

## Wiring Techniques for Tibioperoneal CTO Lesions: *Bi-directional and Transtibial Approach*



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# CTO crossing strategies

## Antegrade approach

1. Endoluminal
2. Subintimal

## Transcollateral

## Retrograde puncture



Alternative  
techniques

# CTO crossing strategies

## ☐ Antegrade approach

1. Endoluminal
2. Subintimal



*No true  
distal  
lumen?*

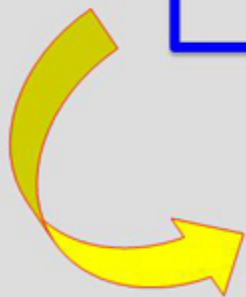


**What to do  
when we are  
unable to find  
the true distal  
lumen?**

1. Impossible to advance
2. Wire goes into collaterals vessels
3. Lost subintimal space
4. Arterial rupture

# Alternative techniques

## Transcollateral



1. Pedal-plantar loop technique
2. Transcollateral retrograde CTO treatment
3. Peroneal artery branches treatment

# **Pedal-plantar loop technique**

## **Case 1**

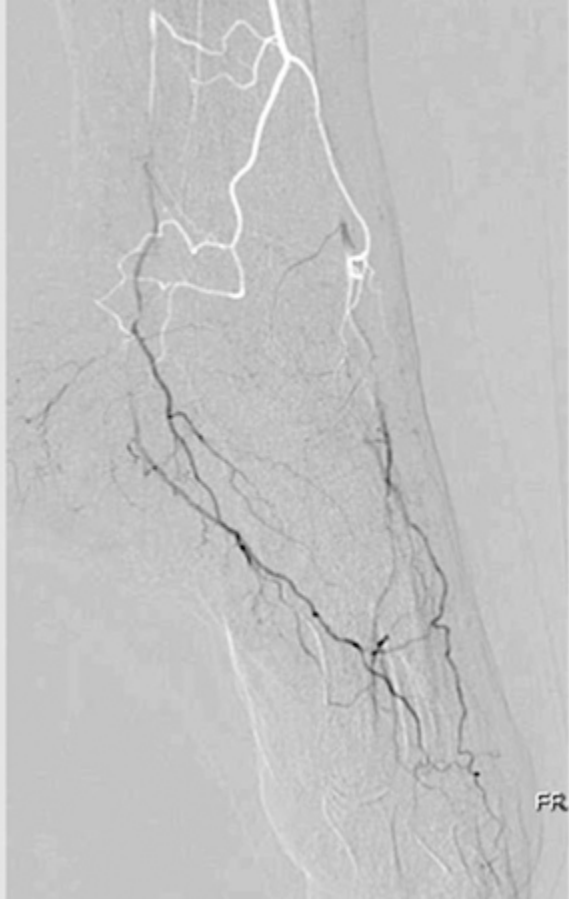
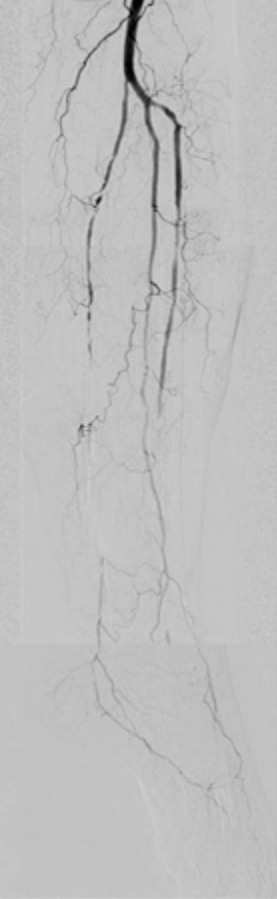
Case 02

Apr 15 2011  
09:10:18

(File 5)

Seq 3  
FRAME = 35 / 128  
MASK = 3

WW: 3068WL-2048









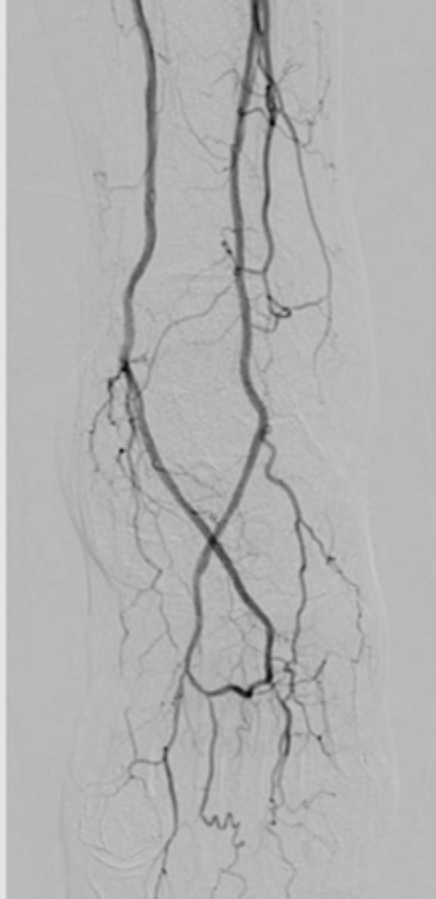
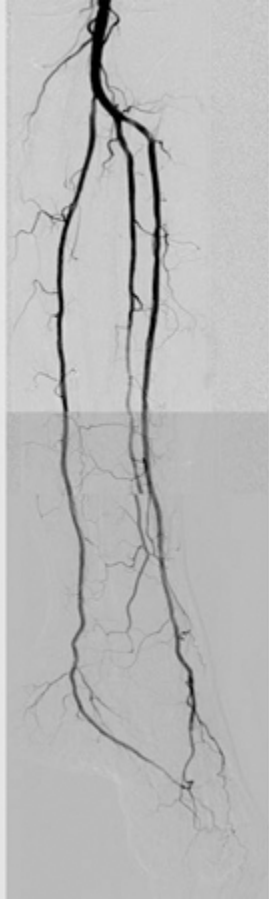
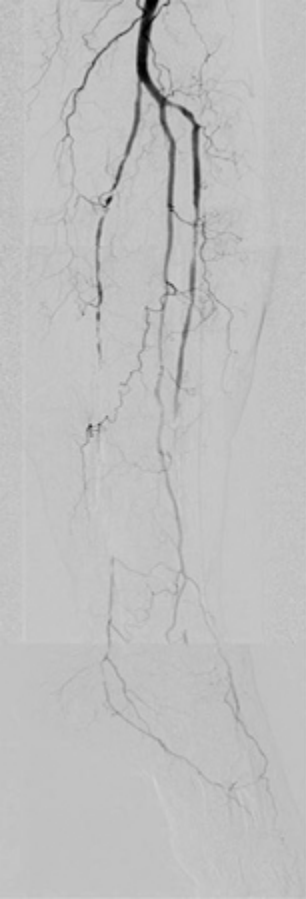
caso 02

Apr 15 2011  
09:56:51

(File 5)

Sag 27  
FRAME = 3 / 73  
MASK = 2

WW: 3008WL: 2038



**Pedal-plantar loop  
technique with retrograde  
subintimal dissection**

**Case 2**

N

Mar 24 2010  
09:12:08

(Filt. 6)

Seq. 2  
FRAME = 1 / 58

WW: 256WL: 128



N

Mar 24 2010  
09:53:44

(Fit. 6)

Seq: 21  
FRAME = 1 / 81

WW: 256WL: 128

N

Mar 24 2010  
10:08:07

(FIL. 6)

Seq. 33  
FRAME = 1 / 96

WW: 256WL: 128

N

Mar 24 2010  
10:17:29

(F12.5)

Seq: 35  
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MASK = 2



# Radial-Ulnar Loop-Technique

## Case 3

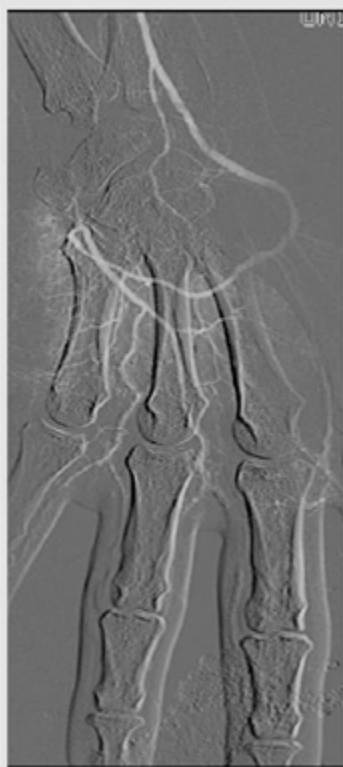
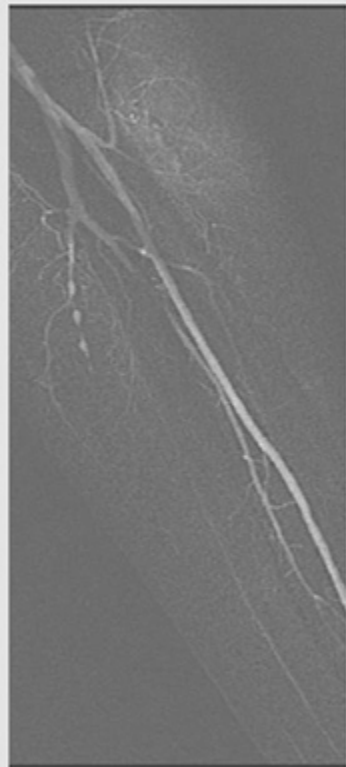
*Courtesy of Roberto Gandini, MD*

# *Loop technique: PTA of ulnar artery*

## Pre-procedural evaluation

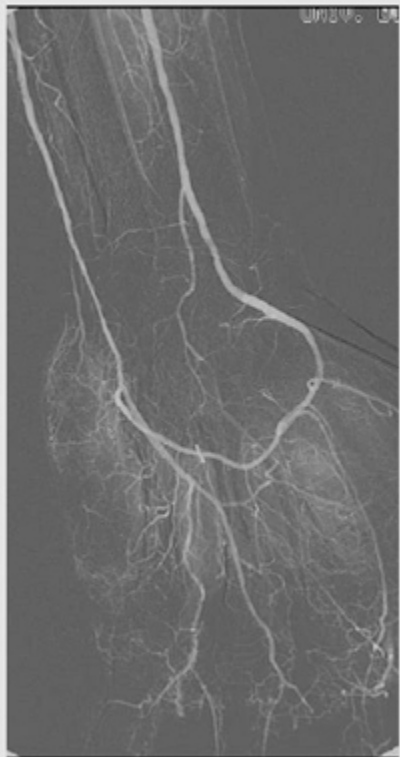
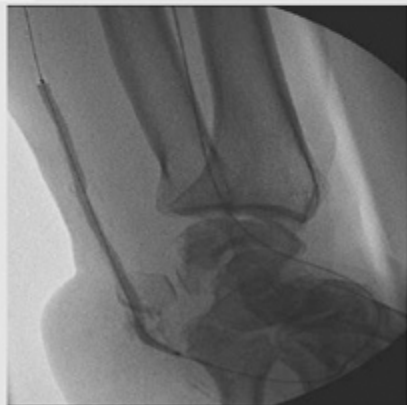


# *Loop technique: PTA of ulnar artery*



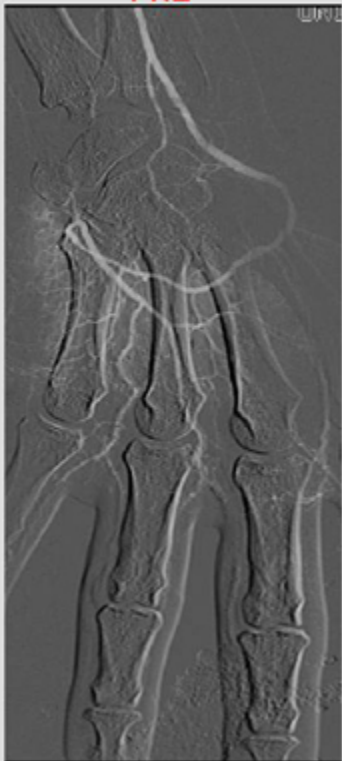
Amphirion Deep 2x80 mm

# *Loop technique: PTA of ulnar artery*

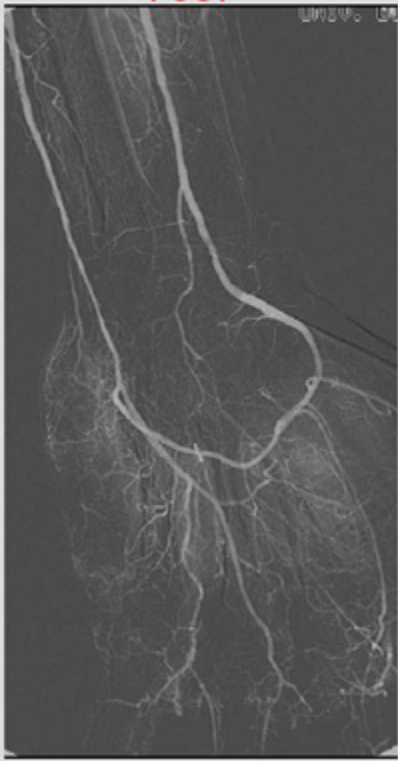


# *Loop technique: PTA of ulnar artery*

**PRE**



**POST**



# *Loop technique: PTA of ulnar artery*

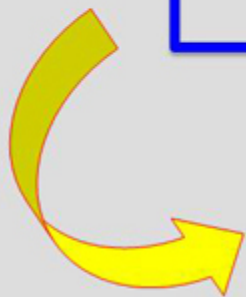
Pre-procedural evaluation



@ 6 months follow-up → no ulceration

# Alternative techniques

## Transcollateral

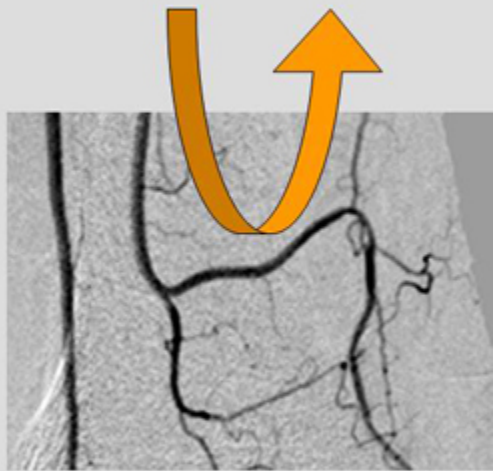


1. Pedal-plantar loop technique
2. Transcollateral retrograde CTO treatment
3. Peroneal artery branches treatment

**Trans-collateral retrograde  
CTO treatment**

**Case 4**





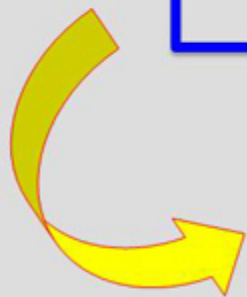






# Alternative techniques

## Transcollateral



1. Pedal-plantar loop technique
2. Transcollateral retrograde CTO treatment
3. Peroneal artery branches treatment

# Targets in BTK-PTA

1°

Complete  
revascularization

- 1 vessel better than 0
- 2-3 vessels better than 1
- Tibials better than peroneal

2°

WRA

- Direct revascularization,  
bypass or PTA better than  
indirect revascularization

# Targets in BTK-PTA

Cardiovasc Intervent Radiol (2008) 31:49–55  
DOI 10.1007/s00270-007-9214-3

CLINICAL INVESTIGATION

## **Transluminal Angioplasty of Peroneal Artery Branches in Diabetics: Initial Technical Experience**

Lanfroi Graziani · Antonio Silvestro · Luca Monge · Gian Mario Boffano ·  
Francesco Kokaly · Ilaria Casadidio · Francesco Giannini

Graziani L et Al. Cardiovasc Intervent Radiol (2008) 31:49–55

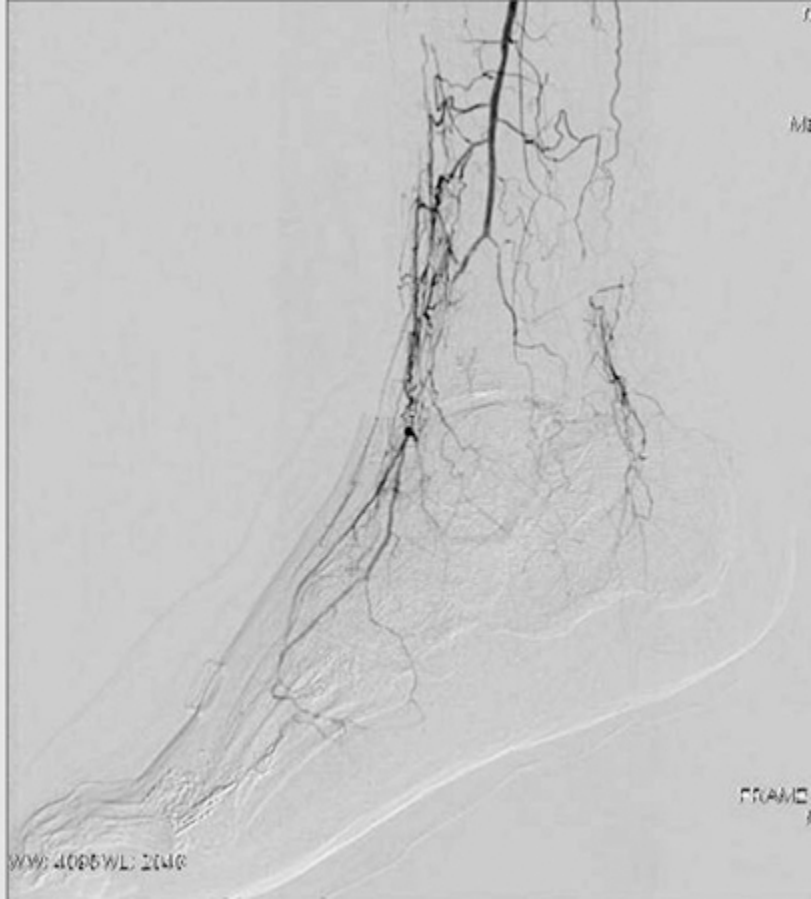
What can we do in case of tibial PTA failure?

What can we do when the peroneal artery is the only re-canalizable artery?

# **Peroneal artery branches treatment**

## **Case 5**





Failure of anterior tibial artery PTA

00000000

00000000  
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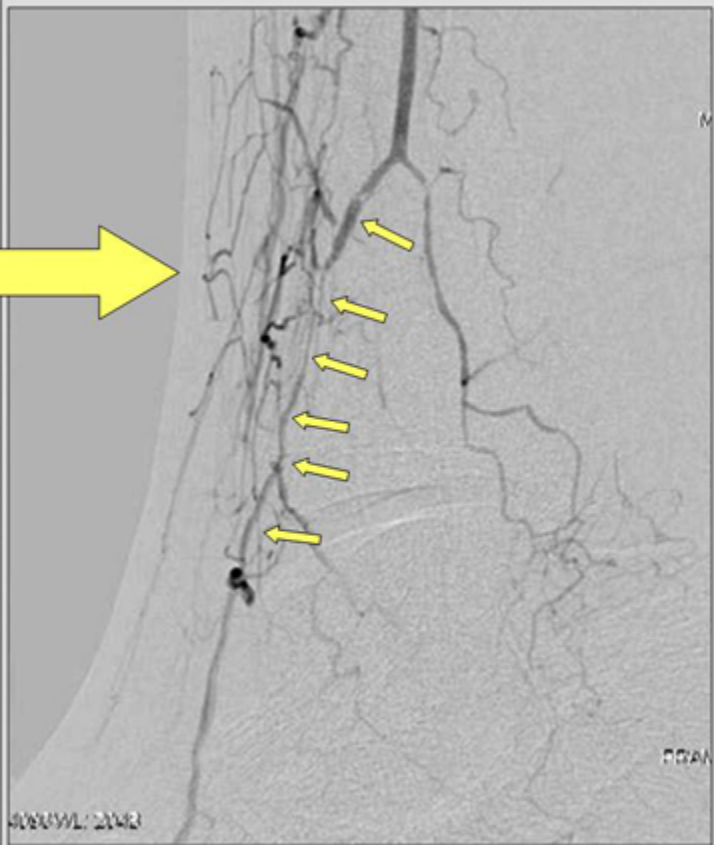
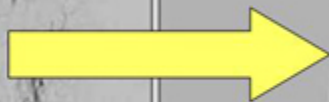
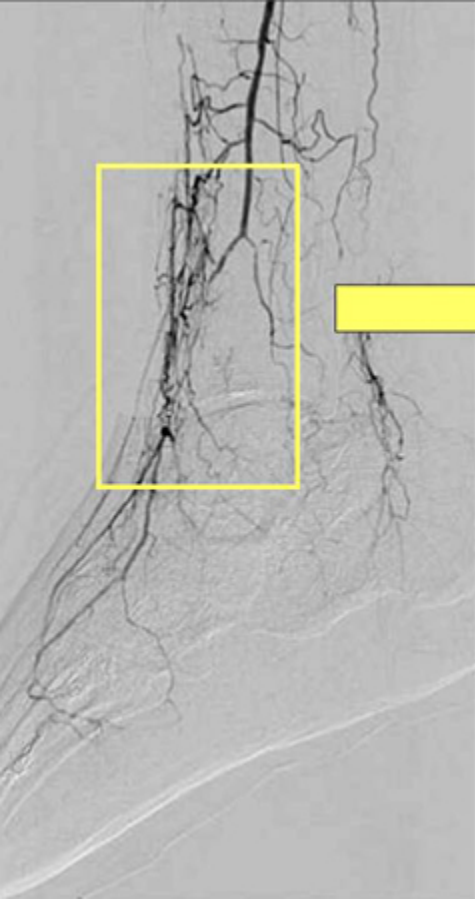
00100100

MOUSE 0717  
074472

(71.5)

2x17  
FRAME - 00 / 01  
MASK - 2

WWW.4080WL.2000



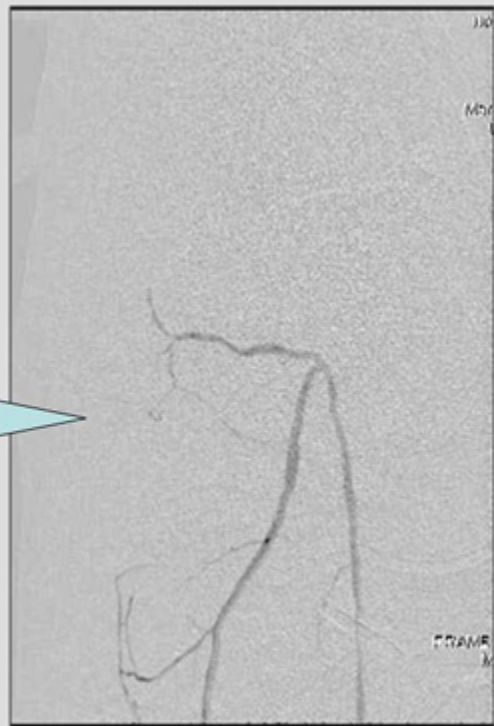
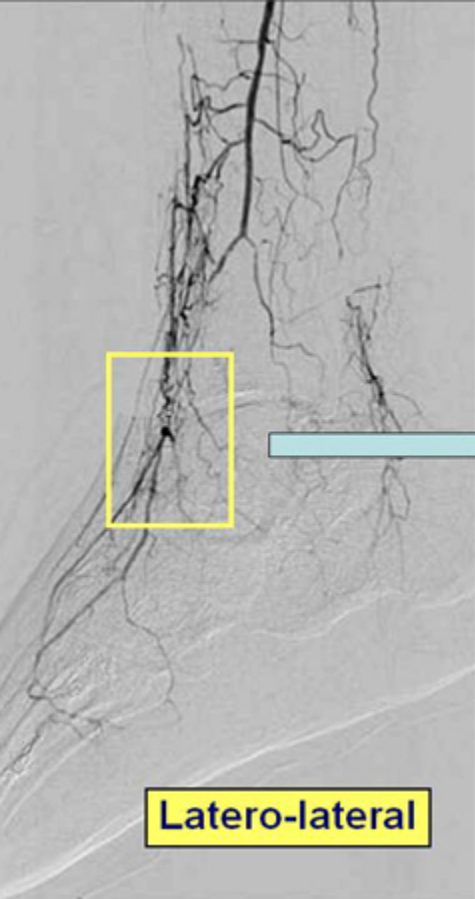
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Mar 21 2014  
07:52:18

1000

200 74  
RWMB - 18/44

WW: 208WL 120









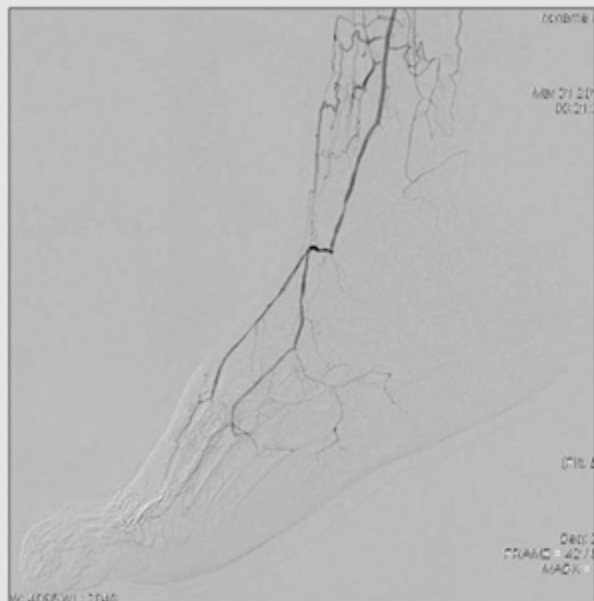
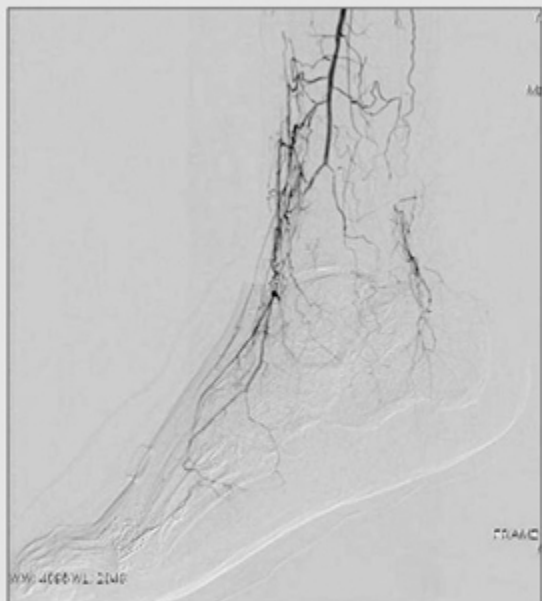
0008104.D01

MAR 21 2010  
00:20:16

(FIL 5)

0000 27  
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MAGN = 1

WWW.A0015WLJ.0040



# CTO crossing strategies

- Antegrade approach

1. Endoluminal

2. Subintimal

- Transcollateral

- Retrograde puncture

# Retrograde (double) approach

- Proximal access in SFA (CFA)
- Distal access:
  - pedal artery → ATA
  - retromalleolar artery → PTA
- 20 gauge needle puncture
- No introducer, wire + low profile OTW balloon
- Snare kit to capture wire in SFA
- Wire in the catheter technique

# **Retrograde puncture**

## **Case 6**

NONAME 001

Jun 07 2010  
11:13:55

(FIL 6)

Seq: 2  
FRAME = 1 / 108

WW: 256WL: 128





JUN 8  
1

FRAME =  
MA

: 2008



MONAME 001

Jun 07 2010  
11:31:37

(FIL 5)

Seq: 7  
FRAME = 4/37  
MASK = 2

WW: 4666WL: 2018

NO NAME LU

Tibia

antegrade wire

Jun 07 2014  
11:38:22

astragalus

Med plantar  
artery (occluded)

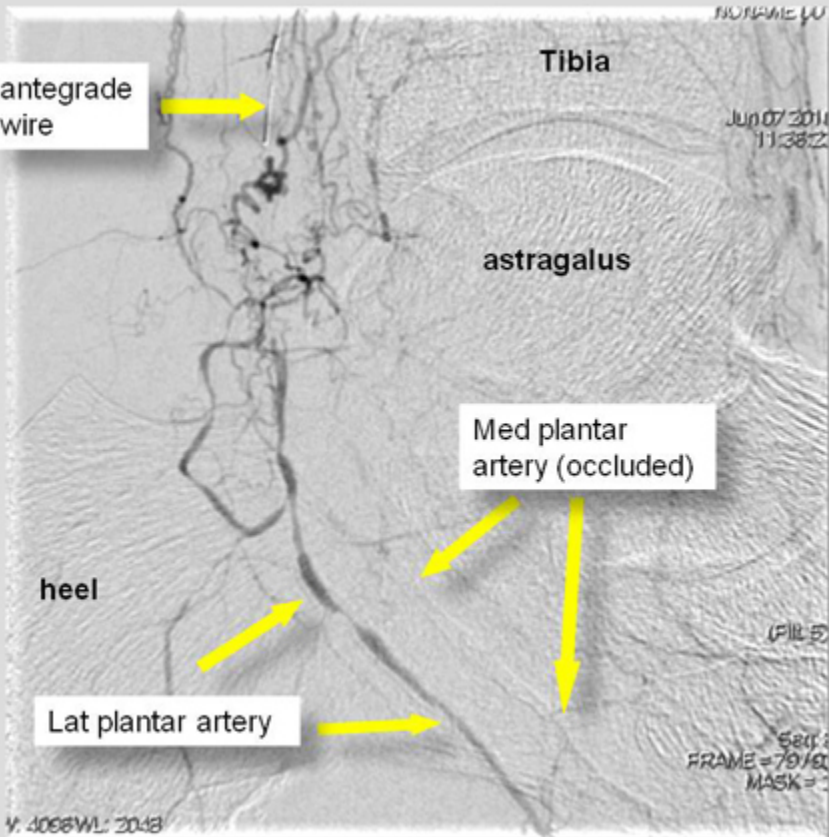
heel

(FILE 5)

Lat plantar artery

500  
FRAME = 79/100  
MASK = 2

V. 4068 WL: 2048




NONAME 001

Jun 07 2010  
11:54:23

(Fit. 6)

Seq. 9  
FRAME = 1/79

WW 256 WL 128



Jun 07 2010  
12:30:00

This is a lateral radiograph of a right ankle and foot. A thin, dark wire is visible, extending from the upper leg down to the ankle area. The tibia and fibula are visible in the upper half of the image, with the distal ends of both bones clearly defined. The ankle joint is visible in the middle, showing the articulation between the distal tibia and the talus. The foot is shown in the lower half, with the metatarsals and phalanges visible. The overall image is in grayscale, typical of medical radiography.

(FIB 8)

SEQ 15  
FRAME = 9/15

258WL:128

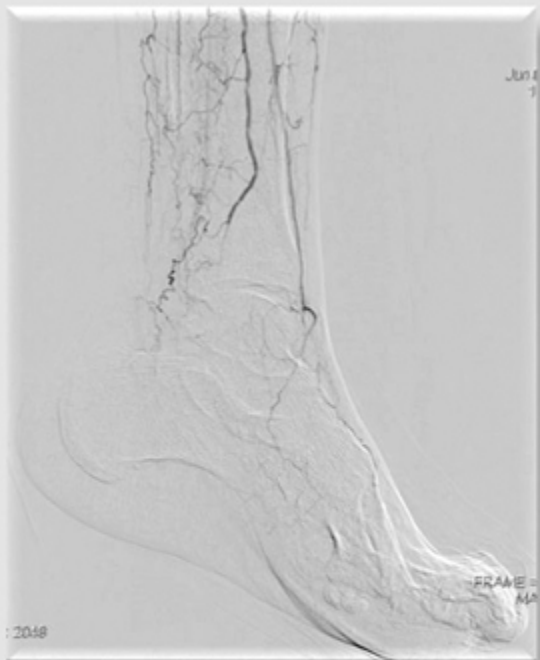
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(File 5)

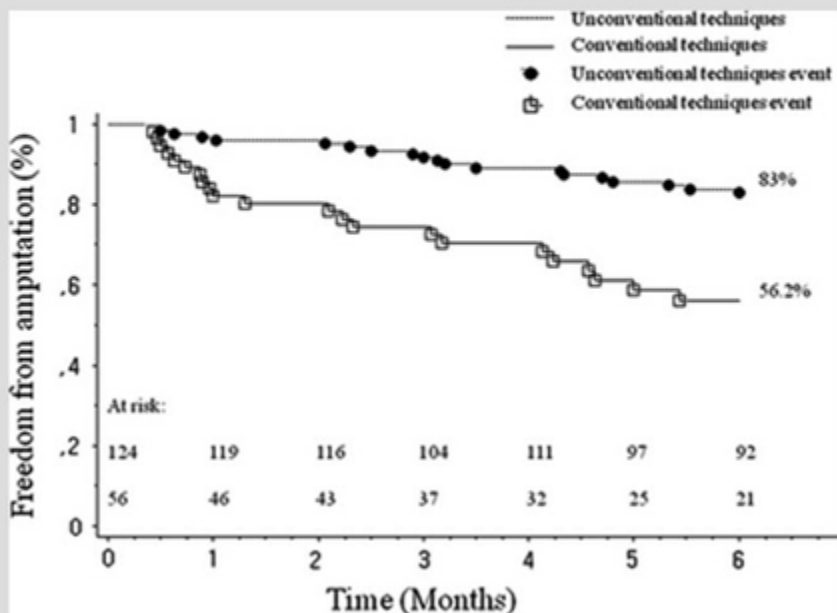
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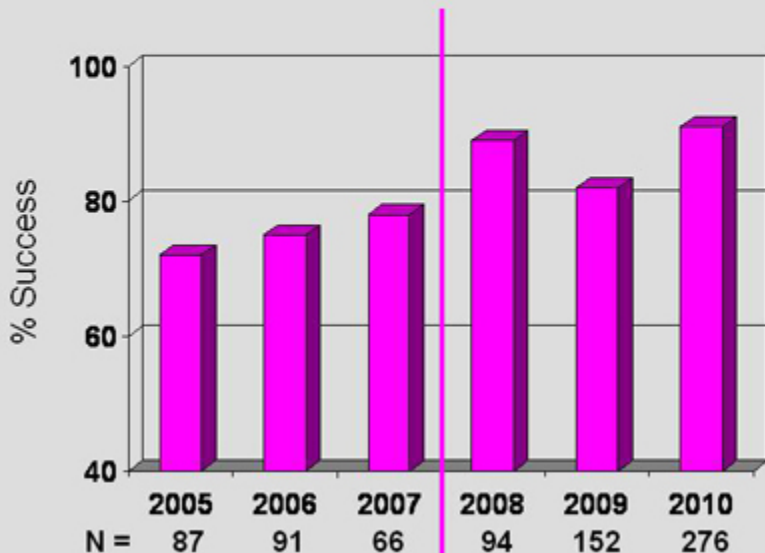
# Success for Unconventional Techniques

Immediate (technical) success 96%



# Procedural success for CTOs

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# Conclusions

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- The treatment of CTOs for BTK interventions requires the knowledge of different techniques.
- In a step-by-step approach these lesions are first attempted endoluminally.
- A sub-intimal approach is used in about 40% of the cases.
- Transpedal or trans-collateral approaches are still considered for highly selected cases and are done in about 10% of our procedures.