Antegrade Wire Escalation Technique for Crossing CTOs – Wire Tips & Techniques

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Disclosure

- Received honoraria for physician training courses from Cordis, CSI, BSCI, Cook, Medtronic

Factors That Influence CTO Treatment Success

- Age of occlusion
- Lesion length and morphology
- Calcification
- Presence of collaterals
- Distal flow

Historically treatment success rate < 70%

Melzi G., et al., Catheter Cardiovasc Interv 2006; 68:29-35.

CTO's in the Mid 1990's

- No controllable CTO guide wires

  Low success rate, high complication rate
- No concept of penetration with stiff guide wire technique
- No information on CTO pathology
- No designated CTO crossing devices

The Main Reason Why Treatment Fails is Inability to Cross the Lesion with a Guide Wire

Guide Wire is a Complex Structure

CORE COMPONENTS

Core Materials

Core Diameter

Core Taper

EXTERNAL COMPONENTS

Coatings

Coils & Covers

Tip Design

The Building Blocks of All Guide Wires

Clinical situation ⟷ Guide wire characteristics

- **Type of access** (Femoral, Radial, Pedal, etc.)
- **Vessel anatomy** (straight run-off, acute angles, tortuous, etc)
- **Lesion location** (Iliac, SFA, ATA, PTA, etc)
- **Lesion type** (Single/multiple stenosis, long/short occlusion, calcified, etc.)

Guide Wire Selection

- Torque
- Tip Durability
- Tactile Feedback
- Penetration Power
- Trackability
- Support
- Crossing
- Flexibility
- Prolapsing

Performance Characteristics

Feature	Performance Characteristics	Clinical Relevance
• Core diameter, material	• Torque transmission (steering)	• Technique for advance/cross
• Inner tip diameter	• Tip stiffness	• Lesion crossing-safety
• Coatings & covers/sleeves	• Lubricity	• Lesion crossing ability
• Core diameter, taper length	• Support	• Device delivery/pushability
• Material	• Durability	• Wire durability/technique
• Tip design & material	• Shaping and shape retention	• Durability/push transmission
• Core tapers & tip design	• Penetration/trackability	• Vessel access
• Bare coils vs. polymer covers	• Tactile feedback	• Safety and positioning
• Core tip dimensions, polymer covers & coatings	• Lubricity vs. safety	• Penetrating power and lesion crossing ability

Guide Wire Selection

Most important considerations when selecting a wire for treating CTOs

1. **Torque response**
2. **Tip feel (tactile response)**
3. **Tip shape – curve formation**

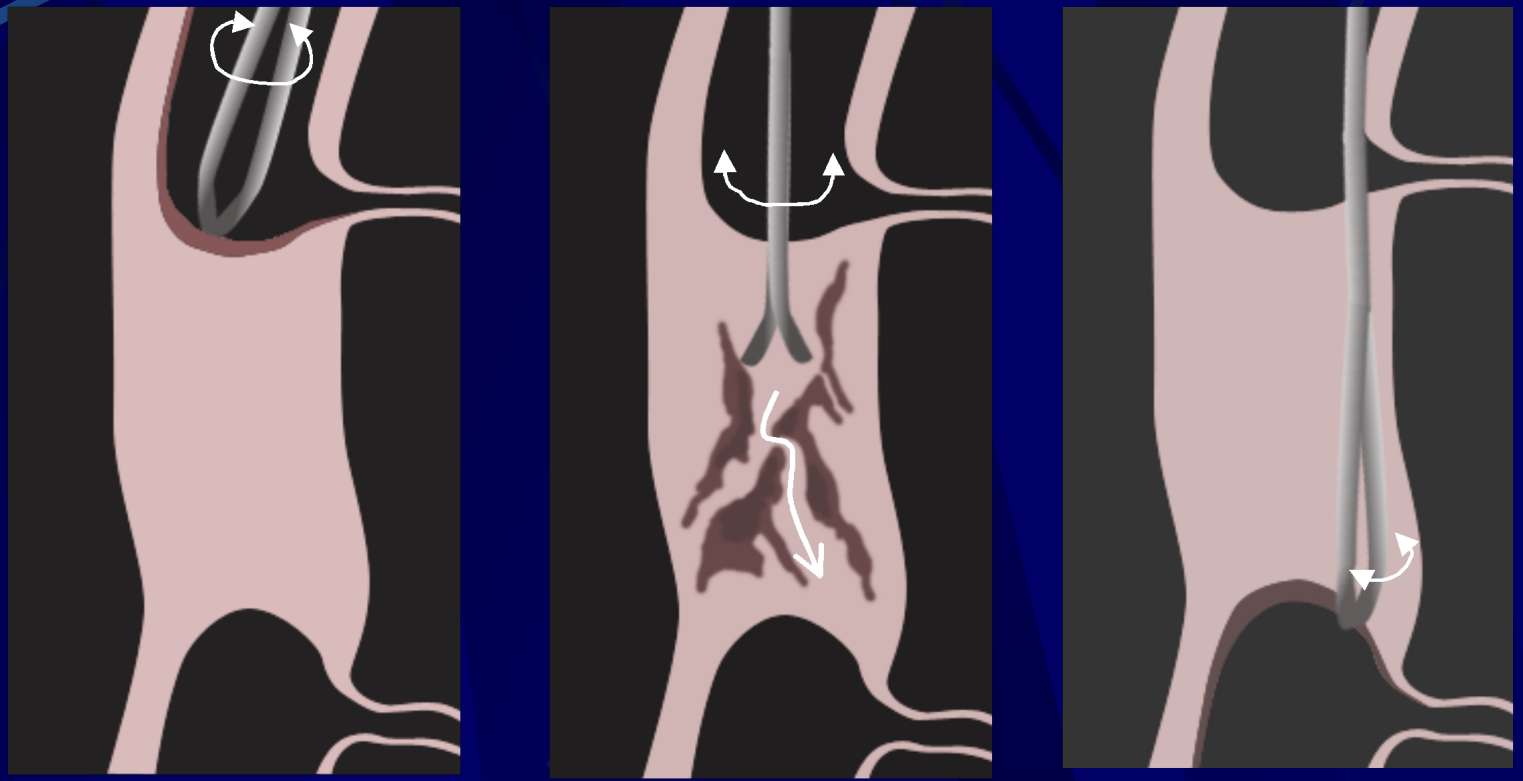
Hydrophobic wires

- **Provide better tactile response to operator**
- **Better for fibrotic calcified lesions, generally > 3 month old CTO, b/c they provide operator improved tactile response to better navigate micro-channels**
- **To get into the "dimple" and use tip load to purchase fibrous cap**

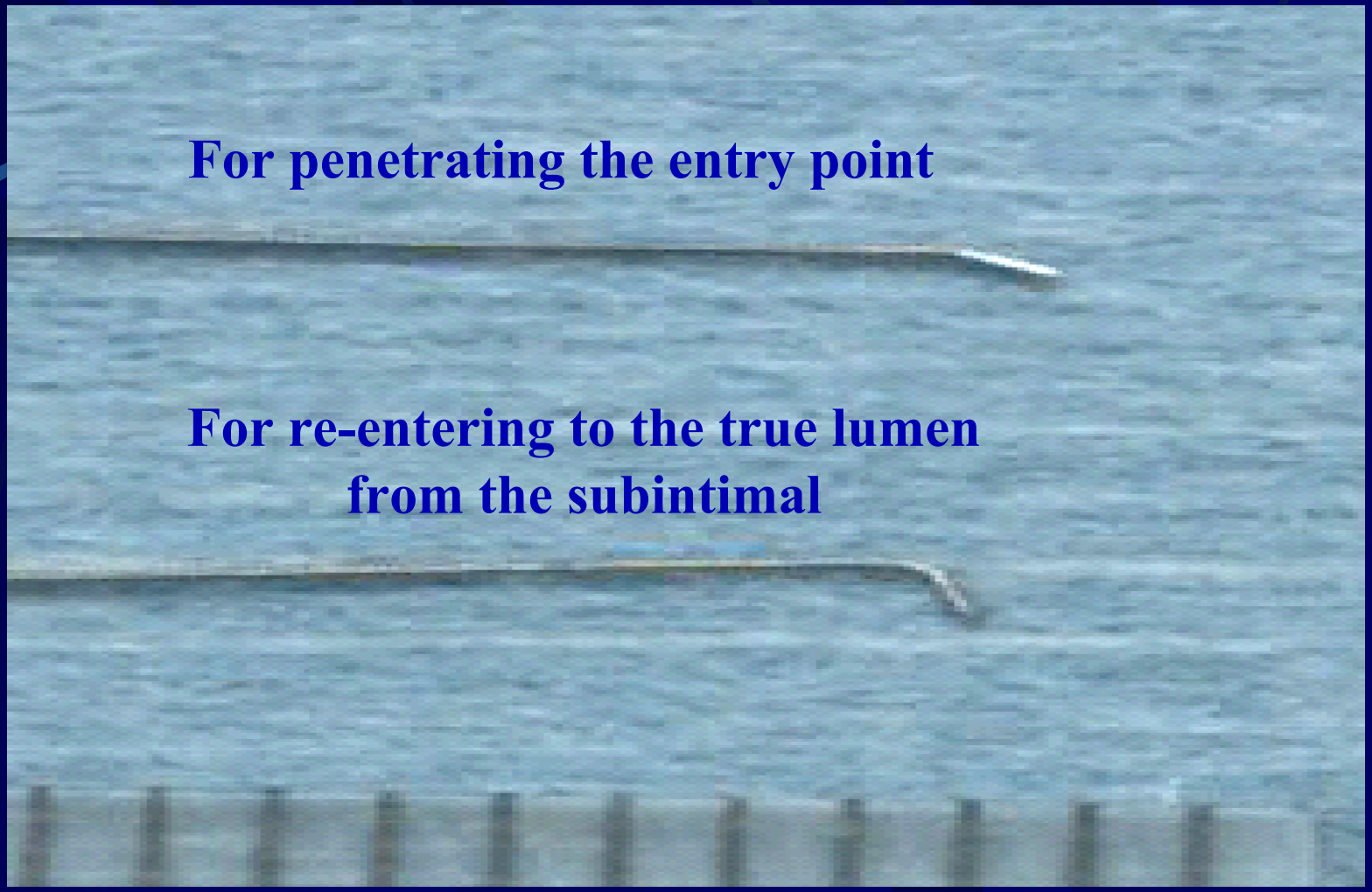
Hydrophilic wires

- **Better for < 3 month old CTOs –soft, lipid laden plaque**
- **Hydrophilic wires with tapered tip may improve the locating of micro-channels, however micro-channels can lead to false lumens/sub-intimal spaces**
- **Hydrophilic wires tend to follow the path of least resistance and generally offer less tip control**

Why so difficult to cross it ?



Tip Shapes


For penetrating the entry point
For re-entering to the true lumen
from the subintimal

Japanese Techniques (coronary CTO)

Drilling Technique

Intermediate GW

Not Cross

Standard GW

Not Cross

Stiffer GW

Not Cross

Other Stiffer GWs

Not Cross

Confianza GW

Approach for Beginners

Penetration Technique

Intermediate GW

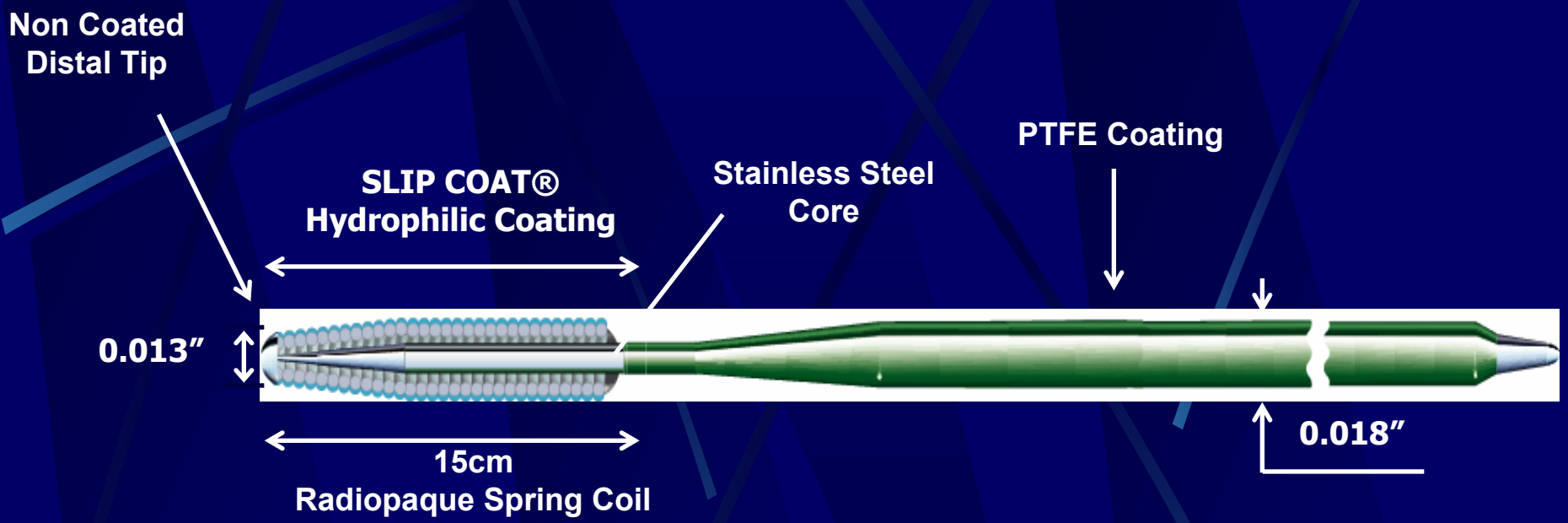
Not Cross

Confianza Pro GW

Approach for Experienced Operators

Asahi Astato 30

When Other Wires or Crossing Devices Fail



- The strongest peripheral wire available
- High tip load allows precise penetration into CTOs with tough caps
- Key: Rotate wire 180° with no bend on wire tip

Make sure you know where is your target

Wires and Catheters for Crossing CTO's

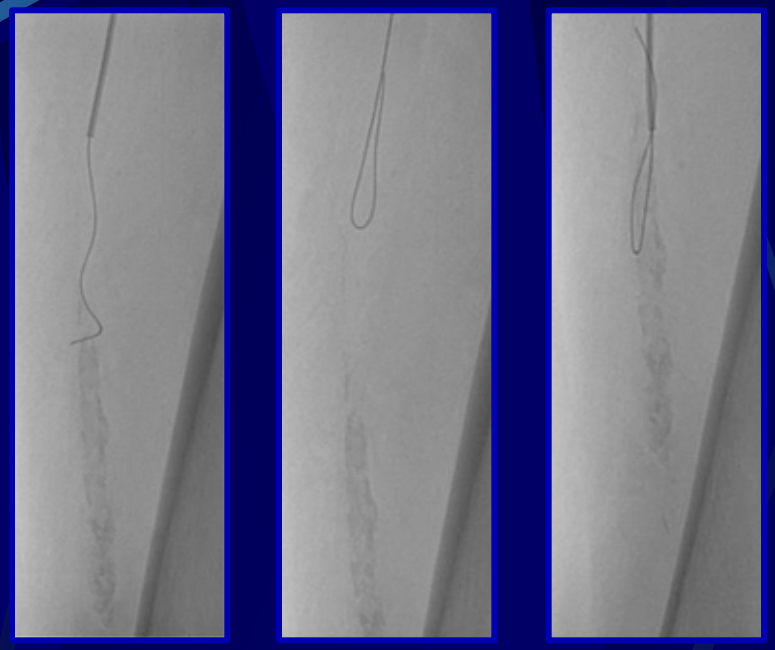
- SFA
  - .035" Glide Wire and Support Catheter. If directing wire is an issue use angled support catheters
  - .018" Support catheter and CTO wire (Astato ,018" 30gr, Approach 25 etc) or Hydrophilic .018 wire (V18 control, Terumo Gold)
  - 014" CTO and hydrophilic wires could be used for re-entry into true lumen from sub-intimal space
- Popliteal
  - As above, but .018 wire and support catheter are most commonly used
- BTK
  - 018" and 014" support catheters and designated CTO (Astato, Approach, Confianza etc) and Hydrophilic wires (Approach Hydro ST, Commander etc)

If wire is subintimal consider Subintimal Angioplasty

- Opens a totally occluded blood vessel
- Angioplasty is performed in the artery wall (subintimal space)
  - SIA creates new channel within subintimal space, under occluded lumen
- Differs from traditional angioplasty, which occurs within the vessel lumen (intraluminal) with balloon opening narrowed lumen

SIA: Procedure

Step 2: Subintimal Entry



- Prolapsed .035-in stiff angled Glidewire
  - Wire advanced with force
  - Obtain “spiral configuration” and advance with more force
  - Use support catheter as backup to support the wire
  - Advance catheter and Glidewire as one unit

CASE 1: Long SFA CTO, 035 support catheter and 0.035” Terumo stiff shaft glide wire

Astato .018 30 gr

Astato switched to 035 Terumo glide, wire tip prolapsed and pushed forward to distal cap with support of .035 catheter

At the distal cap glide wire was removed and .018 Astato was used to re-enter into true lumen

Support catheter advanced into popliteal with test injection confirming intra-luminal position

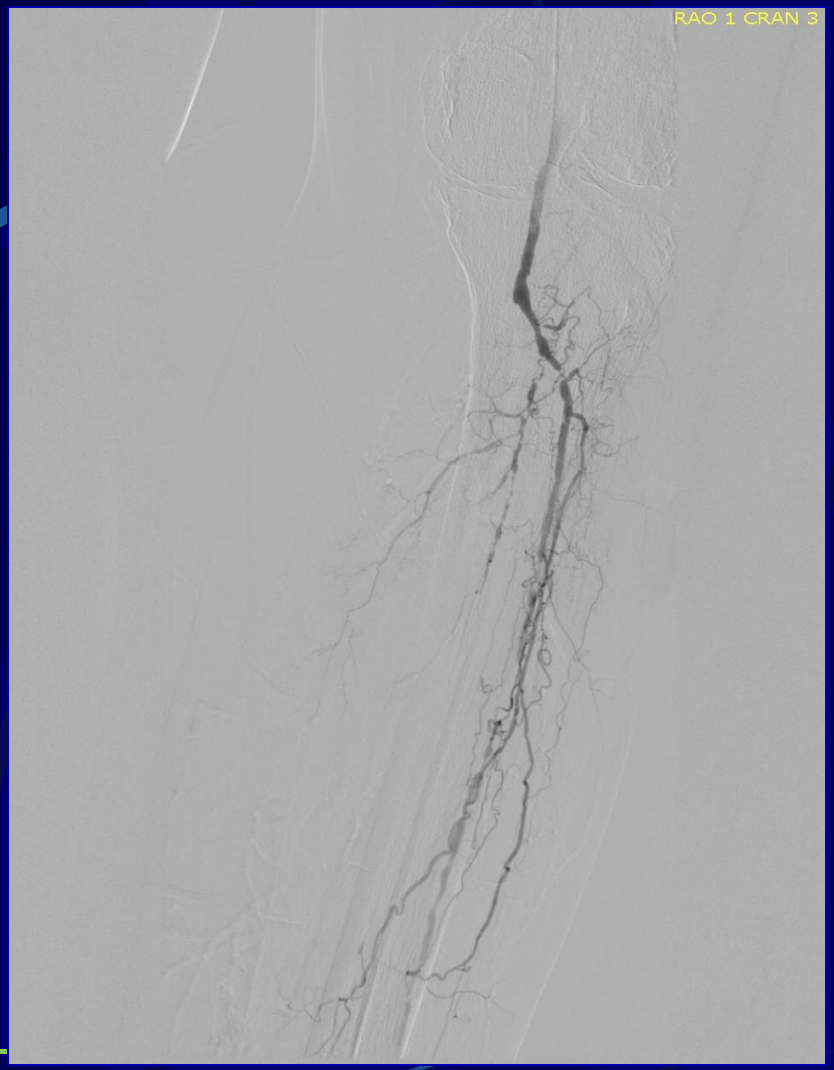
CLI Case with BTK disease

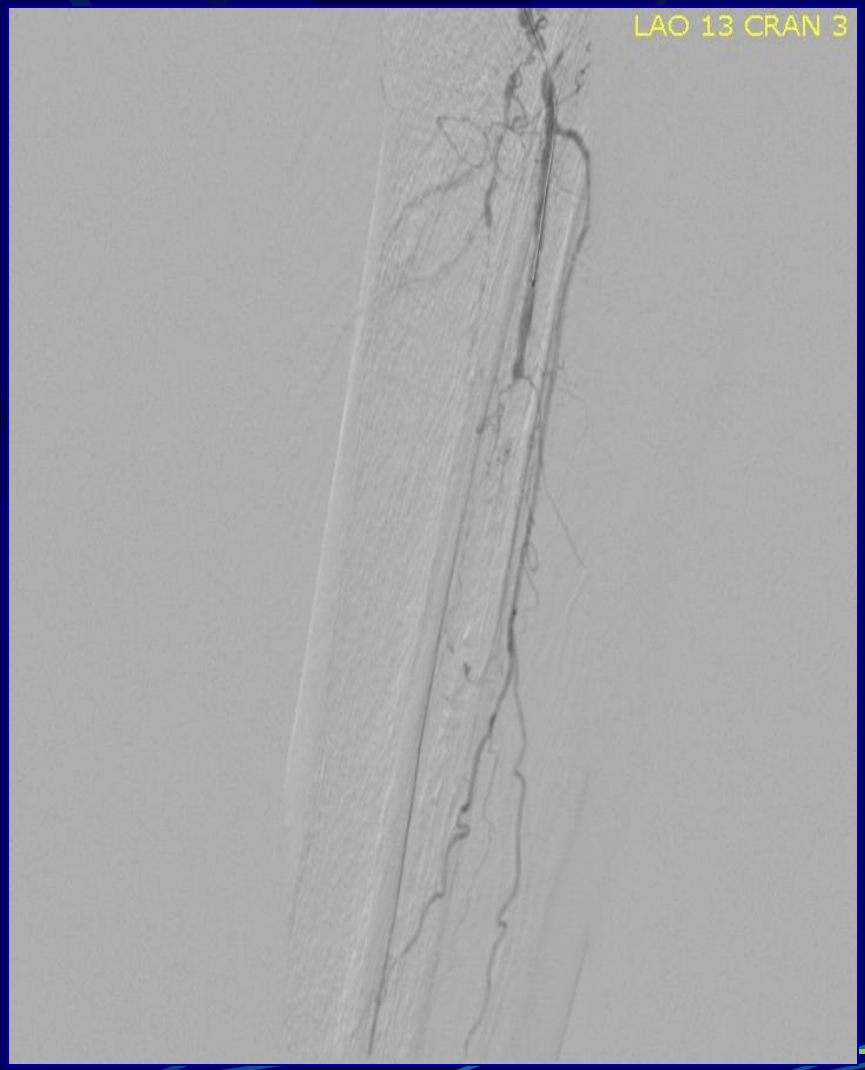
- 93 y. o. female with h/o DM-2, HTN, CAD, hyperlipidemia, PAD with left fem-pop bypass in 2005. S/P Left 4th toe amputation due to gangrene.
- Presents with Non-healing L Foot Ulcers x 4 months ago.

Angiography of the LLE:

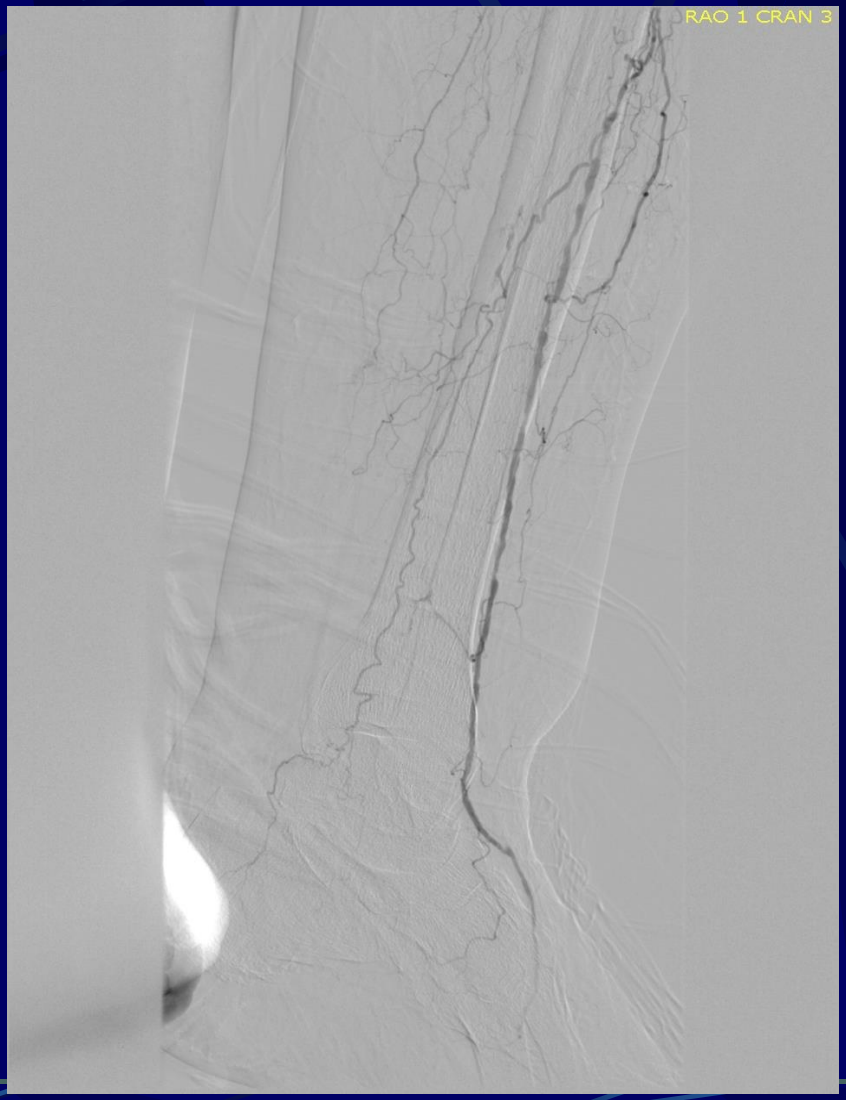
- SFA – totally occluded
- Femoro-popliteal bypass graft - patent
- AT – diffusely severely diseased, occluded in mid segment
- TPT – occluded
- PT – occluded
- Peroneal artery – occluded

Angiogram





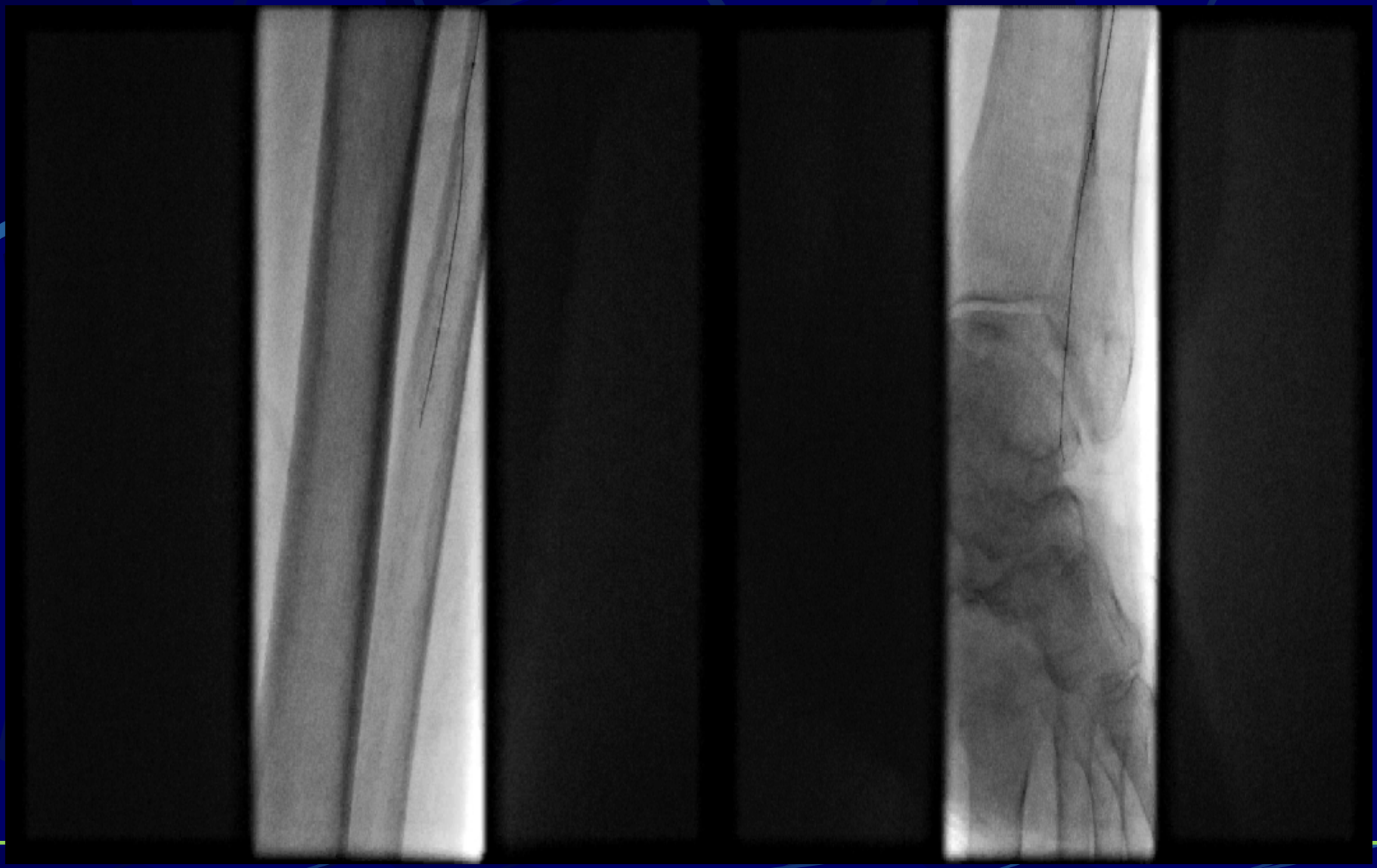
Distal Runoff



Proximal lesion crossed with Approach Hydro ST .014 wire

Wire exchanged to Astato .014 20 gr CTO wire

Astato was advanced into DP



After PTA and spot Stenting with coronary DES