When should we consider the percutaneous and/or hybrid deep venous arterialization for CLTI patients?

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Disclosure

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- No conflicts of interest

	Hybrid	Percutaneous
GSV availability	**= standard bypass**	**No need of GSV**
Surgical wounds		
Device availability		
ATK disease		
Degree of BTK disease		
Pattern of food perfusion		

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Surgical wounds	**Yes, often severe and prone to complications**	**No**
Device availability		
ATK disease		
Degree of BTK disease		
Pattern of food perfusion		


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Surgical wounds directly impact the outcome, length of hospital stay, costs, and quality of life

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Device availability	Everywhere Cheap	Limflow & artisanal approaches High cost
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Baseline

GSV in situ

Final result

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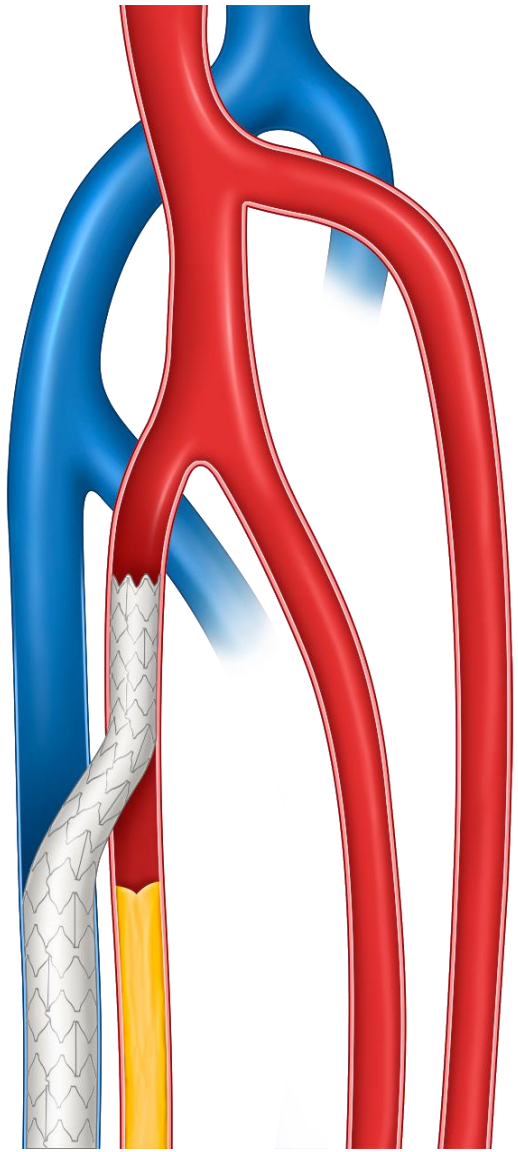
Degree of BTK disease	Prox anastomosis can minimize steal effect	Distal AV-crossing can minimize steal effect
Pattern of food perfusion		

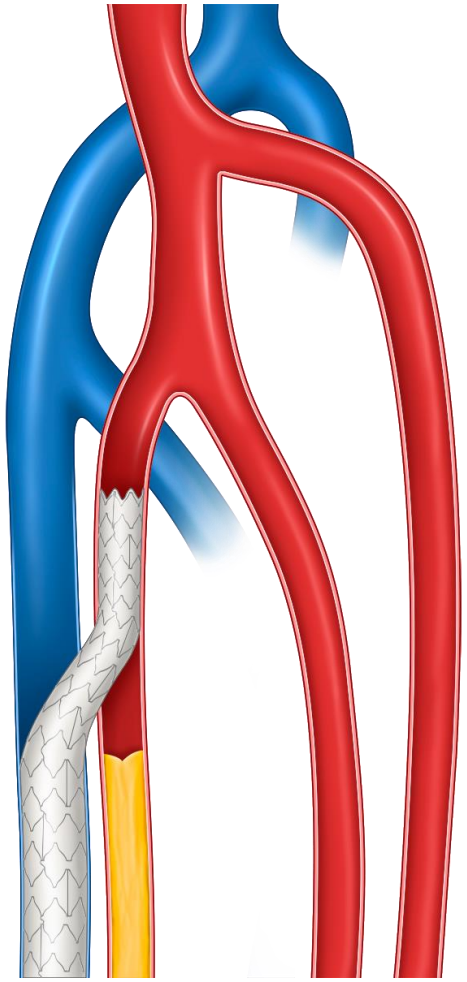
Factors affecting the amount of shunting



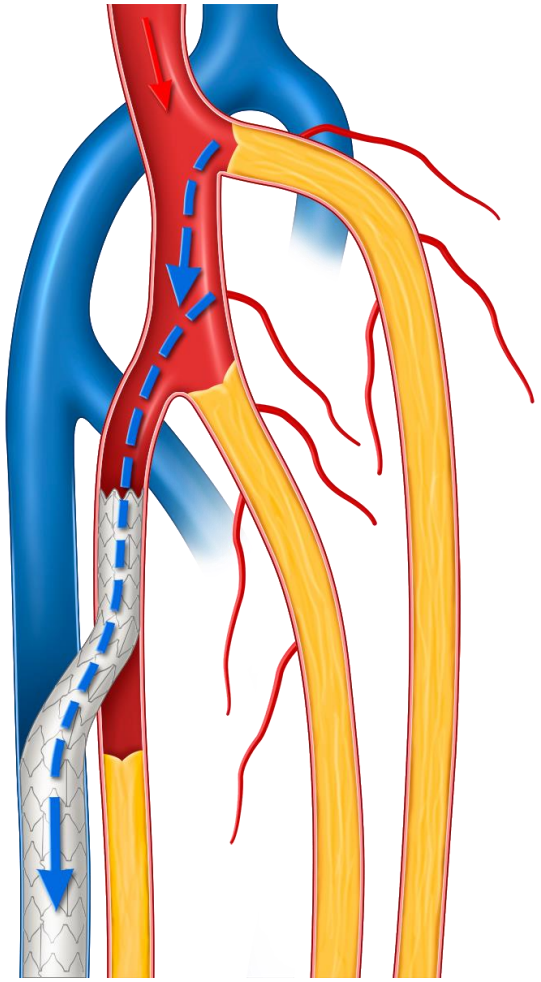
- Arterial inflow pressure
- Arterial outflow resistance
- Venous outflow resistance
- Diameter (size) of shunt
- Distance between last arterial collateral and crossover point

Prof. Steven Kum

Effect of different degree of disease (resistance)



Less disease
→ less shunting

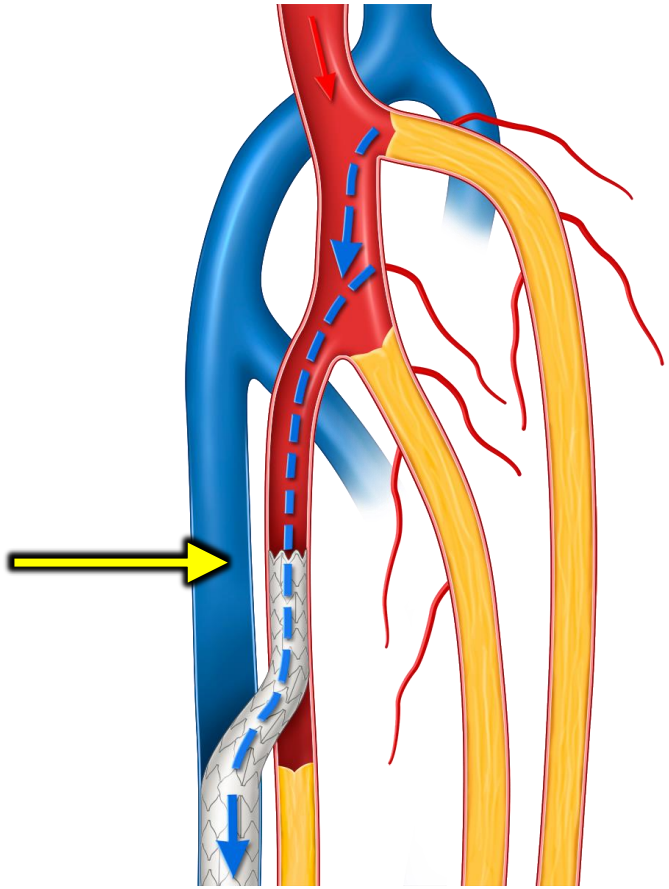


More disease
→ more shunting

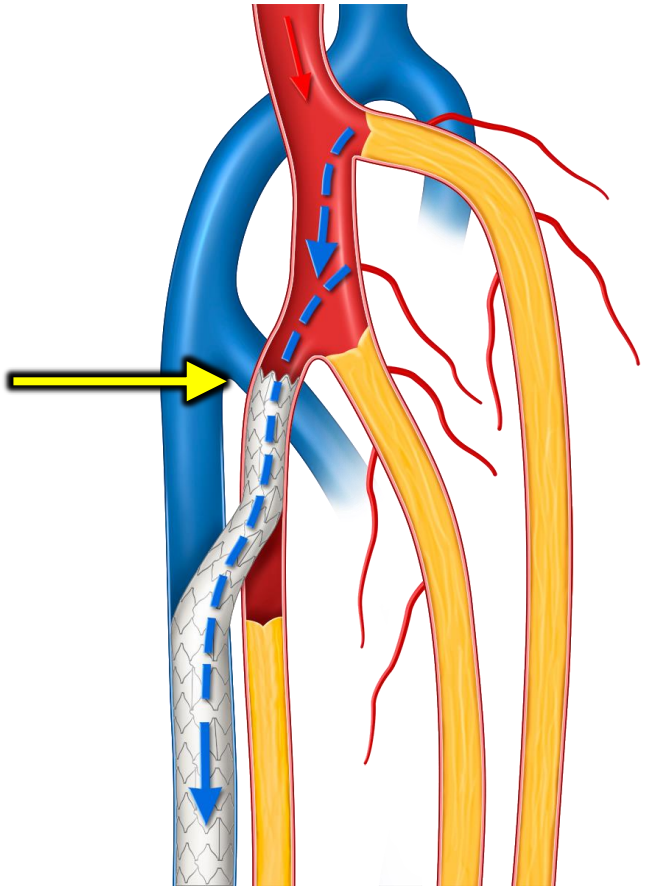
The poorer the residual tissue flow (= deeper ischemia!), the higher the risk of steal effect after FVA leading to sudden deterioration of pain and tissue lesion

Prof. Steven Kum

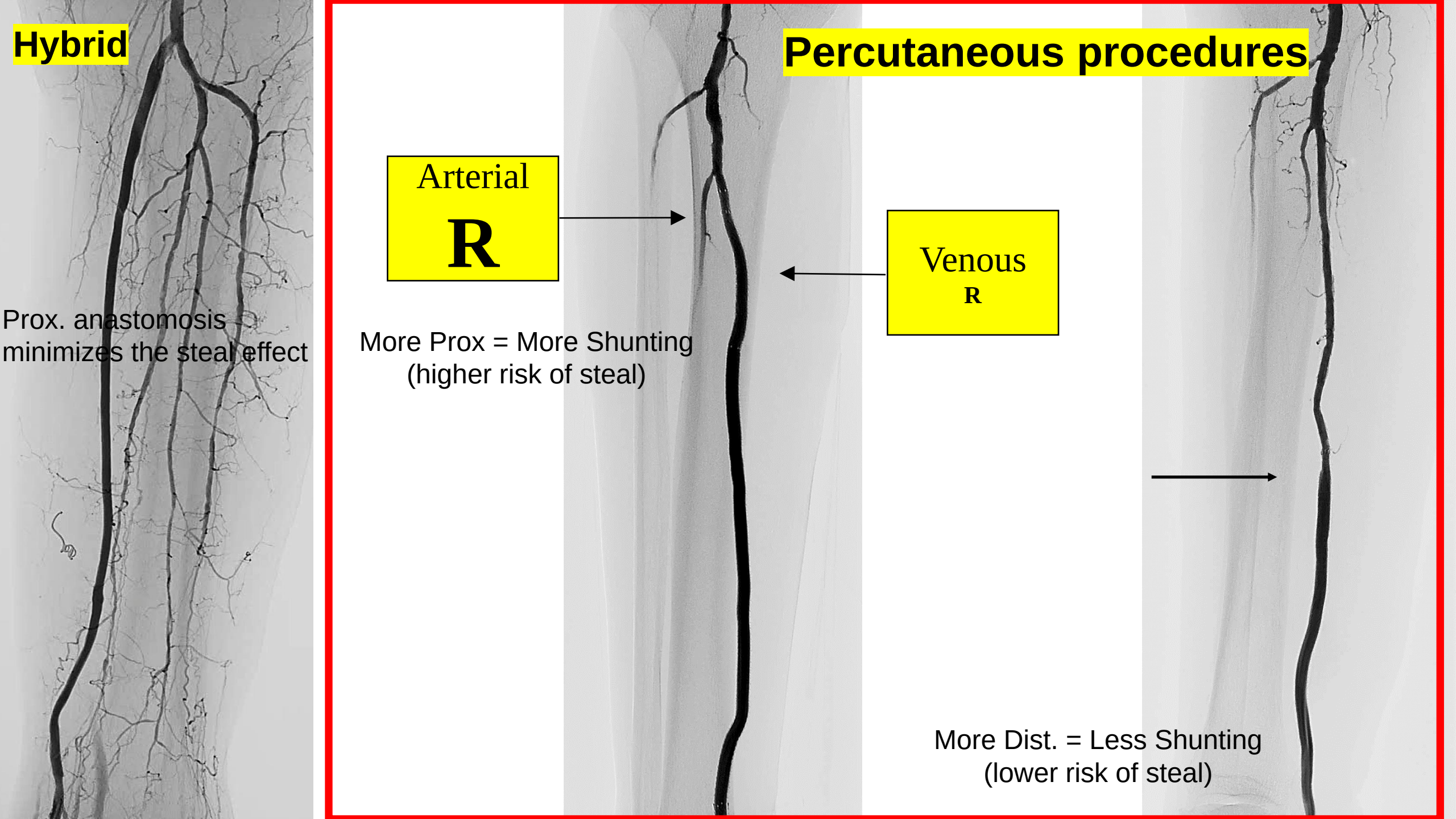
Effect of different level of crossing



Less shunting when crossover point is more distal



More shunting when crossover point is more proximal


Hybrid
Prox. anastomosis minimizes the steal effect
Percutaneous procedures
Arterial
R
Venous
R
More Prox = More Shunting
(higher risk of steal)
More Dist. = Less Shunting
(lower risk of steal)

	Hybrid	Percutaneous
GSV availability	**= standard bypass**	**No need of GSV**
Surgical wounds	**Yes, often severe and prone to complications**	**No**
Device availability	**Everywhere Cheap**	**Limflow & artisanal approaches High cost**
ATK disease	**Prox anastomosis can be done in CFA/SFA/POP**	**Percutaneous-FVA is a pure BTK procedure**
Degree of BTK disease	**Prox anastomosis can minimize steal effect**	**Distal AV-crossing can minimize steal effect**
Pattern of foot perfusion	**Prox anastomosis better preserves the baseline foot perfusion**	**Crossing site must be chosen according to residual function of BTK vessels**

Hybrid approach:

Prox. anastomosis better preserves the baseline foot perfusion

Residual circulation: PTA

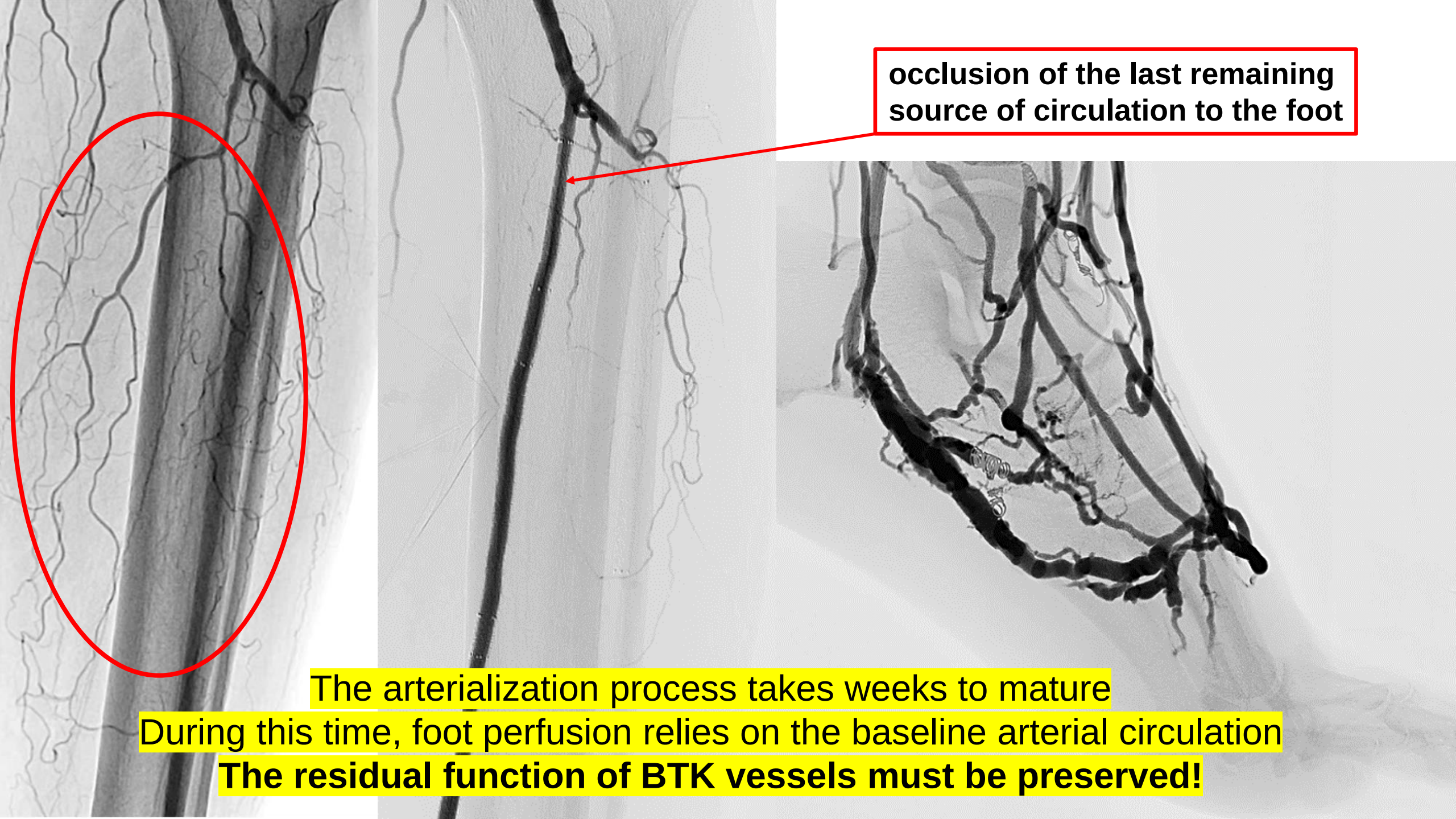
Percutaneous approach

Crossing site must be chosen according to residual function of BTK vessels

- Male, 63yo
- T2DM
- CAD
- PAD: multiple BTK interventions (ATA, PTA)

Percutaneous Procedure

Baseline day 1 day 2 day 4 day 5



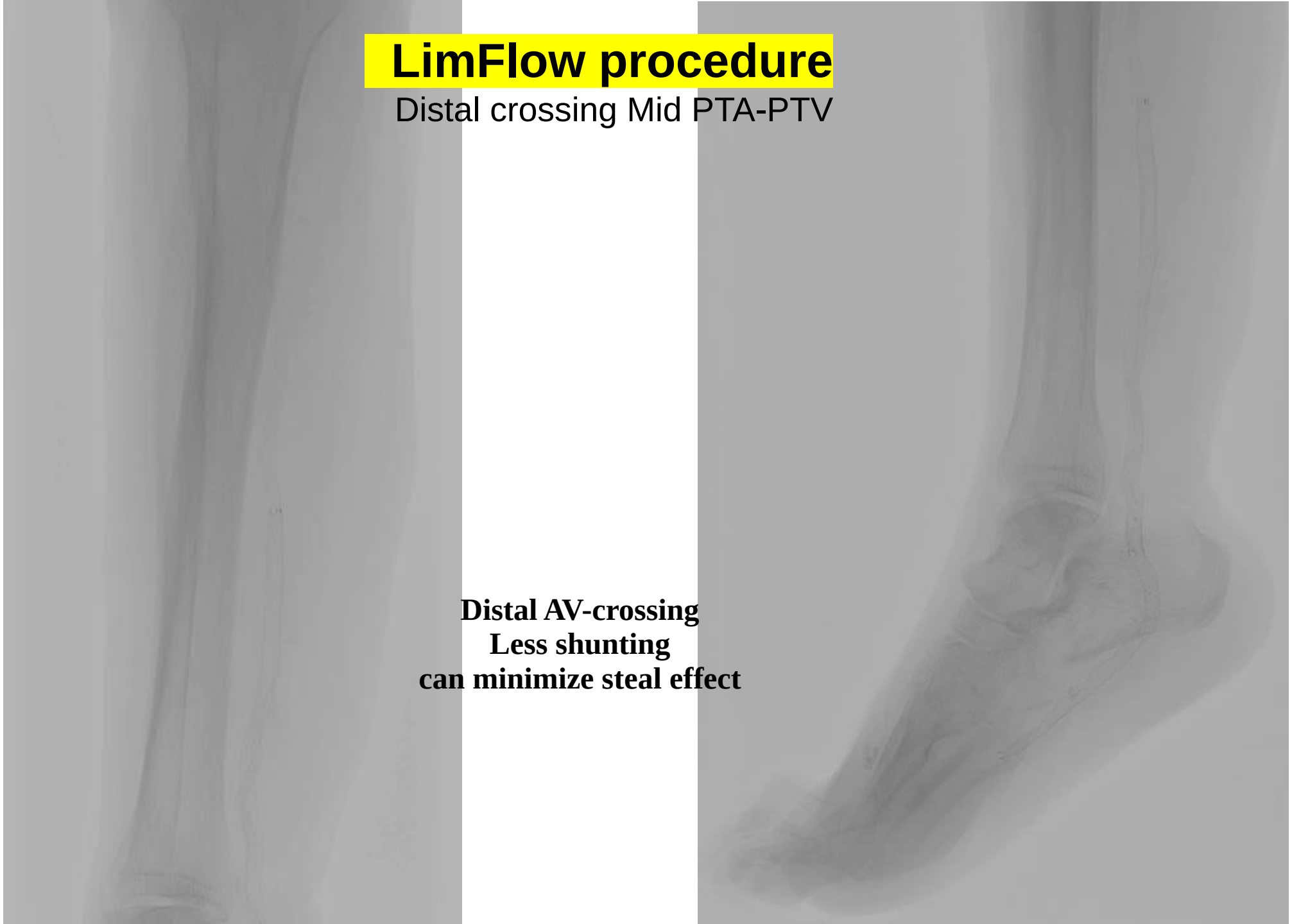
The arterialization process takes weeks to mature

During this time, foot perfusion relies on the baseline arterial circulation

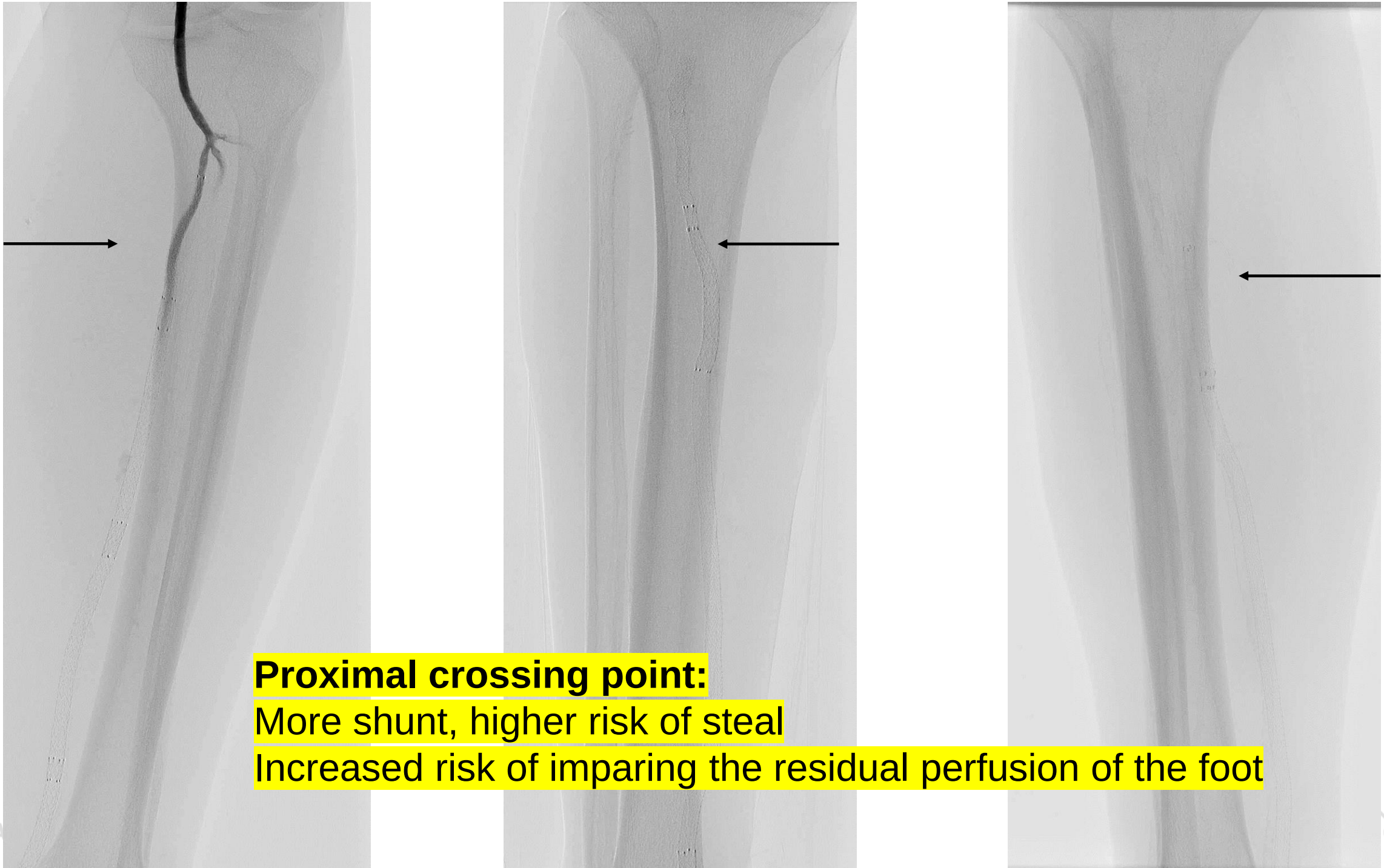
The residual function of BTK vessels must be preserved!

LimFlow procedure

Distal crossing Mid PTA-PTV



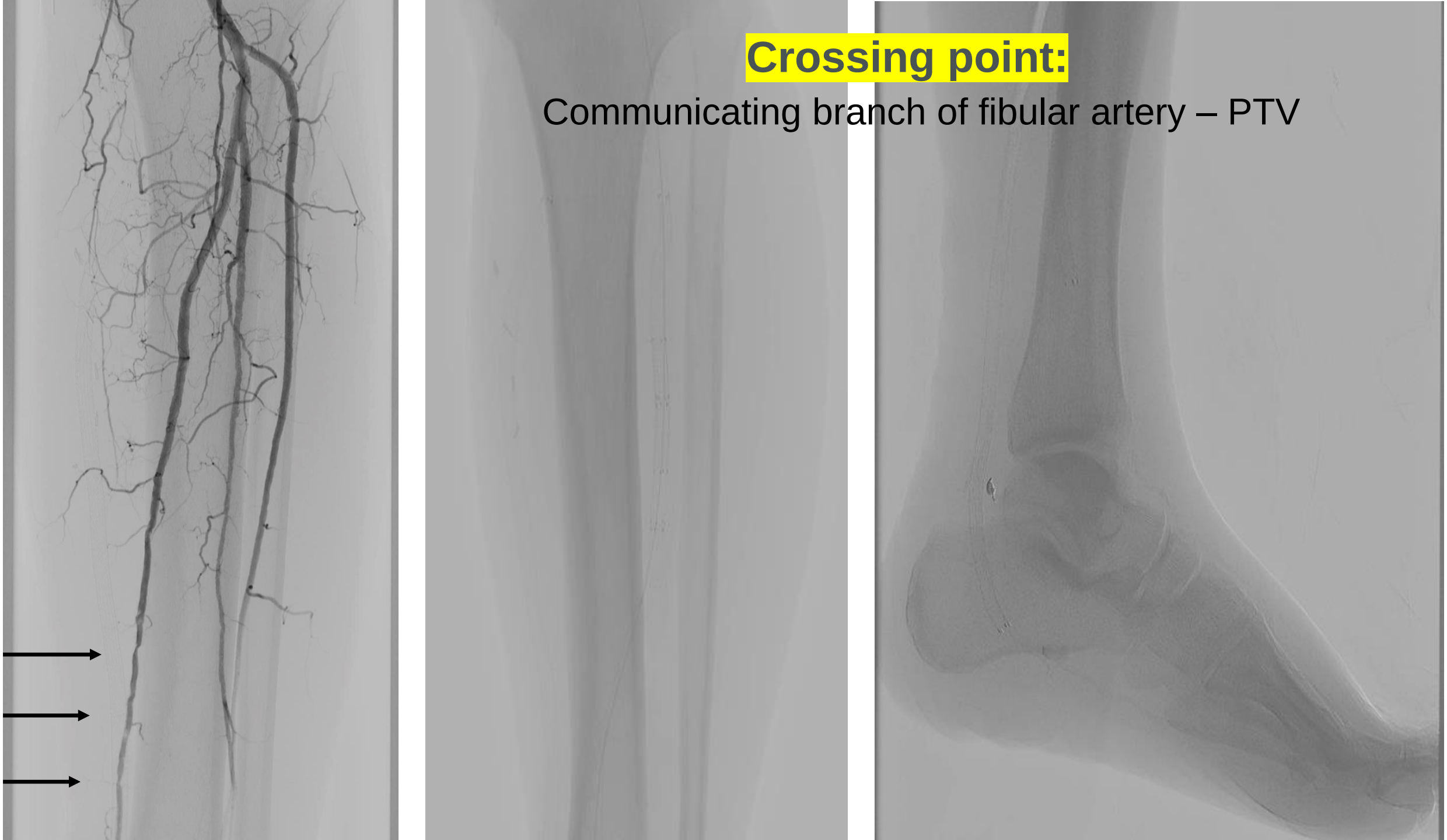
Distal AV-crossing
Less shunting
can minimize steal effect



Proximal crossing point:

More shunt, higher risk of steal

Increased risk of imparing the residual perfusion of the foot



Crossing point:

Communicating branch of fibular artery – PTV

Hybrid *Vs* Percutaneous approach for DVA in CLTI

Final Considerations

The hybrid approach is influenced by the availability and quality of veins.

Surgical wounds can lead to severe complications.

Endovascular procedures are limited by high direct costs.

The hybrid approach is unaffected by ATK disease since proximal anastomosis can be performed at various levels.

The degree of BTK disease and foot perfusion patterns must be carefully evaluated, particularly when choosing a percutaneous approach

Review

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Sage

Endovascular and Surgical Venous Arterialization for No-Option Patients With Chronic Limb-Threatening Ischemia: A Systematic Review and Meta-Analysis

Alessandro Ucci[1], Paolo Perini[1], Antonio Freyrie[1], Michiel A. Schreve[2], Çağdaş Ünlü[2], Eline Huizing[3], Daniel A. van den Heuvel[4], Steven Kum[5], Mehdi H. Shishehbor[6], and Roberto Ferraresi[7]

Conclusion

Promising results after FVA among a large population of no-option CLTI patients.

In high-risk patients, pFVA is a feasible option with favorable limb salvage and wound healing rates.

	Surgical FVA	Percutaneous FVA	Total FVA
N° studies	16	11	27
N° pts/limbs	463/503	290/290	753/793
Mean age yy	65	71	67
CKD-HD	19%	22%	20%
RTF 5-6	86%	98%	91%
6 mm limb salvage	78%	82%	77%
12 mm limb salvage	74%	79%	76%
12 mm survival	95%	87%	87%
6 mm wound healing	nr	48%	-
12 mm wound healing	nr	64%	-

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