Below Knee Intervention

Its results and how to maximize outcomes in pre-drug-eluting era

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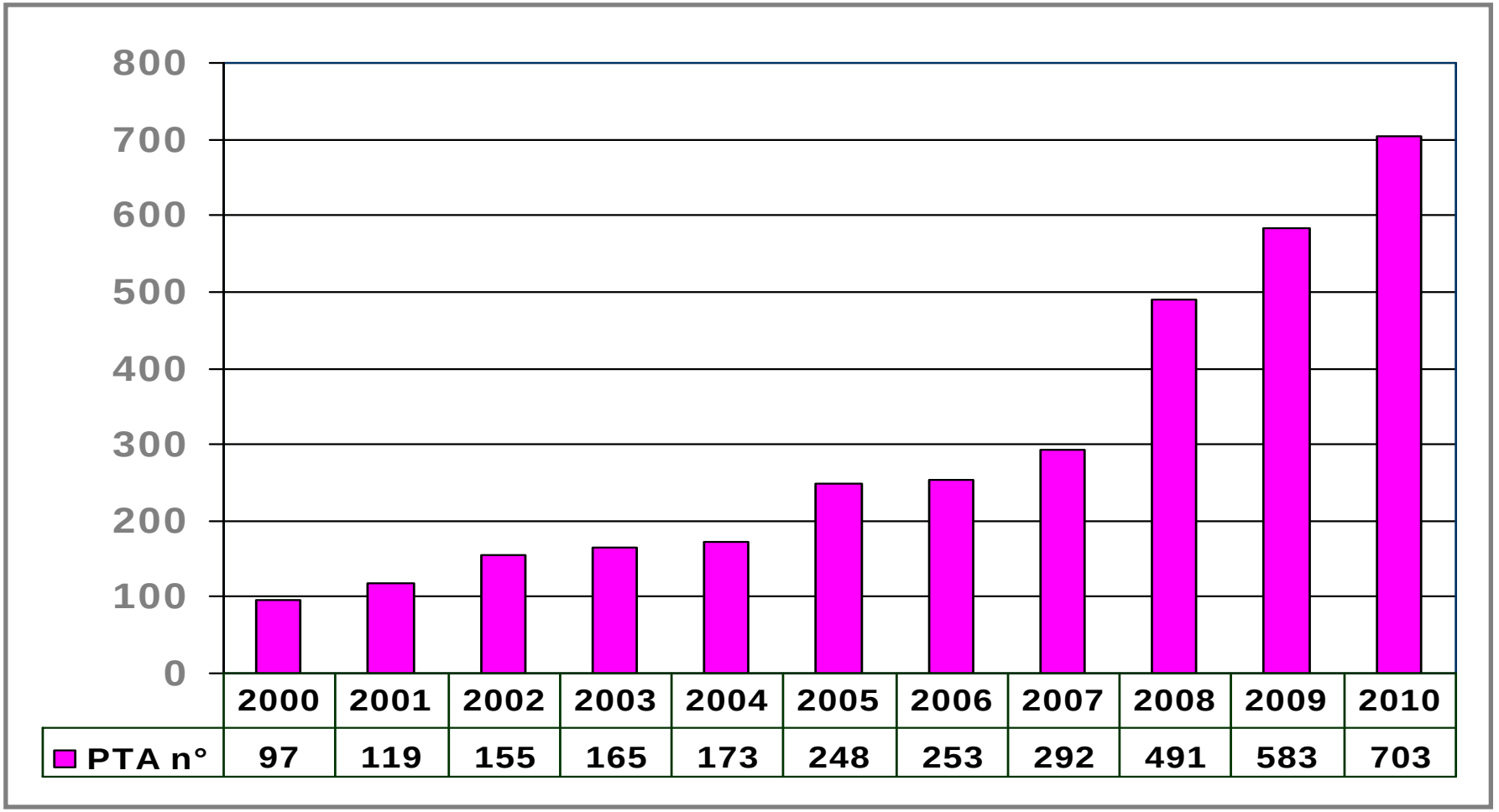
BTK Endovascular Interventions

Milano Experience (2000-2010)

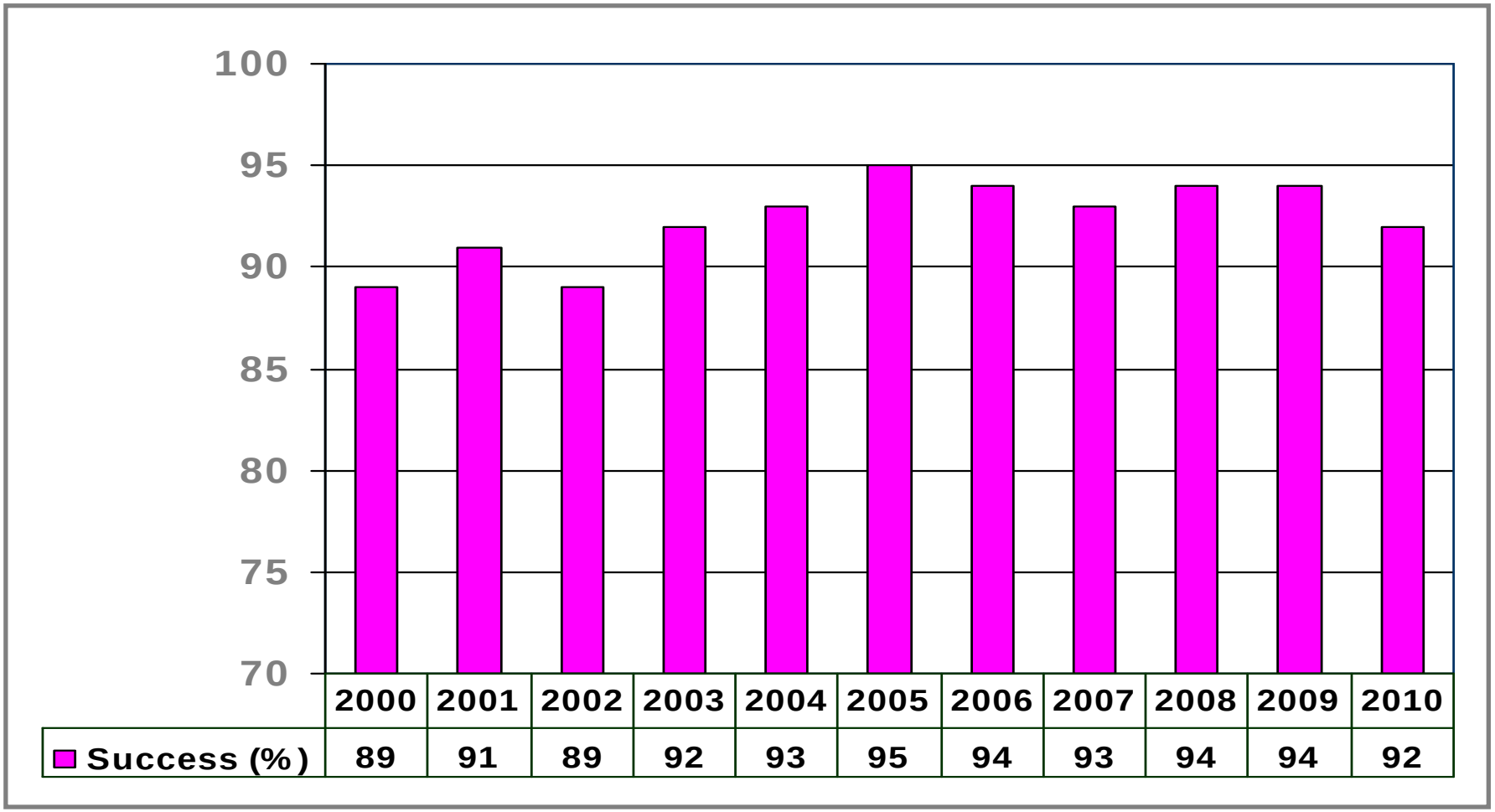


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
PTA n°	97	119	155	165	173	248	253	292	491	583	703

BTK Endovascular Interventions

Milano Experience (2000-2010)

Procedural Success

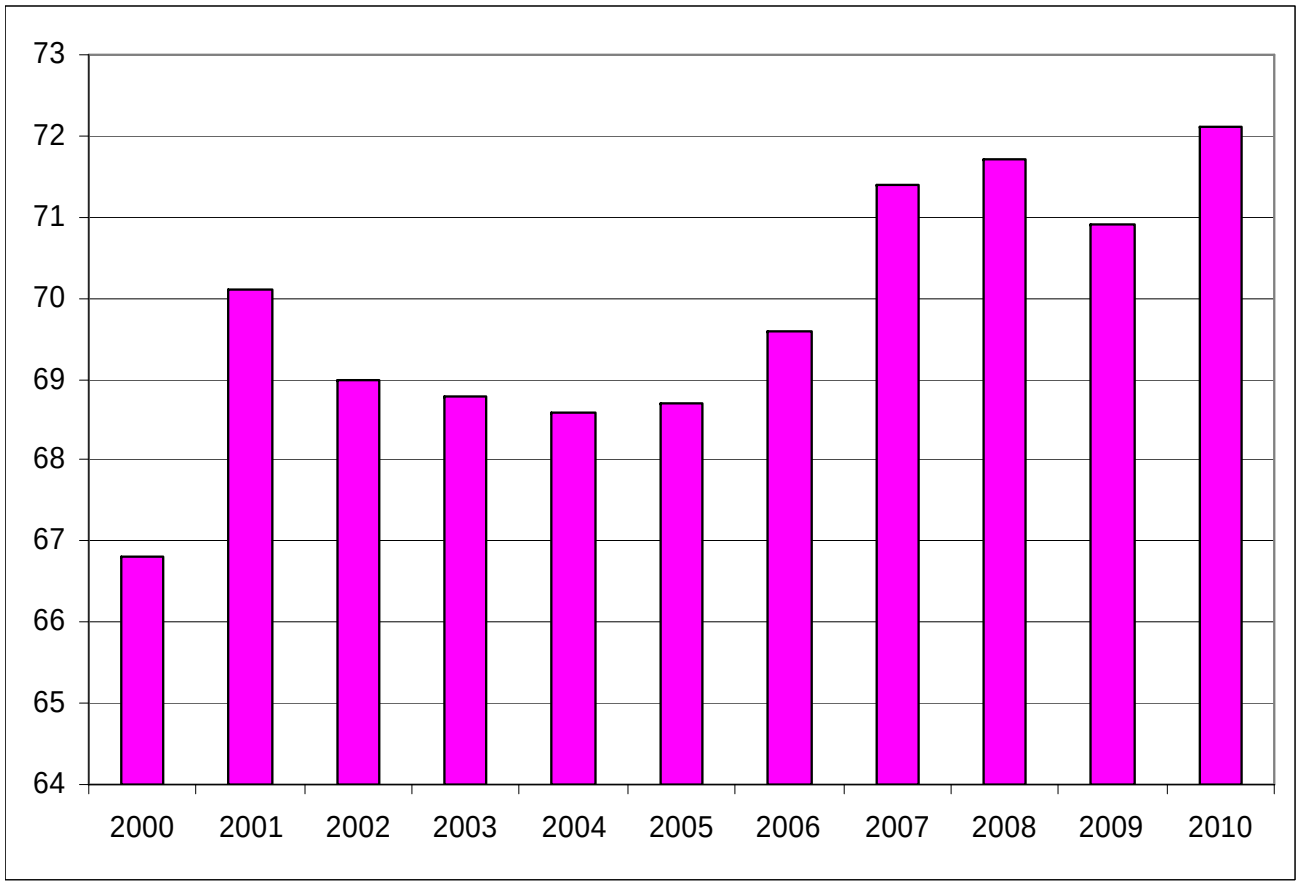


	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Success (%)	89	91	89	92	93	95	94	93	94	94	92

BTK Endovascular Interventions

Milano Experience (2000-2010)

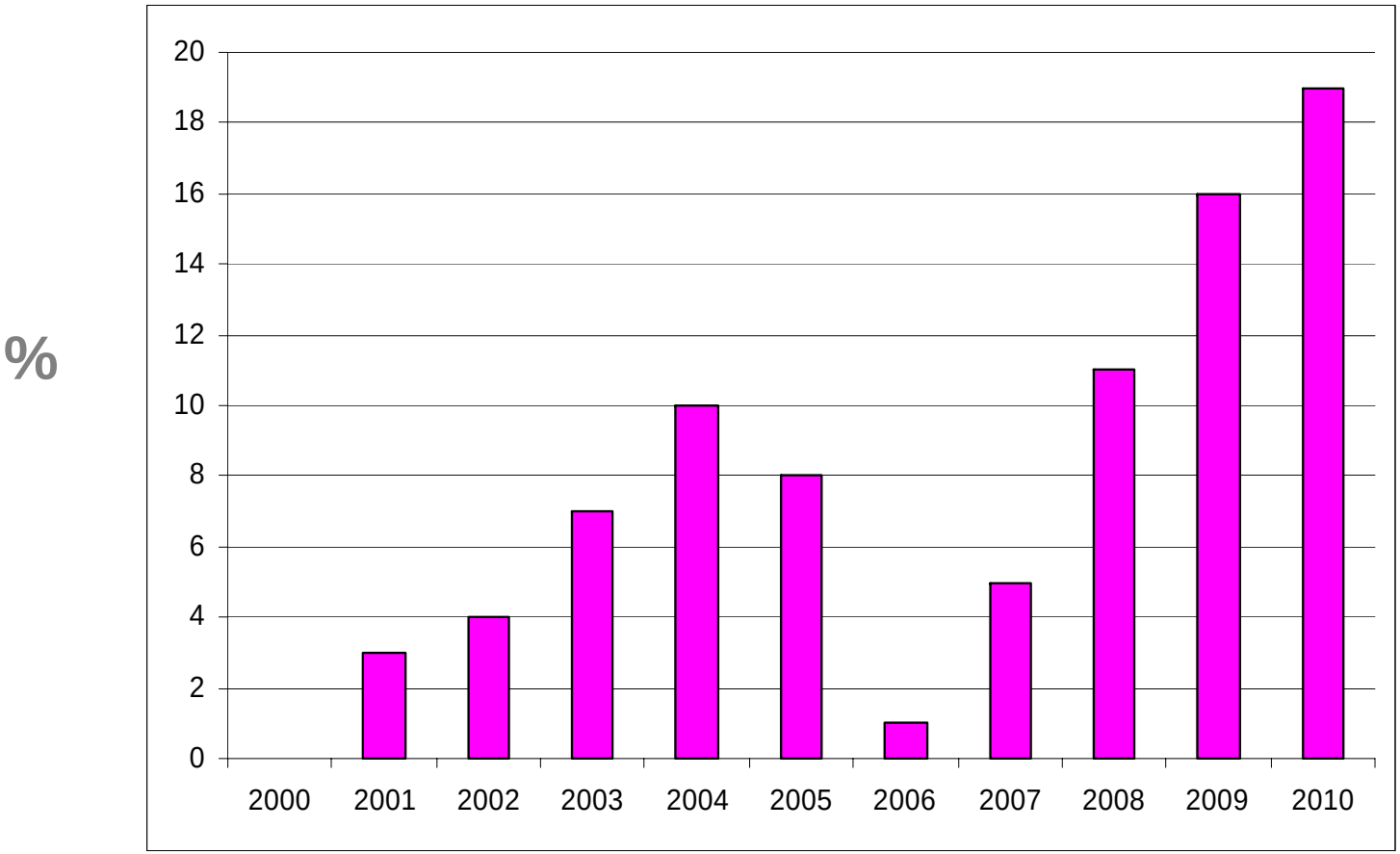
Mean Age



BTK Endovascular Interventions

Milano Experience (2000-2010)

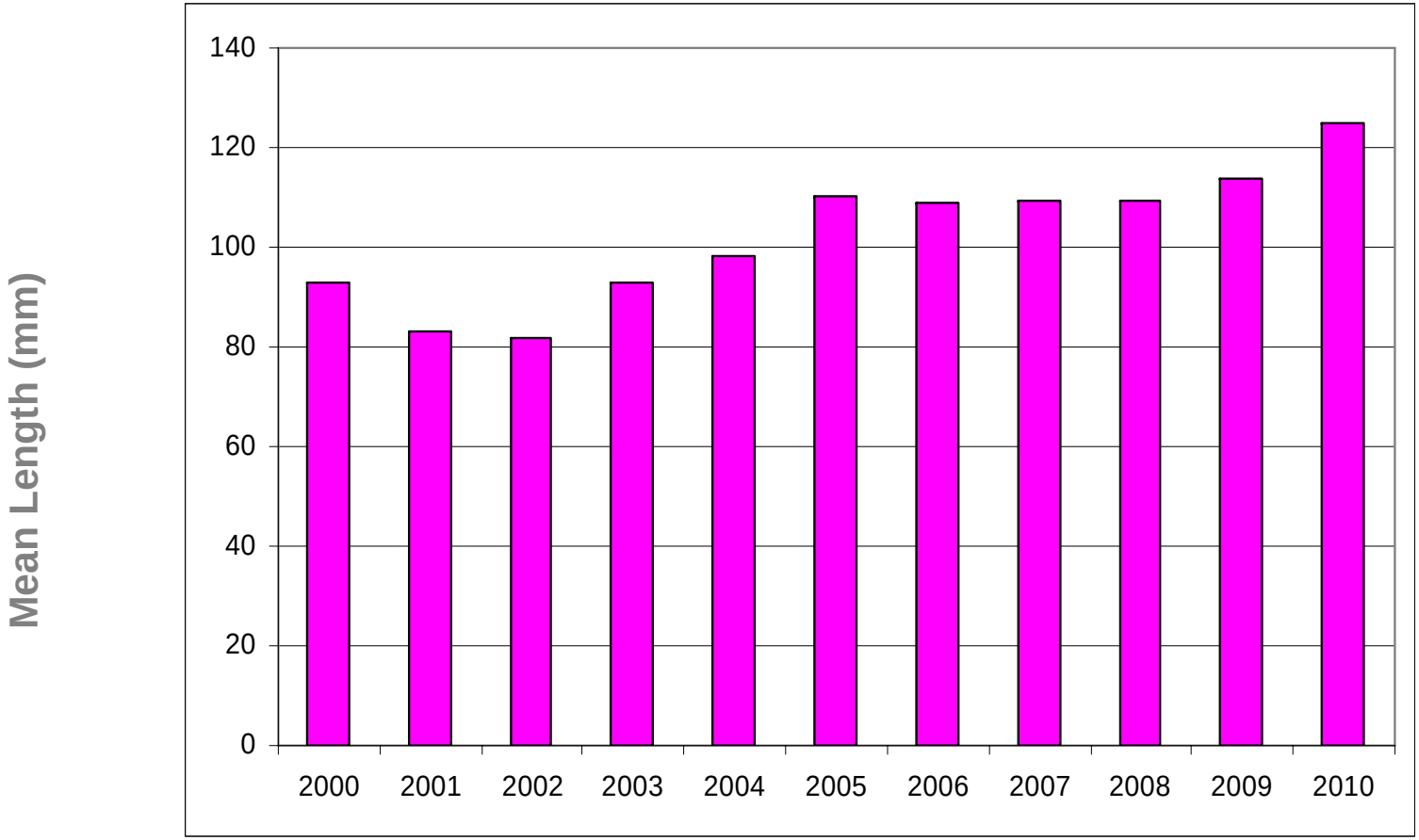
End Stage Renal Disease



BTK Endovascular Interventions

Milano Experience (2000-2010)

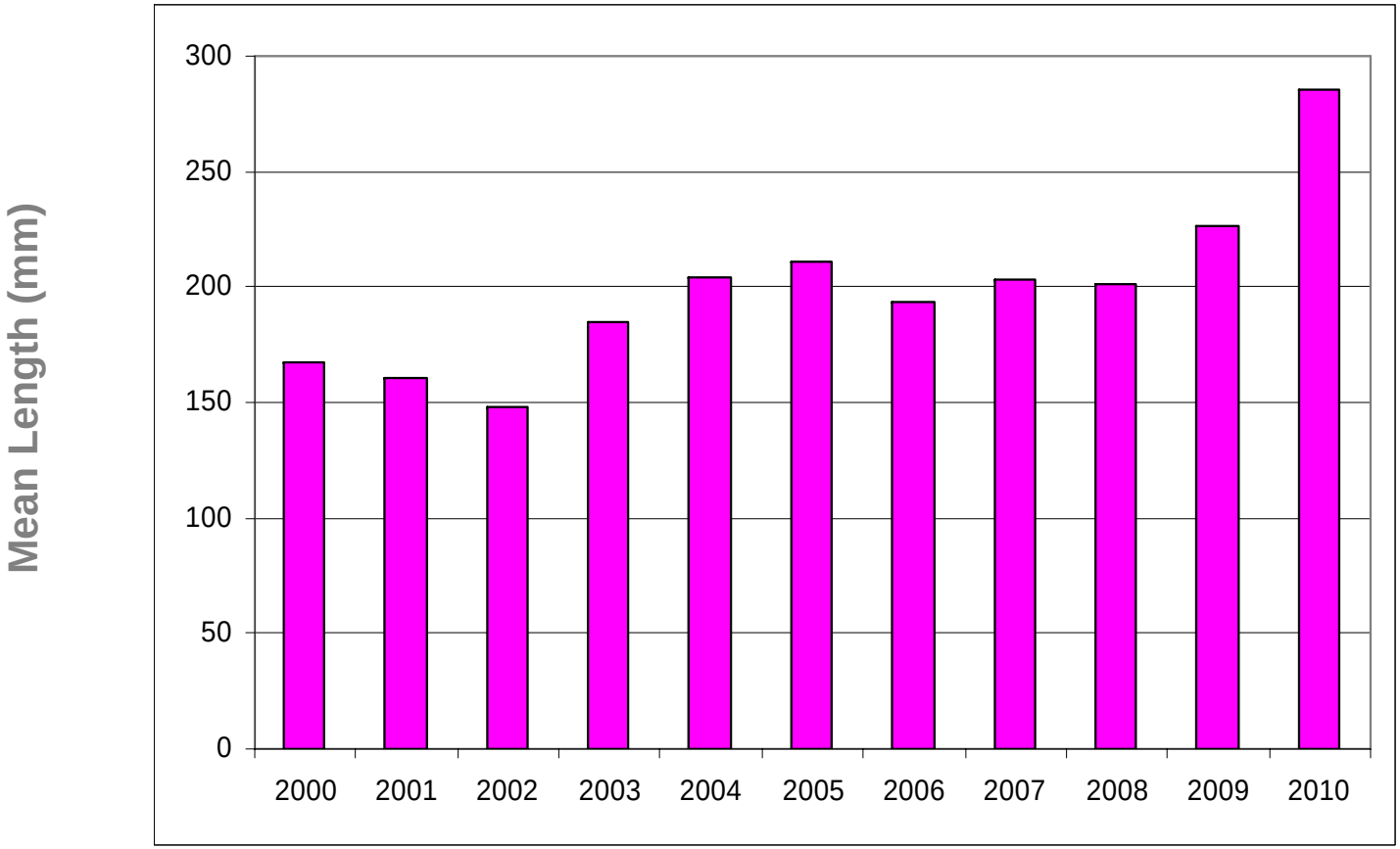
Mean length of the Single Lesion



BTK Endovascular Interventions

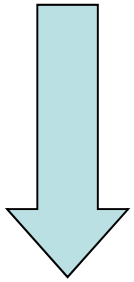
Milano Experience (2000-2010)

Mean length of treated vessels



BTK Endovascular Interventions

Maximize procedural outcome



Maximaze clinical outcome

What is the best BTK-PTA strategy?

1° **Run off 2-3**

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

2° **WRA**
Wound Related Artery

Direct WRA revascularization (PTA or bypass) better than non-WRA revascularization

Patency of crural arteries and risk of amputation

Crural patent arteries	Patients not requiring amputation ($n = 398$)	Patients requiring amputation ($n = 22$)
3	67	0
2	143	0
1	179	7 (4)
0	9	15 (62)

Data are n (%).

No patients with 2-3 patent vessels had a major amputation

No patients in whom one tibial artery was patent had a major amputation

Faglia E, *Diabetic Medicine* 2007;24:823

Patency of crural arteries and risk of amputation

Crural patent arteries	Patients not requiring amputation ($n = 398$)	Patients requiring amputation ($n = 22$)
3	67	0
2	143	0
1	179	7 (4)
0	9	15 (62)

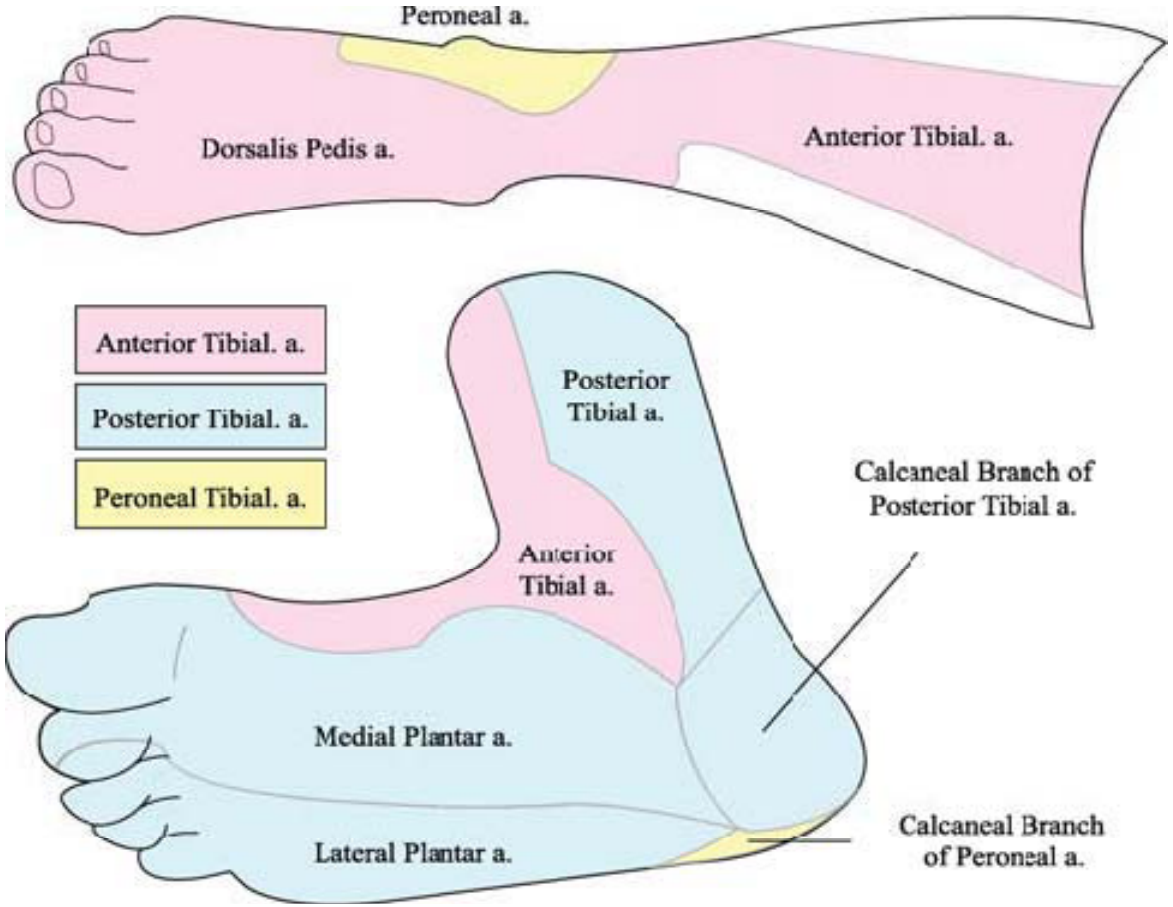
Data are n (%).

In the 7patients with only one patent crural artery who required amputation, the peroneal artery was the only patent vessel

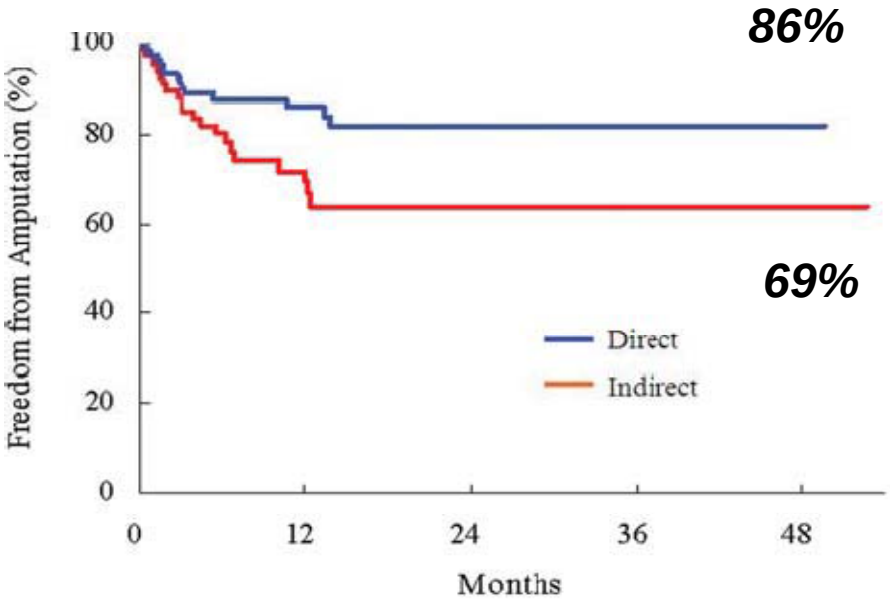
Faglia E, *Diabetic Medicine* 2007;24:823

Direct WRA recanalization

The Angiosome Concept



Direct WRA recanalization



Months		0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51
at risk	D	118	82	62	53	48	39	31	23	22	13	11	8	6	3	3	2	2	
	I	85	59	44	31	27	19	14	11	9	9	4	4	2	2	2	2	2	1
%	D	100	91.2	87.6	87.6	85.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	81.9	
	I	100	88.3	80.4	74.4	69.3	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1	64.1
SE	D	.000	.028	.034	.034	.038	.045	.045	.045	.045	.045	.045	.045	.045	.045	.045	.045	.045	
	I	.000	.037	.048	.055	.052	.067	.067	.067	.067	.057	.067	.067	.067	.067	.067	.067	.067	.067
P value						.0303				.0287				.0287				.0287	

Lida O, *Catheter Cardiovasc Intervent* 2010;75:830

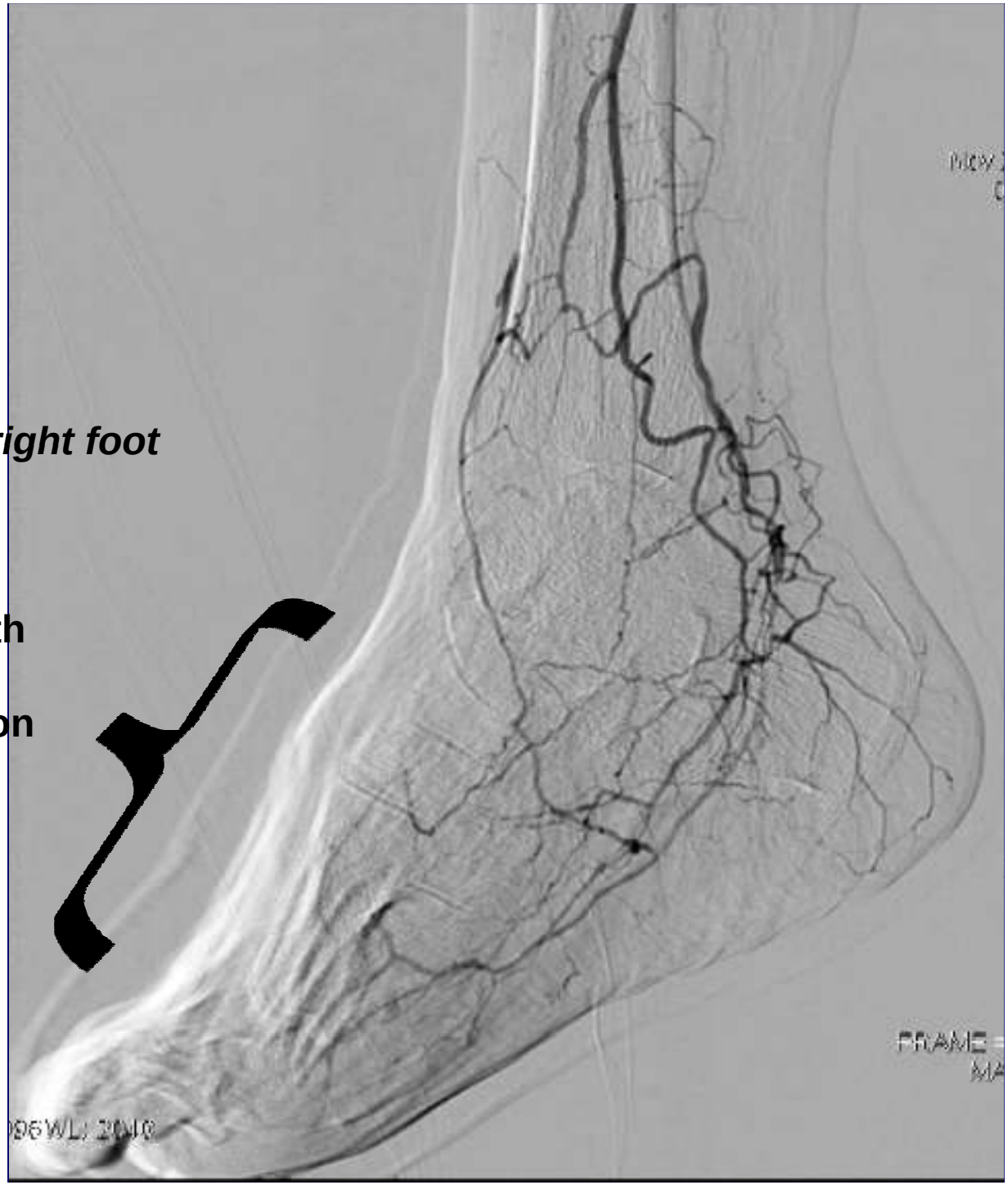
Below Knee Intervention
Key issues

- **Advanced CTO techniques**
  - ***Sub-intimal approach***
  - ***Trans-collateral approach***
  - ***Retrograde (double) approach***
- **Treatment of calcified lesions**
  - ***Cutting balloon***
  - ***Rotablator***
- **Plantar arch recanalization**

Subintimal approach to anterior tibial artery

- ***79 year-old male***
- ***Type II diabetes mellitus***
- ***Previous MI***
- ***Previous CABG***
- ***Renal Insufficiency***
- ***Ulcer and gangrene on the right foot***

Ulcer with tendons exposition




(Fill. 6)

Peroneal artery PTA, easy, cheap & fast but… is it enough?

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

Direct WRA revascularization better than non-WRA revascularization


no
Nov 25 2009
(Hill 6)
Seq: 11
WW 256 WL 128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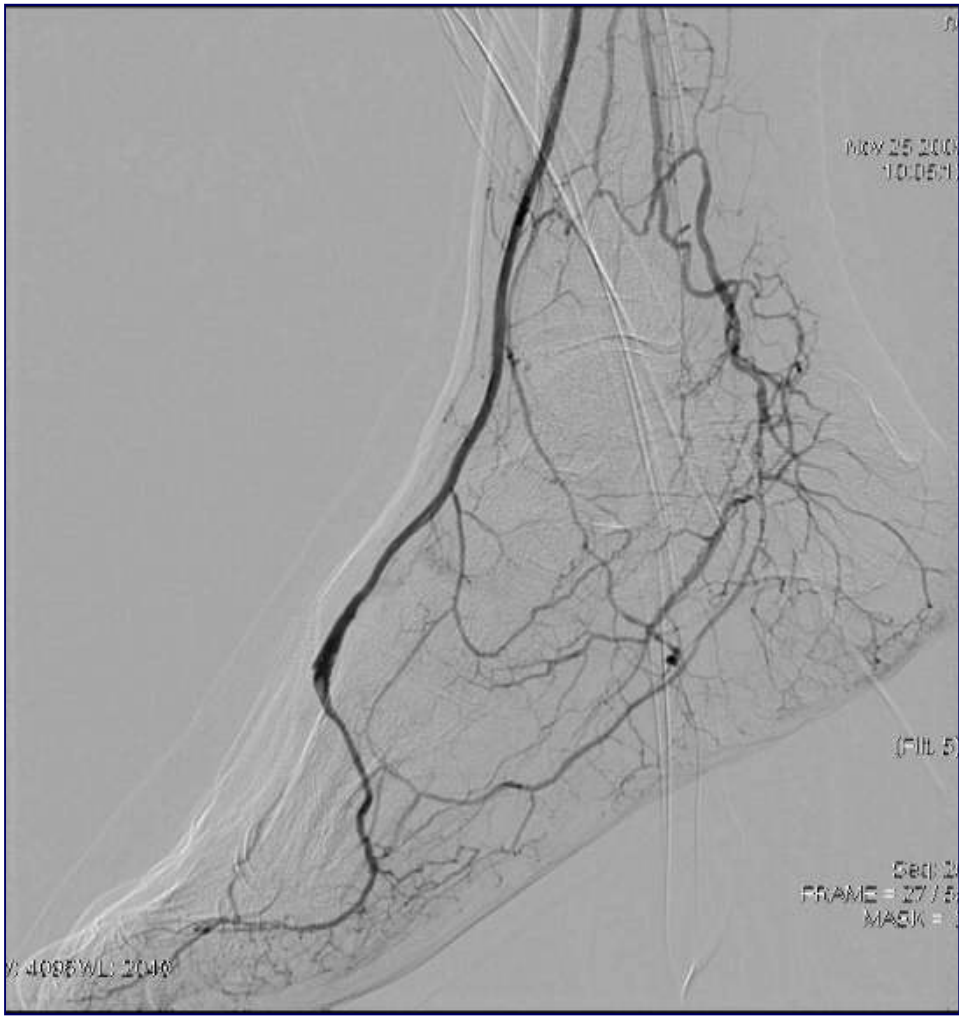
WW: 256 WL: 128


(Fil. 6)

1. ***Look always for direct WRA revascularization***
2. ***Consider that PTA can be successful in patients in whom distal bypass is not possible***



Subintimal approach to posterior tibial artery

- ***67 year-old male***
- ***Type II diabetes mellitus***
- ***Hypertensive***
- ***Previous stroke***
- ***Previous PTAs of the right leg***
- ***Ulcer of the plantar aspect of the left foot***

Ulcer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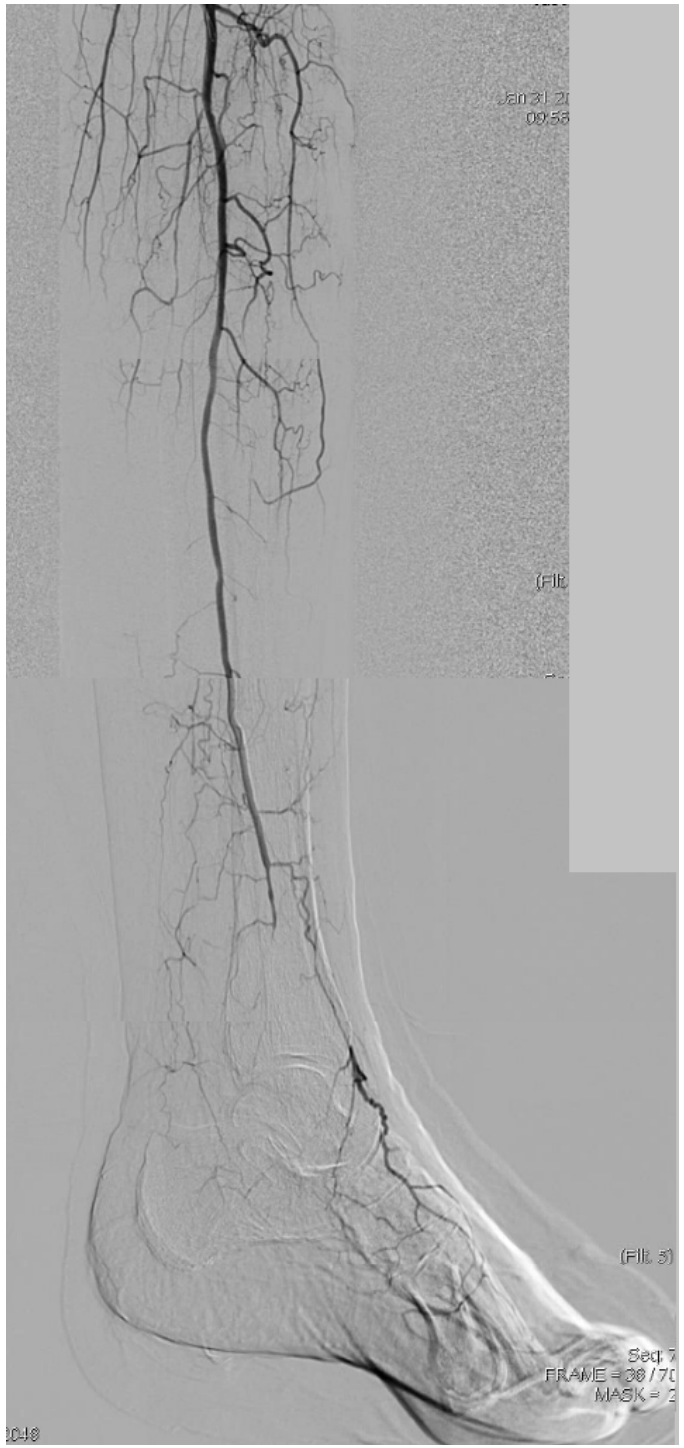
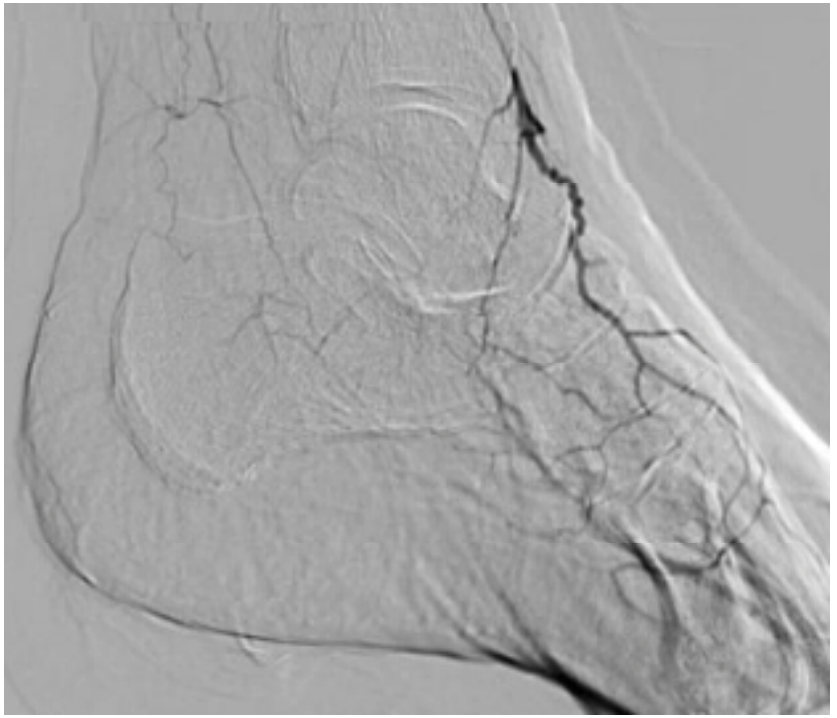


The target is the PTA and the plantar arch

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caso 01
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Seq: 24
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caso 01
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11:03:57
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Seq: 47
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WW: 256 WL: 128


(Filt. 5)

Crural and pedal disease causing CLI

Eur J Vasc Endovasc Surg (2009) 37, 336–342

ELSEVIER

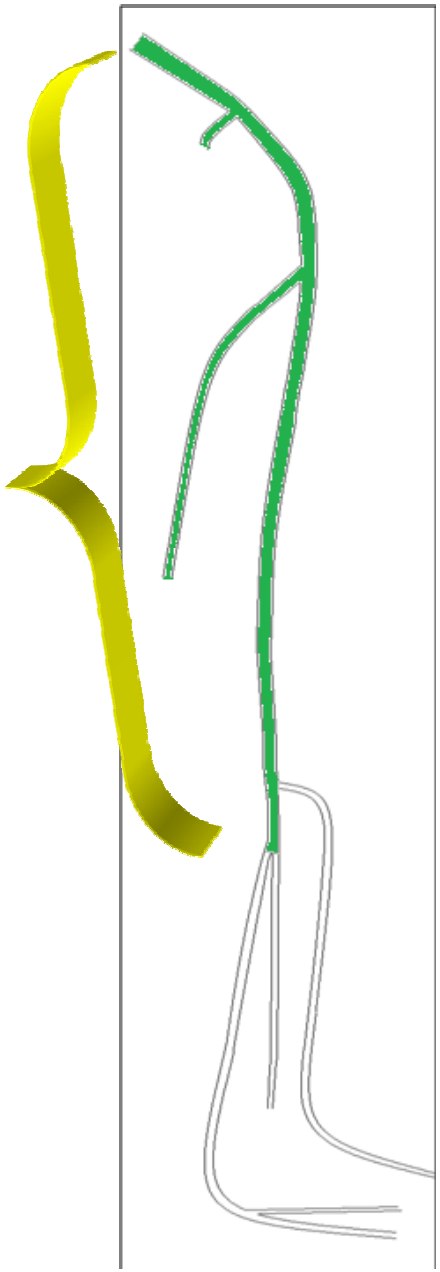
Long-term Outcomes after Angioplasty of Isolated, Below-the-knee Arteries in Diabetic Patients with Critical Limb Ischaemia

R. Ferraresi [a], M. Centola [a], M. Ferlini [a], R. Da Ros [b], C. Caravaggi [b], R. Assaloni [b], A. Sganzaroli [b], G. Pomidossi [a], C. Bonanomi [a], G.B. Danzi [a,*]

To focalize our attention on BTK disease we selected a pure diabetic-BTK population

Crural and pedal disease causing CLI

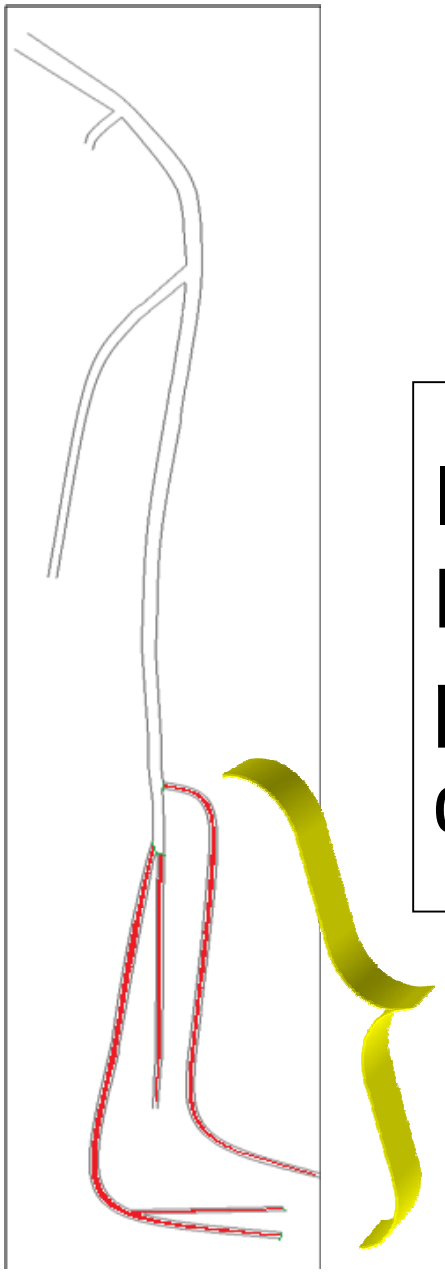
Iliac, fem-pop, TPT **NO significant obstructive disease**



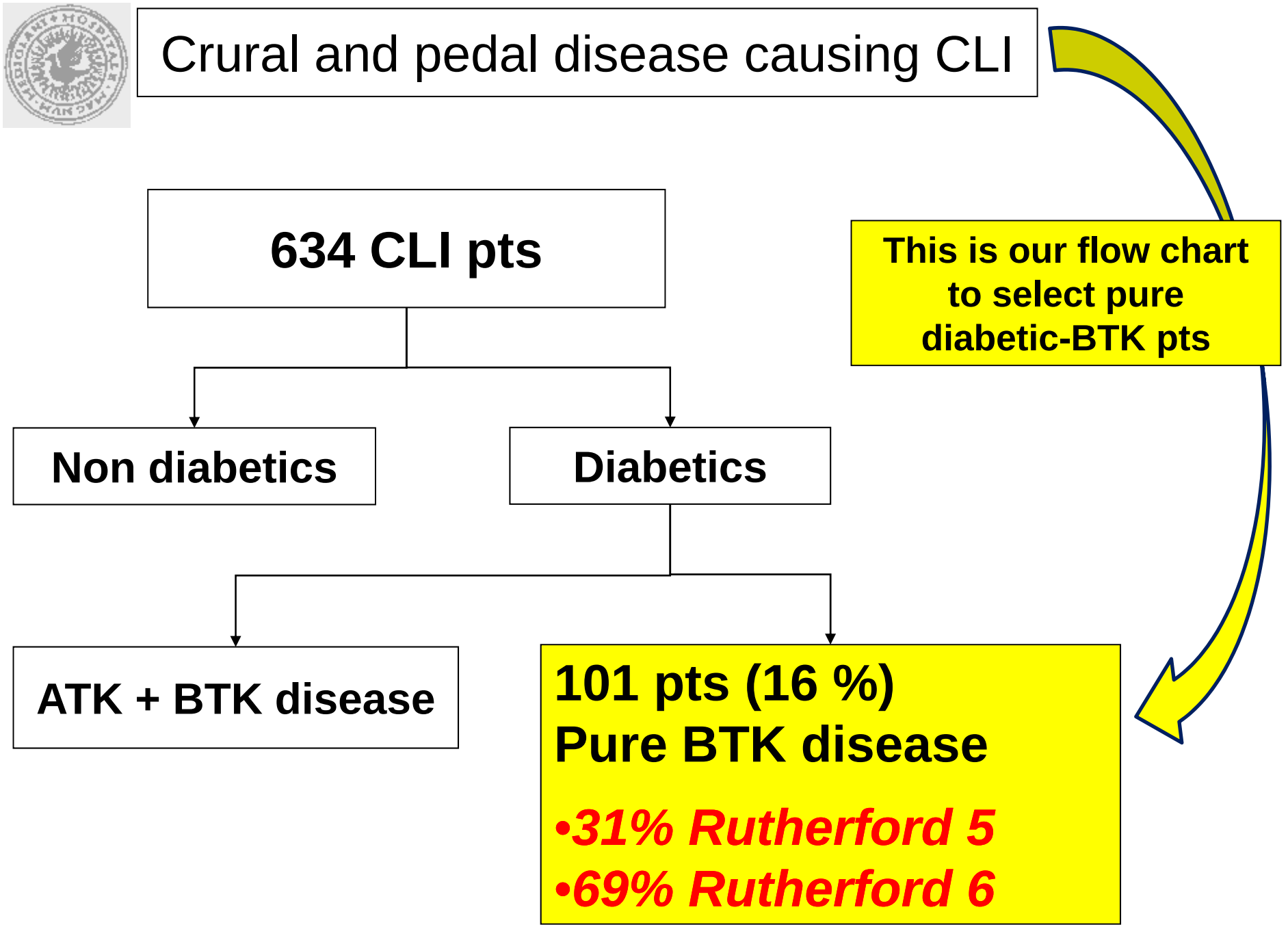
We excluded from this retrospective study patients with above-the-knee vessels disease

Crural and pedal disease causing CLI

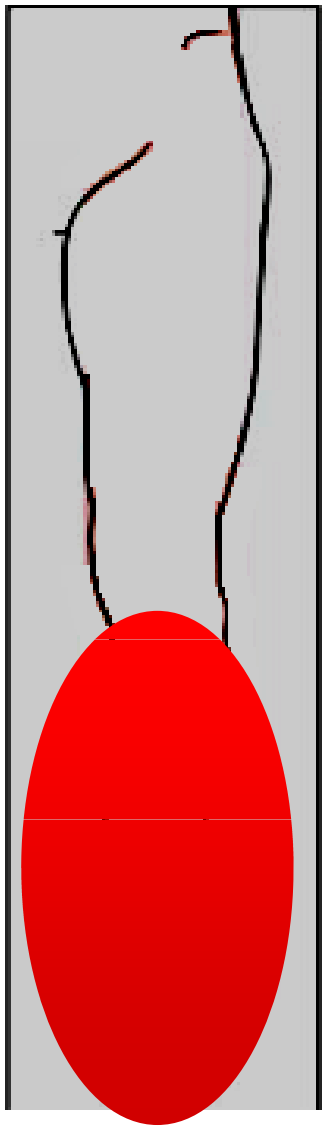
We included all the diabetic patients with pure BTK vessels disease



Isolated AT, PT, PER, pedal, plantar arteries disease


Crural and pedal disease causing CLI
634 CLI pts
This is our flow chart to select pure diabetic-BTK pts
Non diabetics
Diabetics
ATK + BTK disease
101 pts (16 %)
Pure BTK disease
•31% Rutherford 5
•69% Rutherford 6

Baseline angiographic pattern



Diseased vessels in 107 limbs	No.	%
Anterior tibial	103	96
Posterior tibial	104	97
Peroneal	74	69
Pedal artery	51	48
Plantar artery	74	69
0 leg vessel	—	—
1 leg vessel	4	4
2 leg vessels	32	30
3 leg vessels	71	66

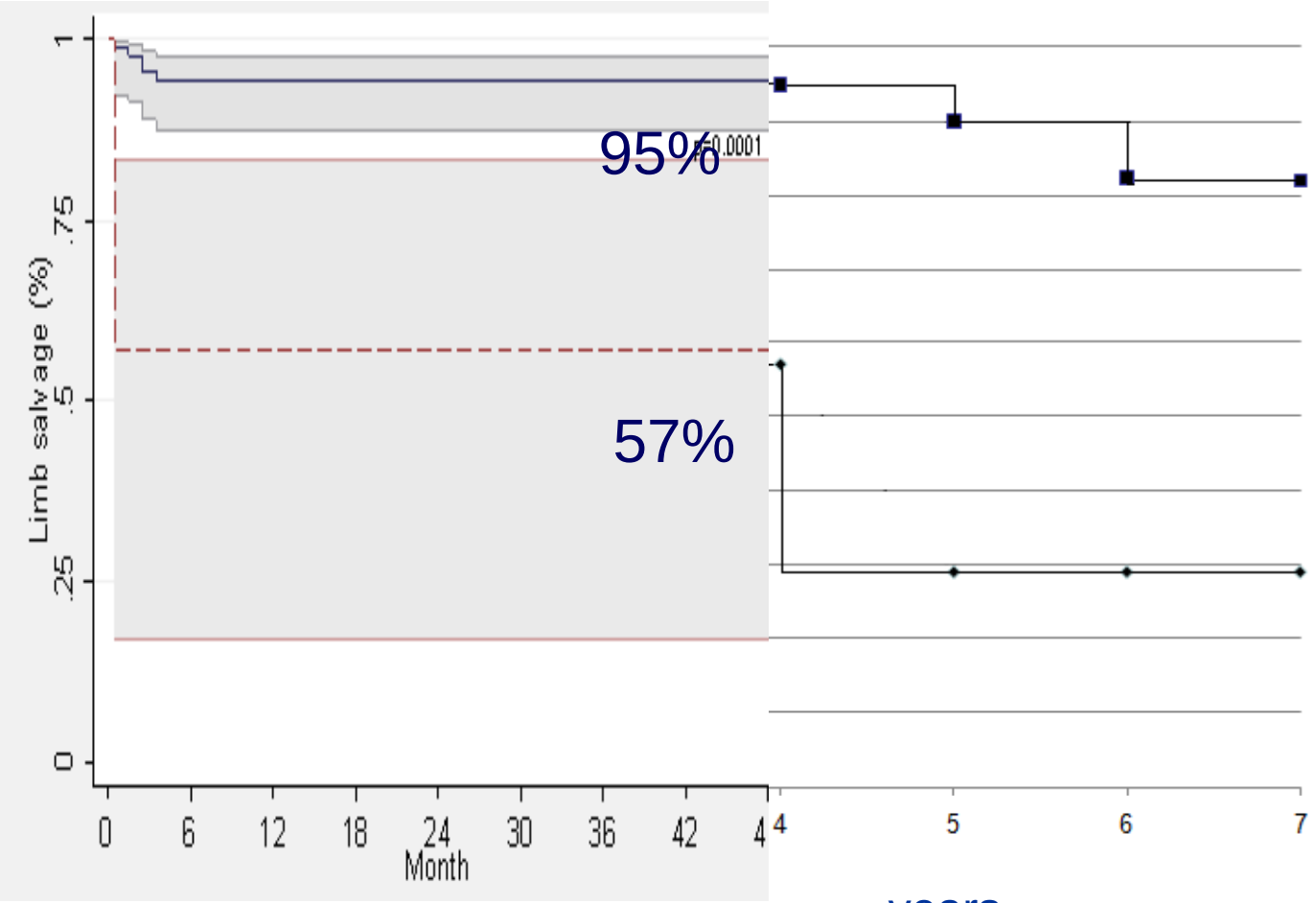
Results: TECHNICAL PTA SUCCESS

101 pts / 107 limbs

7 limbs
unsuccessful PTA
due to *uncrossable heavy calcified lesions: this is the main reason of failure in BTK PTA*

100 limbs
successful PTA

7 years FU LIMB SALVAGE



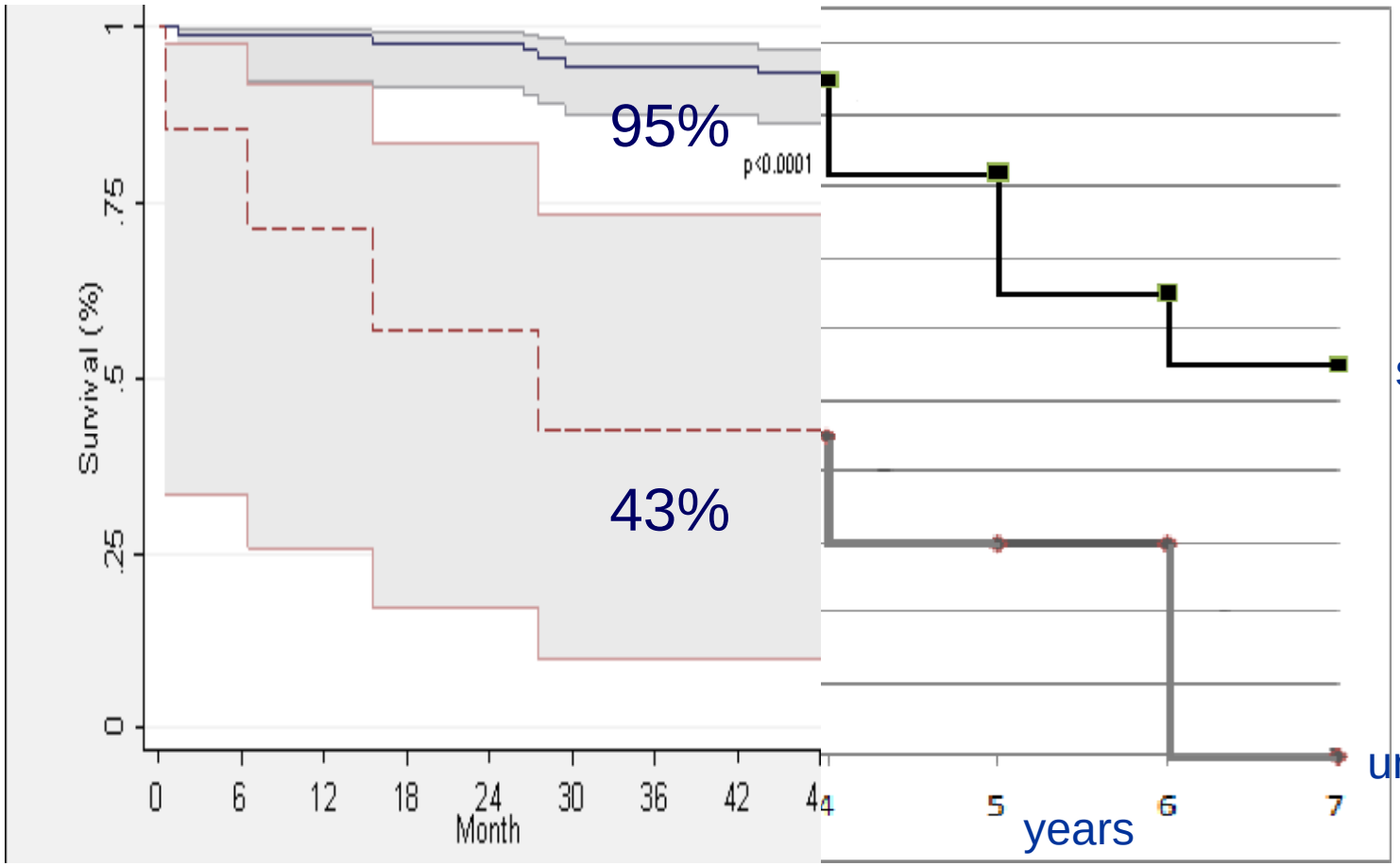
successful PTA

82%

unsuccessful PTA

29%

7 years FU SURVIVAL RATE



successful PTA

60%

unsuccessful PTA

0%

BTK Endovascular Interventions

- In our selected BTK-CLI population a successful PTA led to a high percentage of limb salvage
- Unsuccessful PTA is associated with a very high rate of major amputation and death
- The knowledge of all the available techniques is essential to maximize the procedural success