

SGUM Sektion Gefässe: Abschlusskurs

„Periphere Arterien und Venen“

Basel 27. – 28. März 2025

28. März 2025

11h.05 – 11h.30

Periphere Arterielle Verschlusskrankheit:

Therapiewahl:

konservativ

kathetertechnisch

chirurgisch oder Hybrideingriffe

Bypässe von aortal bis pedal

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GEFÄSSMEDIZIN
SÜDOST

PAVK-Stadieneinteilung nach Fontaine

- **Stadium I:** keine subjektiven Beschwerden
 - **Stadium II a:** freie Gehstrecke > 200 m
 - **II b:** freie Gehstrecke < 200 m
-
- **II kompliziert:**
 - **Stadium III:** kritische Ischämie, Ruheschmerz
 - **Stadium IV:** kritische Ischämie mit Nekrose

PAVK-Klassifikation Fontaine / Rutherford

Fontaine		Rutherford		
Stadium	Klinisches Bild	Grad	Kategorie	Klinisches Bild
I	asymptomatisch	0	0	asymptomatisch
II a	Gehstrecke > 200 m	I	1	leichte Claudicatio
II b	Gehstrecke < 200 m	I	2	mäßige Claudicatio
		I	3	schwere Claudicatio
III	ischämischer Ruheschmerz	II	4	ischämischer Ruheschmerz
IV	Ulkus, Gangrän	III	5	kleinflächige Nekrose
		III	6	großflächige Nekrose

Arterielle Verschlusskrankheit:

Therapiewahl: **konservativ**
kathetertechnisch
chirurgisch oder kombiniert
Bypässe von aortal bis pedal

An Update in Methods for Revascularisation and Expansion of the TASC Lesion Classification to include Below-the-Knee Arteries: A. Supplement to the Inter-Society Consensus for the Management of peripheral Arterial Disease (TASC II): TASC Steering Committee, Jaff MR, White CJ, Hiatt WR, Fowkes GR, Dormandy J, Razavi M, Reekers J, Norgren L.J. Endovasc Ther. 2015 Oct;22(5):663-77. doi: 10.1177/1526602815592206. Epub 2015 Aug 3.

Hybrid and open surgery of Trans Atlantic Inter Society II Type C and D iliac occlusive disease and clinical lesion of common femoral artery. Starodubtsev V, Karpenko A, Ignatenko P. Int Angiol. 2015 Nov 10

TASC II section F on revascularization in PAD.. Norgren L, Hiatt WR, Harris KA, Lammer J; TASC II Working Group. J Endovasc Ther. 2007 Oct;14(5):743-4.

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		III	6	großflächige Nekrose

**weitere Abklärung nicht dringend
aber
konservative Therapie nötig**



Konservative Therapie: erlaubt

- **Stadium I:** keine subjektiven Beschwerden
- **Stadium II a:** freie Gehstrecke > 200 m
II b: freie Gehstrecke < 200 m

Konservative **Therapie** bedeutet:

Kontrolle + Behandlung der **kardiovaskulären Risikofaktoren**

Antiaggregation und eventuell Kombination Rivaroxaban

Gehtraining (mindestens 3x pro Woche mindestens 45 Minuten in den Schmerz gehen)

Patienten mit kardiovaskulärem Ereignis innerhalb
1 Jahr nach Diagnosestellung in %

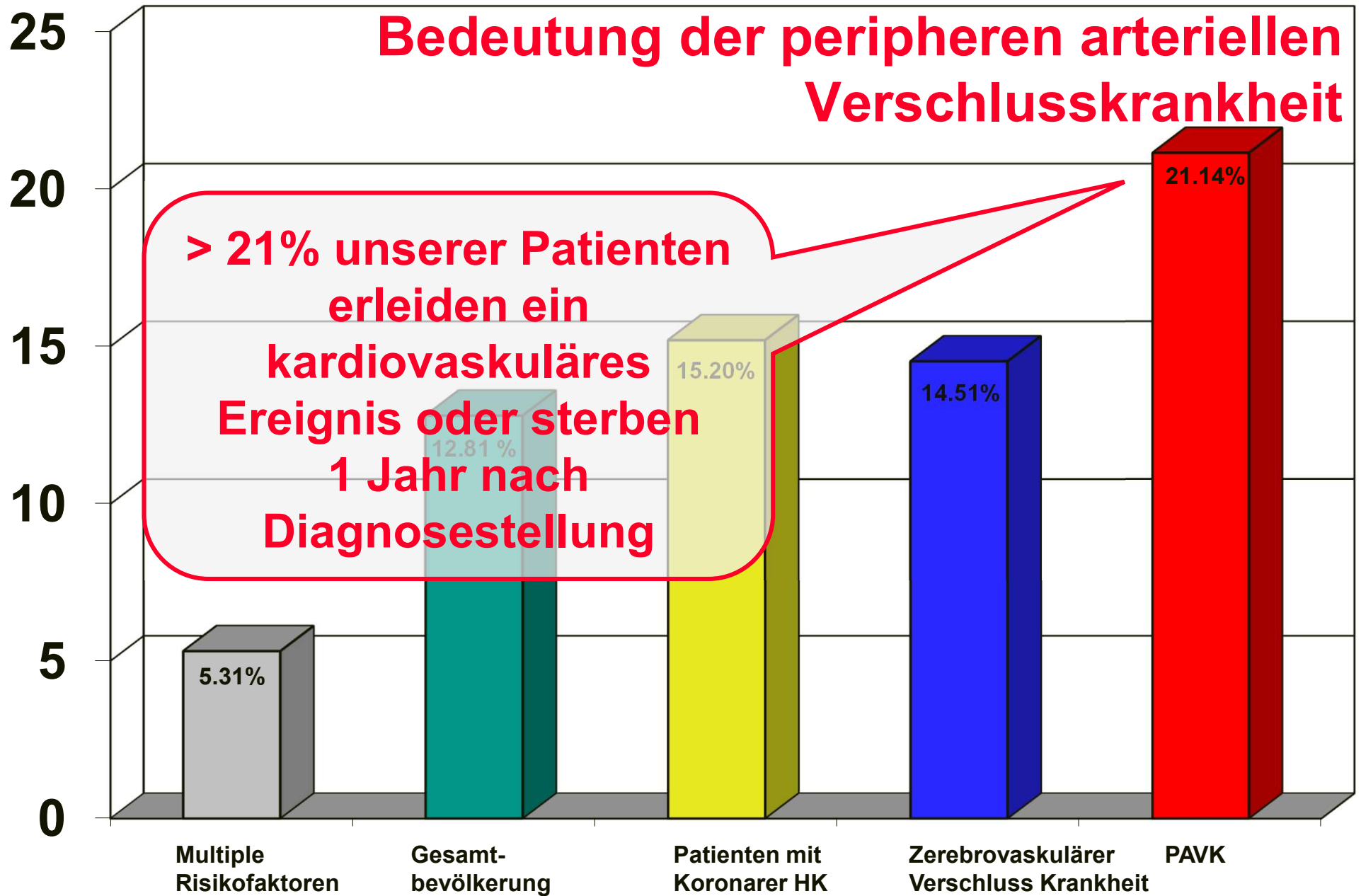
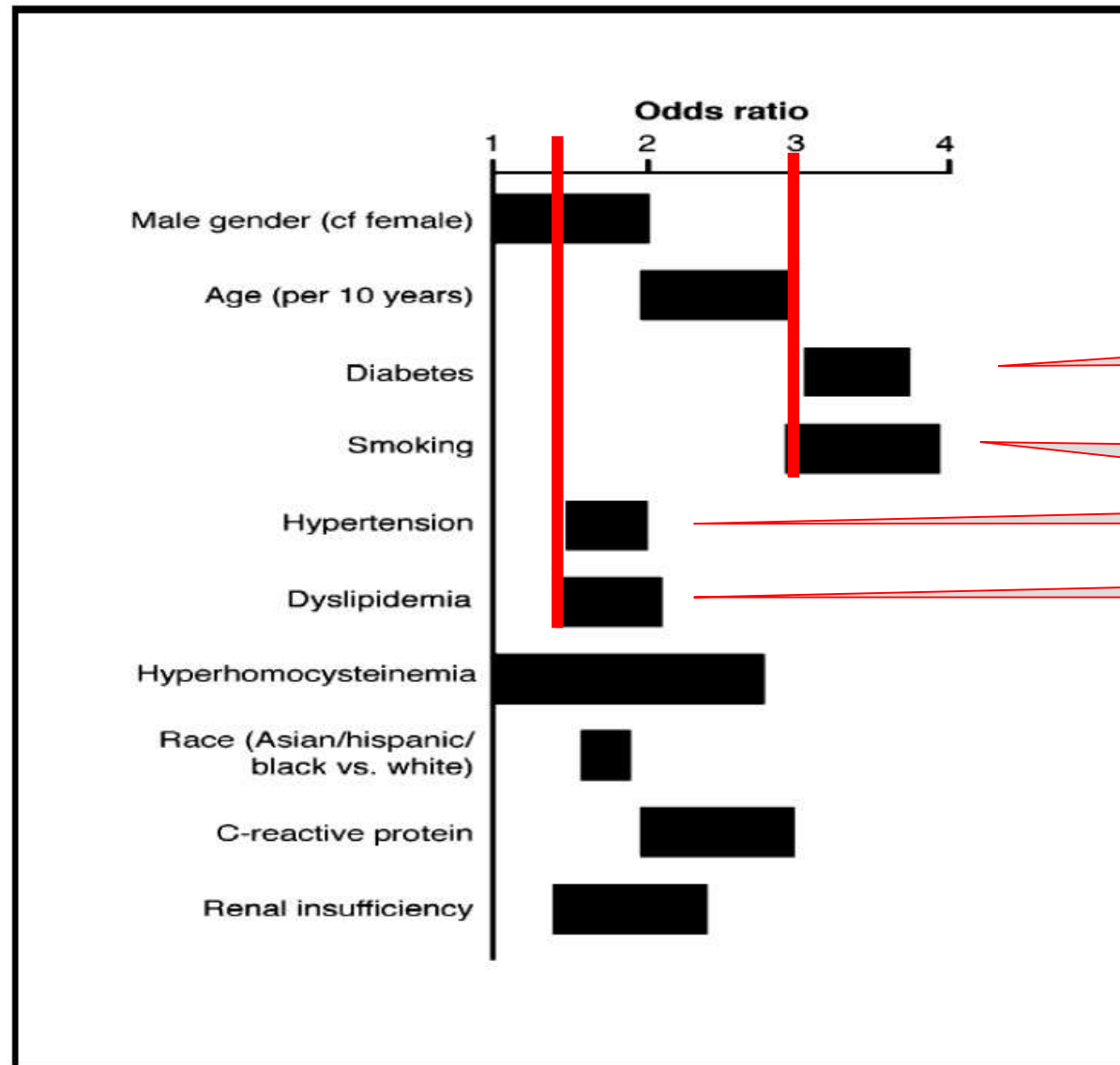


Abbildung 1: PAVK ist ein wichtiger Indikator für das Risiko ein kardiovaskuläres Ereignis / Tod zu erleiden.
Angepasst von Vascular Medicine Working Group. Peripheral arterial disease: A growing problem (2)

Konservative Therapie: erlaubt / nötig !



Ziel HbA1c < 7.0 %

Das ist ja klar !
Aber so schwierig !

Ziel BD < 130/80 mmHg

Ziel LDL < 1.4mmol/L

Recommendations in patients with peripheral arterial diseases: best medical therapy

Recommendations	Class ^a	Level ^b
Smoking cessation is recommended in all patients with PADs. ^{27,28}	I	B
Healthy diet and physical activity are recommended for all patients with PADs.	I	C
Statins are recommended in all patients with PADs. ^{31,32}	I	A
An ultimate LDL-C goal of <1.4 mmol/L (55 mg/dL) and a >50% reduction in LDL-C vs. baseline are recommended in patients with atherosclerotic PAAD. ^{19,24,25,46,300,335}	I	C
In diabetic patients with PADs, strict glycaemic control is recommended.	I	C
Antiplatelet therapy is recommended in patients with symptomatic PADs. ⁵¹	I	C ^d
In patients with PADs and hypertension, it is recommended to control blood pressure 120–129 mmHg, if tolerated	I	A
ACEIs or ARBs should be considered as first-line therapy ^c in patients with PADs and hypertension. ^{47,53}	IIa	B

Recommendations for treatment goals for low-density lipoprotein cholesterol

Recommendations	Class ^a	Level ^b
In secondary prevention for patients at very-high risk, ^c an LDL-C reduction of ≥50% from baseline ^d and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended. ^{33–35,119,120}	I	A
In primary prevention for individuals at very-high risk but without FH, ^c an LDL-C reduction of ≥50% from baseline ^d and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) are recommended. ^{34–36}	I	C
In primary prevention for individuals with FH at very-high risk, an LDL-C reduction of ≥50% from baseline and an LDL-C goal of <1.4 mmol/L (<55 mg/dL) should be considered.	IIa	C
For patients with ASCVD who experience a second vascular event within 2 years (not necessarily of the same type as the first event) while taking maximally tolerated statin-based therapy, an LDL-C goal of <1.0 mmol/L (<40 mg/dL) may be considered. ^{119,120}	IIb	B
In patients at high risk, ^c an LDL-C reduction of ≥50% from baseline ^d and an LDL-C goal of <1.8 mmol/L (<70 mg/dL) are recommended. ^{34,35}	I	A
In individuals at moderate risk, ^c an LDL-C goal of <2.6 mmol/L (<100 mg/dL) should be considered. ³⁴	IIa	A
In individuals at low risk, ^c an LDL-C goal <3.0 mmol/L (<116 mg/dL) may be considered. ³⁶	IIb	A

ASCVD = atherosclerotic cardiovascular disease; FH = familial hypercholesterolaemia; LDL-C = low-density lipoprotein cholesterol.

^aClass of recommendation.

^bLevel of evidence.

^cFor definitions see Table 4.

^dThe term 'baseline' refers to the LDL-C level in a person not taking any LDL-C-lowering medication. In people who are taking LDL-C-lowering medication(s), the projected baseline (untreated) LDL-C levels should be estimated, based on the average LDL-C-lowering efficacy of the given medication or combination of medications.

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European Heart Journal (2020) 41; 111-188: ESC Guidelines: Management of Dyslipidaemias 2019

Table 4 Cardiovascular risk categories

Very-high-risk	<p>People with any of the following:</p> <ul style="list-style-type: none"> Documented ASCVD, either clinical or unequivocal on imaging. Documented ASCVD includes previous ACS (MI or unstable angina), stable angina, coronary revascularization (PCI, CABG, and other arterial revascularization procedures), stroke and TIA, and peripheral arterial disease. Unequivocally documented ASCVD on imaging includes those findings that are known to be predictive of clinical events, such as significant plaque on coronary angiography or CT scan (multivessel coronary disease with two major epicardial arteries having >50% stenosis), or on carotid ultrasound. DM with target organ damage,^a or at least three major risk factors, or early onset of T1DM of long duration (>20 years). Severe CKD (eGFR <30 mL/min/1.73 m²). A calculated SCORE ≥10% for 10-year risk of fatal CVD. FH with ASCVD or with another major risk factor.
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Smoking cessation

Only patients currently smoking or less than four weeks smoke-free were considered as active smokers. Patients were asked if they were able to reduce their smoking habits. Only a reduction of at least 50% of the number of cigarettes smoked directly before hospitalization was considered as a sufficient reduced consumption.

Weight reduction

Patients with a Body-Mass-Index (BMI) ≥ 25 kg/m² (based on WHO recommendations) at hospitalization were considered as overweighted and were asked if they were able to lose weight since the last consultation. A weight loss was considered as 1 kg or more.

Exercise therapy

As part of conservative treatment of PAD and also in combination with surgical interventions [22, 23] SET is advised in PAD guidelines [10, 24, 25, 26, 27]. The guidelines also suggest a walking-based exercise program for patients with CLTI after revascularization therapy [10, 24]. Alternatively, if SET is not possible to attend, home-based exercise (HBE) should be considered [10].

In the consultations patients were asked if they attended SET or if not possible HBE. Training had to fulfill the recommendations of the German national S3-Guideline (at least 30 minutes, at least three times a week) to be sufficient [27].

Nutrition

Food categories were decided to use to investigate the nutrition of the patients [19, 20]. The first category was about the fraction of vegetable products in the diet. The second one focused on fat acids and differentiated between the amount of mono - or polyunsaturated fat acids and the amount of saturated fat acids. The third one addressed the daily salt intake based on the World Health Organization (WHO) recommendations of 5 g or less per day [21].

Optimal pharmacological treatment

The OPT in symptomatic PAD patients includes the use of lipid-lowering drugs, antihypertensives (in case of an elevated blood pressure) and antithrombotic medication [12].

The prescription for all agents was investigated and additionally if patients took their medication regularly, irregularly, or not at all.

Diabetes mellitus

As part of the BMT, glycemic control in PAD patients is recommended in the guidelines [10, 25, 27]. Patients undergoing pharmacological diabetic treatment were checked whether they took their medication as prescribed.

	Intervention group (n=16)	Control group (n=15)	Complete cohort (n=31)
PAD-specific follow-up data			
Duration of participation ^a , mean (SD) [days]	90.3 (17.9)	70.9 (1.7)	80.9 (16.1)
Vascular Quality of Life Questionnaire-6 at last contact ^b , mean (SD) [points]	17.4 (5.2)	13.8 (5.3)	15.6 (5.5)
Major adverse cardiovascular event (MACE) ^c	0 (0)	0 (0)	0 (0)
Major adverse limb event (MALE) ^d	4 (25)	1 (6.7)	5 (16.1)
Smoking			
Smoking cessation ^e	0 (0)	2 (13.3)	2 (6.5)
Current smoker ^f	1 (6.3)	4 (26.7)	5 (16.1)
Reduced consumption	1 (6.3)	2 (13.3)	3 (9.7)
Unchanged consumption	0 (0)	2 (13.3)	2 (6.5)
Body-Mass-Index			
Weight reduction to normal weight: Body-Mass-Index <25 [kg/m ²]	0 (0)	1 (6.7)	1 (3.2)
Body-Mass-Index ≥25 [kg/m ²]	8 (50)	7 (46.7)	15 (48.4)
Body-Mass-Index, mean (SD) [kg/m ²]	28.2 (1.6)	29.6 (4.1)	28.9 (3)
Weight reduction, but still overweight or obese: Body-Mass-Index ≥25 [kg/m ²]	4 (25)	5 (33.3)	9 (29)
Medication prescription			
Optimal pharmacological treatment ^g prescribed	15 (93.8)	13 (86.7)	28 (90.3)
No prescription of lipid-lowering drugs at hospital discharge	1 (6.3)	2 (13.3)	3 (9.7)
Corrected intake of lipid-lowering drugs by intervention	1 (6.3)		
Regular intake of medication according to prescription	16 (100)	15 (100)	31 (100)
Patient is aware of her/his medication	15 (93.8)	11 (73.3)	26 (83.9)
Exercise therapy			
Participation to supervised exercise therapy	0 (0)	0 (0)	0 (0)
Participation to home-based exercise therapy	10 (62.5)	6 (40)	16 (51.6)
Home-based exercise therapy according to S3-Guidelines ^{h,i}	5 (31.3)	3 (20)	8 (25.8)
Diabetes medication			
Any diabetes	3 (18.8)	4 (26.7)	7 (22.6)
Diabetes under pharmacological treatment	1 (6.3)	4 (26.7)	5 (16.1)
Regular intake of diabetes medication according to prescription	1 (6.3)	4 (26.7)	5 (16.1)
Desired type for intervention			
Phone ^j	15 (93.8)	8 (53.3)	23 (74.2)
Internet ^k	1 (6.3)	5 (33.3)	6 (19.4)
Mobile health app ^l	2 (12.5)	4 (26.7)	6 (19.4)
No care desired	0 (0)	1 (6.7)	1 (3.2)

Conclusions

Patients with PAD have a strong requirement to modify their risk profile to prevent cardiovascular and overall mortality. We developed an intervention program based on education and supervision to be evaluated in a future trial. Included were smoking cessation, healthy diet, weight loss, OPT, exercise therapy and diabetes control.

Management of OPT and diabetic medication developed easily due to a complete adherence (hundred percent) to medication prescription. As described in previous studies our results confirm an extremely low adherence to SET. The validated VascuQoL-6 was used to measure patient reported outcomes while it already revealed interesting differences in this small pilot study.

The interesting results will help to design a future trial to evaluate a pragmatic multi-aspect lifestyle intervention that may ultimately help to improve devastating outcomes in this vulnerable target population.

Kardiovaskuläre Behandlungsstrategie

Aufgrund der besonderen Risikosituation wird das kardiovaskuläre Gesamtrisiko (10Jahresrisiko für ein kardiovaskuläres Ereignis) einer Person geschätzt (zB. mit AGLA Rechner : www.agla.ch)

= Basis für die Behandlungsstrategie der kardiovaskulären Risikofaktoren

Lebensstil:

- Ernährung
- Gewicht
- Bewegungsmangel
- Rauchen
- Alkohol

Lipide:

- LDL-Cholesterin
- Triglyceride
- HDL - Cholesterin

Übrige Risikofaktoren:

- Diabetes mellitus
- Arterielle Hypertonie
- Antiaggregation

PAVK-Klassifikation Fontaine / Rutherford

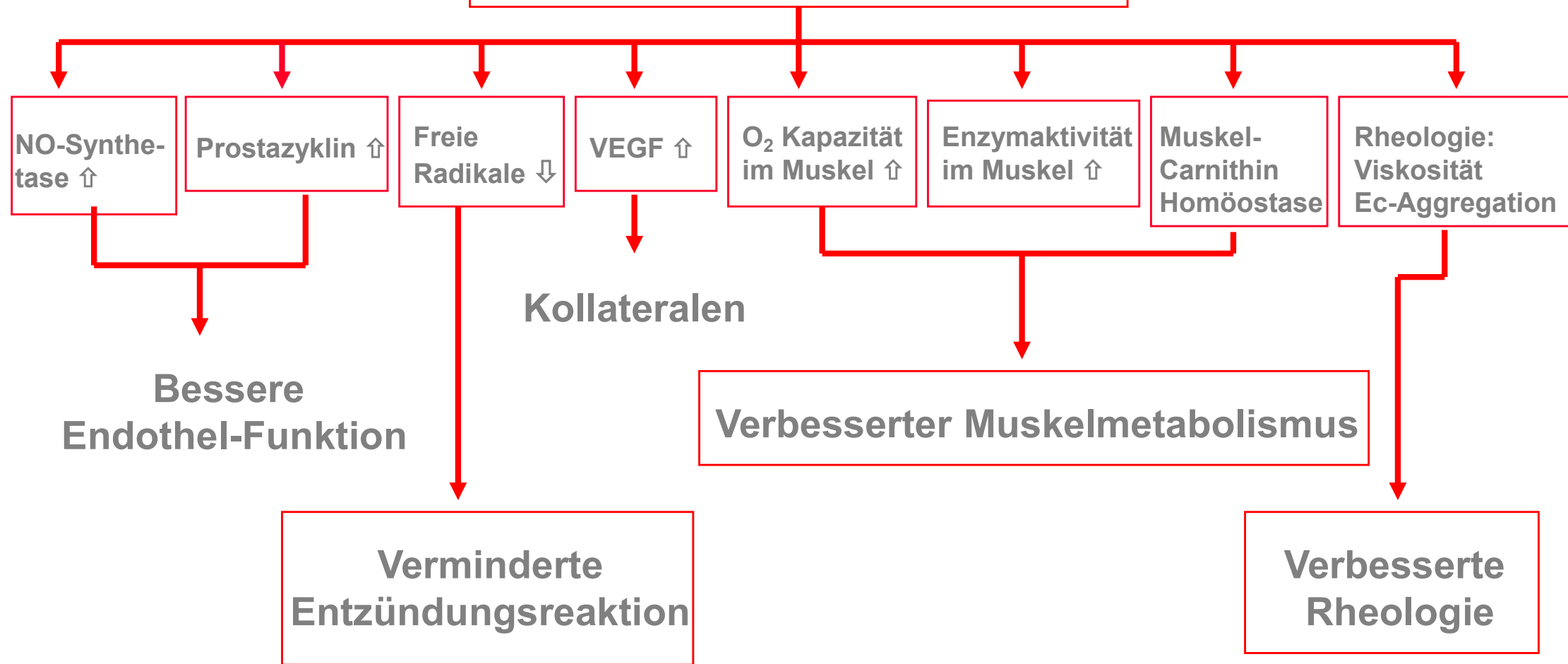
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		III	6	großflächige Nekrose

konservative Therapie nötig
Gehtraining empfohlen
Invasive Therapie möglich



Wirkungen des Trainings

Regelmässiges Gehtraining



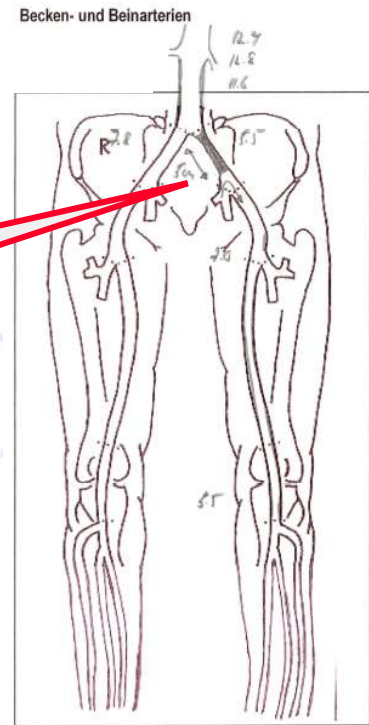
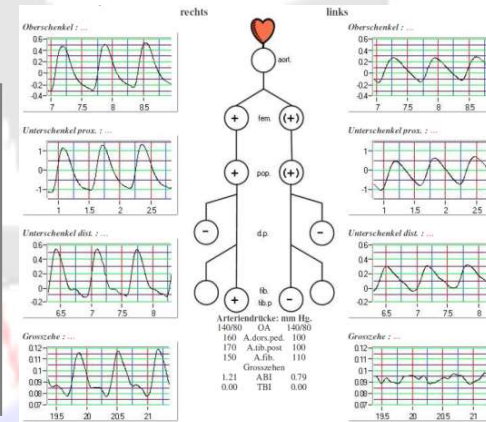
Patient E.P. ♂ (62j.)

Risikofaktoren:
 Rauchen
 Arterielle Hypertonie
 Hypercholesterinämie
 Diabetes mellitus
 Familienanamnese
 Alter

Herr E. wird zugewiesen zur angiologischen Beurteilung wegen seit ein paar Monaten bestehenden Schmerzen im ganzen linken Bein. Diese treten nach ca. 200m geradeaus Gehens auf und verschwinden rasch beim Stehenbleiben. In Ruhe keine Beschwerden. Rechts keine Beschwerden.

Pulsstatus und Knöchelarteriendrucke vom 02.09.2008:

	rechts	mmHg	links	mmHg
RR		140/80		140/80
A. femoralis	+		(+)	
A. poplitea	+		(+)	
A. dorsalis pedis	-	160	-	100
A. tibialis posterior	+	170	-	100
A. fibularis		150		110
ABI		1.21		0.79



Was bieten Sie an ?

Ihre Diagnose: klinisch und mit ABI ?
PAVK Stadium IIa links

Patient E.P. ♂ (62j.)

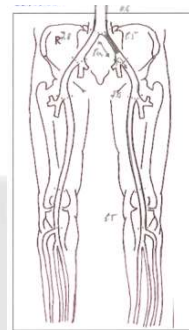
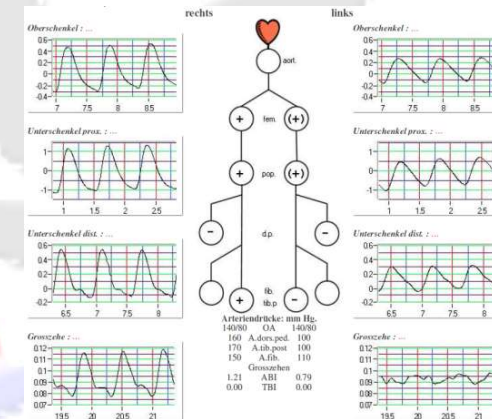
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Unter Gehtraining nach 3 Monaten: 1000m freie Gehstrecke und aktuell beschwerdefrei

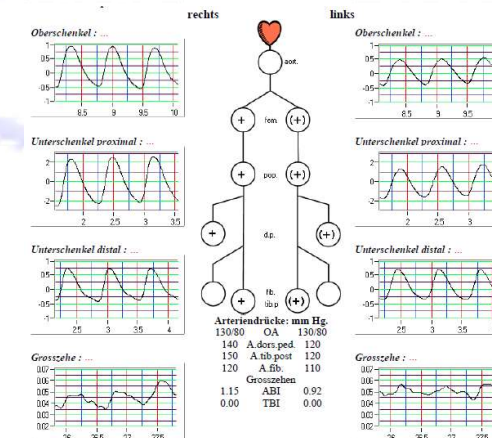
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A. dorsalis pedis	-	160	-	100
A. tibialis posterior	+	170	-	100
A. fibularis		150		110
ABI		1.21		0.79



Pulsstatus und Knöchelarteriendrucke vom 13.02.2018:

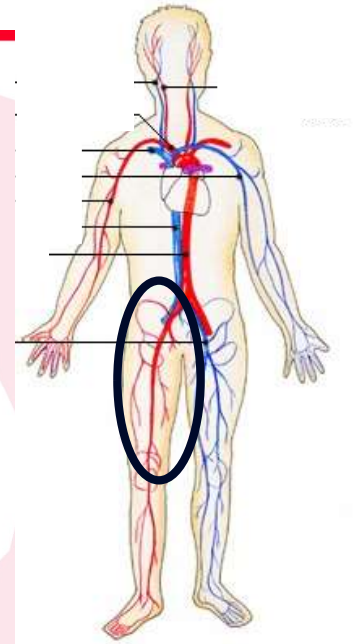
	rechts	mmHg	links	mmHg
RR		130/80		130/80
A. femoralis	+		(+)	
A. poplitea	+		(+)	
A. dorsalis pedis	+	140	(+)	120
A. tibialis posterior	+	150	(+)	120
A. fibularis		120		110
ABI		1.15		0.92



Welche Situation eignet sich ?

✓ **Obliterierende Arteriopathie:**

- ✓ im funktionellen Stadium I – IIb nach Fontaine
- ✓ am besten chronische einseitige Verschlüsse der
 - ✓ Beckenarterien oder
 - ✓ Oberschenkelstrombahn
- ✓ mit Motivation für regelmässiges Gehtraining
- ✓ und Geduld, dass die Beschwerden nur langsam und unter stetigem Trainieren bessern
- ✓ mit Erholungszeit nach 40 m Laufbandgehens \leq 12 Minuten
- ✓ mit kardialen Reserven fürs Training



Welche Situation eignet sich nicht ?

✓ nicht geeignet:

- ✓ im funktionellen Stadium II kompliziert – IV nach Fontaine
- ✓ akute Verschlüsse mit starken Beschwerden
- ✓ bereits einseitig amputiert
- ✓ Training nicht möglich

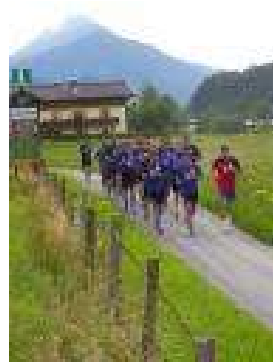


✓ nicht empfohlen:

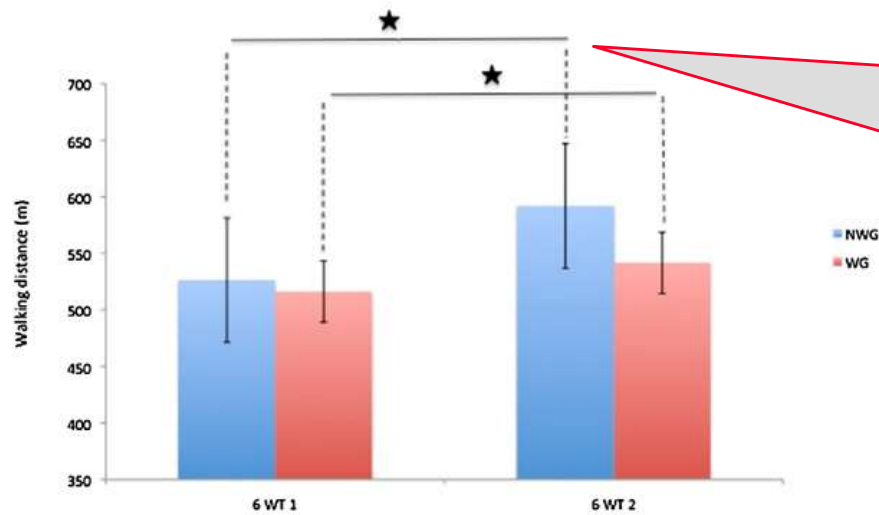
- ✓ akute embolische Verschlüsse
- ✓ akute thrombotische Verschlüsse
- ✓ Stenosen (mit Verschlussgefährdung)
- ✓ ausgedehnte Verschlüsse ohne Kollateralisierungspotential
- ✓ sehr distal gelegene Verschlüsse ohne Kollateralisierungspotential
- ✓ keine Motivation zum Training



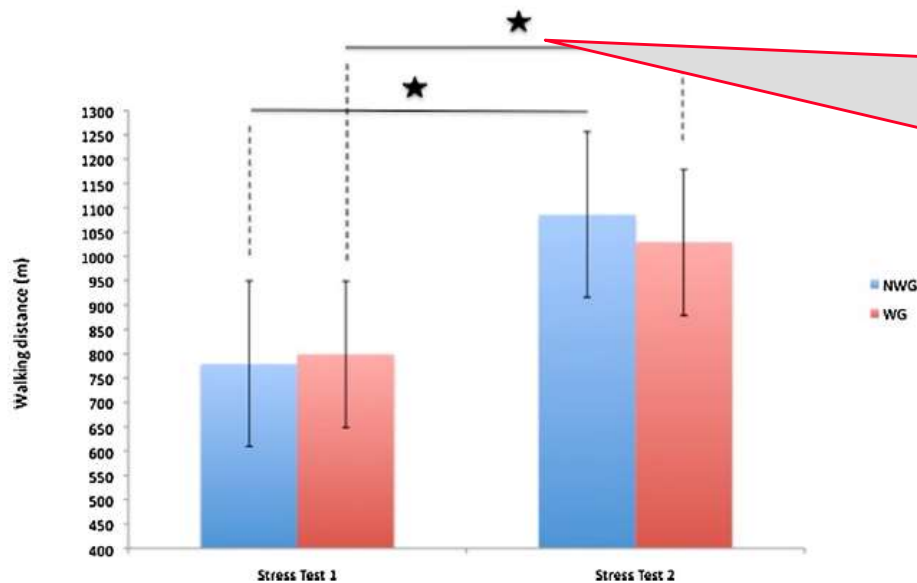
(Geh)training-Formen:



Welche Art des Trainings ?



Vergleich der Gehdistanz im 6 Minuten Gehetest zu Beginn und nach 4 Wochen Gehen:
Nordic Walking versus Gehen ohne Stöcke
 $P < 0.05$



Vergleich der Gehdistanz im Laufbandstest zu Beginn und nach 4 Wochen Gehen:
Nordic Walking versus Gehen ohne Stöcke
 $P < 0.05$

Table 2

Meaningful clinical improvement in walk distance at week 4 for patients with Nordic walking (NWG) and walking without poles (WG).

	NWG, n = 21	WG, n = 21	Total
> 36 m gain	18	9	27
< 36 m gain	3	12	15

Data are no. of patients.

ESC – Guidelines 2024?

Bei PAVK-Patienten mit oder ohne Intervention ist strukturiertes Gehtraining empfohlen (I / A)

Gehen ist erste Wahl
Alternativ: Krafttraining (IIa / A)

Frequenz: mindestens 3 x pro Woche
mindestens 30 Minuten
Trainingsprogramm mindestens 12 Wochen

Recommendation Table 13 — Recommendations for exercise therapy in patients with peripheral arterial disease (see also Evidence Table 5)

Recommendations	Class ^a	Level ^b
In patients with symptomatic PAD, SET is recommended. ^{294,453,456–458,462}	I	A
In those patients undergoing endovascular revascularization, SET is recommended as an adjuvant therapy. ^{482,483}	I	A
When SET is not available or feasible, a structured and monitored (calls, logbooks, connected devices) HBET programme should be considered. ^{468,469,471}	IIa	A
Walking should be considered as a first-line training modality. When walking exercise is not an option, alternative exercise modes (strength training, arm cranking, cycling, and combinations of different training modes) should also be considered. ⁴⁷⁵	IIa	A
Walking training performed at high intensity (77%–95% of maximal heart rate or 14–17 self-perceived exertion on Borg’s scale) should be considered to improve walking performance, ²⁹⁴ and high-intensity exercise training (various aerobic training modes) should be considered to improve cardiorespiratory fitness. ^{294,457}	IIa	A
Training frequency of at least three times per week, training session duration of at least 30 min, and training programme duration of at least 12 weeks should be considered. ⁴⁷²	IIa	B
In patients with PAD, exercise training to moderate-severe claudication pain may be considered to improve walking performance. ^{37,454,456,458} However, improvements are also achievable with lesser claudication pain severities (low-mild pain or pain-free). ^{455,460}	IIb	B
Based on patient’s tolerance, a progressive increase (every 1–2 weeks) in exercise training load may be considered. ^{37,62}	IIb	C

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European Heart Journal 2024; 45: 3538 – 3700. 2024 ESC Guidelines for the management of peripheral arterial and aortic diseases. Lucia Mazzolai, Giseal Teixido-Tura, Jose F. Rodriguez-Palomares et al. and ESC Scientific Document Group

HBET, home-based exercise training; PAD, peripheral arterial disease; SET, supervised exercise training.

^aClass of recommendation.

^bLevel of evidence.

Intermittierende Pneumatische Kompression



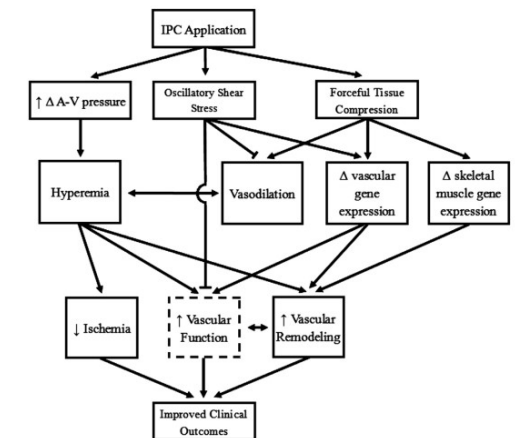
Chronische kritische Ischämie

Manschetten-Druck 120-140 mmHg

Insufflationszeit 1 s für 4 s

Desufflationszeit 15 s

Dauer 3 h pro Tag für 3 Monate



Mechanismus wie beim Gehtraining

Circ J 2012; 76: 971. Using intermittent pneumatic compression therapy in symptomatic PAOD Patients. Shih-Tai Chang et al.

Figure. Intermittent pneumatic compression therapy technique to compress the foot, ankle and calf of patients with peripheral arterial obstructive disease.

Intermittierende Pneumatische Kompression



Chronische kritische Ischämie

Manschetten-Druck 120-140 mmHg

Insufflationszeit 1 s für 4 s

Desufflationszeit 15 s

Dauer 3 h pro Tag für 3 Monate

Table 5. 6-Min Walking Test, ABPI and Transcutaneous Oxygen Tension

	Study group (n=23)		Control group (n=8)	
	Initial	Final	Initial	Final
6-min walking test				
Duration (min)	2.1±0.3	4.1±0.4*	2.3±0.6	2.3±0.4
ICD (m)	21.3±2.9	52.3±9.9*	24.8±5.8	25.4±4.7
ACD (m)	56.3±9.5	109.0±12.2*	57.1±15.7	56.1±13.6
Transcutaneous oxygen tension (mmHg)				
AK	103.1±7.1	110.8±7.1	86.6±14.3	82.5±8.6
BK	94.0±6.6	105.0±7.5	89.2±10.8	74.2±9.3*
Distal	65.0±8.8	92.8±6.9*	41.7±11.5	39.9±9.6
ABPI	0.72±0.03	0.71±0.02	0.75±0.05	0.73±0.32

*P<0.05 compared with the within-group initial value.

ABPI, ankle-brachial blood pressure index; ICD, initial claudication distance; ACD, absolute claudication distance; AK, above-knee level; BK, below-knee level.

Circ J 2012; 76: 971. Using intermittent pneumatic compression therapy in symptomatic PAOD Patients.

Shih-Tai Chang et al.

Figure. Intermittent pneumatic compression therapy technique to compress the foot, ankle and calf of patients with peripheral arterial obstructive disease.

Arterielle Verschlusskrankheit:

Therapiewahl:

- konservativ
- kathetertechnisch
- chirurgisch oder kombiniert
- Bypässe von aortal bis pedal

2024 ESC Guidelines for the management of peripheral arterial and aortic diseases. Developed by the task force on the management of peripheral arterial and aortic diseases of the European Society of Cardiology (ESC). Lucia Mazzolai, Giseal Teixido-Tura, Jose F. Rodriguez-Palomares et al. European Heart Journal 2024; 45: 3538-3700
An Update in Methods for Revascularisation and Expansion of the TSAC Lesion Classification to include Below-the-Knee Arteries: A. Supplement to the Inter-Society Consensus for the Management of peripheral Arterial Disease (TASC II): TASC Steering Committee, Jaff MR, White CJ, Hiatt WR, Fowkes GR, Dormandy J, Razavi M, Reekers J, Norgren L.J. Endovasc Ther. 2015 Oct;22(5):663-77. doi: 10.1177/1526602815592206. Epub 2015 Aug 3.

Hybrid and open surgery of Trans Atlantic Inter Society II Type C and D iliac occlusive disease and clinical lesion of common femoral artery. Starodubtsev V, Karpenko A, Ignatenko P. Int Angiol. 2015 Nov 10

TASC II section F on revascularization in PAD.. Norgren L, Hiatt WR, Harris KA, Lammer J; TASC II Working Group. J Endovasc Ther. 2007 Oct;14(5):743-4.

Arterielle Verschlusskrankheit

Therapiewahl:

Recommendation Table 15 — Recommendations for interventional treatment of asymptomatic and symptomatic peripheral arterial disease (general)

Recommendations	Class ^a	Level ^b
In patients with symptomatic PAD, after a 3 month period of OMT and exercise therapy, PAD-related QoL assessment is recommended. ¹¹⁹	I	B
It is recommended to adapt the mode and type of revascularization options to anatomical lesion location, lesion morphology, and general patient condition. ¹¹⁹	I	C
In patients with symptomatic PAD and impaired PAD-related quality of life after a 3 month period of OMT and exercise therapy, revascularization may be considered. ^{465,540}	IIb	B
In patients with PAD, revascularization is not recommended if the reason is to solely prevent progression to CLTI. ^{541–544}	III	B
In patients with asymptomatic PAD, revascularization is not recommended. ^{119,529}	III	C

2024 ESC Guidelines for the management of peripheral arterial and aortic diseases. Developed by the task force on the management of peripheral arterial and aortic diseases of the European Society of Cardiology (ESC). Lucia Mazzolai, Giseal Teixeira-Tura, Jose F. Rodriguez-Palomares et al. *European Heart Journal* 2024; 45: 3538-3700

An Update in Methods for Revascularisation and Expansion of the TASC Management of peripheral Arterial Disease (TASC II): TASC Steering Endovasc Ther. 2015 Oct;22(5):663-77. doi: 10.1177/1526602815592 Hybrid and open surgery of Trans Atlantic Inter Society II Type Karpenko A, Ignatenko P. *Int Angiol.* 2015 Nov 10 TASC II section F on revascularization in PAD.. Norgren L, Hiatt WR,

CLTI, chronic limb-threatening ischaemia; OMT, optimal medical treatment; PAD, peripheral arterial disease; QoL, quality of life.

^aClass of recommendation.

^bLevel of evidence.

Therapiewahl bei pAVK

Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.

Is recommended/is indicated

Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	Weight of evidence/opinion is in favour of usefulness/efficacy.	Should be considered
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.	May be considered

Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective; and in some cases may be harmful.	Is not recommended
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Recommendations on revascularization of aorto-iliac occlusive lesions^c

Recommendations	Class ^a	Level ^b
An endovascular-first strategy is recommended for short (i.e. <5 cm) occlusive lesions . ²⁹¹	I	C
In patients fit for surgery , aorto-(bi)femoral bypass should be considered in aorto-iliac occlusions. ^{281,291,293}	IIa	B
An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities. ^{288,294,295}	IIa	B
An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options. ^{76,281–283,286}	IIb	B
Primary stent implantation rather than provisional stenting should be considered. ^{294–296}	IIa	B
Open surgery should be considered in fit patients with an aortic occlusion extending up to the renal arteries .	IIa	C
In the case of ilio-femoral occlusive lesions , a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered. ^{297–300}	IIa	C
Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization. ³⁰¹	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

Therapiewahl bei pAVK

Evidence and/or general agreement that a given treatment or procedure is beneficial, useful, effective.

Is recommended/is indicated

Class II	Conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of the given treatment or procedure.	
Class IIa	Weight of evidence/opinion is in favour of usefulness/efficacy.	Should be considered
Class IIb	Usefulness/efficacy is less well established by evidence/opinion.	May be considered

Class III	Evidence or general agreement that the given treatment or procedure is not useful/effective; and in some cases may be harmful.	Is not recommended
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Recommendations on revascularization of femoro-popliteal occlusive lesions^c

Recommendations	Class ^a	Level ^b
An endovascular-first strategy is recommended in short (i.e. <25 cm) lesions. ^{302,303}	I	C
Primary stent implantation should be considered in short (i.e. <25 cm) lesions. ^{304,305}	IIa	A
Drug-eluting balloons may be considered in short (i.e. <25 cm) lesions. ^{77,306–310}	IIb	A
Drug-eluting stents may be considered for short (i.e. <25 cm) lesions. ^{302,303,311}	IIb	B
Drug-eluting balloons may be considered for the treatment of in-stent restenosis. ^{312,313}	IIb	B
In patients who are not at high risk for surgery, bypass surgery is indicated for long (i.e. ≥25 cm) superficial femoral artery lesions when an autologous vein is available and life expectancy is > 2 years. ³¹⁴	I	B
The autologous saphenous vein is the conduit of choice for femoro-popliteal bypass. ^{284,315}	I	A
When above-the-knee bypass is indicated, the use of a prosthetic conduit should be considered in the absence of any autologous saphenous vein. ²⁸⁴	IIa	A
In patients unfit for surgery, endovascular therapy may be considered in long (i.e. ≥25 cm) femoro-popliteal lesions. ³¹¹	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

Aktiv – kathetertechnisch oder chirurgisch

- **Stadium I:** keine subjektiven Beschwerden
 - **Stadium II a:** freie Gehstrecke > 200 m
 - **II b:** freie Gehstrecke < 200 m
-
- **II kompliziert:**
 - **Stadium III:** kritische Ischämie, Ruheschmerz
 - **Stadium IV:** kritische Ischämie mit Nekrose
- ↑ erlaubt
- dringend
- ↓

PAVK-Klassifikation Fontaine / Rutherford

Fontaine		Rutherford		
Stadium	Klinisches Bild	Grad	Kategorie	Klinisches Bild
I	asymptomatisch	0	0	asymptomatisch
II a	Gehstrecke > 200 m	I	1	leichte Claudicatio
II b	Gehstrecke < 200 m	I	2	mäßige Claudicatio
		I	3	schwere Claudicatio
III	ischämischer Ruheschmerz	II	4	ischämischer Ruheschmerz
IV	Ulkus, Gangrän	III	5	kleinflächige Nekrose
		III	6	großflächige Nekrose

konservative Therapie nötig
Gehtraining empfohlen
Invasive Therapie möglich

medikamentöse Therapie nötig
Invasive Therapie DRINGEND !
Limb salvage

Arterielle Verschlusskrankheit:

Therapiewahl: konservativ
kathetertechnisch
chirurgisch oder kombiniert
Bypässe von aortal bis pedal

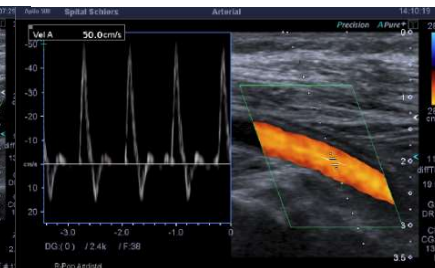
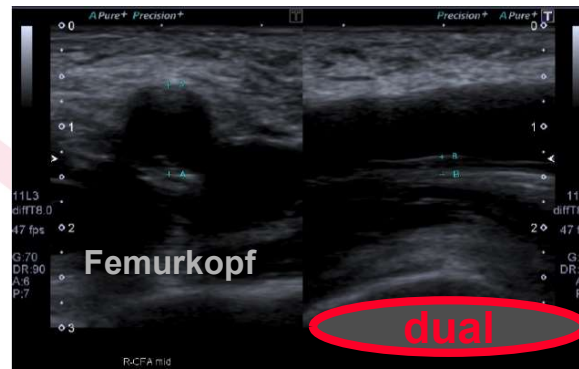
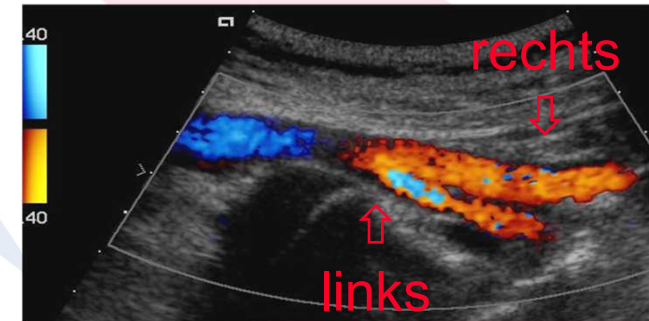
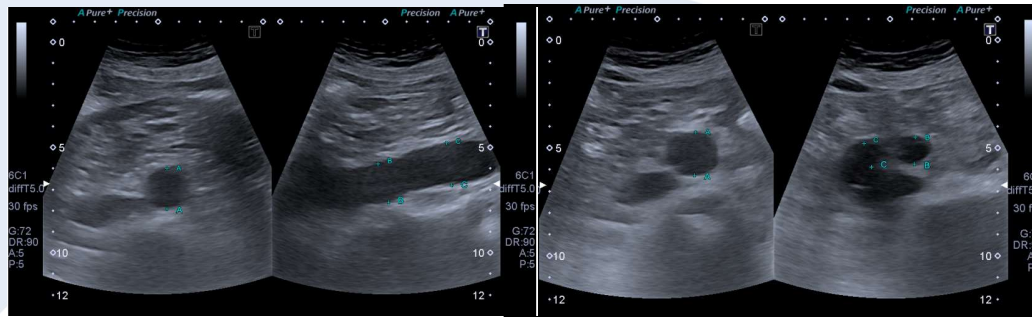
An Update in Methods for Revascularisation and Expansion of the TASC Lesion Classification to include Below-the-Knee Arteries: A. Supplement to the Inter-Society Consensus for the Management of peripheral Arterial Disease (TASC II): TASC Steering Committee, Jaff MR, White CJ, Hiatt WR, Fowkes GR, Dormandy J, Razavi M, Reekers J, Norgren L.J. Endovasc Ther. 2015 Oct;22(5):663-77. doi: 10.1177/1526602815592206. Epub 2015 Aug 3.

Hybrid and open surgery of Trans Atlantic Inter Society II Type C and D iliac occlusive disease and clinical lesion of common femoral artery. Starodubtsev V, Karpenko A, Ignatenko P. Int Angiol. 2015 Nov 10

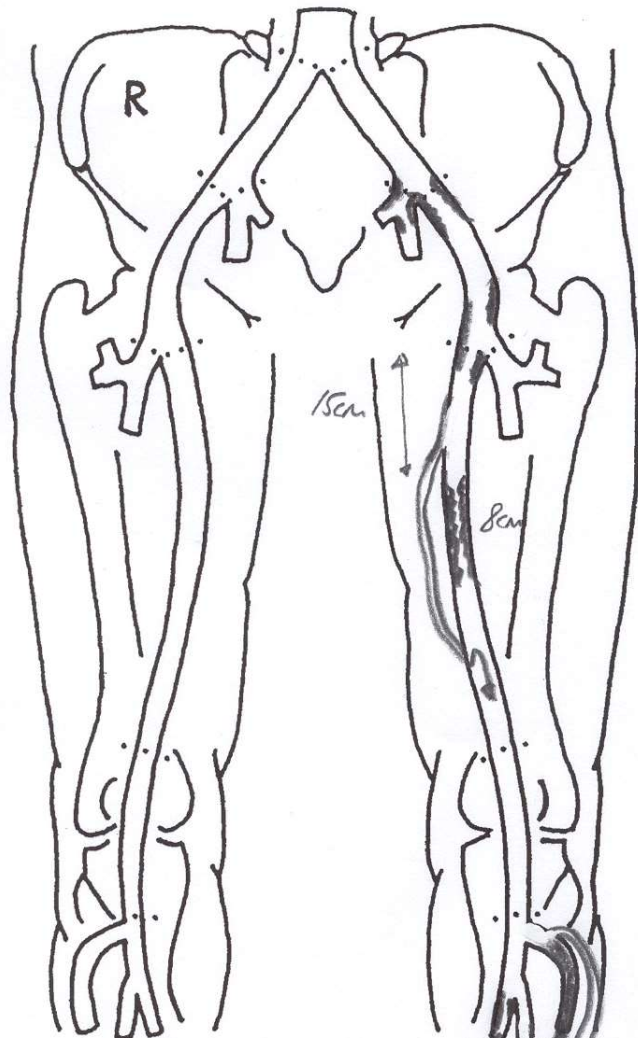
TASC II section F on revascularization in PAD.. Norgren L, Hiatt WR, Harris KA, Lammer J; TASC II Working Group. J Endovasc Ther. 2007 Oct;14(5):743-4.

Periphere Arterien – vor Intervention

⇒ Sonographie zur Therapieplanung



Kathetertechnische Dilatation:



⇒ Angiographie in
Dilatationsbereitschaft

Bei Symptomen wie:

- Claudicatio nach 500 m (IIa)
- Claudicatio nach 100 m (IIb)
- distalen oder akralen Läsionen
- vor orthopädischer
Fusschirurgie
- Akute Ischämie / Läsionen
- zur Bypassrettung

Kathetertechnische Dilatation:

Recommendations on revascularization of femoro-popliteal occlusive lesions^c

Recommendations	Class ^a	Level ^b
An endovascular-first strategy is recommended in short (i.e. <25 cm) lesions. ^{302,303}	I	C
Primary stent implantation should be considered in short (i.e. <25 cm) lesions. ^{304,305}	IIa	A
Drug-eluting balloons may be considered in short (i.e. <25 cm) lesions. ^{77,306–310}	IIb	A
Drug-eluting stents may be considered for short (i.e. <25 cm) lesions. ^{302,303,311}	IIb	B
Drug-eluting balloons may be considered for the treatment of in-stent restenosis. ^{312,313}	IIb	B
In patients who are not at high risk for surgery, bypass surgery is indicated for long (i.e. ≥25 cm) superficial femoral artery lesions when an autologous vein is available and life expectancy is > 2 years. ³¹⁴	I	B
The autologous saphenous vein is the conduit of choice for femoro-popliteal bypass. ^{284,315}	I	A
When above-the-knee bypass is indicated, the use of a prosthetic conduit should be considered in the absence of any autologous saphenous vein. ²⁸⁴	IIa	A
In patients unfit for surgery, endovascular therapy may be considered in long (i.e. ≥25 cm) femoro-popliteal lesions. ³¹²	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

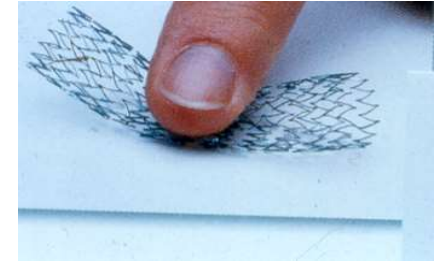
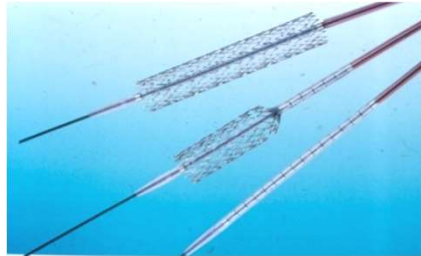
- zur Bypassrettung

⇒ Angiographie in
Dilatationsbereitschaft

Kathetertechnische Dilatation

Besonderheiten: wacher Patient

Lokalanaesthesie



61jähriger ♂ mit akuten Wadenschmerzen am Vortag beim Spazieren. Vorher nie Beschwerden allerdings bei residueller beinbetonter Hemiparese links nach A. carotis interna Verschluss rechts. Nachts Einschlafen des Fusses links und Zehenschmerzen.

Wie beuteilen Sie ?

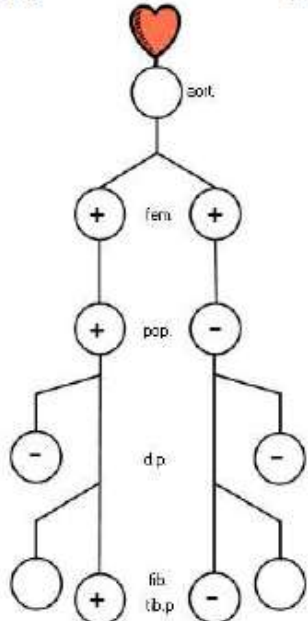
Was erwarten Sie für klinische Befunde ?

Wie klären Sie ab?



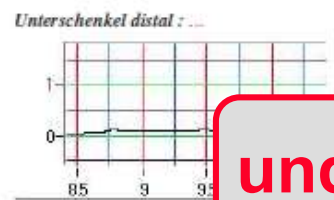
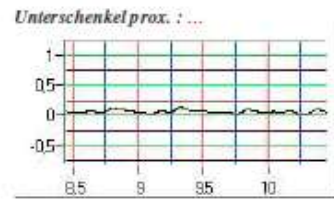
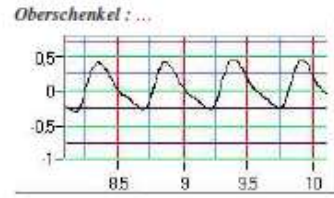
rechts

links

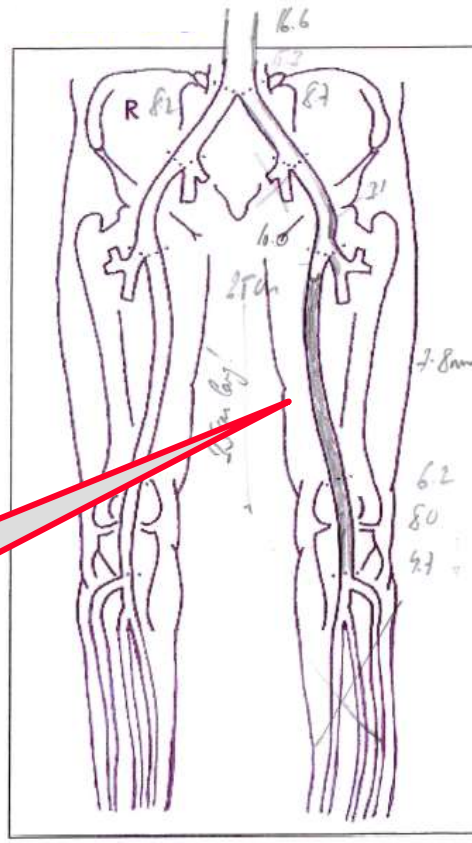


Arteriendrucke: mm Hg.

200/120	OA	200/120
200	A. dors. ped.	0
200	A. tib. post.	0
200	A. fib.	0
Grosszehen		
1.00	ABI	0.00
0.00	TBI	0.00



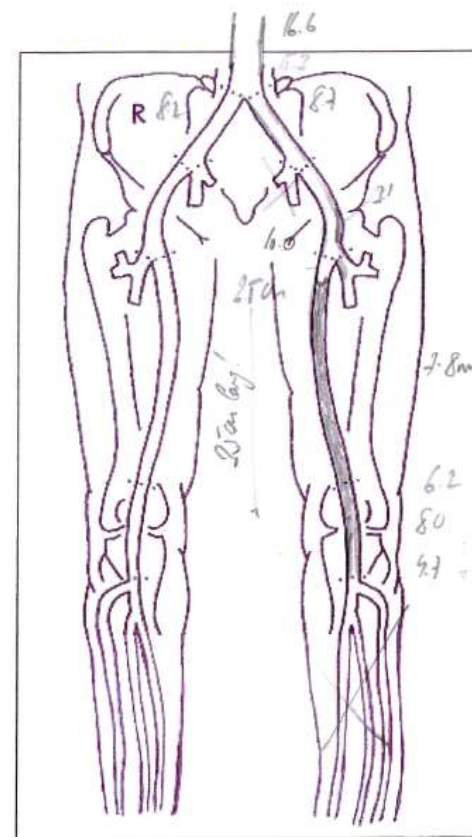
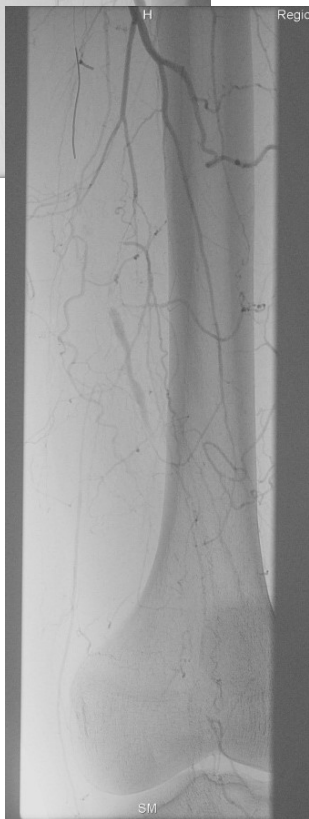
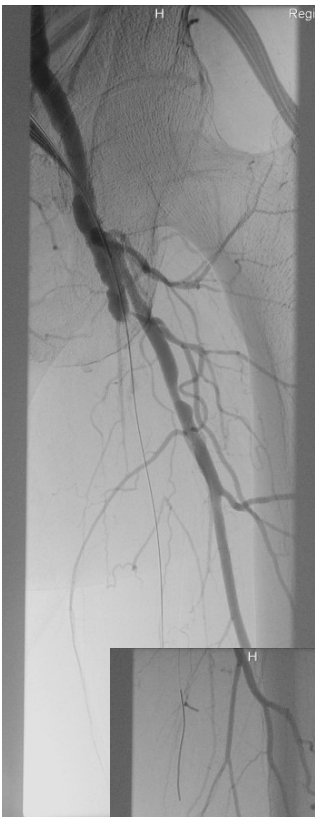
und jetzt ?



Stenosegrad = % Querschnittsreduktion

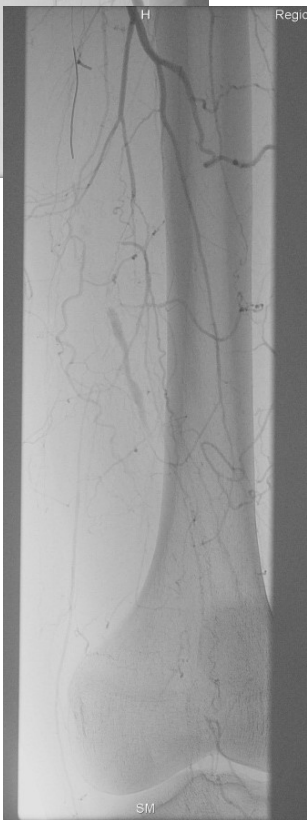
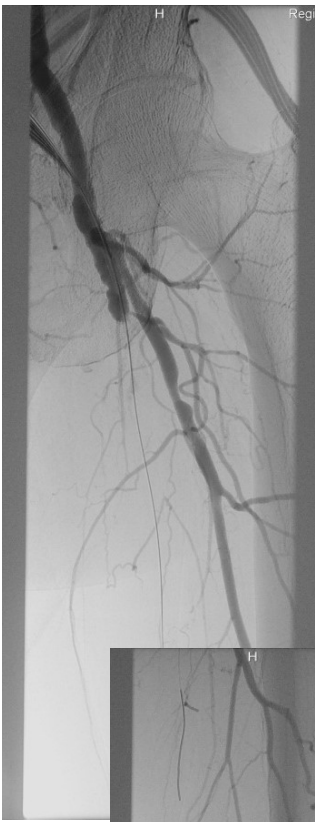
	rechts	links
A. iliaca communis%%
A. iliaca externa%%
A. iliaca interna%%
A. femoralis com.%	20-45%
A. profunda femoris%	50-70%
A. femoralis superficialis proximal%%
A. femoralis superficialis distal%%
A. poplitea%%
Truncus tibio-fibularis%%
A. tibialis anterior%%
A. tibialis posterior%%
A. fibularis%%





Stenosegrad = % Querschnittsreduktion

	rechts	links
Aorta abdominalis%%
A. iliaca communis%%
A. iliaca externa%%
A. iliaca interna%%
A. femoralis com.%	20-40%
A. profunda femoris%	50-70%
A. femoralis superficialis proximal%%
A. femoralis superficialis distal%%
A. poplitea%%
Truncus tibio-fibularis%%
A. tibialis anterior%%
A. tibialis posterior%%
A. fibularis%%



TASC - Kriterien für interventionelle / invasive Therapie:

TASC- Klassifikation

Aortoiliakale und femoropopliteale Läsionen

TASC Typ A

Endovaskuläre Techniken

TASC Typ B

Endovaskuläre Techniken

TASC Typ C

Chirurgische Techniken bei niedrigen Operationsrisiko,
sonst Einsatz von endovaskulären Techniken


TASC Typ D

Chirurgische Techniken

TASC - Kriterien für kathetertechnische Interventionen:

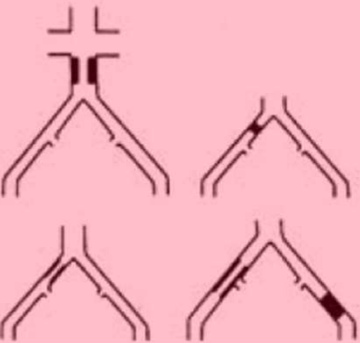
Type A lesions

- Unilateral or bilateral stenoses of CIA
- Unilateral or bilateral single short (≤ 3 cm) stenosis of EIA




Type B lesions:

- Short (≤ 3 cm) stenosis of infrarenal aorta
- Unilateral CIA occlusion
- Single or multiple stenosis totaling 3–10 cm involving the EIA not extending into the CFA
- Unilateral EIA occlusion not involving the origins of internal iliac or CFA



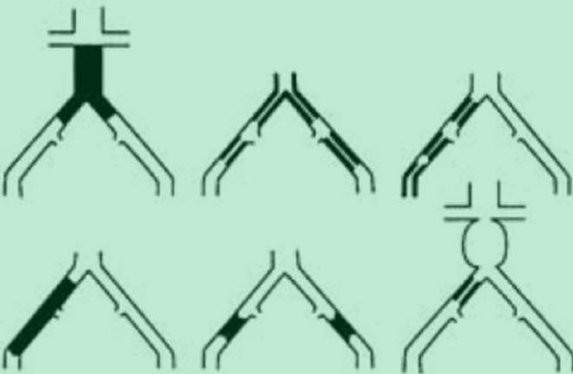
Type C lesions

- Bilateral CIA occlusions
- Bilateral EIA stenoses 3–10 cm long not extending into the CFA
- Unilateral EIA stenosis extending into the CFA
- Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA
- Heavily calcified unilateral EIA occlusion with or without involvement of origins of internal iliac and/or CFA



Type D lesions

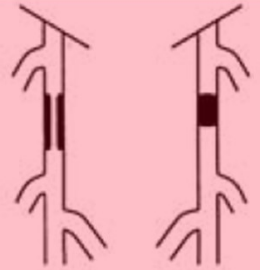
- Infra-renal aortoiliac occlusion
- Diffuse disease involving the aorta and both iliac arteries requiring treatment
- Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA
- Unilateral occlusions of both CIA and EIA
- Bilateral occlusions of EIA
- Iliac stenoses in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery



a)

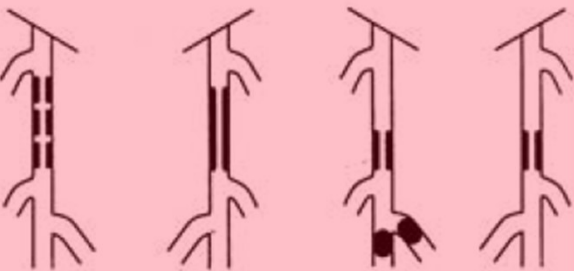
Type A lesions

- Single stenosis ≤ 10 cm in length
- Single occlusion ≤ 5 cm in length




Type B lesions:

- Multiple lesions (stenoses or occlusions), each ≤ 5 cm
- Single stenosis or occlusion ≤ 15 cm not involving the infrageniculate popliteal artery
- Single or multiple lesions in the absence of continuous tibial vessels to improve inflow for a distal bypass
- Heavily calcified occlusion ≤ 5 cm in length
- Single popliteal stenosis



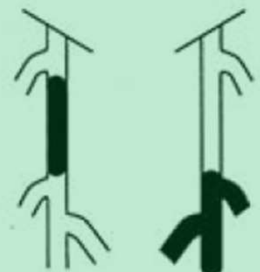
Type C lesions

- Multiple stenoses or occlusions totaling > 15 cm with or without heavy calcification
- Recurrent stenoses or occlusions that need treatment after two endovascular interventions






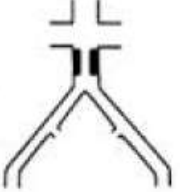








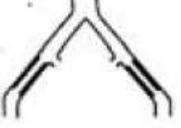


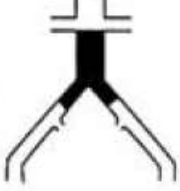







Type D lesions

- Chronic total occlusions of CFA or SFA (> 20 cm, involving the popliteal artery)
- Chronic total occlusion of popliteal artery and proximal trifurcation vessels

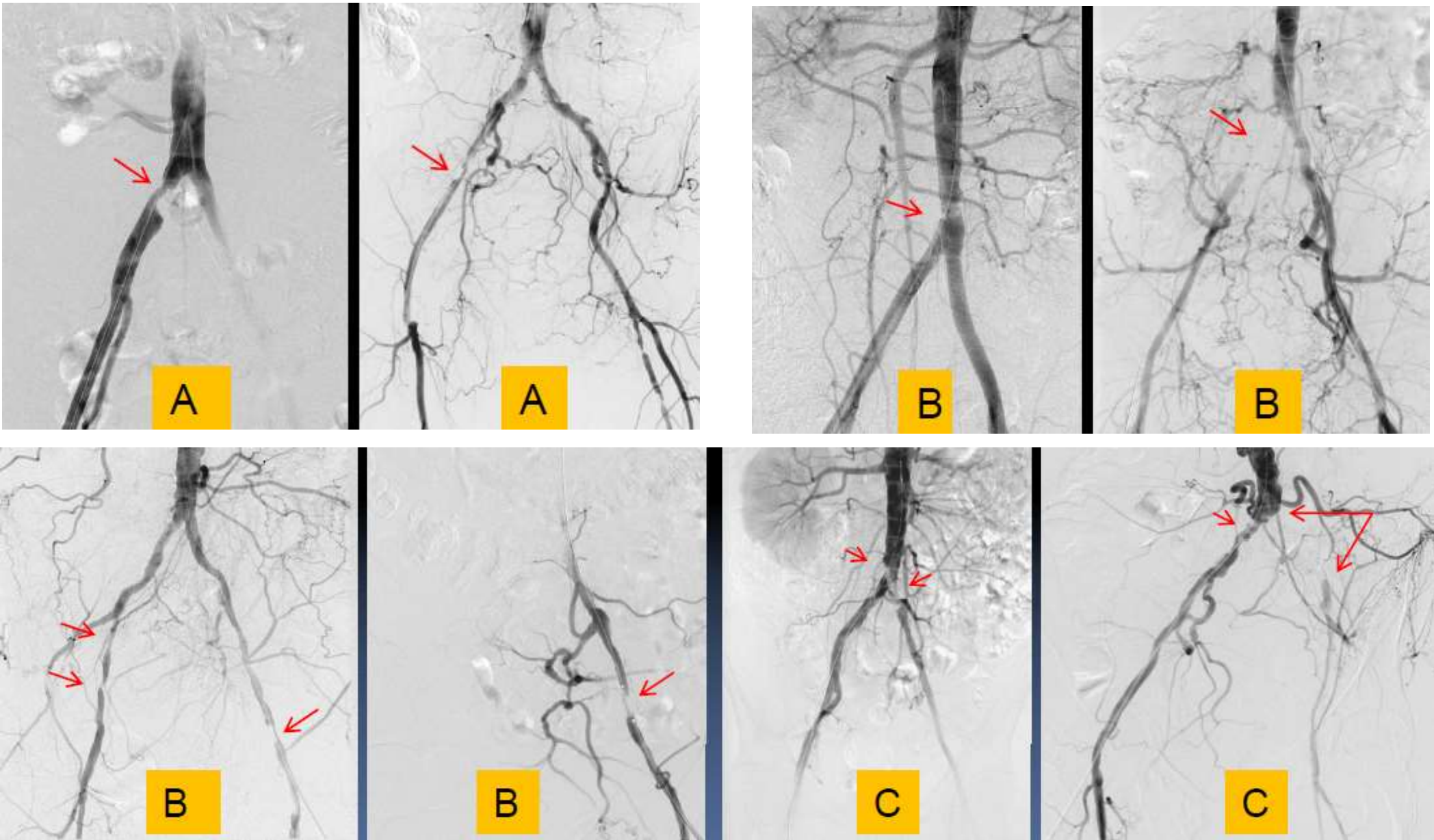


b)

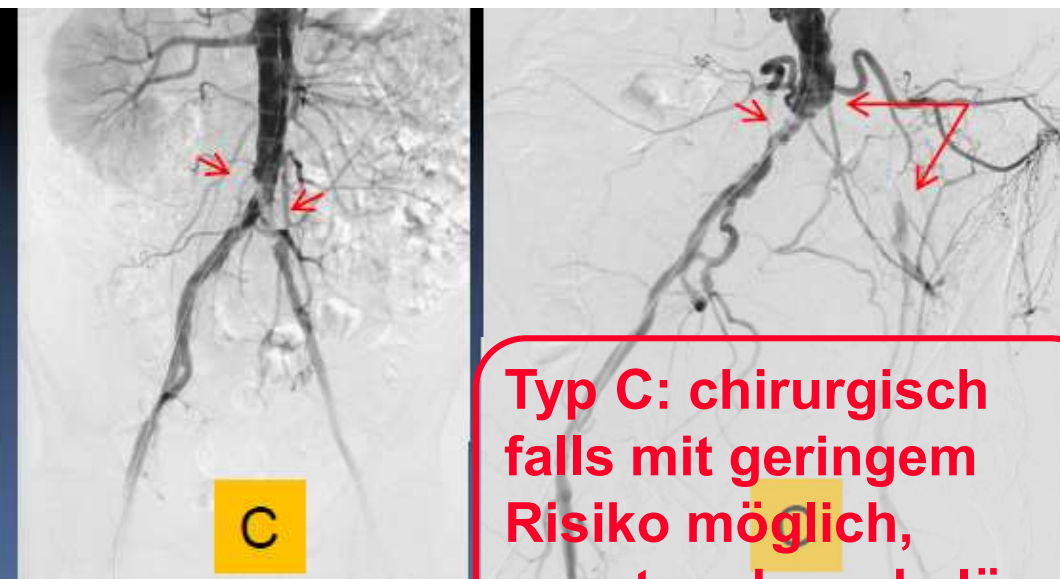
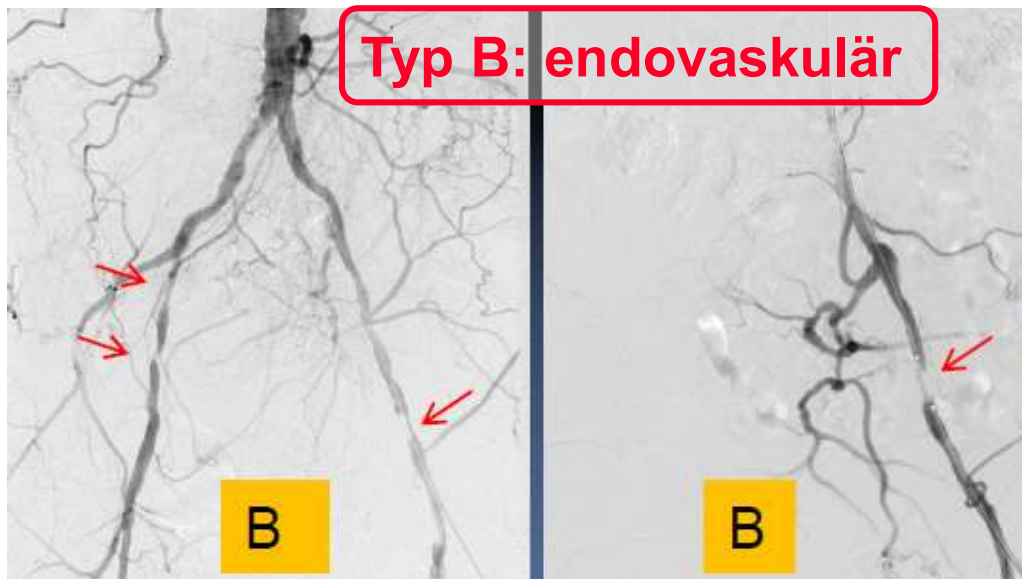
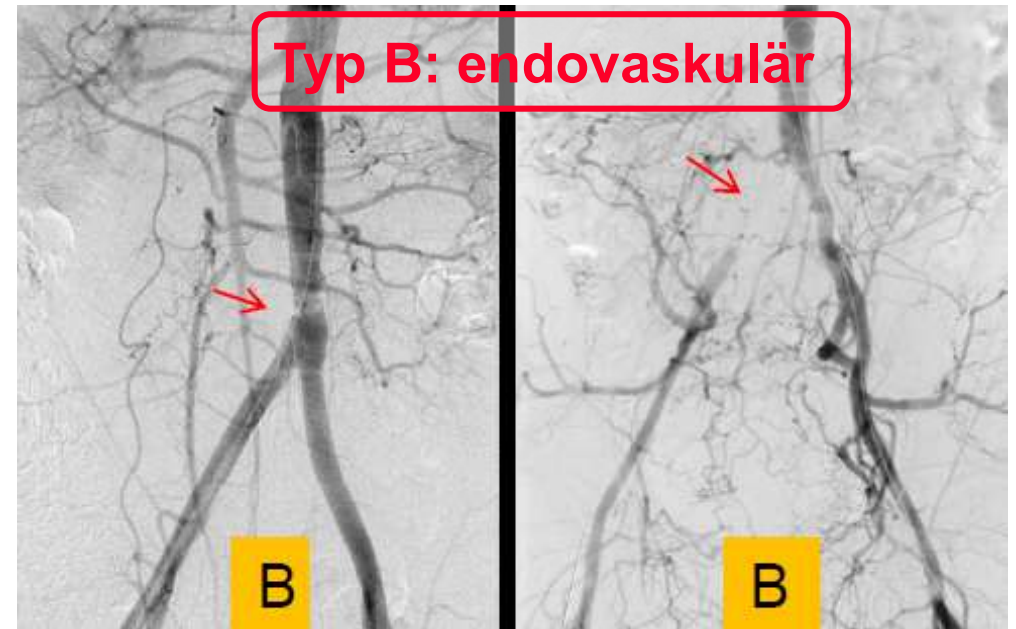
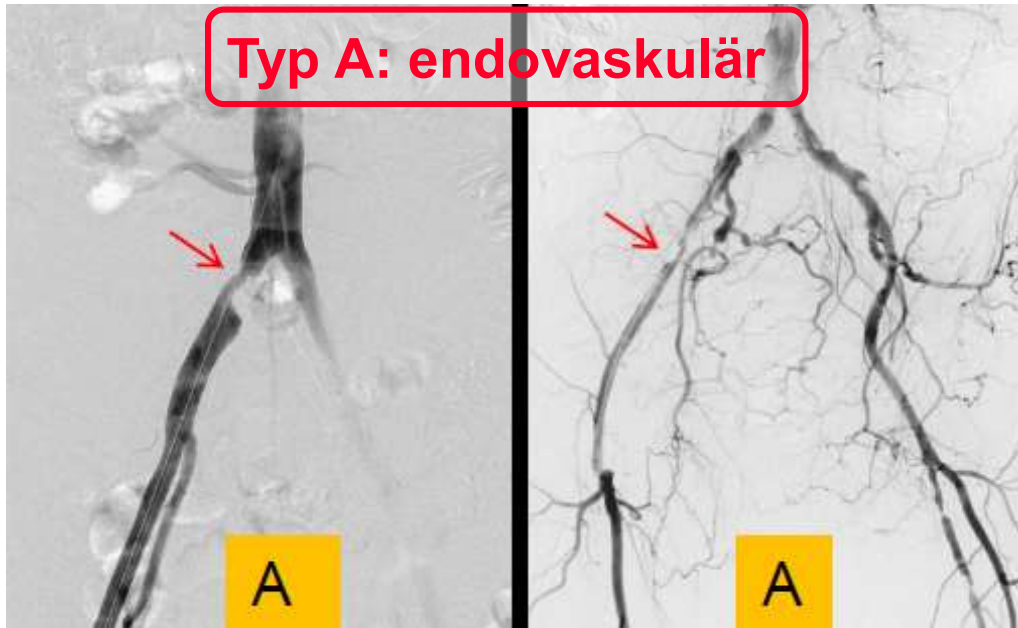
TASC - Kriterien für kathetertechnische Interventionen:

<p>Type A lesions</p> <ul style="list-style-type: none"> • Unilateral or bilateral stenoses of CIA • Unilateral or bilateral single short (≤ 3 cm) stenosis of EIA 	<p>Typ A: endovaskulär</p>	<p>Type A lesions</p> <ul style="list-style-type: none"> • Single stenosis ≤ 10 cm in length • Single occlusion ≤ 5 cm in length  
<p>Type B lesions:</p> <ul style="list-style-type: none"> • Short (≤ 3cm) stenosis of infrarenal aorta • Unilateral CIA occlusion • Single or multiple stenosis totaling 3–10 cm involving the EIA not extending into the CFA • Unilateral EIA occlusion not involving the origins of internal iliac or CFA    	<p>Typ B: endovaskulär</p>	<p>Type B lesions:</p> <ul style="list-style-type: none"> • Multiple lesions (stenoses or occlusions), each ≤ 5 cm • Single stenosis or occlusion ≤ 15 cm not involving the infrageniculate popliteal artery • Single or multiple lesions in the absence of continuous tibial vessels to improve inflow for a distal bypass • Heavily calcified occlusion ≤ 5 cm in length • Single popliteal stenosis    
<p>Type C lesions</p> <ul style="list-style-type: none"> • Bilateral CIA occlusions • Bilateral EIA stenoses 3–10 cm long not extending into the CFA • Unilateral EIA stenosis extending into the CFA • Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA • Heavily calcified unilateral EIA occlusion with or without involvement of origins of internal iliac and/or CFA   	<p>Typ C: chirurgisch falls mit geringem Risiko möglich, sonst endovaskulär</p>	<p>Type C lesions:</p> <ul style="list-style-type: none"> • Bilateral stenoses or occlusions of the EIA • Recurrent stenoses or occlusions that need treatment 
<p>Type D lesions</p> <ul style="list-style-type: none"> • Infra-renal aortoiliac occlusion • Diffuse disease involving the aorta and both iliac arteries requiring treatment • Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA • Unilateral occlusions of both CIA and EIA • Bilateral occlusions of EIA • Iliac stenoses in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery      	<p>Typ D: chirurgisch</p>	<p>Type D lesions</p> <ul style="list-style-type: none"> • Chronic total occlusions of CFA or SFA (>20 cm, involving the popliteal artery) • Chronic total occlusion of popliteal artery and proximal trifurcation vessels  

TASC - Kriterien für kathetertechnische Interventionen:



TASC - Kriterien für kathetertechnische Interventionen:



Unsere Patientin: B.C., 37jährig ♀

Seit circa 1 Jahr bemerkt Frau B. Schmerzen in den Beinen beidseits beginnend in den Waden mit Ausstrahlung über die Oberschenkel vorne bis ins Gesäss beidseits. Sie muss deswegen stehen bleiben. Die Beschwerden seien immer schlimmer geworden. Treppensteigen sei kaum mehr möglich. Jetzt treten die Beschwerden nach 50m leichten Aufwärtsgehen und nach 200m eher langsamen Geradeausgehens auf. Sie verschwinden nach wenigen Sekunden Stehenbleiben und treten beim Weitergehen später wieder auf. In Ruhe keine Beschwerden.

Ihre Beurteilung der Beschwerden ?
Was spricht für "arteriell"?
Was könnte für "nicht-arteriell" sprechen ?

Wie können wir das noch weiter klären ?

Unsere Patientin: B.C., 37jährig ♀

Seit circa 1 Jahr bemerkt Frau B. Schmerzen in den Beinen beidseits beginnend in den **Waden** mit Ausstrahlung über die **Oberschenkel vorne** bis ins **Gesäss** beidseits. Sie muss **deswegen stehen bleiben**. Die Beschwerden seien immer schlimmer geworden. Treppensteigen sei kaum mehr möglich. Jetzt treten die Beschwerden nach 50m leichten **Aufwärtsgehen** und nach 200m eher langsamen **Geradeausgehens** auf. Sie verschwinden nach **wenigen Sekunden** Stehenbleiben und treten beim Weitergehen später wieder auf. In **Ruhe keine** Beschwerden.

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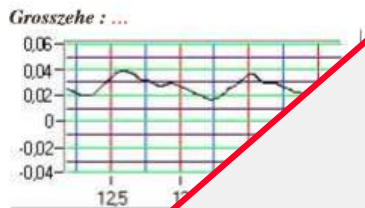
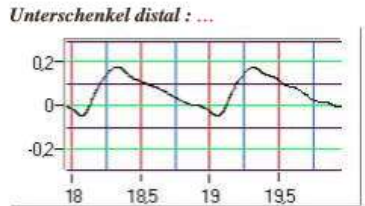
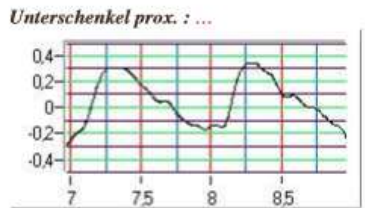
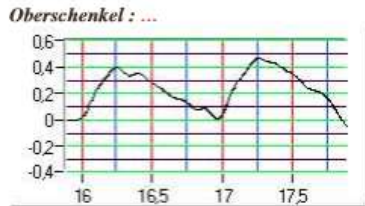
Unsere Patientin: B.C., 37jährig ♀

Oszillographie untere Extremitäten

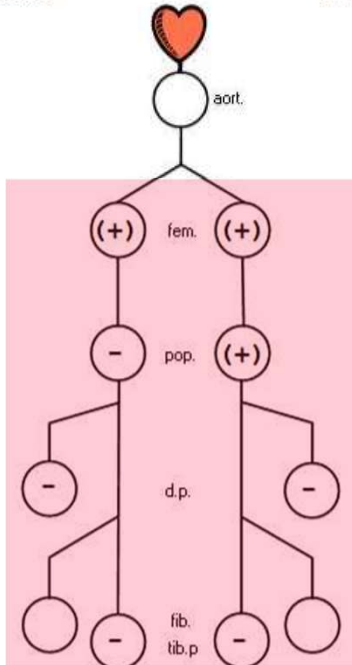
Geräusche:(unbelastet / belastet)

~ / ~ mittelfrequent

~ / ~ hochfrequent



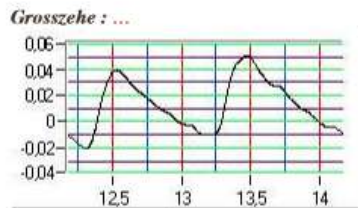
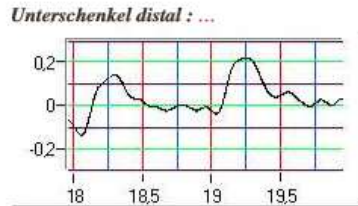
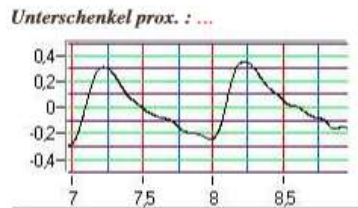
rechts



Arteriendrucke: mm Hg.

140/90	OA	140/90
135	A.dors.ped.	135
135	A.tib.post	159
149	A.fib.	149
Grosszehen		
1.06	ABI	1.14
0.00	TBI	0.00

links

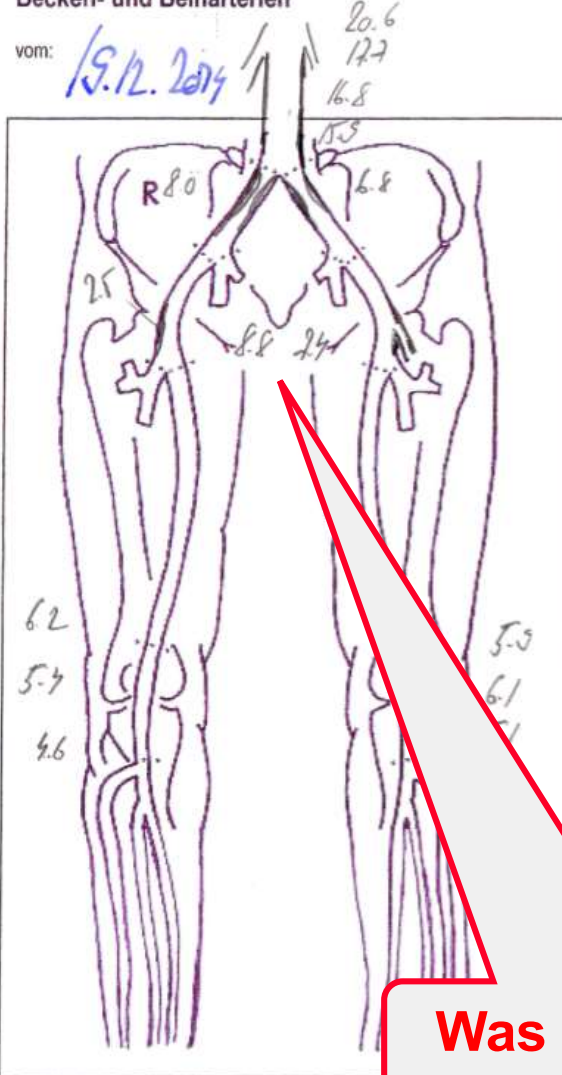


Pulsstatus: Arterien: + palp.,
(+) schwach, ++ verbreitert,
- nicht palp., O nicht untersucht

Befundskizze Duplexsonographie

Becken- und Beinarterien

vom:



Untersucher:

Canova

Unterschrift:

h

Stenosegrad = % Querschnittsreduktion

	rechts	links
Aorta abdominalis%%
A. iliaca communis	80-85%	50-75%
A. iliaca externa%%
A. iliaca interna%%
A. femoralis com.	20-45%	20-45%
A. profunda femoris%%
A. femoralis superficialis proximal%%
A. femoralis superficialis distal%%
A. poplitea%%
Truncus tibio-fibularis%%
A. tibialis anterior%%
A. tibialis posterior%%
A. fibularis%%

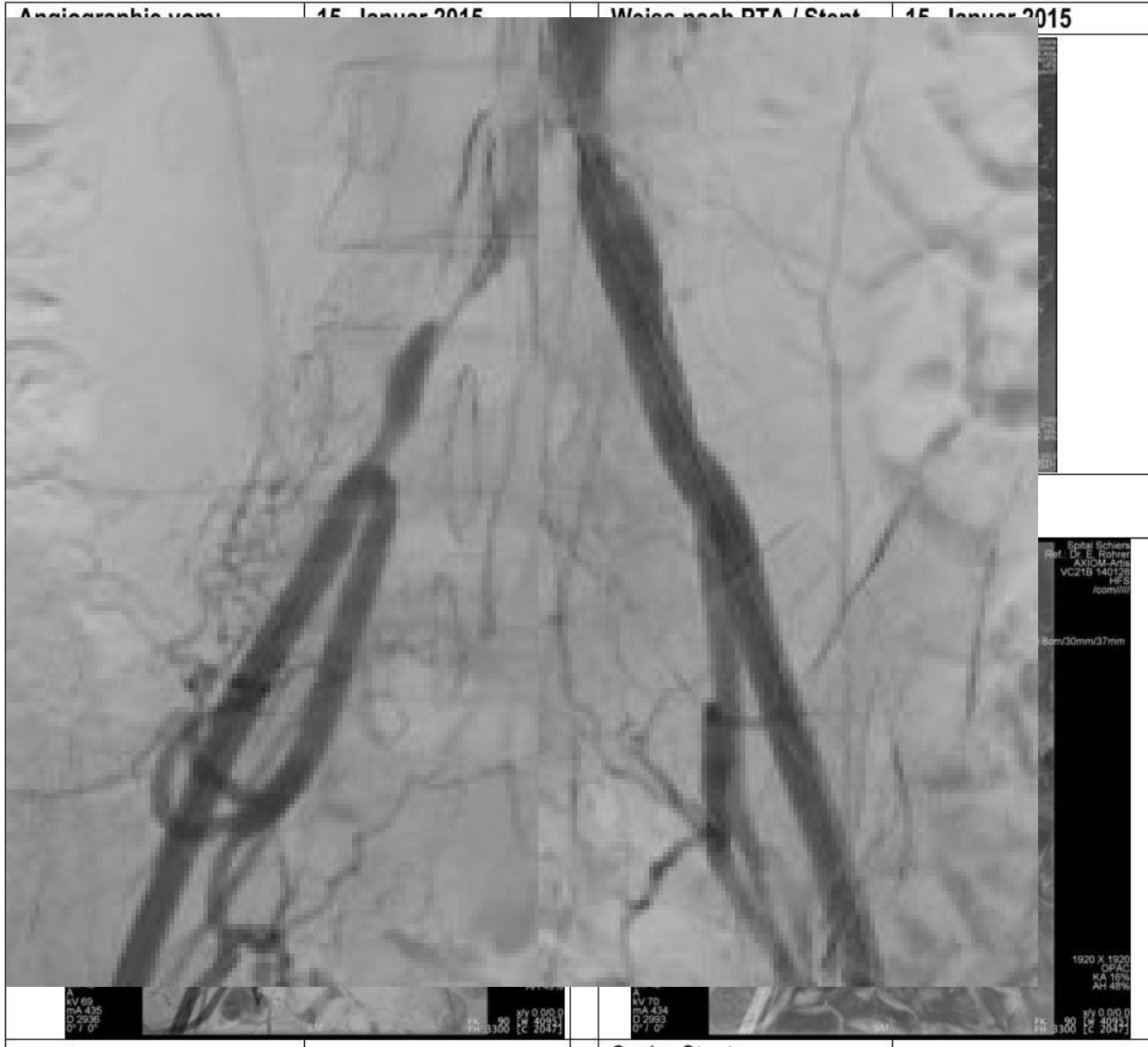
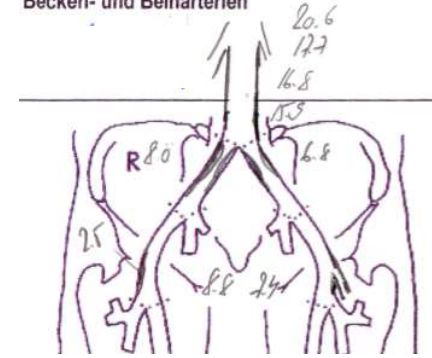
Wie weiter ?

Welche Befunde erwarten Sie ?

Was empfehlen Sie ?

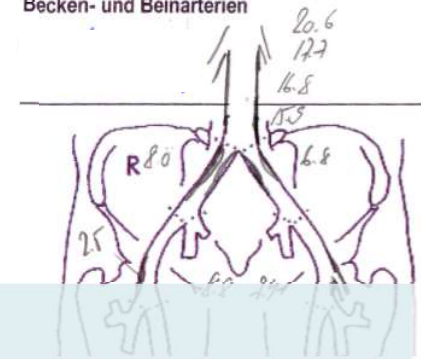
Unsere Patientin: B.C., 37jährig ♀

Becken- und Beinarterien



Unsere Patientin: B.C., 37jährig ♀

Becken- und Beinarterien



Angiographie vom:	15. Januar 2015	Weiss nach PTA / Stent	15. Januar 2015
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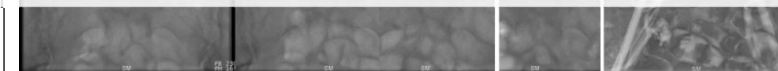
Recommendations on revascularization of aorto-iliac occlusive lesions^c

Recommendations	Class ^a	Level ^b
An endovascular-first strategy is recommended for short (i.e. <5 cm) occlusive lesions. ²⁹¹	I	C
In patients fit for surgery, aorto-(bi)femoral bypass should be considered in aorto-iliac occlusions. ^{281,292,293}	IIa	B
An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities. ^{288,294,295}	IIa	B
An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options. ^{76,281-283,286}	IIb	B
Primary stent implantation rather than provisional stenting should be considered. ²⁹⁴⁻²⁹⁶	IIa	B
Open surgery should be considered in fit patients with an aortic occlusion extending up to the renal arteries.	IIa	C
In the case of ilio-femoral occlusive lesions, a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered. ²⁹⁷⁻³⁰⁰	IIa	C
Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization. ³⁰¹	IIb	C

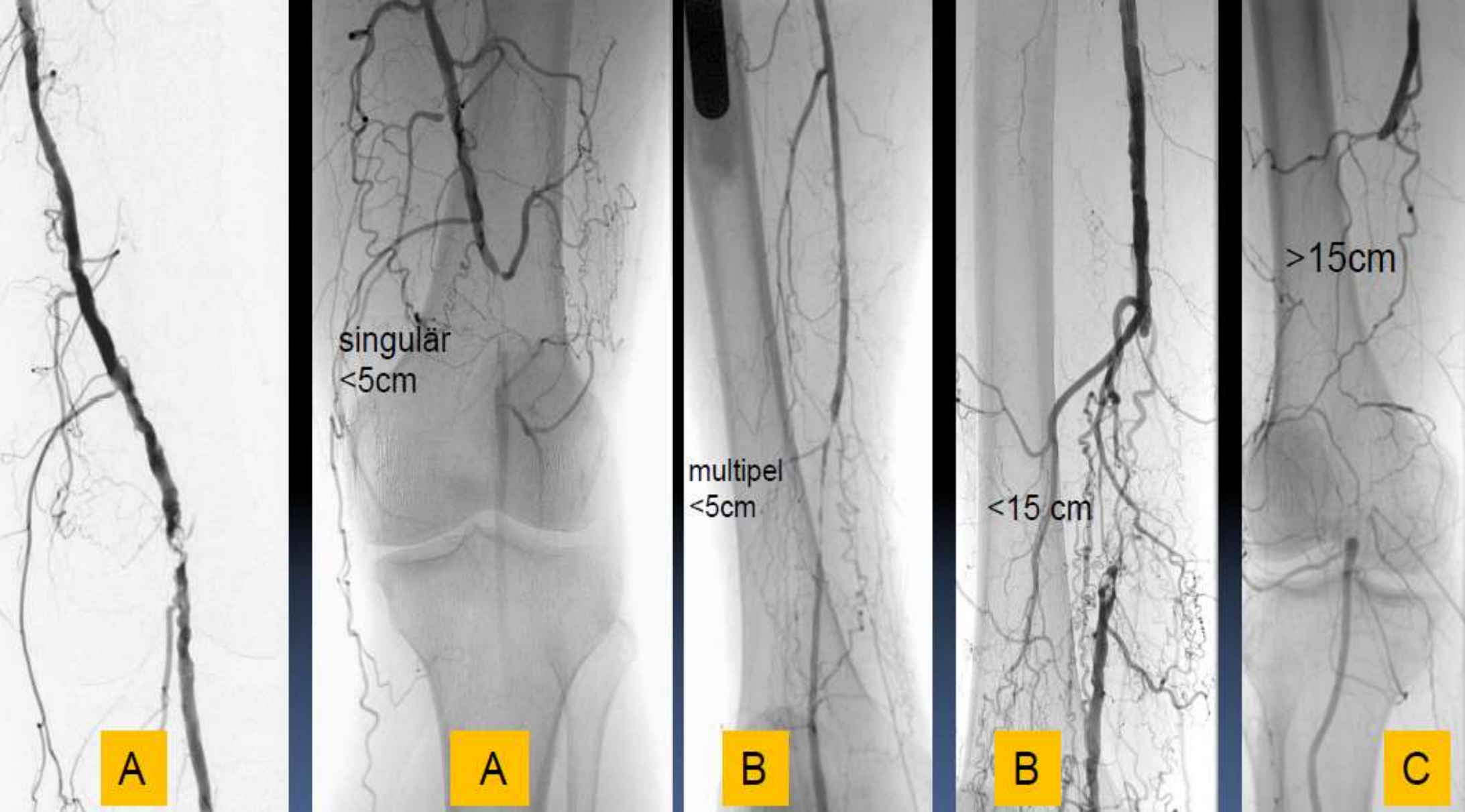
^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.



TASC - Kriterien für kathetertechnische Interventionen:



TASC - Kriterien für kathetertechnische Interventionen:

Typ A: endovaskulär

singulär
<5cm

A

Typ B: endovaskulär

multipel
<5cm

B

ESC Guidelines 25 cm !

< 5 cm

B

>15cm

Typ C: chirurgisch
falls mit geringem
Risiko möglich,
sonst endovaskulär

C

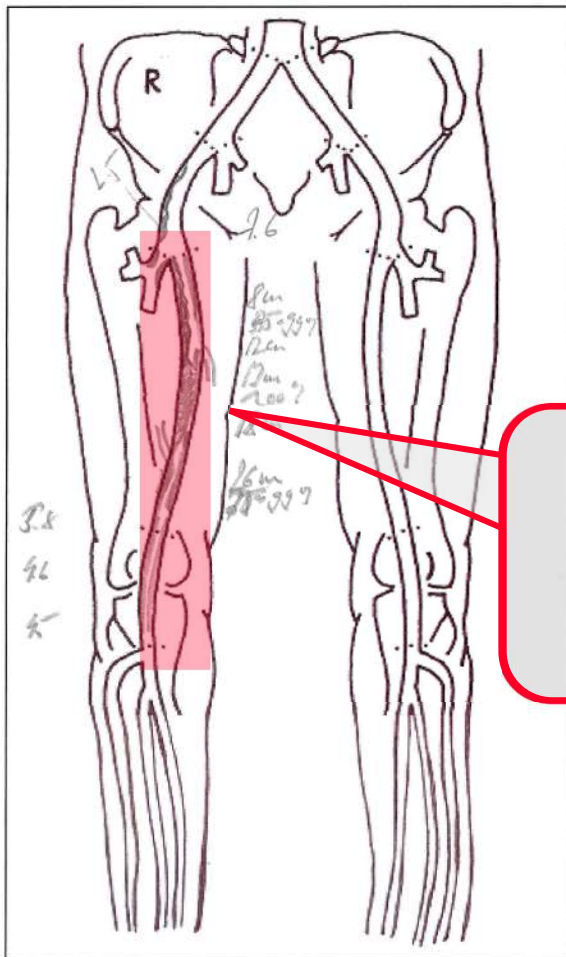
Gefäßmedizin–Patientin B.M. ♀ (70j.)

Risikofaktoren:
 Rauchen
 Arterielle Hypertonie
 Hypercholesterinämie
 Diabetes mellitus
 Familienanamnese
 Alter

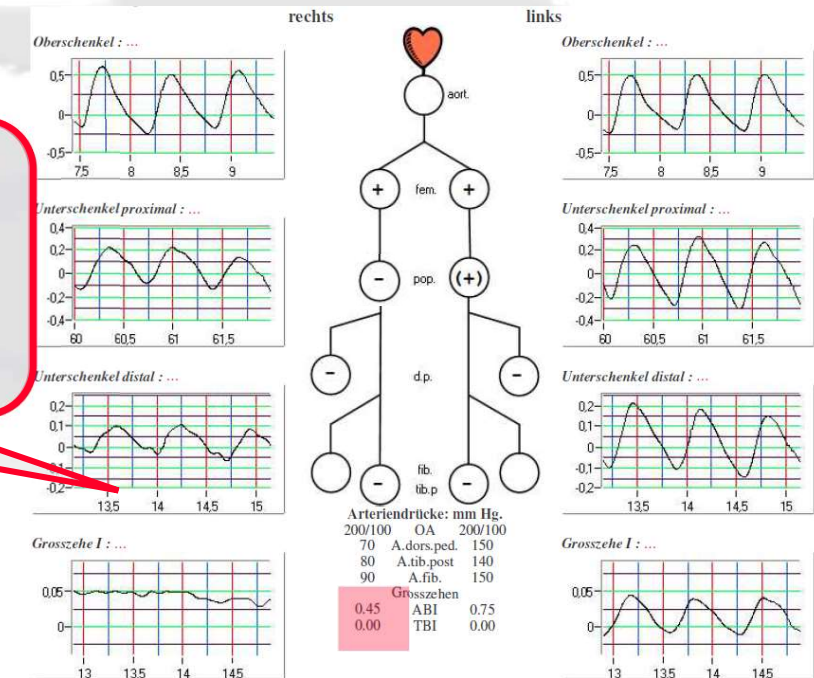
Wie klären Sie weiter ab ?

Becken- und Beinarterien

vom: 25.07. 2018

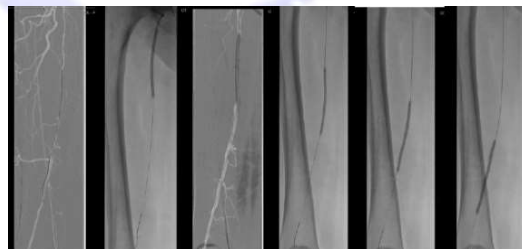
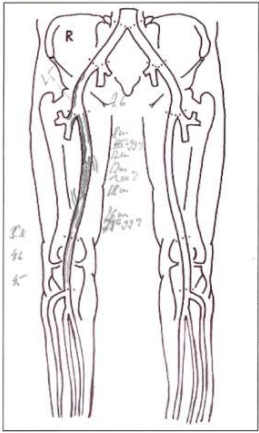


**Welche invasive
 Therapie empfehlen
 Sie evidenz-basiert?**



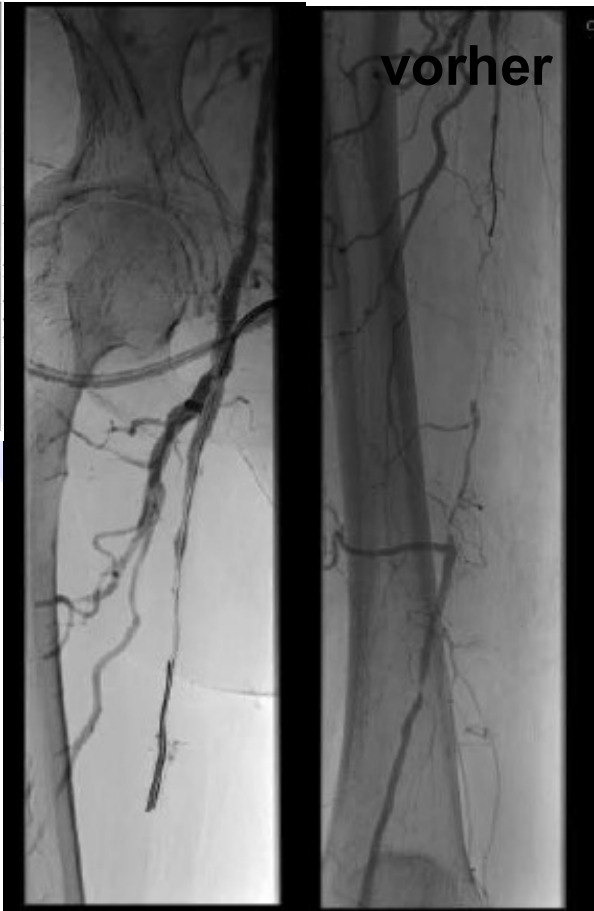
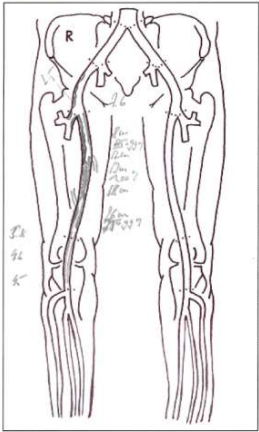
Gefäßmedizin–Patientin B.M. ♀ (70j.)

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Rauchen
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Familienanamnese
Alter



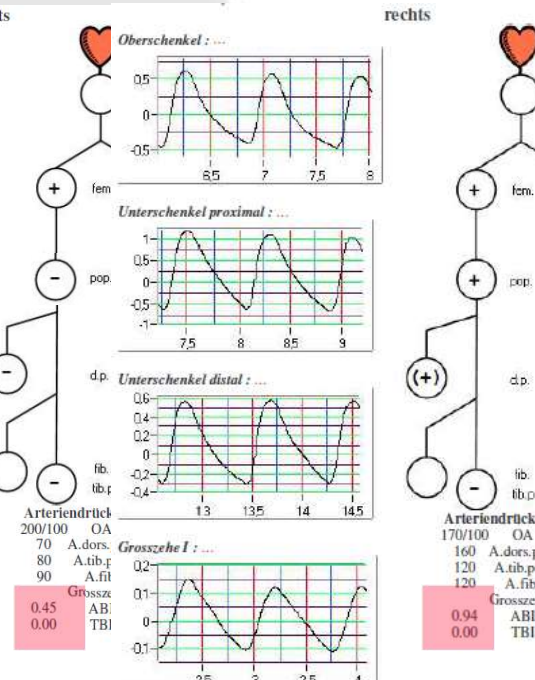
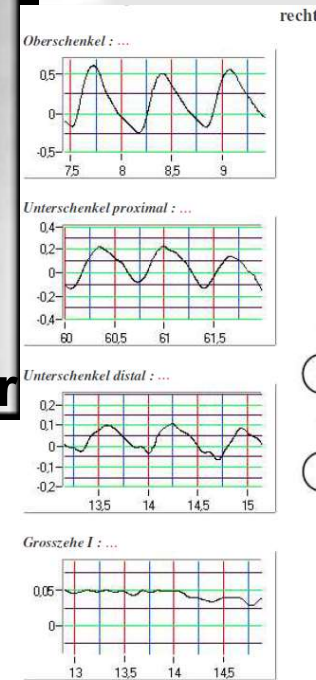
Gefäßmedizin–Patientin B.M. ♀ (70j.)

Risikofaktoren:
 Rauchen
 Arterielle Hypertonie
 Hypercholesterinämie
 Diabetes mellitus
 Familienanamnese
 Alter



vorher

nachher



Unsere Patientin B.M. ♀ (70j.)

Risk factors:
 Smoking
 Arterial hypertension
 Hypercholesterolemia
 Diabetes mellitus
 Family history
 Age

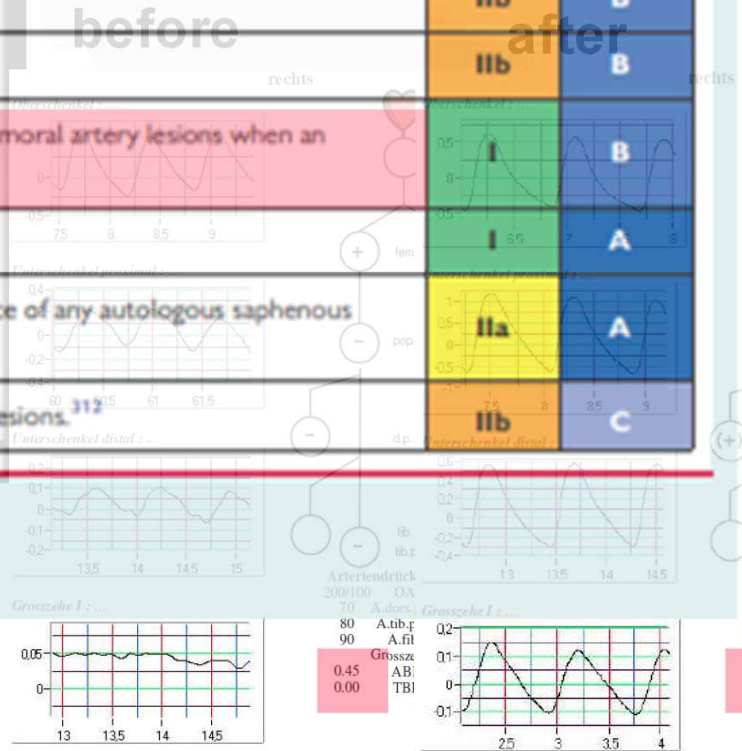
Recommendations on revascularization of femoro-popliteal occlusive lesions^c

Recommendations	Class ^a	Level ^b
An endovascular-first strategy is recommended in short (i.e. <25 cm) lesions. ^{302,303}	I	C
Primary stent implantation should be considered in short (i.e. <25 cm) lesions. ^{304,305}	IIa	A
Drug-eluting balloons may be considered in short (i.e. <25 cm) lesions. ^{77,306-310}	IIb	A
Drug-eluting stents may be considered for short (i.e. <25 cm) lesions. ^{302,303,311}	IIb	B
Drug-eluting balloons may be considered for the treatment of in-stent restenosis. ^{312,313}	IIb	B
In patients who are not at high risk for surgery, bypass surgery is indicated for long (i.e. ≥25 cm) superficial femoral artery lesions when an autologous vein is available and life expectancy is > 2 years. ³¹⁴	I	B
The autologous saphenous vein is the conduit of choice for femoro-popliteal bypass. ^{284,315}	I	A
When above-the-knee bypass is indicated, the use of a prosthetic conduit should be considered in the absence of any autologous saphenous vein. ²⁸⁴	IIa	A
In patients unfit for surgery, endovascular therapy may be considered in long (i.e. ≥25 cm) femoro-popliteal lesions. ³¹²	IIb	C

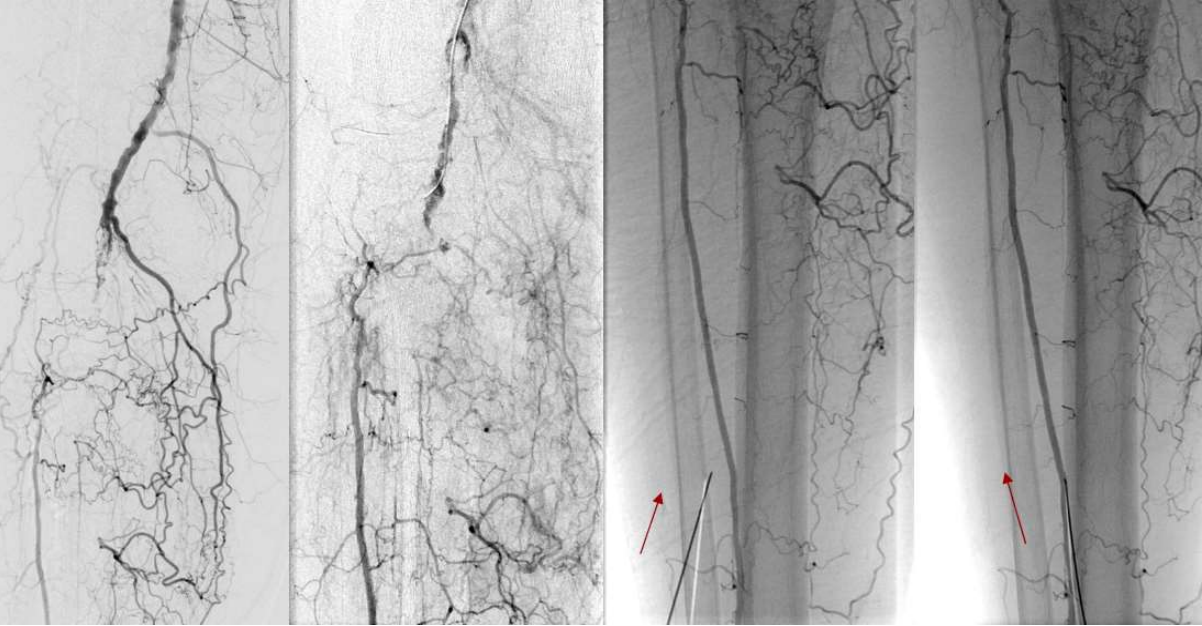
^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

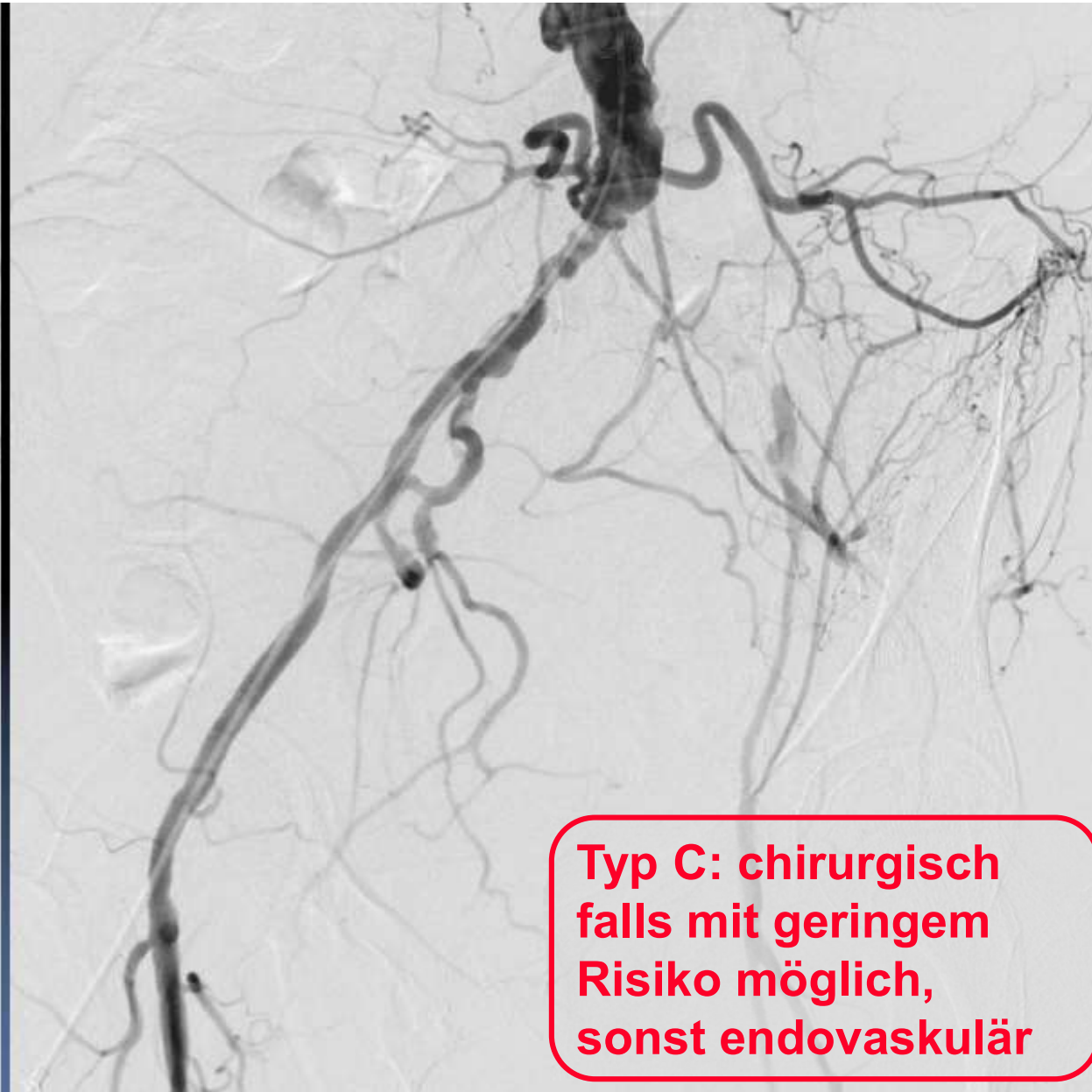


TASC - Kriterien für kathetertechnische Interventionen:



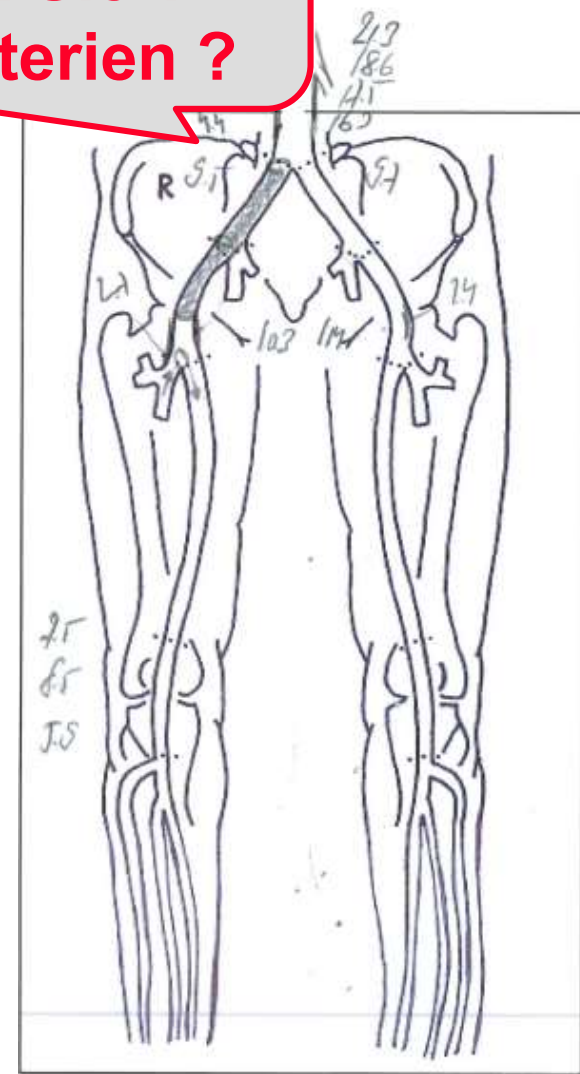
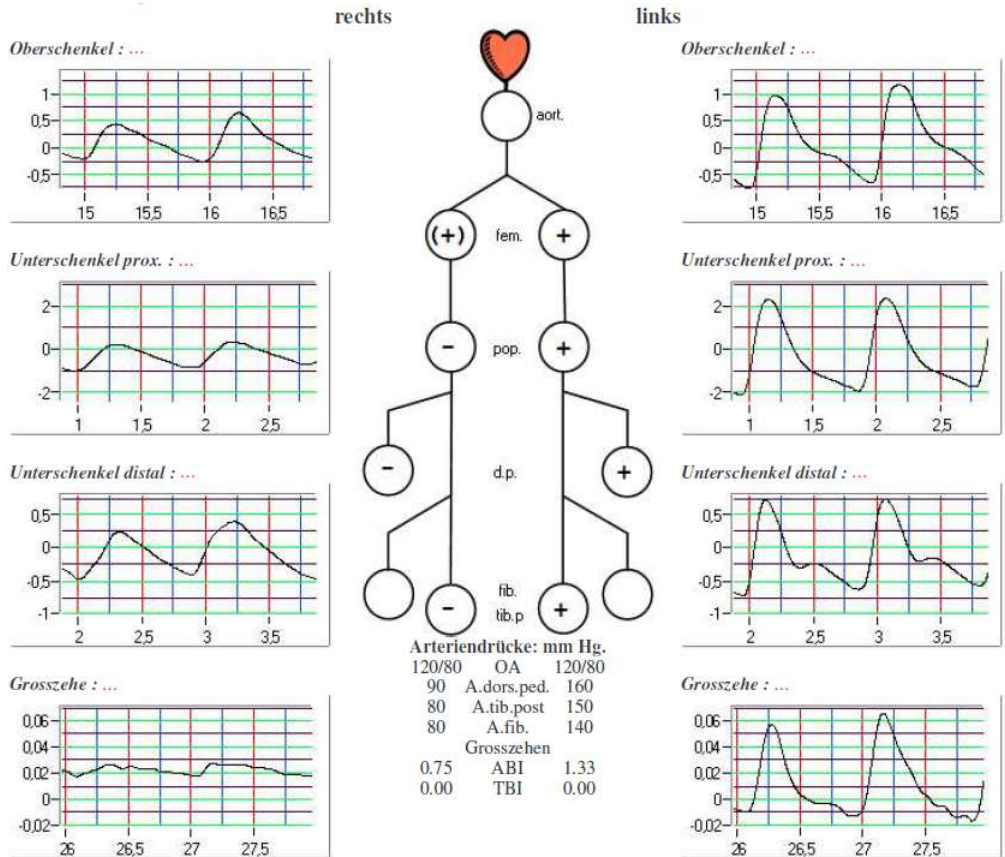
Typ A: endovaskulär

TASC - Kriterien für kathetertechnische Interventionen:

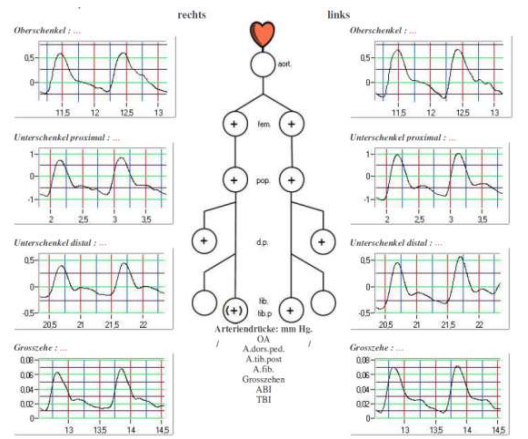
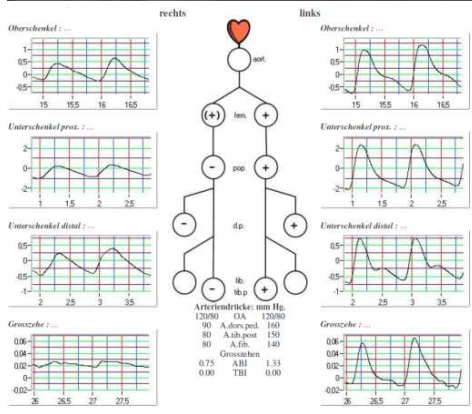
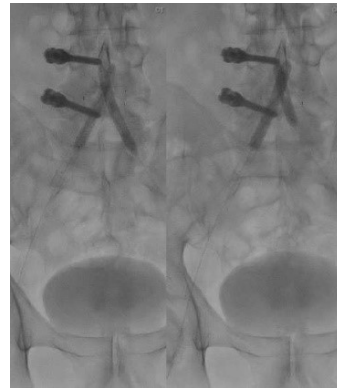
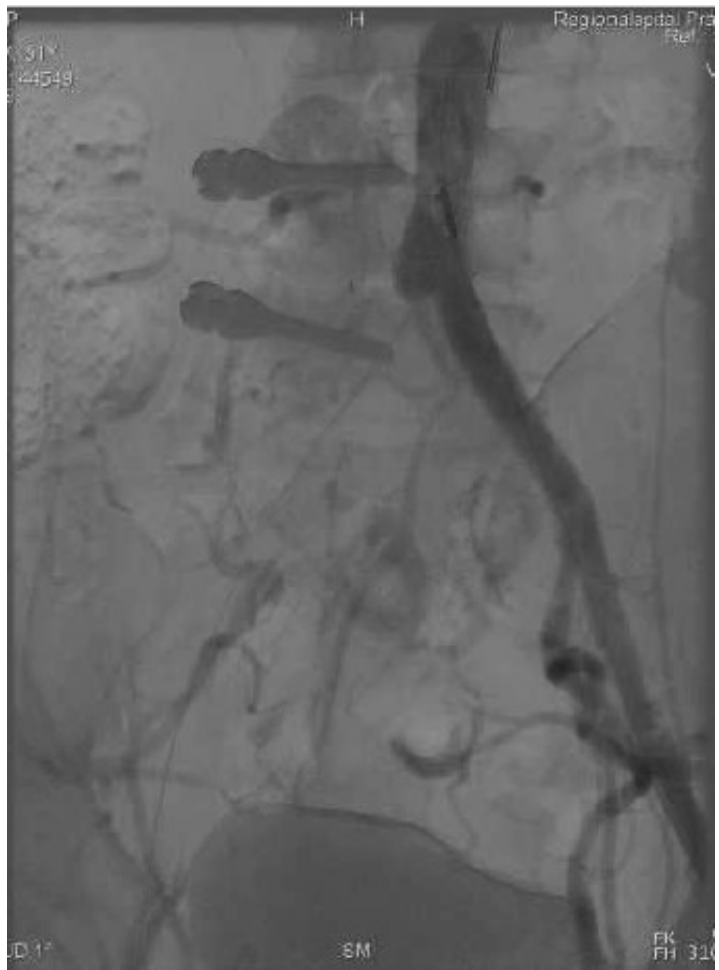
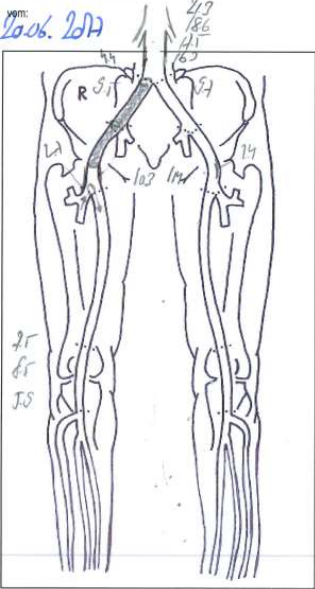


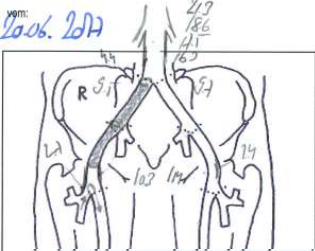
49jähriger ♂ mit Oberschenkelclaudicatio rechts nach 50 - 100m seit 2-3 Jahren mit massiver Verschlechterung seit 6 Wochen nach 10 m zügigen Gehens

**PAVK Stadium ?
Was empfehlen Sie ?
Nach TASC Kriterien ?**



Becken- und Beinarterien





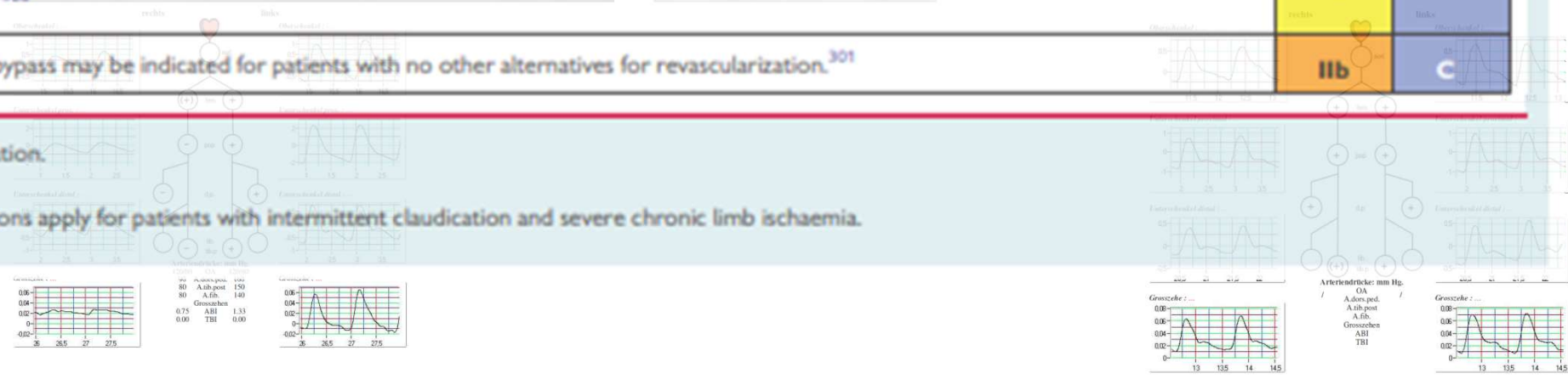
Recommendations on revascularization of aorto-iliac occlusive lesions^c

Recommendations	Class ^a	Level ^b
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An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities. ^{288,294,295}	IIa	B
An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options. ^{76,281-283,286}	IIb	B
Primary stent implantation rather than provisional stenting should be considered. ²⁹⁴⁻²⁹⁶	IIa	B
Open surgery should be considered in fit patients with an aortic occlusion extending up to the renal arteries.	IIa	C
In the case of ilio-femoral occlusive lesions, a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered. ²⁹⁷⁻³⁰⁰	IIa	C
Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization. ³⁰¹	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.



Arterielle Verschlusskrankheit:

Therapiewahl: konservativ
kathetertechnisch
chirurgisch oder kombiniert
Bypässe von aortal bis pedal

An Update in Methods for Revascularisation and Expansion of the TASC Lesion Classification to include Below-the-Knee Arteries: A. Supplement to the Inter-Society Consensus for the Management of peripheral Arterial Disease (TASC II): TASC Steering Committee, Jaff MR, White CJ, Hiatt WR, Fowkes GR, Dormandy J, Razavi M, Reekers J, Norgren L.J. Endovasc Ther. 2015 Oct;22(5):663-77. doi: 10.1177/1526602815592206. Epub 2015 Aug 3.


Hybrid and open surgery of Trans Atlantic Inter Society II Type C and D iliac occlusive disease and clinical lesion of common femoral artery. Starodubtsev V, Karpenko A, Ignatenko P. Int Angiol. 2015 Nov 10

TASC II section F on revascularization in PAD.. Norgren L, Hiatt WR, Harris KA, Lammer J; TASC II Working Group. J Endovasc Ther. 2007 Oct;14(5):743-4.

TASC - Kriterien für kathetertechnische Interventionen:

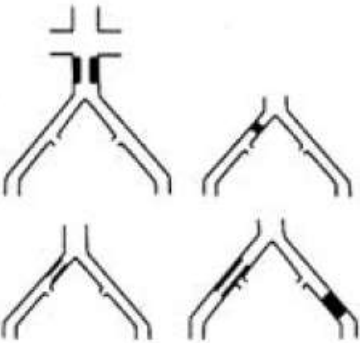
Type A lesions

- Unilateral or bilateral stenoses of CIA
- Unilateral or bilateral single short (≤ 3 cm) stenosis of EIA




Type B lesions:

- Short (≤ 3 cm) stenosis of infrarenal aorta
- Unilateral CIA occlusion
- Single or multiple stenosis totaling 3–10 cm involving the EIA not extending into the CFA
- Unilateral EIA occlusion not involving the origins of internal iliac or CFA



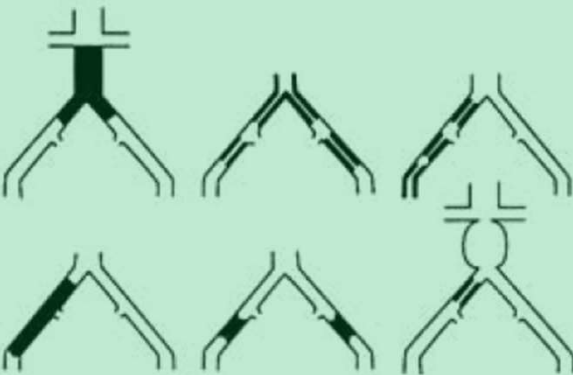
Type C lesions

- Bilateral CIA occlusions
- Bilateral EIA stenoses 3–10 cm long not extending into the CFA
- Unilateral EIA stenosis extending into the CFA
- Unilateral EIA occlusion that involves the origins of internal iliac and/or CFA
- Heavily calcified unilateral EIA occlusion with or without involvement of origins of internal iliac and/or CFA



Type D lesions

- Infra-renal aortoiliac occlusion
- Diffuse disease involving the aorta and both iliac arteries requiring treatment
- Diffuse multiple stenoses involving the unilateral CIA, EIA, and CFA
- Unilateral occlusions of both CIA and EIA
- Bilateral occlusions of EIA
- Iliac stenoses in patients with AAA requiring treatment and not amenable to endograft placement or other lesions requiring open aortic or iliac surgery

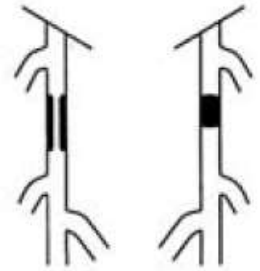


a)

Typ D: chirurgisch

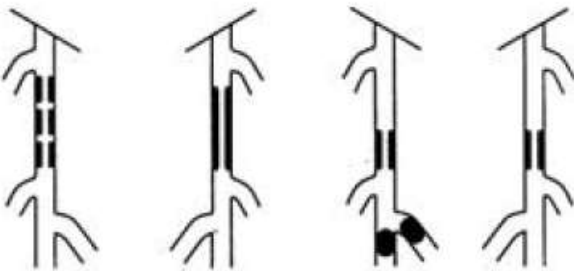
Type A lesions

- Single stenosis ≤ 10 cm in length
- Single occlusion ≤ 5 cm in length




Type B lesions:

- Multiple lesions (stenoses or occlusions), each ≤ 5 cm
- Single stenosis or occlusion ≤ 15 cm not involving the infrageniculate popliteal artery
- Single or multiple lesions in the absence of continuous tibial vessels to improve inflow for a distal bypass
- Heavily calcified occlusion ≤ 5 cm in length
- Single popliteal stenosis



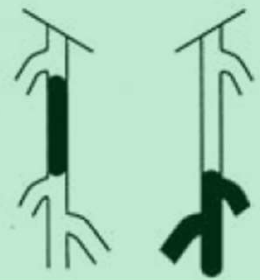
Type C lesions

- Multiple stenoses or occlusions totaling >15 cm with or without heavy calcification
- Recurrent stenoses or occlusions that need treatment after two endovascular interventions



Type D lesions

- Chronic total occlusions of CFA or SFA (>20 cm, involving the popliteal artery)
- Chronic total occlusion of popliteal artery and proximal trifurcation vessels



b)

Therapiewahl bei pAVK

Recommendations on revascularization of aorto-iliac occlusive lesions^c

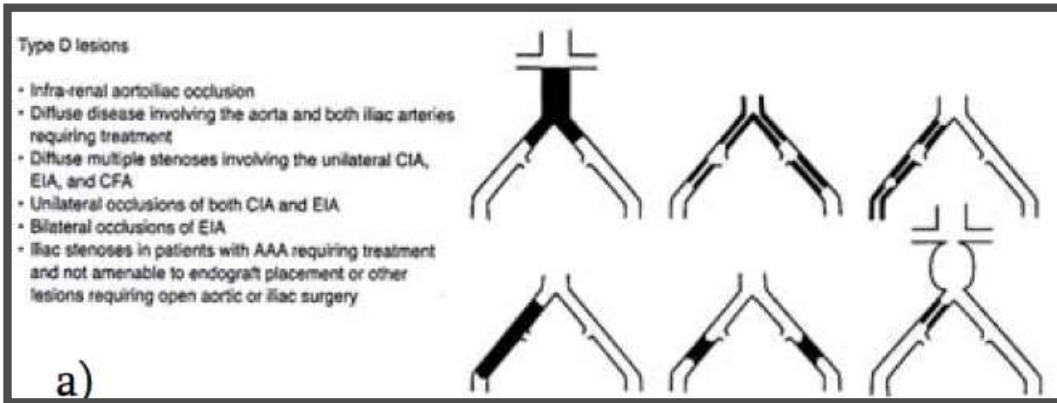
Recommendations	Class ^a	Level ^b
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An endovascular-first strategy should be considered in long and/or bilateral lesions in patients with severe comorbidities. ^{288,294,295}	IIa	B
An endovascular-first strategy may be considered for aorto-iliac occlusive lesions if done by an experienced team and if it does not compromise subsequent surgical options. ^{76,281–283,286}	IIb	B
Primary stent implantation rather than provisional stenting should be considered. ^{294–296}	IIa	B
Open surgery should be considered in fit patients with an aortic occlusion extending up to the renal arteries.	IIa	C
In the case of ilio-femoral occlusive lesions, a hybrid procedure combining iliac stenting and femoral endarterectomy or bypass should be considered. ^{297–300}	IIa	C
Extra-anatomical bypass may be indicated for patients with no other alternatives for revascularization. ³⁰¹	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

TASC - Kriterien für kathetertechnische Interventionen:

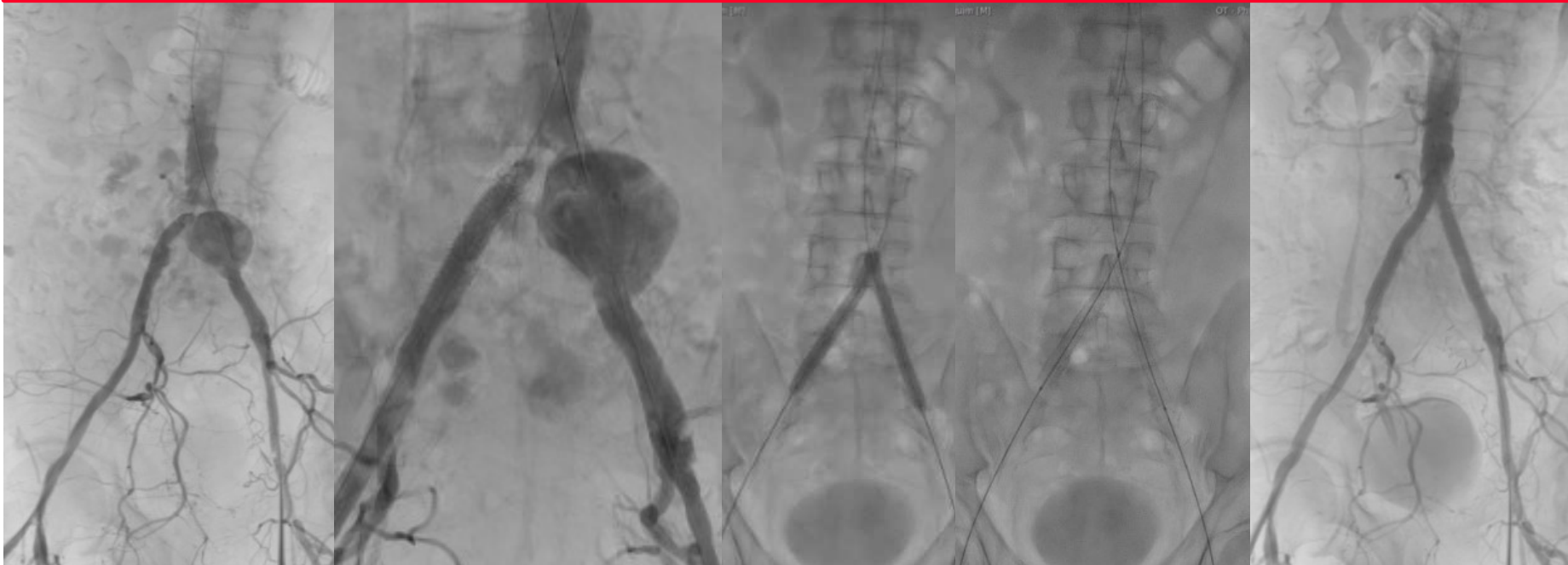


Typ D: chirurgisch

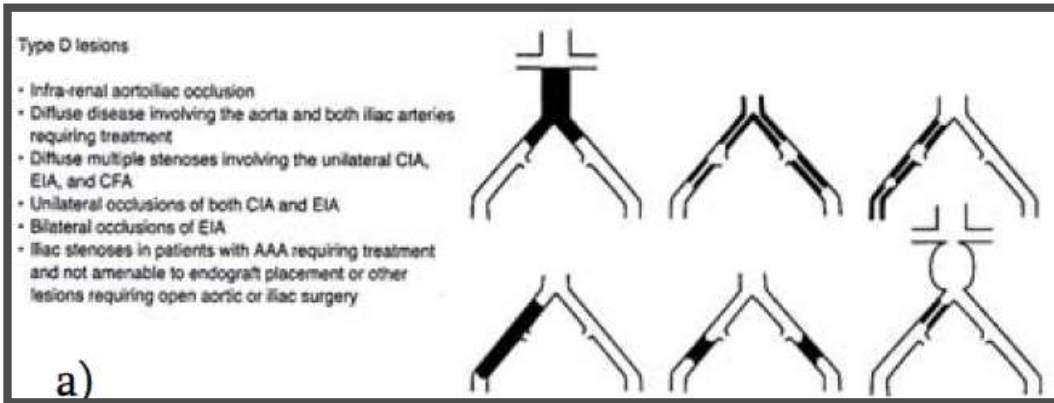
.... oder heute auch nicht mehr 😊

TASC Typ D

**+ Aneurysma spurium links nach Operation (TEA iliakal) vor 20 Jahren mit
Rekonstruktion mit Ballon expandierbarem Covered Stent**



TASC - Kriterien für kathetertechnische Interventionen:



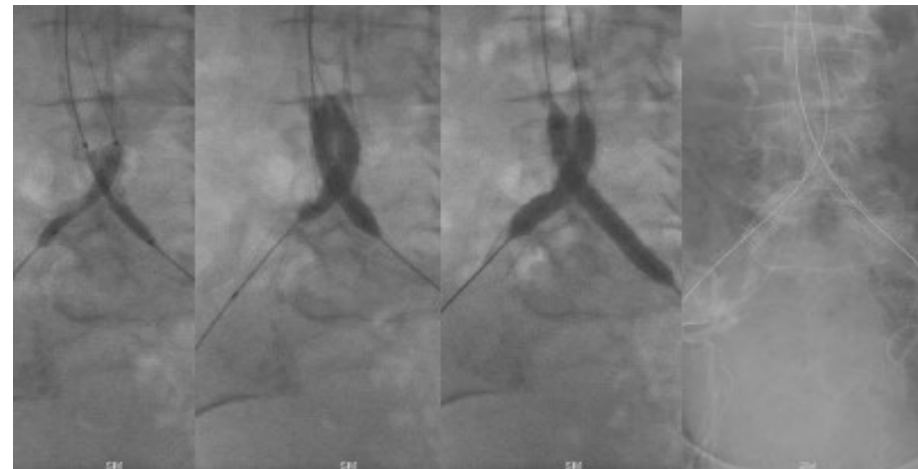
Typ D: chirurgisch

.... oder heute auch nicht mehr 😊

TASC Typ D

Aorto-bi-iliakale Obstruktion

Rekonstruktion mit Ballon expandierbarem Stent



Therapiewahl bei pAVK

Recommendations on revascularization of femoro-popliteal occlusive lesions^c

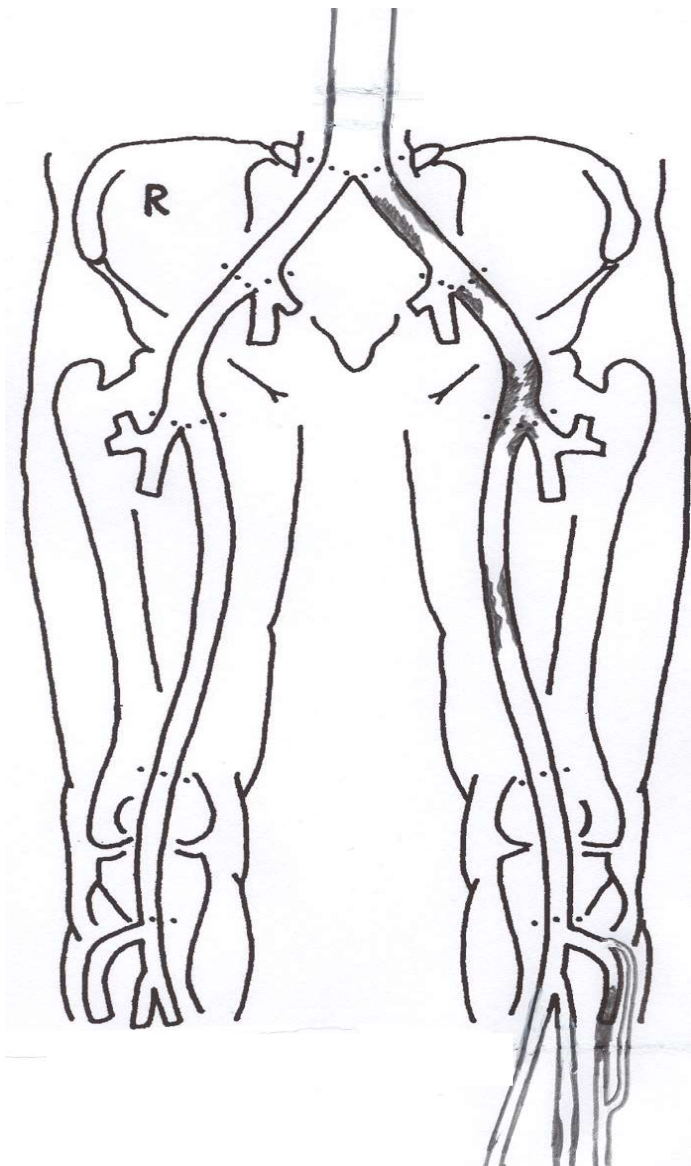
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An endovascular-first strategy is recommended in short (i.e. <25 cm) lesions. ^{302,303}	I	C
Primary stent implantation should be considered in short (i.e. <25 cm) lesions. ^{304,305}	IIa	A
Drug-eluting balloons may be considered in short (i.e. <25 cm) lesions. ^{77,306–310}	IIb	A
Drug-eluting stents may be considered for short (i.e. <25 cm) lesions. ^{302,303,311}	IIb	B
Drug-eluting balloons may be considered for the treatment of in-stent restenosis. ^{312,313}	IIb	B
In patients who are not at high risk for surgery, bypass surgery is indicated for long (i.e. ≥25 cm) superficial femoral artery lesions when an autologous vein is available and life expectancy is > 2 years. ³¹⁴	I	B
The autologous saphenous vein is the conduit of choice for femoro-popliteal bypass. ^{284,315}	I	A
When above-the-knee bypass is indicated, the use of a prosthetic conduit should be considered in the absence of any autologous saphenous vein. ²⁸⁴	IIa	A
In patients unfit for surgery, endovascular therapy may be considered in long (i.e. ≥25 cm) femoro-popliteal lesions. ³¹²	IIb	C

^aClass of recommendation.

^bLevel of evidence.

^cThese recommendations apply for patients with intermittent claudication and severe chronic limb ischaemia.

Kombiniert chirurgisch + kathetertechnisch



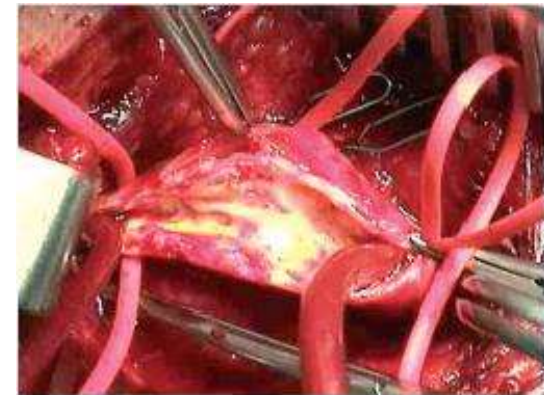
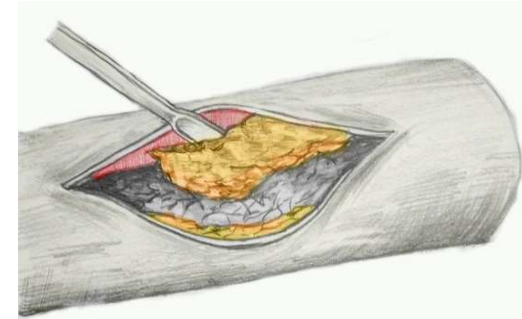
Bei Symptomen wie:

- Claudicatio nach 500 m (IIa)
- Claudicatio nach 100 m (IIb)
- distalen oder akralen Läsionen
- vor orthopädischer Fusschirurgie

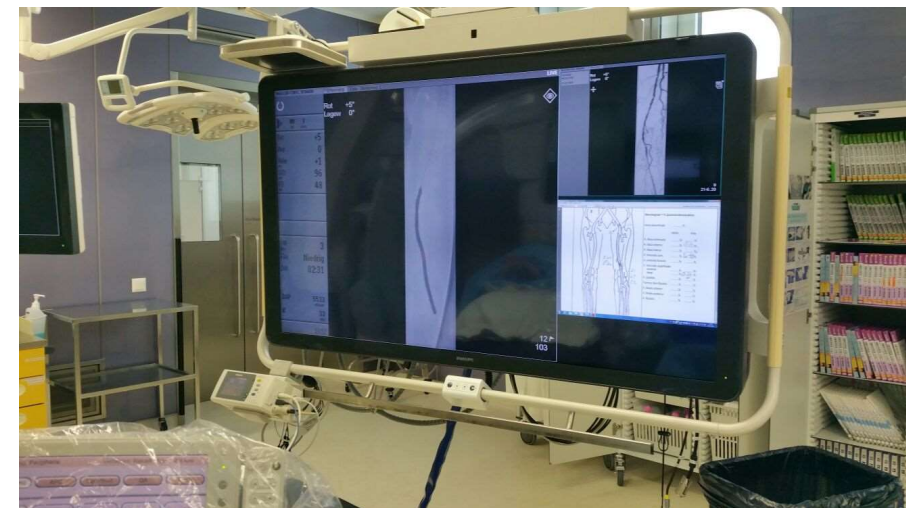
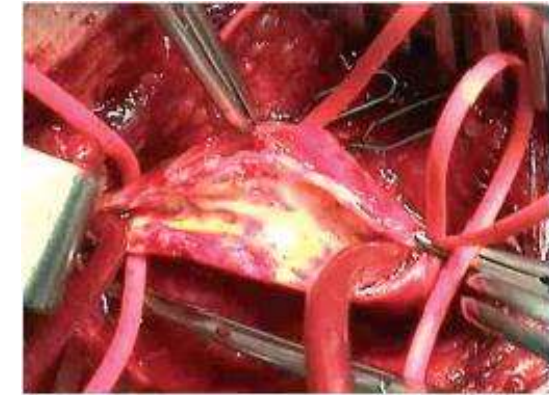
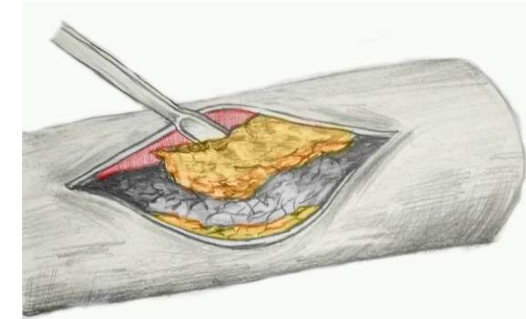
- Akute Ischämie / Läsionen

⇒ Thrombendarteriektomie Femoralbifurkation und intraoperative Dilatation evt. Stenting ist eine valable Möglichkeit

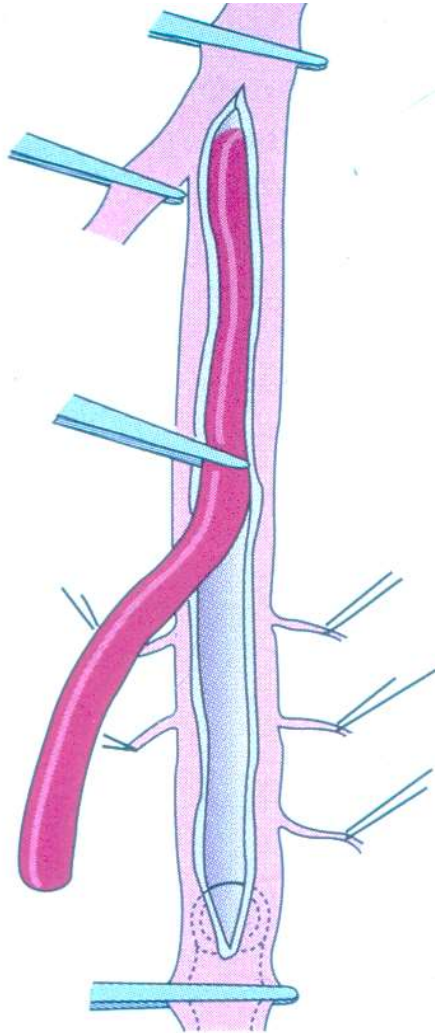
Hybrideingriff: Chirurgische Thrombendarteriektomie und intraoperative Ballon Dilatation



Hybrideingriff: Chirurgische Thrombendarterektomie und intraoperative Ballon Dilatation

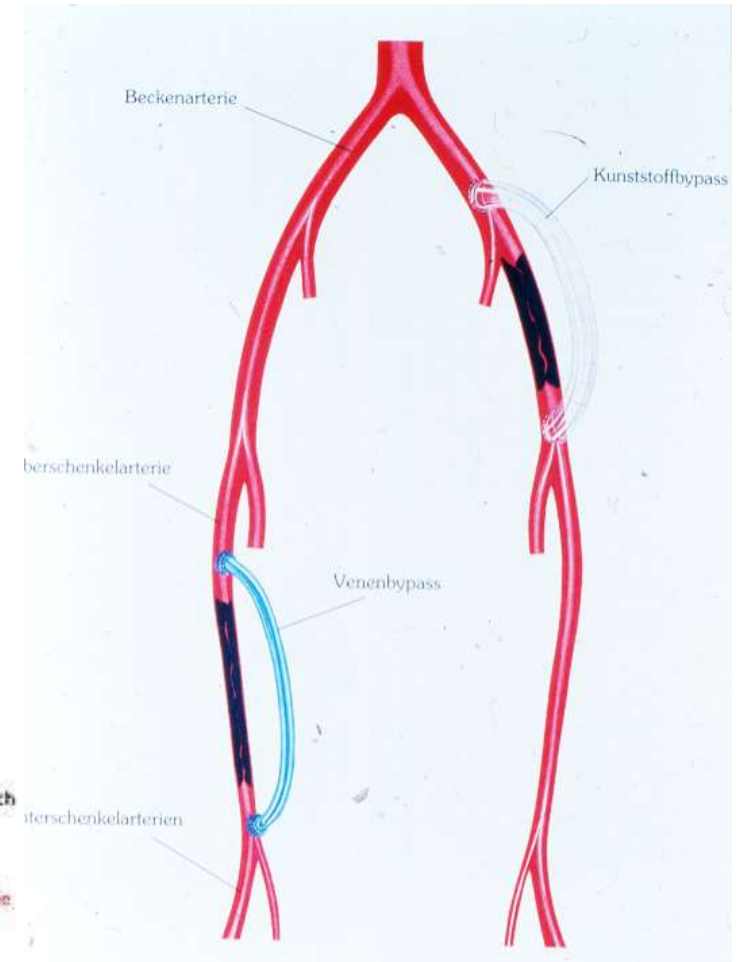
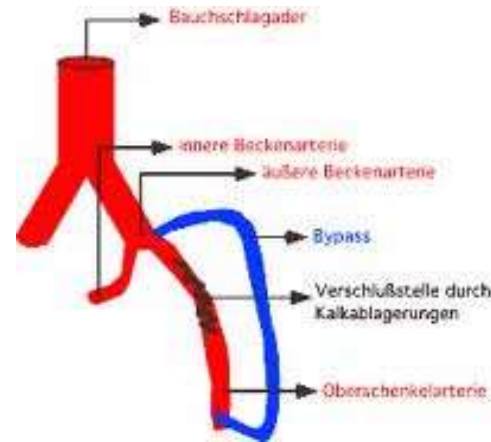


Operationsarten



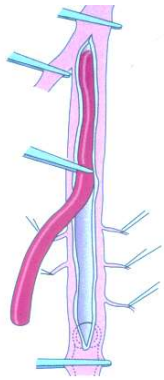
**Ausschäloperation
Thrombektomie**

Operation

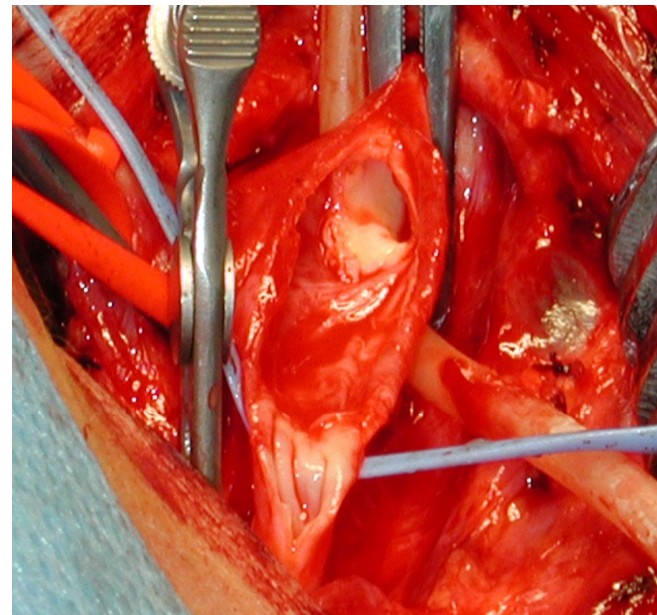
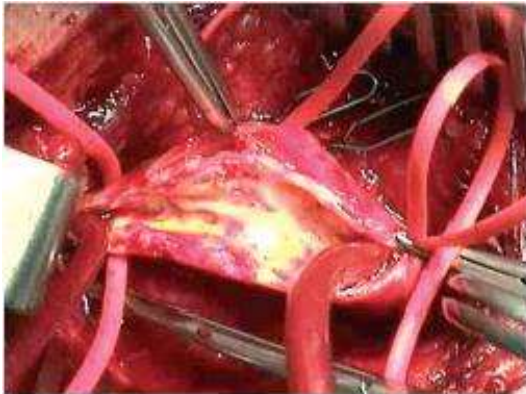
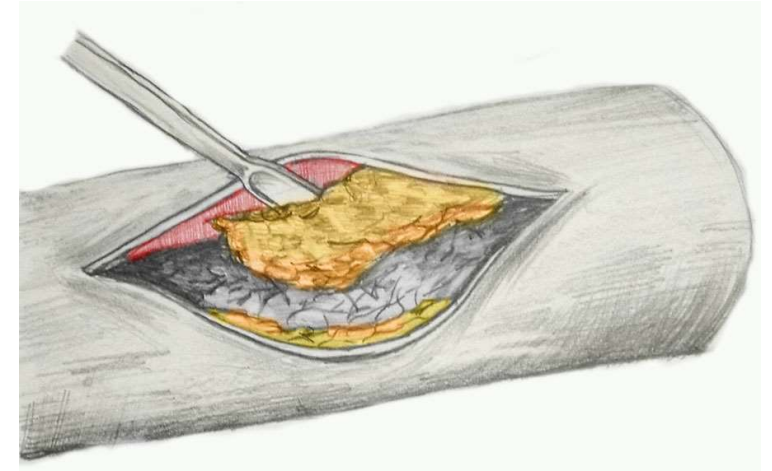


Bypass-Operation

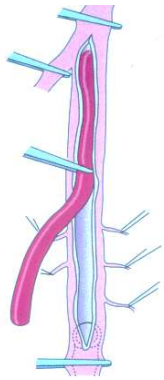
Thrombendarteriektomie



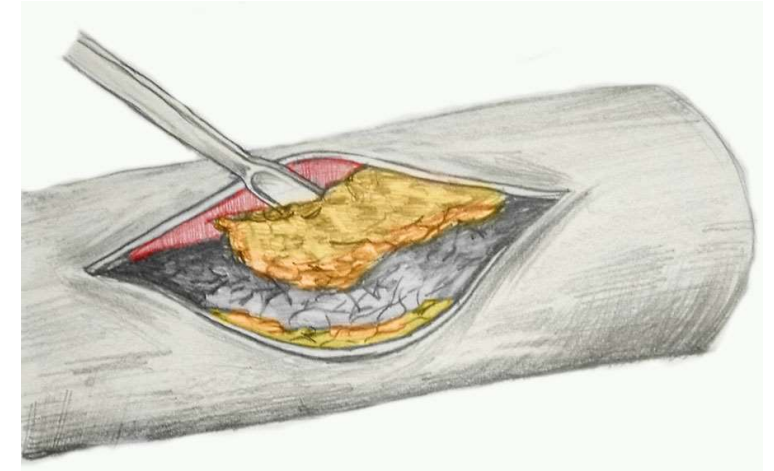
Ausschäl-Operation



Thrombendarteriektomie



Ausschäl-Operation

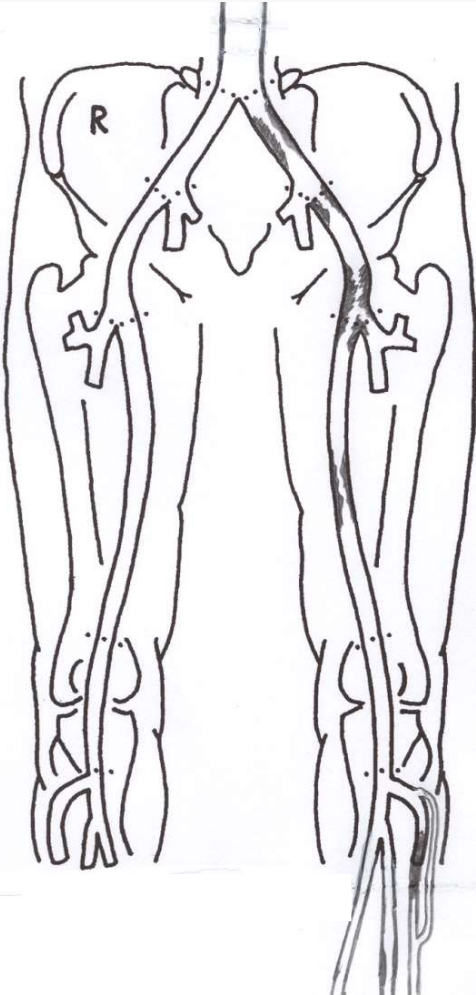


Ist mit den heutigen Materialien
auch kathetertechnisch möglich



Femoral Bifurkation - Therapie Planung

⇒ Thromboendarrektomie Femoral-
bifurkation and intraoperative
Dilatation



... oder heute als
Shockwave Lithotrypsie

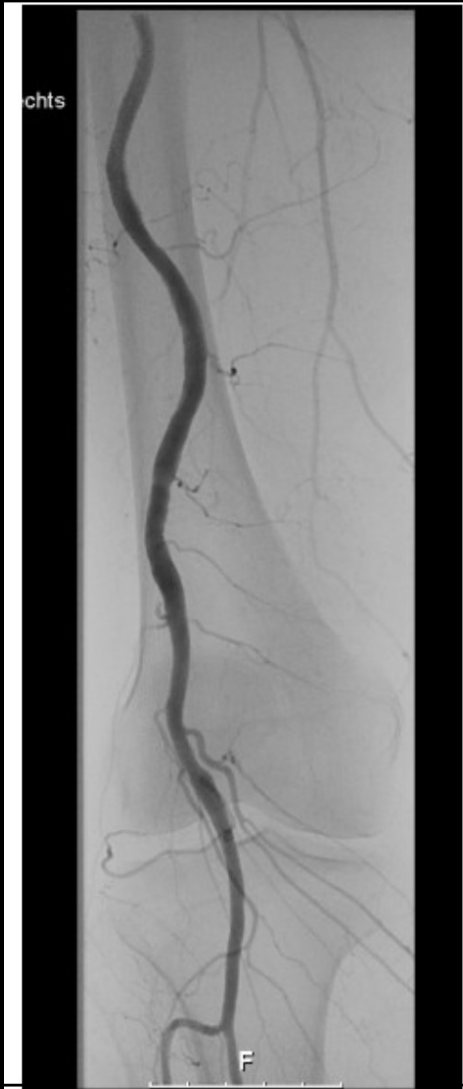
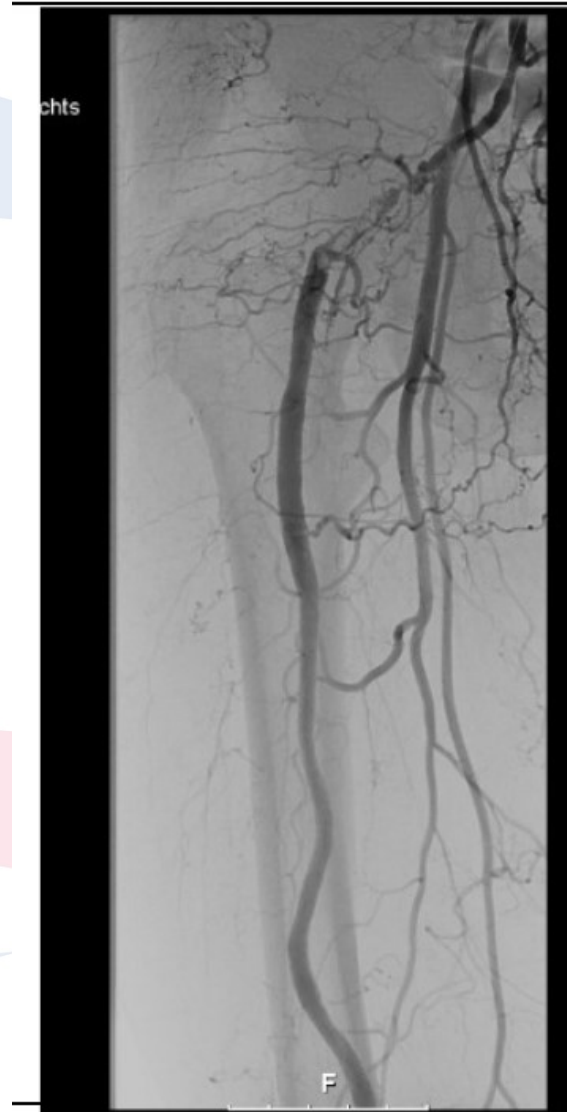
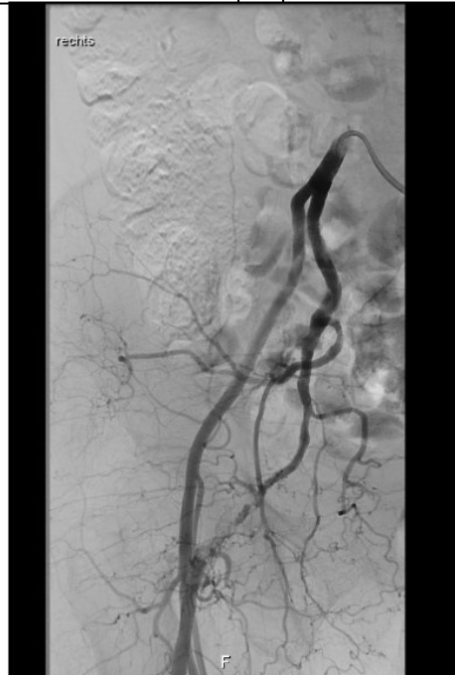
Und noch etwas Spannendes

Wadenclaudicatio nach 100 m
Odyssee an Abklärungen: Rheumatologe,
Neurologe, Osteopathie, Physiotherapie
... während knapp 2 Jahren

Angiographie vom:

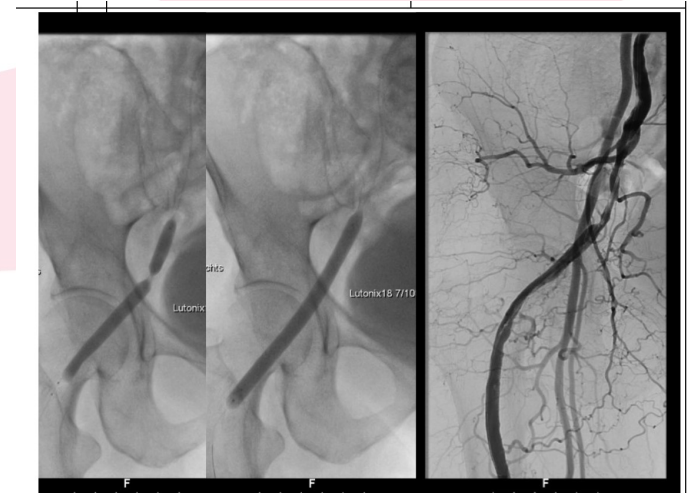
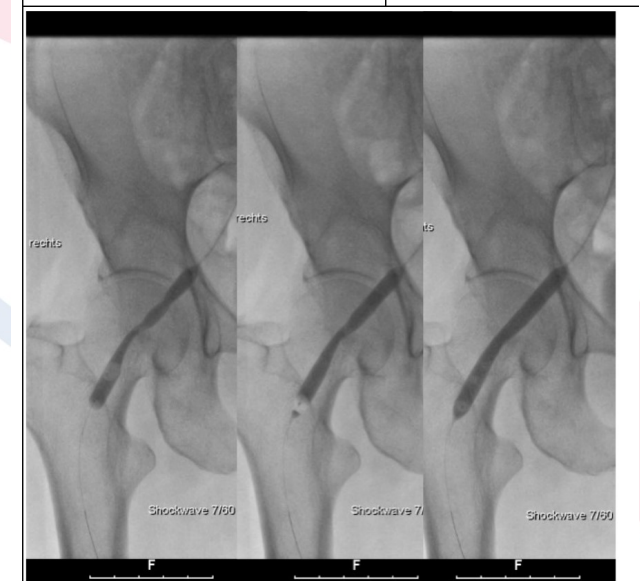
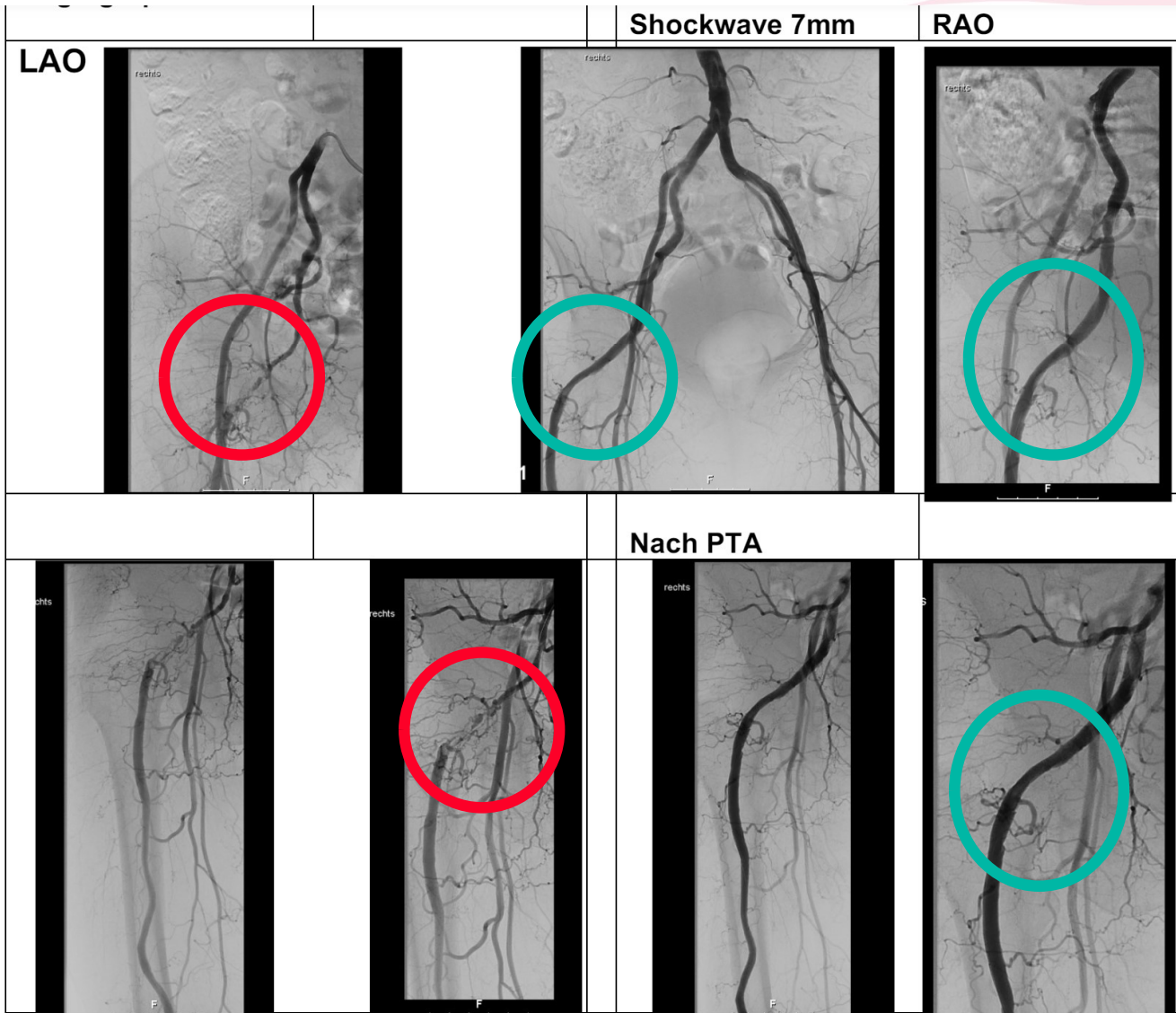
15.02.2024

LAO



Und noch etwas Spannendes

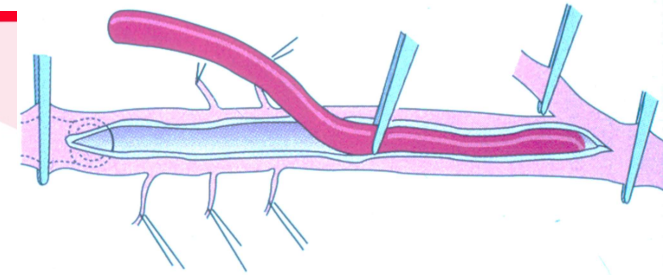
Shockwave Lithotrypsie



Operativ bedeutet: Thrombendarterektomie, Embolektomie oder Bypasschirurgie

● Thrombendarterektomie

- Suprainguinal:
 - isolierte Aortenstenose junger Patienten
 - kathetertechnisch nicht revaskularisierbare nicht massiv verkalkte Beckenarterienverschlüsse
- Femoralbifurkationsstenosen / Verschlüsse



● Embolektomie

- Femoralbifurkationsembolie (auch in LA möglich)
- Sonst nur bei kathetertechnisch nicht revaskularisierbaren Embolien

Operativ bedeutet: Thrombendarterektomie, Embolektomie oder Bypasschirurgie

● Bypasschirurgie:

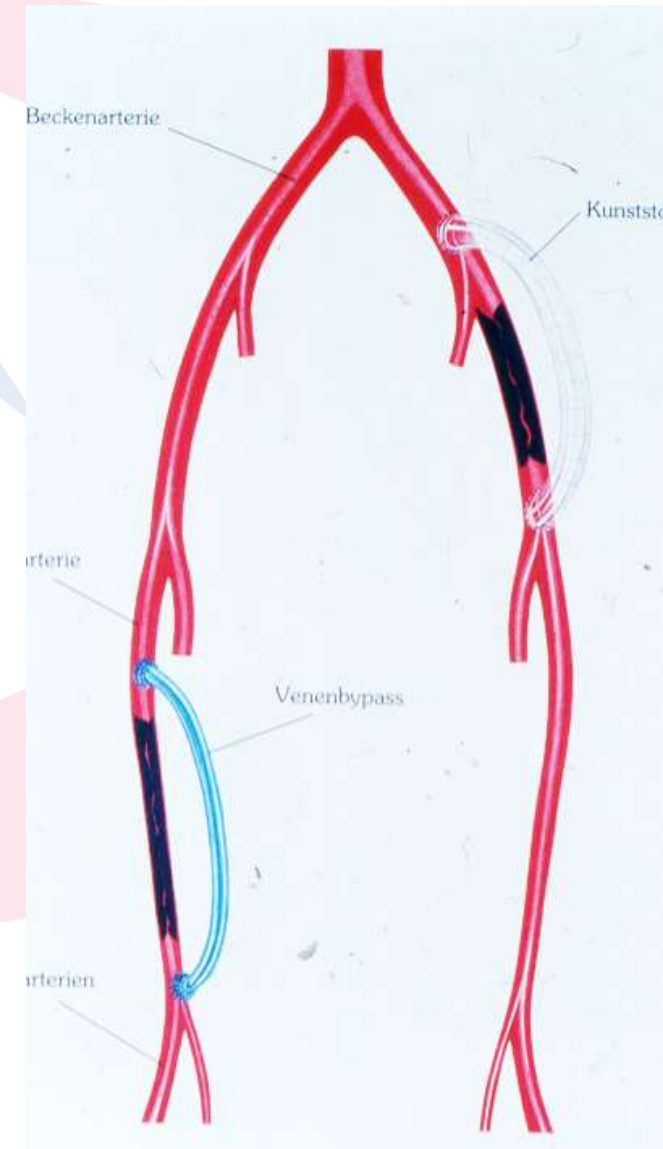
○ Suprainguinal:

- aorto-bi-iliakale Verschlusskrankheit bei jüngeren PatientInnen als Y-Graft aorto-bi-iliakal oder bi-femoral
- iliako-iliakales Interponat bei stark verkalkten und kathetertechnisch nicht revaskularisierbaren Verschlüssen auch über eine Lumbotomie möglich

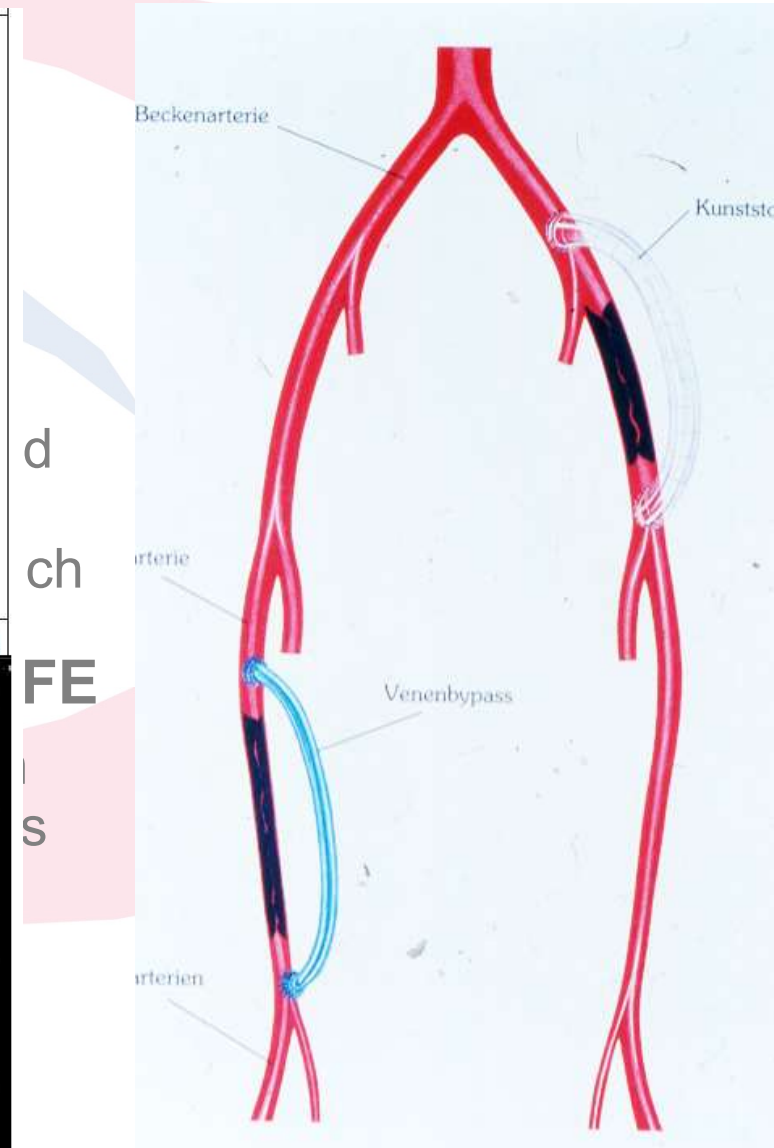
○ Infrainguinal supragenikulär: Vene oder PTFE

- femoro-poplitealer Bypass bei kathetertechnisch nicht revaskularisierbaren Verschlüssen oder als
- femoro-popliteales Interponat zur Ausschaltung eines Poplitealaneurysmas

○ Infrainguinal infragenikulär: Vene

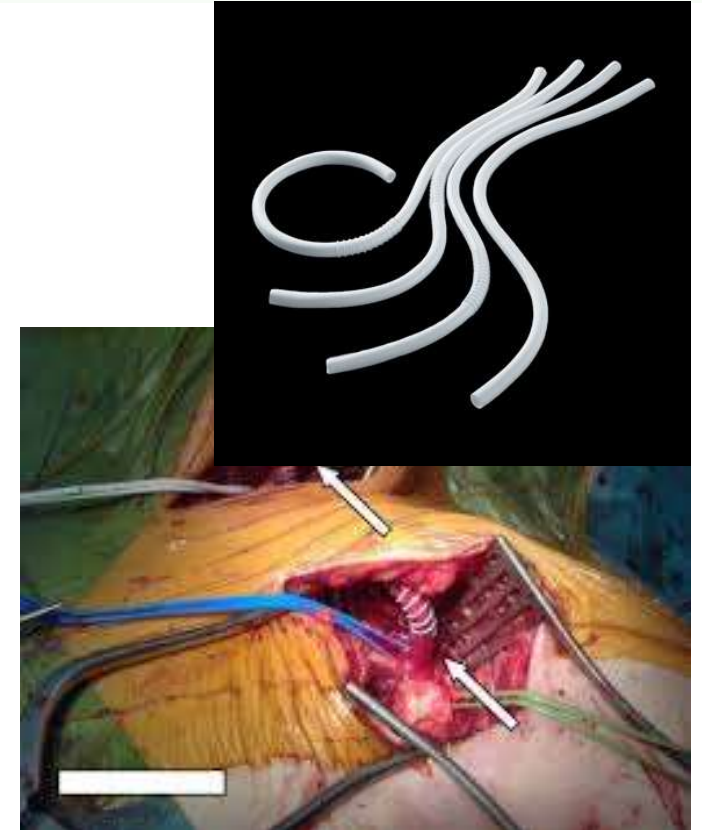
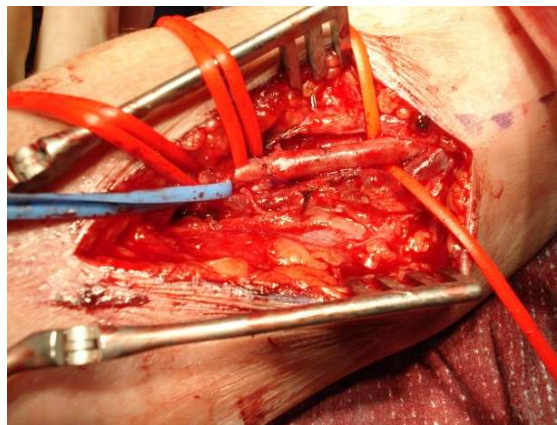
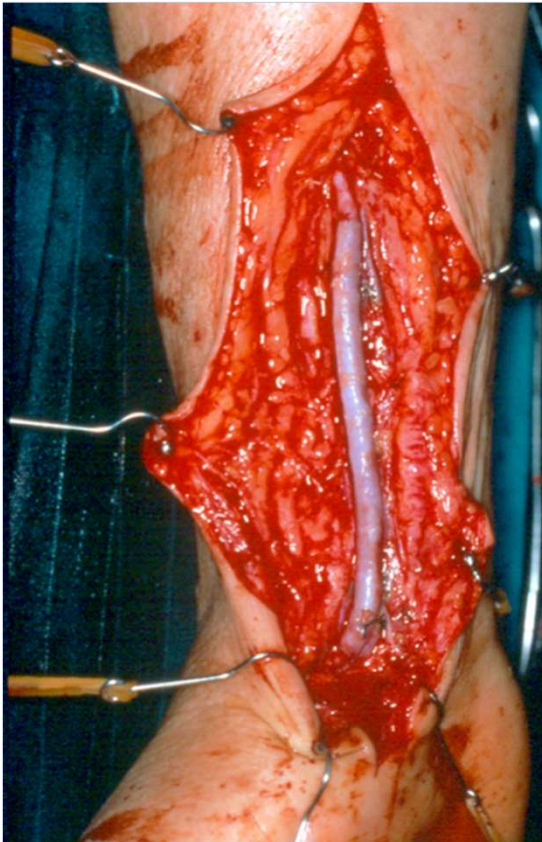
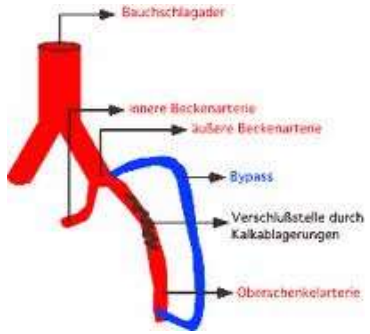


Operativ bedeutet: Thrombendarterektomie, Embolektomie oder Bypasschirurgie



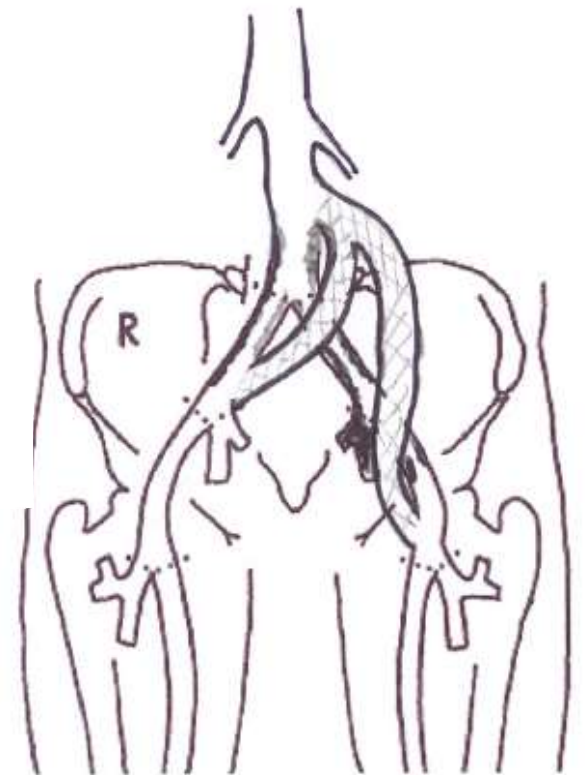
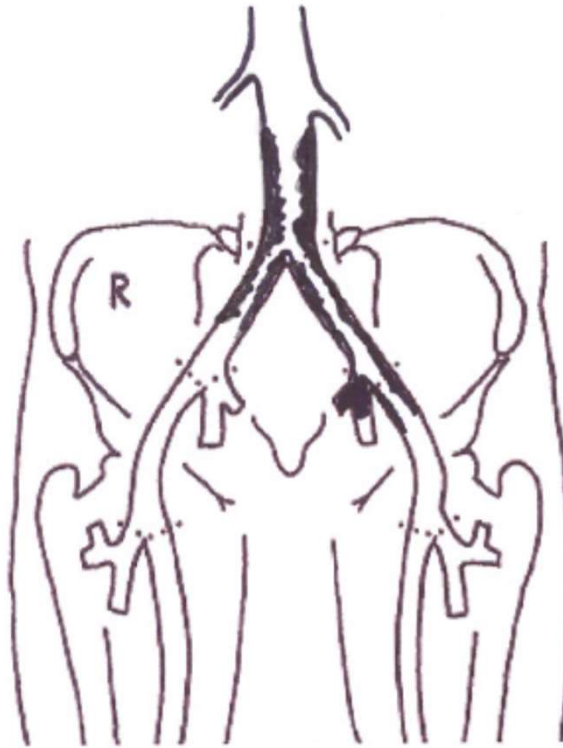
Bypassoperation

Überbrücken

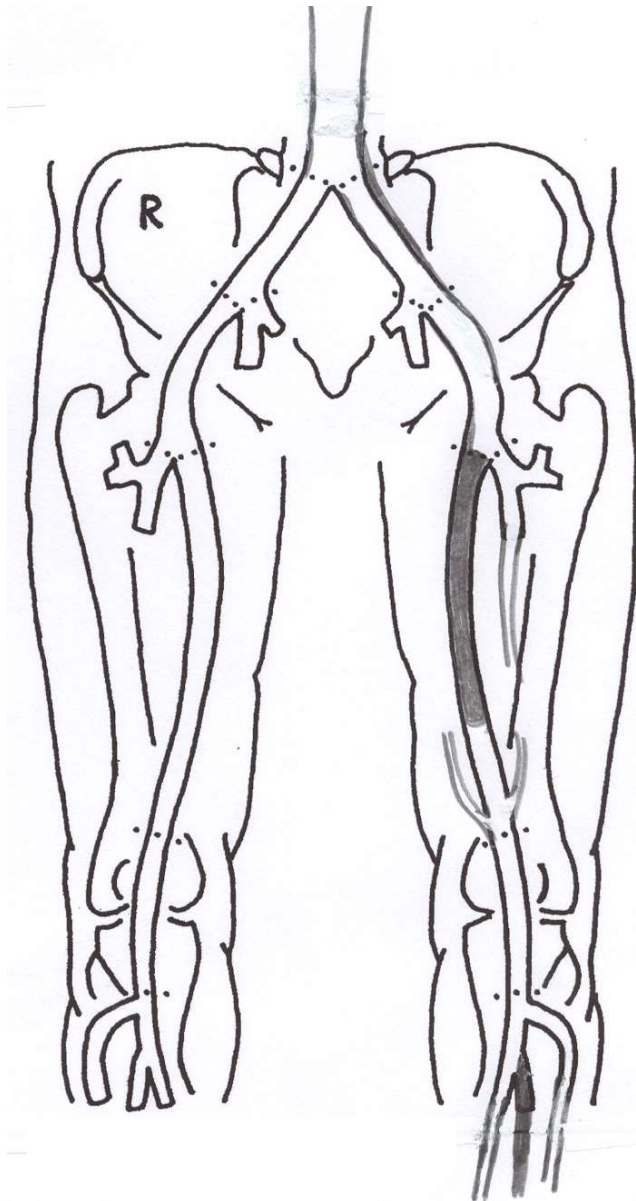


Operativ bedeutet:

**Thrombendarterektomie
oder Bypasschirurgie**



Bypasschirurgie infrainguinal



Bei Symptomen wie:

- Claudicatio nach <200 m
- akralen Läsionen
- Ruheschmerzen
- vor orthopädischer Fusschirurgie
- Akuter Ischämie / Läsionen

⇒ femoro-poplitealer supragenikulärer Bypass
(falls kathetertechnische Revaskularisation nicht möglich)

Operativ bedeutet:



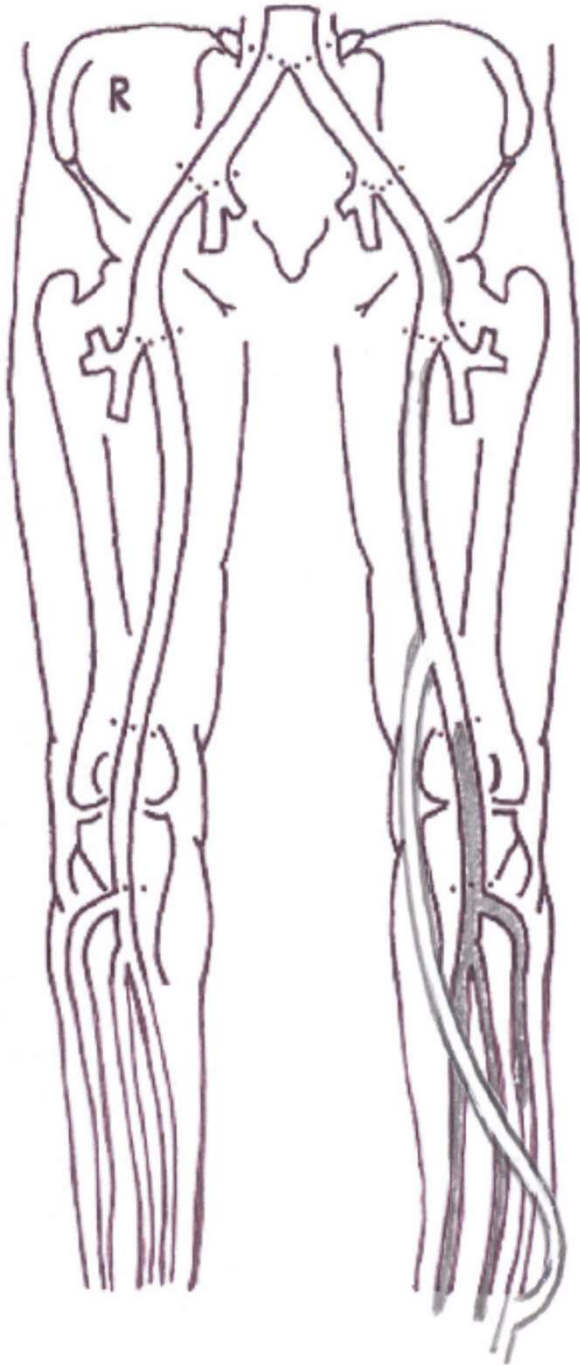
Thrombendarterektomie oder Bypasschirurgie

Bei Symptomen wie:

- **störende Claudicatio**
- **akralen Läsionen**
- **Ruhschmerzen**
- **vor orthopädischer
Fusschirurgie**

- **Akuter Ischämie / Läsionen**

(falls kathetertechnische
Revaskularisation nicht möglich)



Bypasschirurgie distal

Distale und pedale Bypässe eigentlich nur zum
Retten einer Extremität

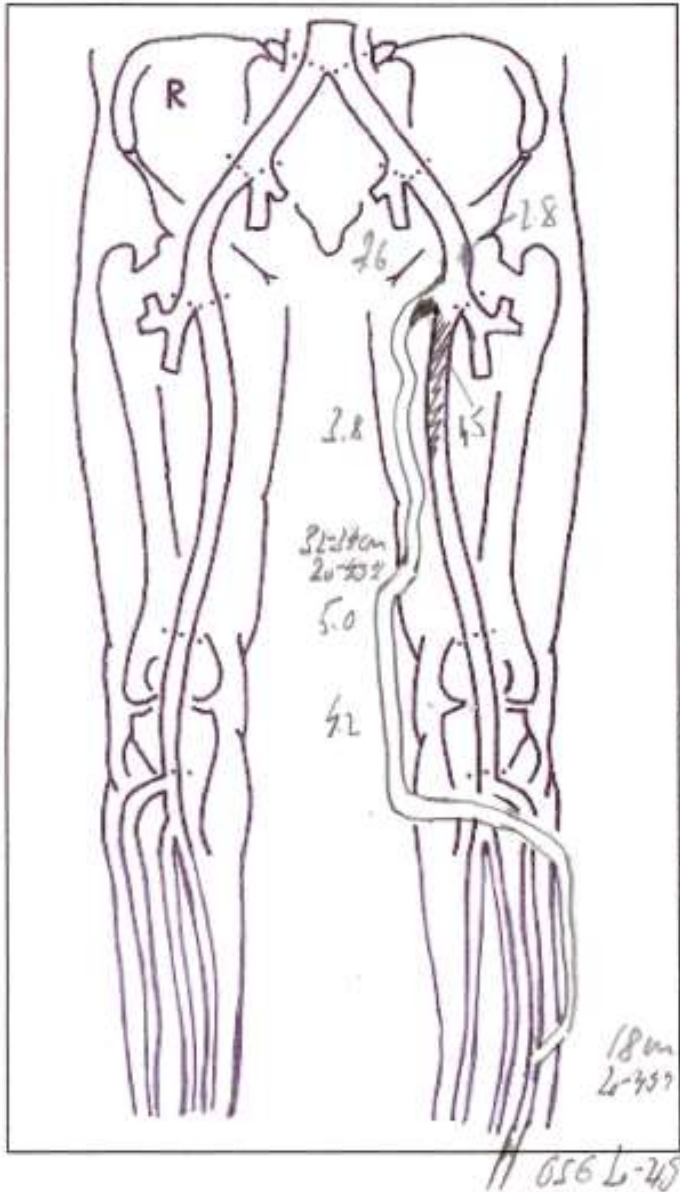
wenn immer möglich mit Vene als Graftmaterial

Bei Symptomen wie:

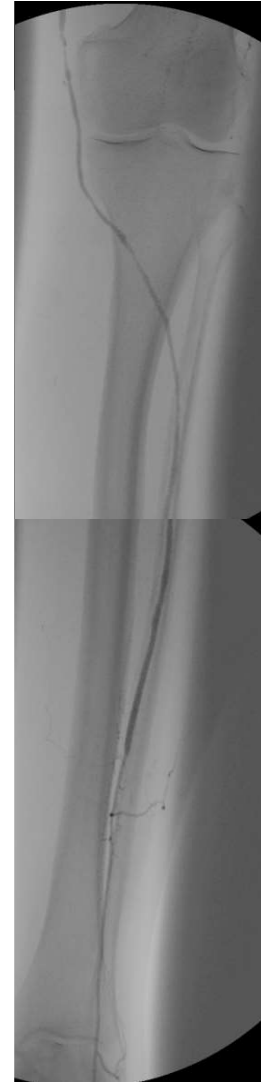
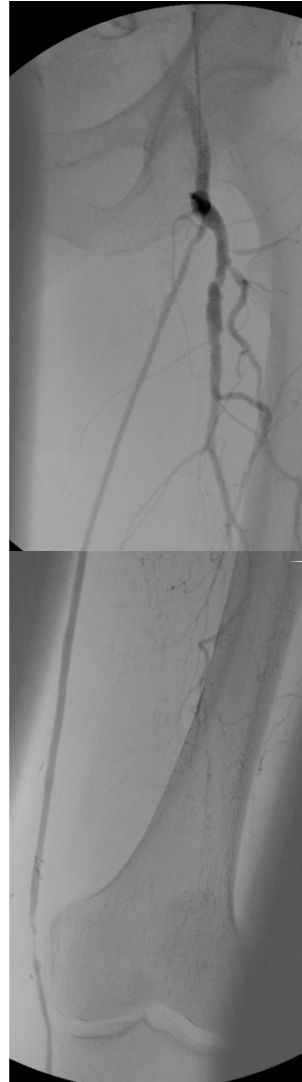
- feuchtem Gangraen
- Ruheschmerzen
- vor dringend notwendiger orthopädischer Fusschirurgie

Becken- und Beinarterien

vom: 16.08.2023



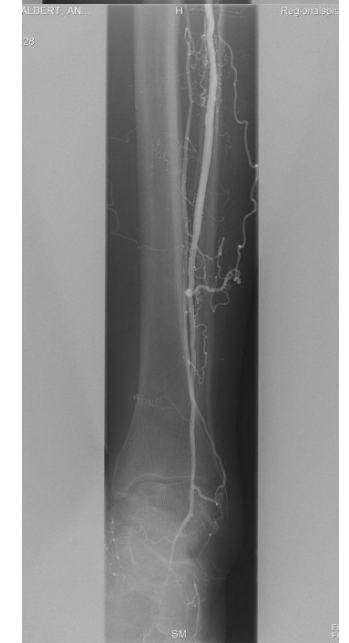
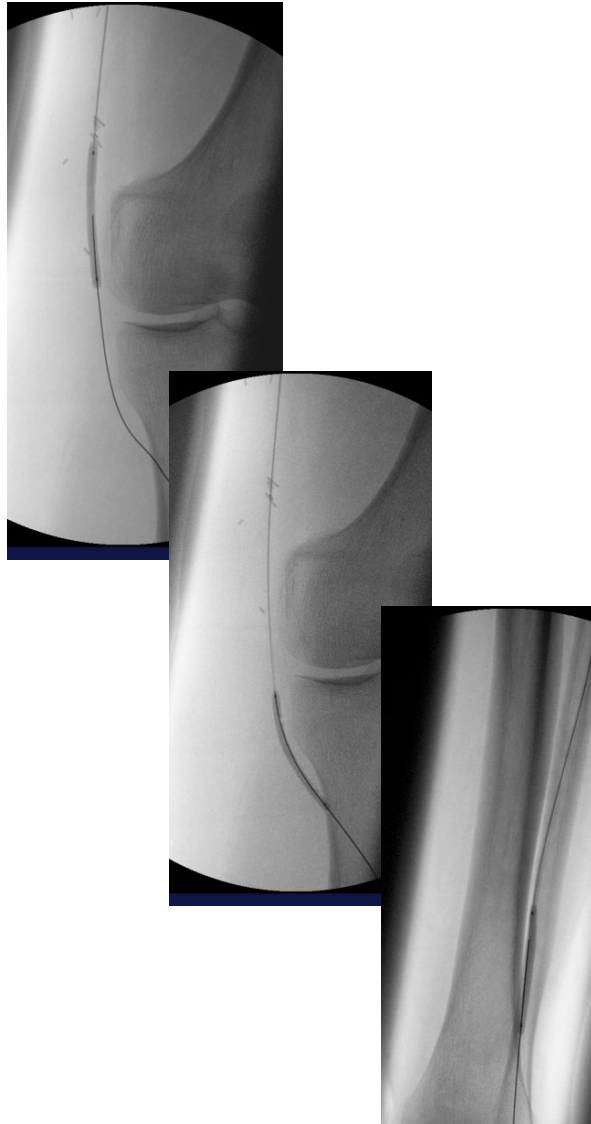
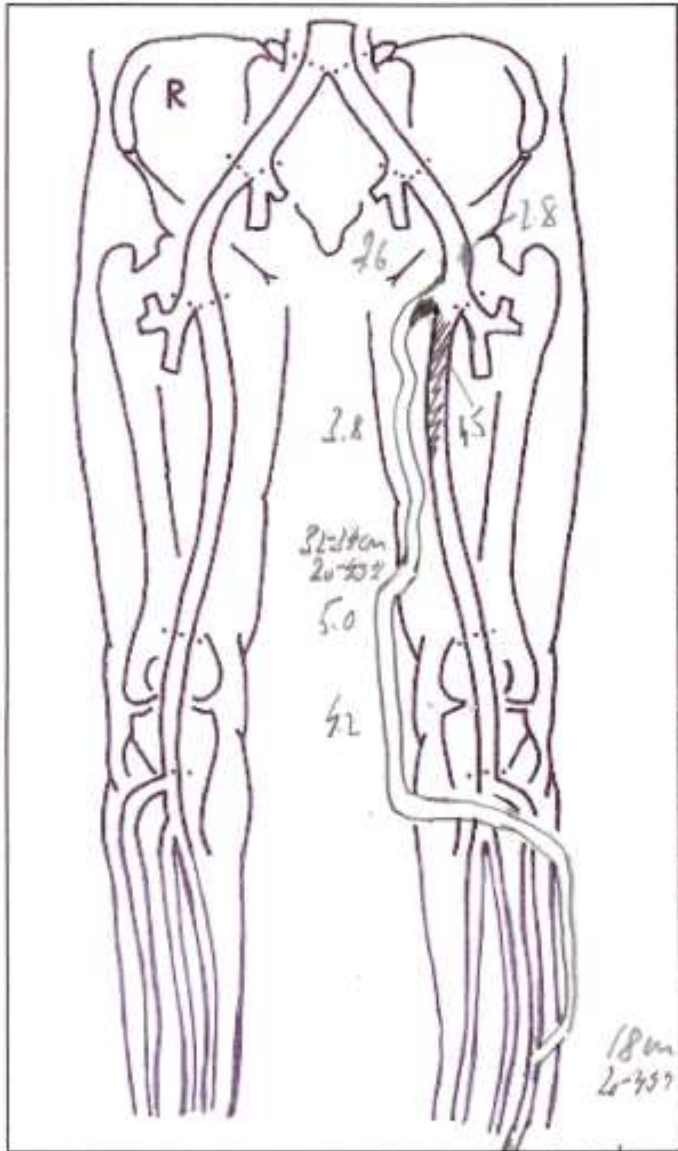
Bypasschirurgie distal



Becken- und Beinarterien

vom: 16.08.2023

Bypasschirurgie distal



Therapie bei obliterierender Arteriopathie

Entscheidung "massgeschneidert"

und angepasst:

an Evidence Based Medicine – Empfehlungen
an Good Clinical Practice – Vorgaben

Aber auch:

an Patientensituation und an
an Behndlersituation:

eigene Fähigkeiten

apparative Möglichkeiten

vor- und nachbehandelnde Möglichkeiten

... und an

Geographische Situation / lokale Möglichkeiten

Oekonomische Situation

