Female, 76 yy
- 1990 Type 2 DM
- 1994 NHL, CT + RT (chest)
- 2000 CABG, PM, CHF
- 2005 ESRD → haemodialysis
- 2009 left thigh amputation (ischemic gangrene)
- 2010 ulcer of the toes







Angiographic pattern



Tibioperoneal trunk stenosis



Angiographic pattern



Good anterior tibial and peroneal arteries
Long calcific disease of posterior tibial artery



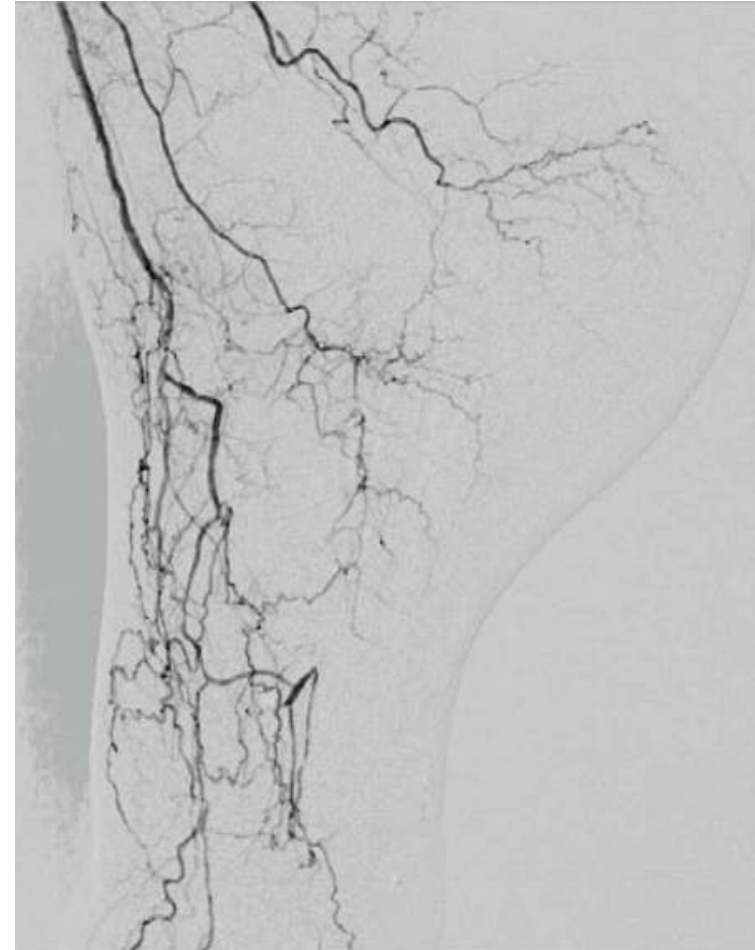
Angiographic pattern



Diffuse disease of pedal artery, occlusion of plantar arteries
Diffuse calcific disease of metatarsal and digital arteries



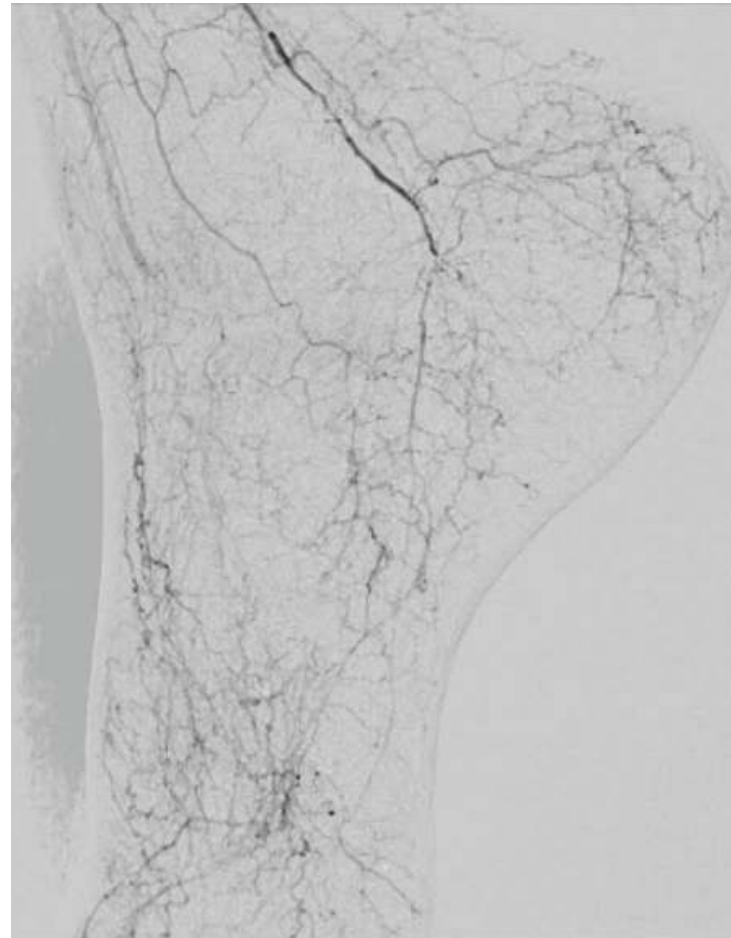
Angiographic pattern



Diffuse disease of pedal artery, occlusion of plantar arteries
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Angiographic pattern



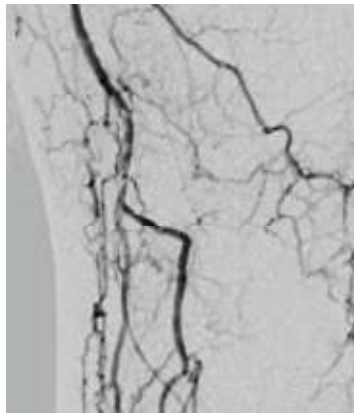
Diffuse disease of pedal artery, occlusion of plantar arteries
Diffuse calcific disease of metatarsal and digital arteries



Possible goals



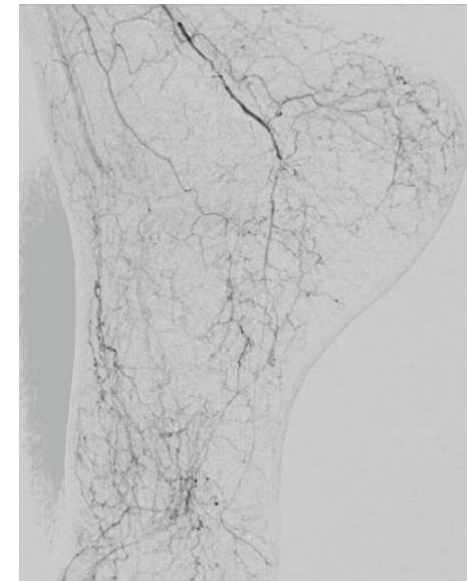
1. Tibioperoneal trunk



2. Pedal artery

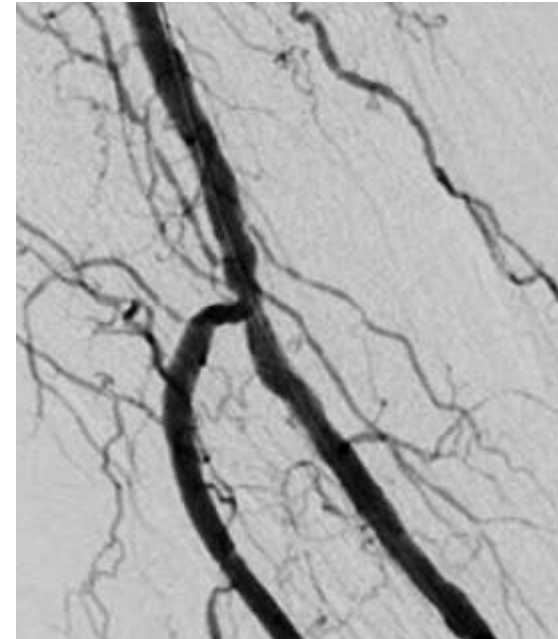
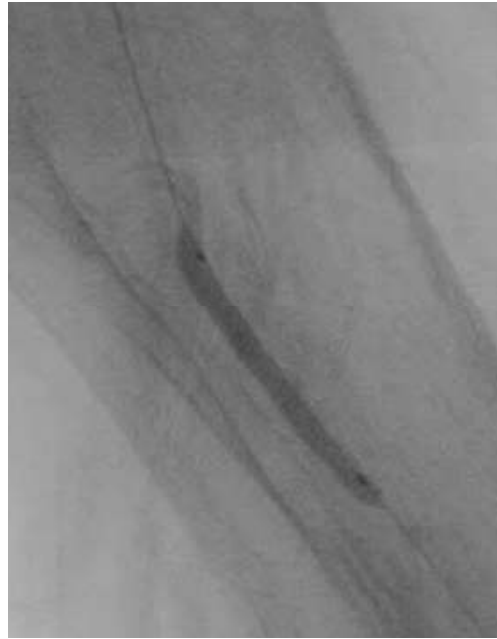


3. Posterior tibial → plantar artery





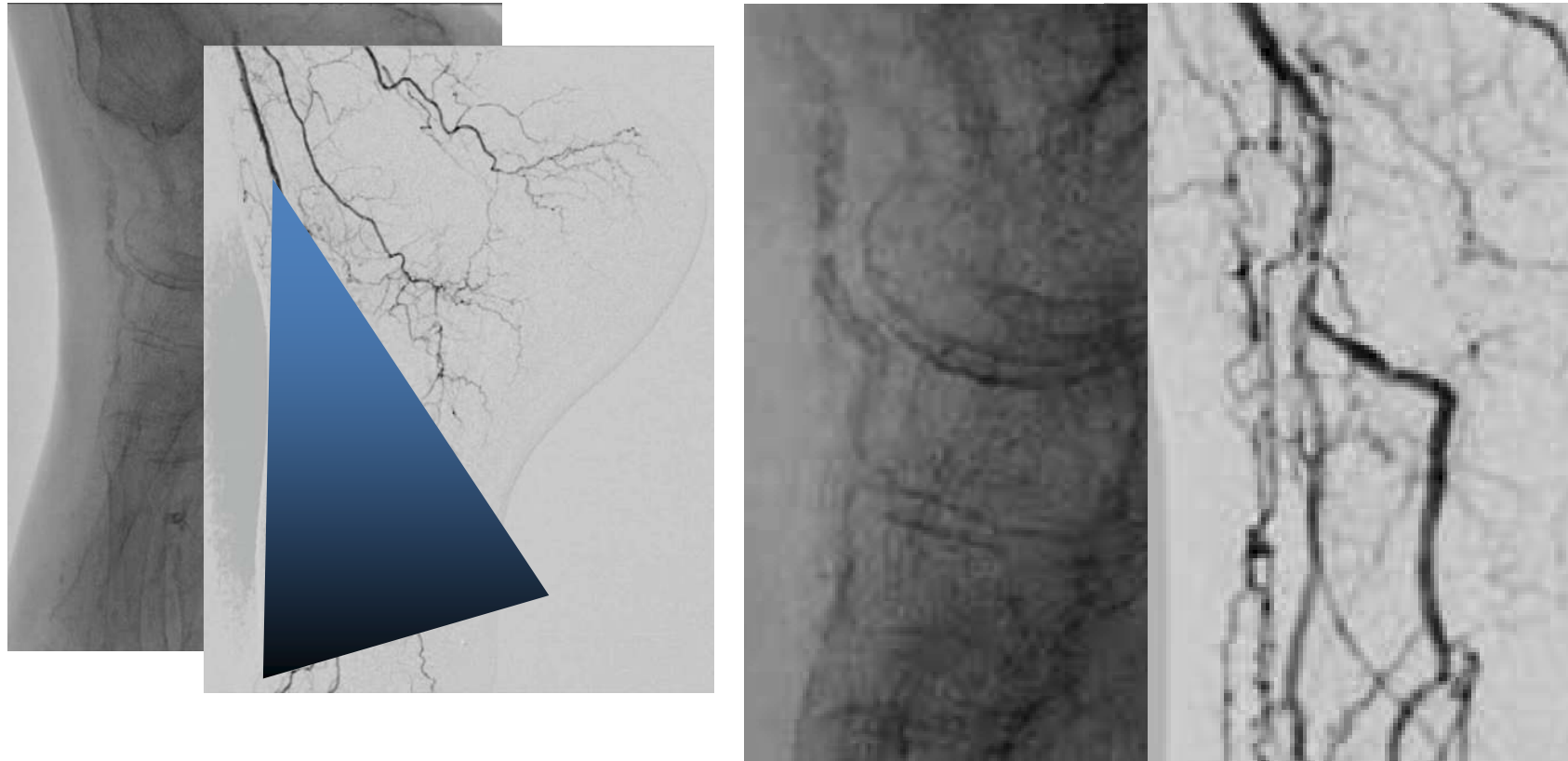
Tibioperoneal trunk treatment



1. 3.0-20 mm coronary balloon, 18 atm
2. Easy, safe
3. Totally ineffective (alone) in giving blood to the forefoot



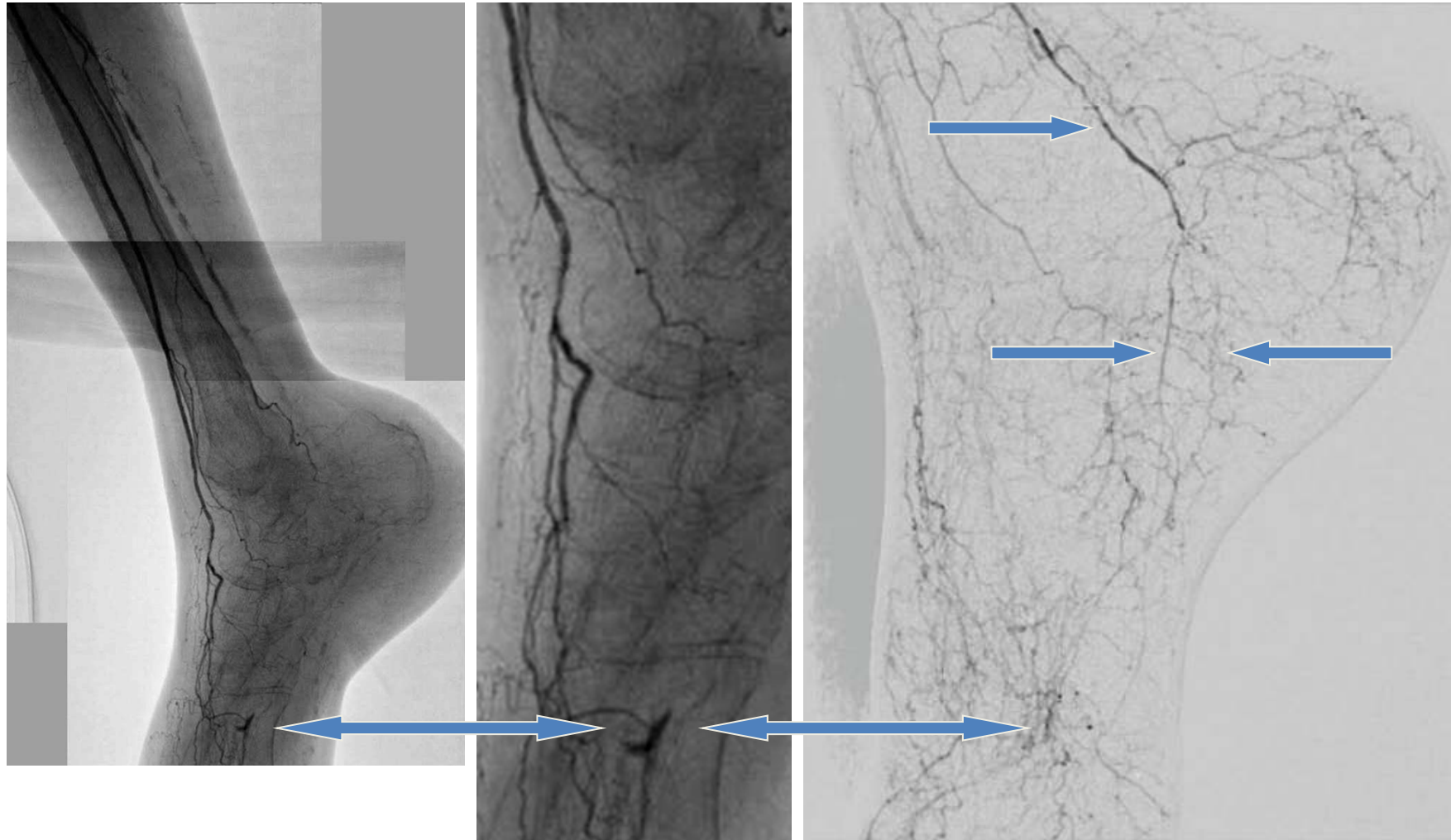
Pedal artery treatment



1. Where is the pedal artery ?
2. This is the only blood flow pathway to the forefoot: in case of failure → thigh amputation



PTA & plantar artery treatment

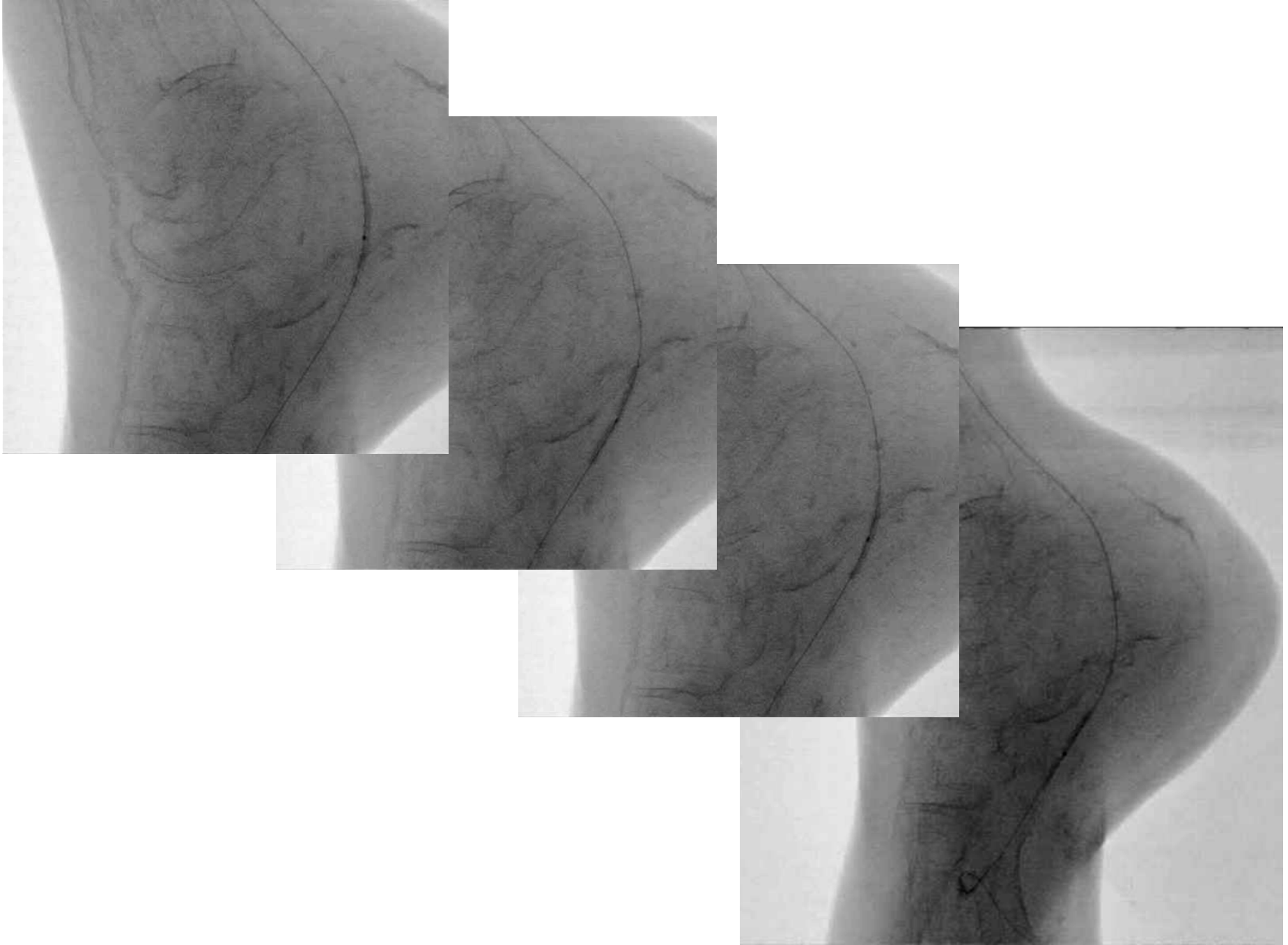


In the late pictures the artery is open



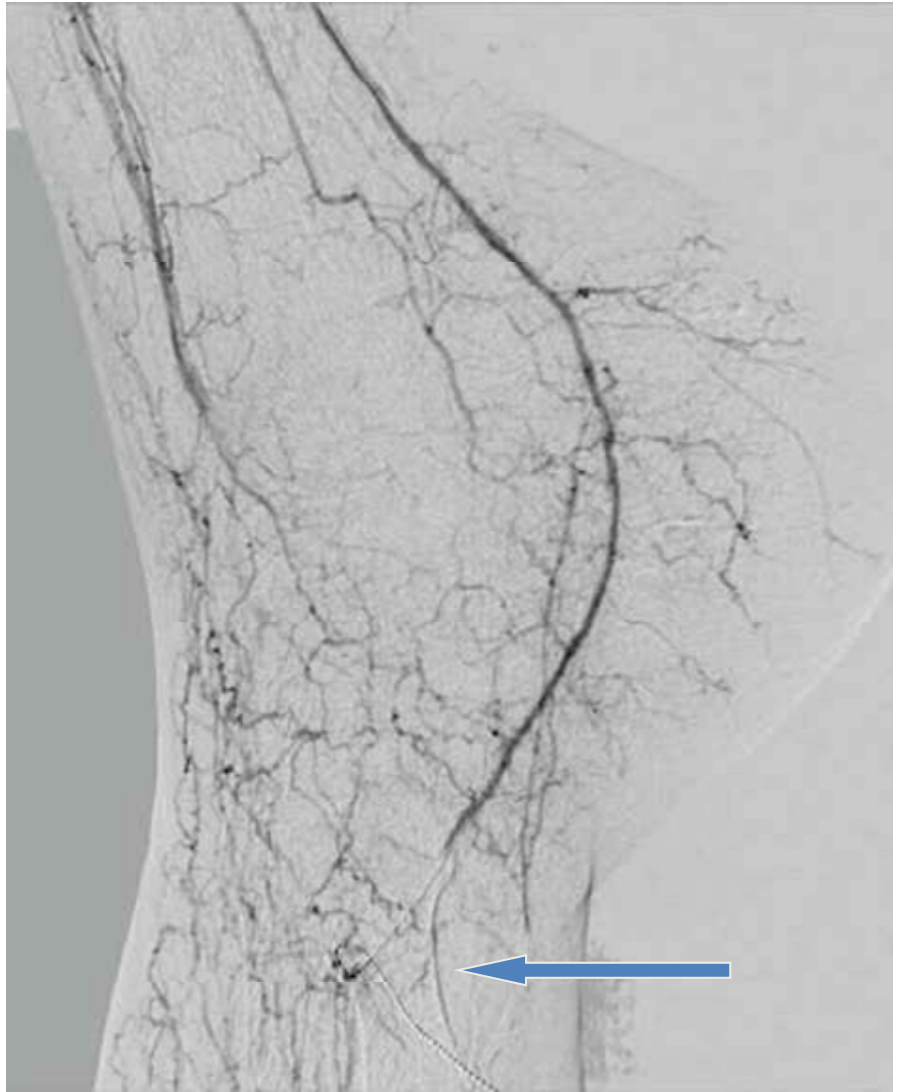
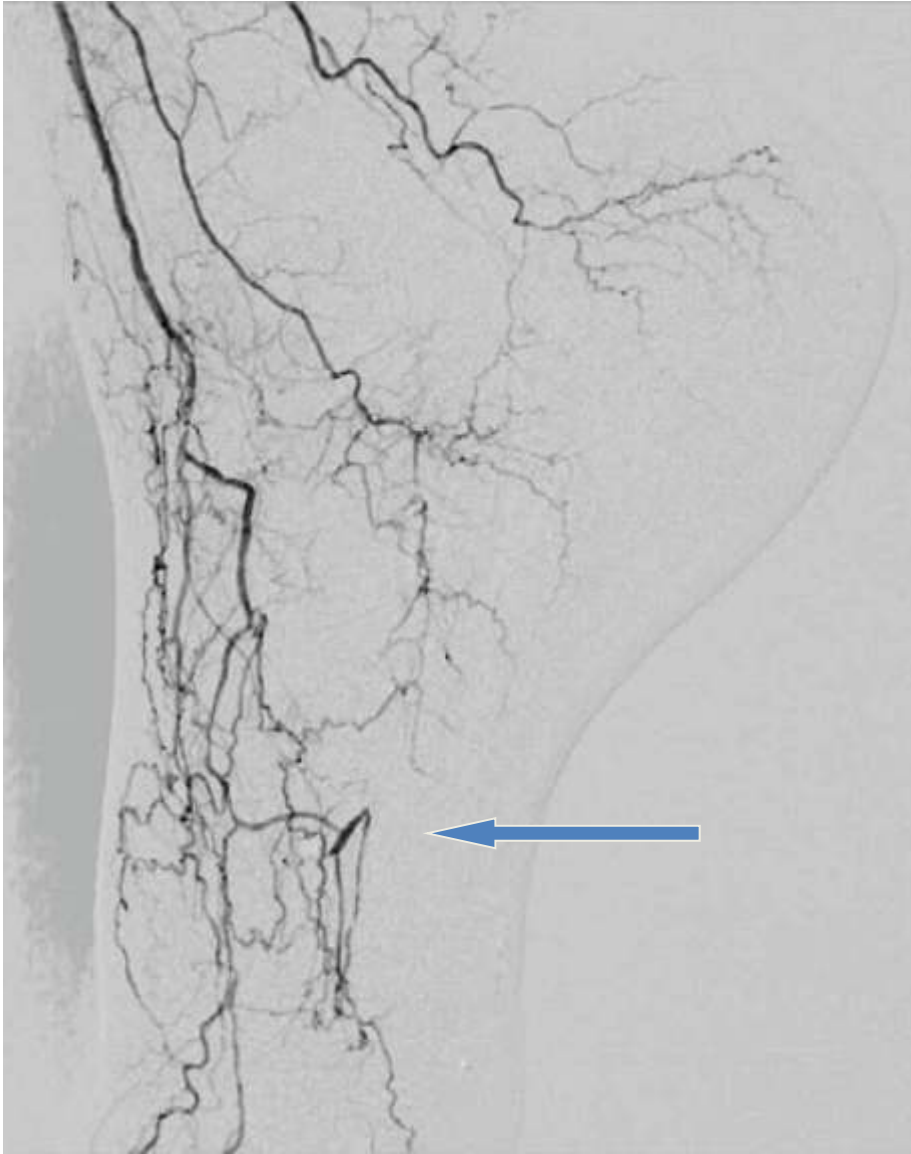
Selected material

- 1. Cross the lesion: hydrophilic wire**
 - 0.014" wire: PT2 (BSC)
- 2. Open a pathway: OTW low profile balloon**
 - 1.5 mm x 20 mm Apex Flex (BSC) 18 atm
 - 2.0 mm x 40 mm Apex (BSC) 18 atm











Selected material

Cross the lesion: hydrophilic wire

- 0.014" wire: PT2 (BSC)

Open a pathway: OTW low profile balloon

- 1.5 mm x 20 mm Apex Flex (BSC) 18 atm
- 2.0 mm x 40 mm Apex (BSC) 18 atm

Progressive artery dilatation: OTW low profile balloon

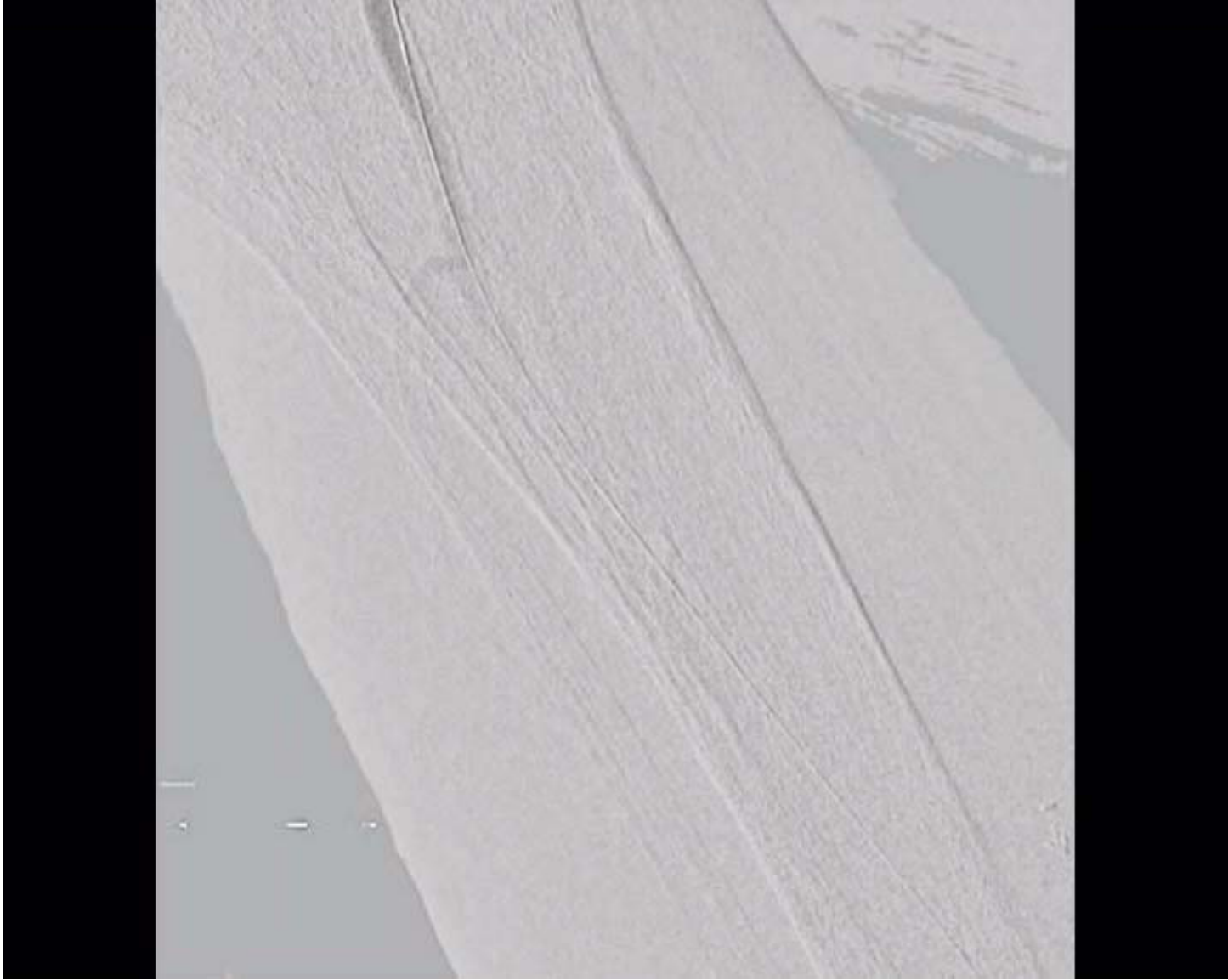
- 2.0 mm x 80 mm Amphirion Deep (Invatec) 15 atm
- 2.5 mm x 80 mm Amphirion Deep (Invatec) 15 atm

Spot treatment of resistant lesions: non compliant balloon

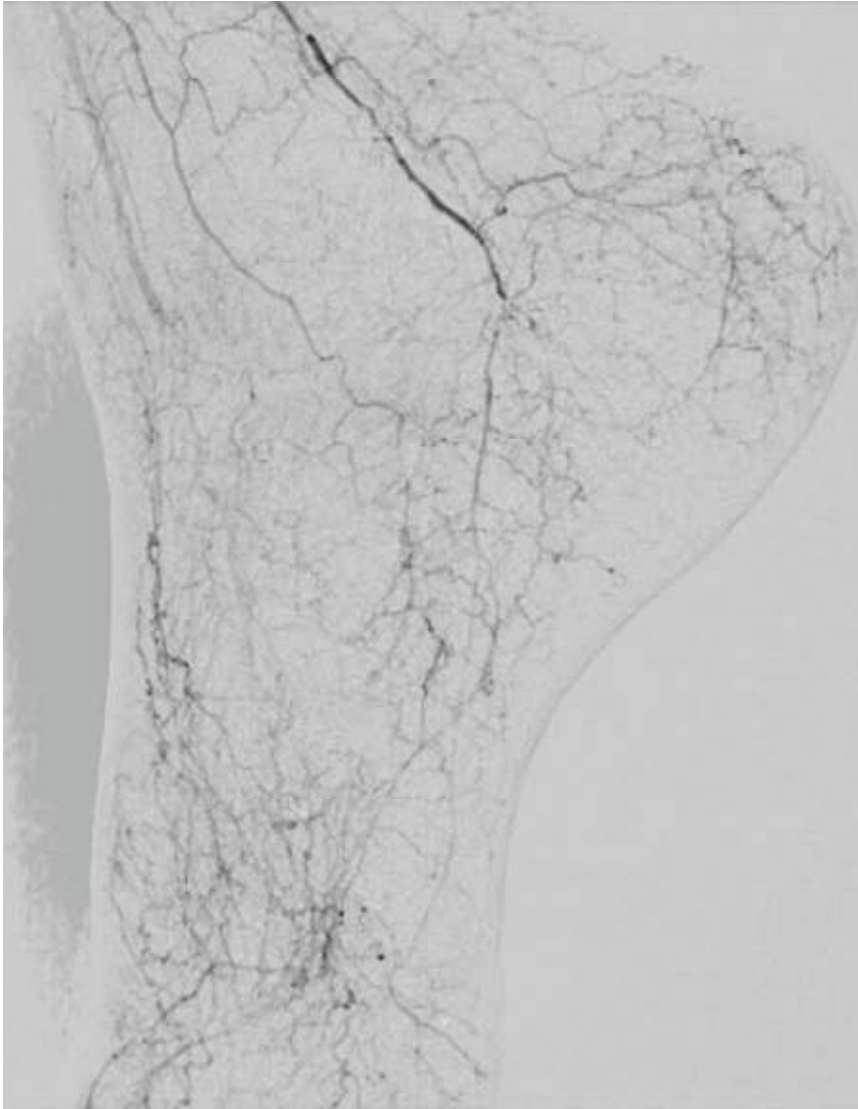
- 2.5 mm x 15 mm Quantum Maverick (BSC) 26 atm













Very Small Vessels and Diffuse Disease

- ES, female
- age 4: Type 1 DM diagnosis
- age 18: ESRD (hemodialysis)
- age 28: gangrene of the toes

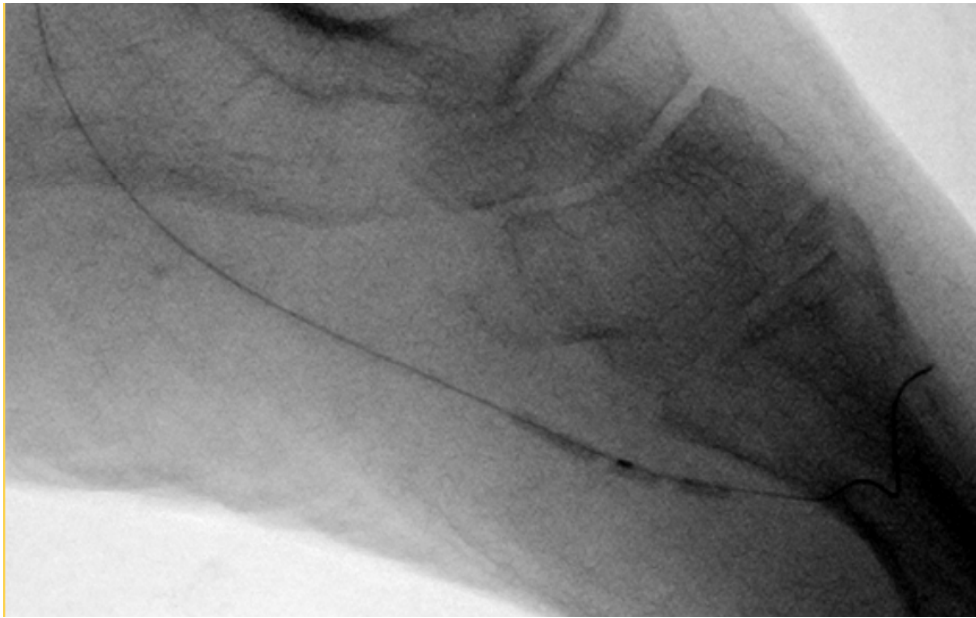




Selected Material

- **4F Berenstein diagnostic catheter (Cordis)**
- **PT2 wire (BSC)**
- **Apex 1.5-20 mm Push OTW (BSC)**
- **Apex 2.0-20 mm Flex (BSC)**
- **Amphirion Deep 2.0-30 mm (Invatec)**

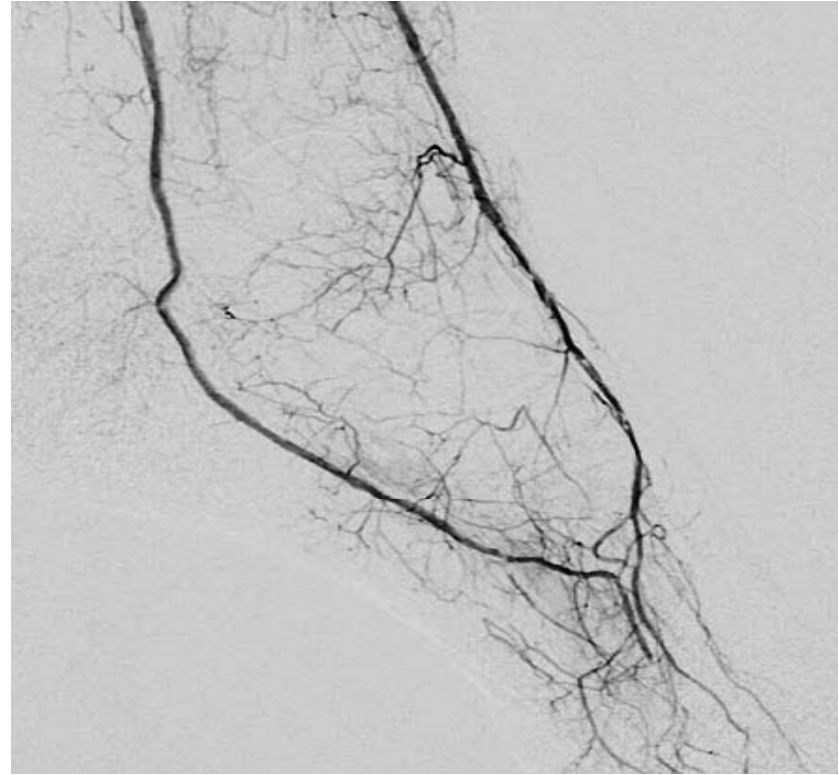








Before



After



BtK PTA in Patients with Chronic Dialysis

Endovascular treatment of patients with chronic dialysis is technically challenging because:

- The prevalent localization of lesions in distal vessels with diffuse disease and poor run-off
- The calcified nature of the lesions
- The presence of very tight stenoses that make the crossing very problematic



BtK PTA in Patients with Chronic Dialysis

- Considering that bypass is not technically feasible in most of the cases the percutaneous treatment of the vessels of the foot is essential to avoid amputation
- This goal can be achieved by using antegrade vascular approach and coronary techniques and materials
- In the near future drug-eluting balloons could be very useful in this specific setting