

Below the Knee Interventions and Angiosome Concept



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Critical Limb Ischemia

Treatment Goals

- Improve healing
- Limb salvage
- Improve functional capacity
- Improve quality of life
- Prolong life

Critical Limb Ischemia

Revascularization

Revascularization is better

Amputation 8-20% vs >50% if no revasc

Revasc Strategy evolution

- **Single line to the foot**
- **Two main vessel to foot**
- **As many vessels as possible**
- **Open inflow as source of collaterals**
- **Angiosome oriented revascularization**

Balloon Devices

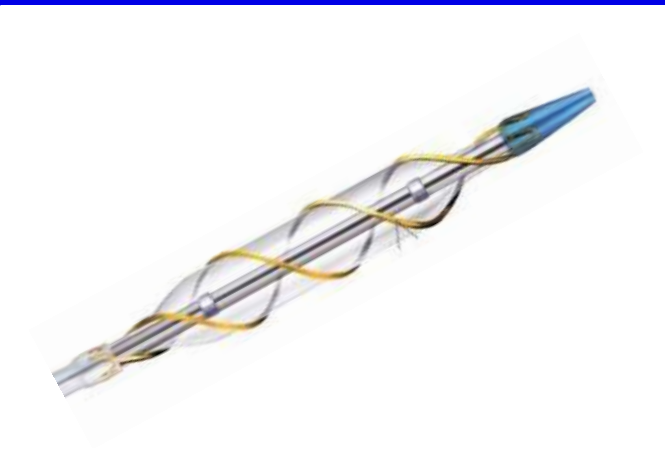
POBA



Cutting Balloon



Angiosculpt



PolarCath Balloon



Atherectomy Devices

Turbo-Laser



Silver Hawk



Rotablator



CSI 360 Orbital Atherectomy



Drug Eluting Devices

Drug Eluting Stents

Drug Eluting Balloon



Critical Limb Ischemia

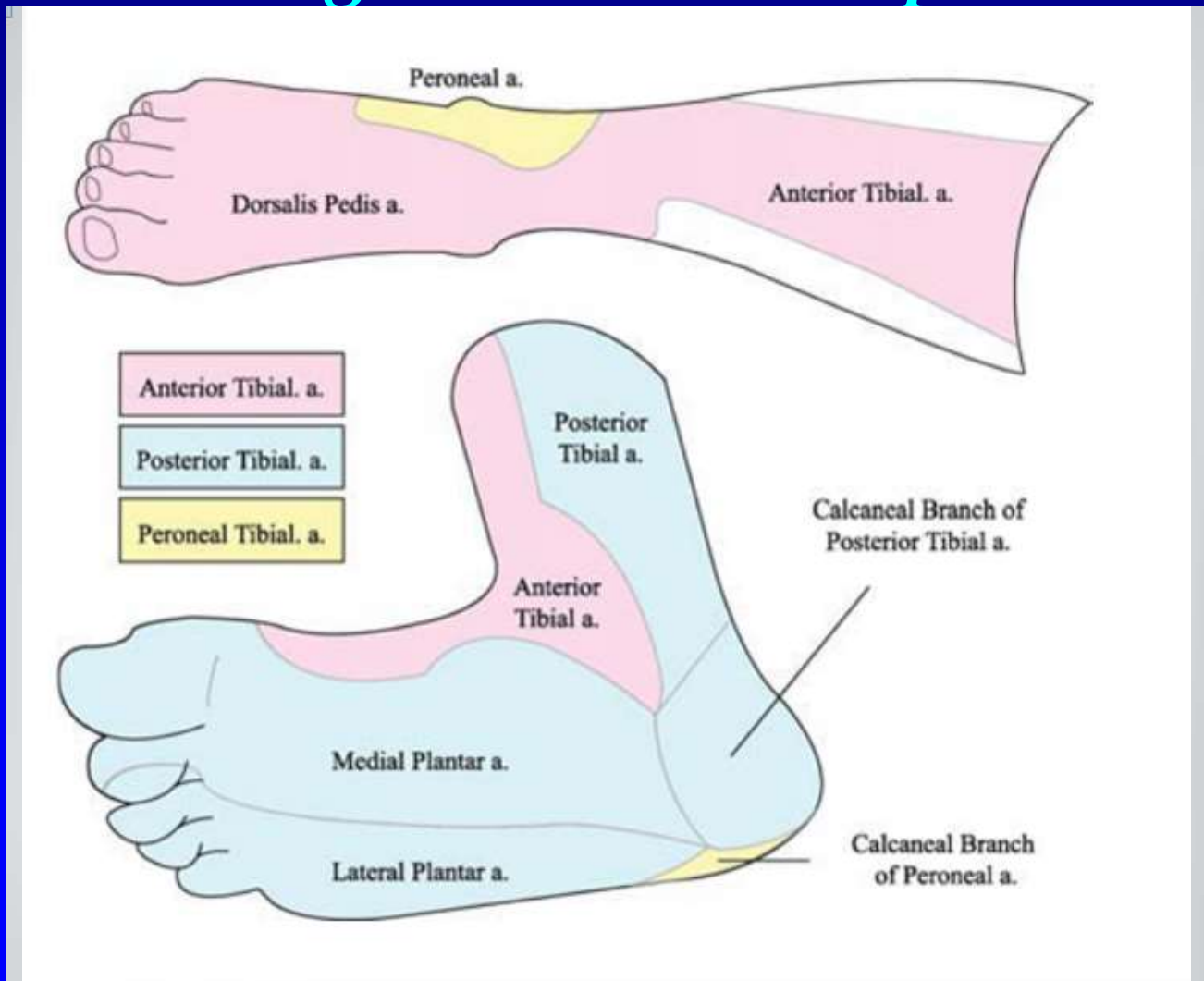
Total lesions	907 (3.0 L/patient)
Bellow the knee	406 lesion (1.9 L/patient)
CTO	57% of procedures
Multilevel	49% of procedures
BK alone	33% of procedures
Antegrade	40%
Antegrade-Retrograde	10%
Non-CTO success	99%
CTO success	89%

Pre and procedural preparation

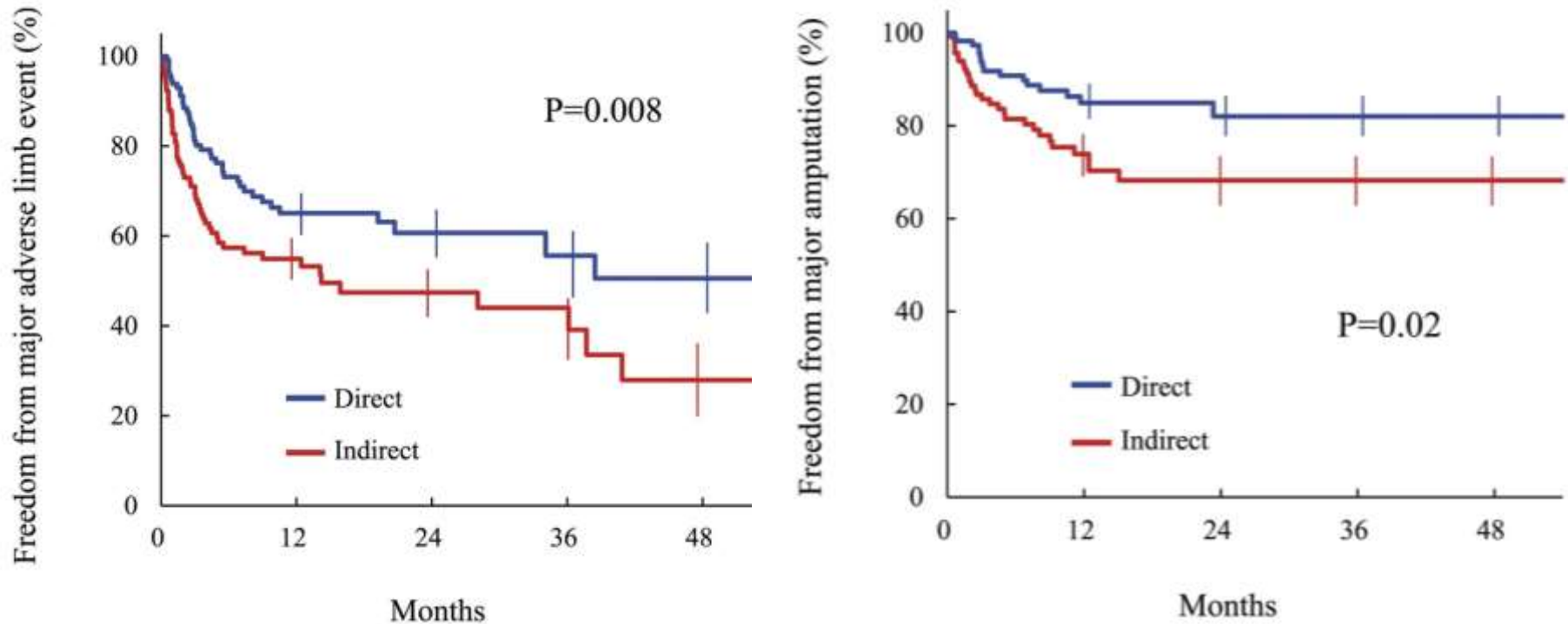
- **Imaging (CTA, MRA and DA)**
- **Know the entire anatomy, including foot**
- **Understanding of entry and exit areas**
- **Presence of side branches**
- **Collateral circulation**
- **Distal target**
- **Use of road mapping**
- **Appropriate support**
- **Appropriate antithrombotic**

Critical Limb Ischemia

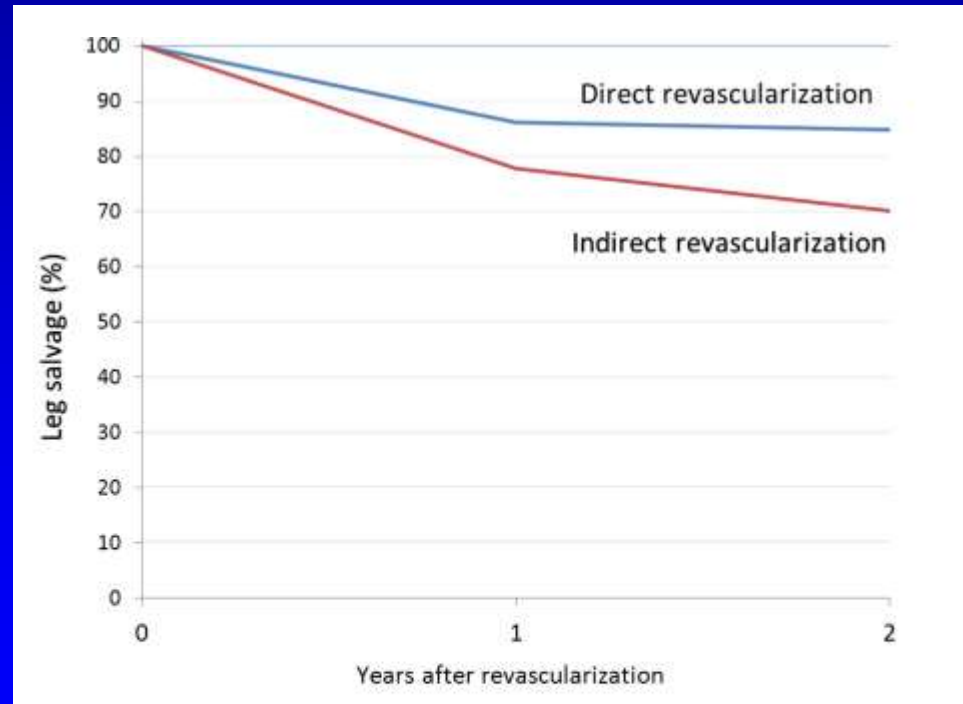
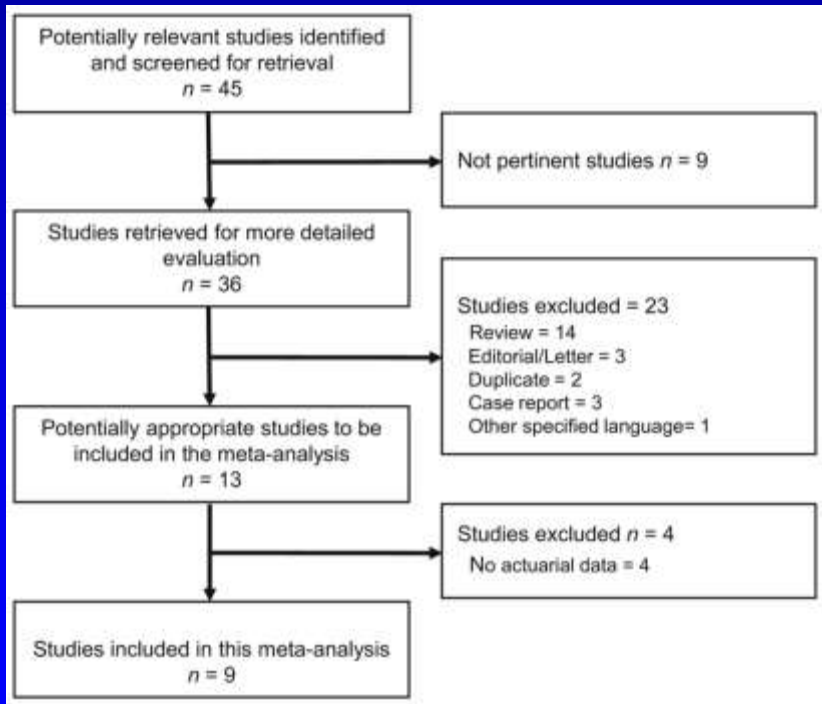
Angiosoma Concept



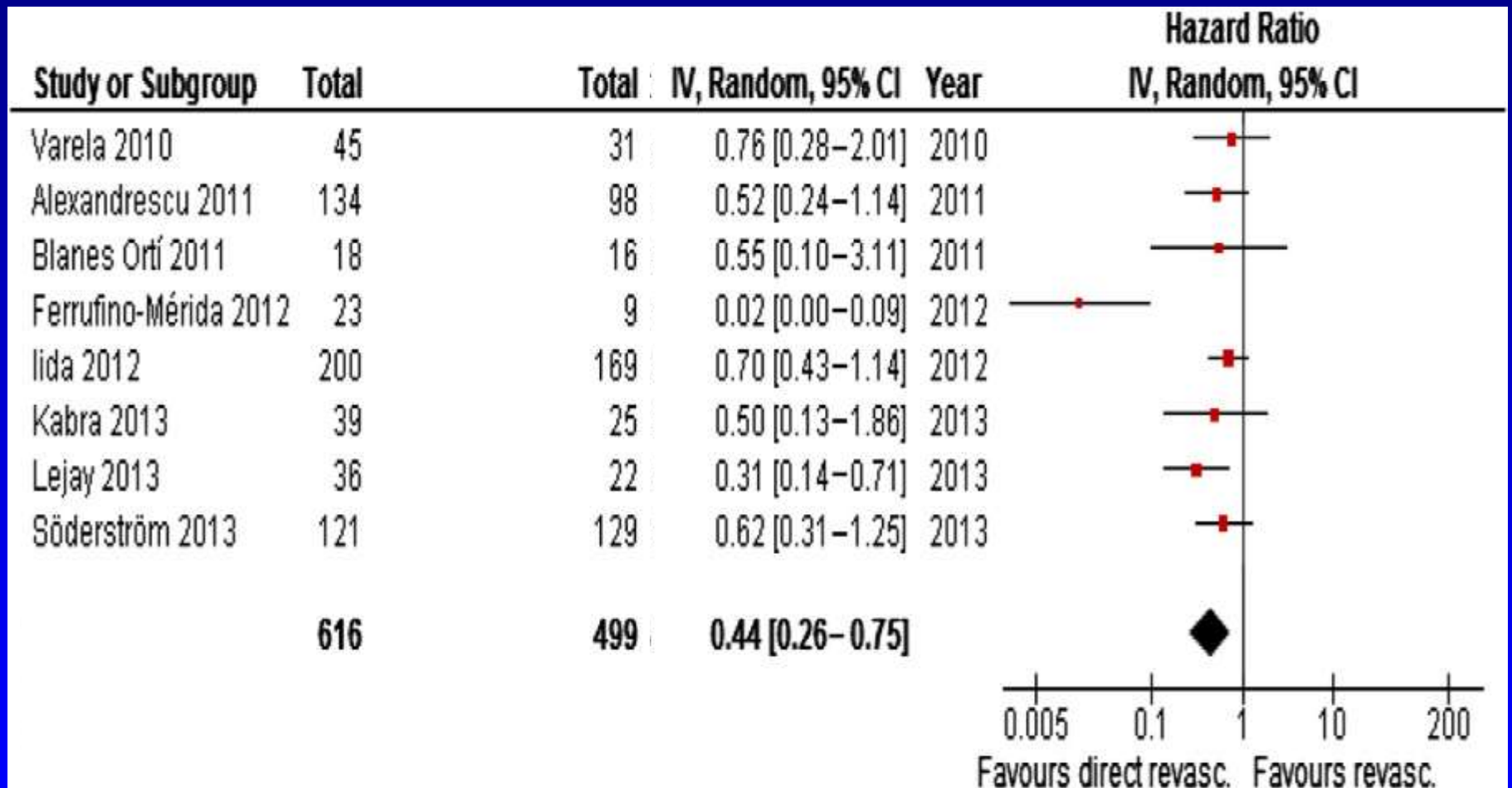
Direct vs Indirect Revasc in BK interventions for CLI (360 pts)



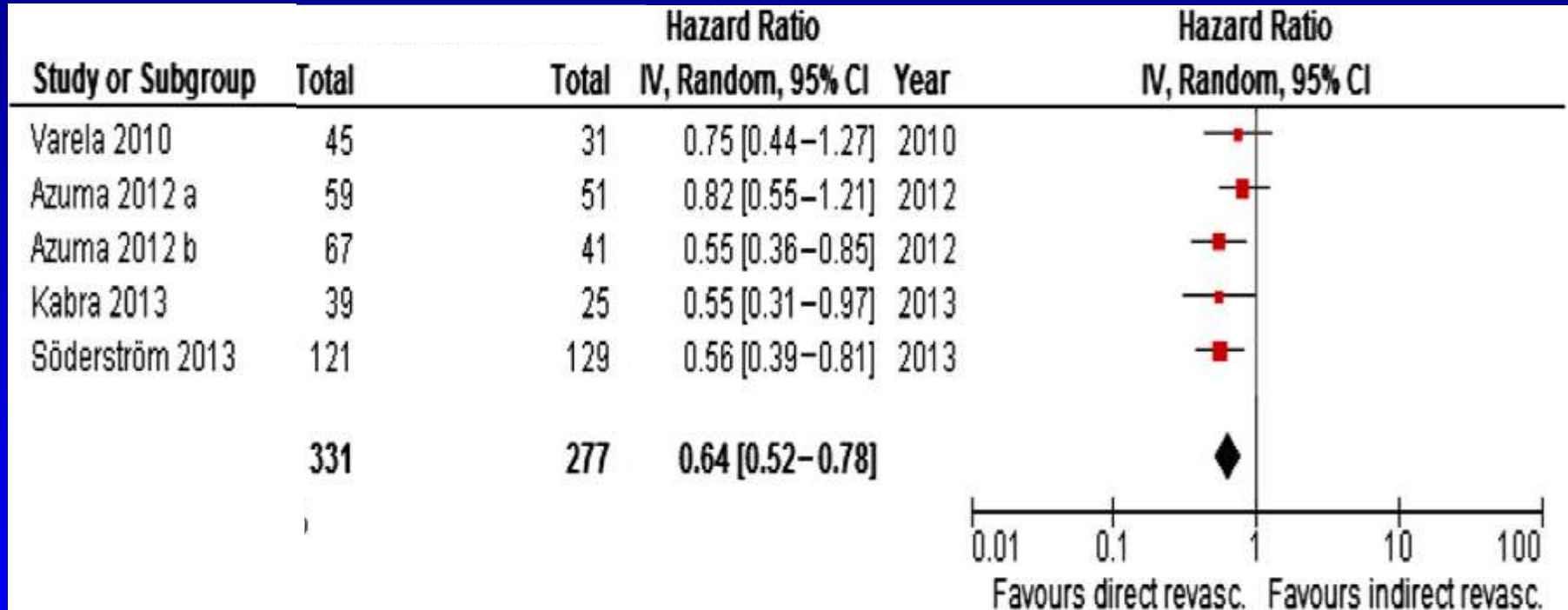
Metaanalysis of reported studies



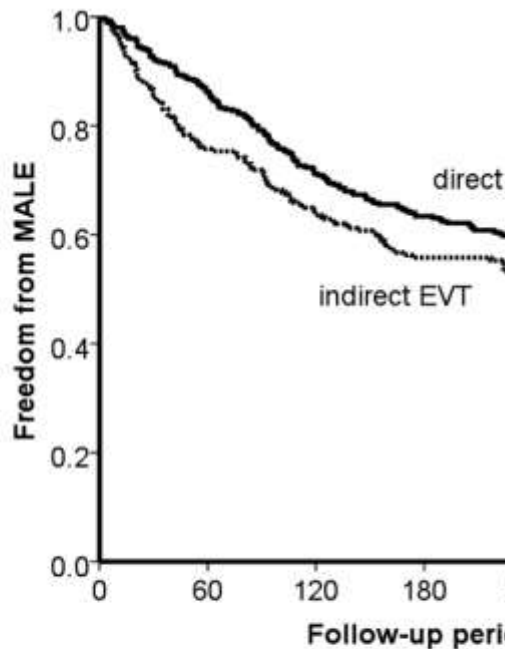
Limb Salvage



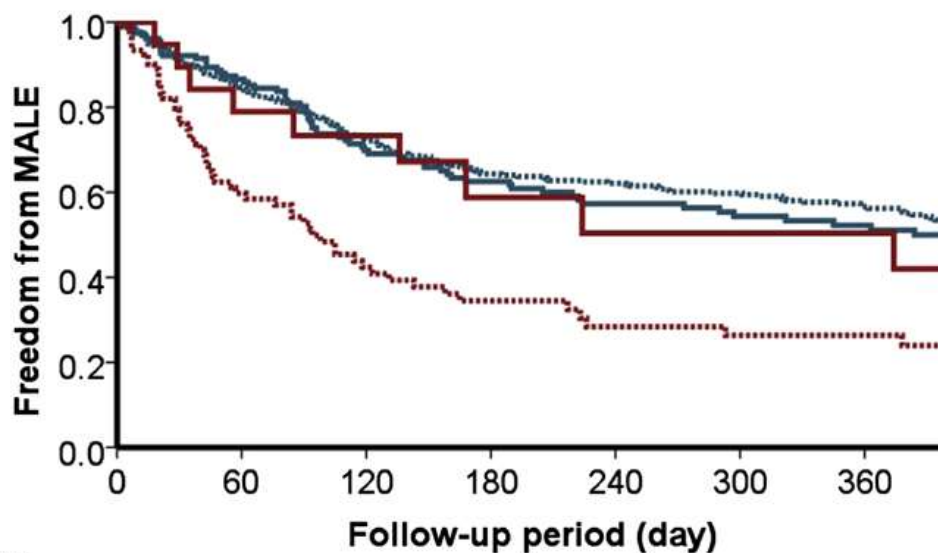
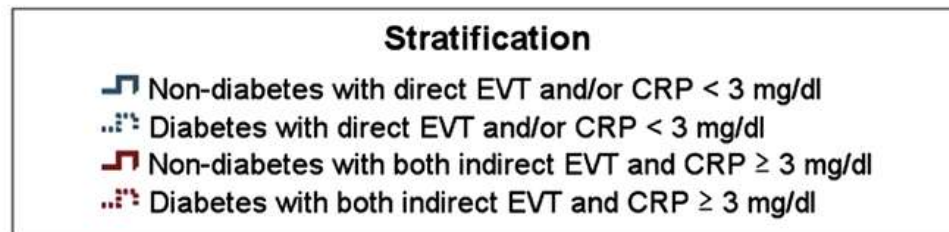
Wound Healing



Diabetes vs Non-Diabetes Status

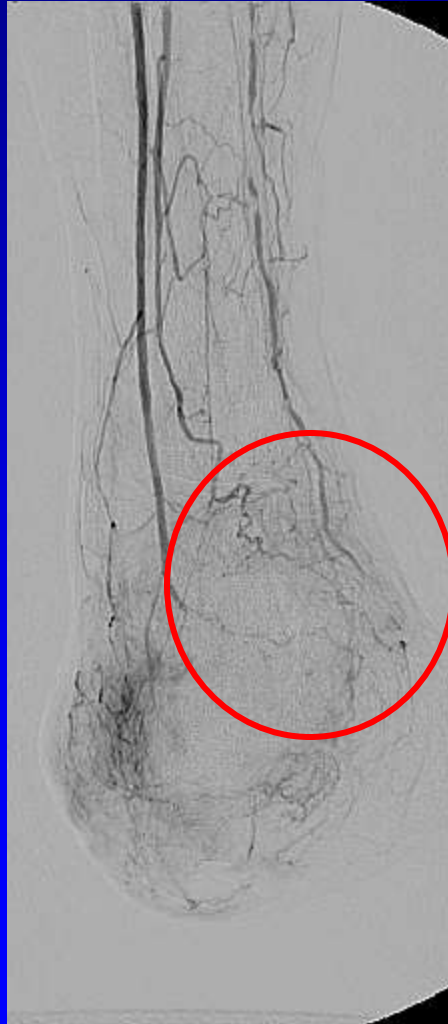


No. at risk	
direct EVT	411 325 242 202
indirect EVT	307 200 152 118



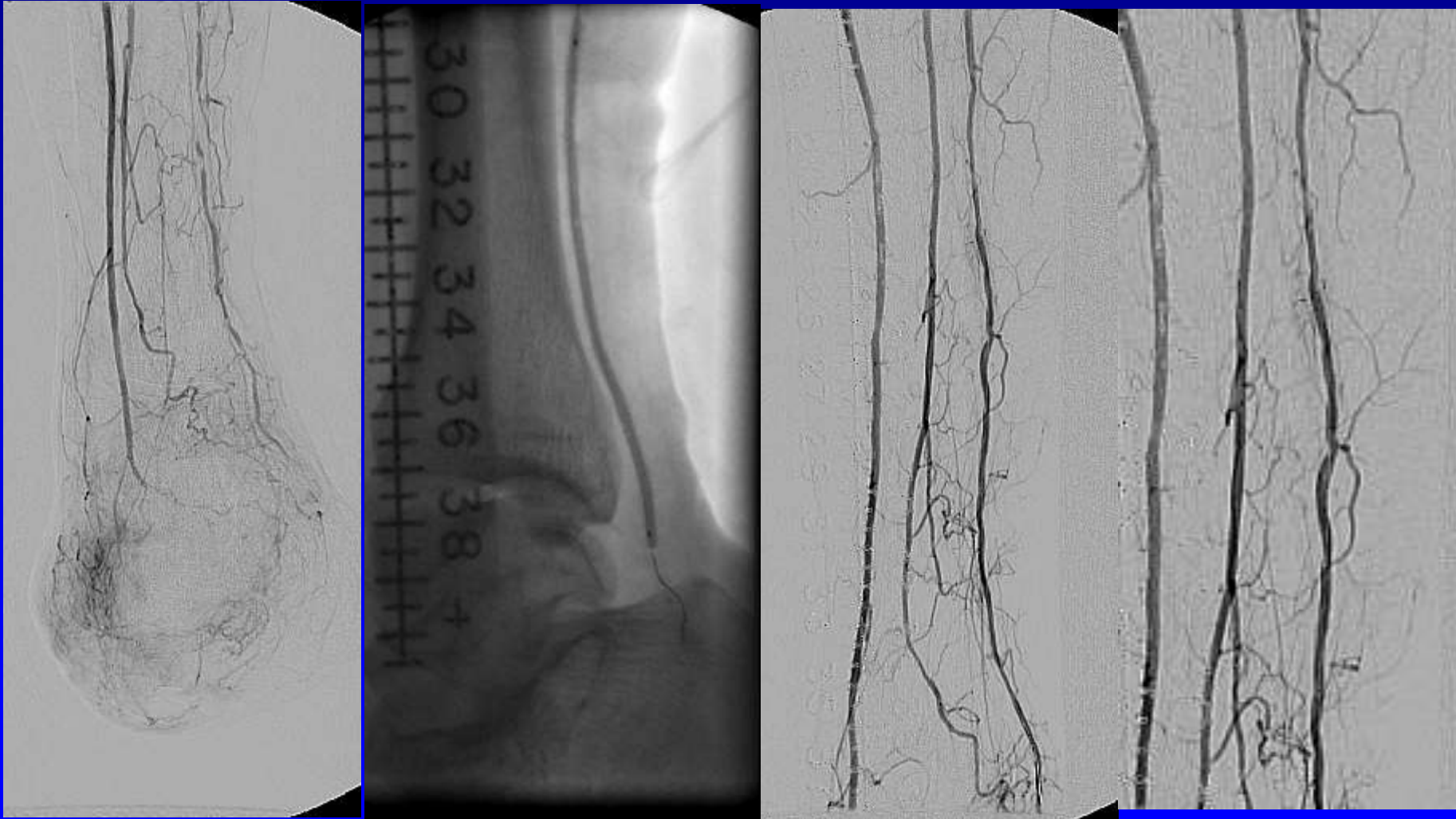
Below the knee Interventions

Adequate Imaging



Below the knee Interventions

Long Balloons



BK Interventions in CTO

- **Arterial Access**
- **Procedural imaging preparation**
- **Understand the anatomy**
- **Intraluminal approach**
- **Subintimal approach**
- **Assisted re-entry devices**
- **Antegrade-Retrograde approach**

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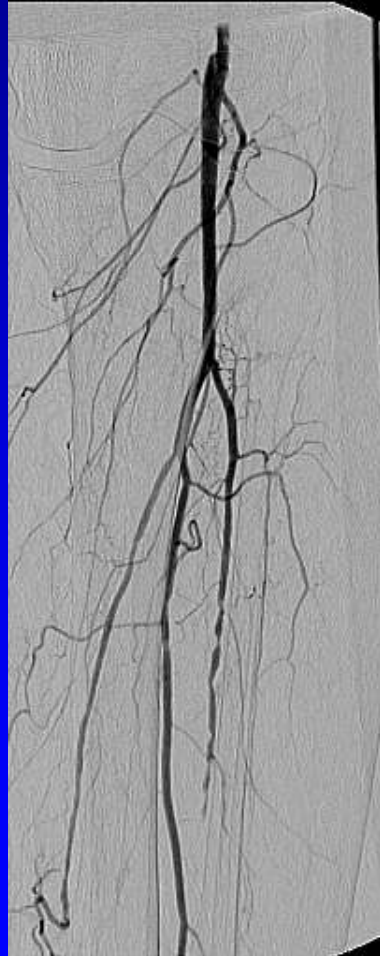
Below the knee Interventions

Understand the Anatomy



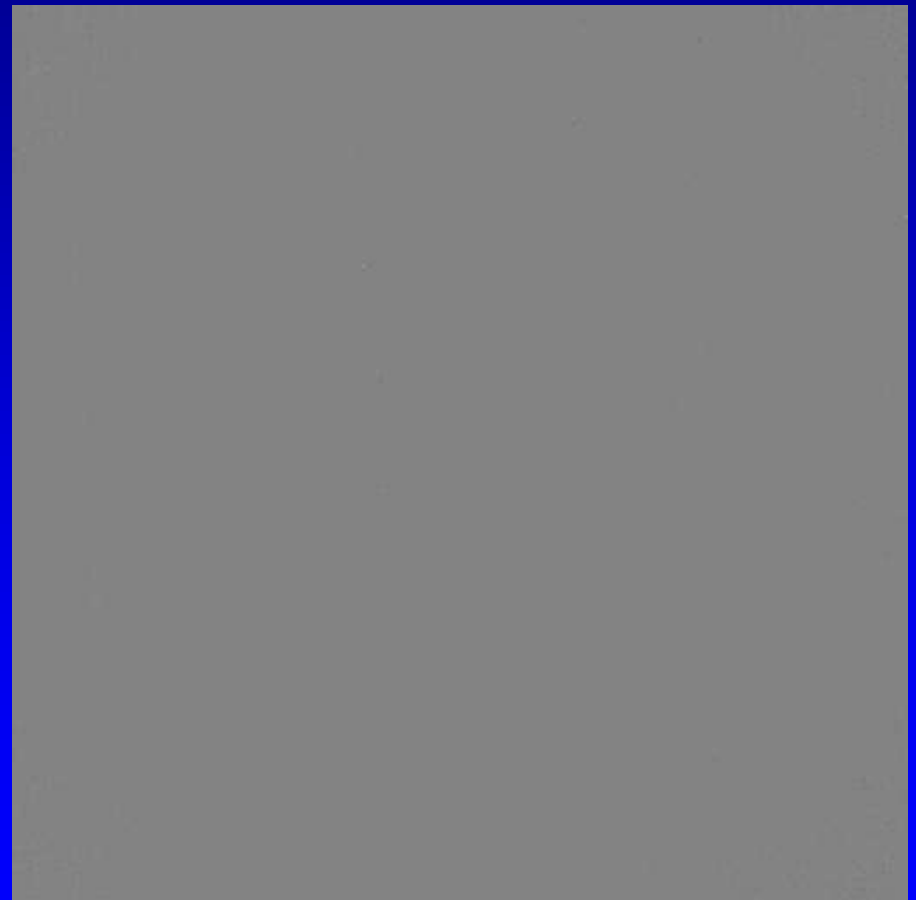
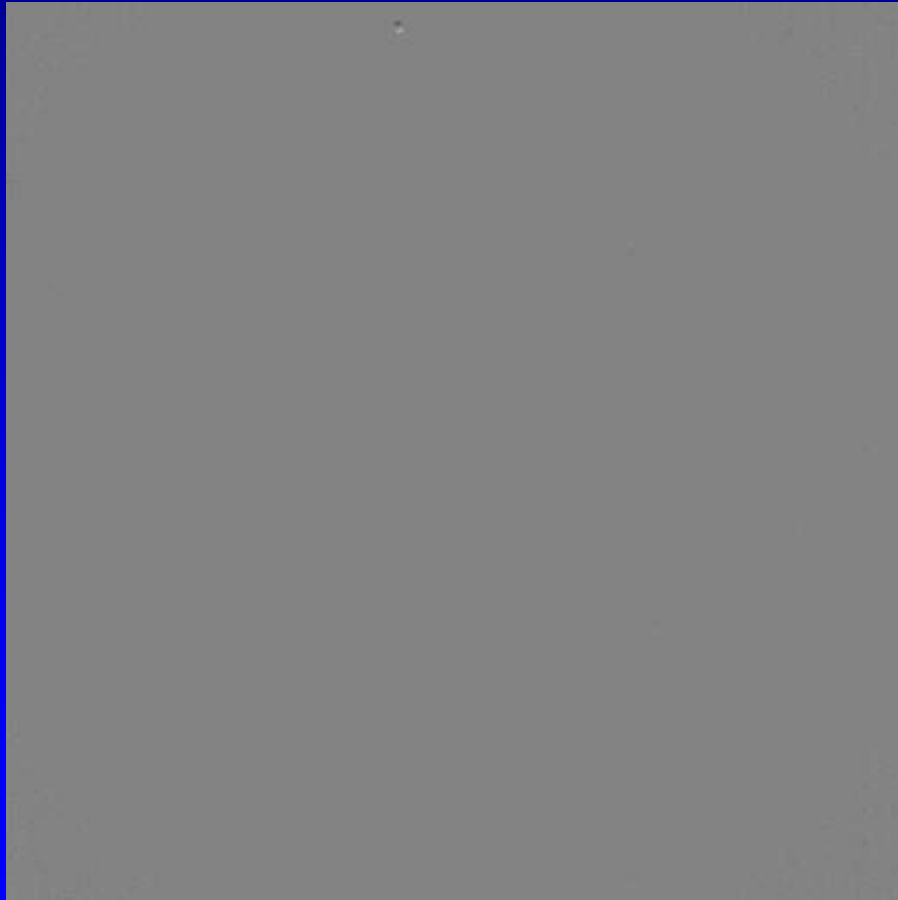
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Understand the Anatomy



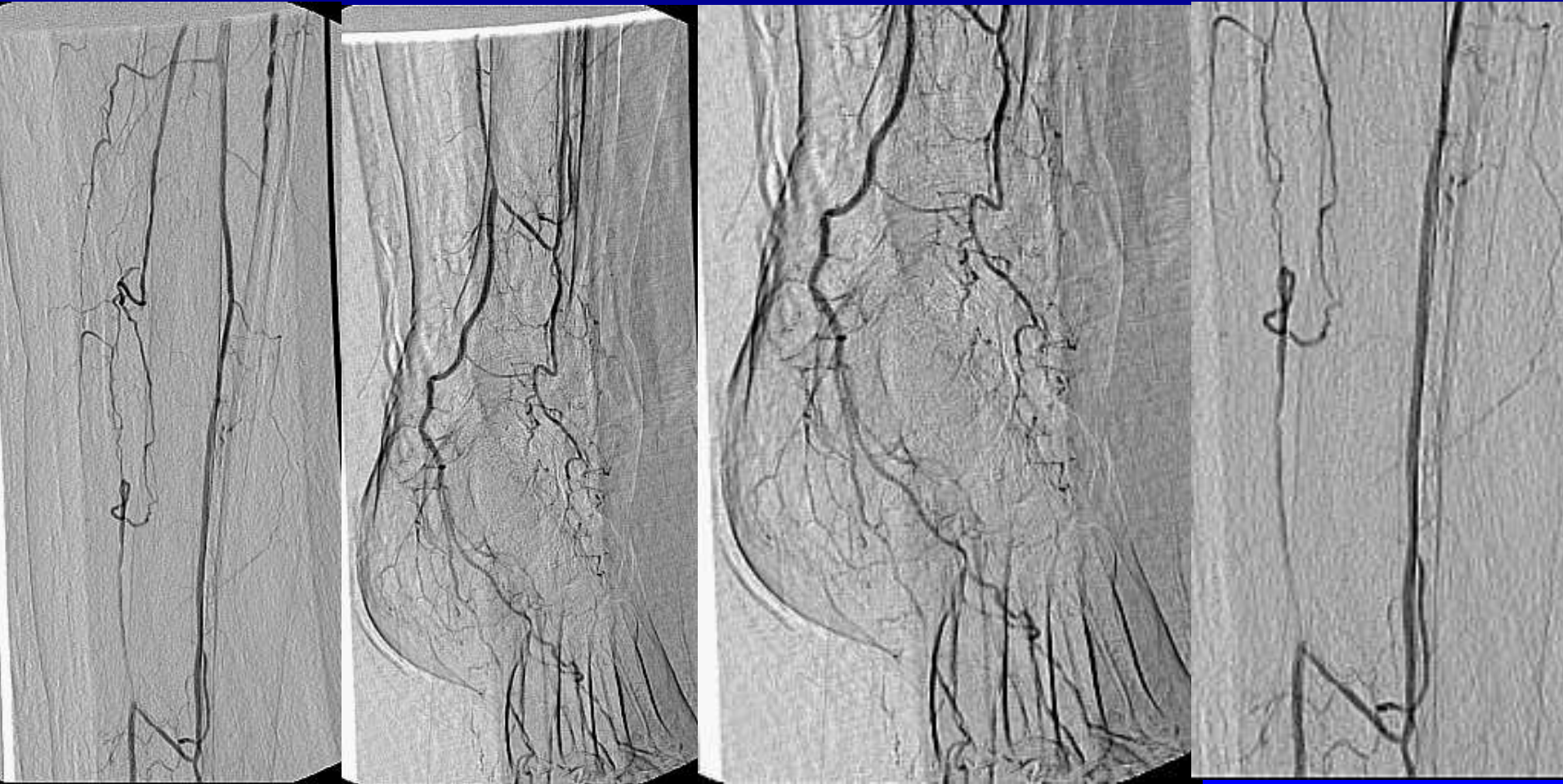
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Understand the Anatomy



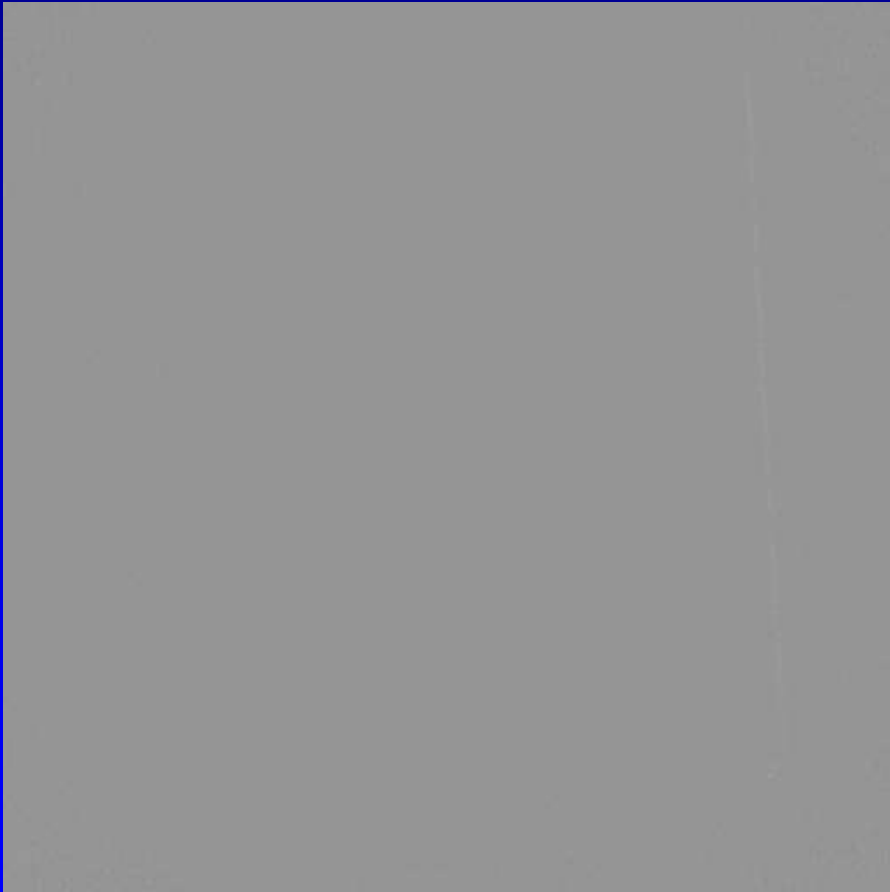
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Understand the Anatomy



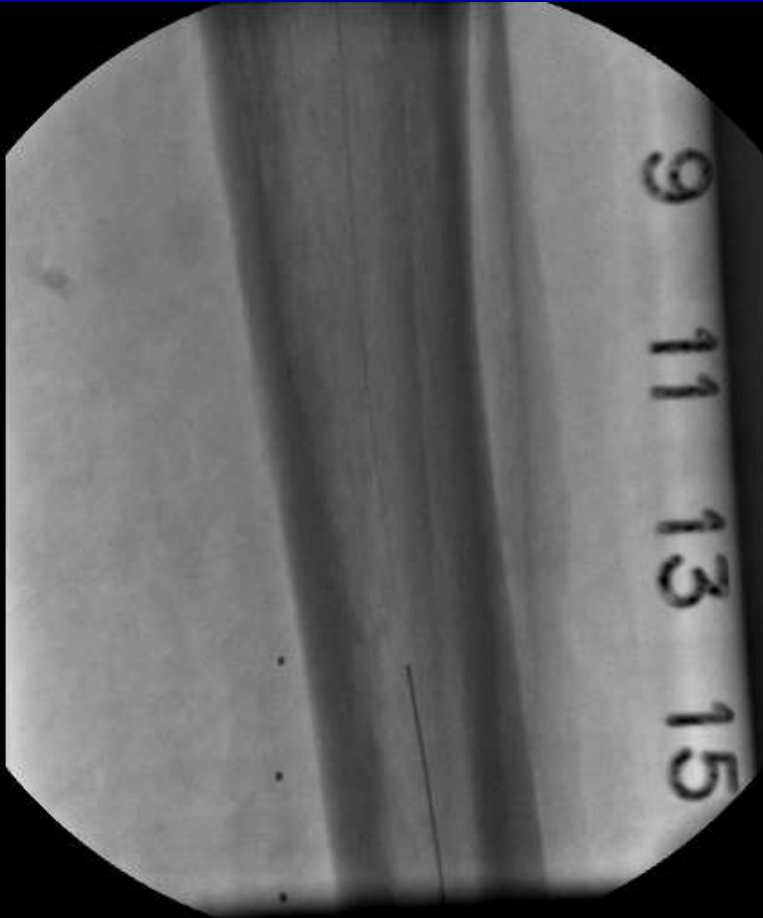
Below the knee Interventions

CTO via collateral channel



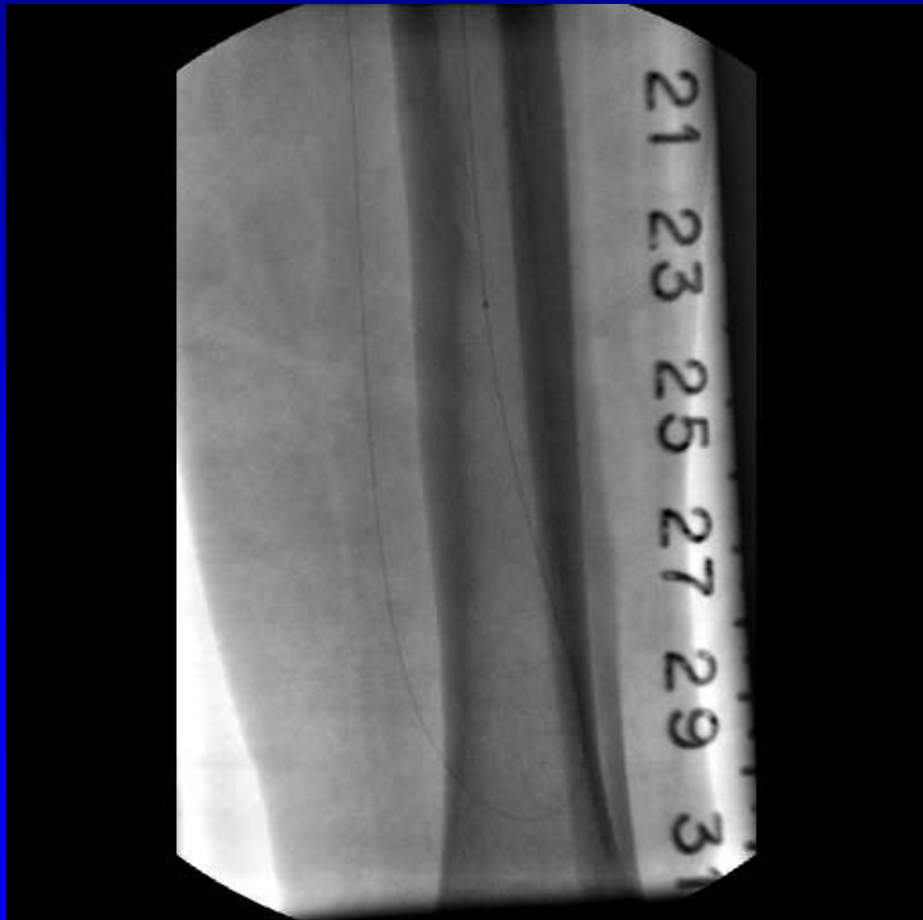
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CTO via collateral channel



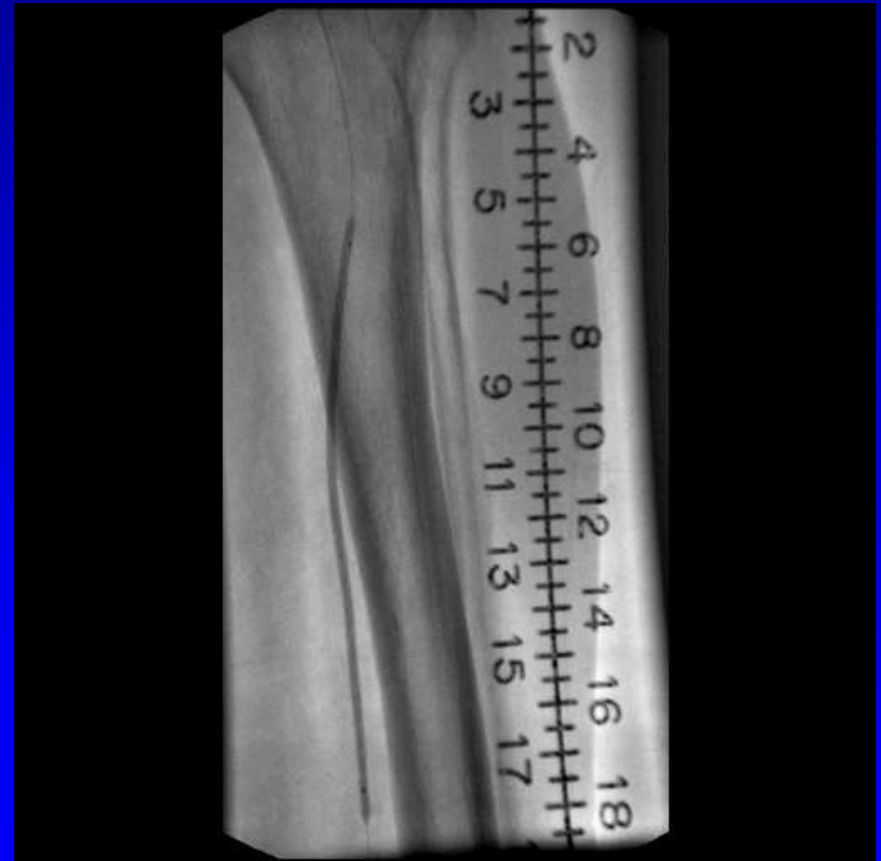
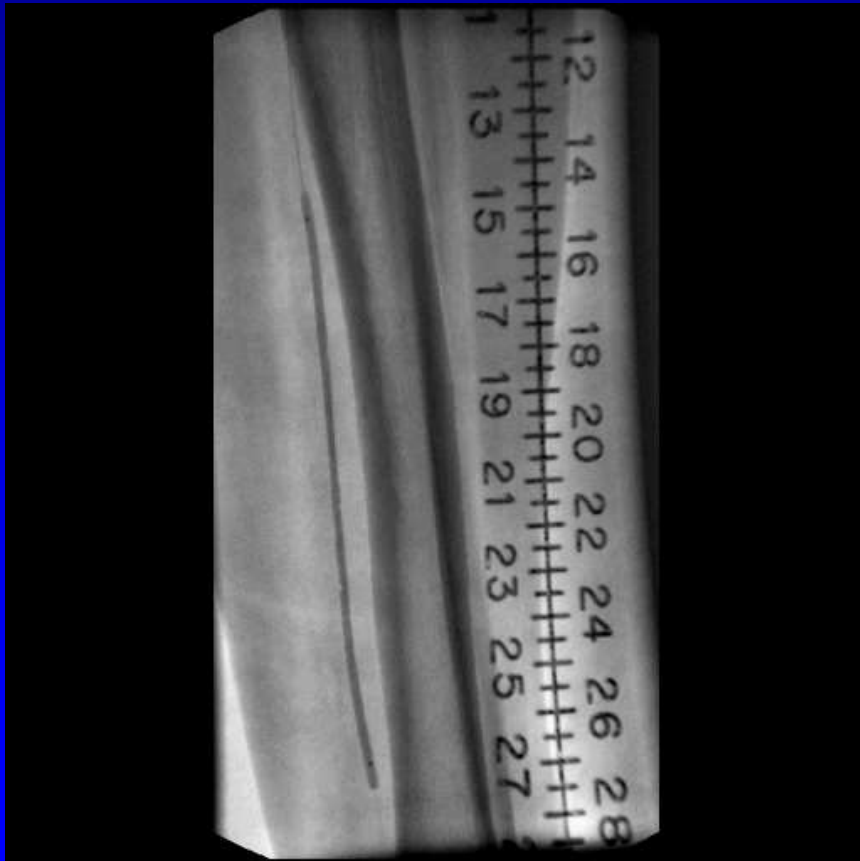
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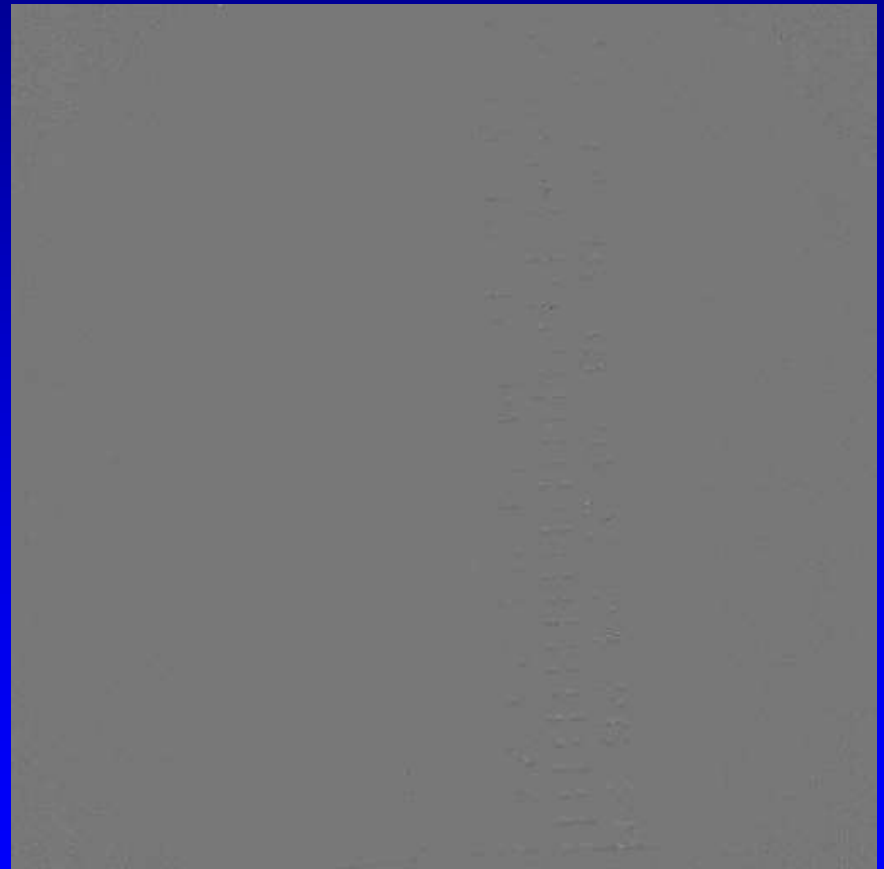
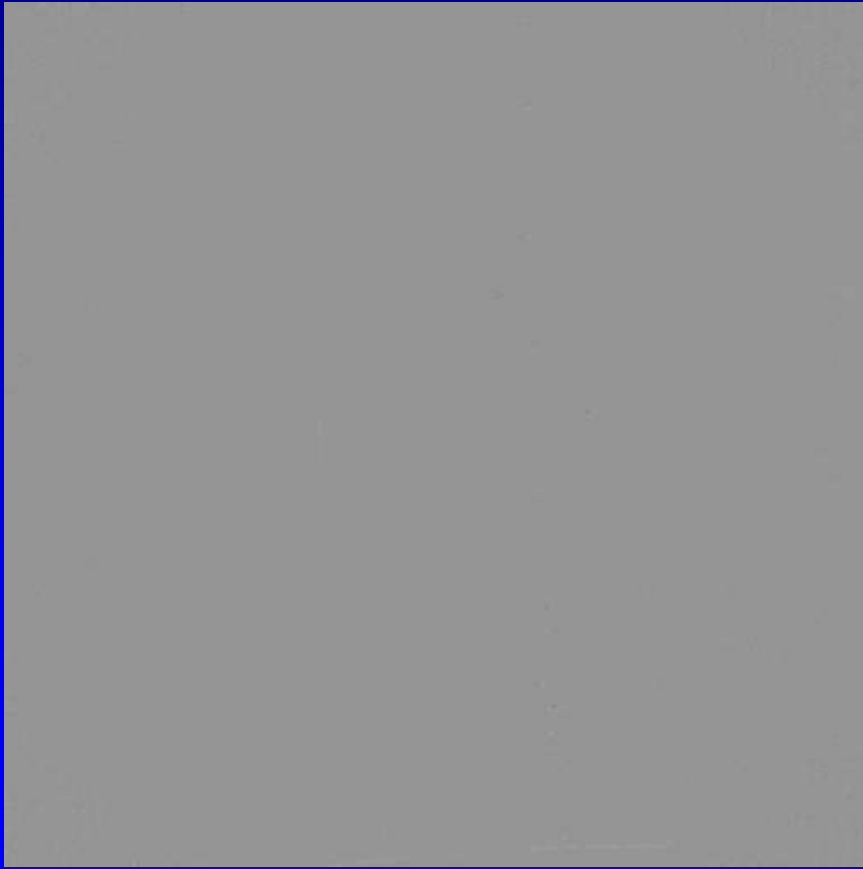
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CTO via collateral channel



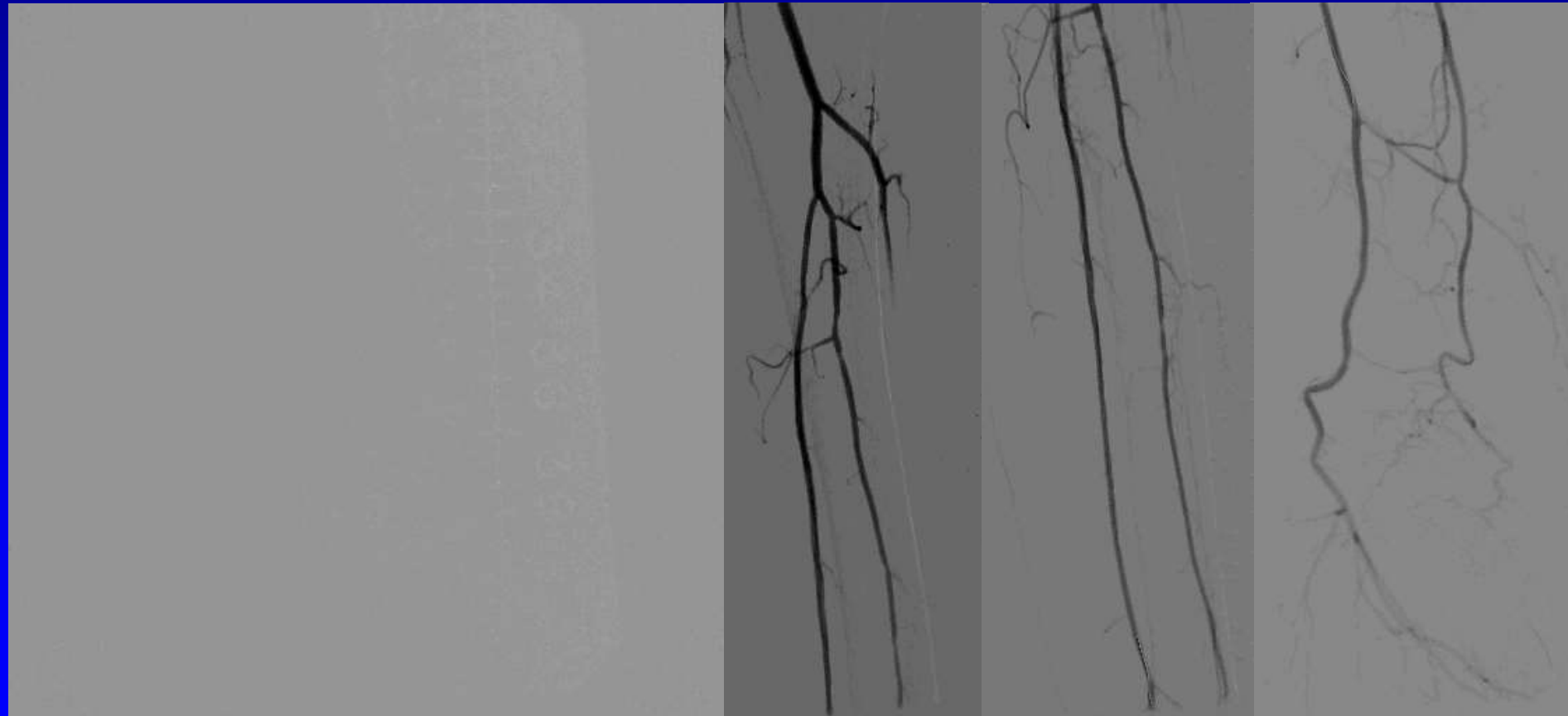
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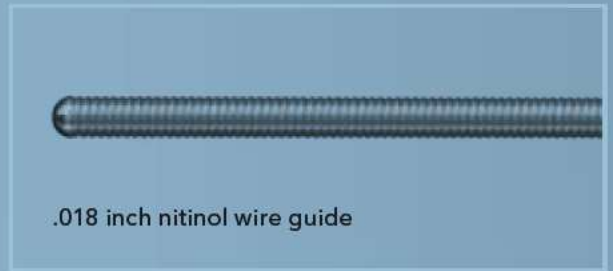
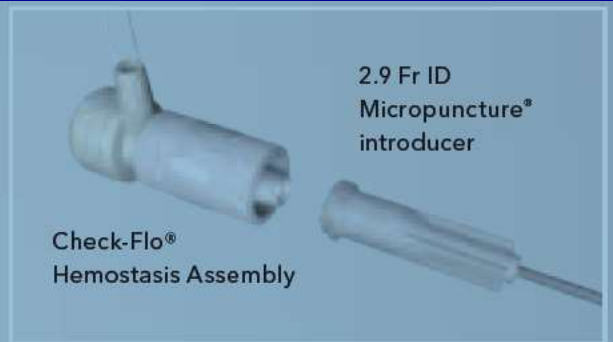
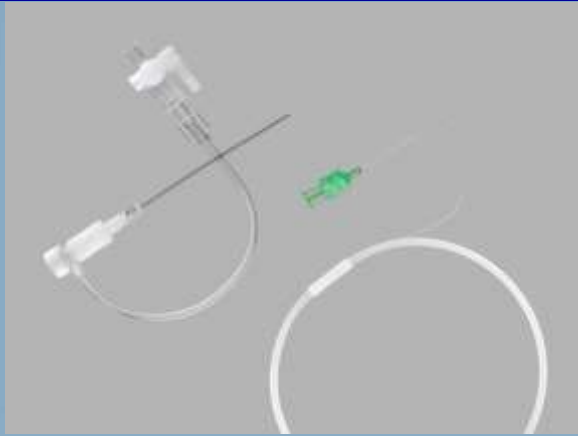
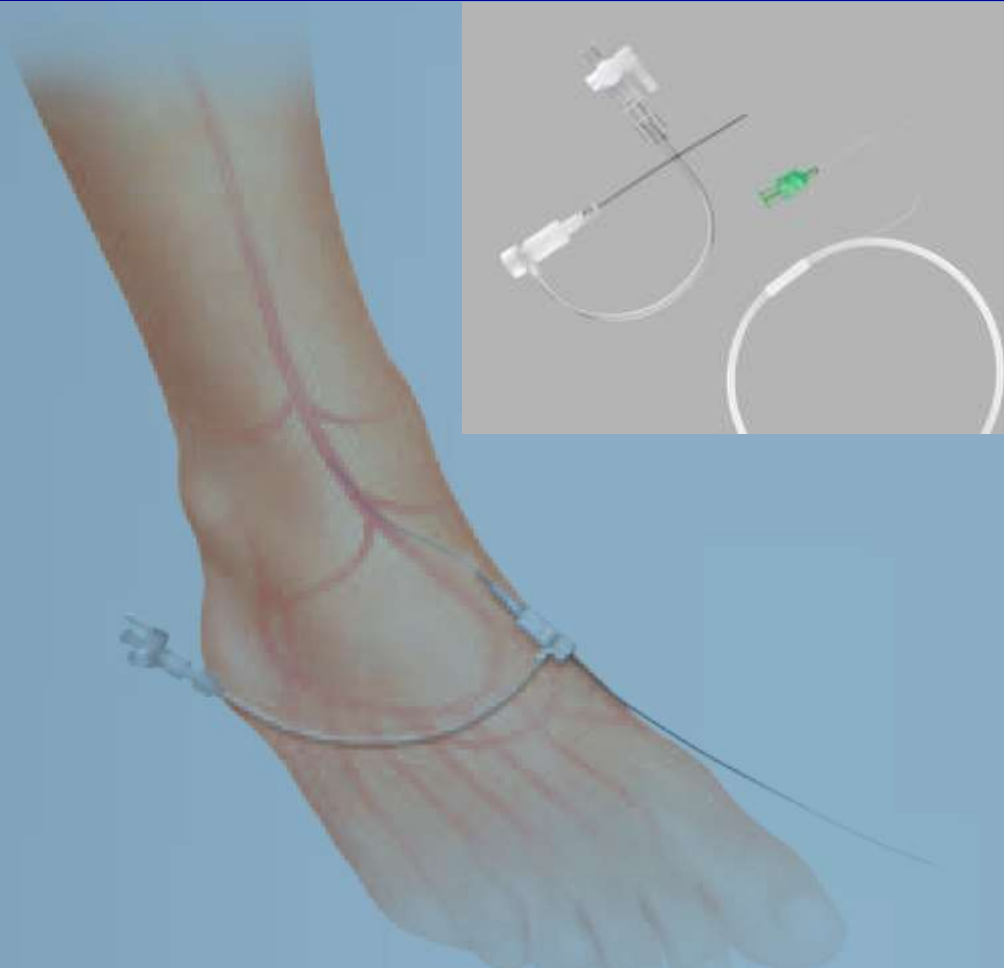


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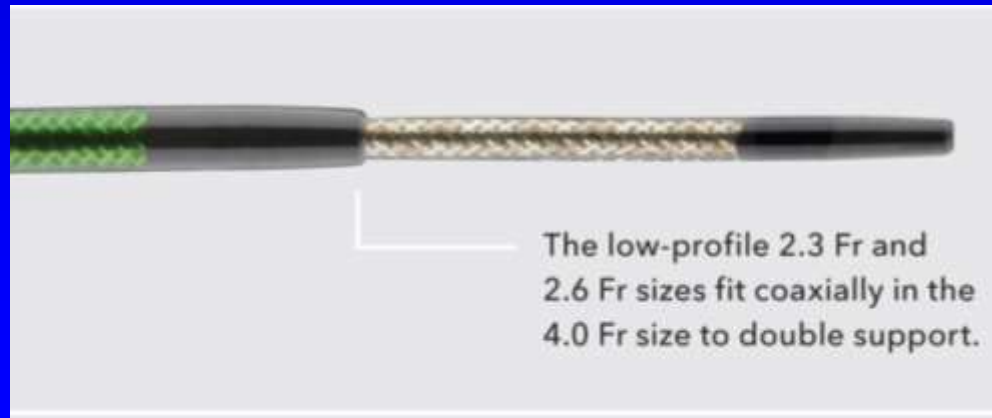
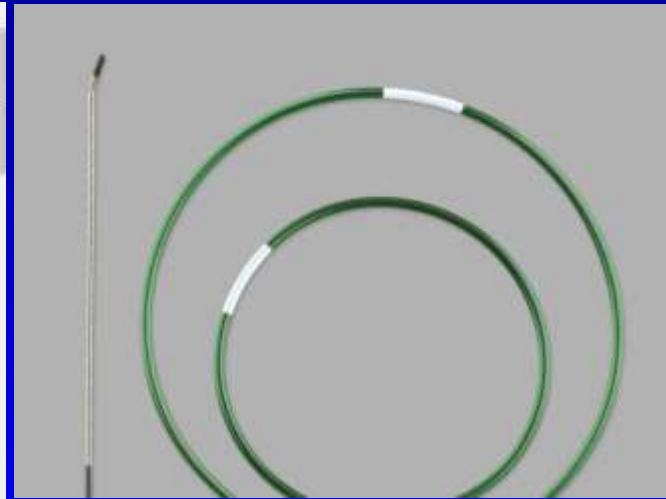
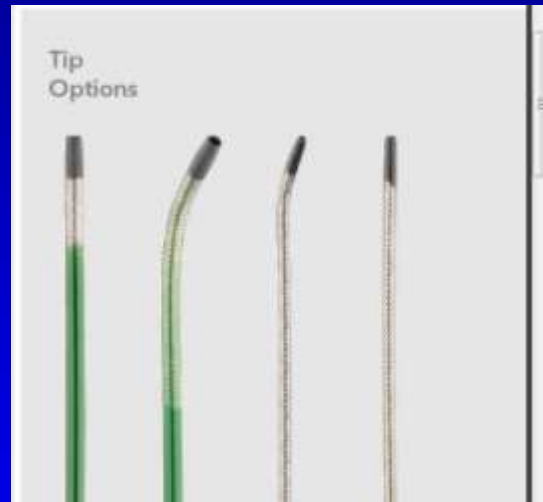
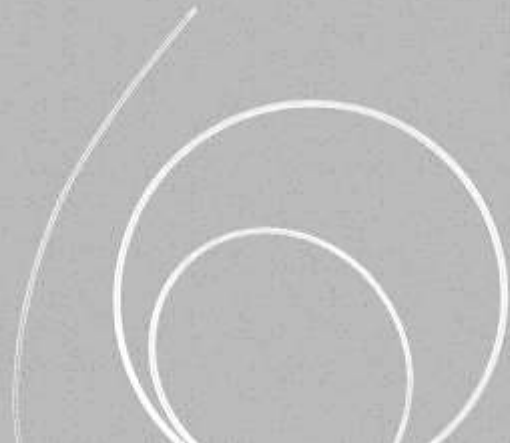
Below the knee Interventions

Pedal Access Tools



Below the knee Interventions

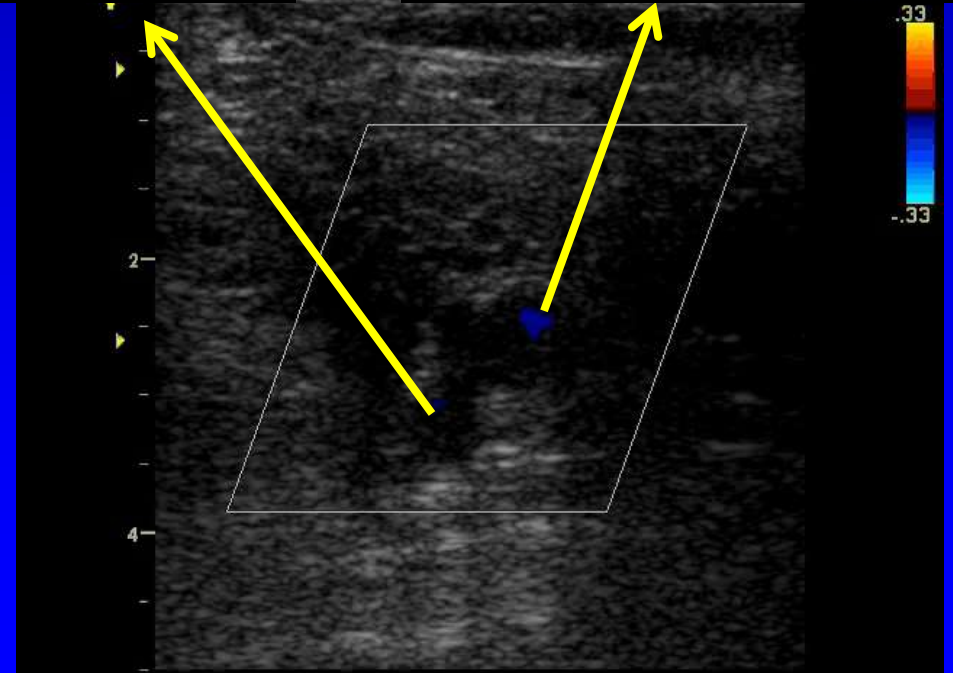
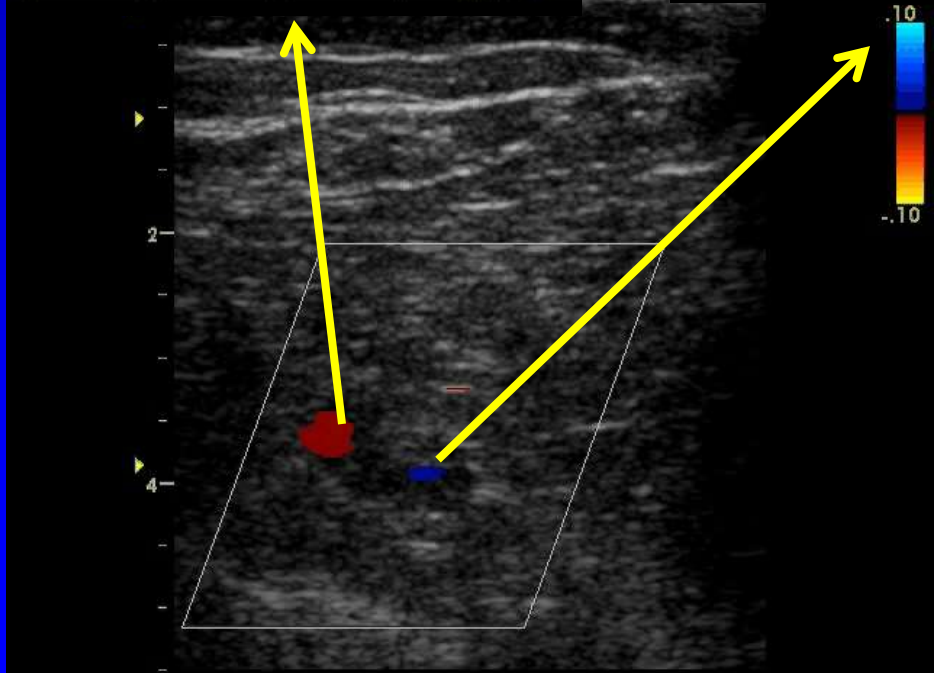
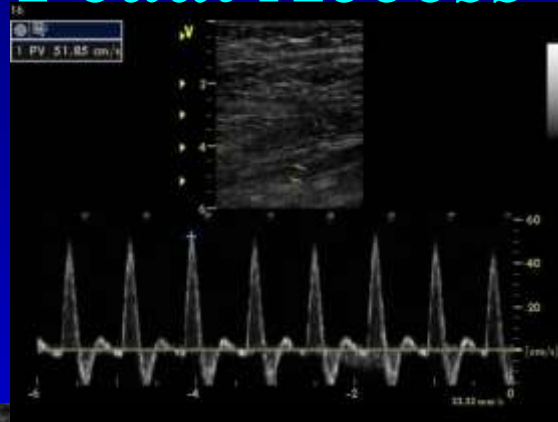
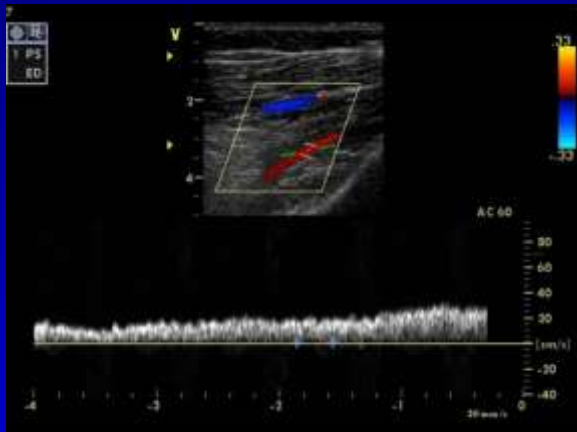
Pedal Access Tools



The low-profile 2.3 Fr and 2.6 Fr sizes fit coaxially in the 4.0 Fr size to double support.

Below the knee Interventions

Pedal Access



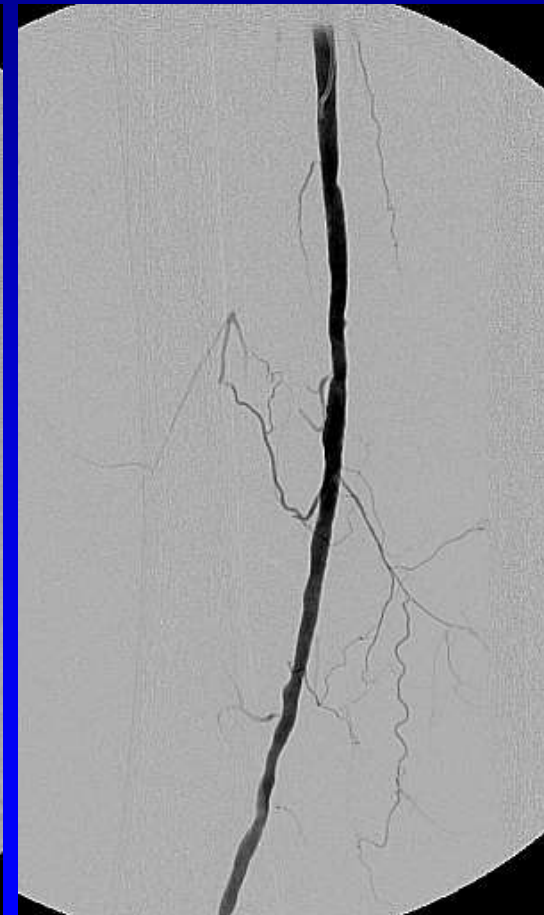
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Pedal Access



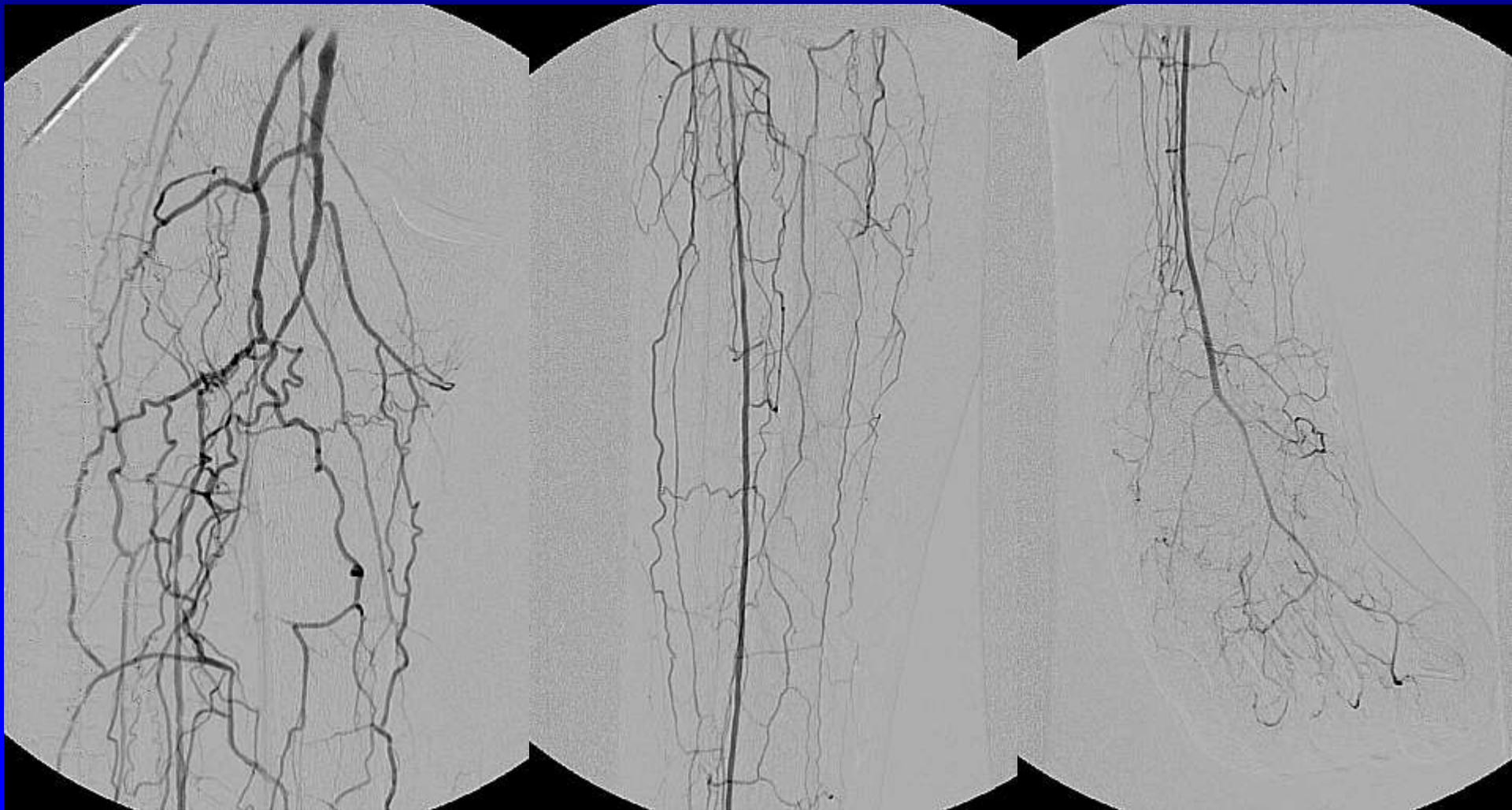
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Pedal Access



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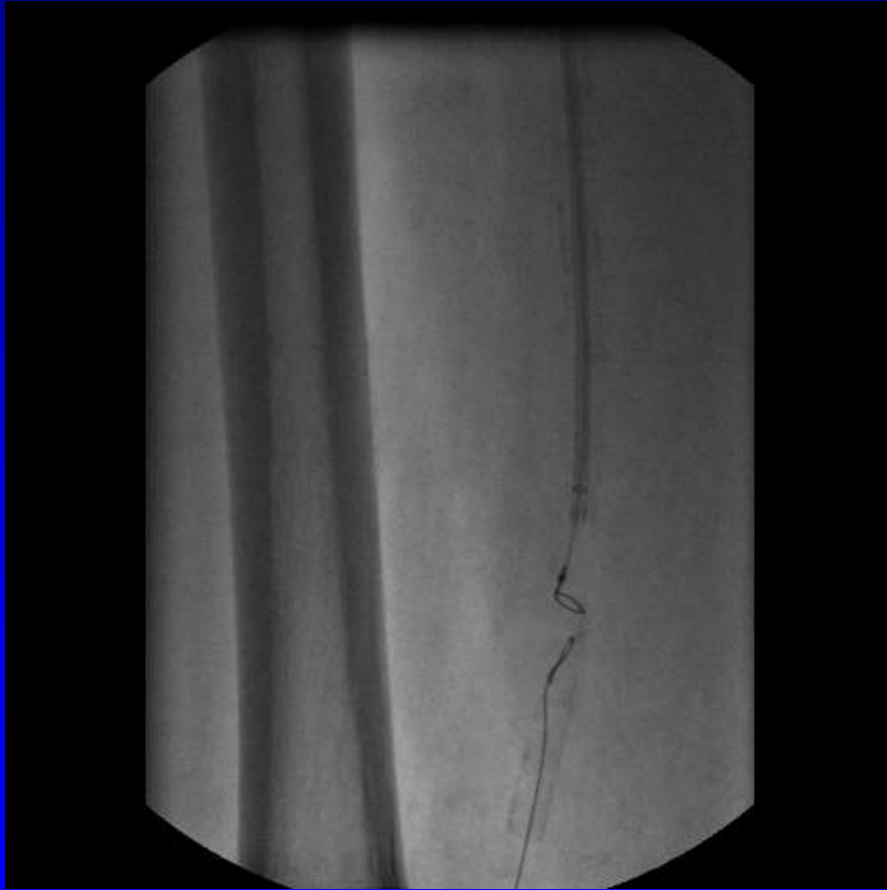
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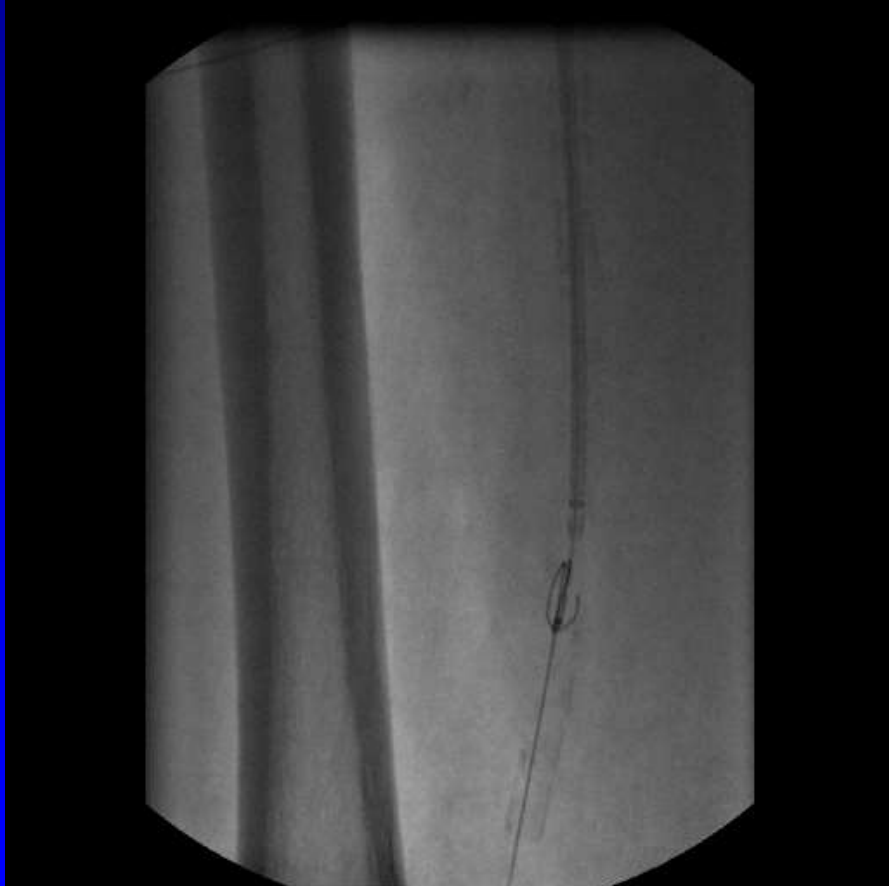
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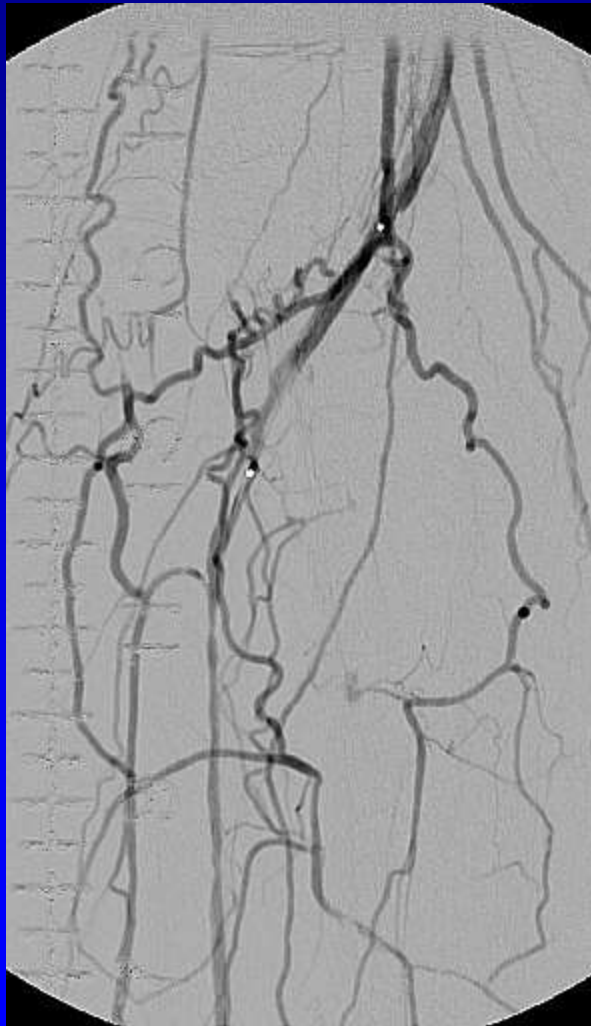
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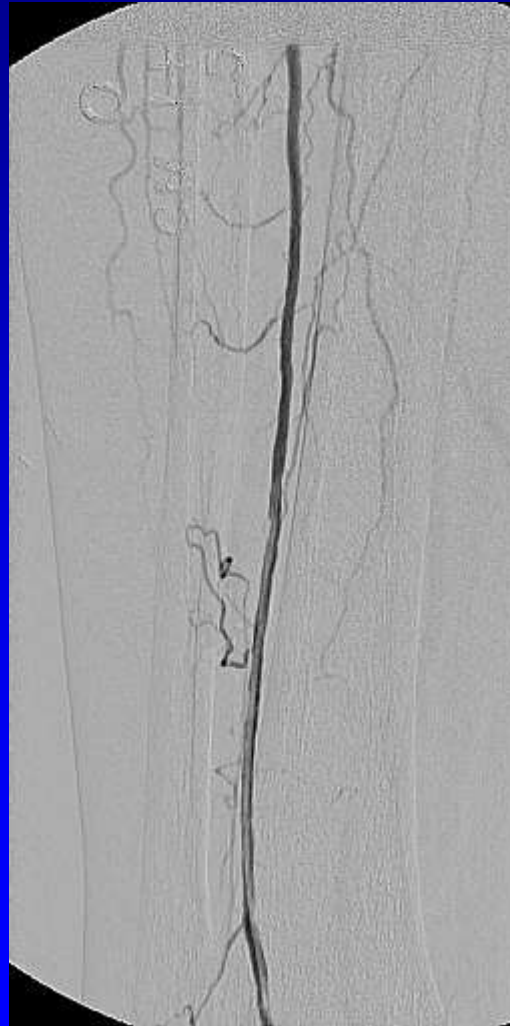
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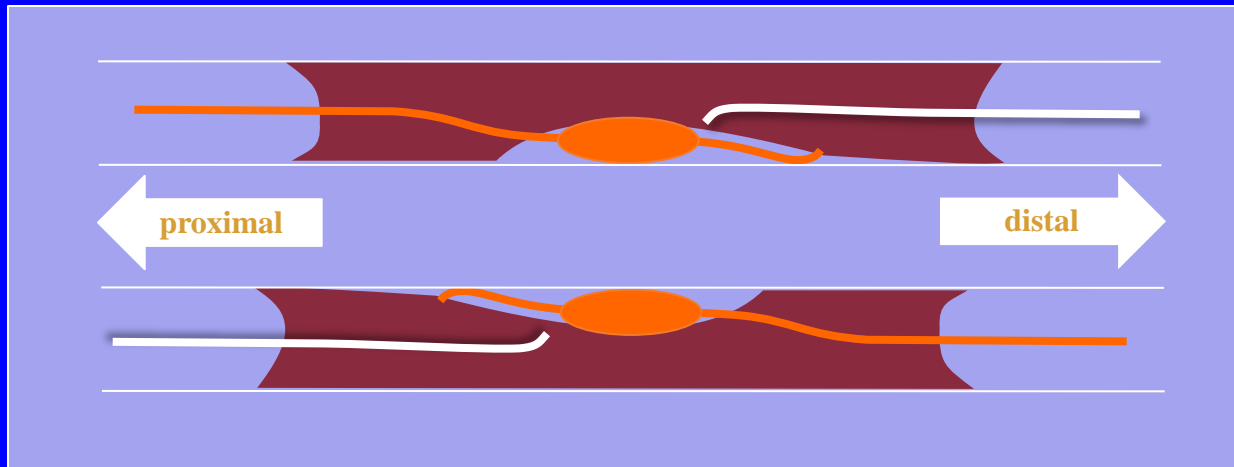
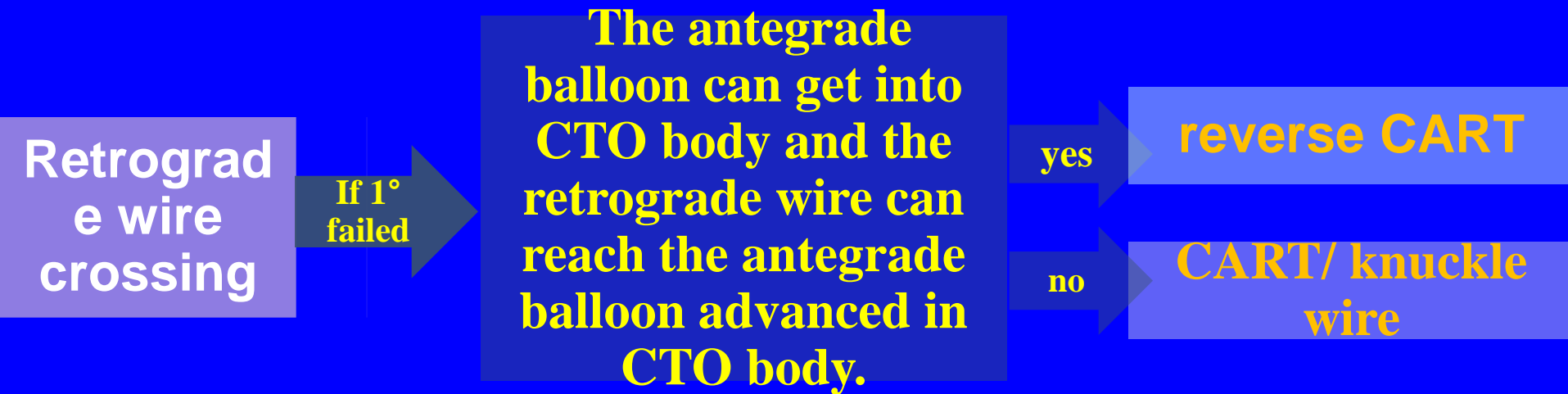


Below the knee Interventions

Pedal Access



CART or Reverse CART



Below the knee Interventions

Pedal Access techniques

- **CART**
- **Reverse CART**
- **Direct intervention from pedal**
- **Snaring wire and reverse**
- **Initial pedal PTA and reverse**

Angiosome Concept

- **No prospective evaluation**
- **Used of historical controls**
- **Most studies used different definitions with no anatomical information**
- **Not information from studies of degree of tissue loss between groups**
- **Studies performed at different times**
- **Possible selection bias. Good targets versus diffuse atherosclerosis. More advanced disease versus less disease, etc**

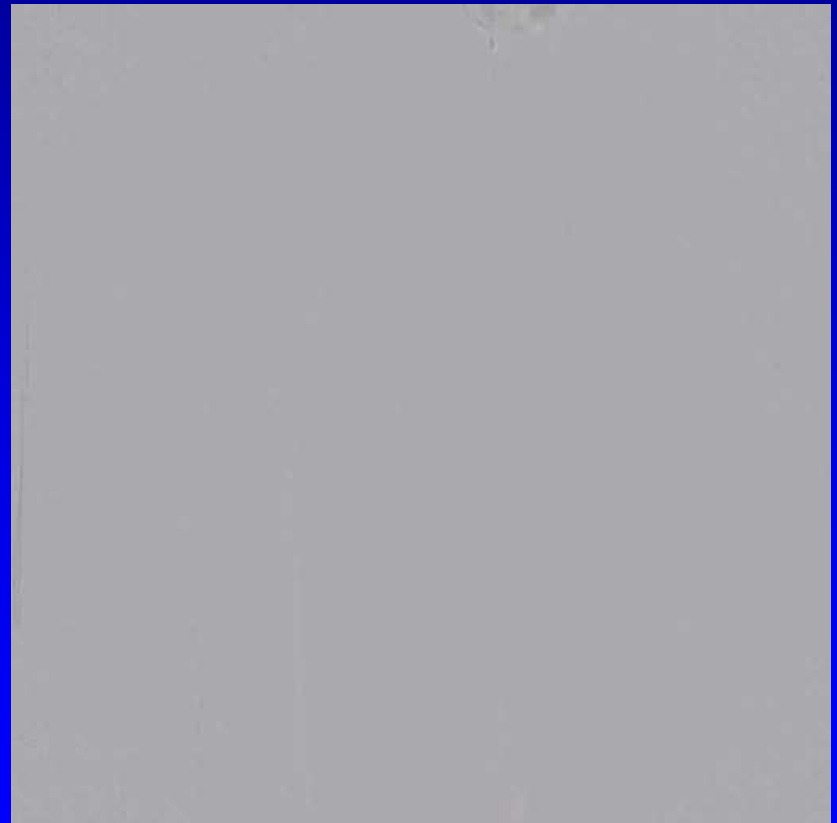
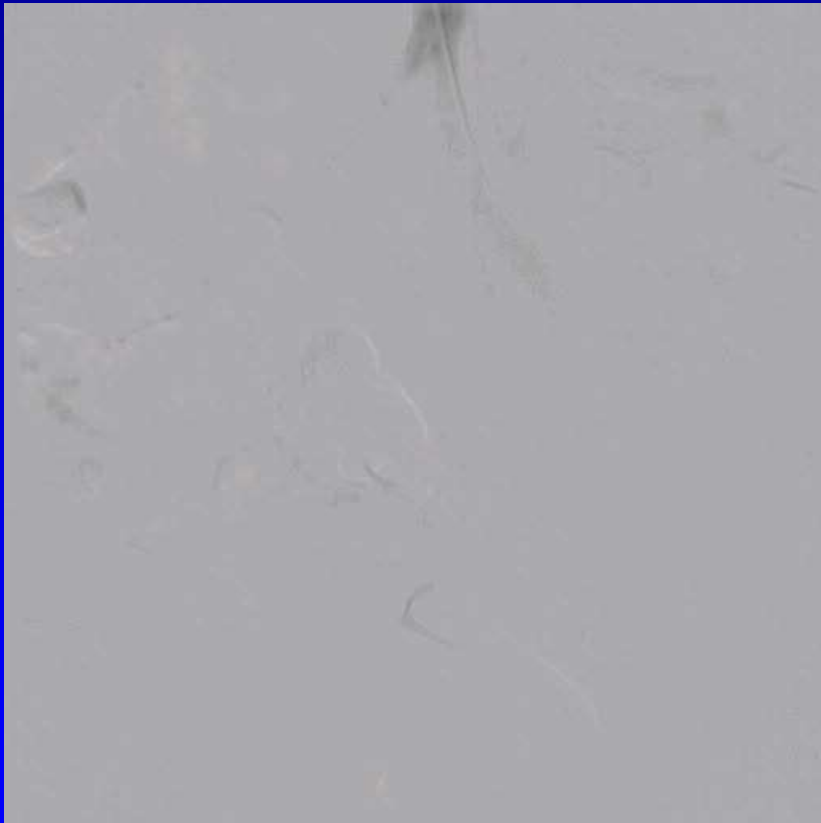
Angiosome Concept

- **Not beneficial in non-diabetics (collateral circulation is not as affected)**
- **The presence of good plantar arch might be the best predictor**
- **Patients with ischemic limbs have different angiosome distribution**
- **Interangiosome connection**
- **Not able to get direct revascularization might be the main predictor**

Thank you

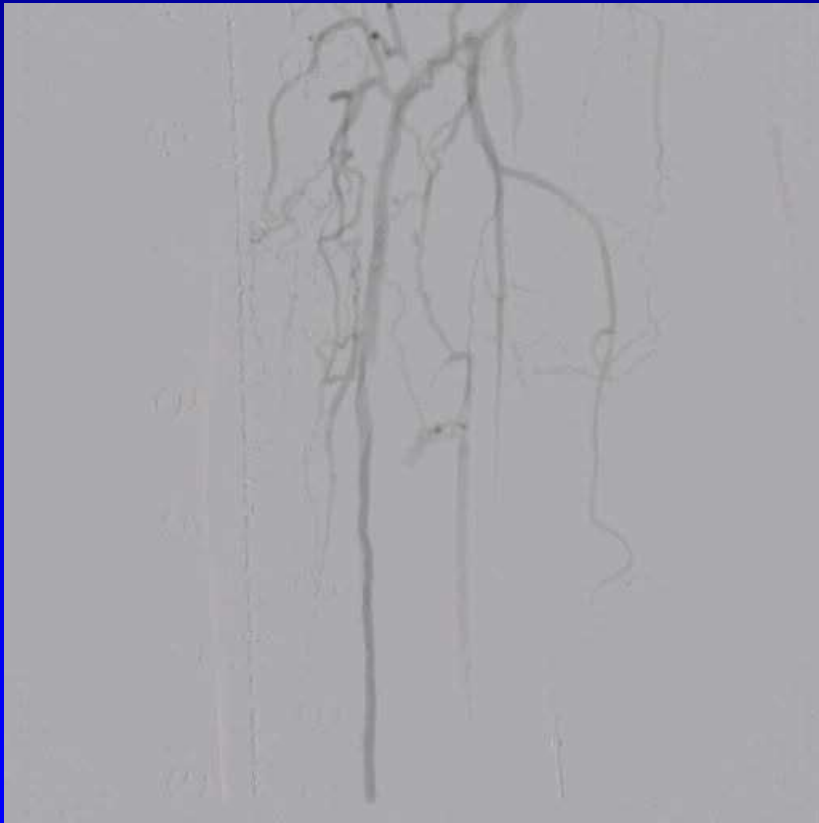
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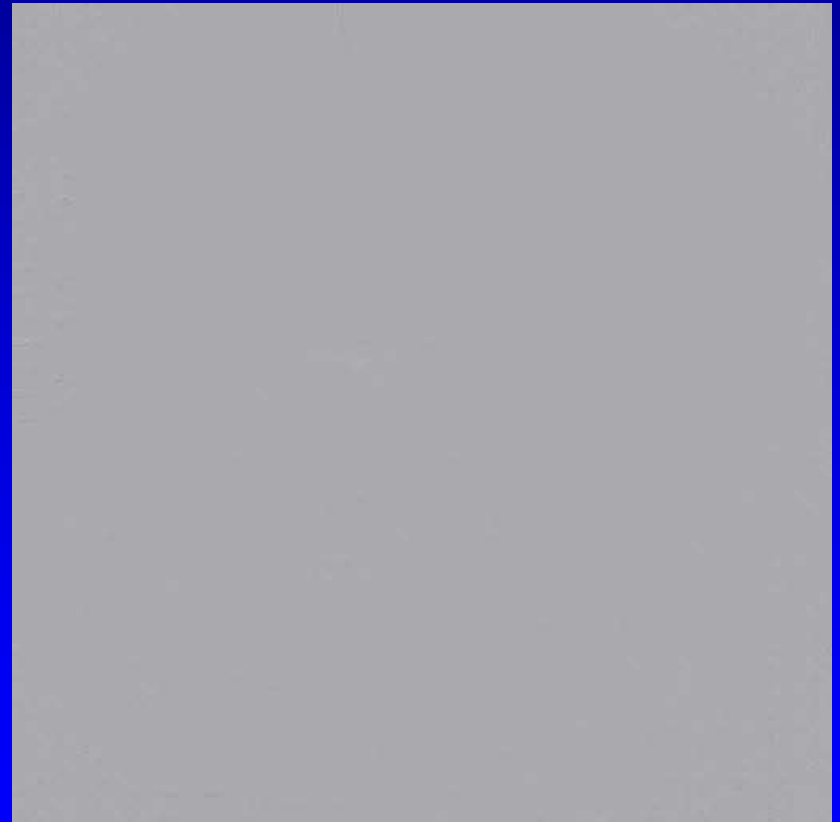
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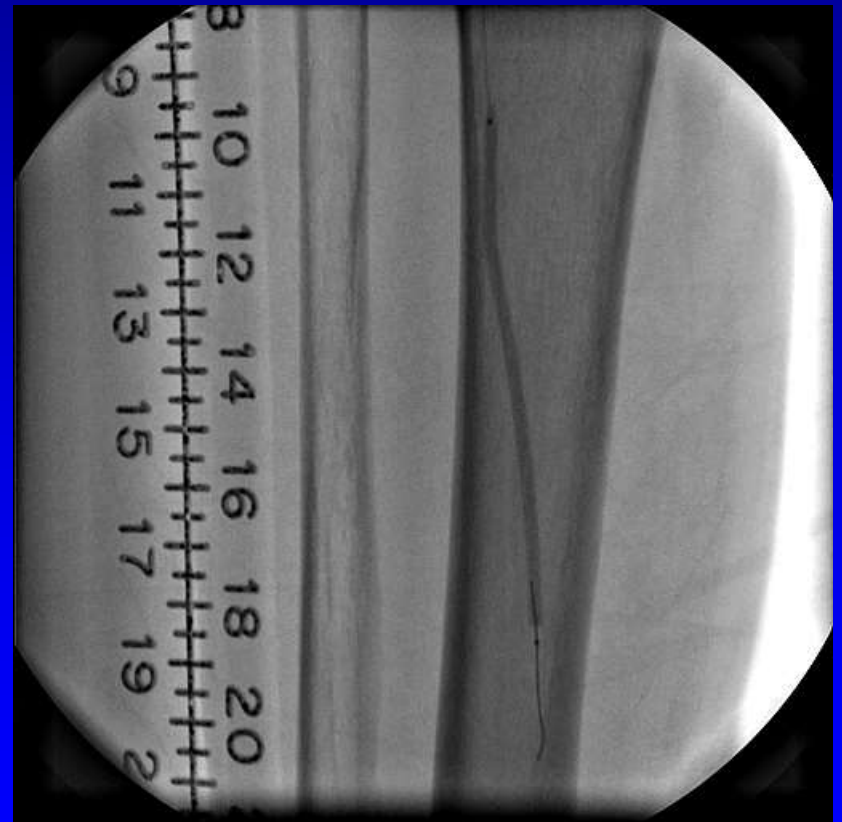
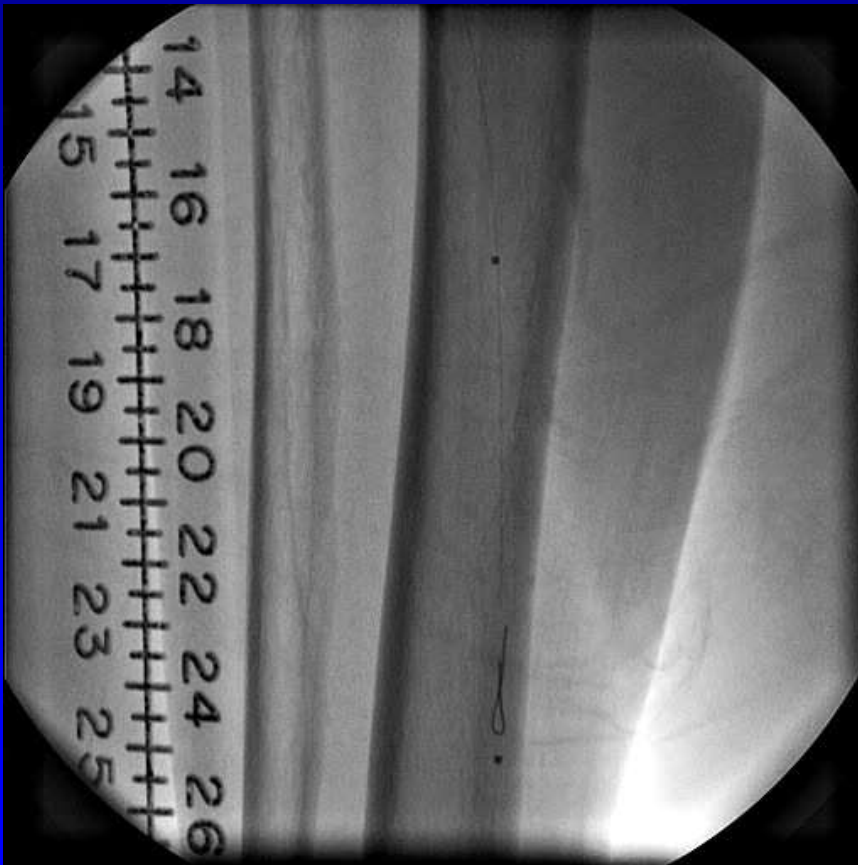
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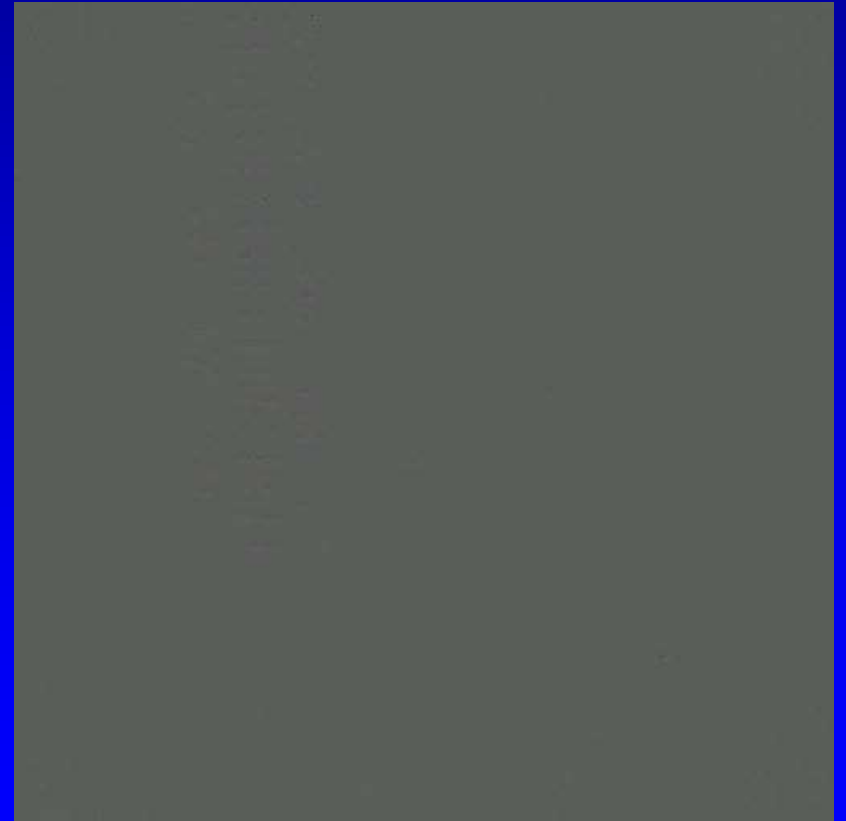
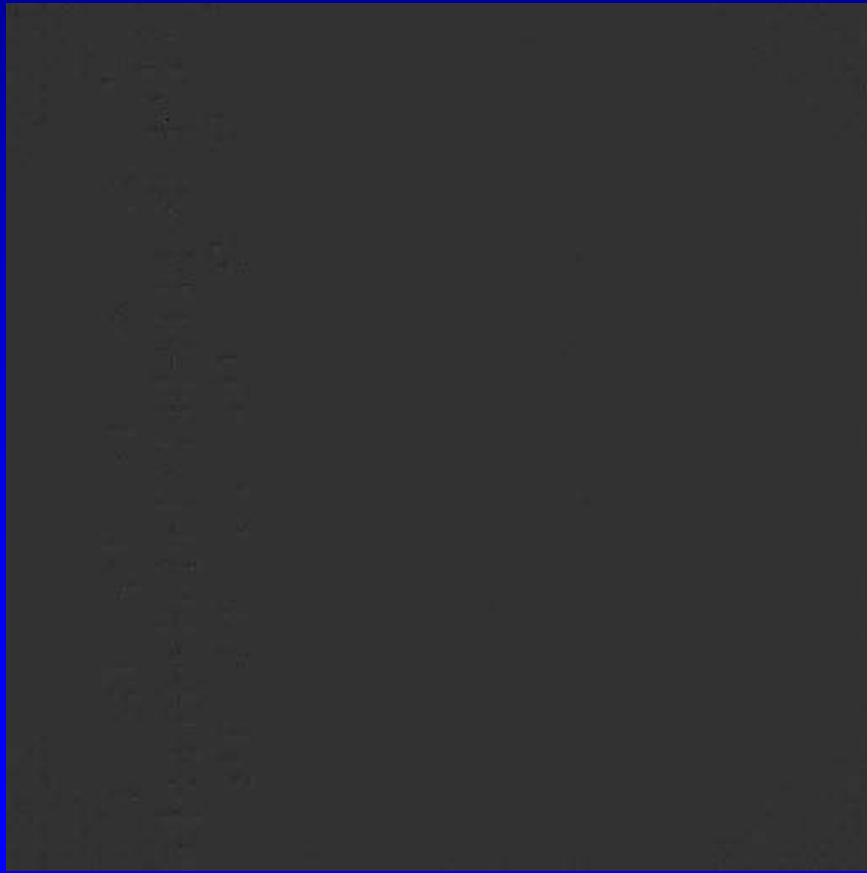
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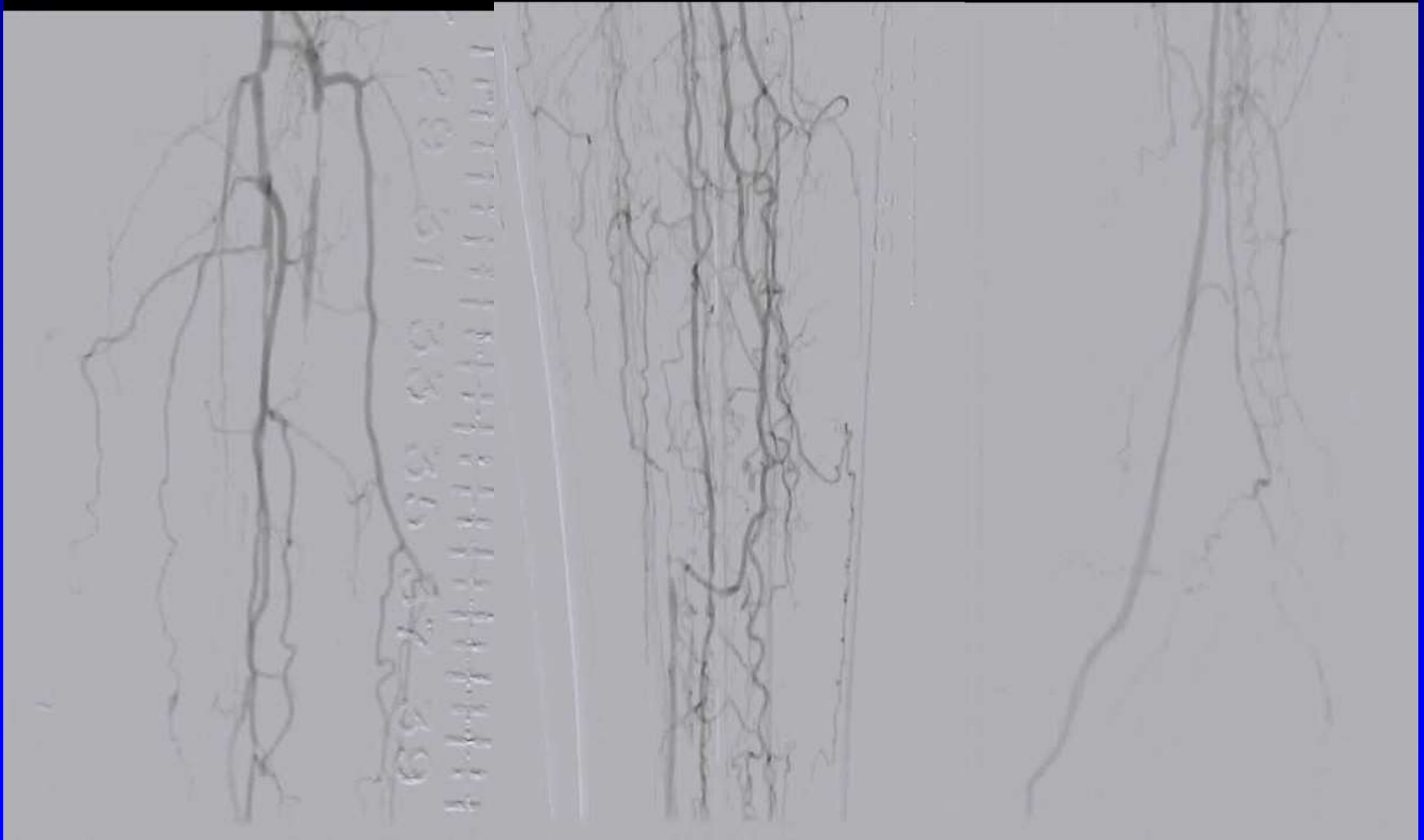
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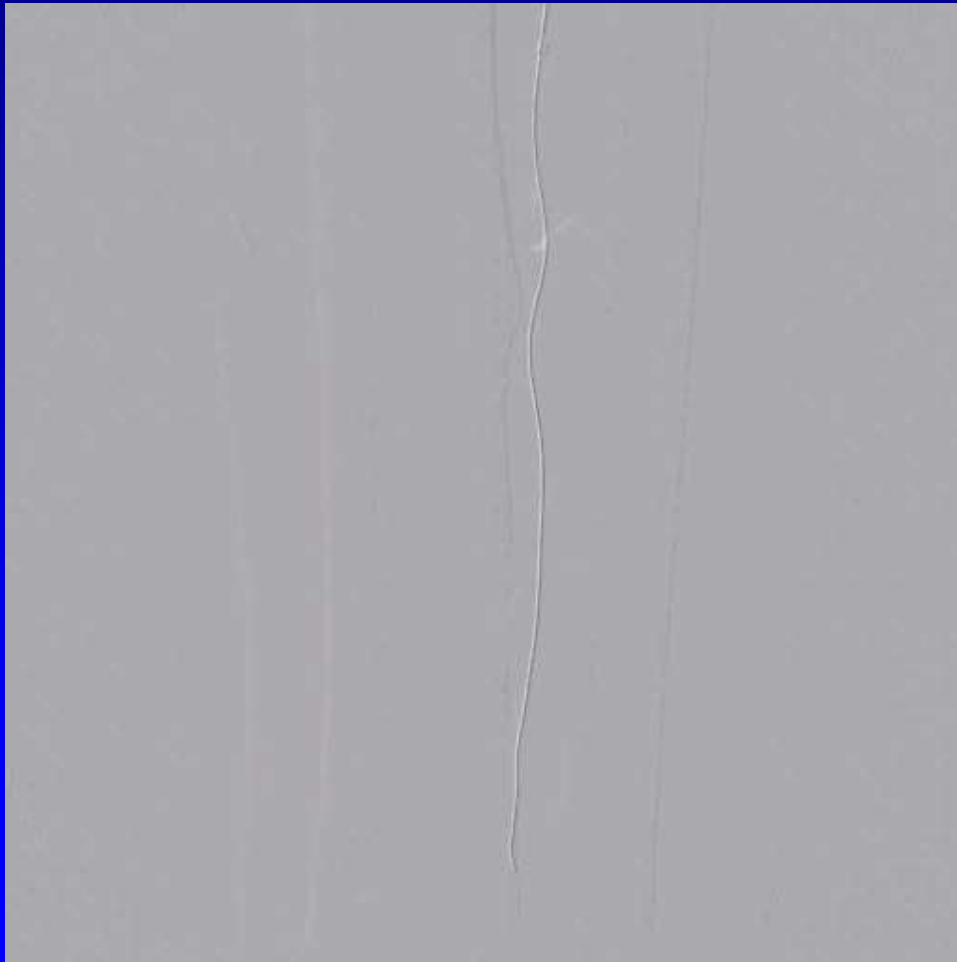
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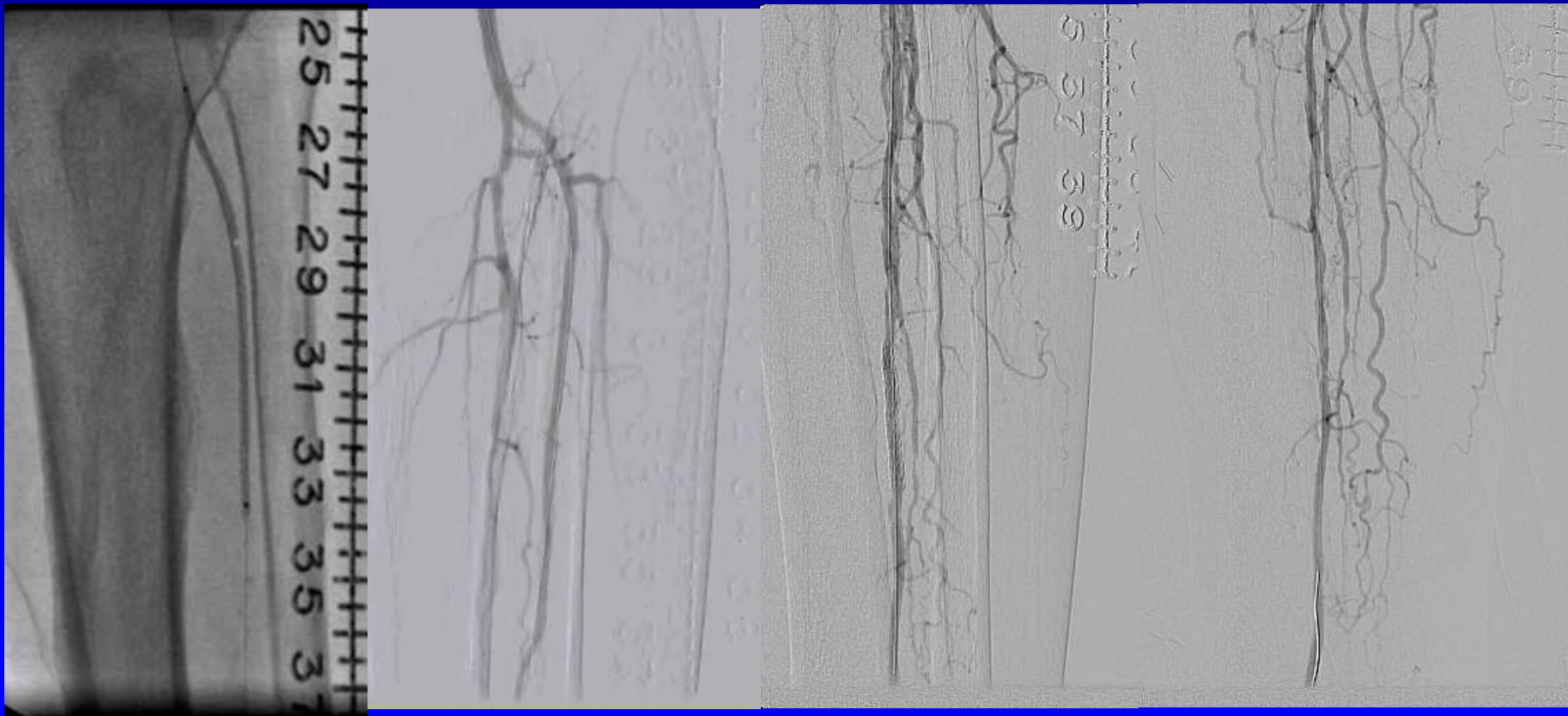
Below the knee Interventions

Pedal Access



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Pedal Access



PTA in Limb Ischemia

Pharmacology During the Procedure

- Treatment of Spasm

- Anticoagulation 

- Antiplatelets agents 

- Heparin
- Bivalirudin
- Additional bolus

- Aspirin
- Clopidogrel
- GP 2b/3a
- Prasugrel

Thank you

Thank you