

***BTK recanalization: the
flamboyant Italian style***

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*Peripheral Interventional Unit
Diabetic Foot Center
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HUMANITAS
GAVAZZENI

Vincenzo Foppa, 1462
*“The miracle of the salvaged foot”
Cappella Portinari, S. Eustorgio Church
Milan, Italy*



BTK recanalization: the flamboyant Italian style

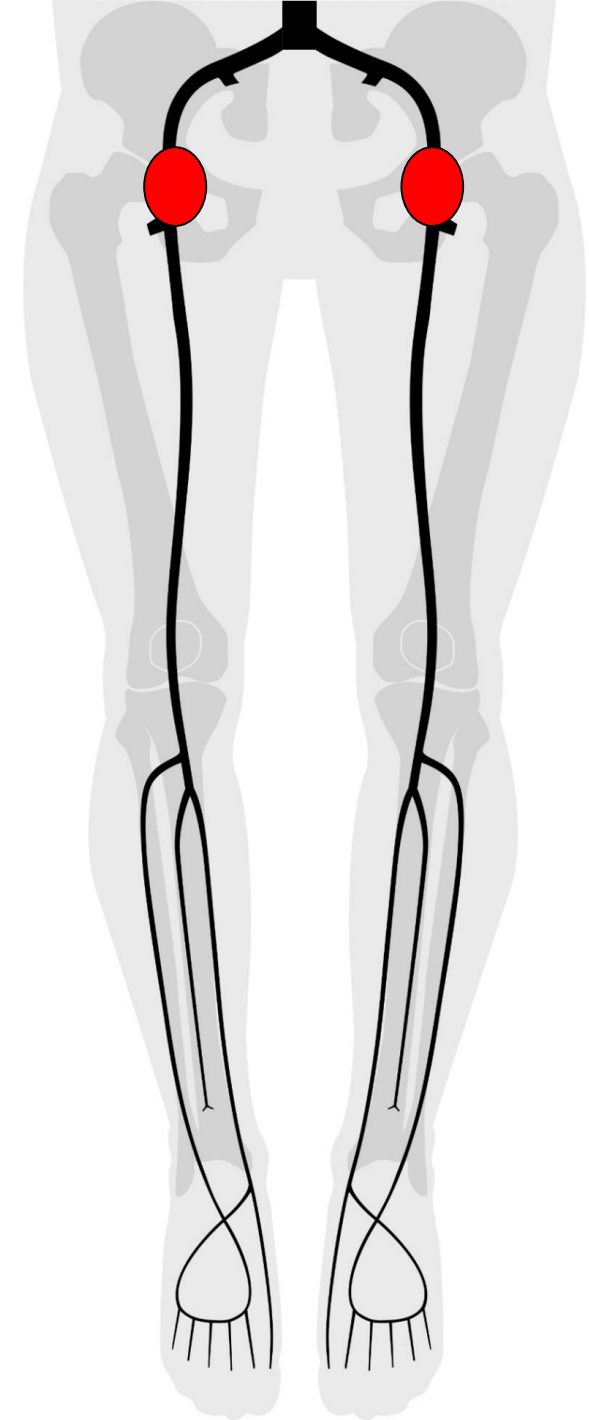
- 1. Master antegrade fem approach**
- 2. Identify optimal targets**
- 3. Step-by-step approach in CTOs**
- 4. Choose the proper size**

Tips and tricks for a correct “endo approach”

R. FERRARESI¹, L. M. PALENA², G. MAURI³, M. MANZI⁴

J CARDIOVASC SURG 2013;54:685-711

The antegrade femoral approach is the only one able to guarantee a correct device control in BTK vessel disease treatment



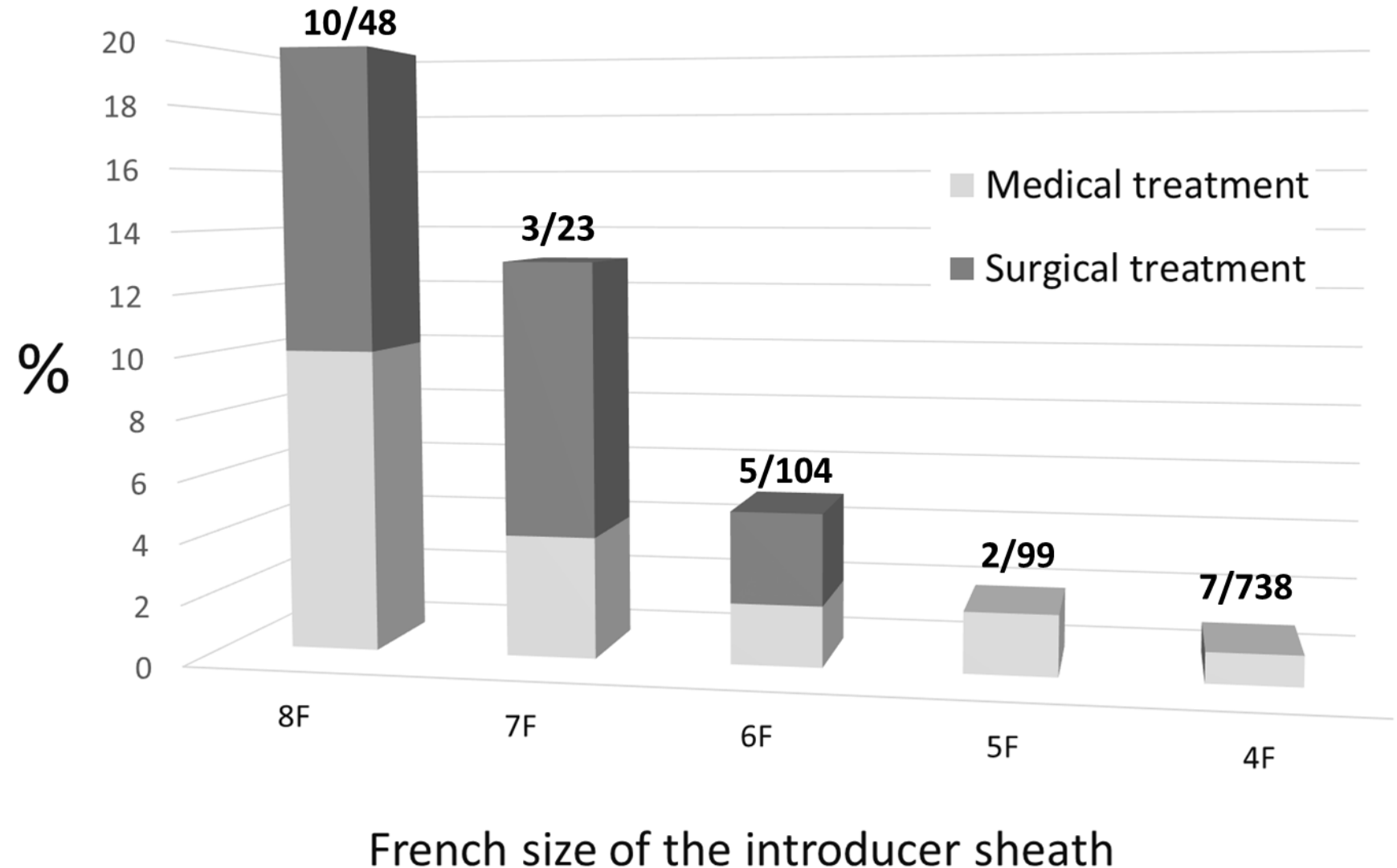
We started antegrade femoral puncture as first choice approach in below-the-groin vessel disease in 2000.

In the very first 1012 cases (2000-2008), we had 27 major complications (2,7%)

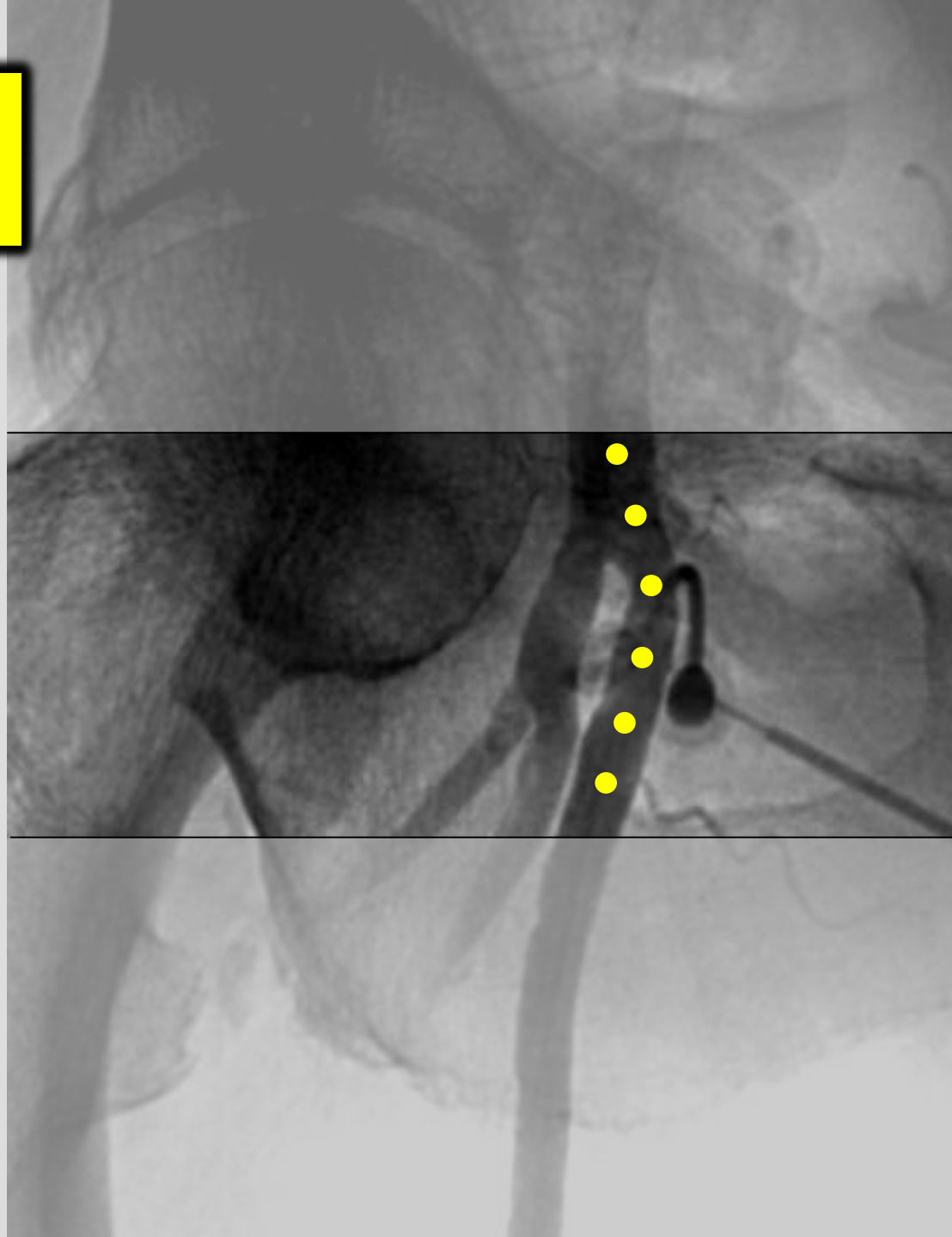
	Medical treatment	Surgical treatment	Puncture above half line of the femoral head	Puncture below half line of the femoral head
Groin hematoma	14	3	4	13
Abdominal wall hematoma	1	-	1	-
Scrotal hematoma	-	1	1	-
Pseudoaneurism	-	1	-	1
Retroperitoneal hematoma	5	1	6	-
Acute femoral thrombosis	-	1	-	1
Total	20	7		

Antegrade femoral approach complications according to sheath size (2000-2008 yy; 1012 procedures)

1st key factor in reducing complications: standard use of 4-5 F sheaths



**2nd key factor in
reducing complications
X-ray guided puncture**



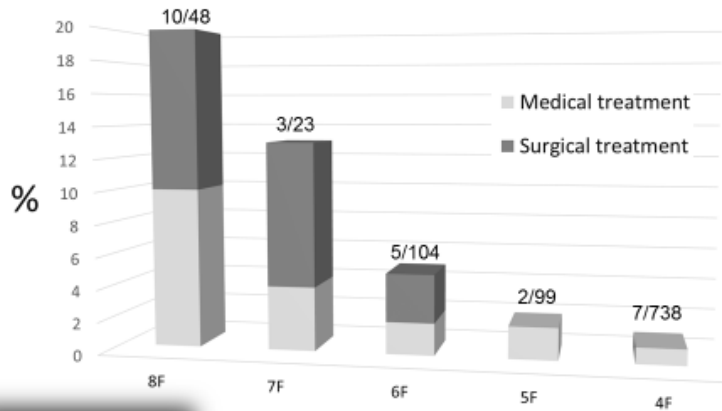
Danger of retroperitoneal, abdominal wall and external genital bleeding

The antegrade femoral puncture can be in the CFA or in the proximal SFA without an increase in morbidity

Kweon M et Al. Antegrade Superficial Femoral Artery versus Common Femoral Artery Punctures for Infrainguinal Occlusive Disease. J Vasc Interv Radiol 2012;23:1160-4

Danger of thigh hematoma or pseudoaneurism

Antegrade femoral approach complications according to sheath size (2000-2008 yy; 1012 procedures)



1st key factor in reducing complications: standard use of 4-5 F sheaths

French size of the introducer sheath

Antegrade fem approach is essential in CLI-BTK pts

Key points for safety:

1. 4-5 F sheath
2. X-ray guided puncture

A too high puncture is highly problematic for manual compression hemostasis because the common femoral artery (CFA) is going deeply into the external iliac artery and the puncture may be above the inguinal ligament, which represents the best barrier against retroperitoneal bleeding.

Kiani F et Al. Common femoral artery access techniques: a review. J Cardiovasc Med 2009;10:517-22

This is the correct puncture region: below the inguinal ligament, not too distal from the inferior edge of the femoral head

A too low puncture into the superficial femoral artery (SFA) can impair manual compression hemostasis because the artery is going deeply into the muscle and is not surrounded by the connective groin tissue that is the best environment for a fast and sure hemostasis.

Gabriel M et Al. Location of femoral artery puncture site and the risk of postcatheterization pseudoaneurysm formation. Int J Cardiol 2007;120:167-71

2nd key factor in reducing complications: X-ray guided puncture

BTK recanalization: the flamboyant Italian style

1. Master antegrade fem approach

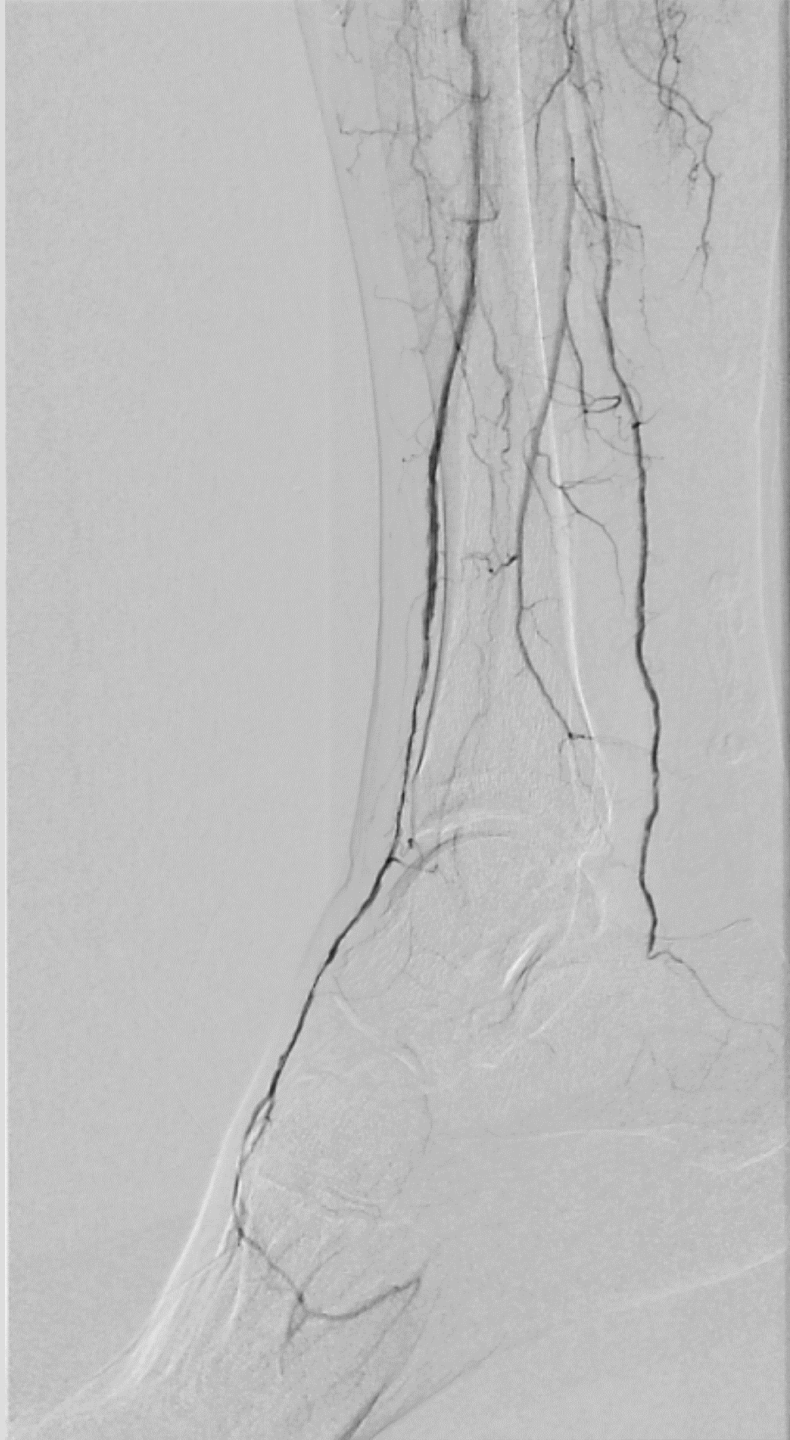
2. Identify optimal targets

3. Step-by-step approach in CTOs

4. Choose the proper size

*The shorter line between two points is the straight line
(Euclid, mathematician)*

- **66 yo man (football referee, active)**
- **T2DM, 6 yy**
- **Malleolus ulcer, not healing**
- **Absence of peripheral pulses**





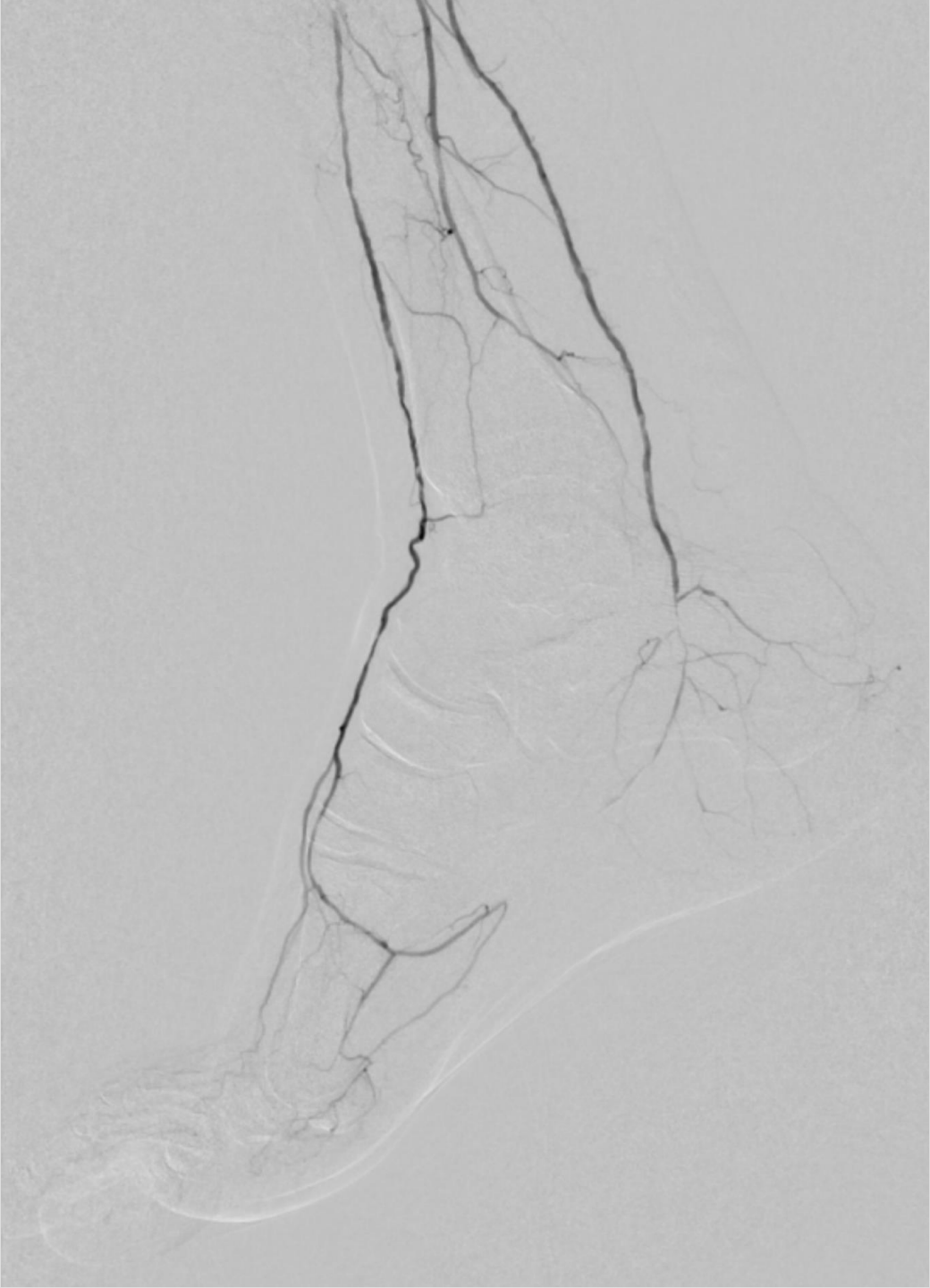
Dx
RE-TRATTAMENTO

This is a lateral X-ray of a human foot. The image shows the skeletal structure, including the metatarsals and phalanges. The foot appears to be in a relatively normal position, with some minor soft tissue shadows. The text 'Dx RE-TRATTAMENTO' is printed on the left side of the image.



Dx
PRE-TRATTAMENTO

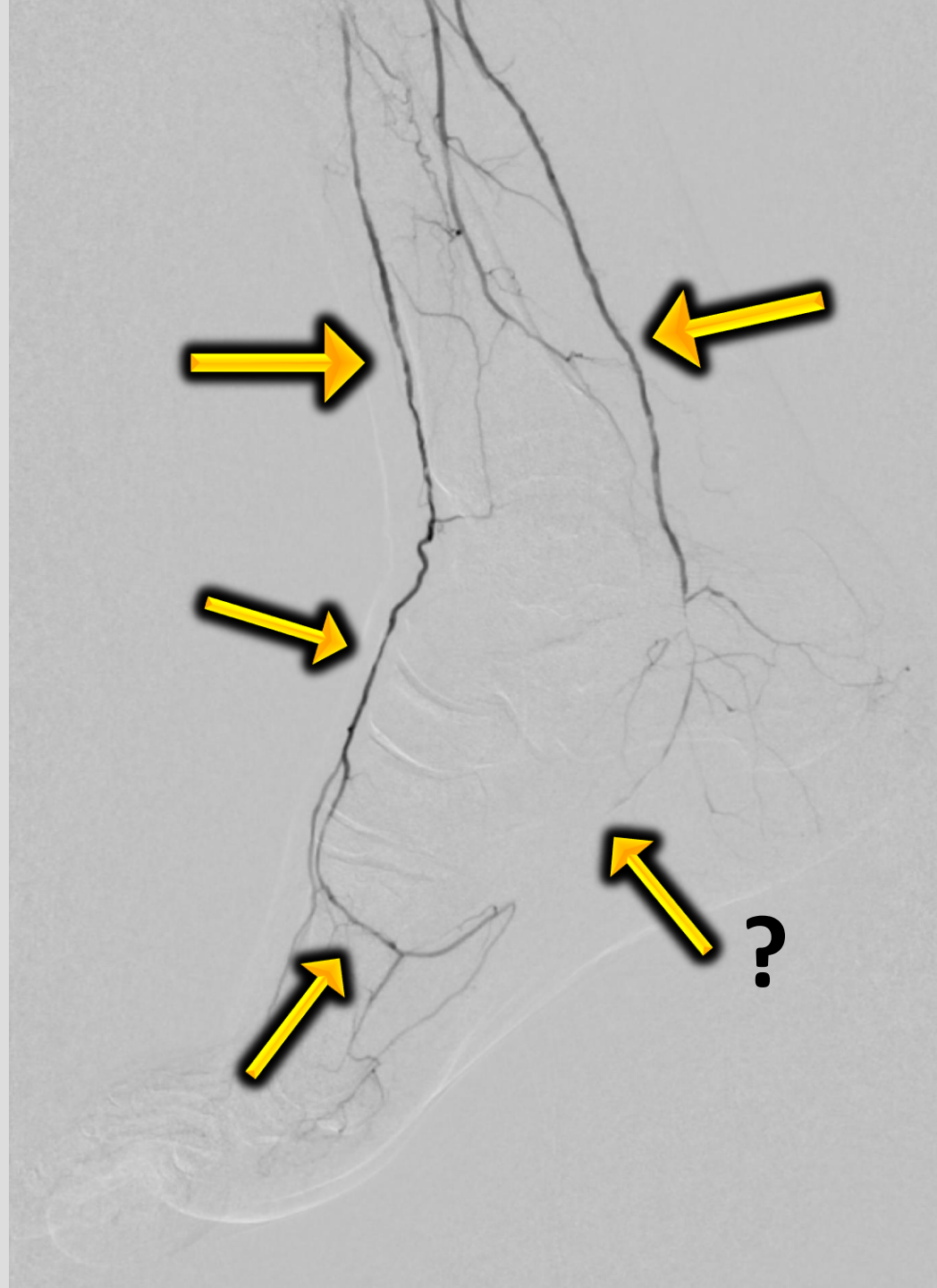
This is a lateral X-ray of a human foot, showing the skeletal structure. The foot appears to be in a slightly different position compared to the re-treatment image, possibly indicating a deformity or a specific condition. The text 'Dx PRE-TRATTAMENTO' is printed on the right side of the image.



what should
be treated



what should
not be treated



what was done



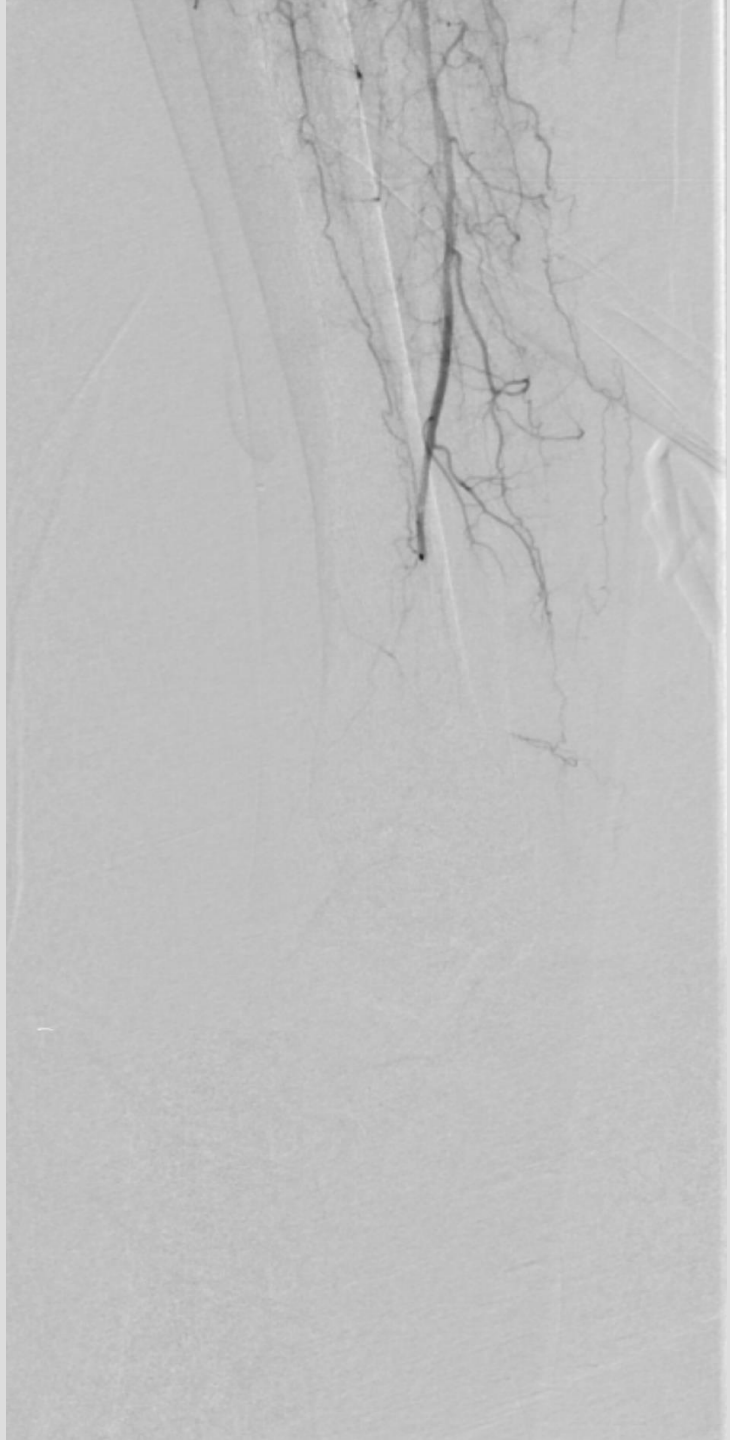
what was done



what was done



Final result



**4 days later in
my cathlab**



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Think a lot, do less and respect what is, more or less, functioning

Step-by-step approach in CTOs crossing strategy

❑ Antegrade approach

1. Endoluminal
2. Subintimal



Failure

❑ Retrograde puncture

❑ Transcollateral

1. Pedal-plantar loop technique
2. Peroneal artery branches PTA

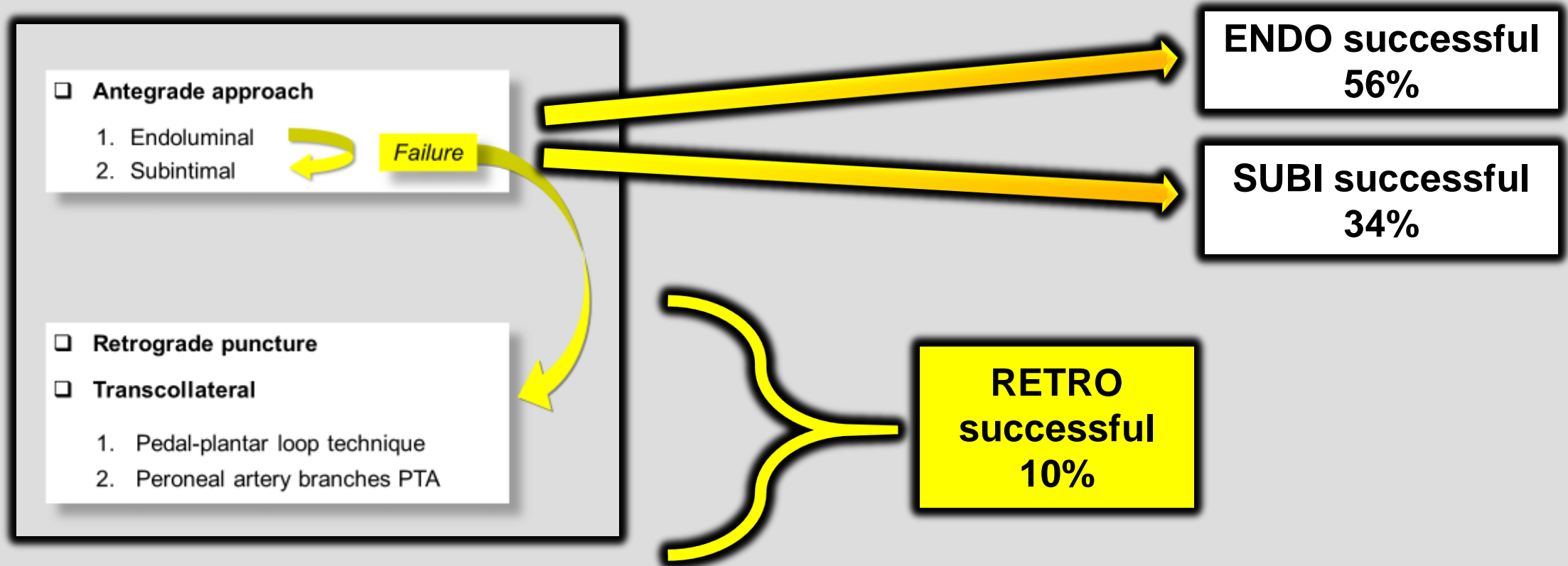


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Tips and tricks for a correct “endo approach”

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Step-by-step approach in CTOs crossing strategy



Wire ?

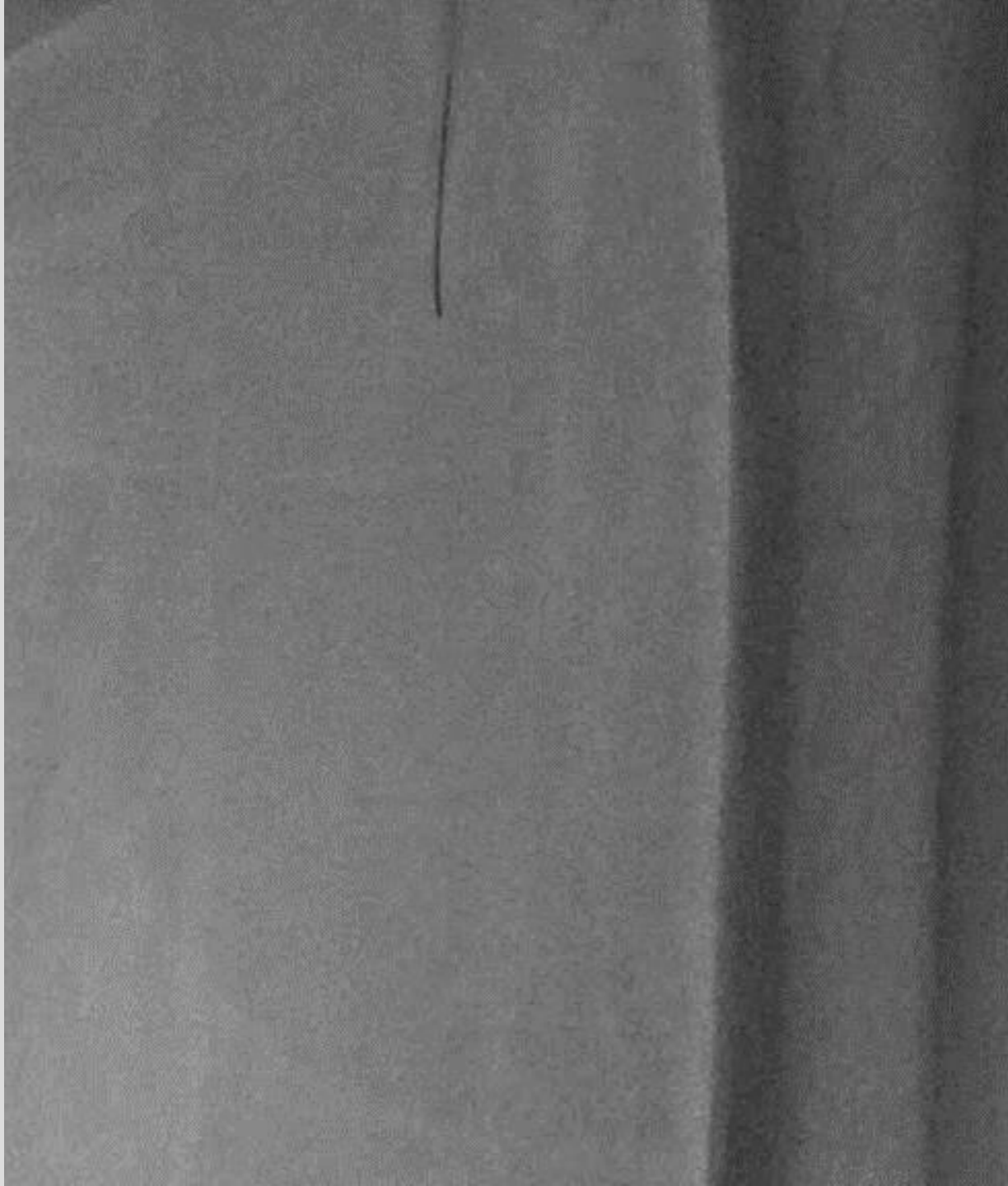


0.035" wire



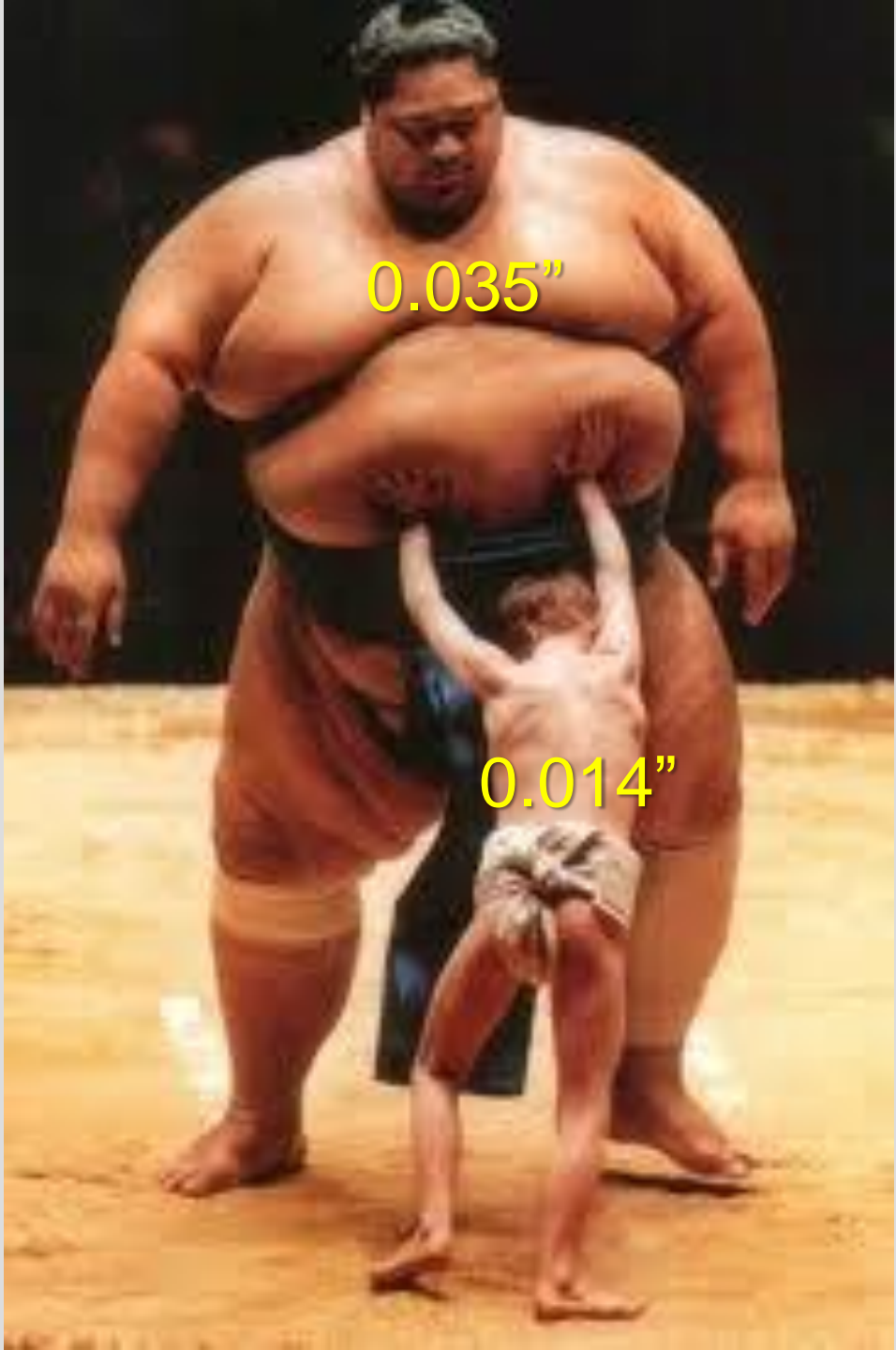
0.014" wire

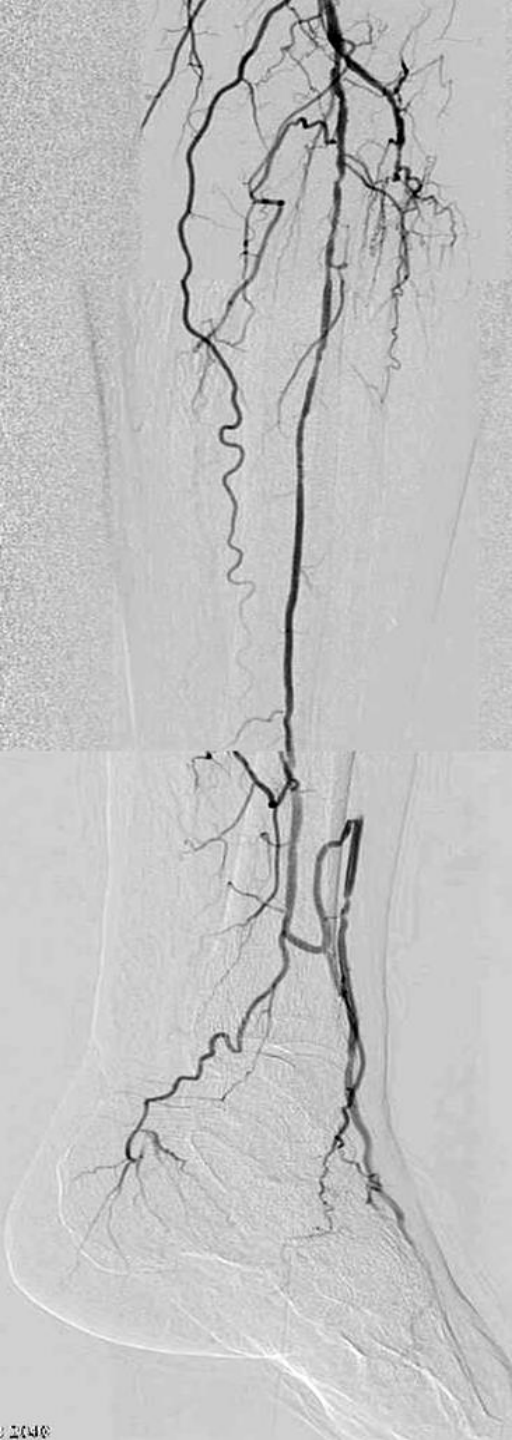






Wire ?









Hydrodynamic boost: a novel re-entry technique in subintimal angioplasty of below-the-knee vessels

Roberto Ferraresi¹ · Meneme Hamade² · Vito Gallicchio² · Nicola Troisi³ · Giovanni Mauri⁴

hydro

Mar 24 2014
18:58:44

(FIL 5)

Seq: 22
FRAME = 3 / 82
MASK = 2

096WL: 2048

HYDRO

Sep 19 2014
14:18:54

(FIL 5)

Sect 7
FRAME = 18 / 40
MASK = 2

4096WL 2048

HYDRO 01

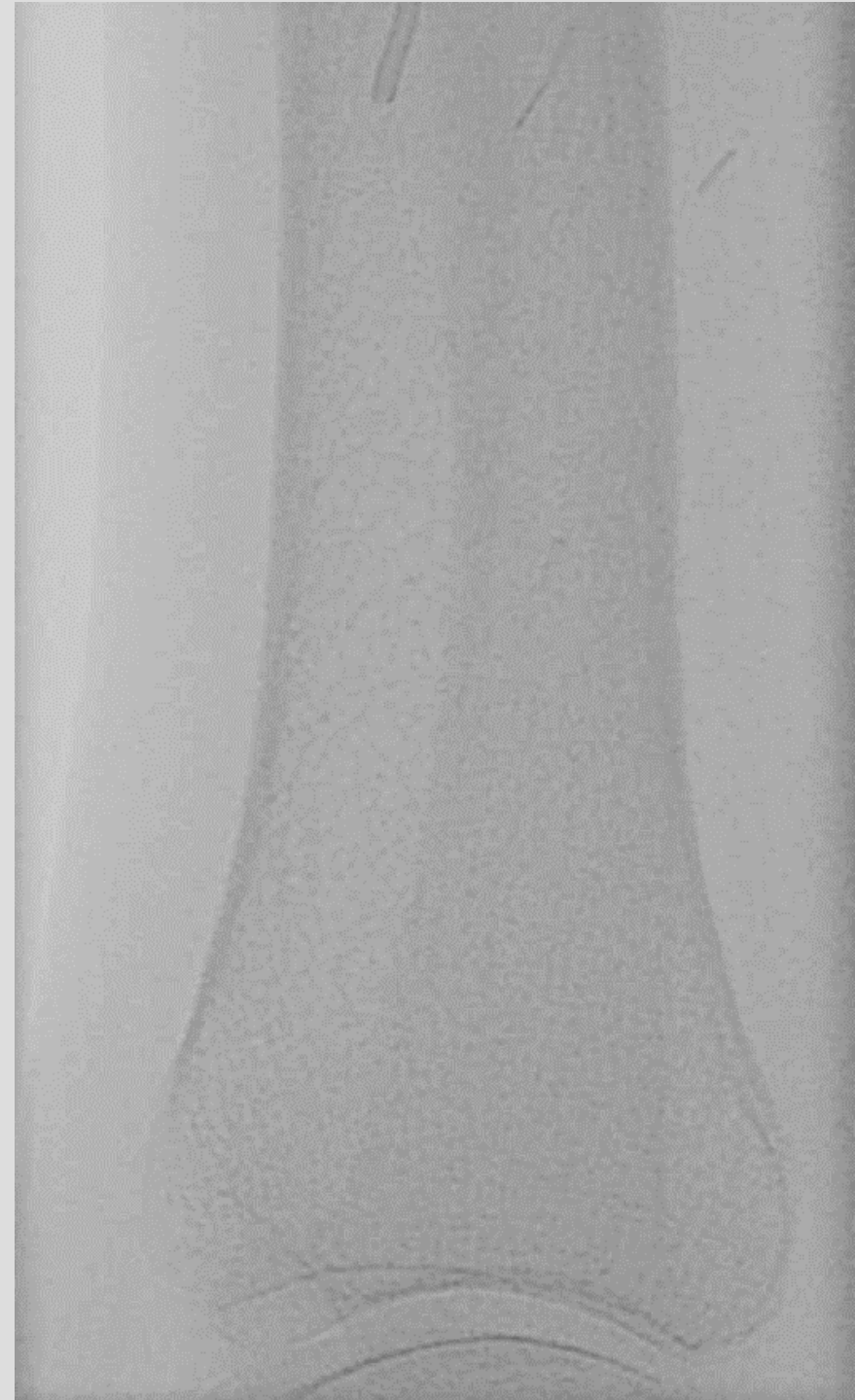
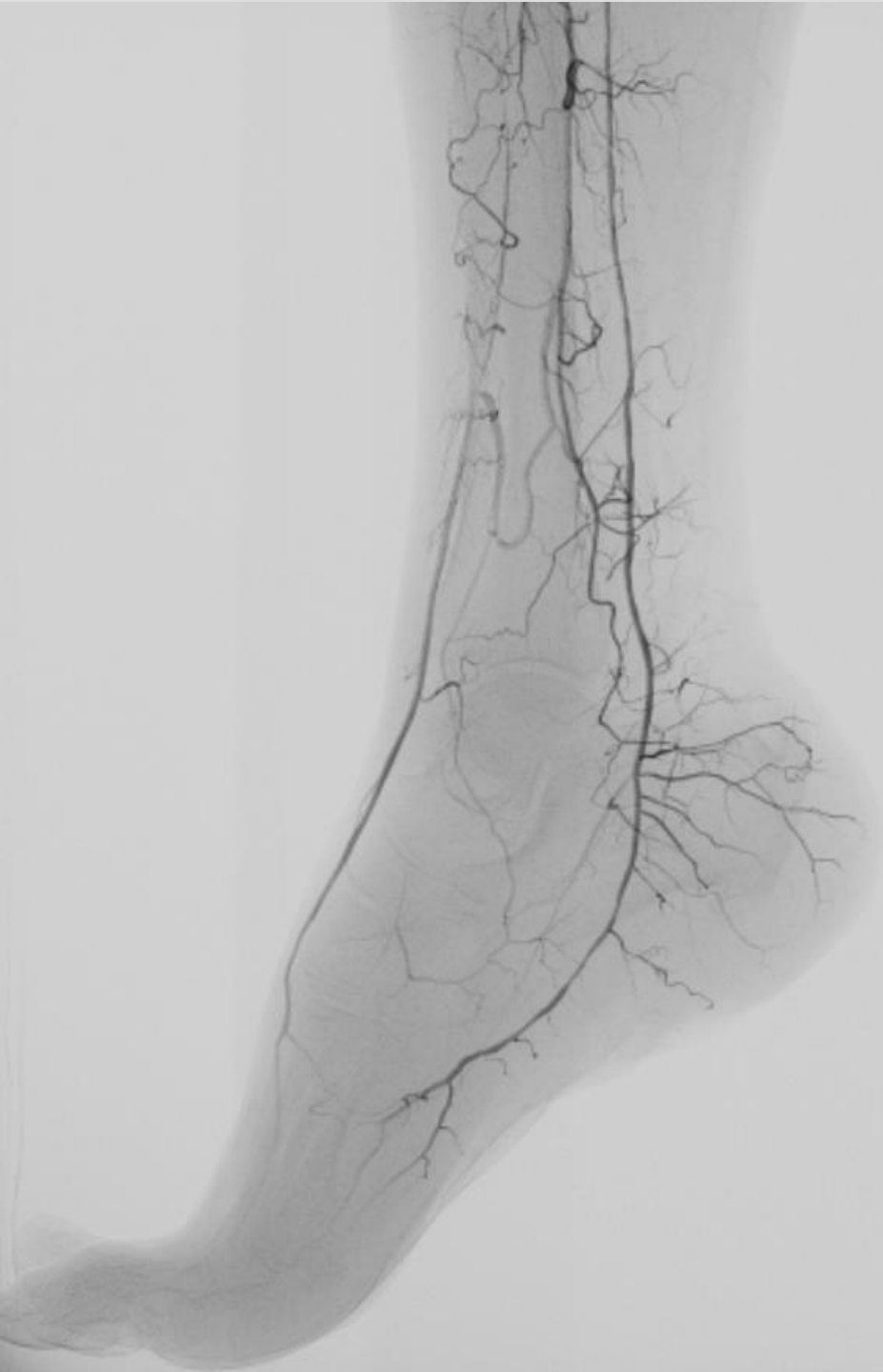
Feb 14 2014
09:42:48

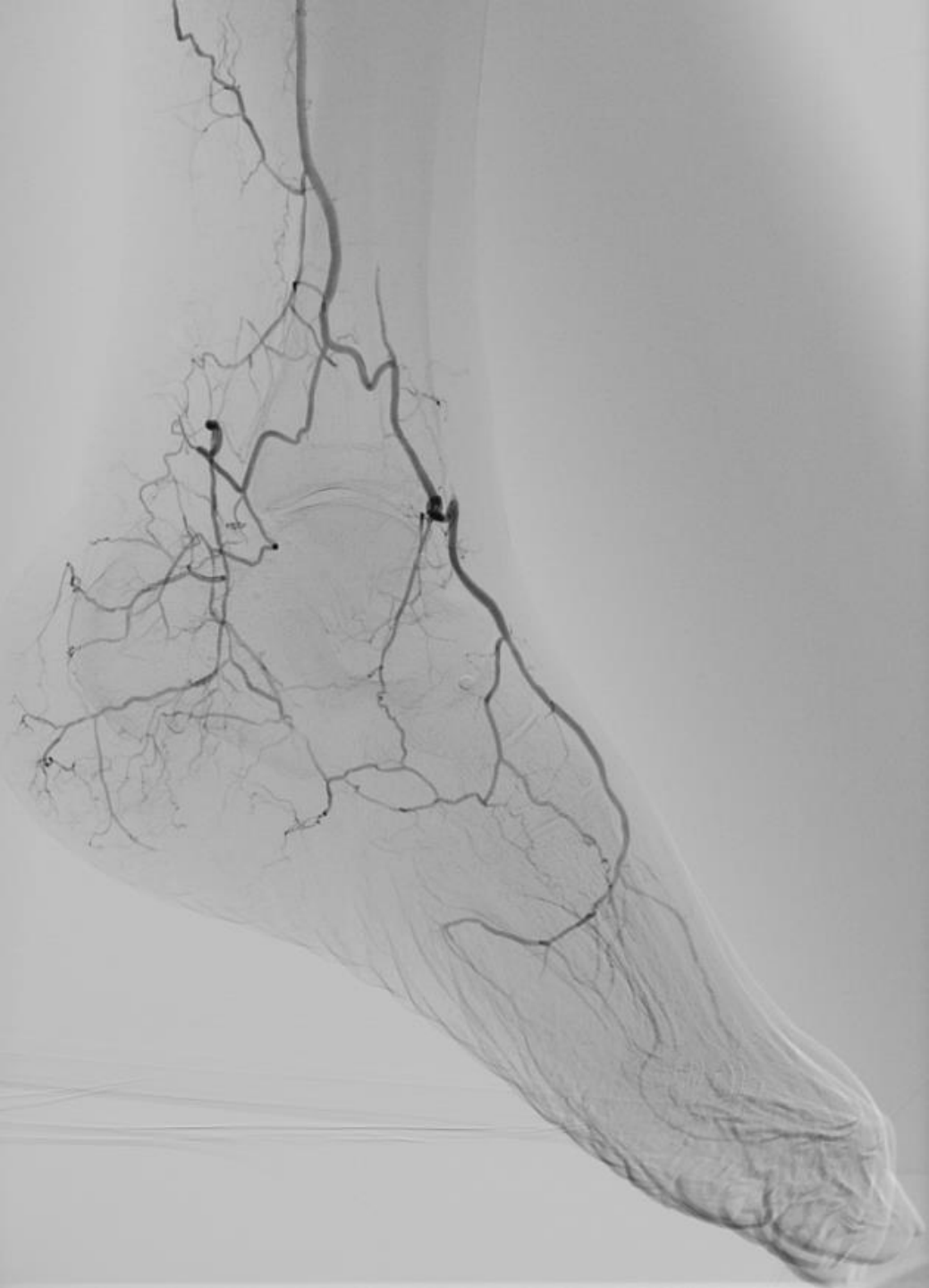
(Fit 5)

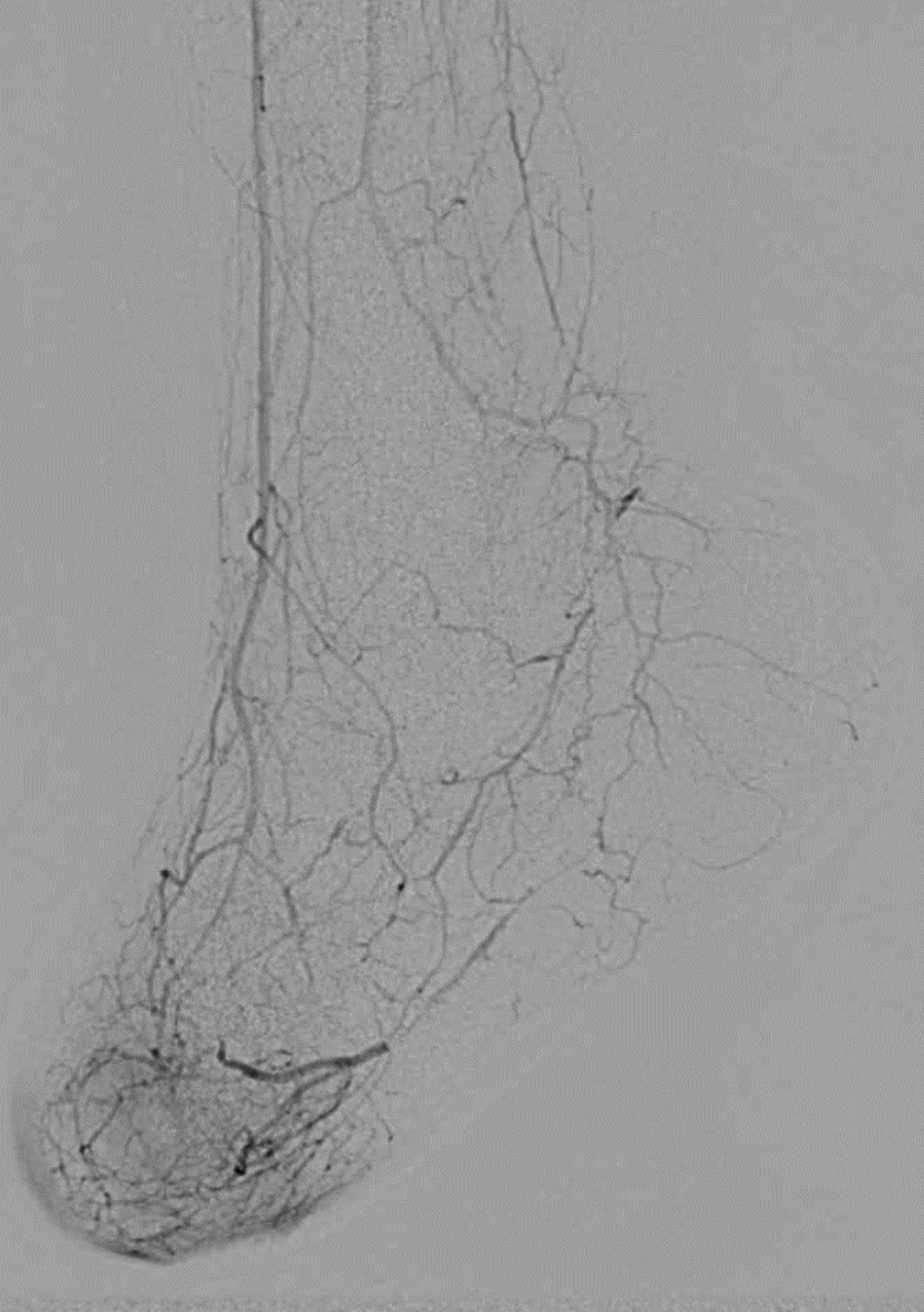
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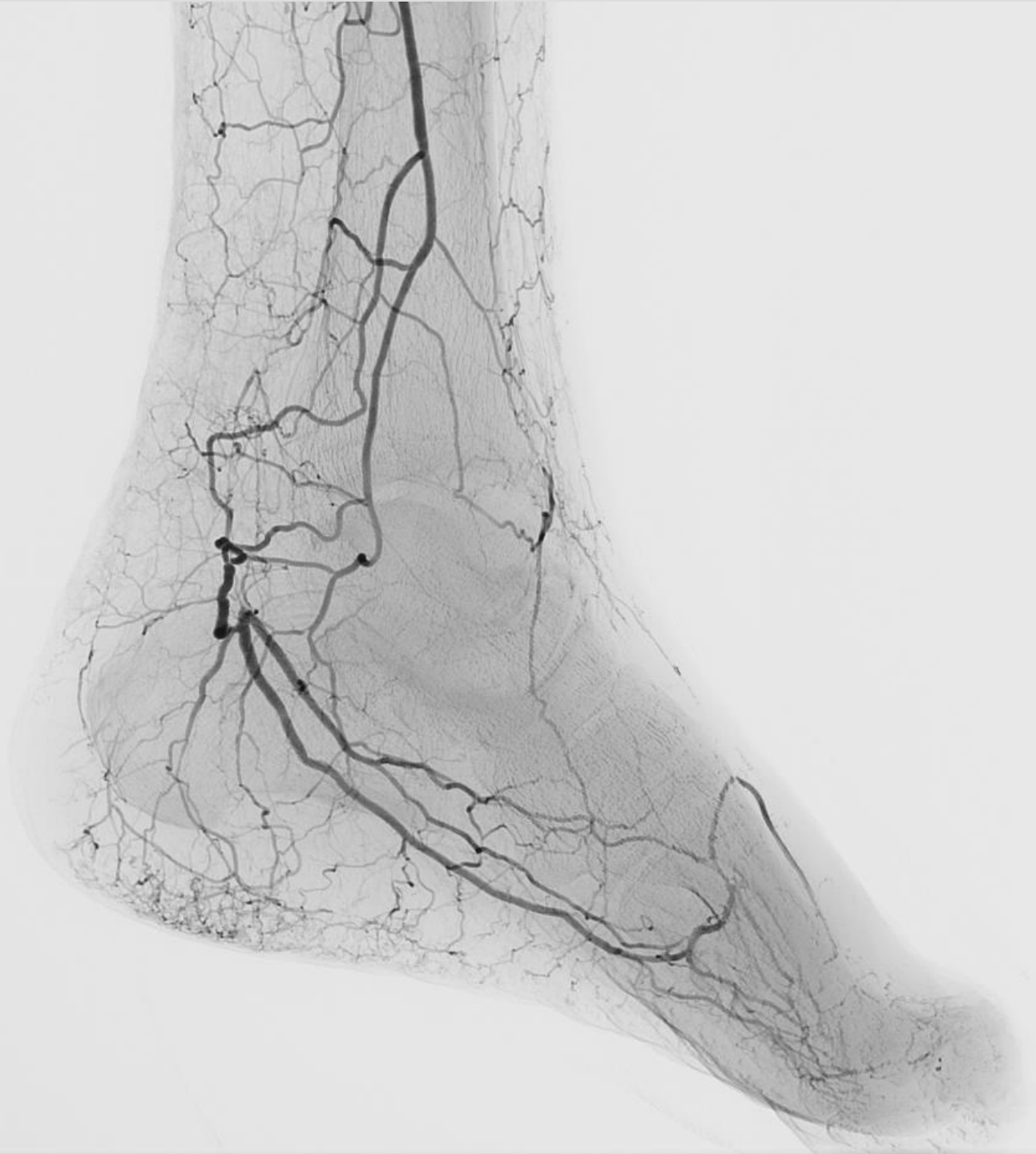
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❑ Antegrade approach

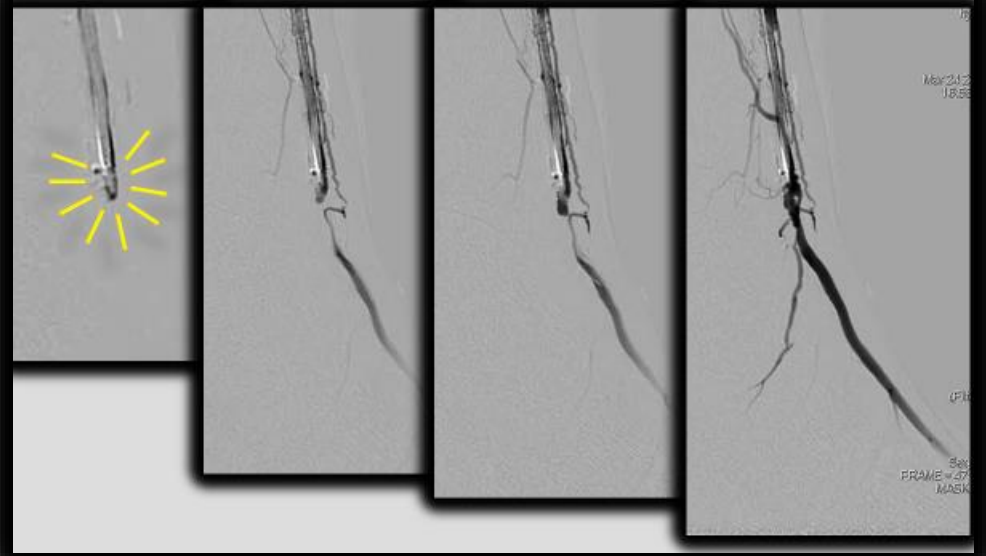
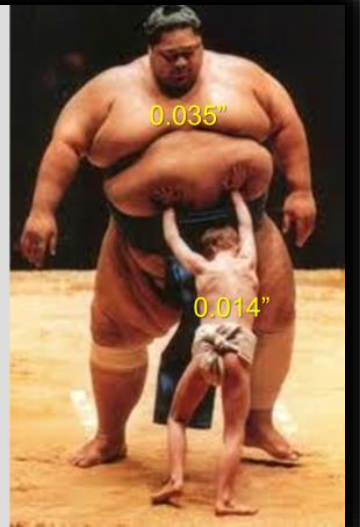
1. Endoluminal
2. Subintimal



❑ Retrograde puncture

❑ Transcollateral

1. Pedal-plantar loop technique
2. Peroneal artery branches PTA



Develop your unique technical strategy using every tool at your disposal with discipline and fantasy

BTK recanalization: the flamboyant Italian style

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3. Step-by-step approach in CTOs
4. Choose the proper size

Change your strategy "on the road", according to the patient's anatomy

ATA

PTA

Prox

3.3

± 0.71

2.9

± 0.54

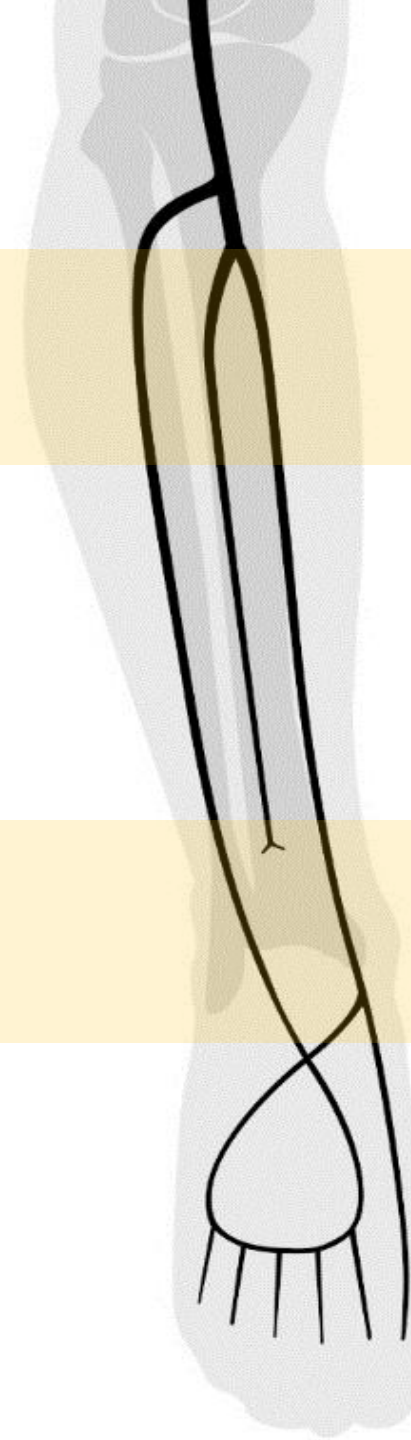
Dist

2.3

$\pm 0,61$

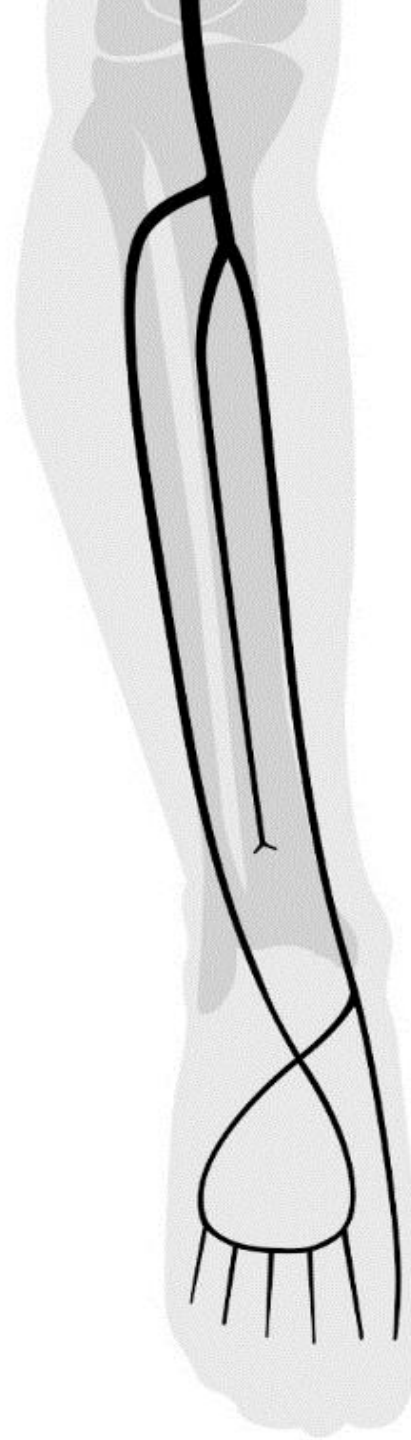
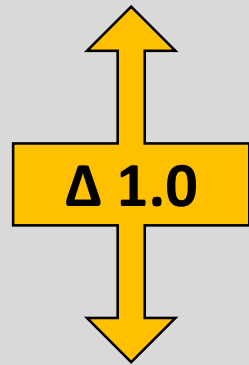
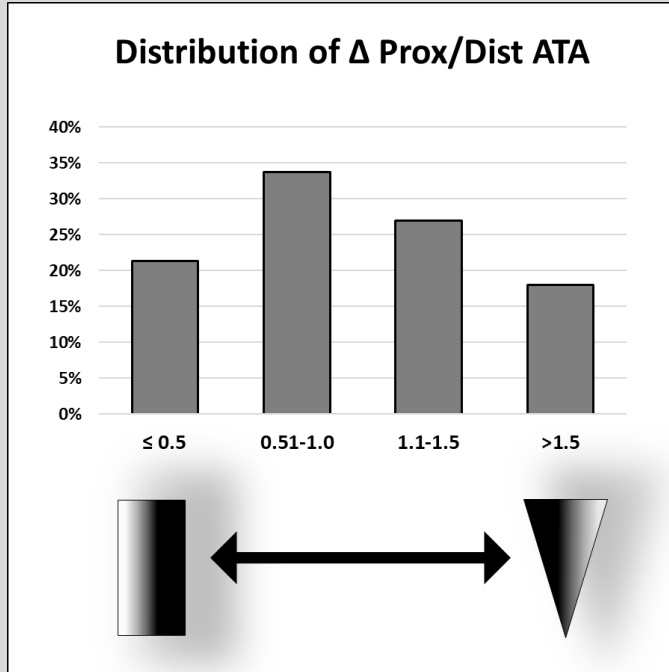
2.3

± 0.52

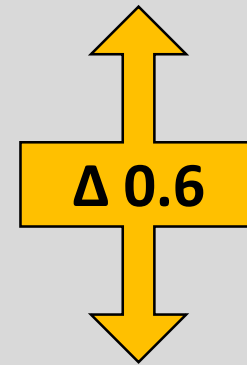
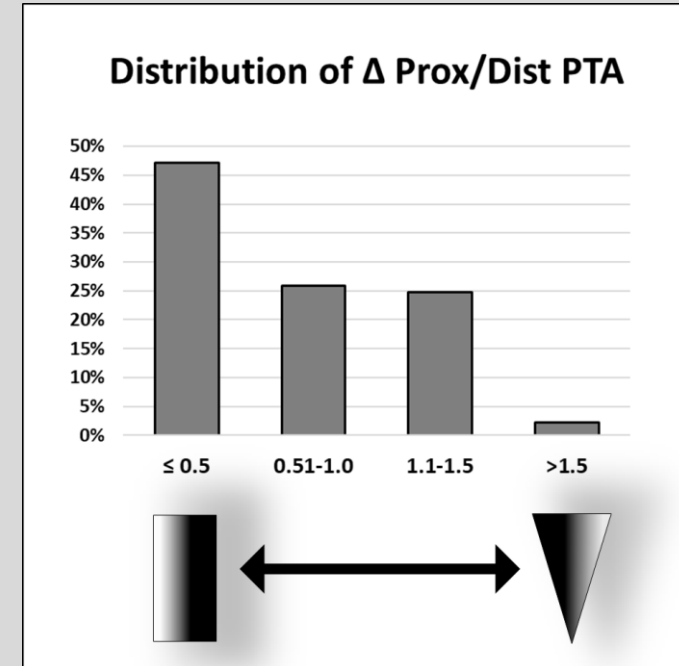


- Echo measure in 124 legs
- Mean diameter \pm SD mm

ATA



PTA



- Echo measure in 124 legs
- Mean diameter \pm SD mm

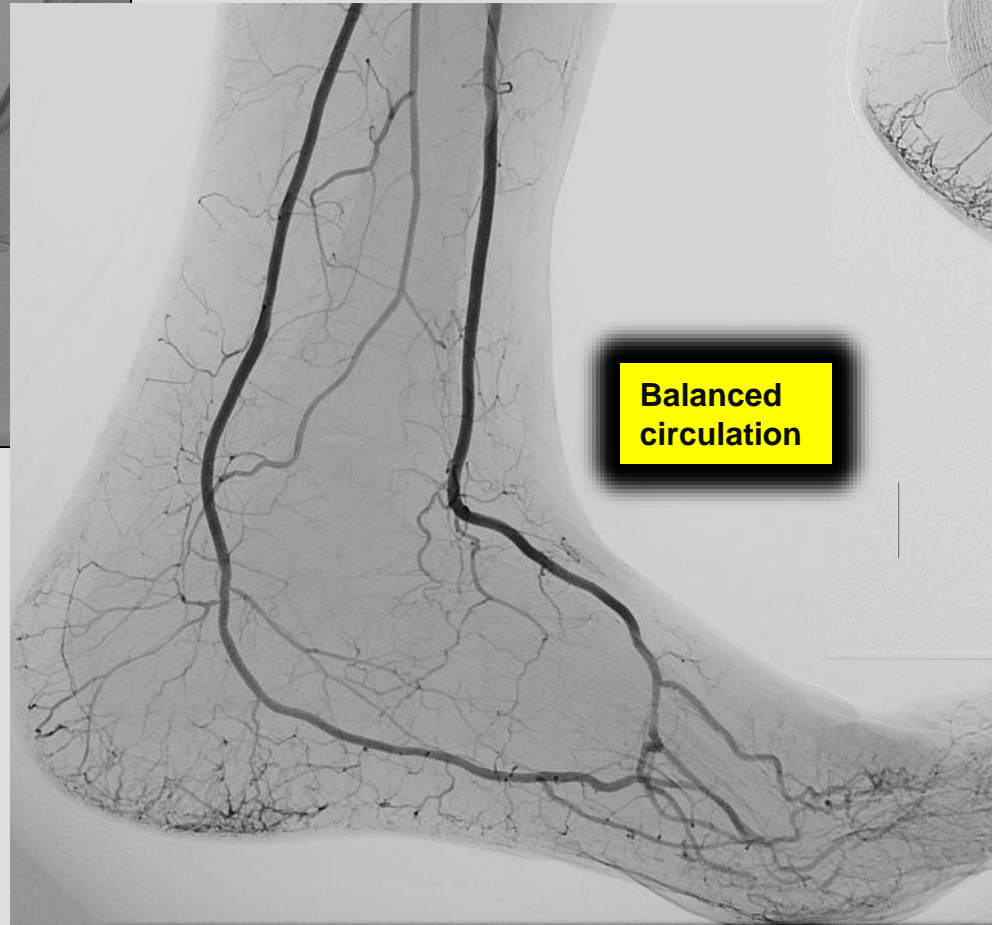
Dominant DPA



Dominant LPA



**Balanced
circulation**



PETER LANZER
EDITOR
PanVascular
Medicine
Second Edition

**Interventional Treatment of the
Below the Ankle Peripheral
Artery Disease**

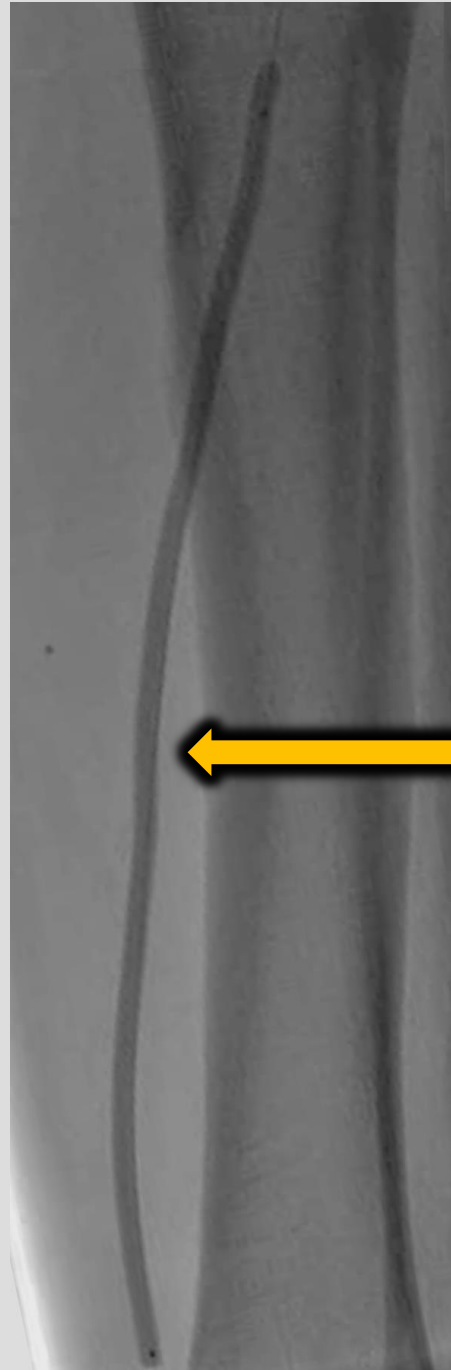
119

Roberto Ferraresi, Luis Mariano Palena, Giovanni Mauri, and
Marco Manzi

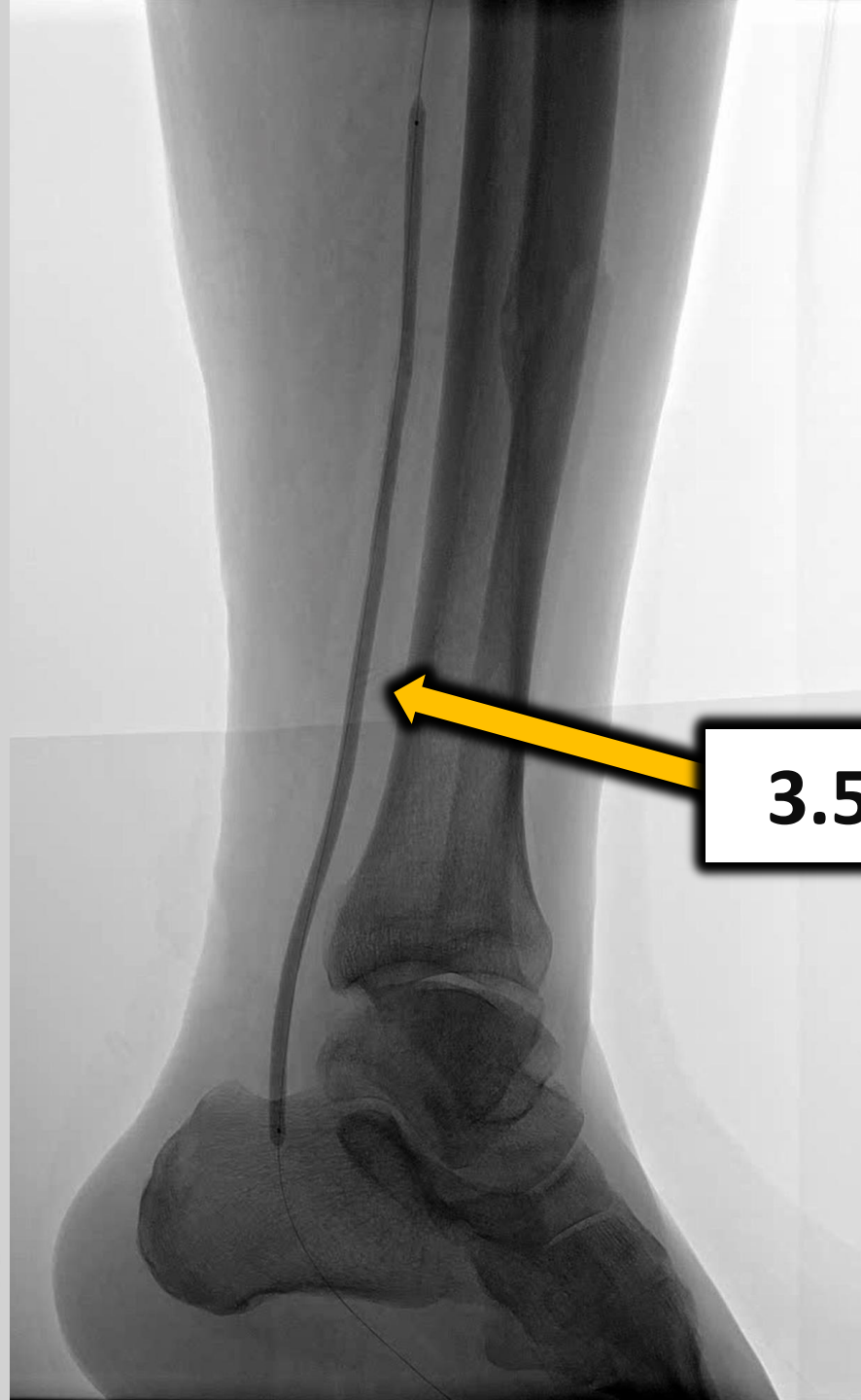
**Distal distribution pattern in 3150
studied legs**



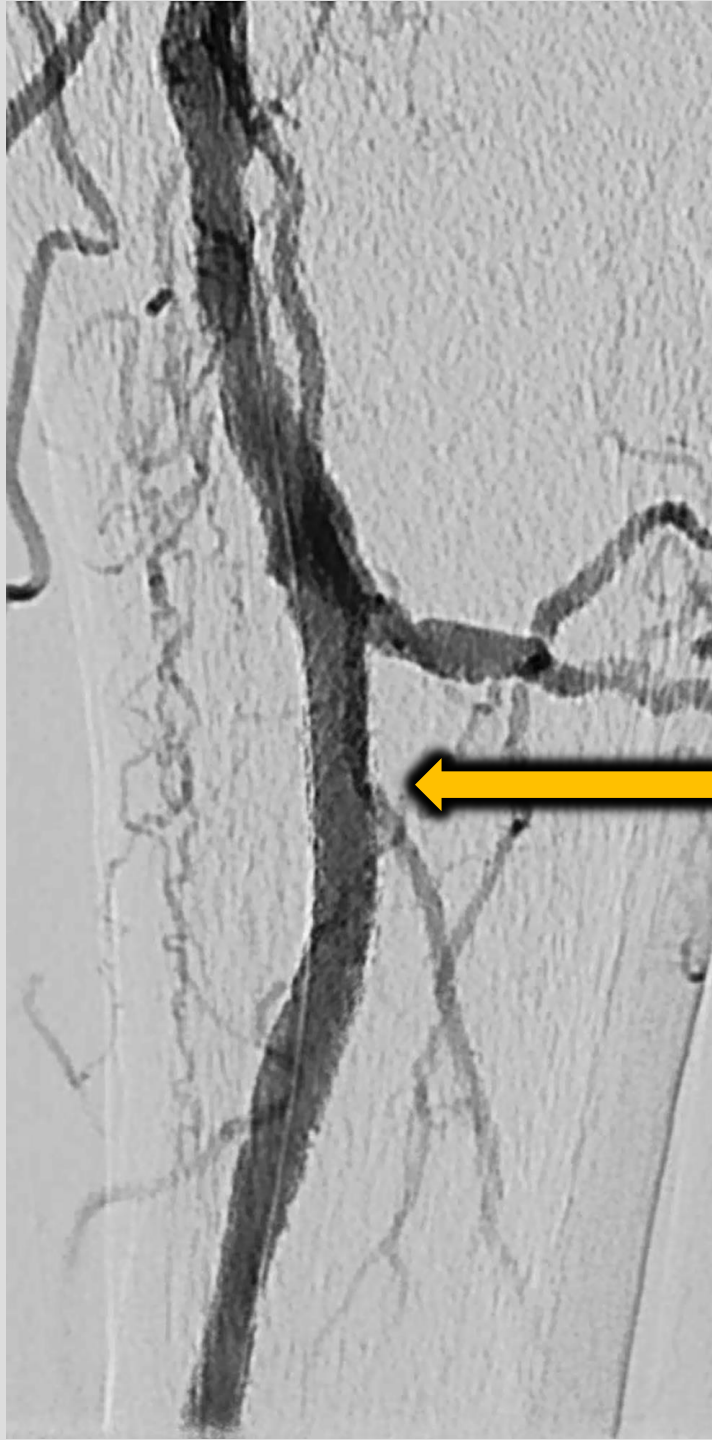
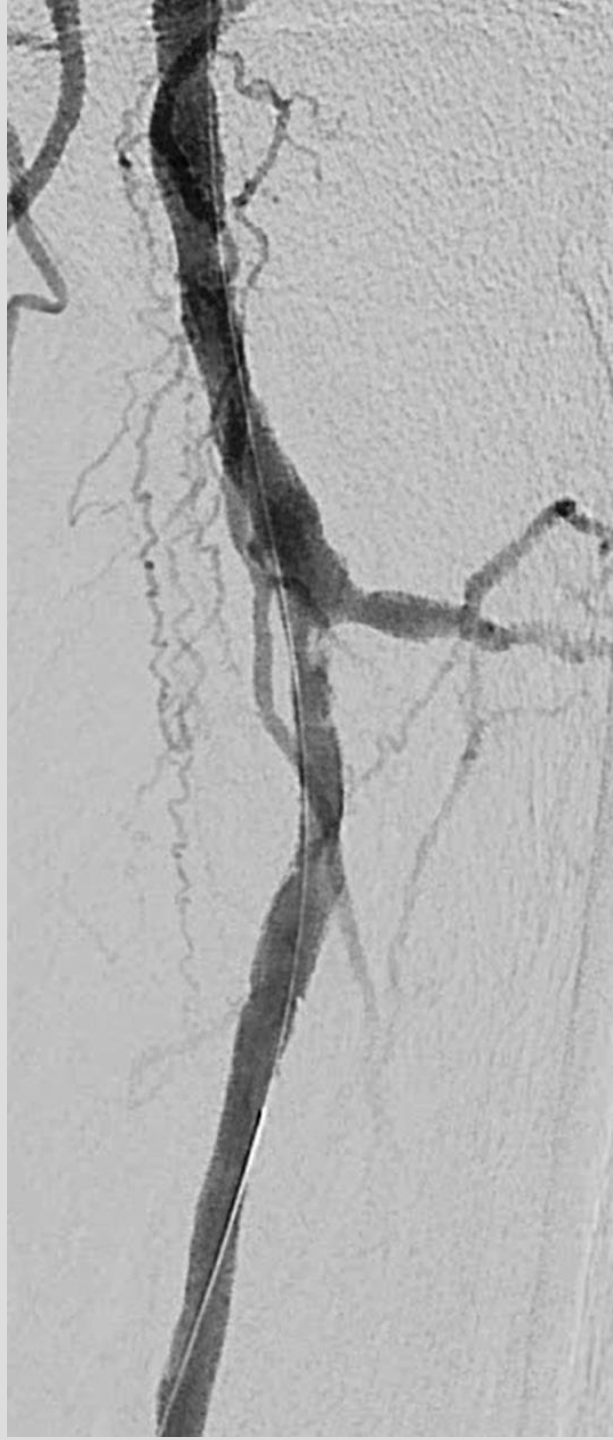




4.0 x 200 mm DCB 16 atm



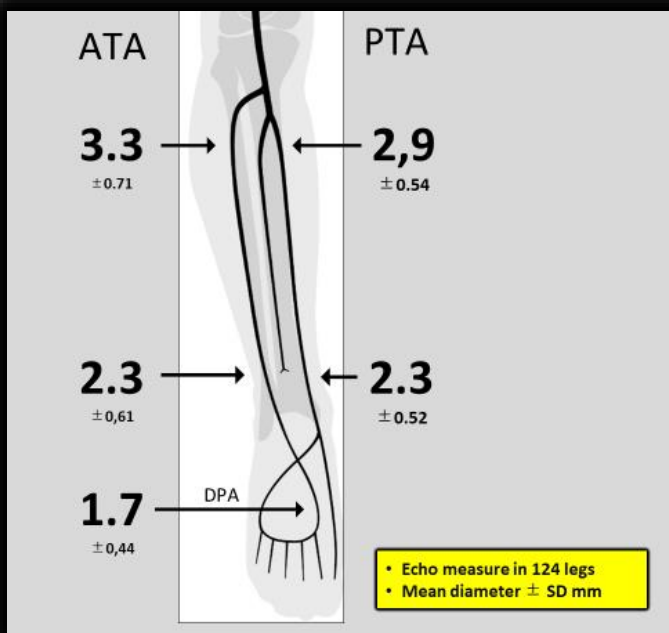
3.5 x 200 mm DCB 16 atm



4.0 x 24 mm DES 16 atm

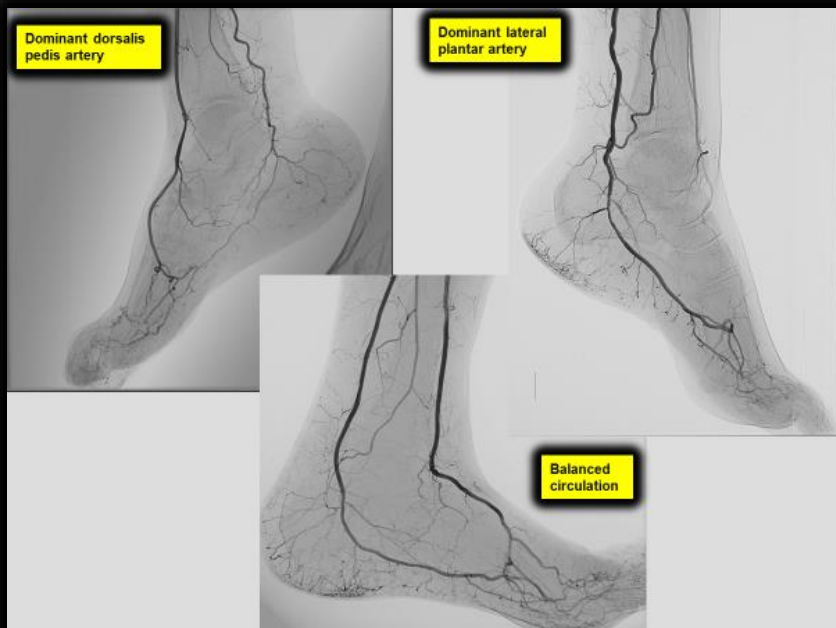






The mean prox diameter of tibial arteries is ≥ 3.0 mm

Tibial arteries are cylindrical or conical depending on the size of the outflow into foot vessels



Study	mRVD (mm)
2012 Achilles-DES	2,60
2009 Falkowski-BMS	2,69
2009 Falkowski-DES	2,69
2012 Xcell-Xpert	2,80
2010 Below-BMS	2,90
2010 Below-DES	2,90
2011 Rastan-BMS	3,00
2011 Yukon-BMS	3,00
2012 Destiny-BMS	3,00
2011 Rastan-DES	3,00
2011 Yukon-DES	3,00
2012 Destiny-DES	3,00
2007 Bosiers-MULTI-LINK Vision	3,10
2009 Deloose-Chromis Deep	3,10
2012 Werner-DES	3,20
2006 Scheinert-BMS	3,50
2006 Scheinert-DES	3,50
2018 Varcoe-BES	3,00
2018 TOBA-BTK-BMS	3,20

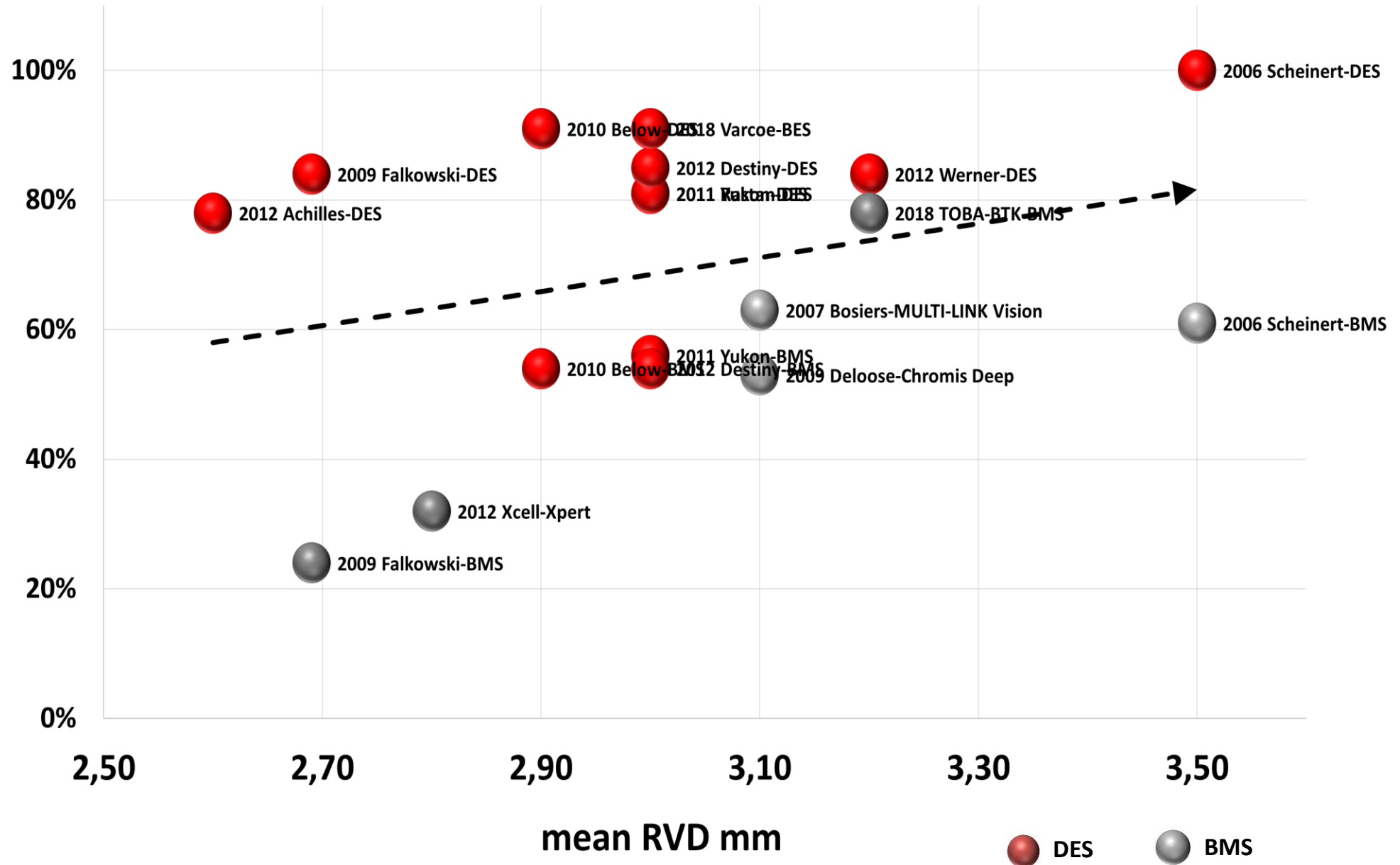


mRVD 3.01 mm
Δ 0.90 mm

BMS-SES-DES
BTK studies

PATENCY RATE IN BTK-STENTING

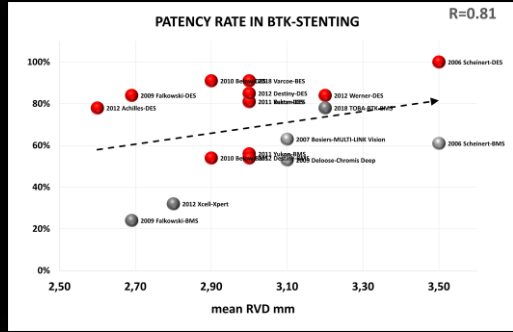
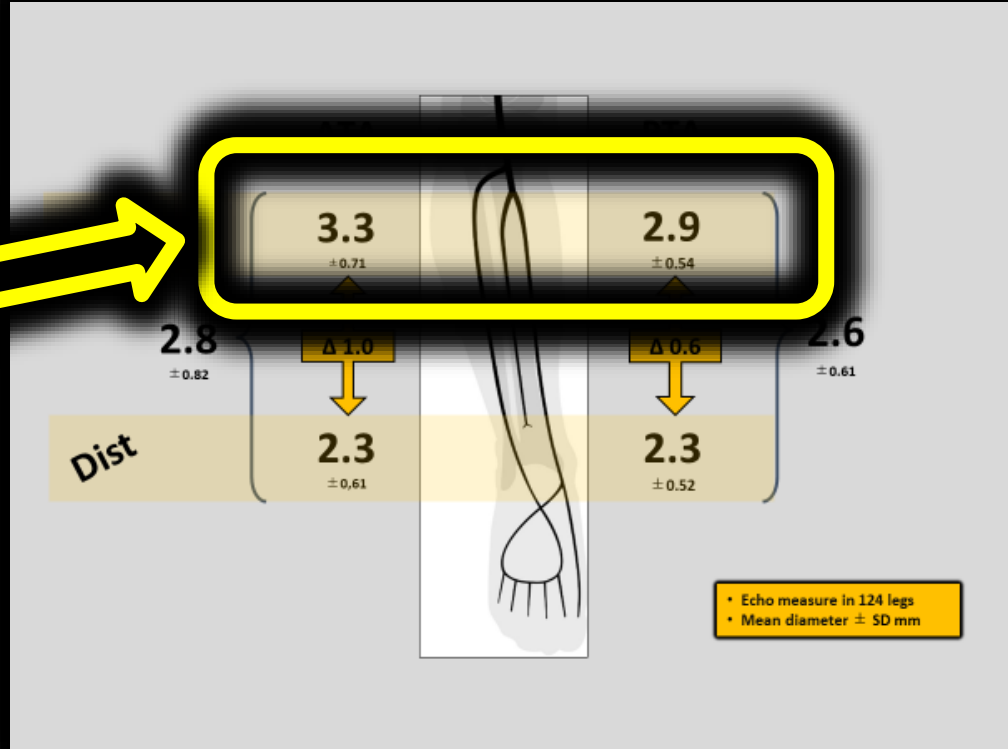
R=0.81



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**BMS-SES-DES
BTK studies**

**mRVD 3.01 mm
Δ 0.90 mm**



1. No agreement on sizing
2. The mRVD was realistic!
3. DES & bigger is better!

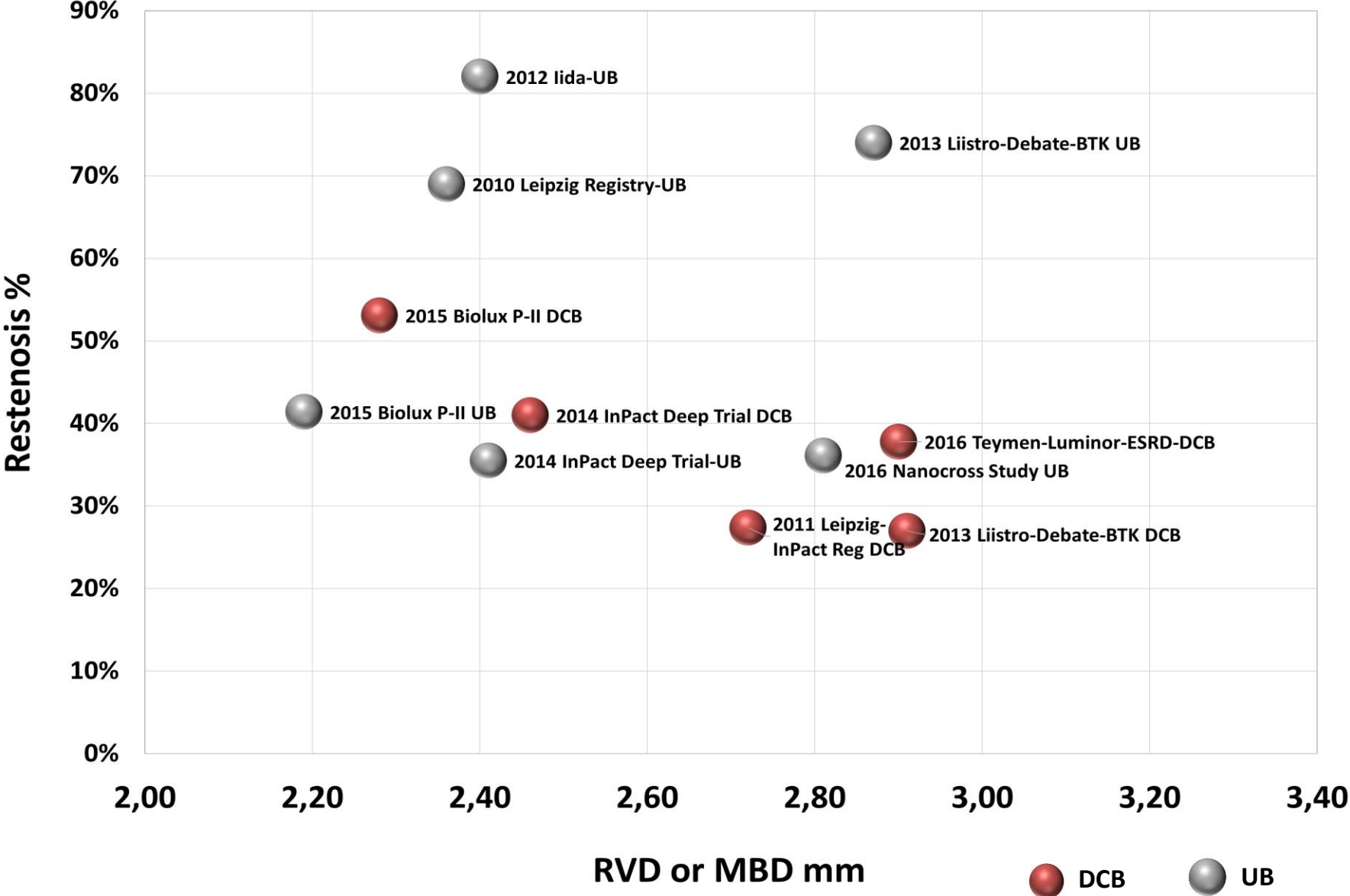
**UB-DCB POBA
BTK studies**

STUDY	mBD/mRVD mm
2015 Biolux P-II UB	2,19
2015 Biolux P-II DCB	2,28
2010 Leipzig Registry-UB	2,36
2012 Iida-UB	2,40
2014 InPact Deep Trial-UB	2,41
2014 InPact Deep Trial DCB	2,46
2018 Lutonix Registry DCB	2,70
2011 Leipzig-InPact Reg DCB	2,72
2016 Nanocross Study UB	2,81
2013 Liistro-Debate-BTK UB	2,87
2016 Teymen-Luminor-ESRD-DCB	2,90
2013 Liistro-Debate-BTK DCB	2,91

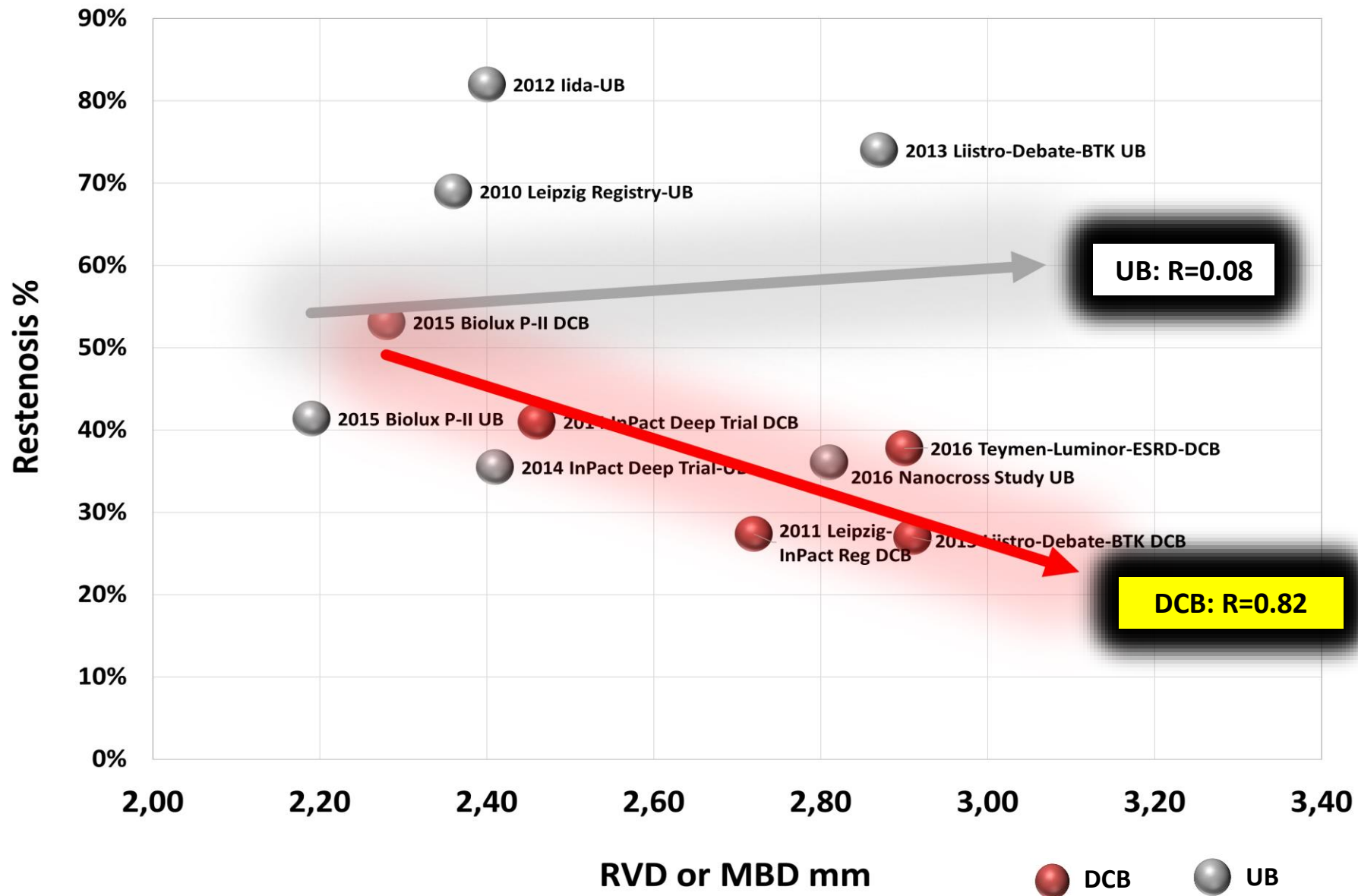


**2.58 mm
Δ 0.72 mm**

BTK-POBA: restenosis versus diameter



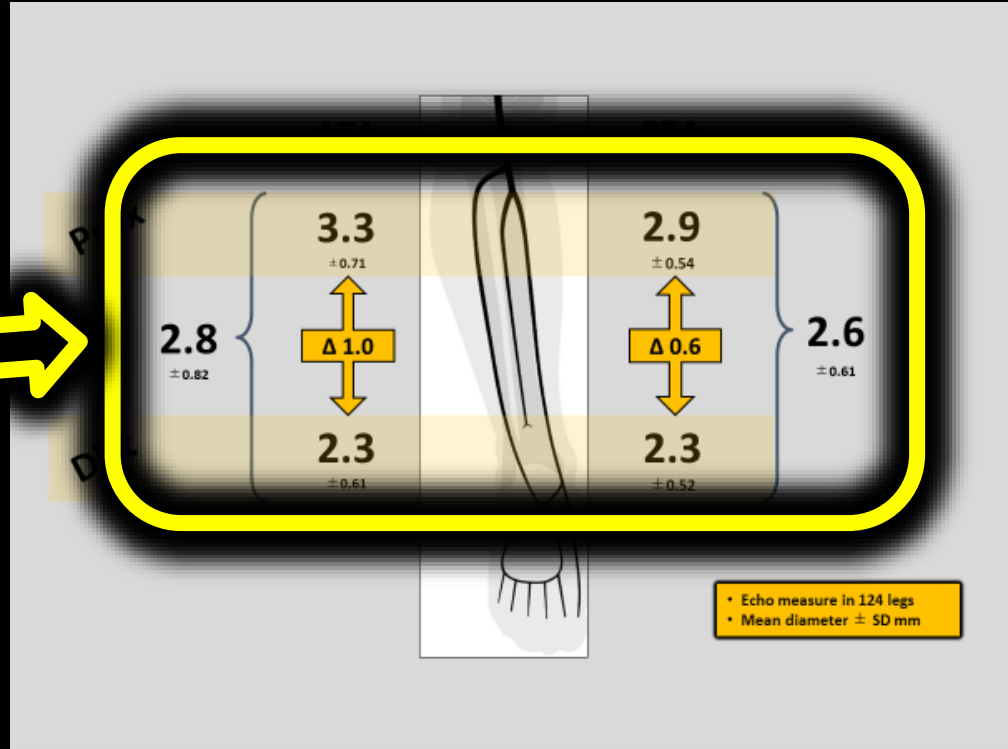
BTK-POBA: restenosis versus diameter



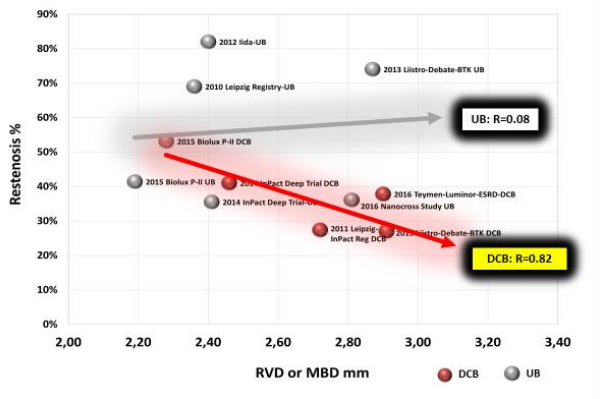
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2013 Llistro-Debate-BTK DCB	2,91

**2.58 mm
Δ 0.72 mm**



BTK-POBA: restenosis versus diameter



- Huge disagreement on sizing: in many BTK-POBA studies there is significant undersizing in comparison with ECHO measure and BTK stent studies**
- According to this rough analysis DCB restenosis rate is correlated with the proper vessel size balloon dilatation: if DCB is undersized it cannot function!**

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*The shorter line between two points is the straight line
(Euclid, mathematician)*

Think a lot, do less and respect what is, more or less, functioning

Change your strategy "on the road", according to the patient's anatomy

Measure is a key point in life! Use every BTK clue to size your treatment