



# SAINT 2013

Vivantes

## Unterschenkel – Mission impossible postponed?

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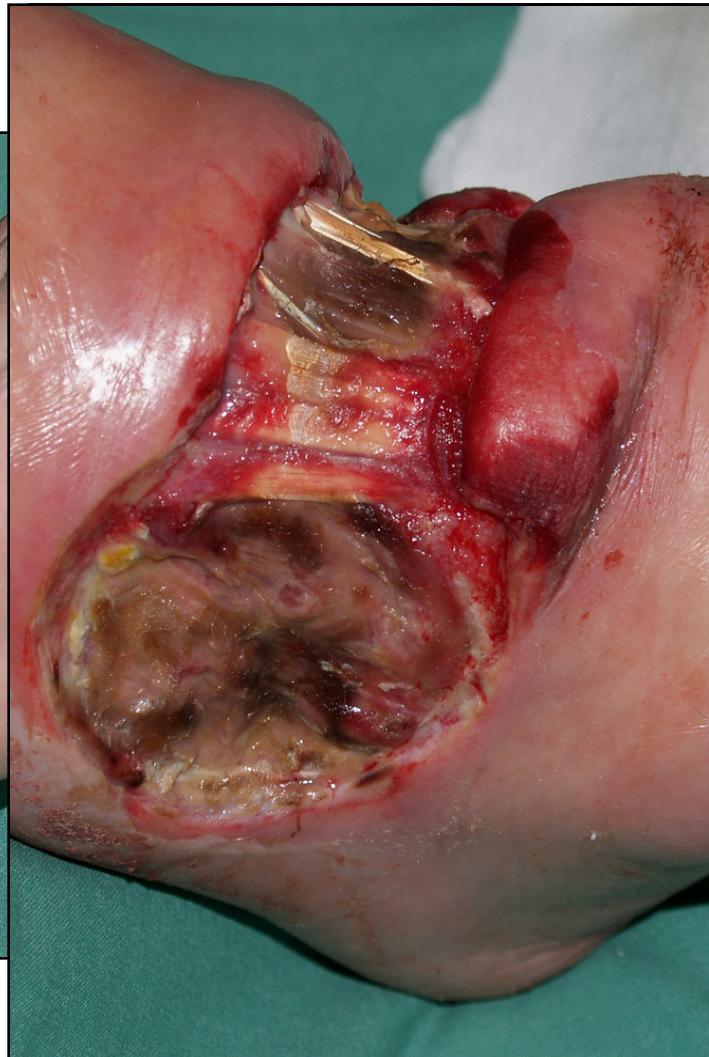
Klinika Am Urban, im Friedrichshain, Hellersdorf und Prenzlauer Berg, Berlin

## Mission impossible ?

- kleine Gefäße
- lange Verschlüsse
- Spasmus
- Dissektionen
- Kalzifikationen
- Diabetiker
- Niereninsuffiziente
- häufige Rezidivstenosen
- Bypass etabliertes gefäßchir. Verfahren

# Unterschenkel – Mission impossible postponed ?

Worum geht es bei der Unterschenkelrevaskularisation?



## Indikationen

- Stadium II b ?
- Stadium III
- Stadium IV !
- Diabetiker !!!
- Niereninsuffiziente !!!

## Therapieprinzipien

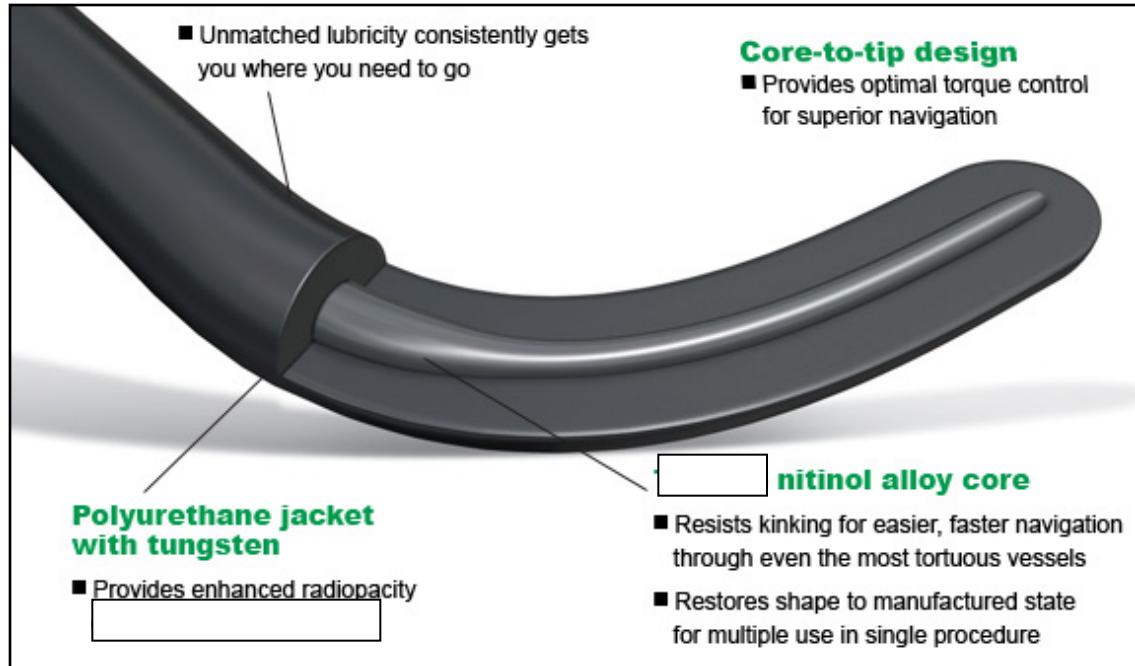
- Zugang
- Rekanalisation
- Ballondilatation
- ggf. Stentinsertion
- Medikation

## Therapieprinzipien

- Zugang
  - ✓ antegrad ipsilateral
  - ✓ contralateral – cross over
  - ✓ transpedal

## Therapieprinzipien

### ➤ Rekanalisation: Draht und Katheter



## Therapieprinzipien

### ➤ Rekanalisation

- ✓ Führungsdraht
  - hydrophile Beschichtung
  - 0,035, 0,018 oder 0,014 inch
  - ausreichend steifer Schaft
- ✓ Katheter
  - 4 oder 5 F
  - Berenstein/Vertebralisis-Konfiguration
  - drahtverstärkter Schaft

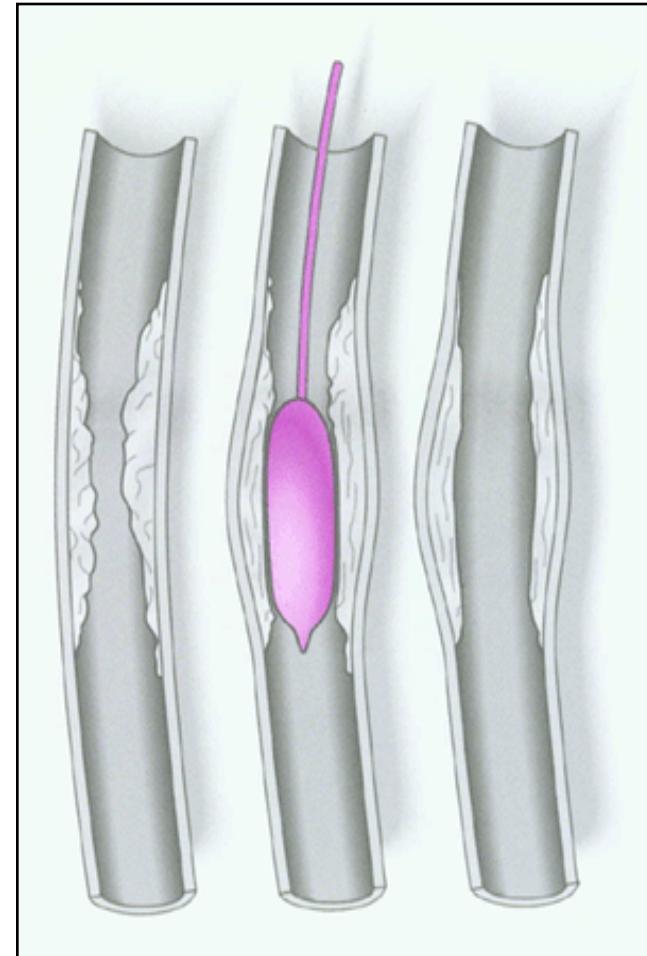
## Therapieprinzipien

### ➤ Rekanalisation

- ✓ intentionelle subintimale Rekanalisation
  - J-hydrophiler Draht
  - Berenstein-Katheter

## Therapieprinzipien

- Ballonangioplastie

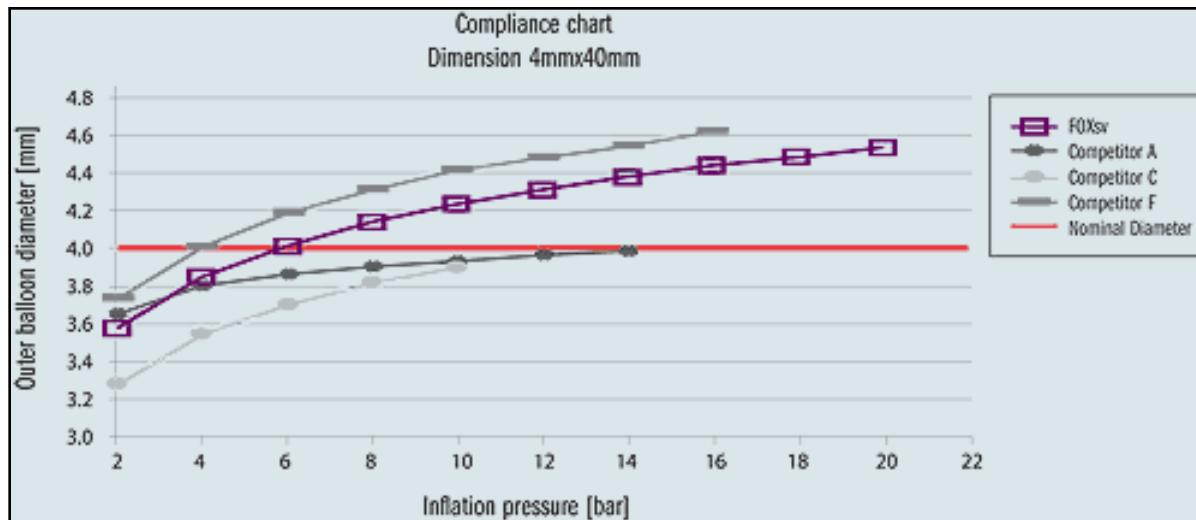


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## Therapieprinzipien

### ➤ Ballonangioplastie

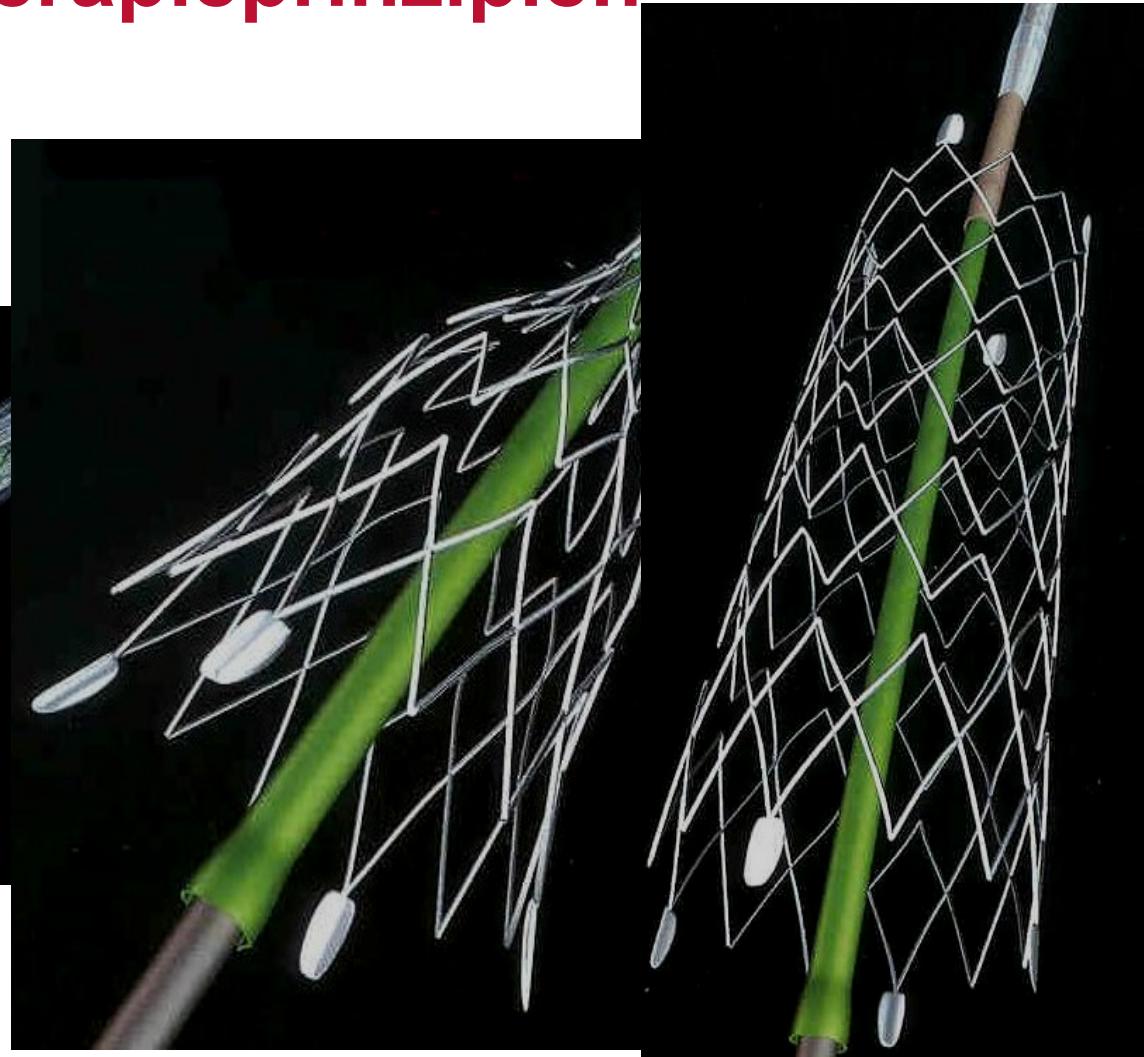
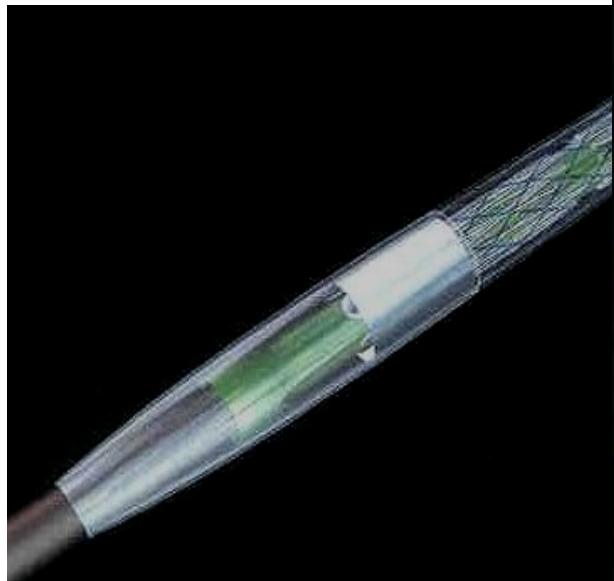
- ✓ 4 F Schaft (oder kleiner)
- ✓ 2,0 – 4,0 mm Ballondurchmesser
- ✓ 2 - 20 cm Ballonlänge
- ✓ OTW oder rapid exchange



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## Therapieprinzipien

### ➤ Stentinsertion



## Therapieprinzipien

### ➤ Medikation

- ✓ ASS 100 mg/d
- ✓ Heparin 5000 I.E. i.a. / 100 I.E./kg KG
- ✓ Calciumkanalblocker (Nifedipin 10 mg s.l.)
- ✓ Prostanoide (10 µg PGE<sub>1</sub> i.a.)
- ✓ Clopidogrel ?
- ✓ GP IIb/IIIa-Blocker ?
- ✓ Antikoagulation danach ?

## Indikationen

- morphologische Stratifikation ?

- ‘A’ lesions:
  - represent those which yield excellent results from, and should be treated by, endovascular means;
- ‘B’ lesions:
  - offer sufficiently good results with endovascular methods that this approach is still **preferred first**, unless an open revascularization is required for other associated lesions in the same anatomic area;
- ‘C’ lesions:
  - produce superior enough long-term results with open revascularization that endovascular methods should be used only in patients at high risk for open repair; and
- ‘D’ lesions:
  - do not yield good enough results with endovascular methods to justify them as primary treatment. Finally it must be understood that most PAD requiring intervention is characterized by more than one lesion, at more than one level, so these schemes are limited by the necessity to focus on individual lesions."

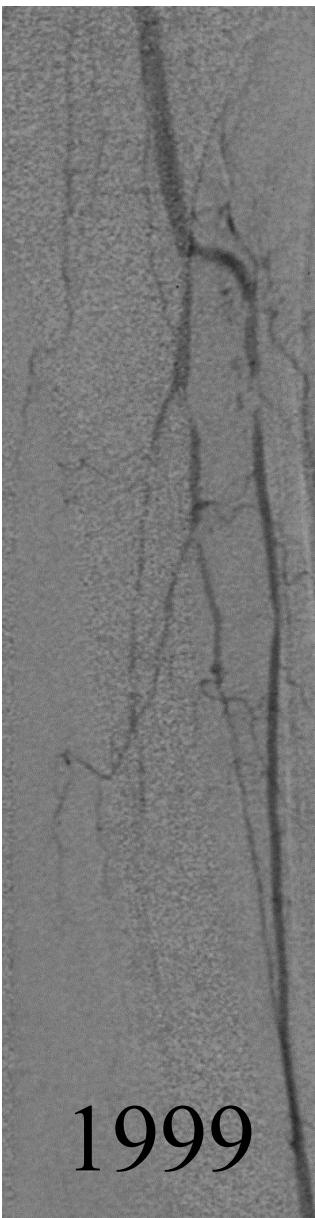
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## TASC 2000

- A – Läsion
  - ✓ fokale Stenose < 1 cm

# Ballonangioplastie infragenual



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## TASC 2000

- B – Läsion
- ✓ multiple Stenosen jeweils < 1 cm

# Ballonangioplastie infragenual



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## TASC 2000

- C – Läsion
- ✓ Stenosen 1 - 4 cm
- ✓ Okklusionen 1 – 2 cm

# Ballonangioplastie infragenual

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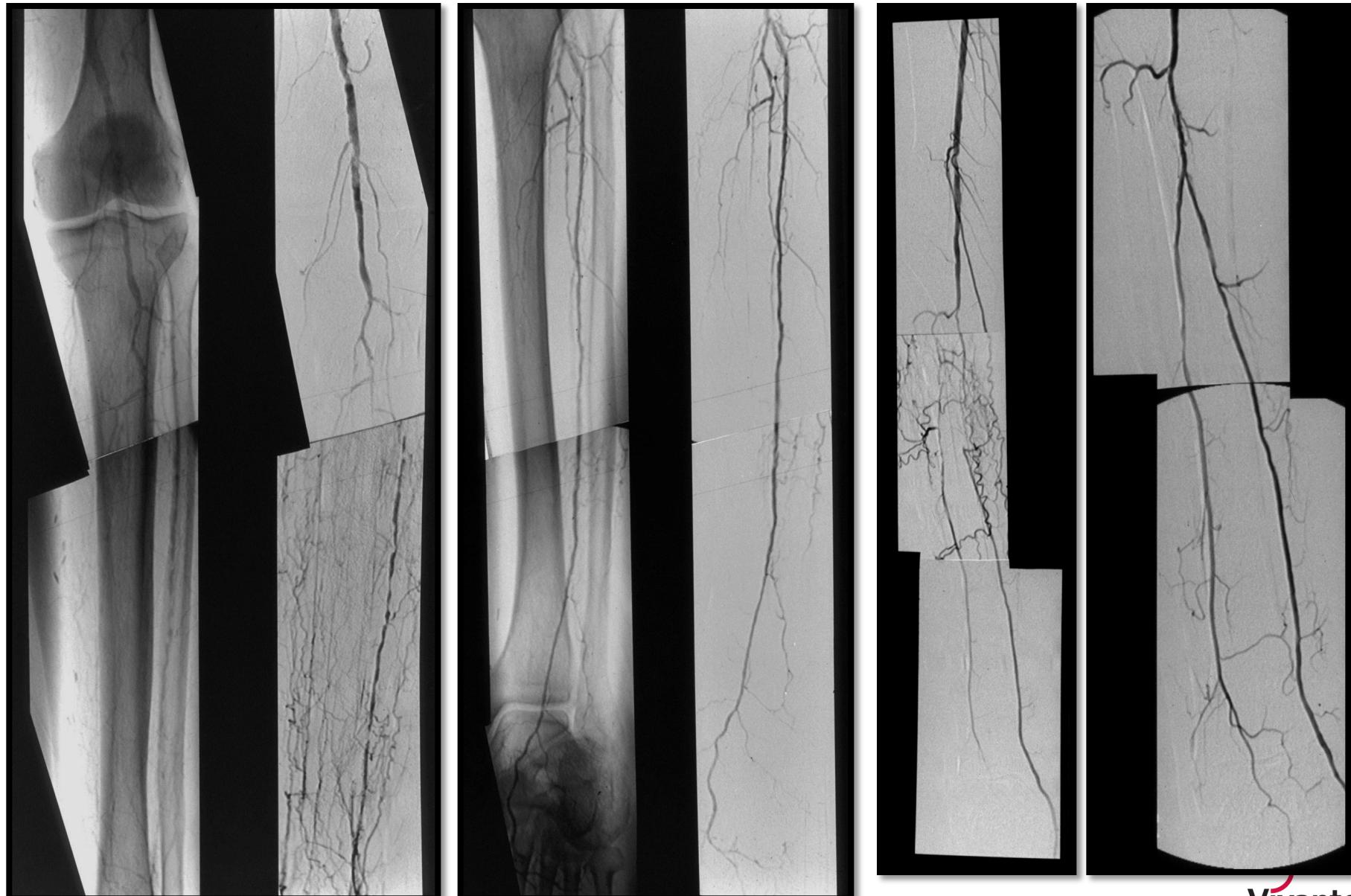
# Unterschenkel – Mission impossible postponed ?

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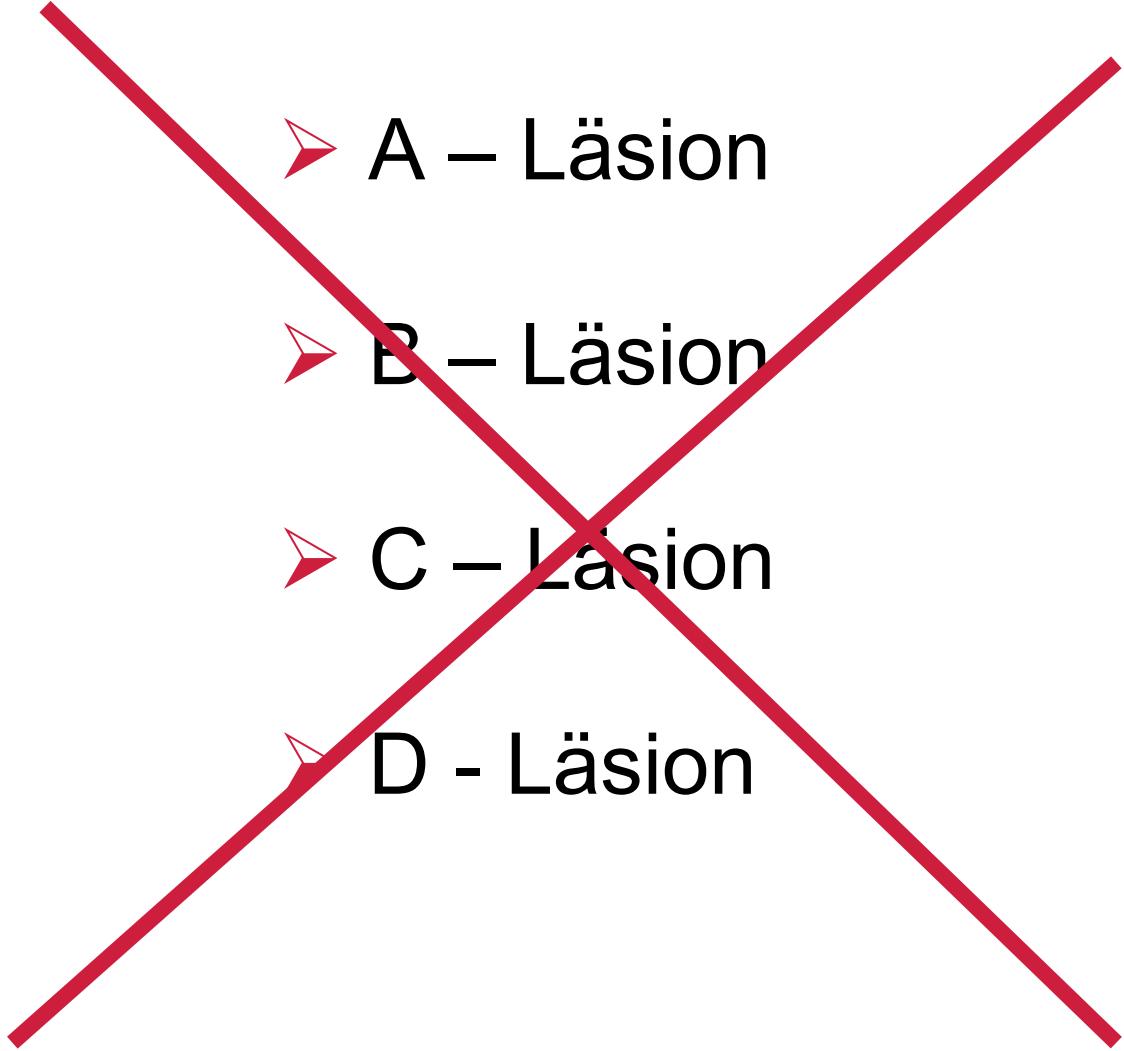
## TASC 2000

- D – Läsion
- ✓ Stenosen > 4 cm
- ✓ Verschlüsse > 2 cm

# Ballonangioplastie infragenual



## TASC 2007

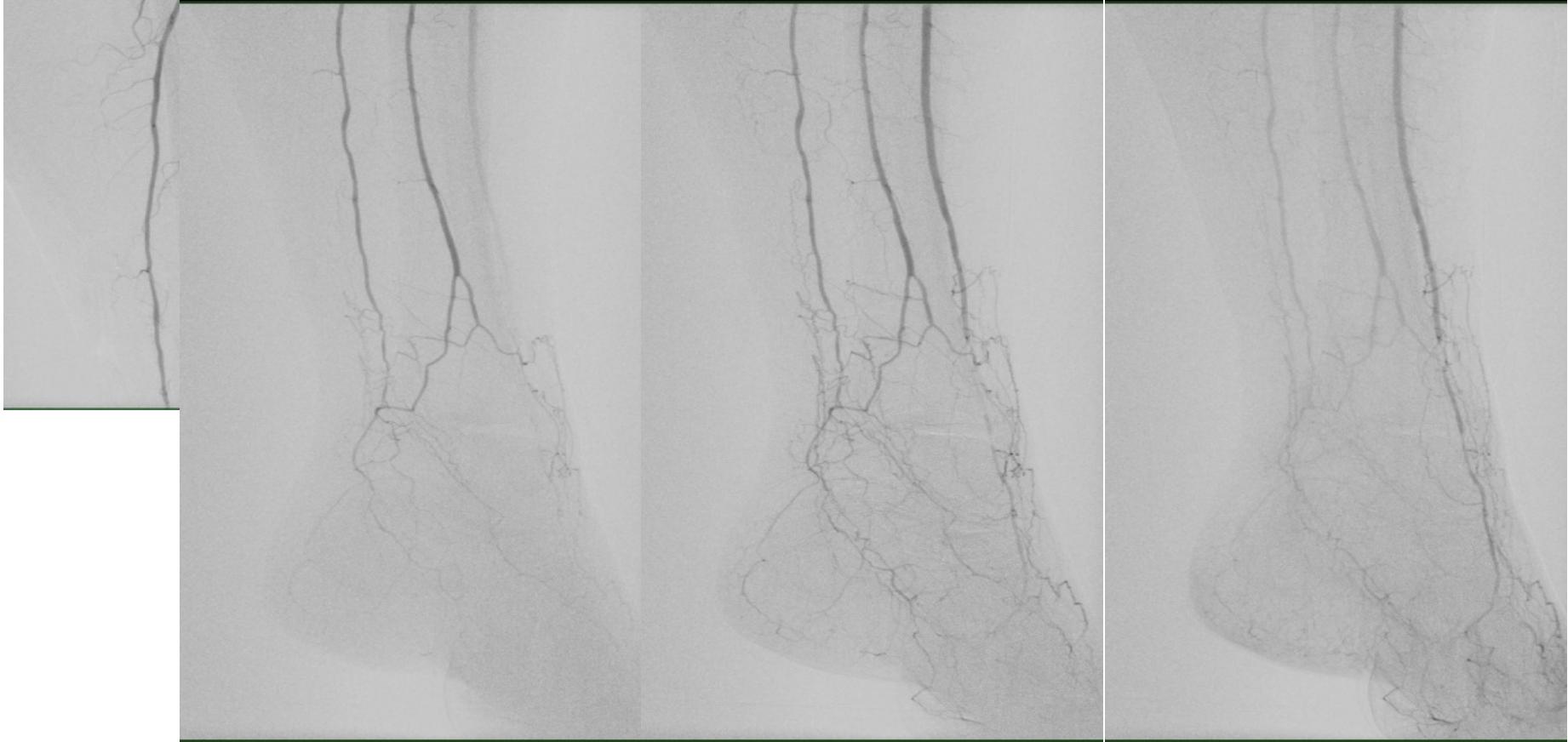
- 
- A – Läsion
  - B – Läsion
  - C – Läsion
  - D - Läsion

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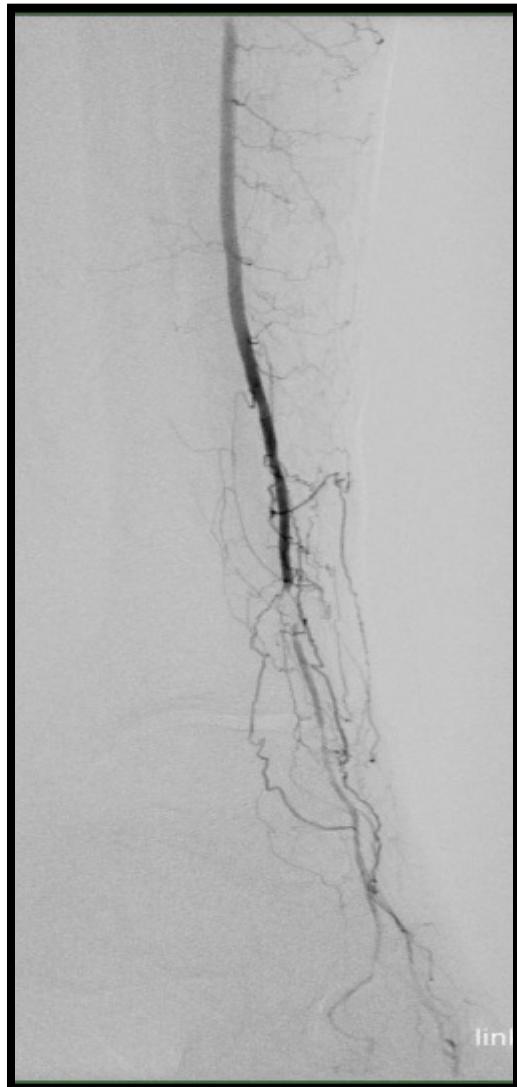


J. M. 29.9.56

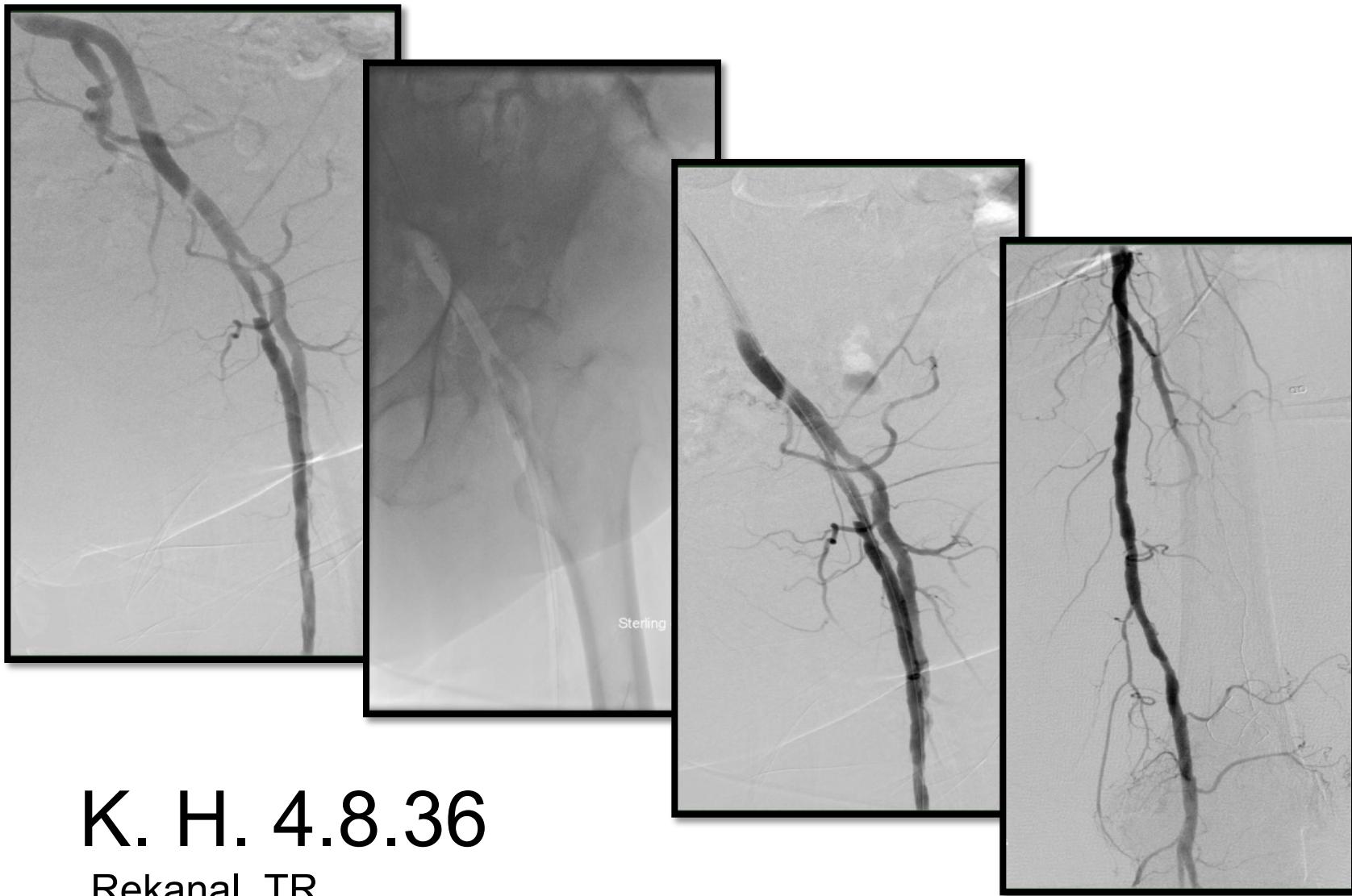
PTA ATA distal



# Unterschenkel – Mission impossible postponed ?



# Unterschenkel – Mission impossible postponed ?



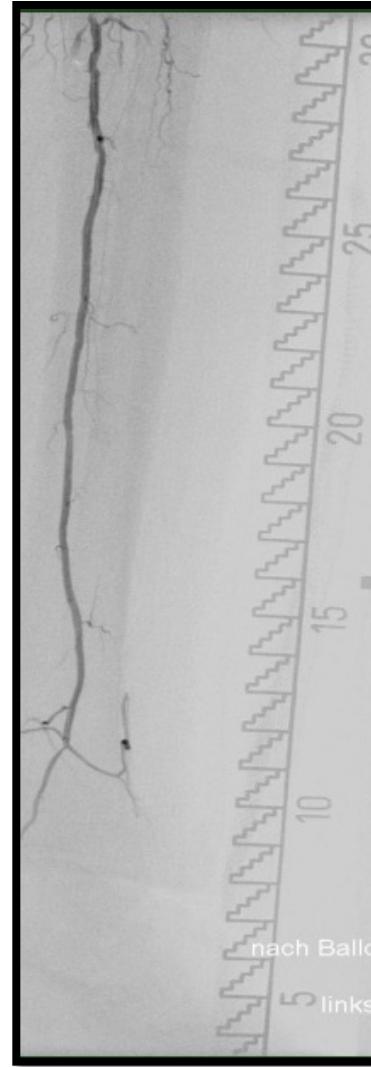
K. H. 4.8.36

Rekanal. TR

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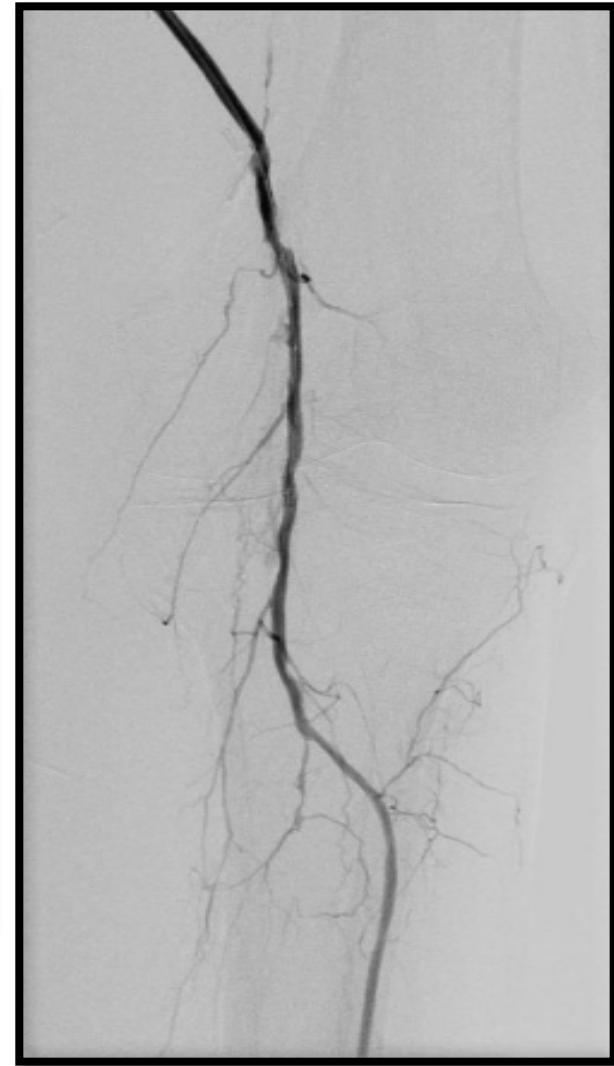
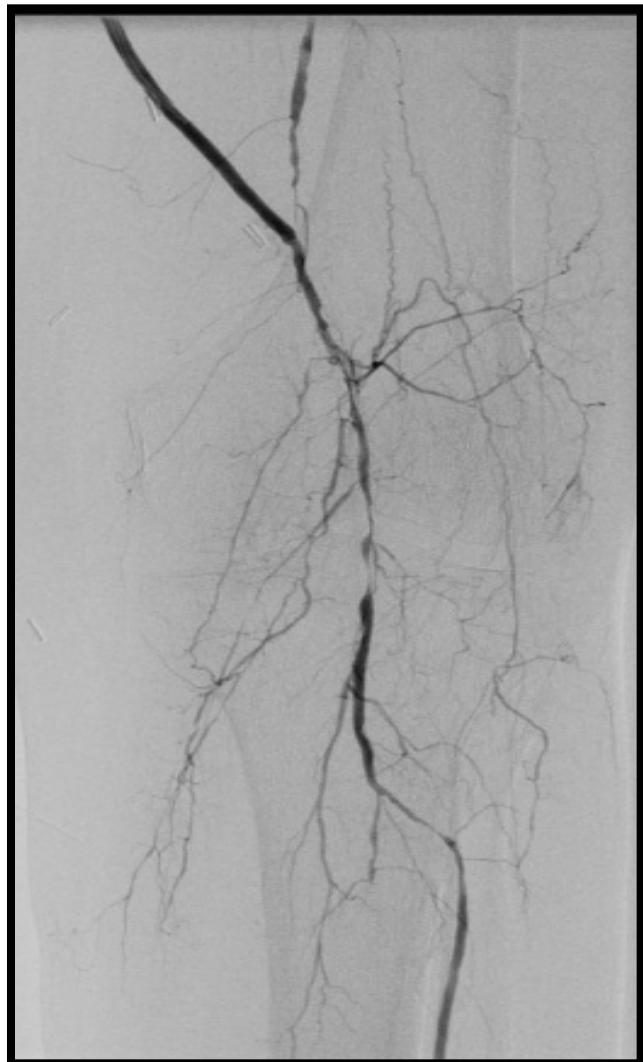
# Unterschenkel – Mission impossible postponed ?



# Unterschenkel – Mission impossible postponed ?

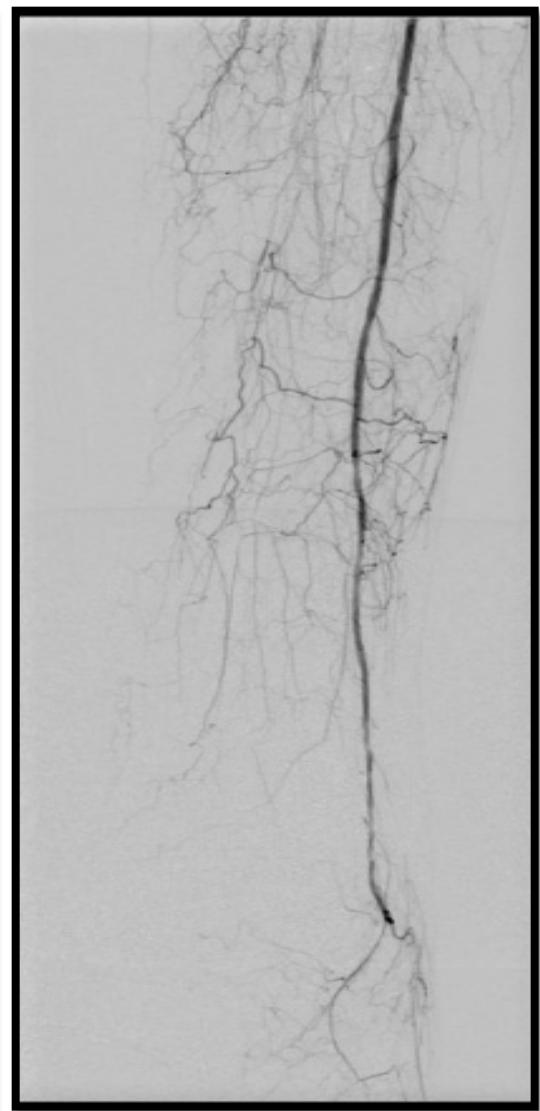
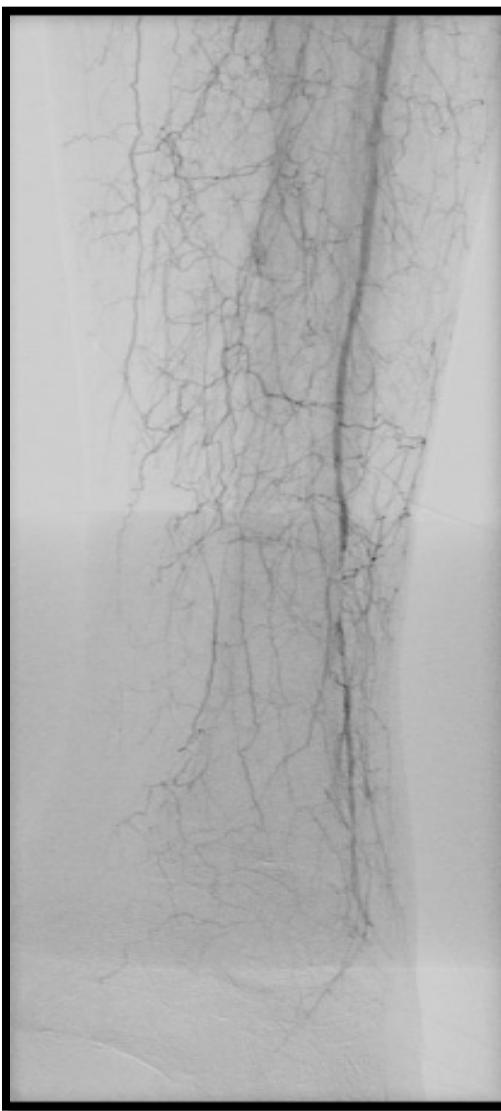
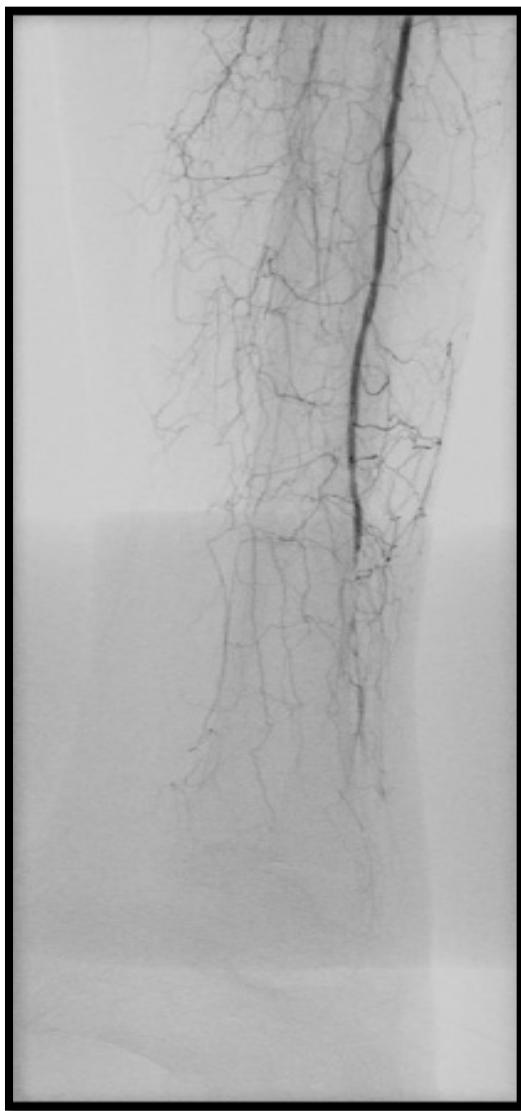
M. C. 15.3.29

PTA A. popl., ATA, z. n. Bypass femoral



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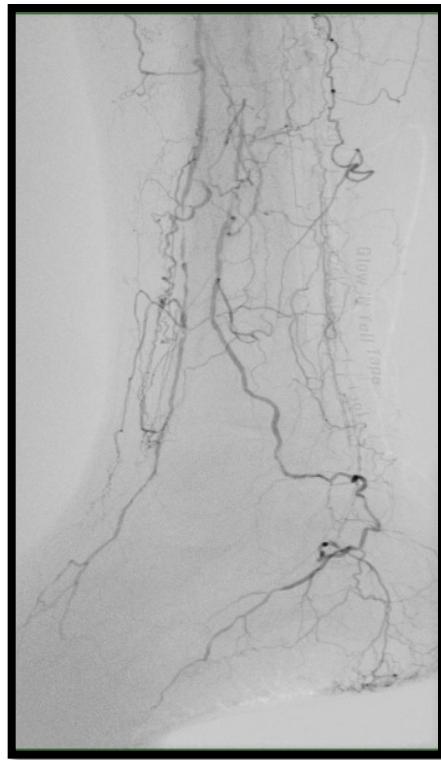
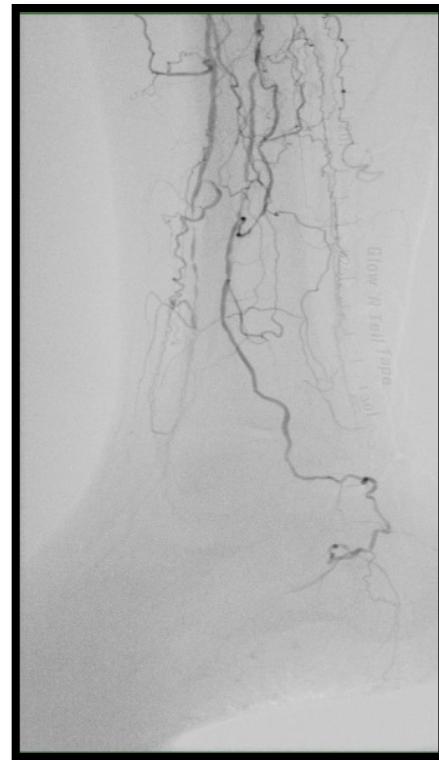
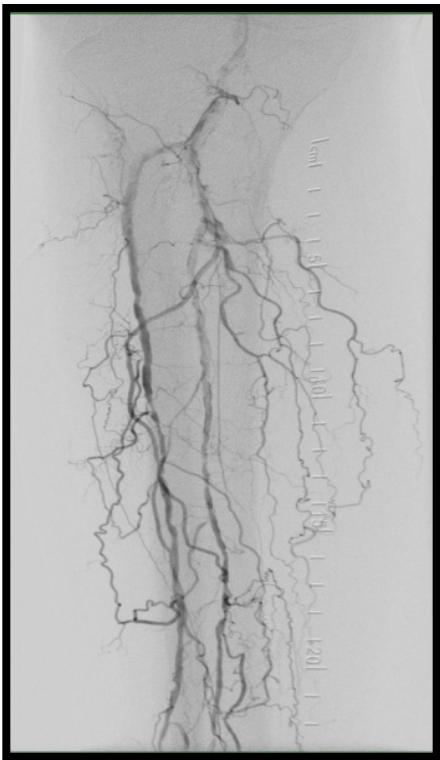
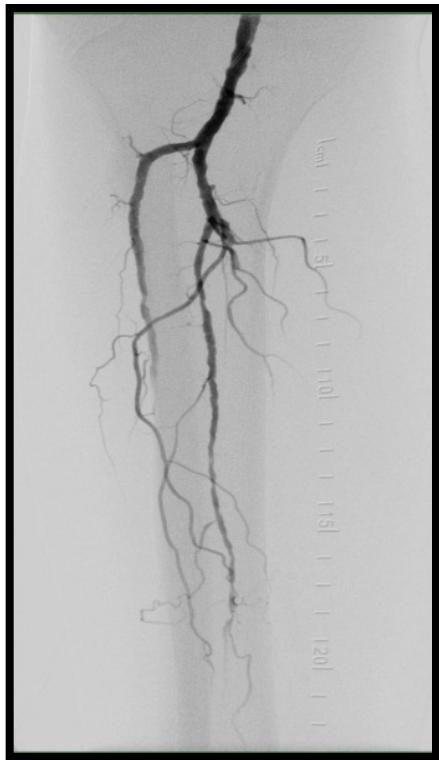
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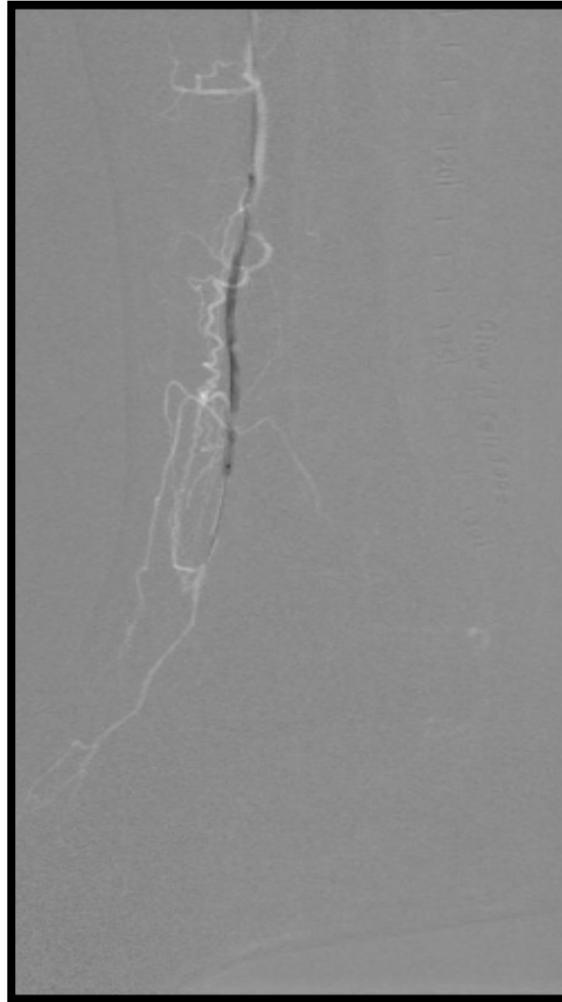
# Unterschenkel – Mission impossible postponed ?

F. H.

PTA ATA AF



# Unterschenkel – Mission impossible postponed ?



# Unterschenkel – Mission impossible postponed ?

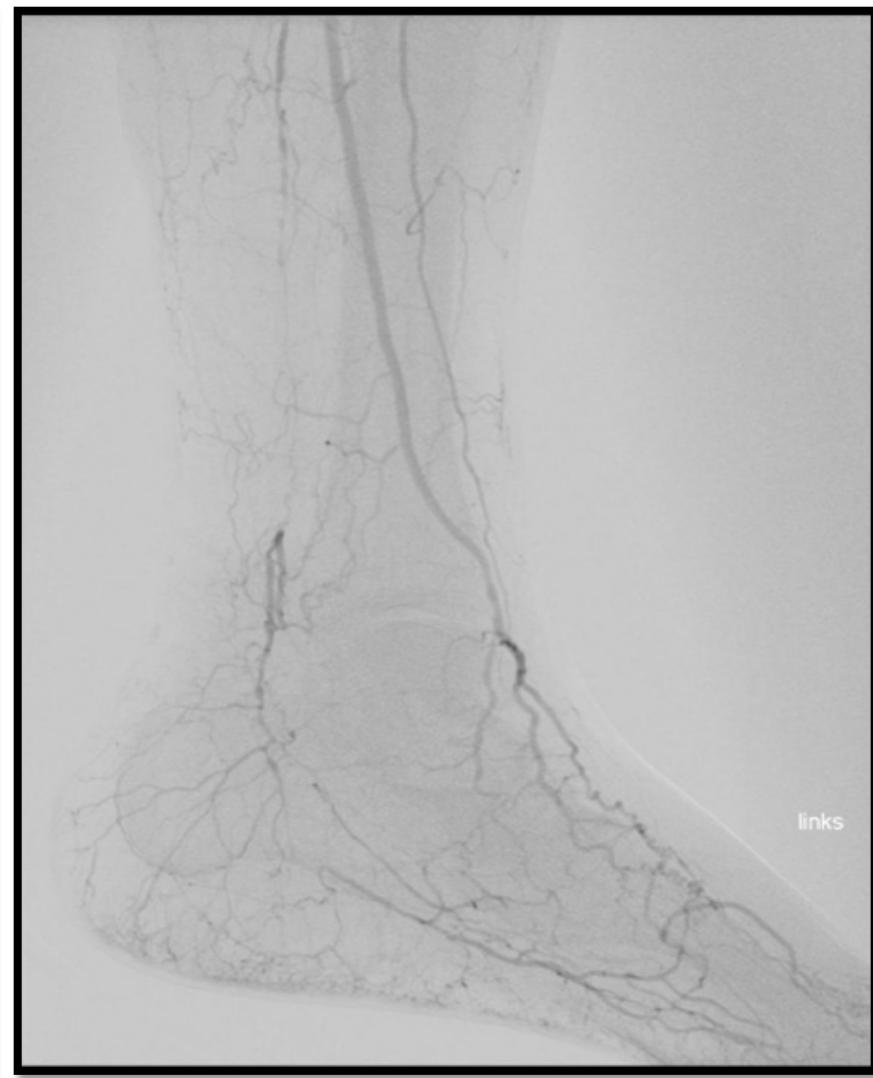
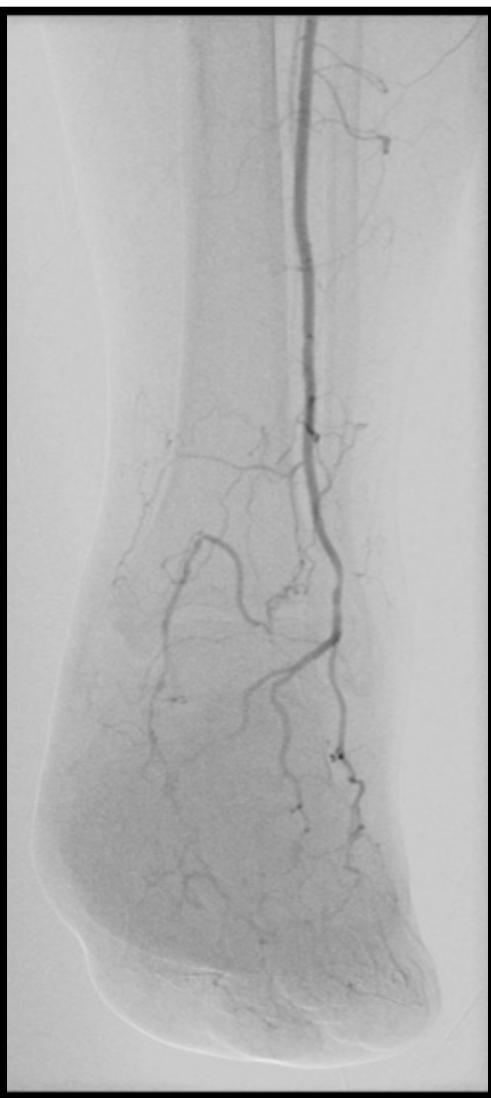


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## Angiosome

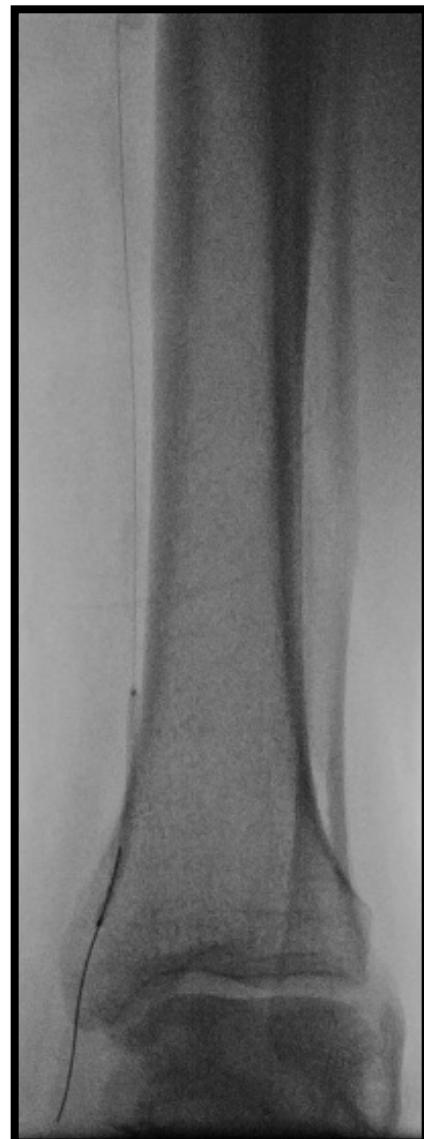


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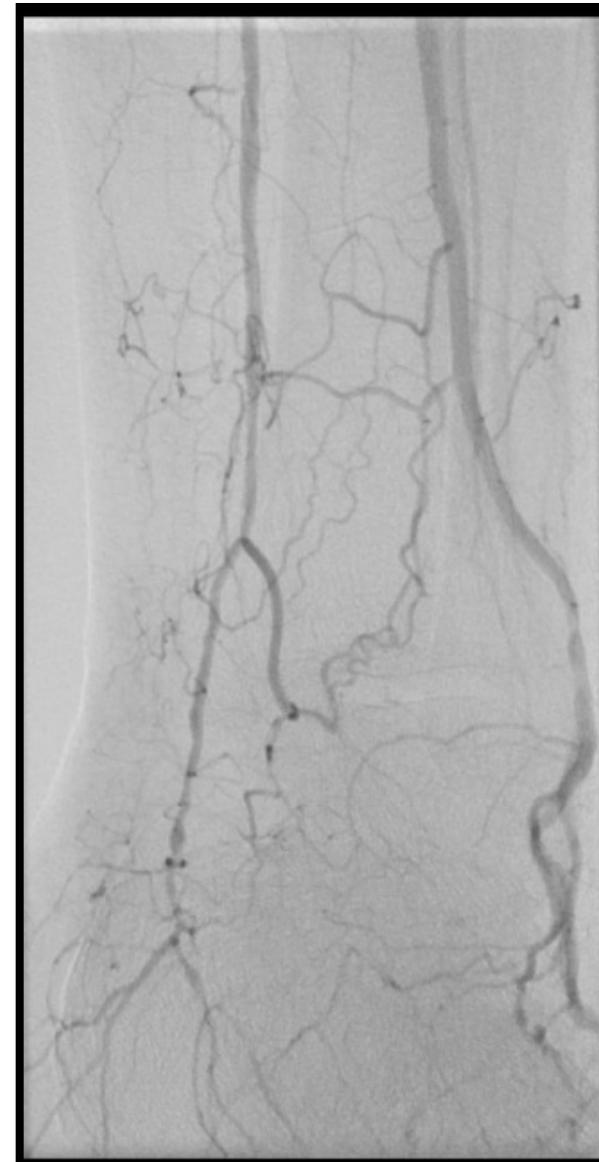
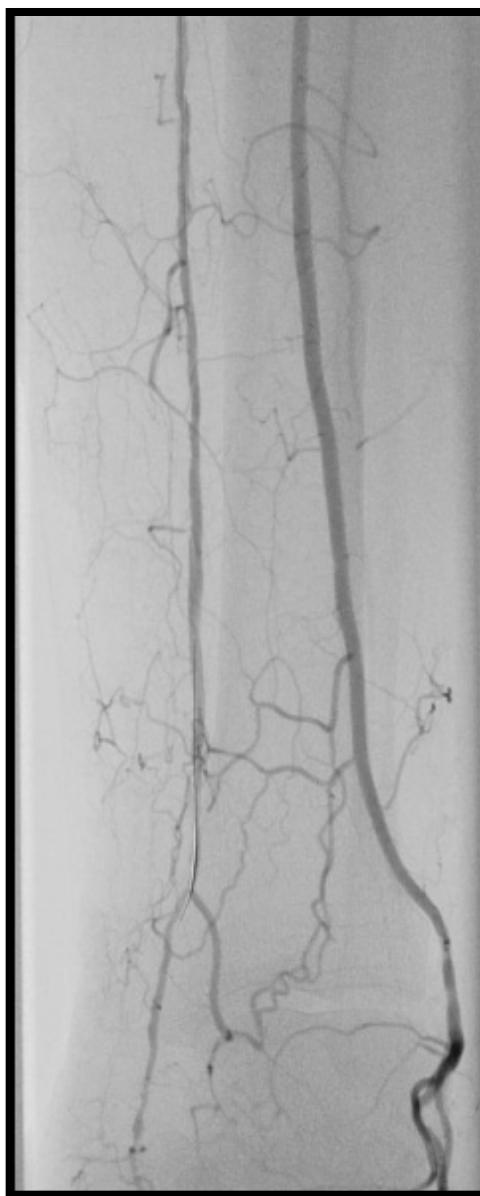


S. W. 11.4.35 Rekanal. ATP

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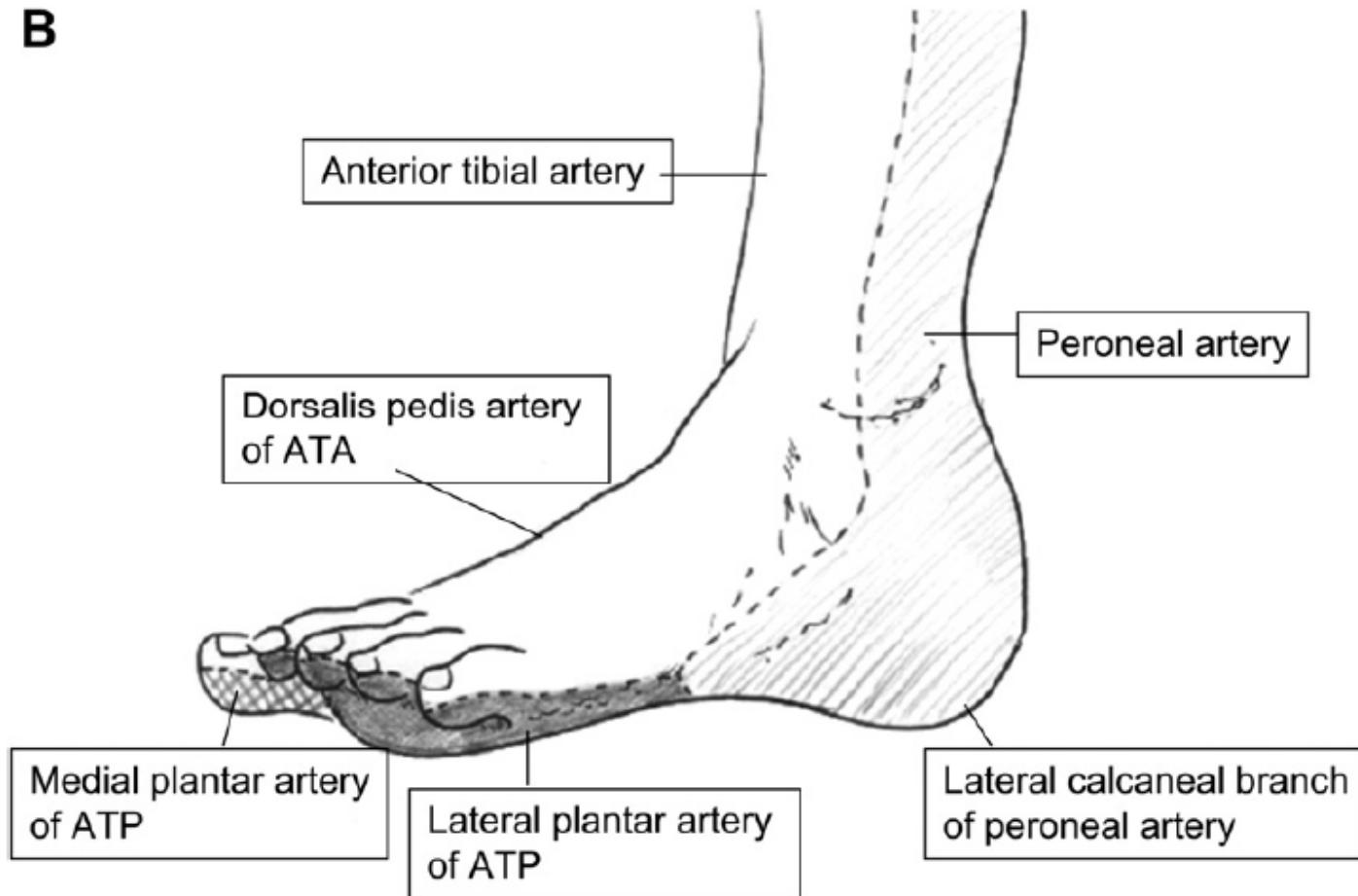
# Unterschenkel – Mission impossible postponed ?



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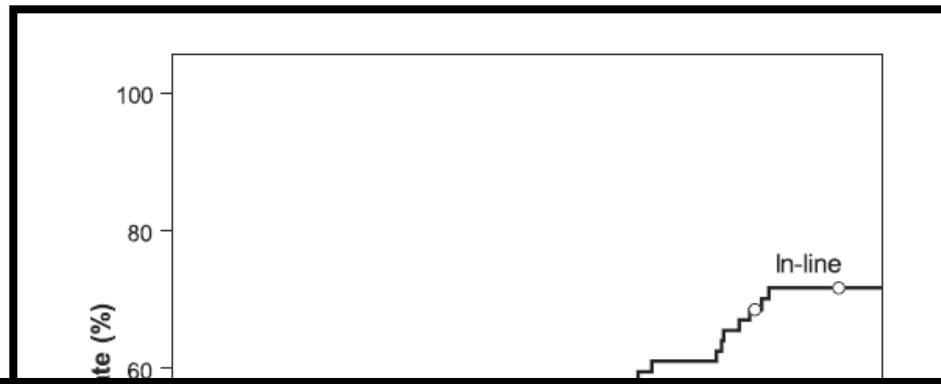
## Angiosom-orientierte PTA

B



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## Angiosom- orientierte PTA



	Univariate analysis		Multivariate analysis		
	P value	HR	95% CI	P value	
Age	.051	0.99	0.98-1.01	.870	
Female gender	.941	—	—	—	
Coronary artery disease	.295	—	—	—	
Chronic pulmonary disease	.251	—	—	—	
Cerebrovascular disease	.350	—	—	—	
Estimated glomerular filtration rate <30 mL/min/1.73m <sup>2</sup> or dialysis	.510	—	—	—	
Dyslipidemia	.355	—	—	—	
Hypertension	.410	—	—	—	
Smoking	.528	—	—	—	
Ulcer extending to bone (UTWCS grade 3)	.323	—	—	—	
Ulcer with signs of infection (UTWCS stage D)	.387	—	—	—	
Presence of multidrug-resistant bacteria	.201	—	—	—	
Gangrene	.174	0.66	0.44-0.99	.477	
Heel ulcer	.165	0.64	0.35-1.14	.129	
In-line	<.001	1.90	1.32-2.73	.001	

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## Ergebnisse

Autor	Extr.	CLI	Diabetes	Erfolg	Beinerh.	F/U
Starck	46	67%	NA	76%	NA	NA
Schwarten	114	100%	60%	97%	86%	24
Bakal	57	98%	85%	78%	NA	NA
Horvath	71	42%	35%	96%	NA	NA
Dorros	151	53%	46%	90%	NA	NA
Bull	168	76%	52%	100%	85%	24
Matsi	84	100%	77%	83%	52%	24
Wagner	158	68%	46%	95%	88%	17
Sivanathan	46	53%	13%	96%	NA	NA
Sos	71	83%	59%	91%	86%	12
Lofberg	86	100%	74%	88%	75%	12
Söder	72	100%	76%	76%	80%	18
Alfke	121	97%	77%	68%	81%	36

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## Crurale PTA – Uni MR 1997-2000

➤ Patienten	112 (63% M)
➤ behandelte Beine	122
➤ Alter	72±10
➤ kritische Ischämie	93%
➤ Risikofaktoren	
▪ Diabetes	77%
▪ Nikotinabusus	39%
▪ Niereninsuffizienz	45%
▪ > 2 Faktoren	92%

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## Crurale PTA – Uni MR 1997-2000

### Behandelte Gefäße N=232

- Okklusionen                                    75 (62%)
- Stenosen
  - 81-99%    39 (32%)
  - 51-80%    7 ( 6%)
- Läsionslänge                                    13 cm

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## Crurale PTA – Uni MR 1997-2000

### Run-off Status

#### vor PTA

- kein crurales Gefäß      84      (69%)

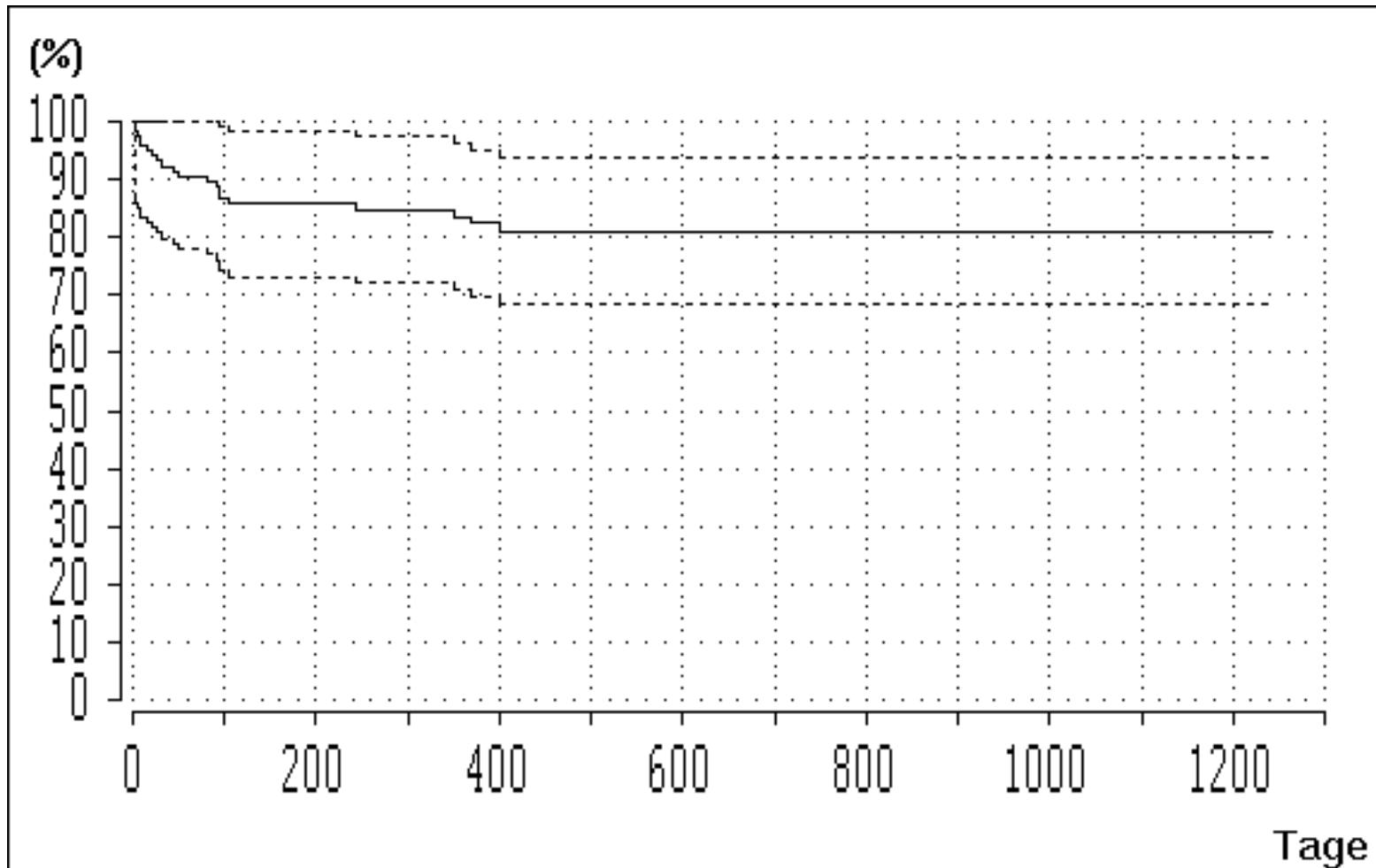
#### nach PTA

- zwei crurale Gefäße      32      (26%)
- ein crurales Gefäß      78      (64%)
- kein crurales Gefäß      11      ( 9%)

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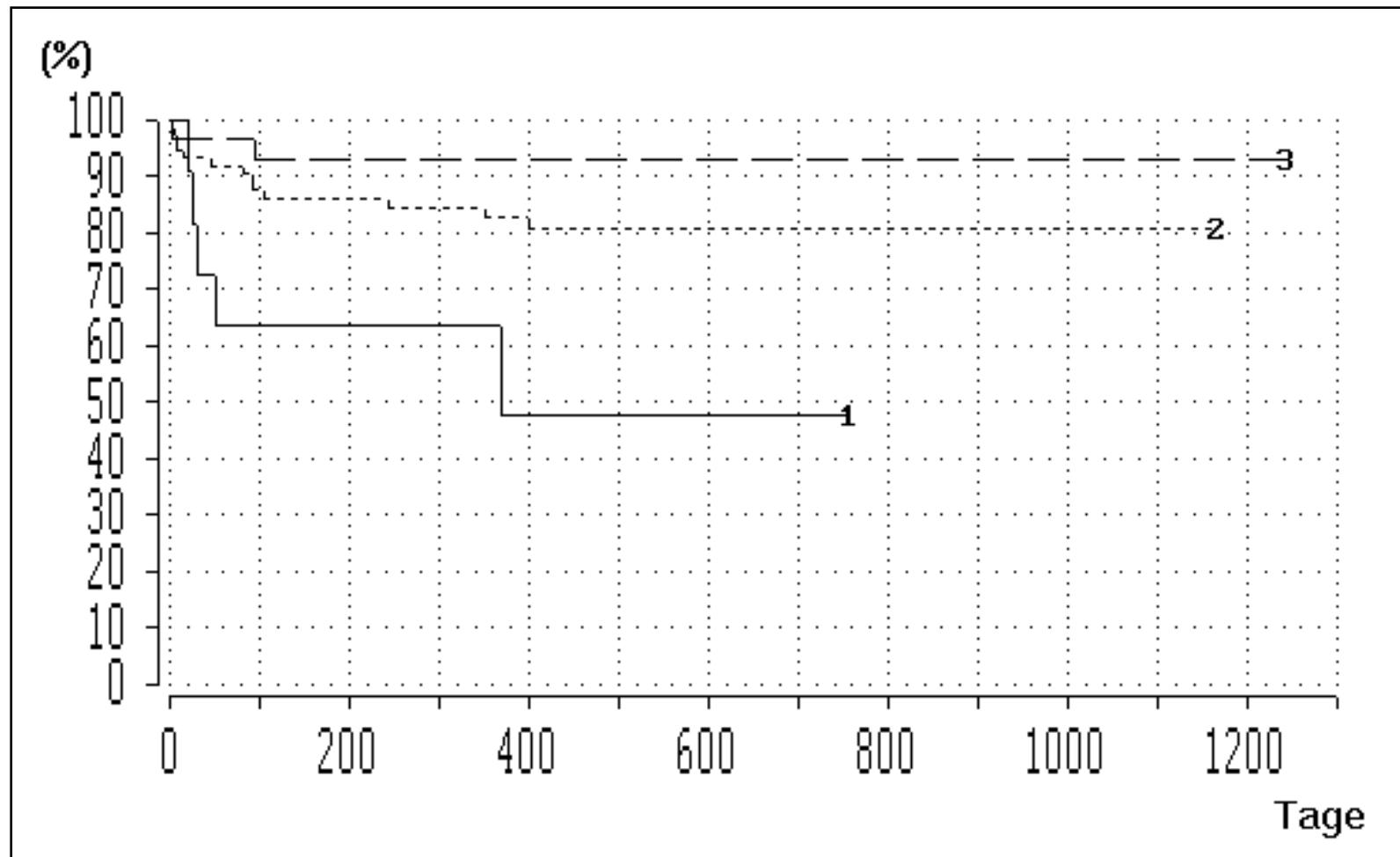
## Crurale PTA (MR 1997-2000) - Beinerhaltungsrate

1 J – 84%  
2 J – 81%  
3 J – 81%



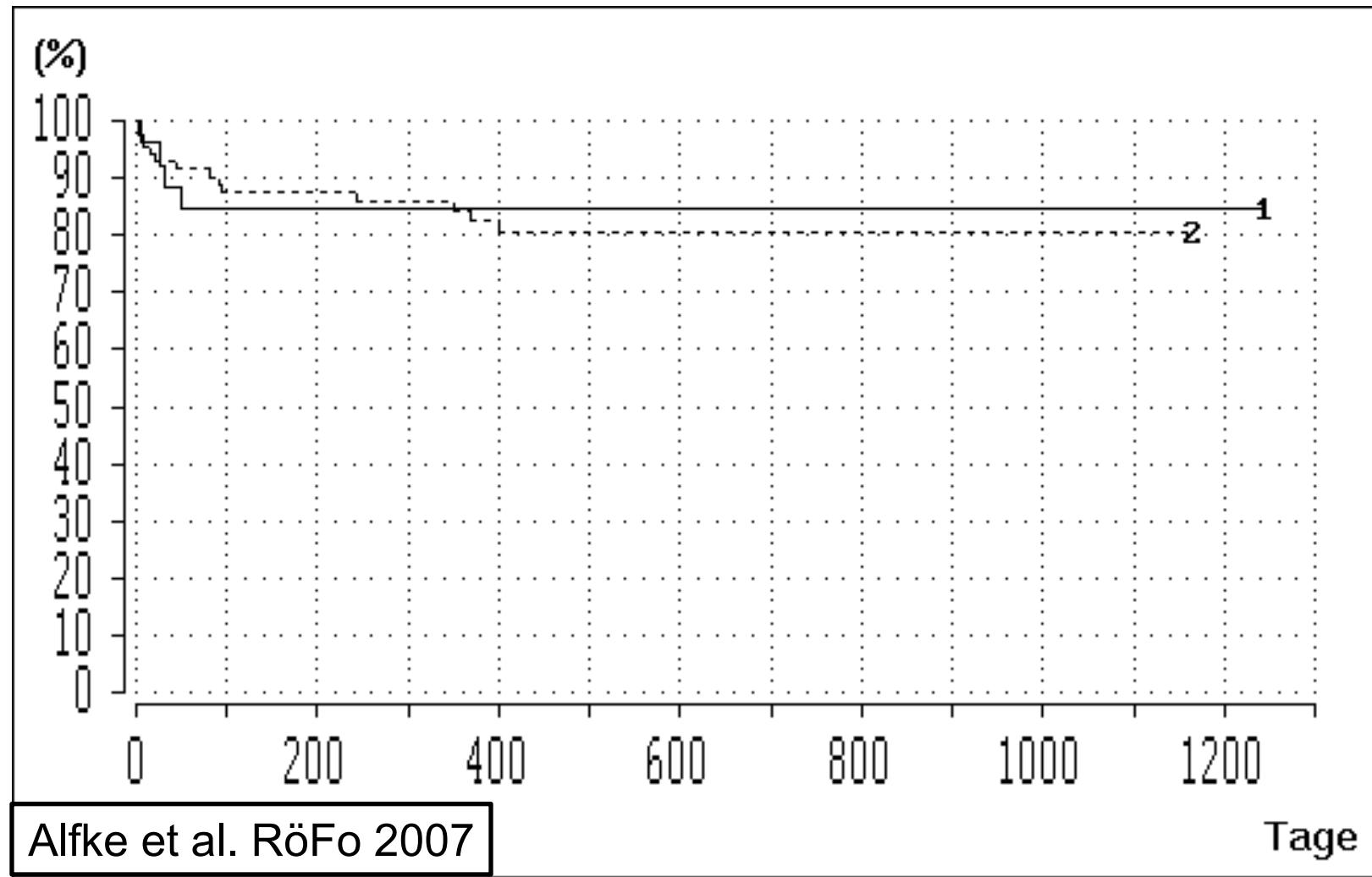
# Unterschenkel – Mission impossible postponed ?

## Crurale PTA (MR 1997-2000) - **Beinerhaltungsrate und run off-Status**



# Unterschenkel – Mission impossible postponed ?

## Crurale PTA (MR 1997-2000) - **Beinerhaltungsrate und Diabetes**



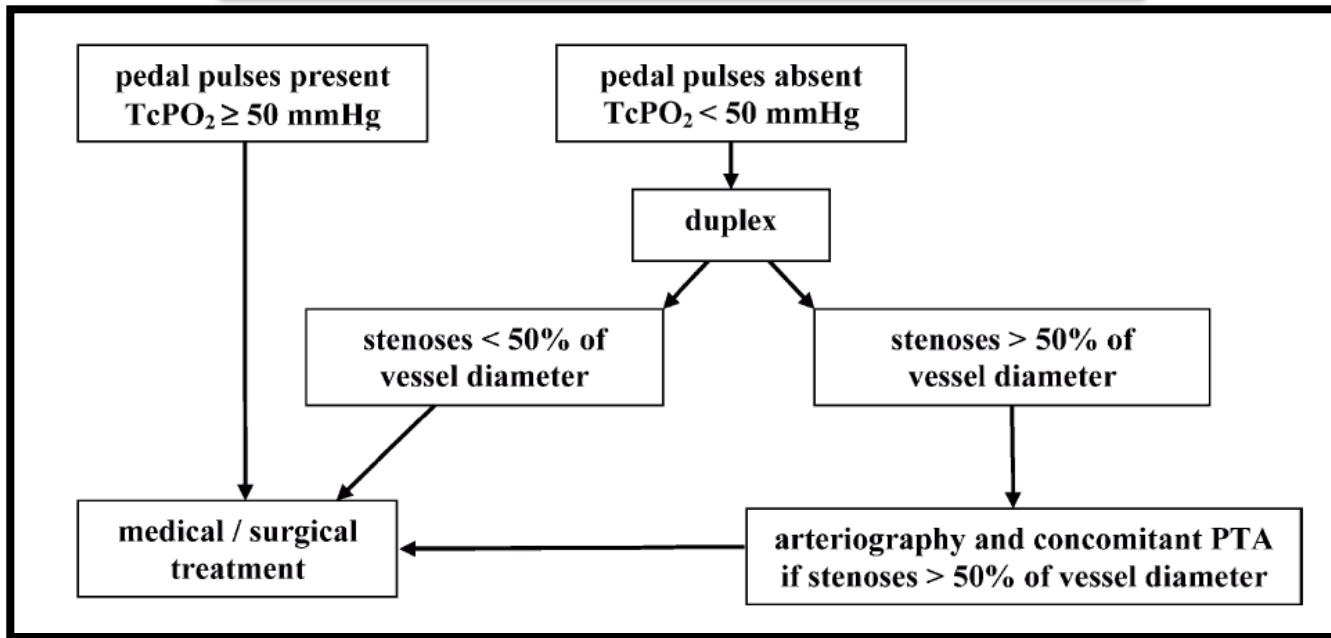
Alfke et al. RöFo 2007

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## Peripheral Angioplasty as the First-choice Revascularization Procedure in Diabetic Patients with Critical Limb Ischemia: Prospective Study of 993 Consecutive Patients Hospitalized and Followed Between 1999 and 2003

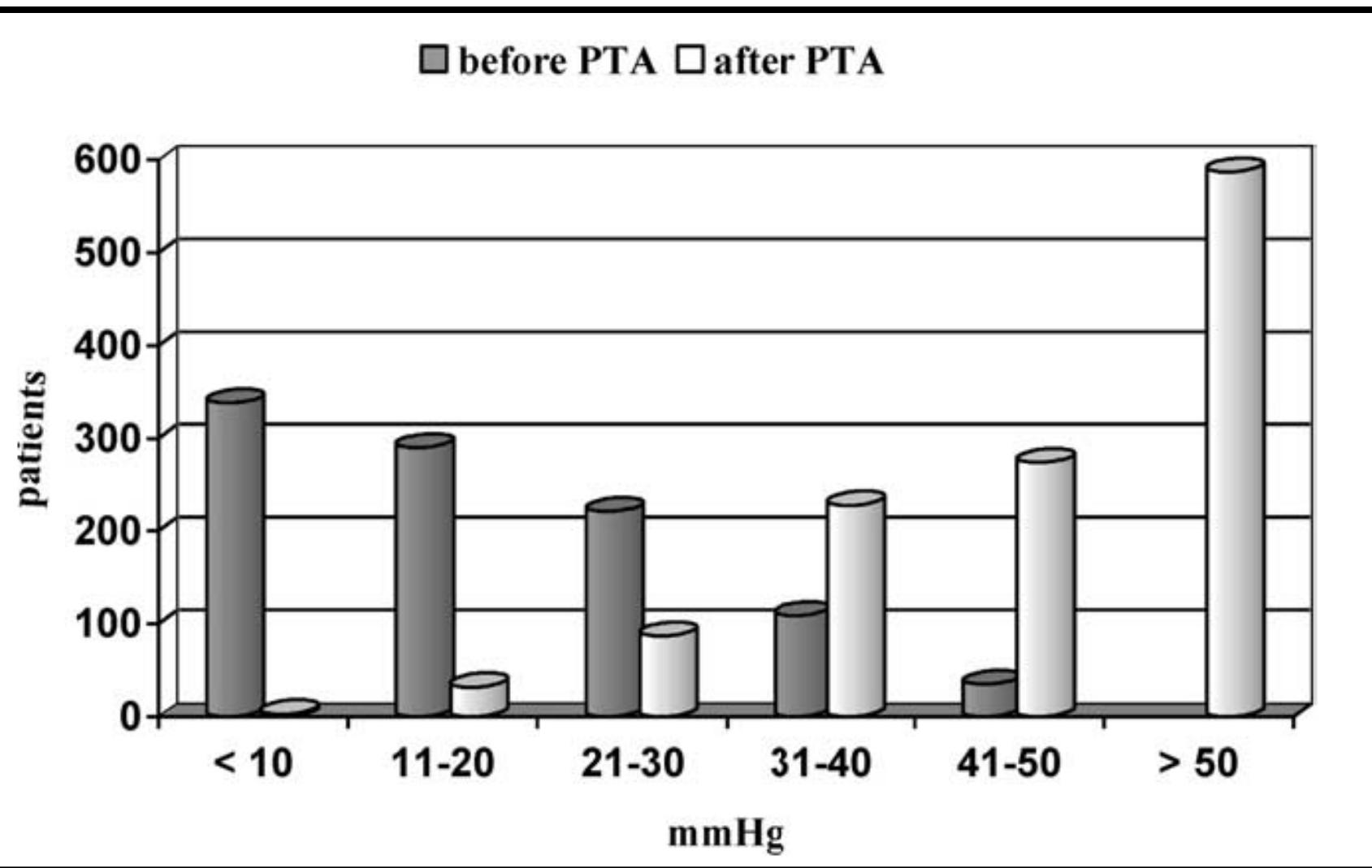
E. Faglia,<sup>1\*</sup> L. Dalla Paola,<sup>2</sup> G. Clerici,<sup>1</sup> J. Clerissi,<sup>3</sup> L. Graziani,<sup>4</sup> M. Fusaro,<sup>4</sup> L. Gabrielli,<sup>5</sup> S. Losa,<sup>5</sup> A. Stella,<sup>6</sup> M. Gargiulo,<sup>6</sup> M. Mantero,<sup>1</sup> M. Caminiti,<sup>1</sup> S. Ninkovic,<sup>2</sup> V. Curci<sup>1</sup> and A. Morabito<sup>7</sup>

Eur J Vasc Endovasc Surg 29, 620–627 (2005)



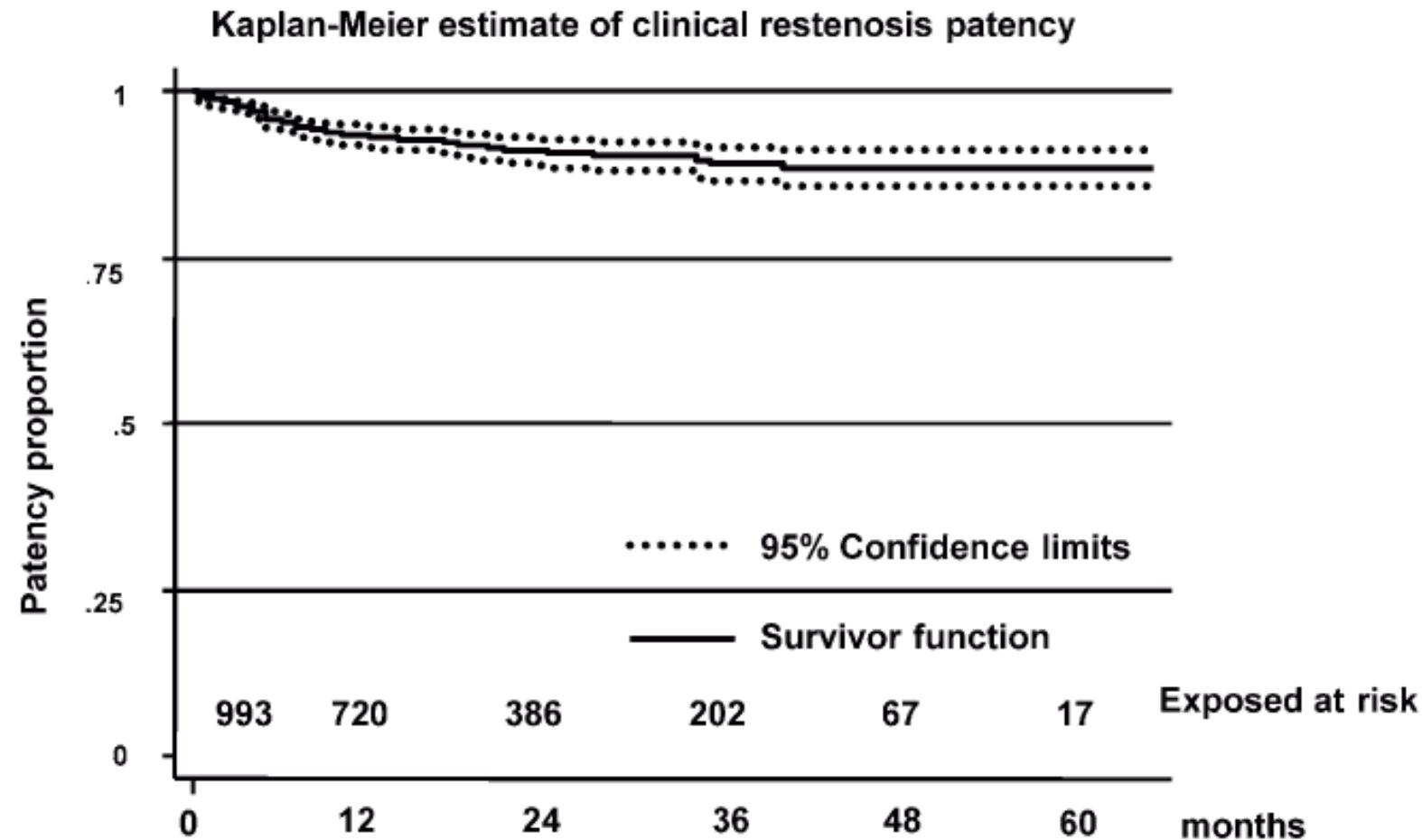
# Unterschenkel – Mission impossible postponed ?

## Langzeitergebnisse infrapopliteale PTA - Extremitätenerhalt



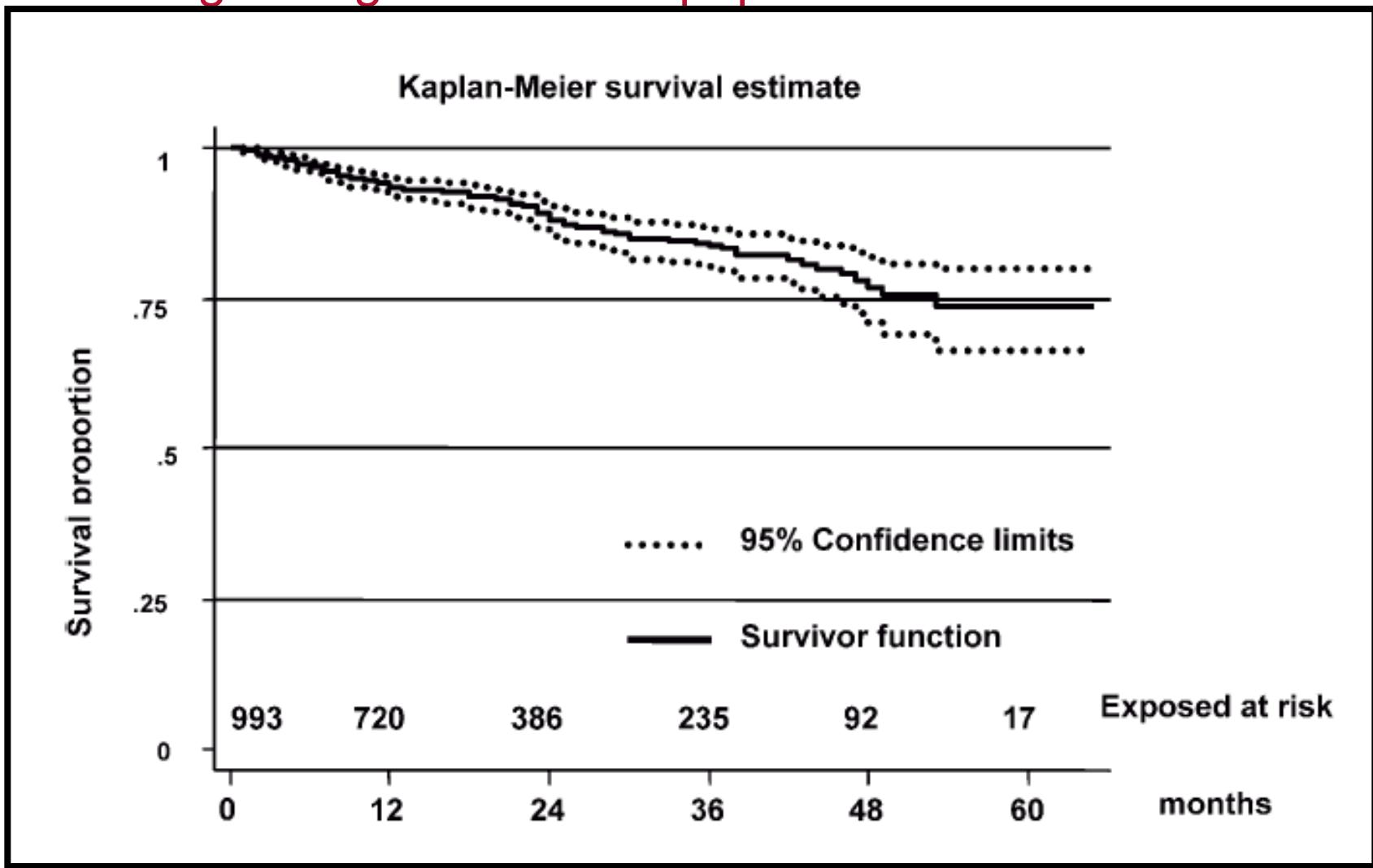
# Unterschenkel – Mission impossible postponed ?

## Langzeitergebnisse infrapopliteale PTA - Extremitätenerhalt



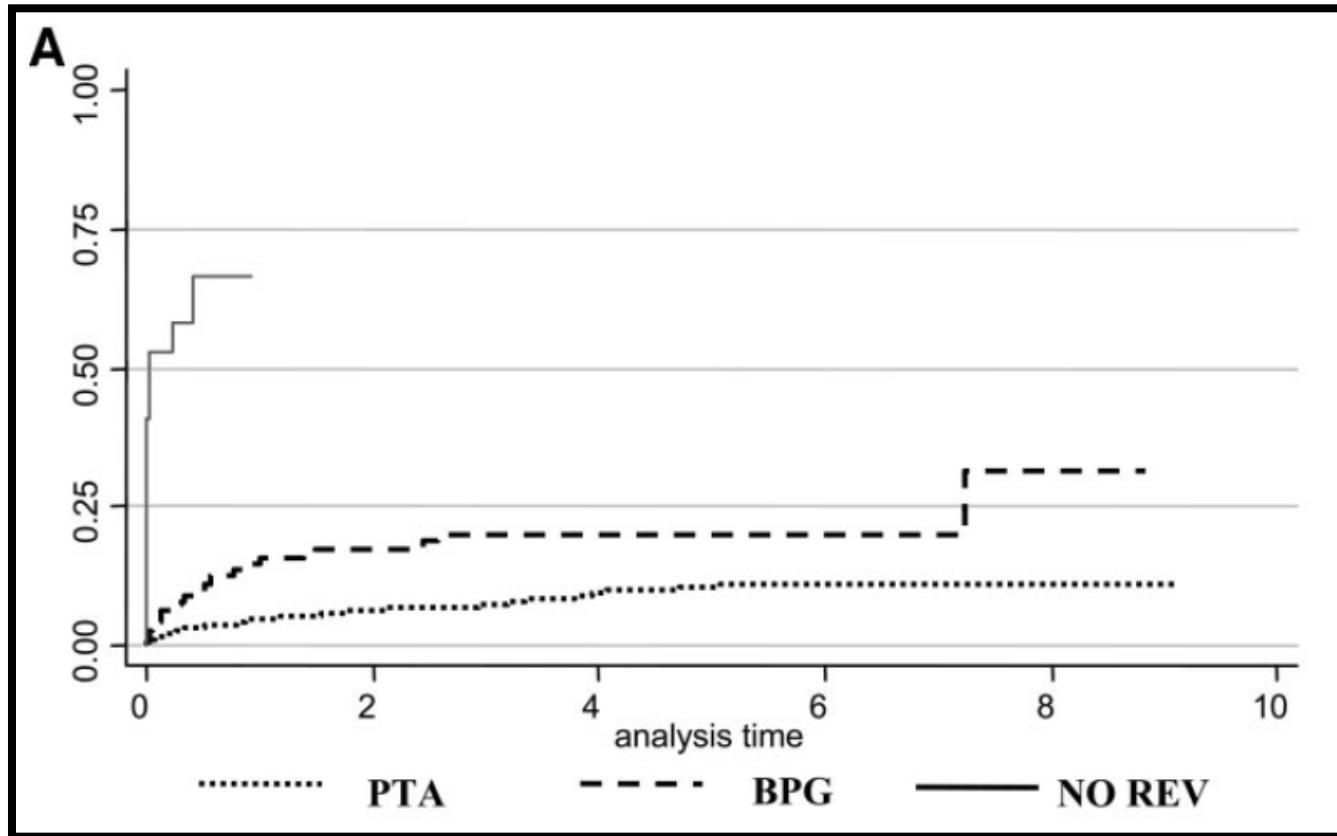
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## Langzeitergebnisse infrapopliteale PTA - Überleben



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## Langzeitergebnisse infrapopliteale PTA - Extremitätenerhalt

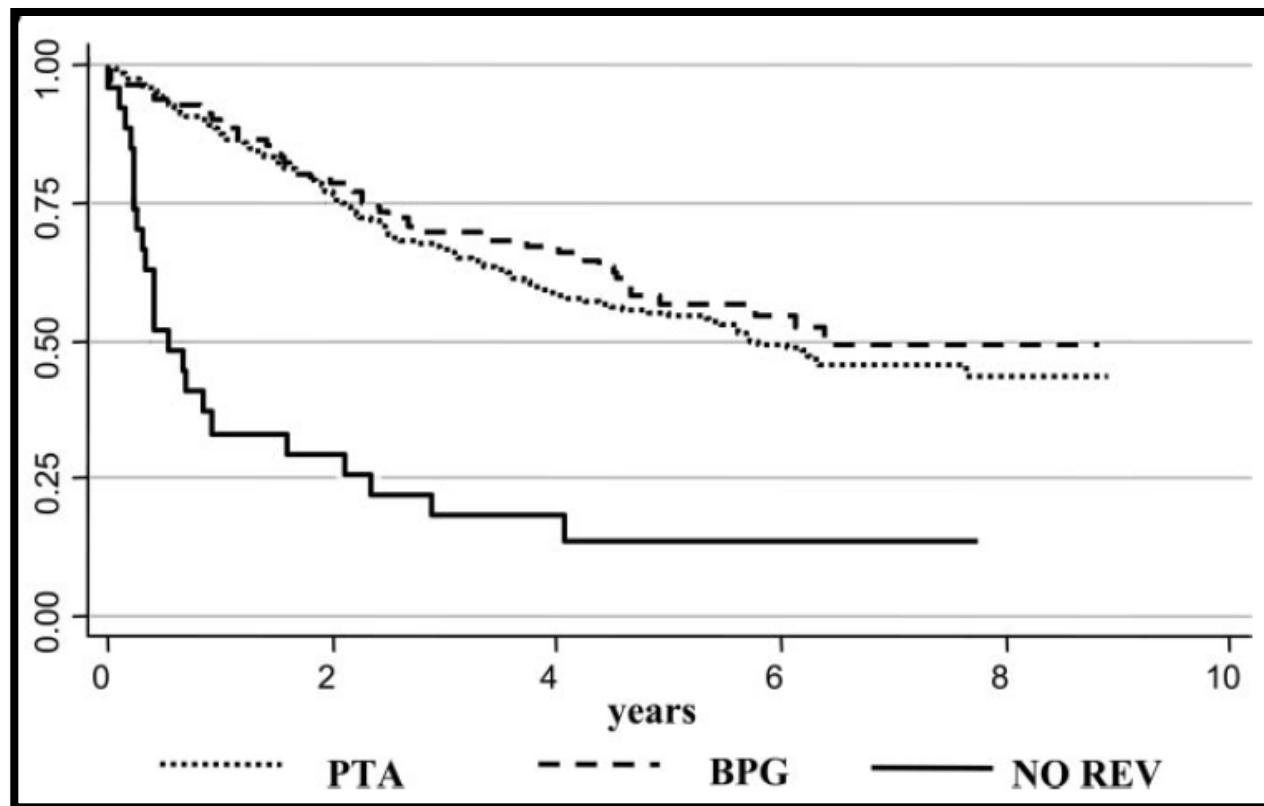


### Long-Term Prognosis of Diabetic Patients With Critical Limb Ischemia

Diabetes Care 32:822–827, 2009

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## Langzeitergebnisse infrapopliteale PTA - Mortalität



### Long-Term Prognosis of Diabetic Patients With Critical Limb Ischemia

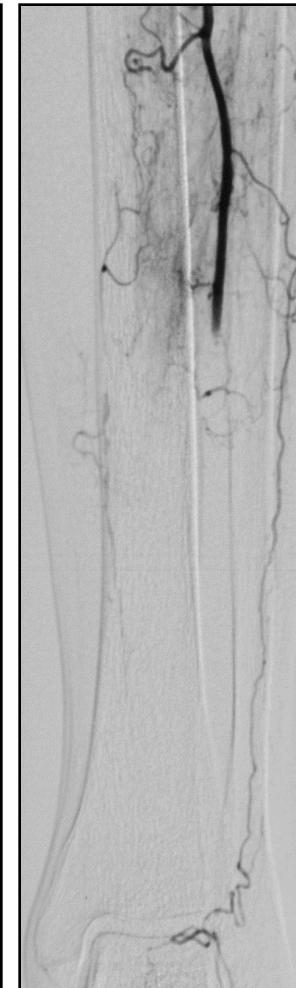
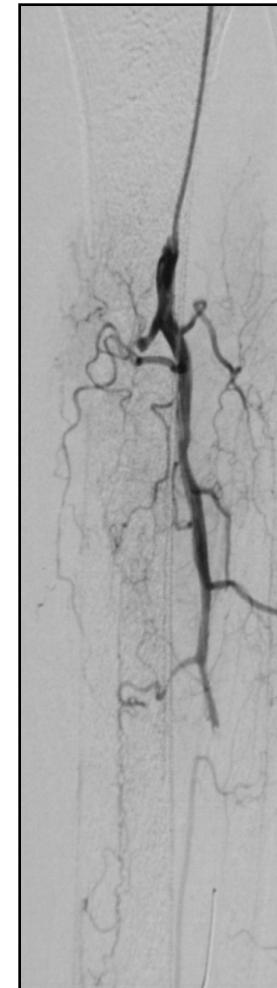
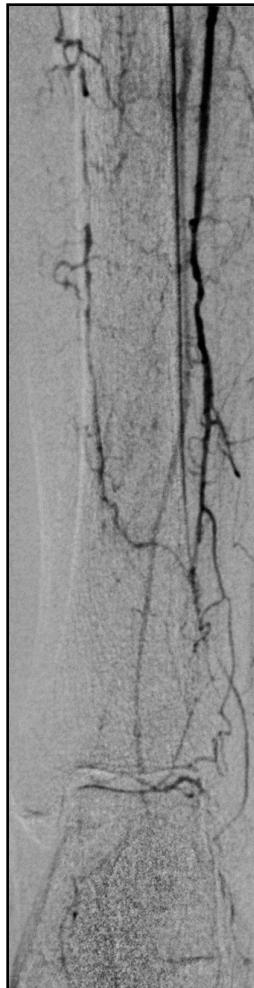
Diabetes Care 32:822–827, 2009

## Unterschenkel – Was tun ?

- Ballon-PTA
- Drug eluting balloon (DEB)
- Stent
  - selbstexpandierend
  - ballonexpandierbar
- Drug eluting stent (DES)
- Atherektomie
- Laser
- Lyse
- Thrombektomie

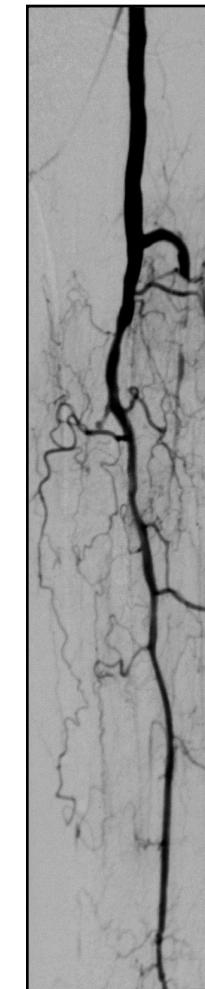
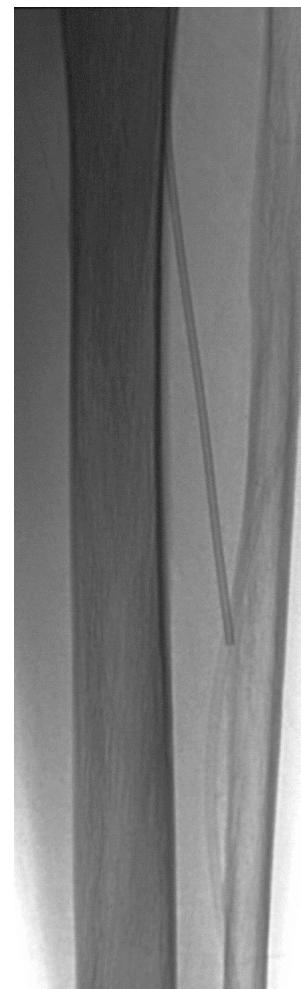
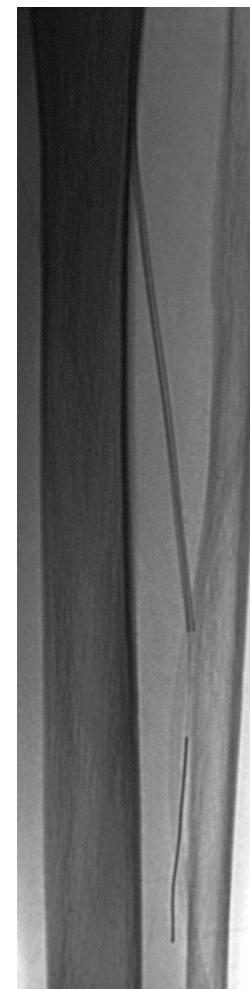
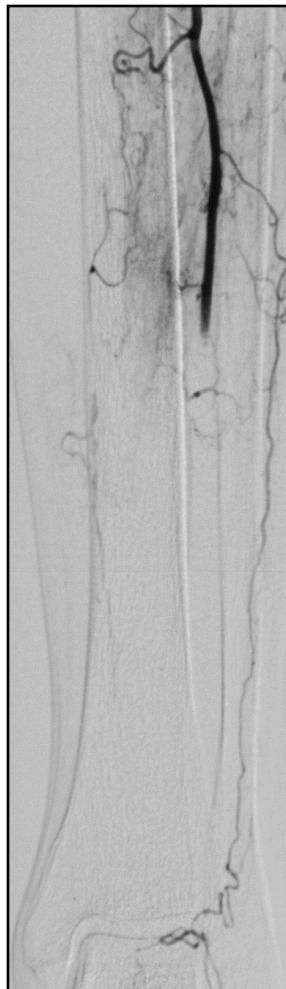
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## Thrombektomie



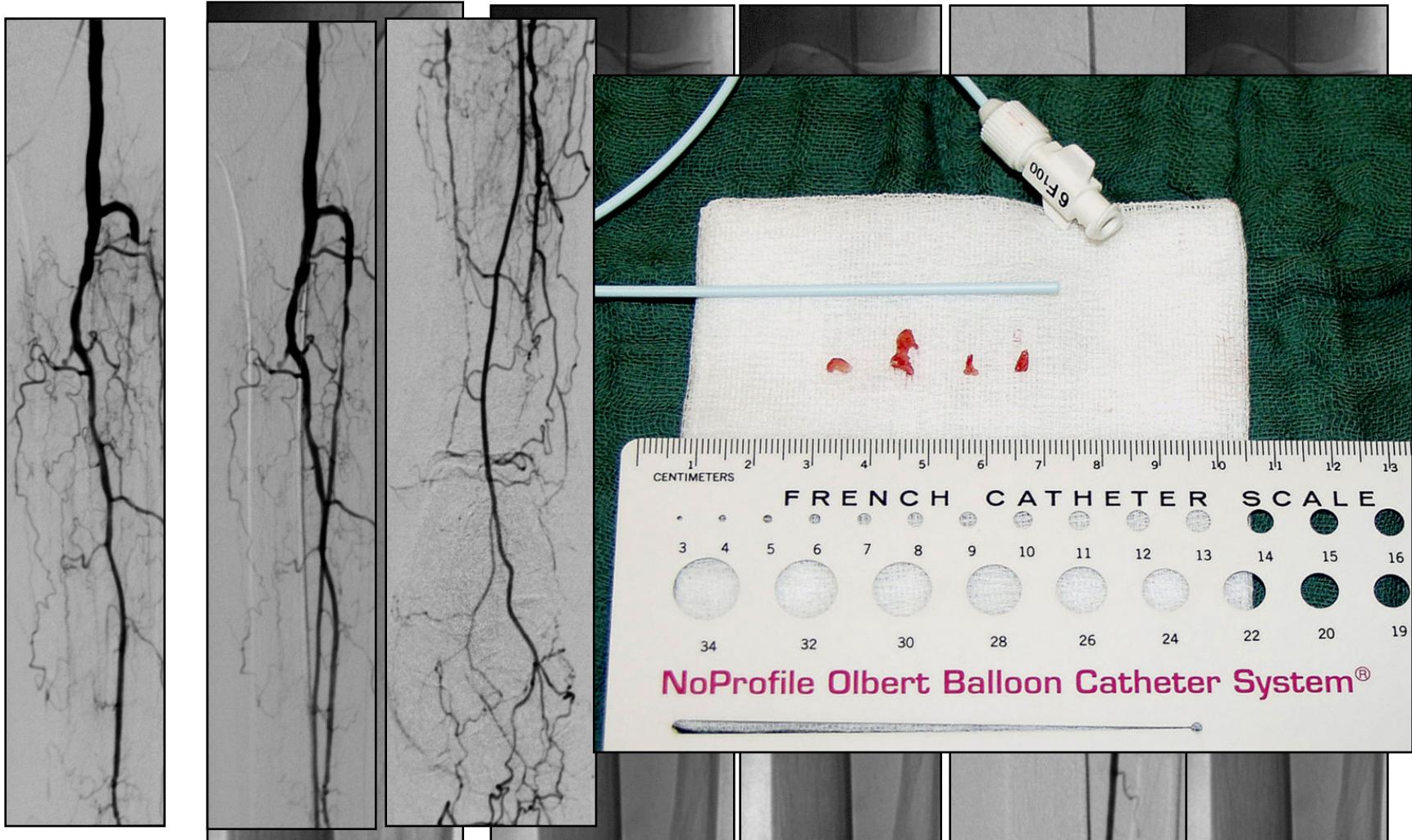
# Unterschenkel – Mission impossible postponed ?

## Thrombektomie



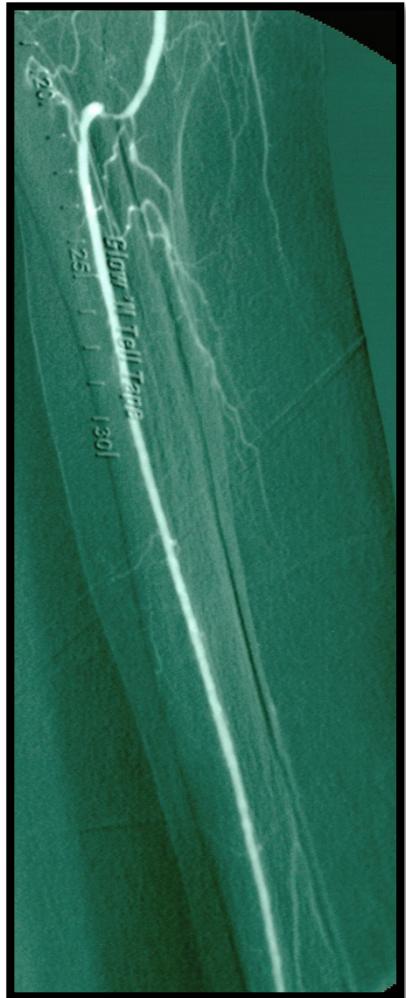
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## Thrombektomie



# Unterschenkel – Mission impossible postponed ?

## Stent - PTA



# Unterschenkel – Mission impossible postponed ?

## Stent - PTA



# Unterschenkel – Mission impossible postponed ?

## Drug Eluting Stent vs Bare Metal Stent

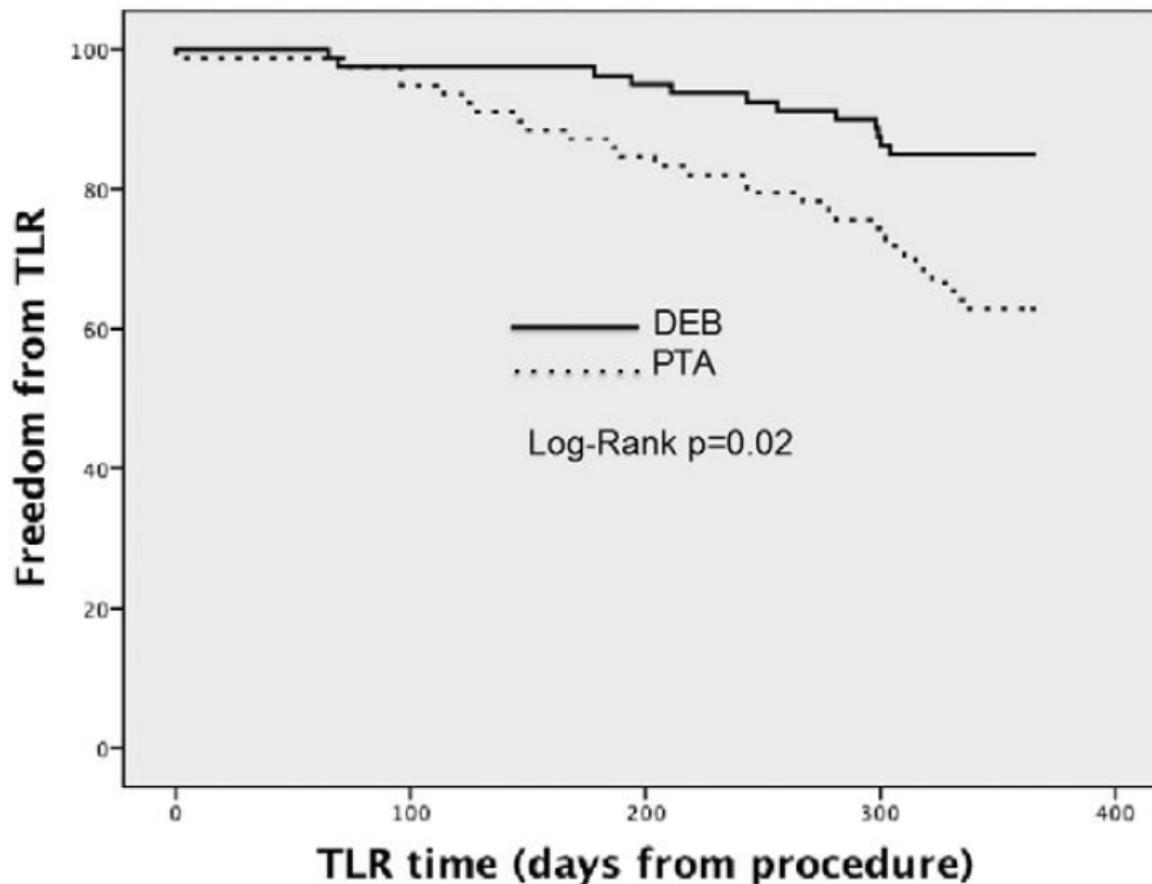
	<b>YUKON-BTK [17]</b> <b>SES/BMS</b>	<b>DESTINY [3]†</b> <b>EES/BMS</b>	<b>ACHILLES [21]†</b> <b>SES/PTA</b>
Patients (n)/lesions (n)	161/161	140/154	200/228
Rutherford-Becker class	2 to 5	4 and 5	3 to 5
Mean lesion length (mm)	$30 \pm 8$ / $31 \pm 9$ ‡	15.9/18.9‡	$26.9 \pm 21$ / $27.5 \pm 22$ ‡
Primary patency (%)	80.6/55.6*	85.2/54.4*	80.6/58.1*
Secondary patency (%)	91.9/71.4*	NA	NA
Follow-up (months)	12	12	12
TLR (%)	9.7/17.5‡	7.5/34.7*	10/16.5‡
Limb salvage rate (%)	98.4/96.8‡	98.7/97.1‡	86.2/80‡
Death (%)	17.1/13.9‡	18.5/16.3‡	10.1/11.9‡

**Drug-eluting stents for treatment of focal infrapopliteal lesions**

*Vasa 2012; 41: 90–95*

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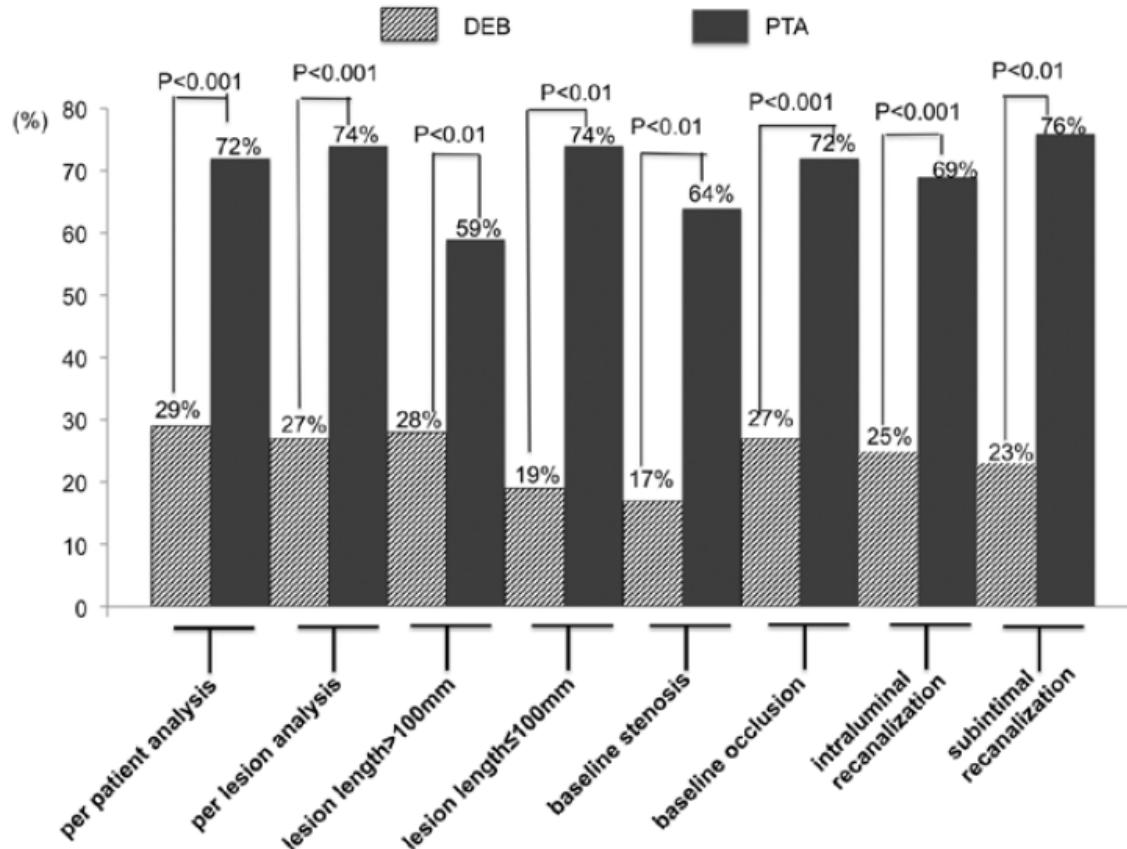
## Drug Eluting Balloon vs PTA



(Circulation. 2013;128:615-621.)

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## Drug Eluting Balloon vs PTA

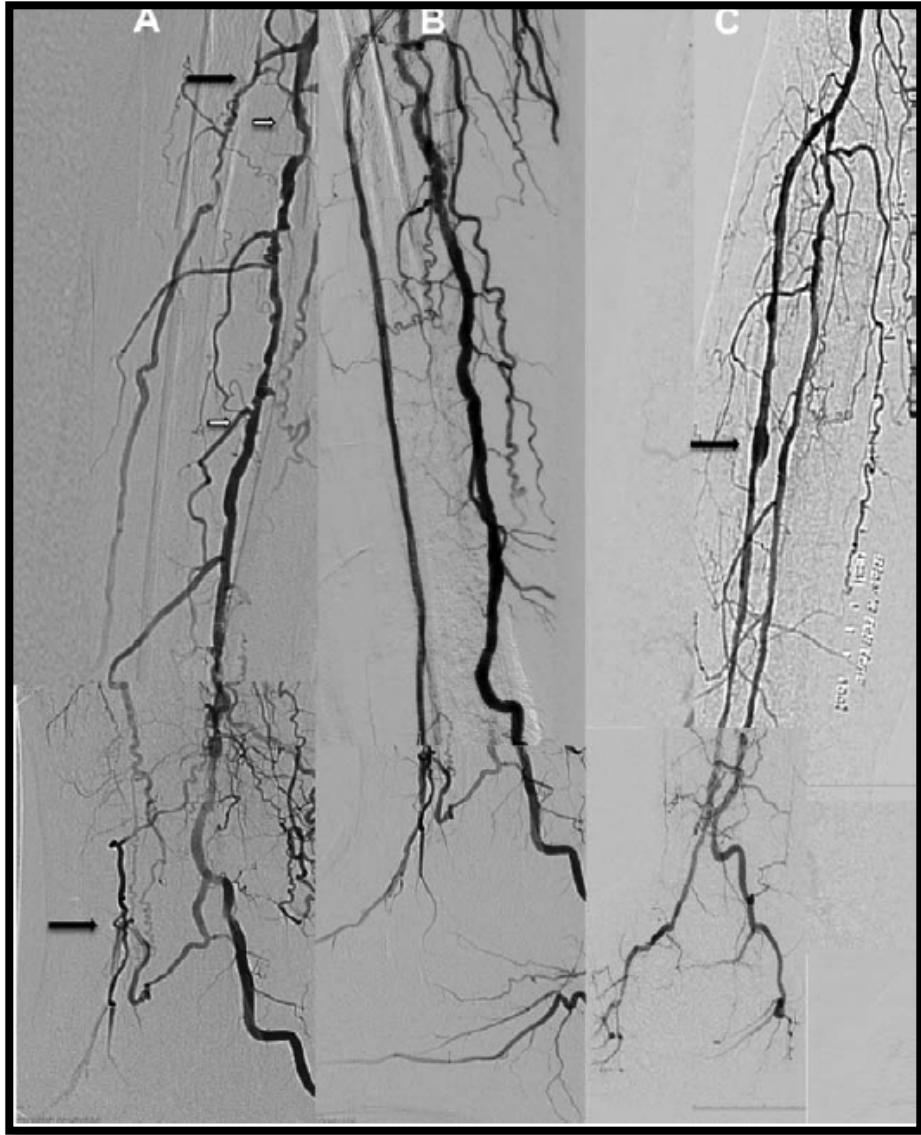


(Circulation. 2013;128:615-621.)

# Unterschenkel – Mission impossible postponed ?

## Drug Eluting Balloon

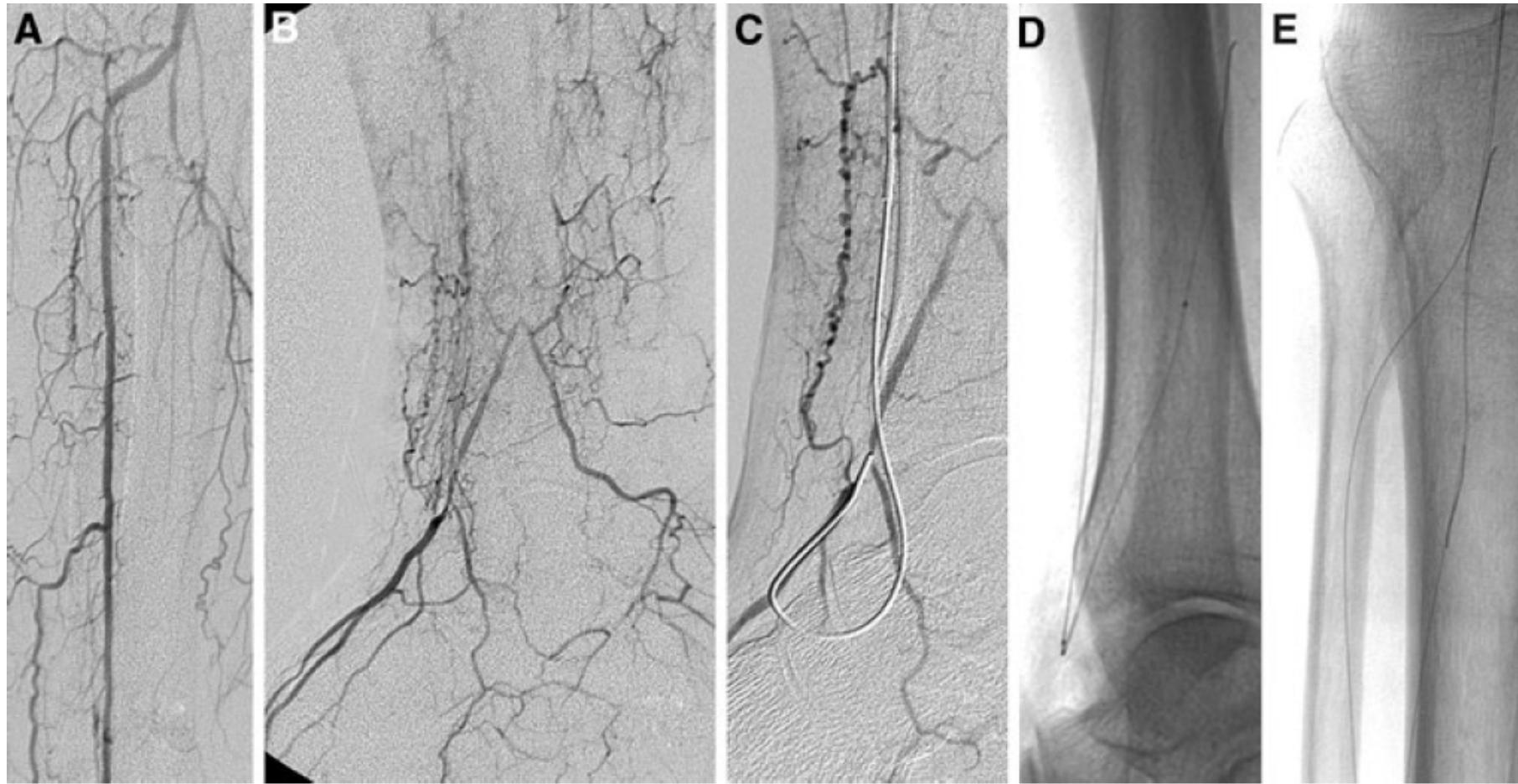
Positives Remodelling



(Circulation. 2013;128:615-621.)

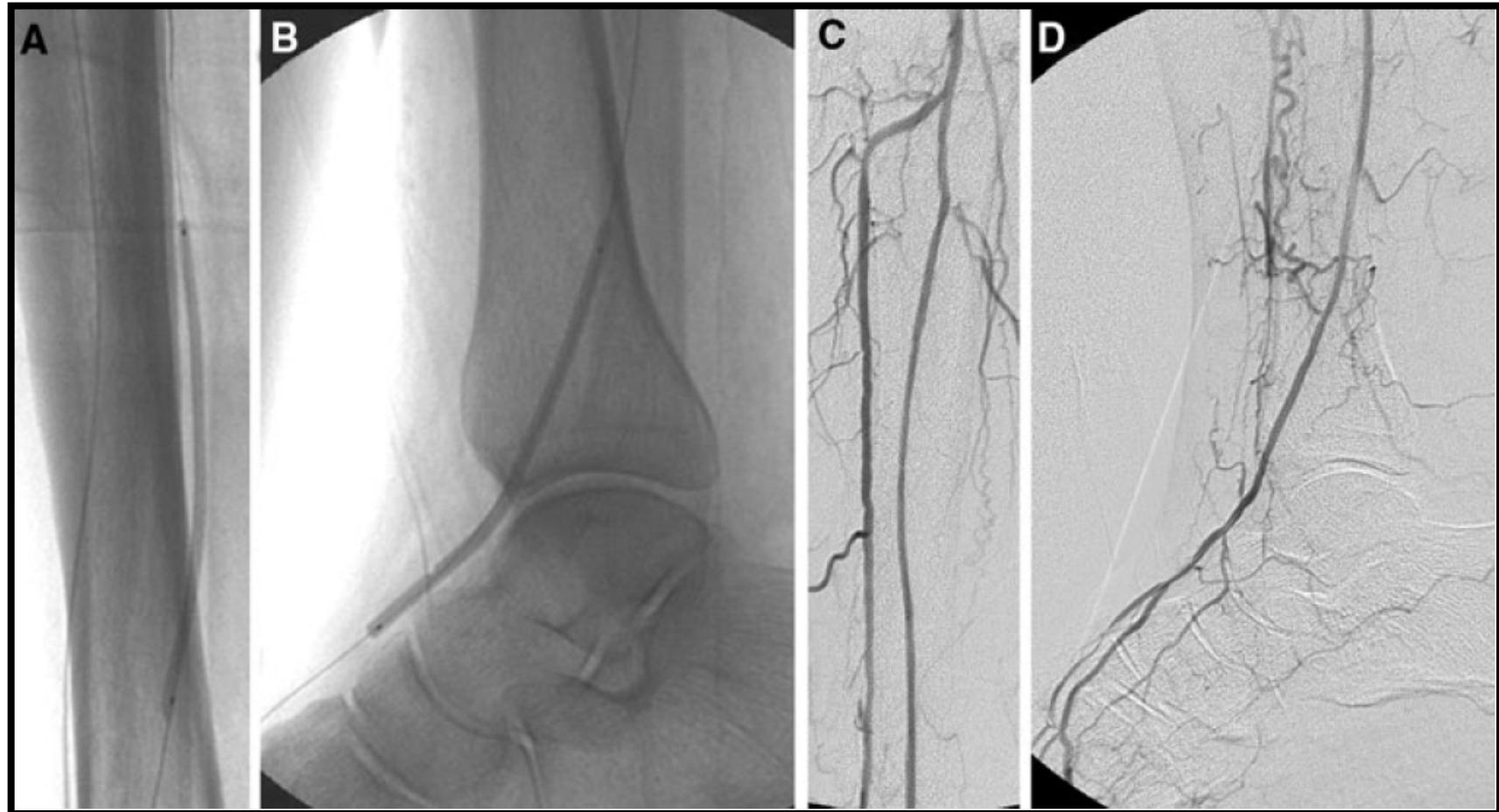
# Unterschenkel – Mission impossible postponed ?

## Antegrade – retrograde Rekanalisation



# Unterschenkel – Mission impossible postponed ?

## Antegrade – retrograde Rekanalisation



Cardiovasc Intervent Radiol (2011) 34:S78–S82

## Zusammenfassung

- kritische Ischämie
  - ✓ obligate Indikation zur Revaskularisation
  - ✓ **aufwändige** endovaskuläre Interventionen unabhängig vom morphologischen Typ !
  - ✓ Medikation
  - ✓ Ballonangioplastie ! DEB !
  - ✓ falls Stent → DES besser als BMS
  - ✓ der klinische Erfolg ist entscheidend, nicht die Langzeitoffenheitsrate !!!
  - ✓ Rezidiveingriffe akzeptieren
  - ✓ multidisziplinäre Therapie
    - Wundzentrum

# Unterschenkel –Mission impossible postponed ?

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## Empfehlung

Recommendation 29 of the European Consensus Document on Critical Limb Ischemia:

„Primary amputation should be undertaken only if the possibility of a revascularization procedure has been excluded at a vascular center“

*Circulation 1991; 84: 1*