# Lessons for Successful Subintimal Angioplasty in SFA CTO

**John R. Laird**
**Professor of Medicine**
**Medical Director of the Vascular Center**
**UC Davis Medical Center**

# CTOs in the Periphery

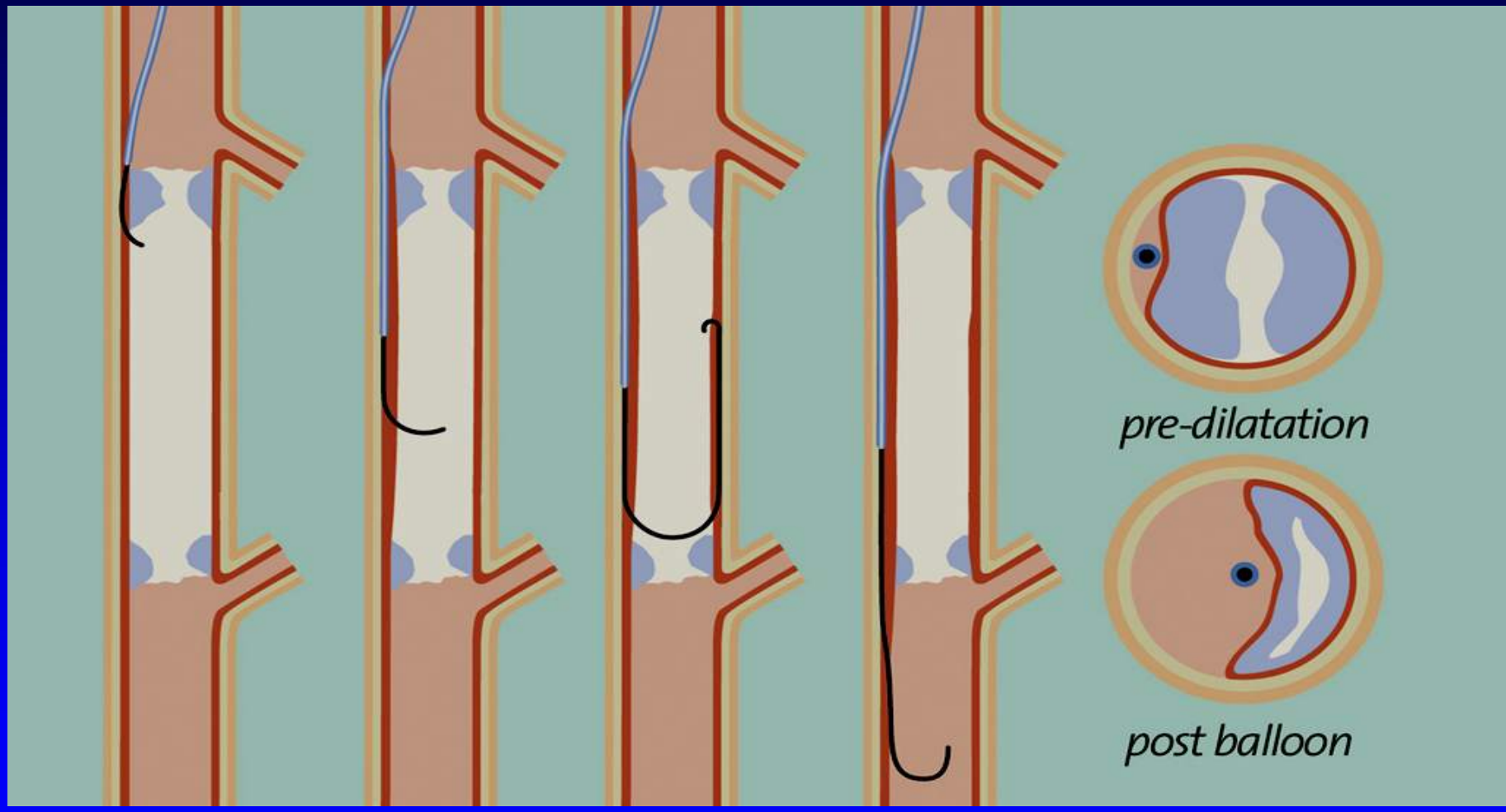
- Presence of Total Occlusion – 20-40%
- Often very old - Difficult to Treat
  - Time intensive without incremental reimbursement
  - Significant contrast and radiation exposure
  - Complications
    - Dissection, Perforation, Embolization.
  - Historical Success rate - <70%
- Late events - Restenosis, Reocclusion
- Risk – Benefit
- Most common reason to send to surgery

# Long SFA Occlusions

CHALLENGES OF THE INTRALUMINAL APPROACH:

- Penetration of CTO fibrous cap
- Presence of collaterals
- Lack of Guidewire tip maneuverability
- Tough, calcified lesions
- Subintimal trapping of the guidewire
- Difficulty regaining access to the true lumen

# Subintimal Angioplasty



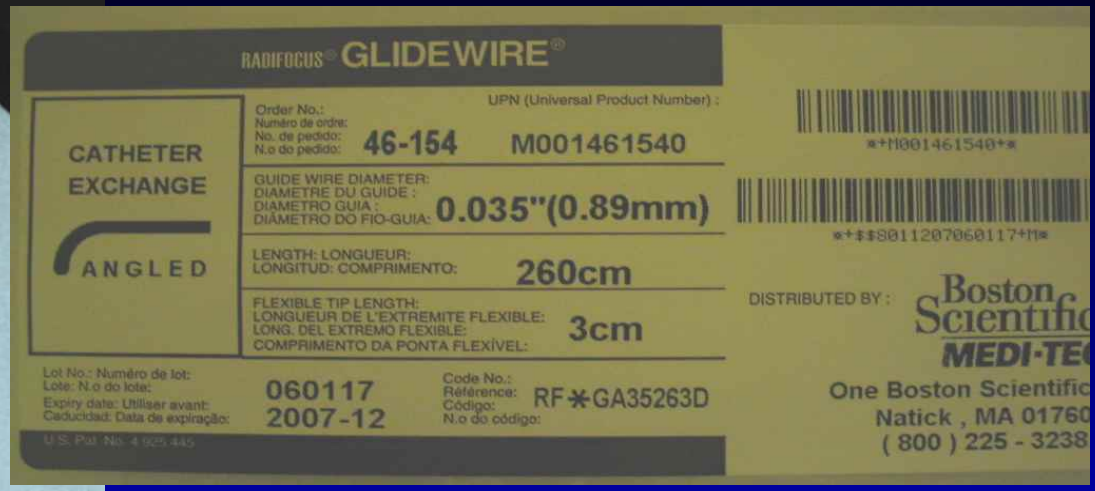
# Subintimal Angioplasty

## Advantages

- Relatively quick
- Relatively simple
- Does not require expensive equipment (just a catheter and hydrophilic guidewire)
- Reasonable success rates

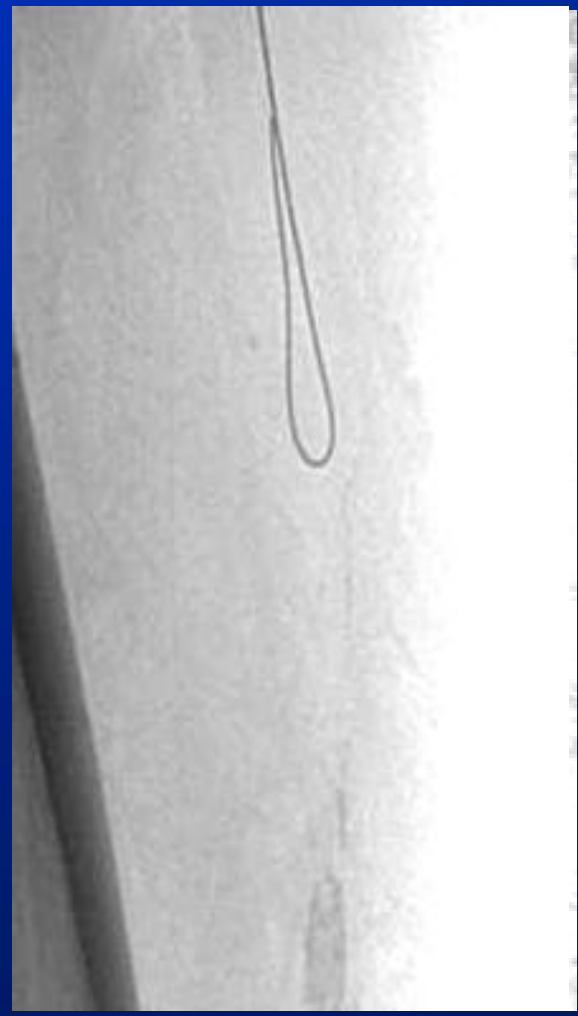
## Disadvantages

- Difficult reentry in calcified or diffusely diseased arteries
- May extend dissection beyond end of occlusion and lengthen treatment segment
- May occlude collatorals


RADIFOCUS® GLIDEWIRE®
CATHETER EXCHANGE
ANGLED
Order No.:
Numéro de ordre:
No. de pedido:
N.o do pedido:
46-154
UPN (Universal Product Number) :
M001461540
GUIDE WIRE DIAMETER:
DIAMETRE DU GUIDE :
DIAMETRO GUIA :
DIÂMETRO DO FIO-GUIA:
0.035"(0.89mm)
LENGTH: LONGUEUR:
LONGITUD: COMPRIMENTO:
260cm
FLEXIBLE TIP LENGTH:
LONGUEUR DE L'EXTREMITE FLEXIBLE:
LONG. DEL EXTREMO FLEXIBLE:
COMPRIMENTO DA PONTA FLEXÍVEL:
3cm
Lot No.: Numéro de lot:
Lote: N.o do lote:
Expiry date: Utiliser avant:
Caducidad: Data de expiração:
060117
2007-12
Code No.:
Référence:
Código:
N.o do código:
RF*GA35263D
U.S. Pat. No. 4,925,445
DISTRIBUTED BY :
Boston Scientific
MEDI-TE
One Boston Scientific
Natick , MA 0176
( 800 ) 225 - 3238

# The Steps of Subintimal Angioplasty

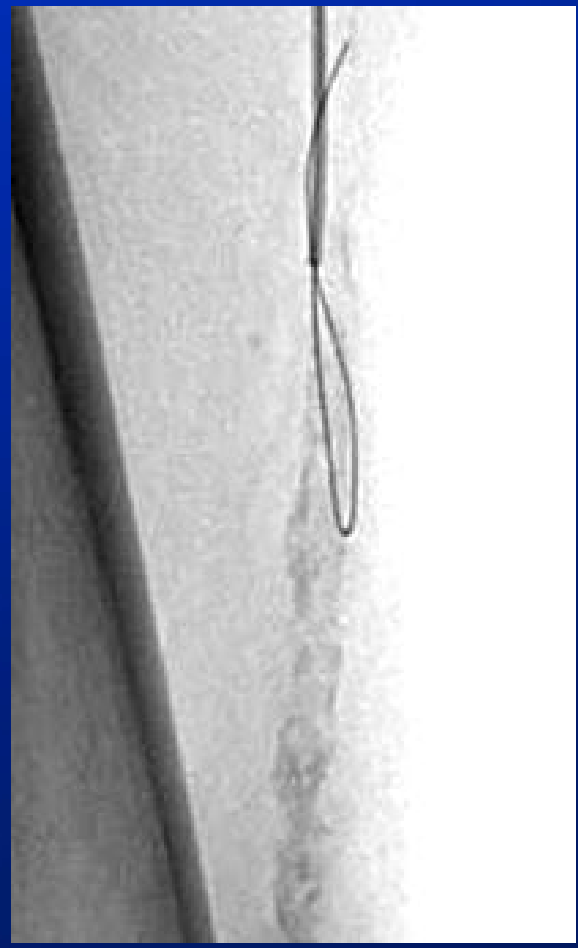
- Place tip of sheath close to origin of occlusion and near proximal collateral
- Point  catheter at the plaque/wall interface, pointing opposite the largest collateral or side branch
- Probe with Glidewire - tip will catch but loop will form
- Advance loop



**Bolia, Bell Clin Radiol, 1989: 40, 325**
**Lipsitz, JVS 37(2),  2003, pp 386-391**

# The Steps of Subintimal Angioplasty

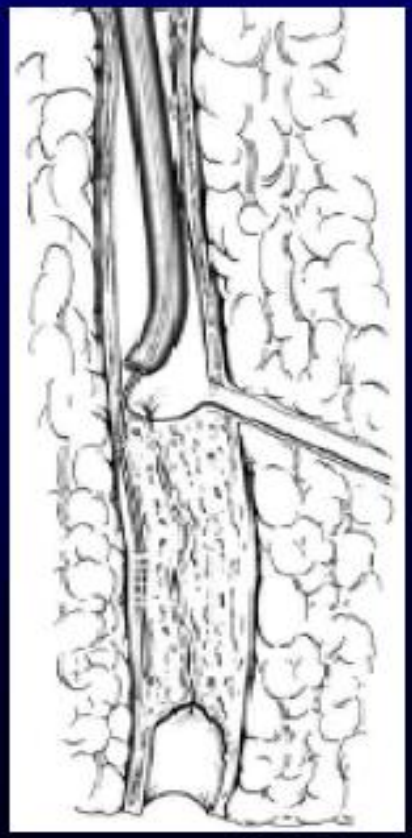
- Smooth dissection plane
- Advance catheter once loop fully formed (don’t want loop too wide)
- Once catheter support is advanced, advance the wire again



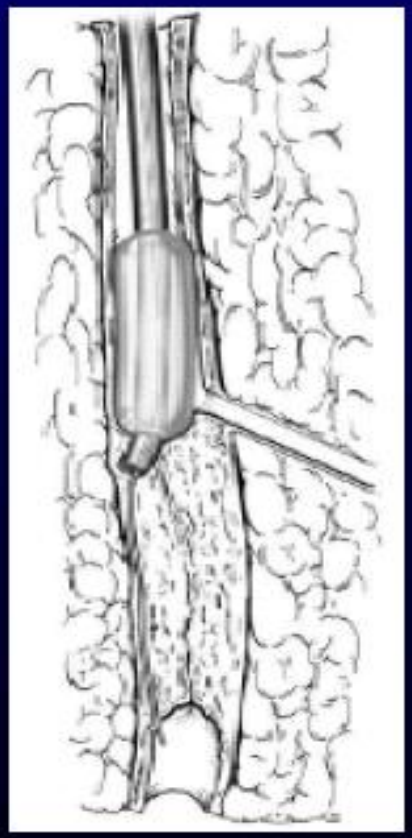
# The Steps of Subintimal Angioplasty

- Contrast administered through sheath will show distal reconstitution
- Successful re-entry in 75-87% - typical tactile sensation as guidewire passes into true lumen
- Balloon angioplasty of entire occlusion length – stent for suboptimal result
- If guidewire does not reenter, do not extend dissection plane more distally

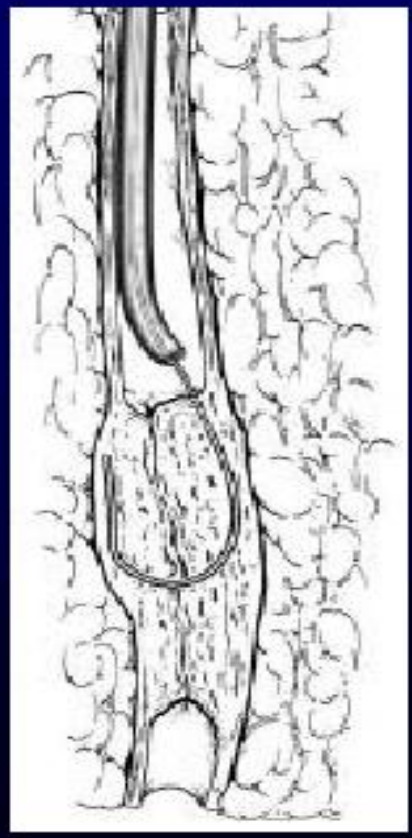
# Subintimal Angioplasty



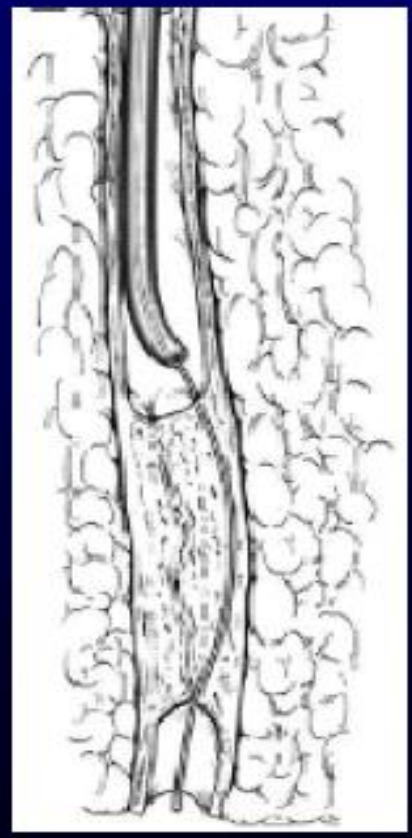
Guidewire entry into subintimal space



Balloon stabilization for guidewire entry into subintimal space

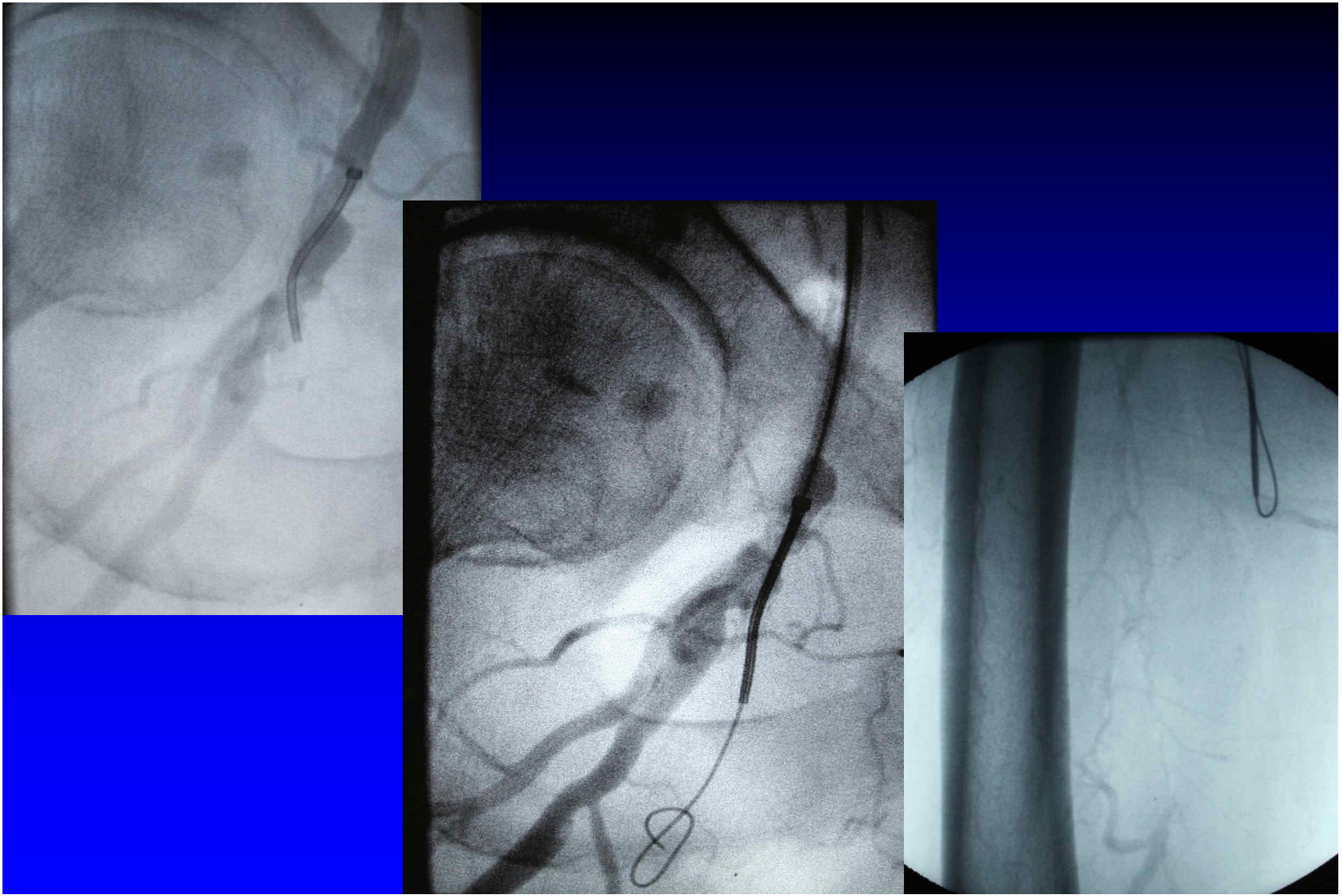


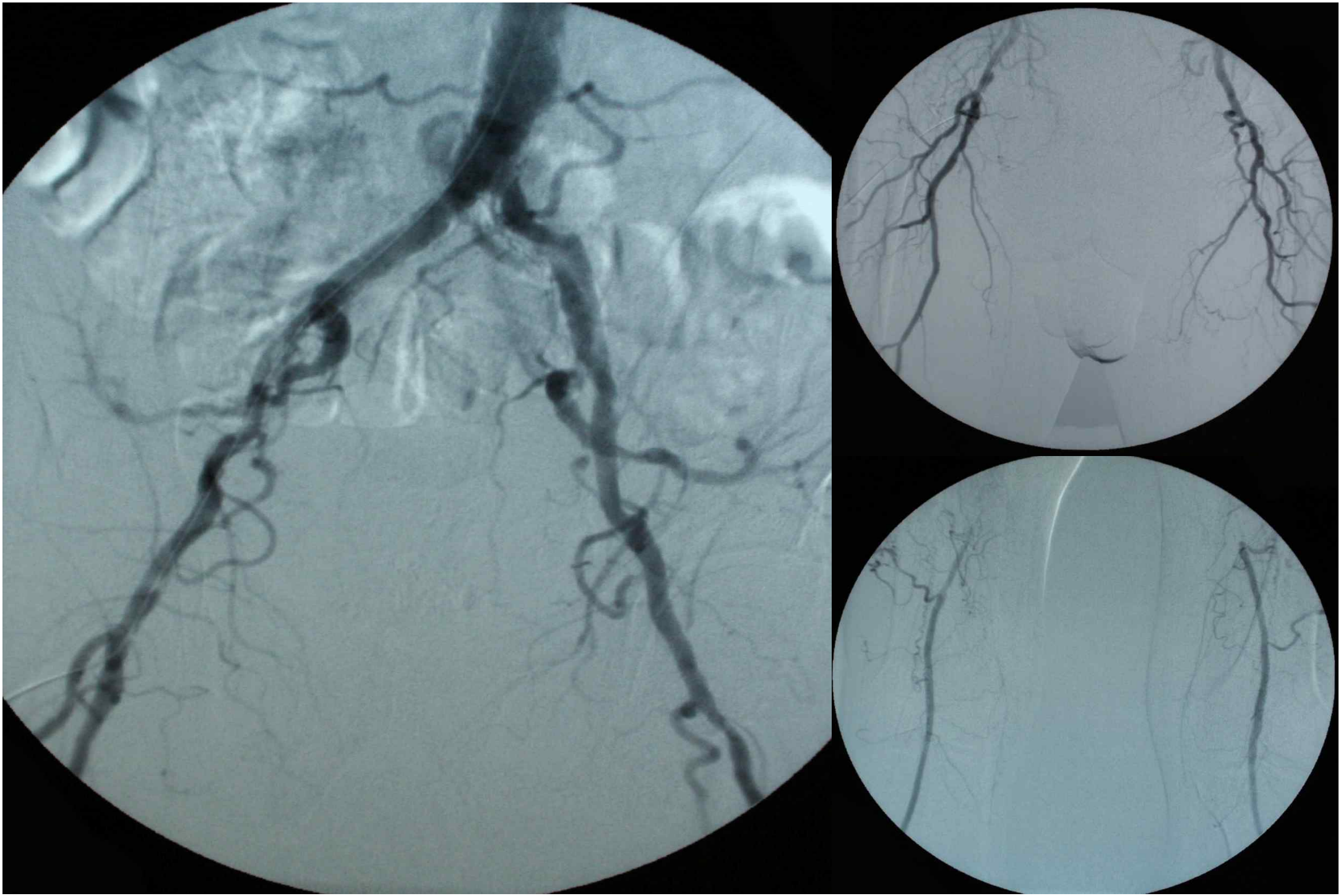
Typical loop that develops when guidewire is passed into subintimal space

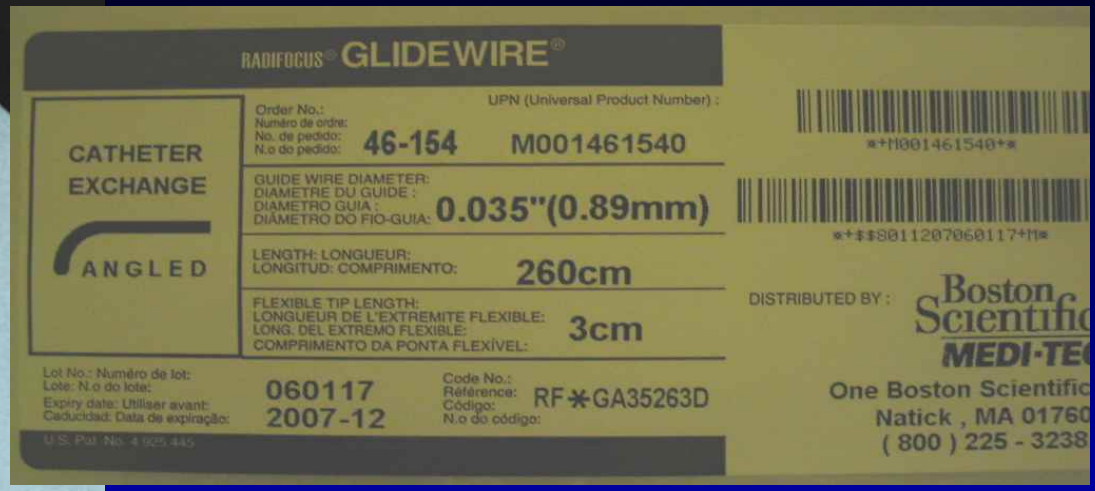


Re-entry into the true lumen at the distal portion of lesion

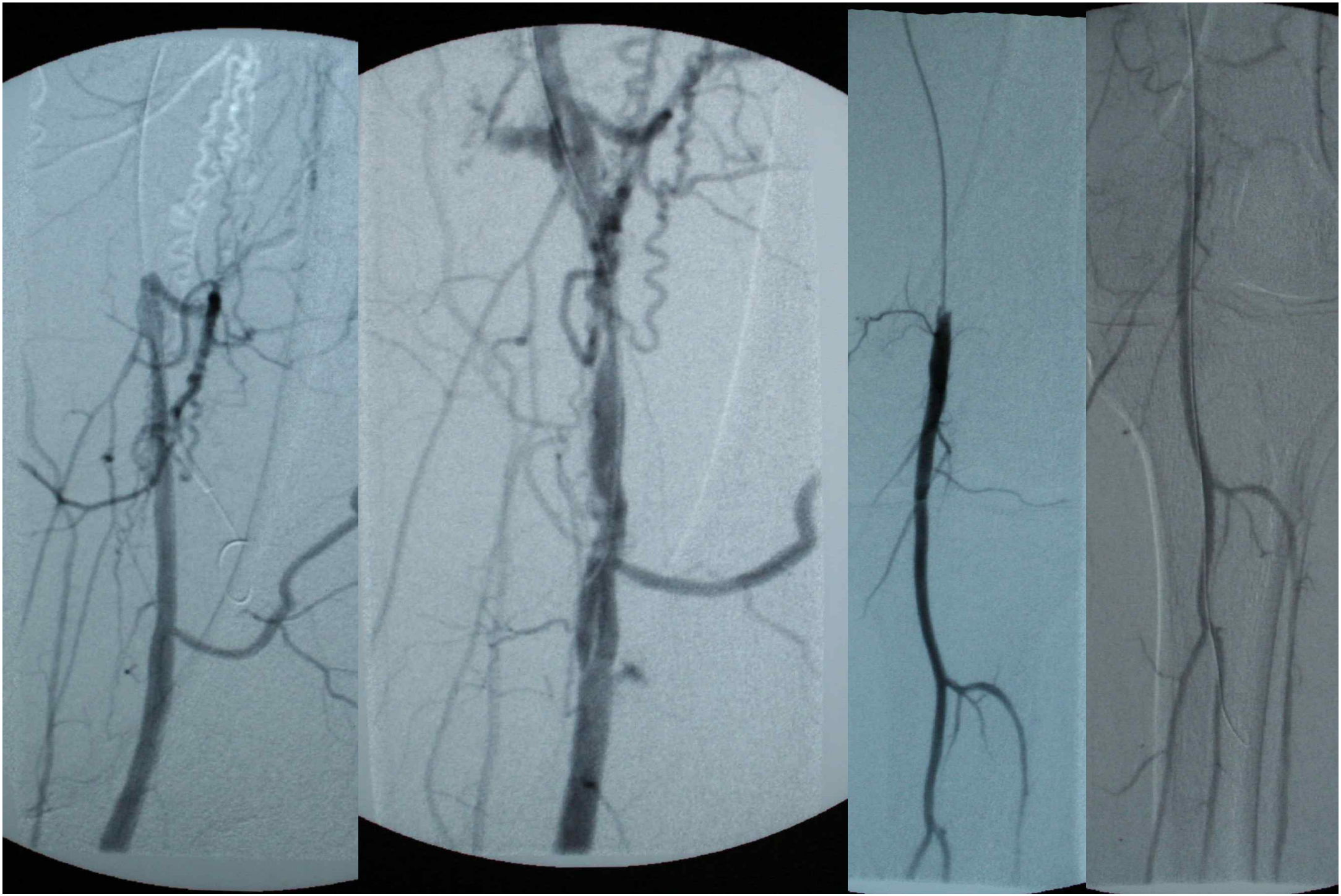
Nadal, L.L., et. al., *Techniques in Vascular and Interventional Radiology*, 2004; (7):16-22.

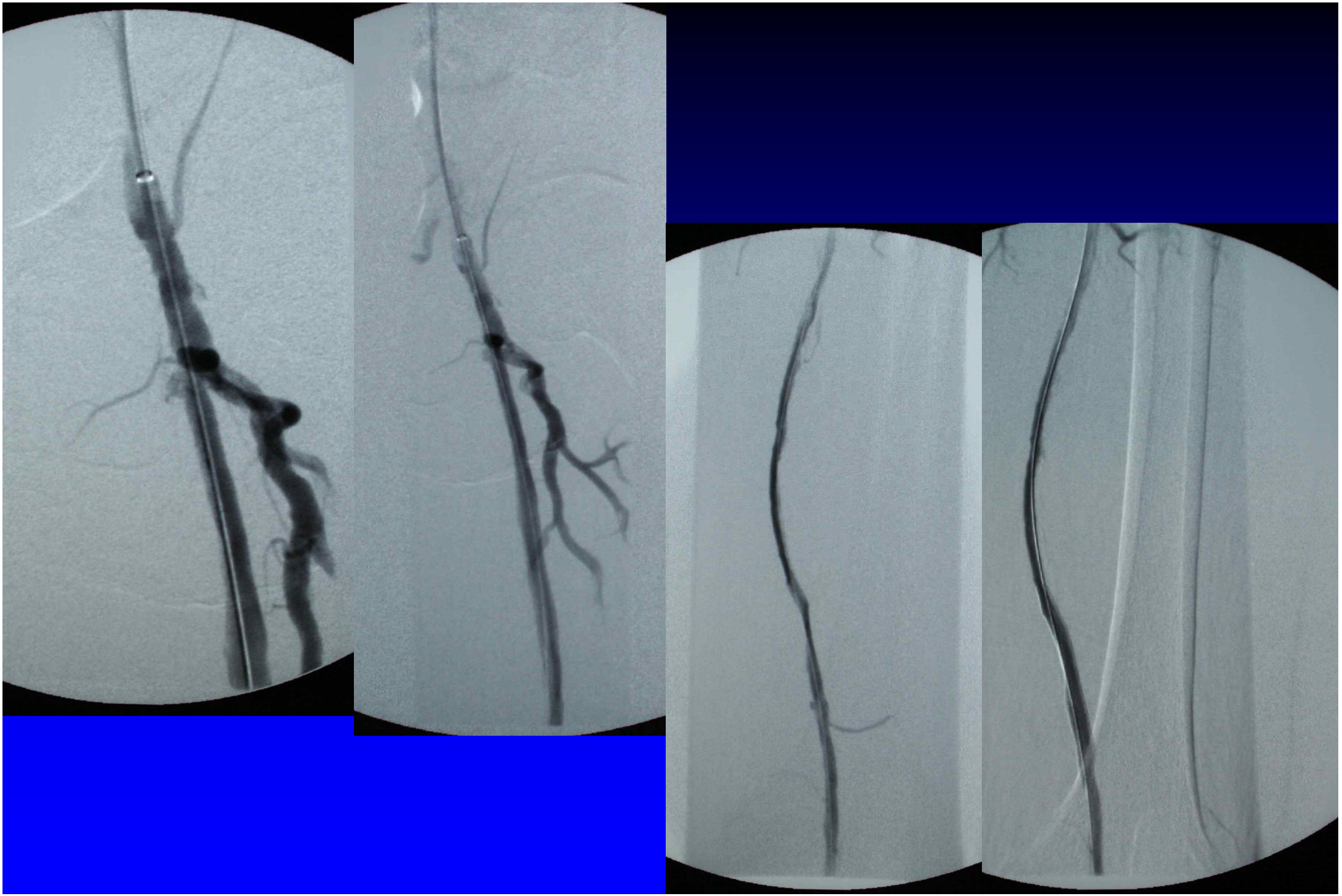





RADIFOCUS® GLIDEWIRE®
CATHETER EXCHANGE
ANGLED
Order No.:
Numéro de ordre:
No. de pedido:
N.o do pedido:
46-154
UPN (Universal Product Number) :
M001461540
GUIDE WIRE DIAMETER:
DIAMETRE DU GUIDE :
DIAMETRO GUIA :
DIÂMETRO DO FIO-GUIA:
0.035"(0.89mm)
LENGTH: LONGUEUR:
LONGITUD: COMPRIMENTO:
260cm
FLEXIBLE TIP LENGTH:
LONGUEUR DE L'EXTREMITE FLEXIBLE:
LONG. DEL EXTREMO FLEXIBLE:
COMPRIMENTO DA PONTA FLEXÍVEL:
3cm
Lot No.: Numéro de lot:
Lote: N.o do lote:
Expiry date: Utiliser avant:
Caducidad: Data de expiração:
060117
2007-12
Code No.:
Référence:
Código:
N.o do código:
RF*GA35263D
U.S. Pat. No. 4,925,445
DISTRIBUTED BY :
Boston Scientific
MEDI-TE
One Boston Scientific
Natick , MA 0176
( 800 ) 225 - 3238

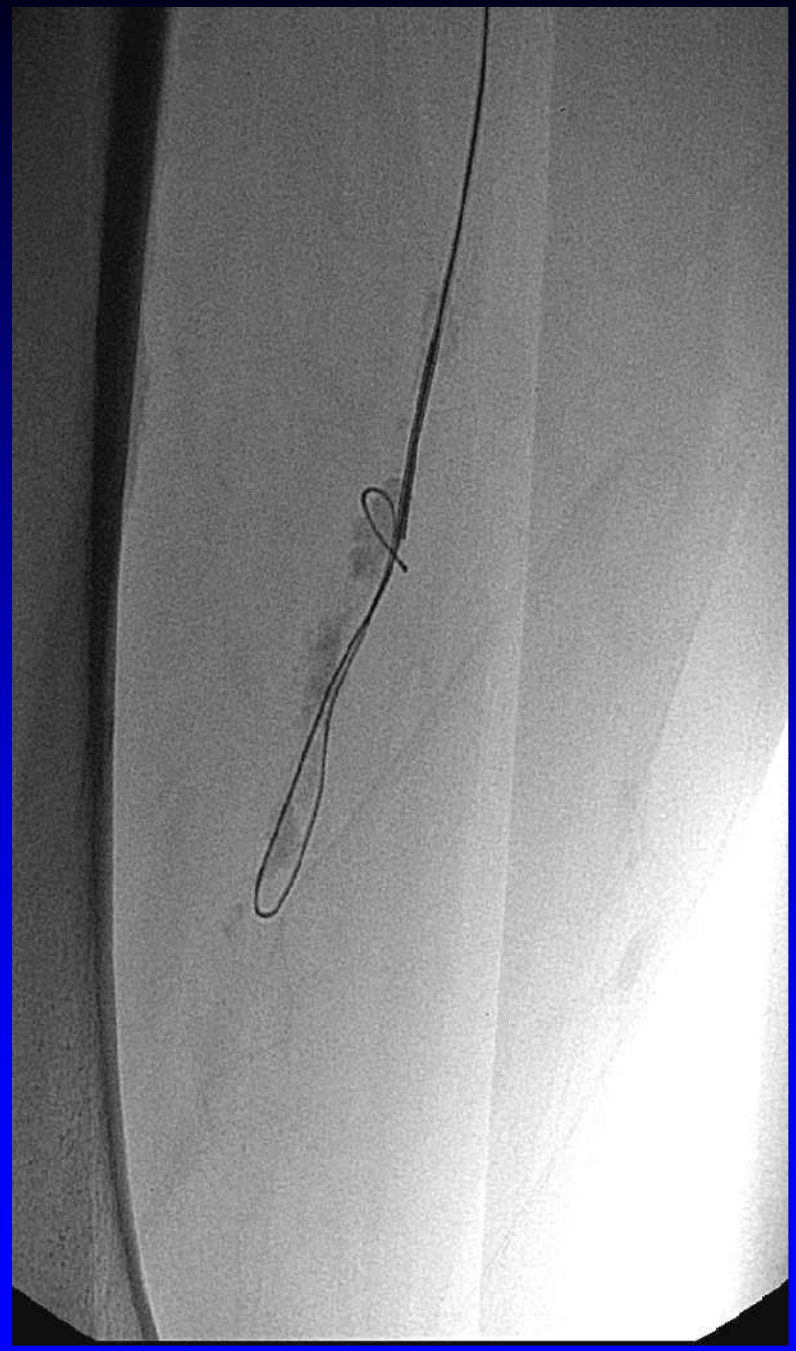
- Regular angled Terumo guidewire for most cases
- Stiff angled Terumo for more calcified vessels





# Difficult Reentry

- Artery beyond occlusion diffusely diseased
- Heavy calcification
- Suboptimal dissection plane

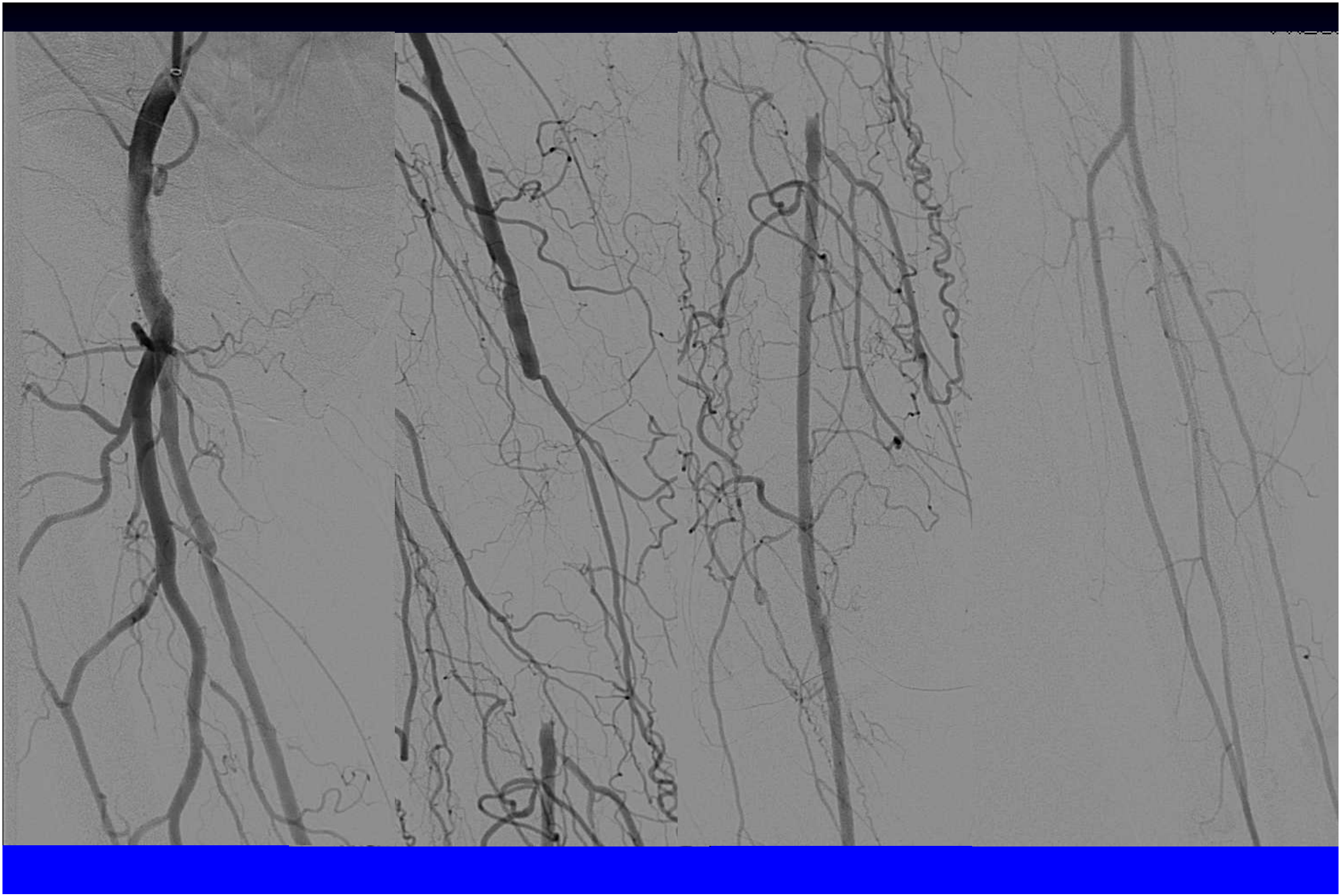


# Reentry Devices

# Outback Catheter

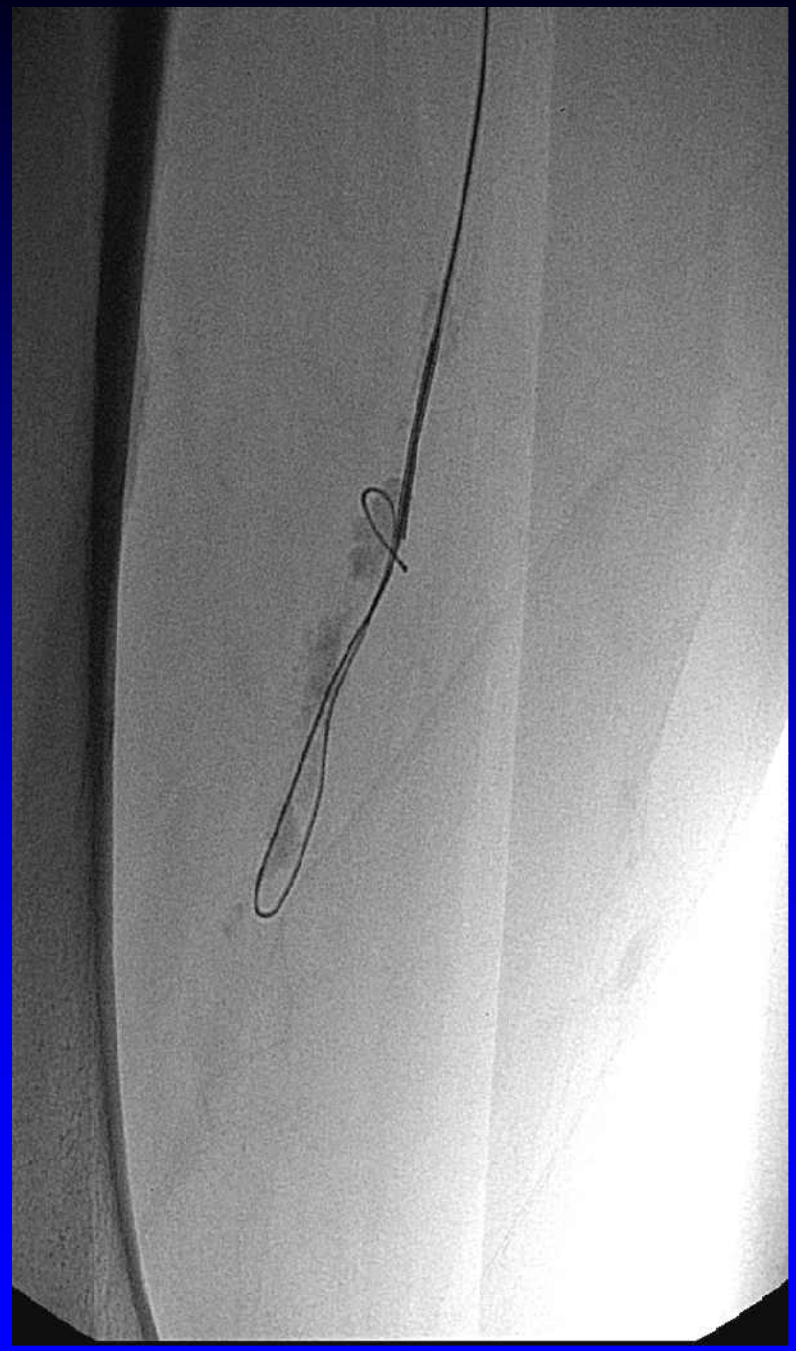
# Case Presentation

- 68 year old male
- Lifestyle limiting right calf claudication
- Right ABI = 0.7
- Right distal SFA occlusion

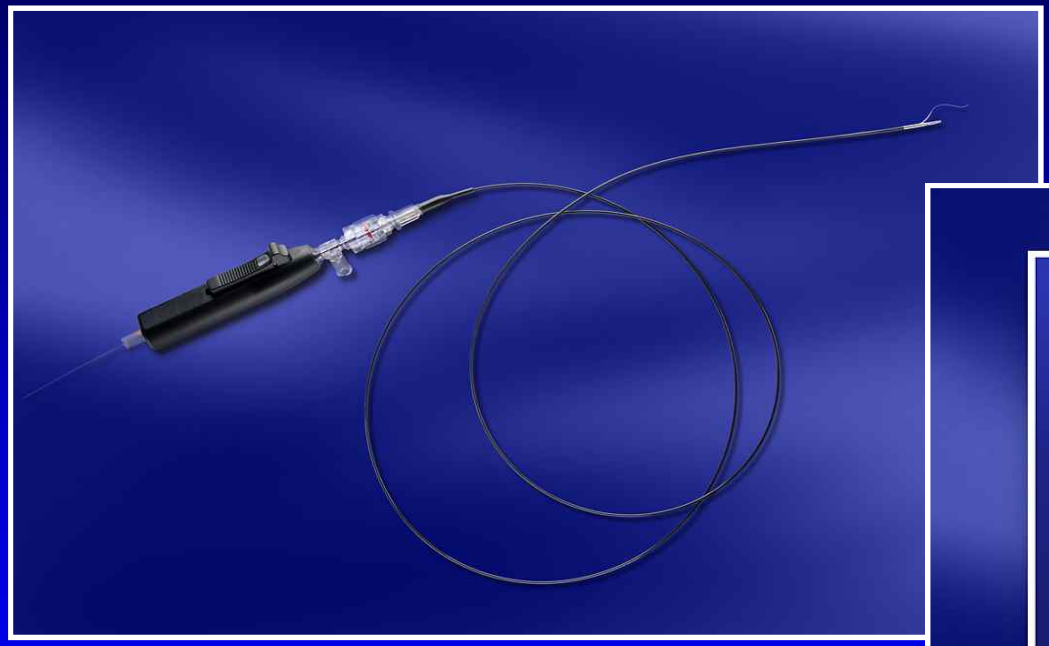


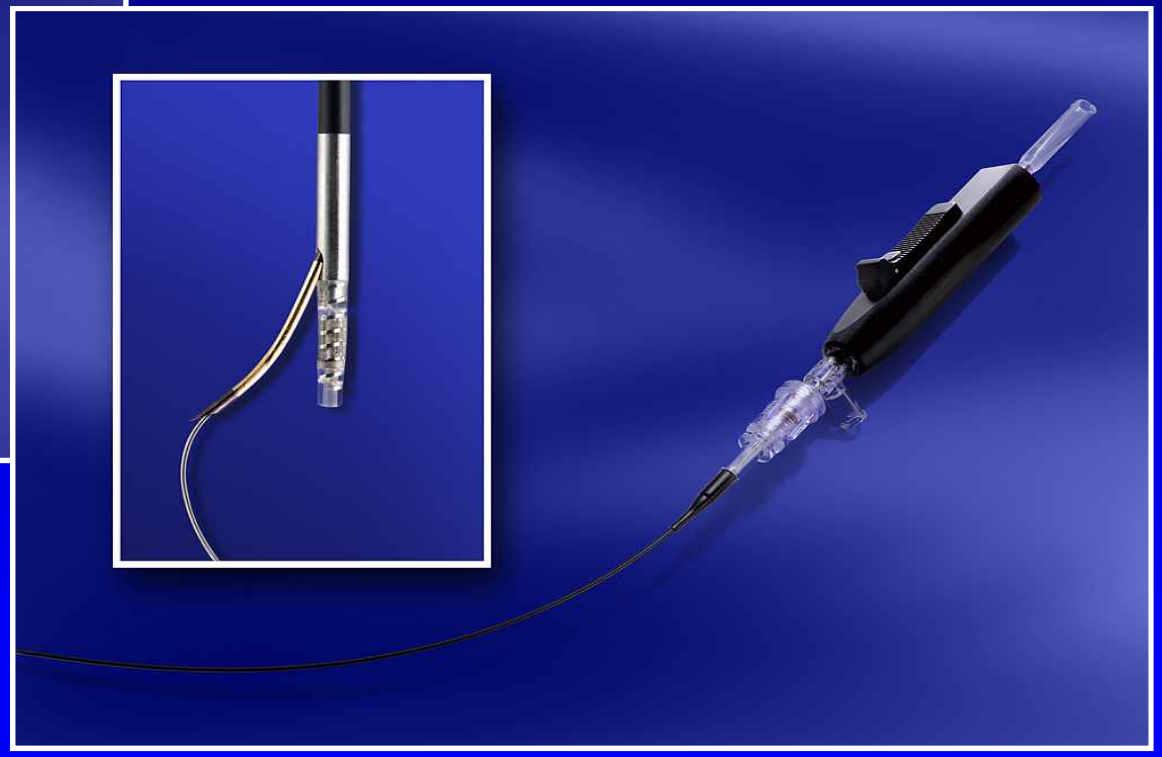
# Simple Case, Right?

- Lesion is actually quite calcified
- Guidewire goes subintimal and will not reenter true lumen
- What next?



# Controlled Re-entry
# Outback® LTD Re-Entry Catheter

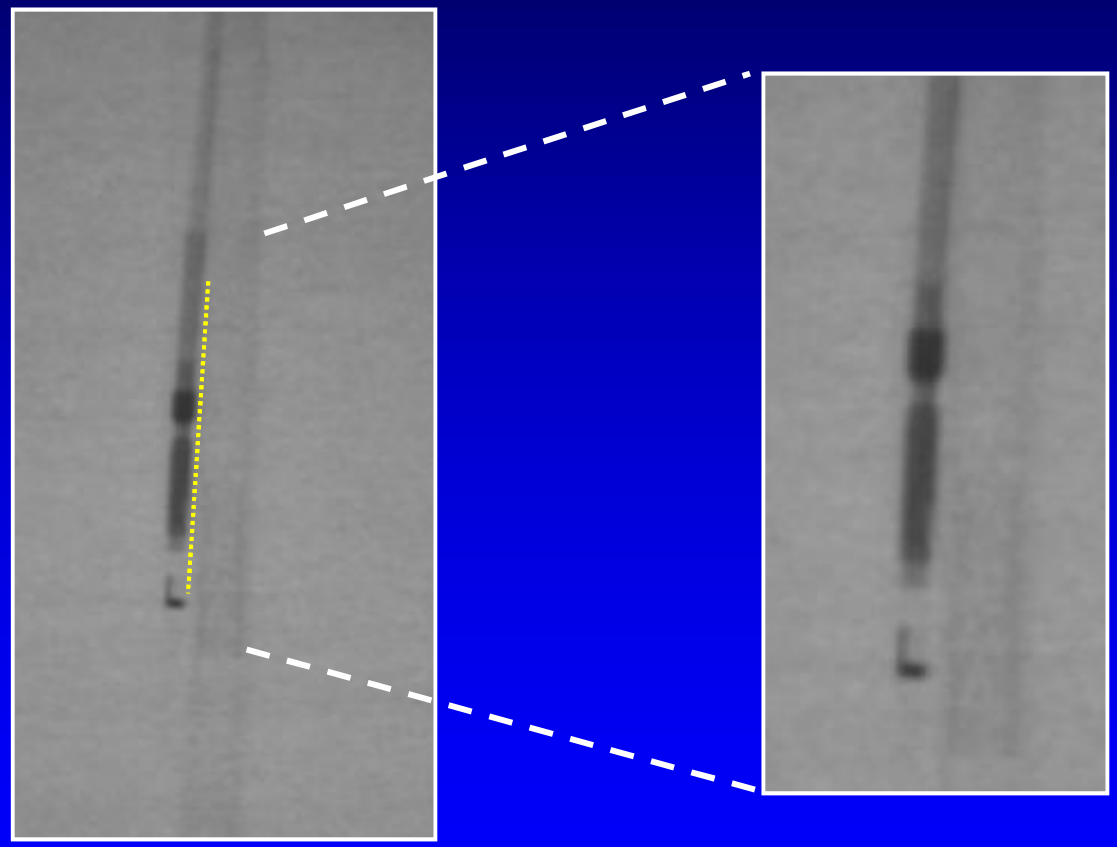




# Outback® LTD Orientation Markers

'L' marker = Locate

- Position image intensifier to show Outback adjacent to true lumen
- Point 'L' marker toward true lumen

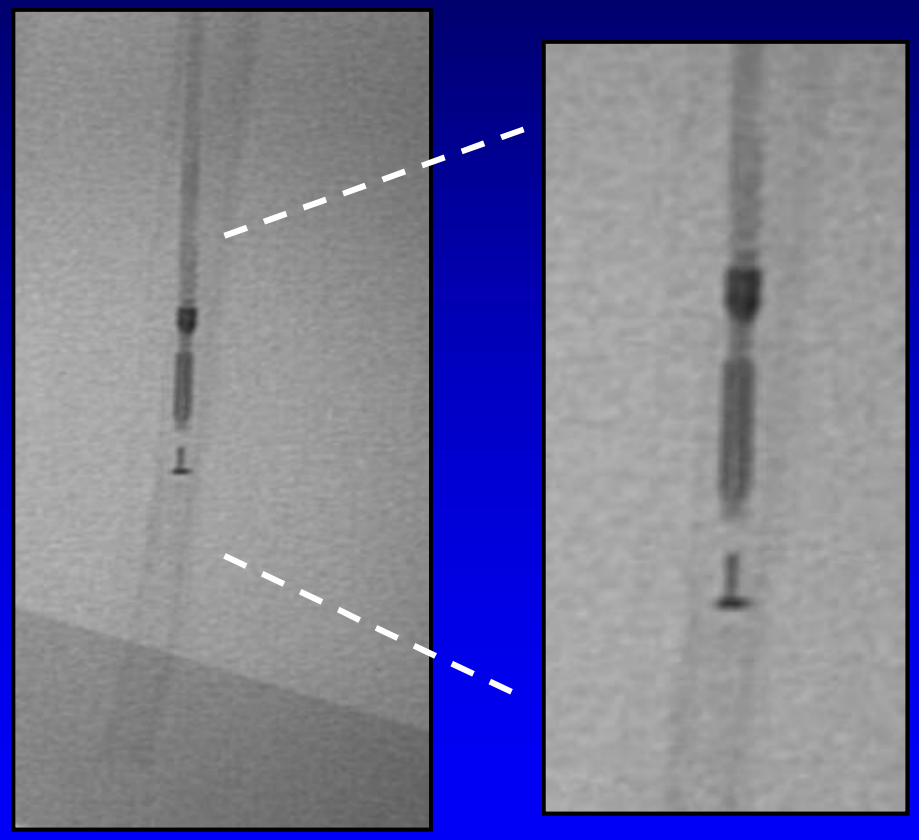


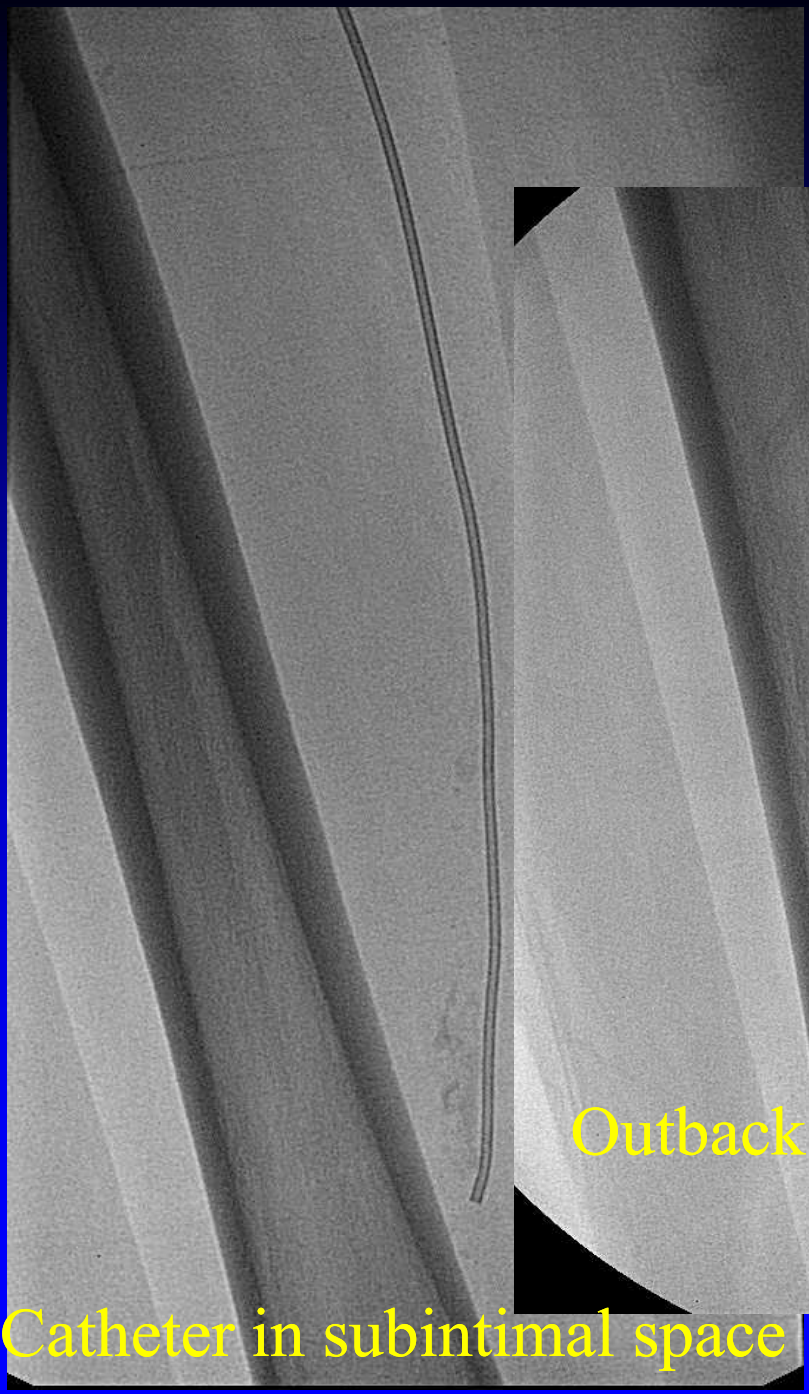
# Outback® LTD Orientation Markers

'T' marker = Tune

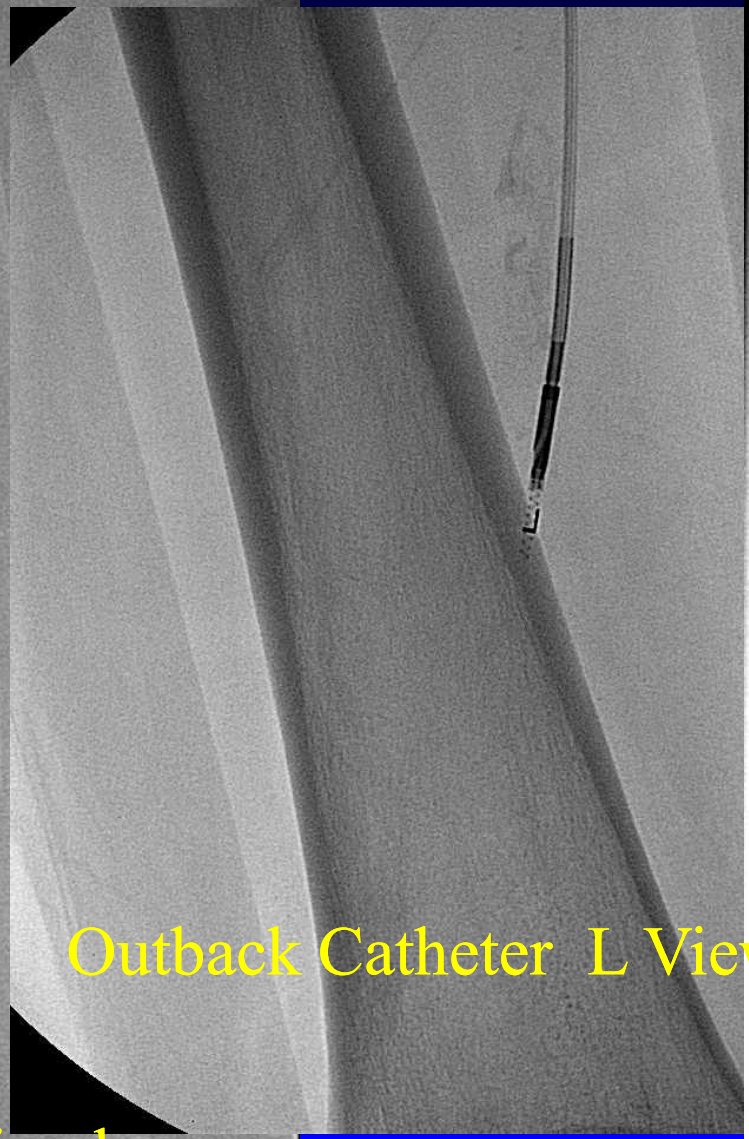
- Move image intensifier to orthogonal (90°) view. Assure Outback in 'in-line' with true lumen

- Fine tune Outback to display full 'T' (  ) marker

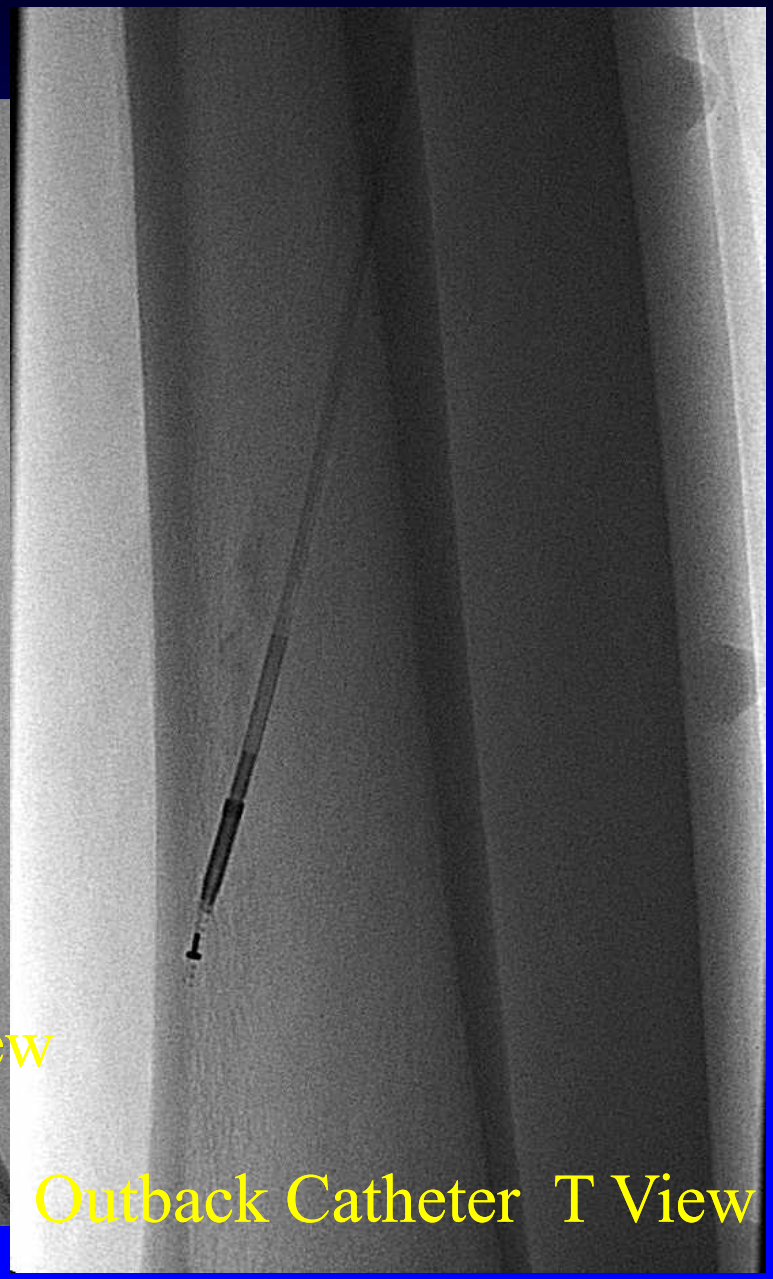




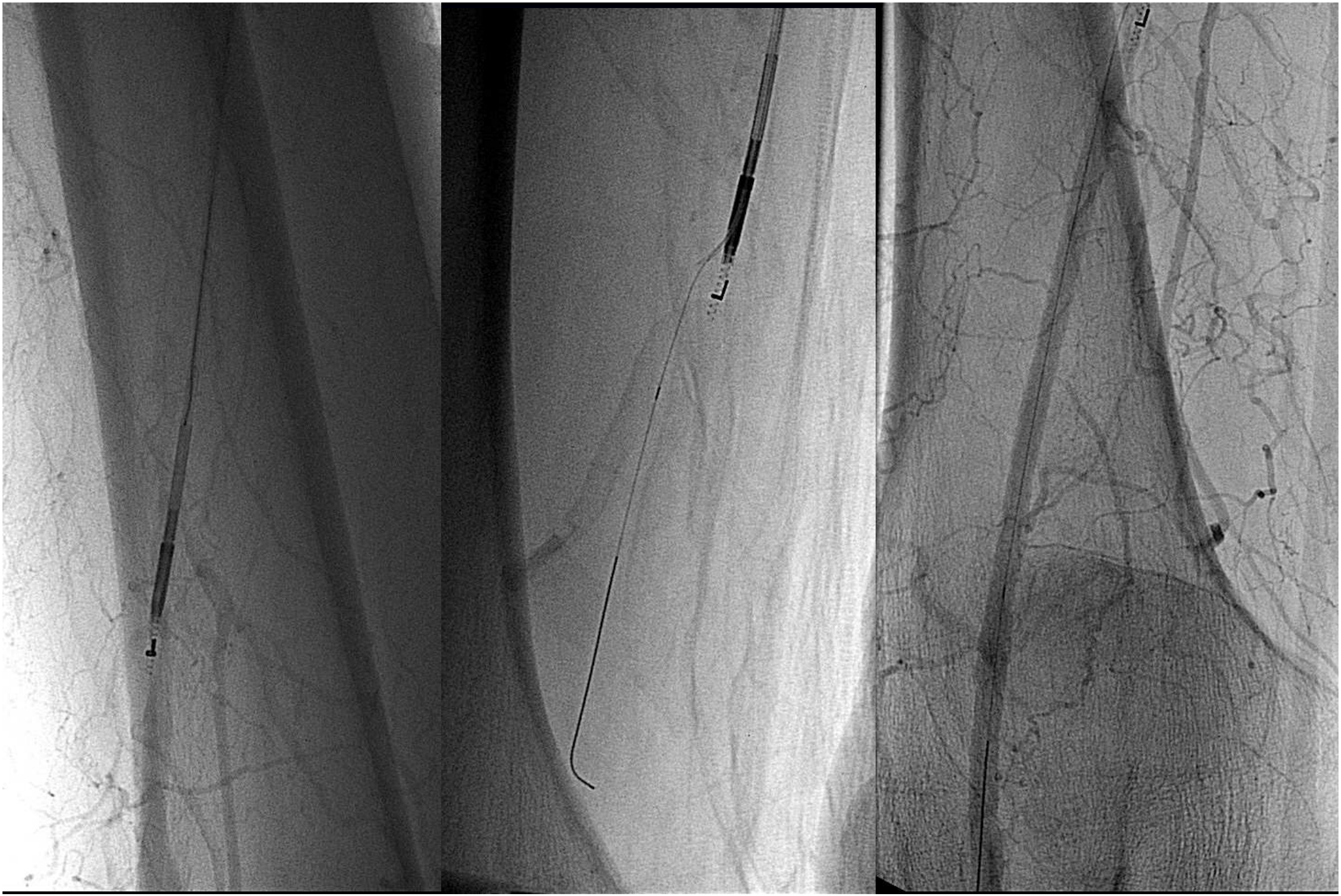
Catheter in subintimal space

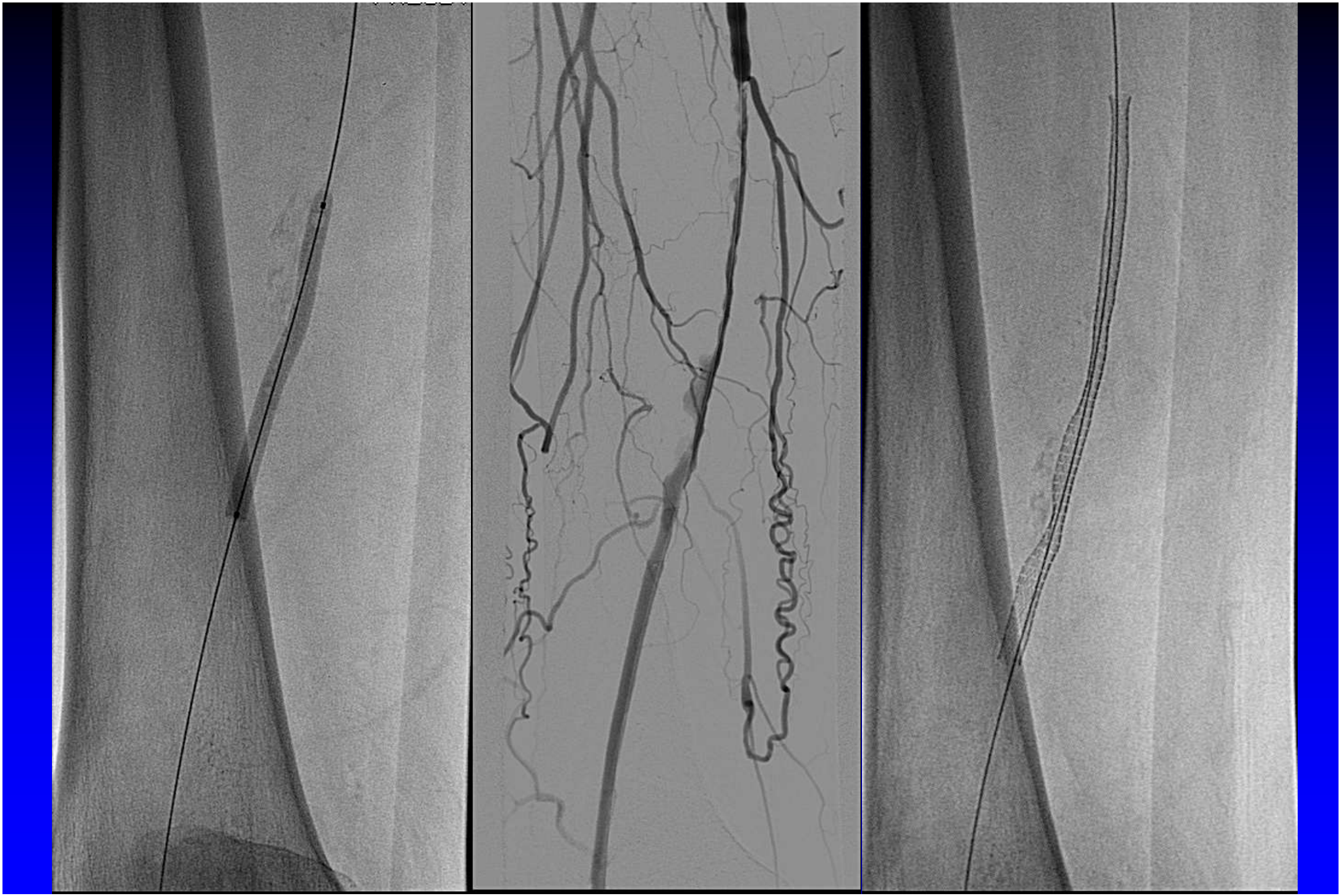


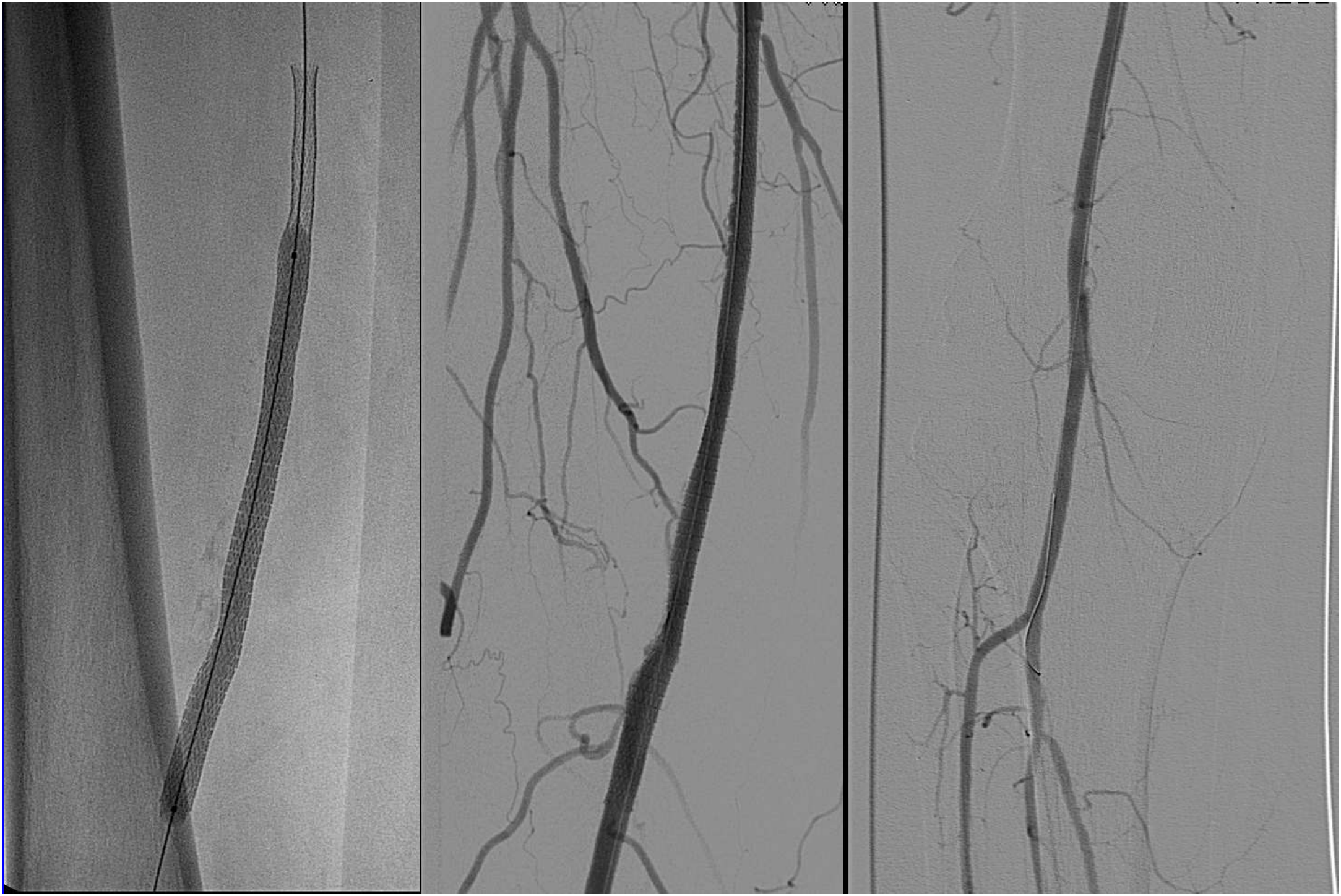
Outback Catheter L View



Outback Catheter T View

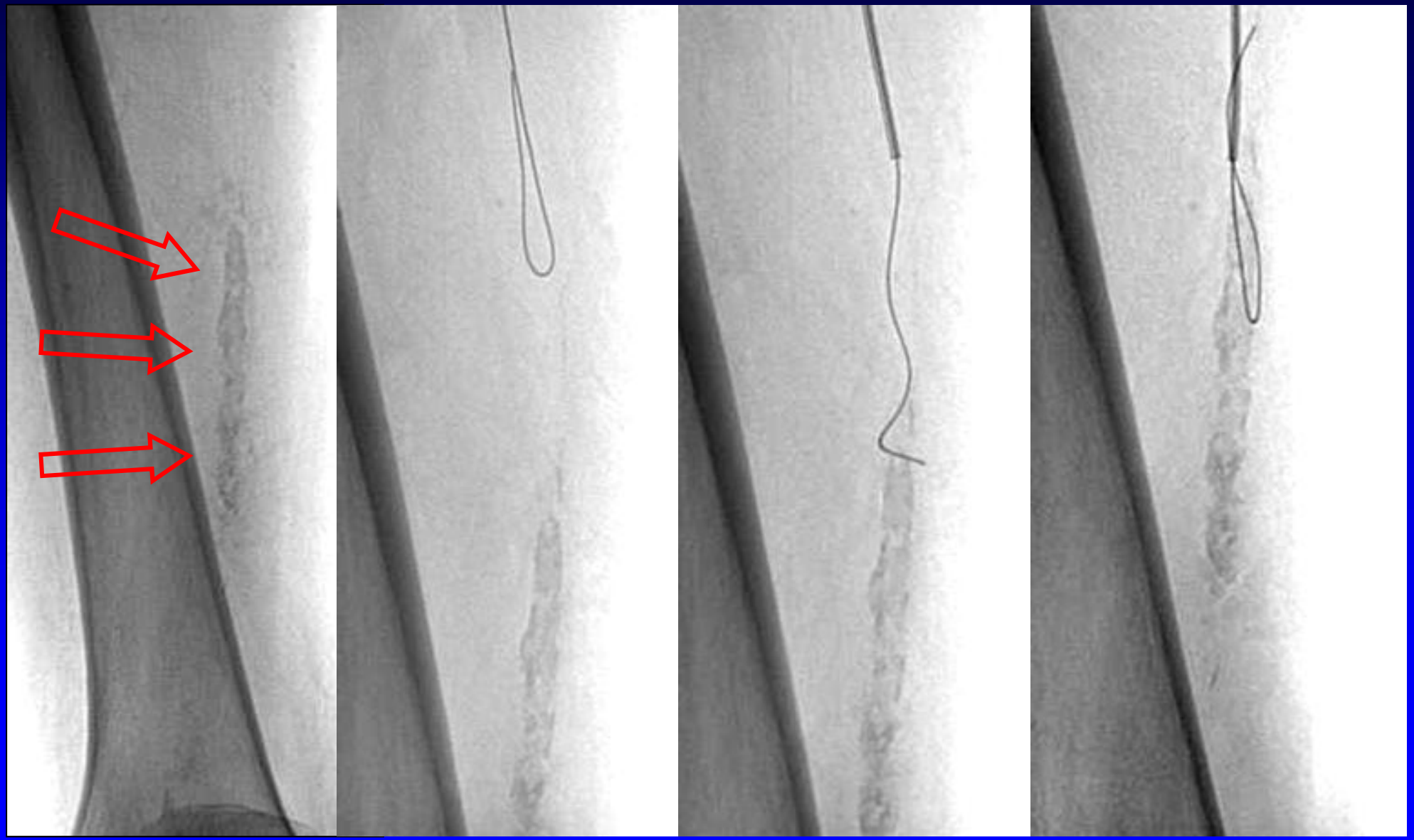






# Long Occlusion of Right SFA

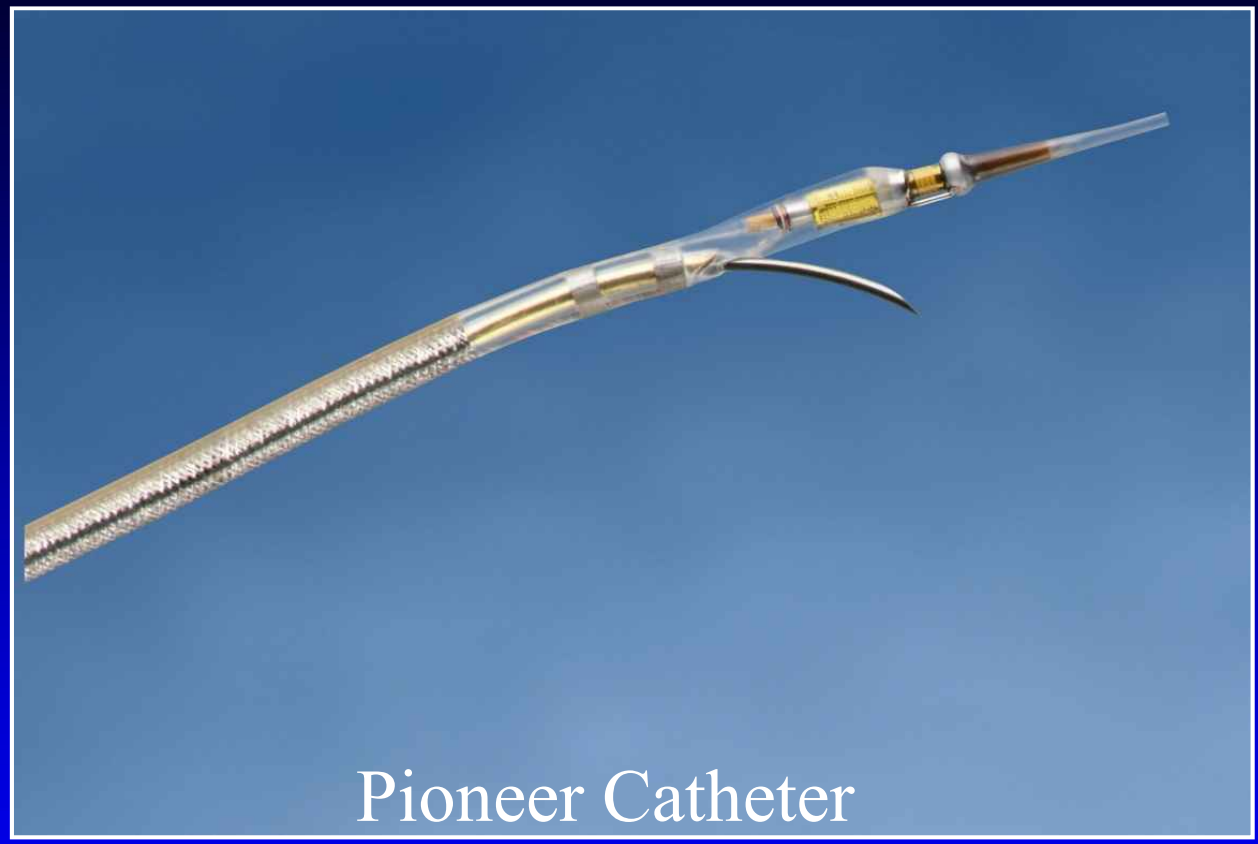
# Attempted Subintimal Recanalization



# Subintimal Angioplasty

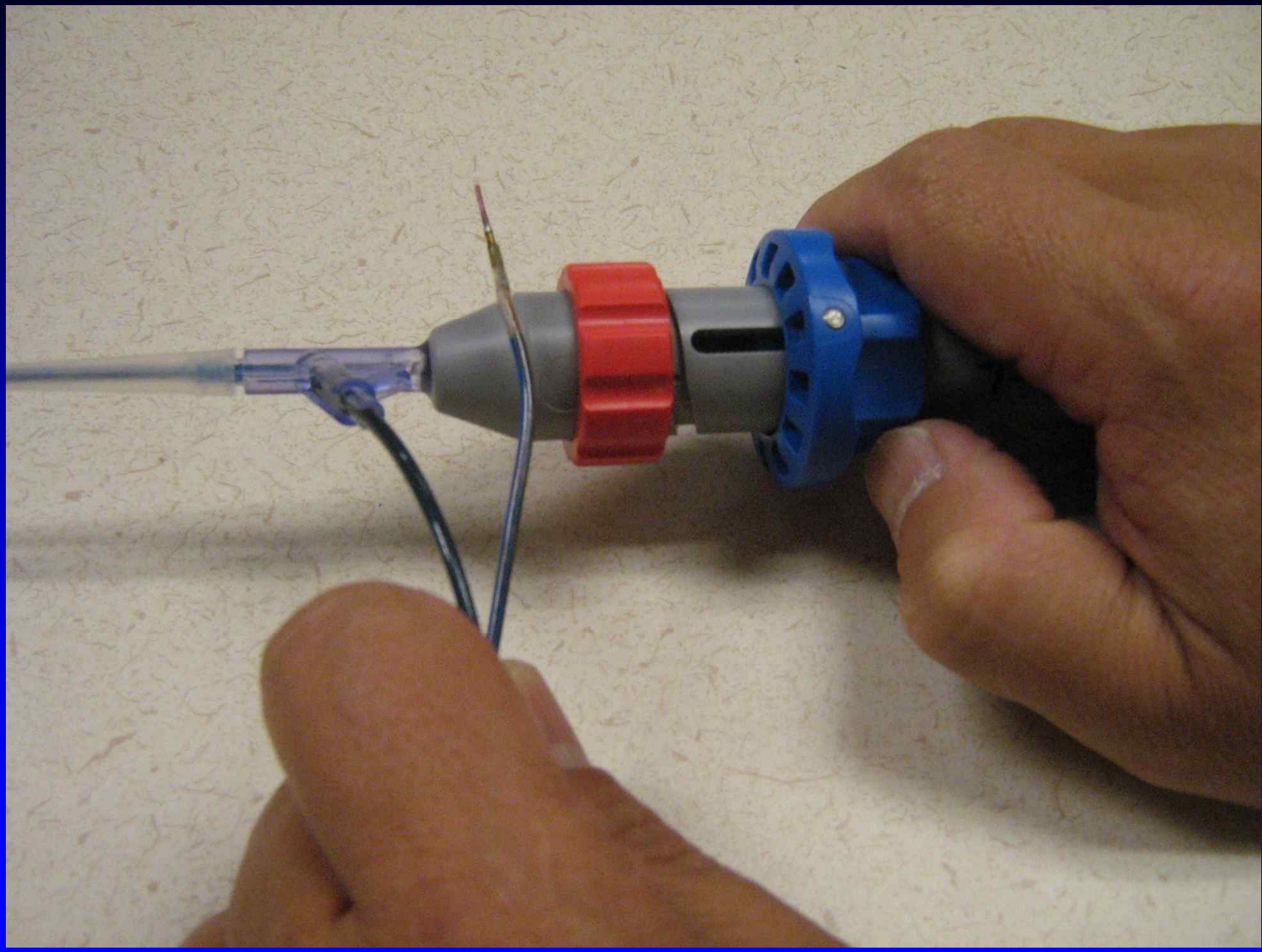
Major potential problem :

Distal extension of the dissection with involvement of the first popliteal segment or below.

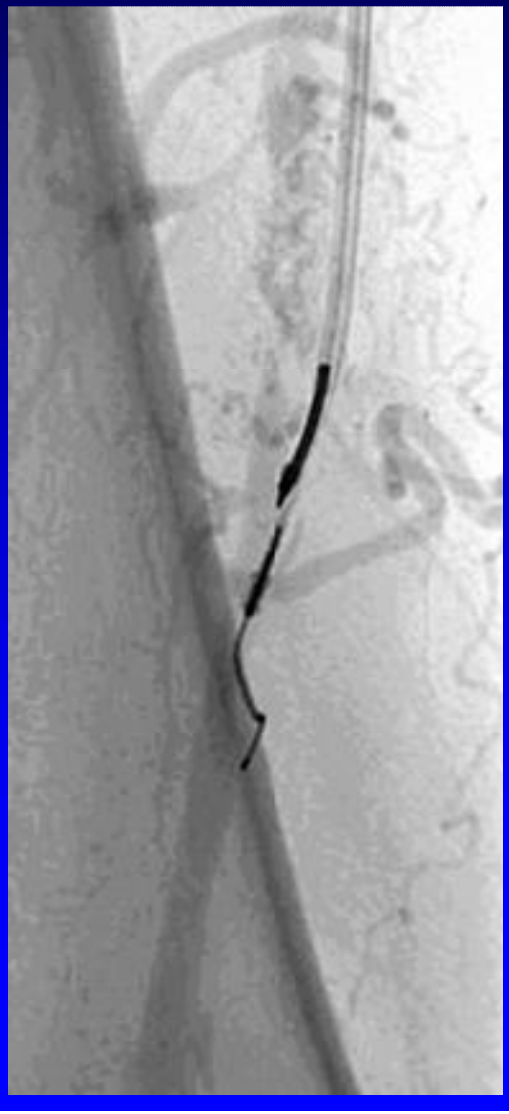


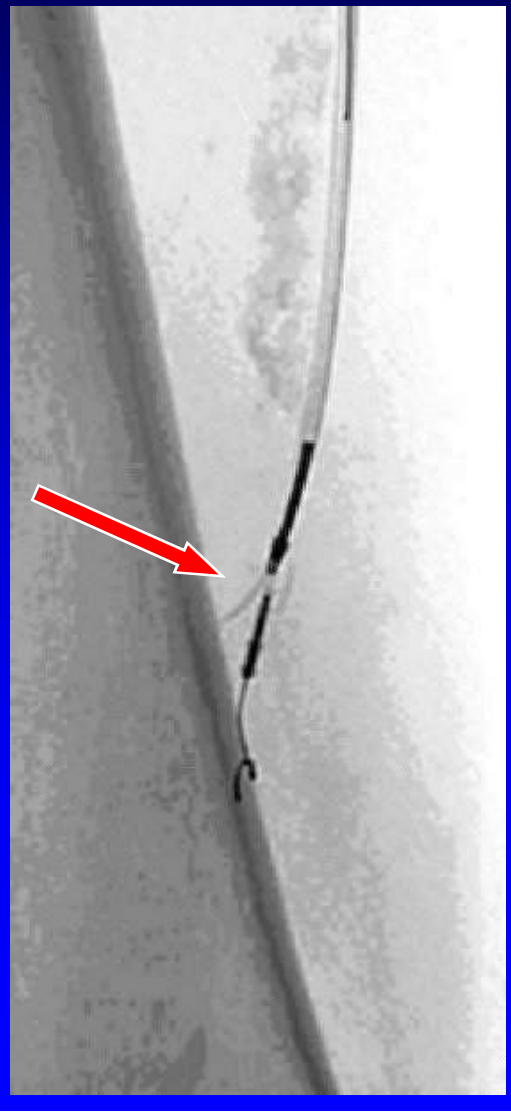
Pioneer Catheter

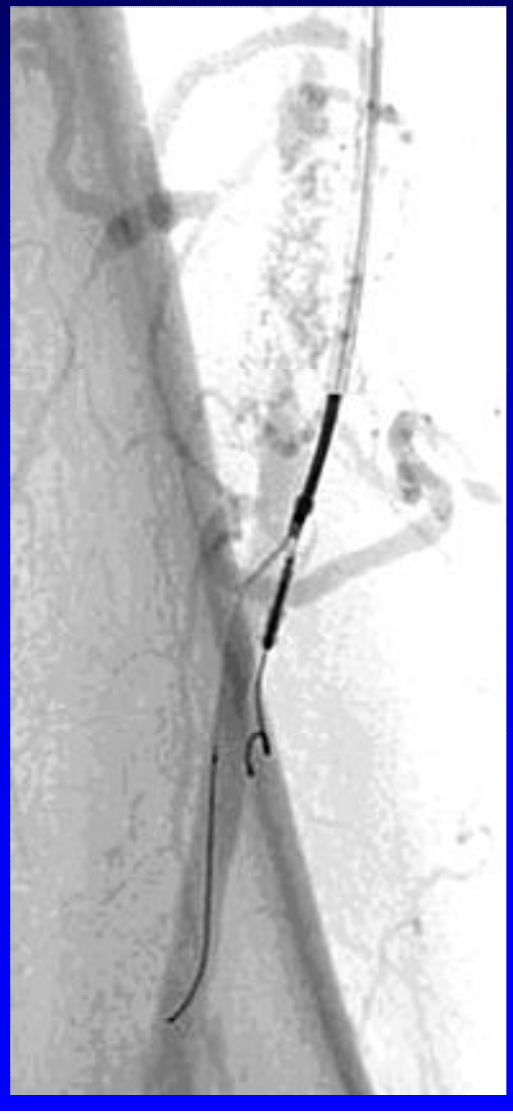
# Crossing Success
# > 95%



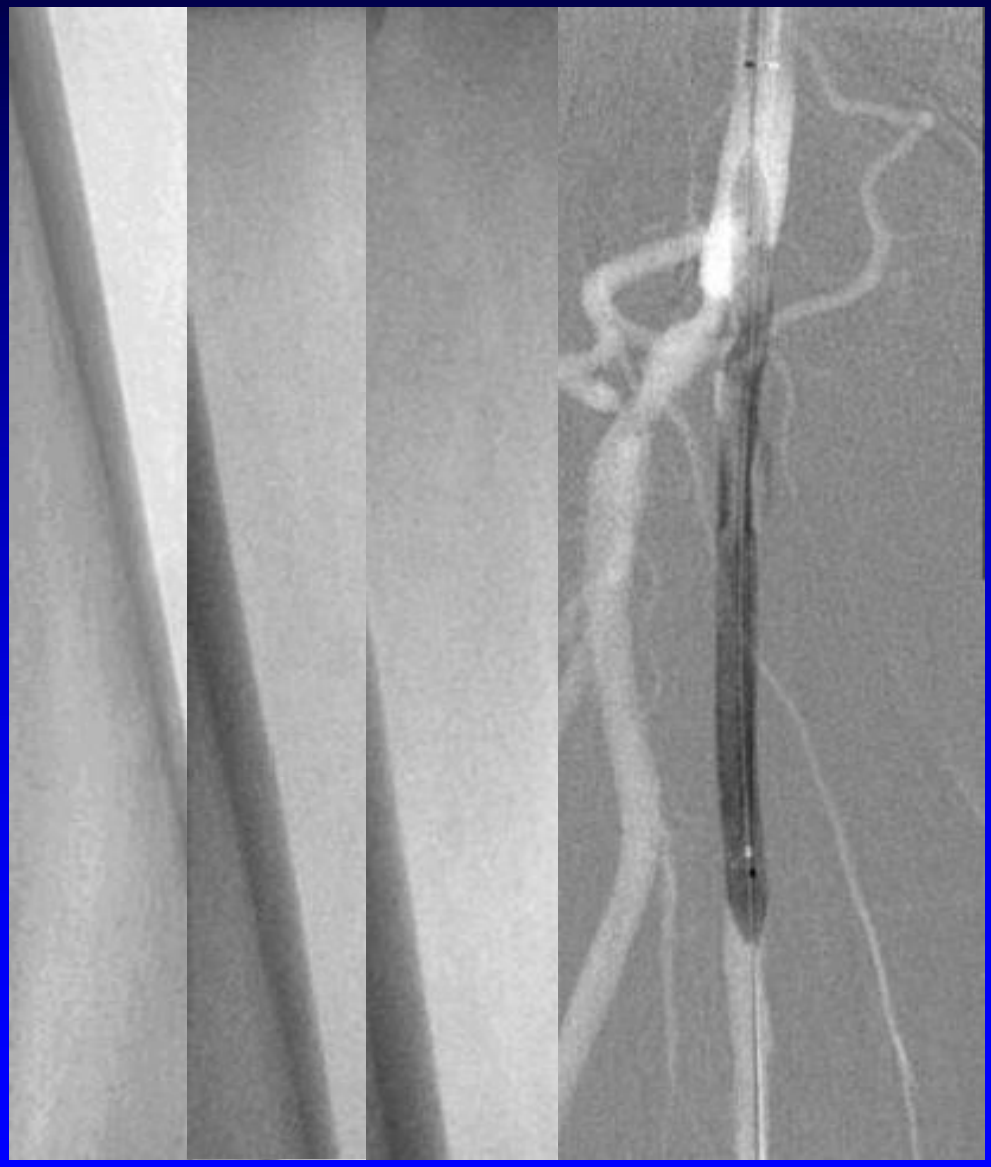
# Recanalization with the Re-Entry-Catheter



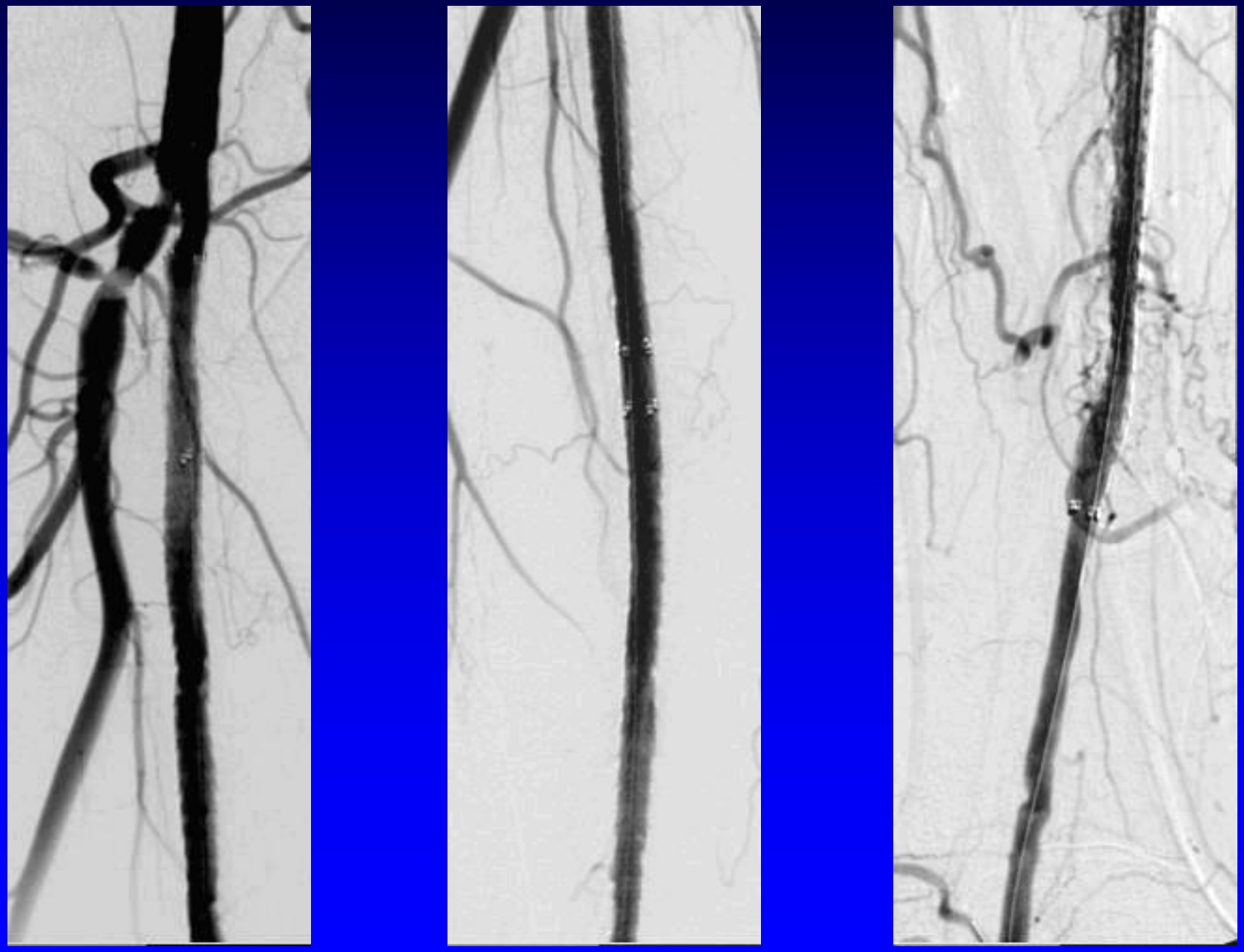




# Angioplasty of long SFA-Occlusions



# Following Stent Implantation



# Reentry Devices

- Pioneer
  - 6 Fr
  - Two guidewires
  - IVUS Guidance
  - Set needle depth (3, 5, or 7 mm)
  - Reimbursement available for IVUS
- Outback
  - 6 Fr
  - One guidewire
  - Fluoroscopic guidance
  - inexact needle depth
  - Reimbursement in Korea

# Conclusions

- Subintimal recanalization is a quick, simple and inexpensive approach to SFA occlusion
- Effective in the majority of cases
- Re-entry devices address the most common reason for failure – inability to reenter the true lumen distal to the occlusion
- Should increase success rates for CTO crossing  to close to 100%