Big & small vessels
the new scenario of Peripheral Artery Disease

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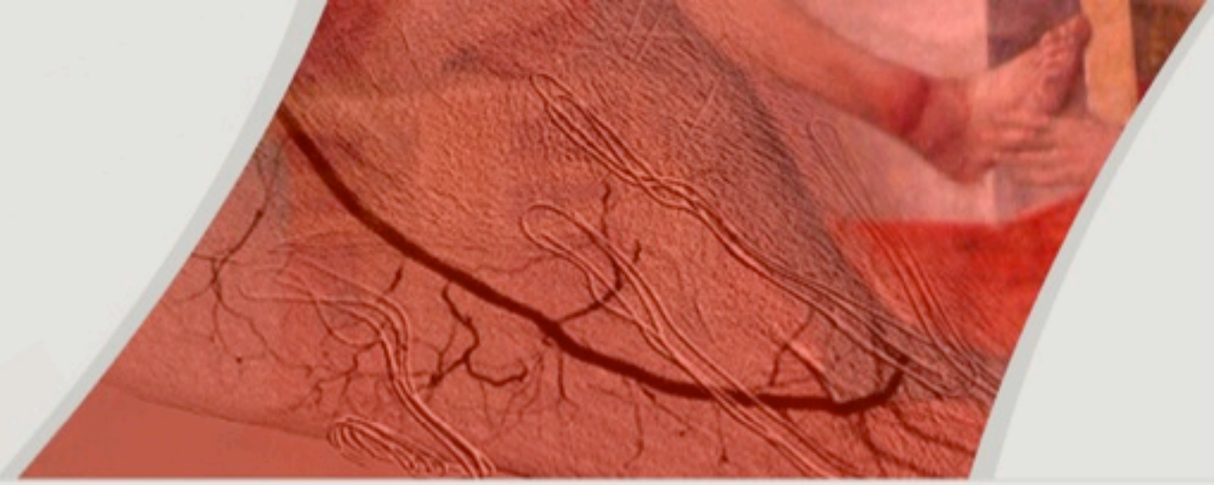
Big & small vessels

the new scenario of Peripheral Artery Disease



Obstructive disease pattern in CLI

PAD - Definition

- Elastic artery central core
- Muscular mid-distribution system
- Muscular distal-distribution system
  - Case 1
  - Case 2
  - Case 3

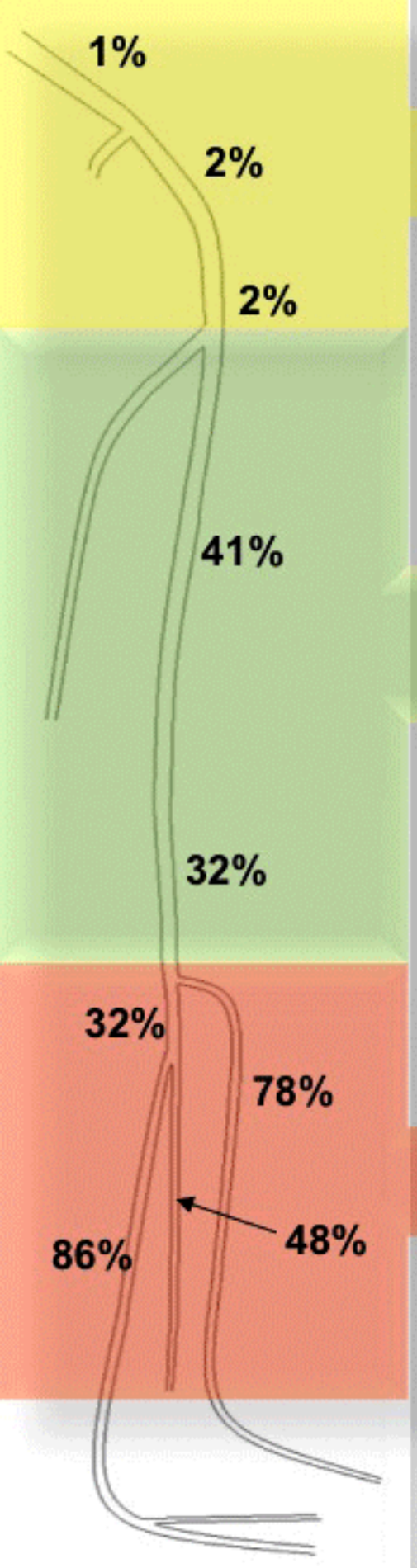
PAD - Conclusions

Obstructive disease pattern in CLI “real world”

Our experience in CLI treatment (2010-2013, our diabetic foot clinic)

- 1,343 patients →1,589 legs (first angiographic study)
- All CLI patients (Rutherford 4-5-6)
- Mean age 72 yrs
- 82% DM
- 46% smokers/ex-smokers
- 20% end-stage-renal-disease in hemodialysis
- 75% high blood pressure

Obstructive disease pattern in CLI “real world”



5% above-the-groin (ATG)

53% FEM-POP

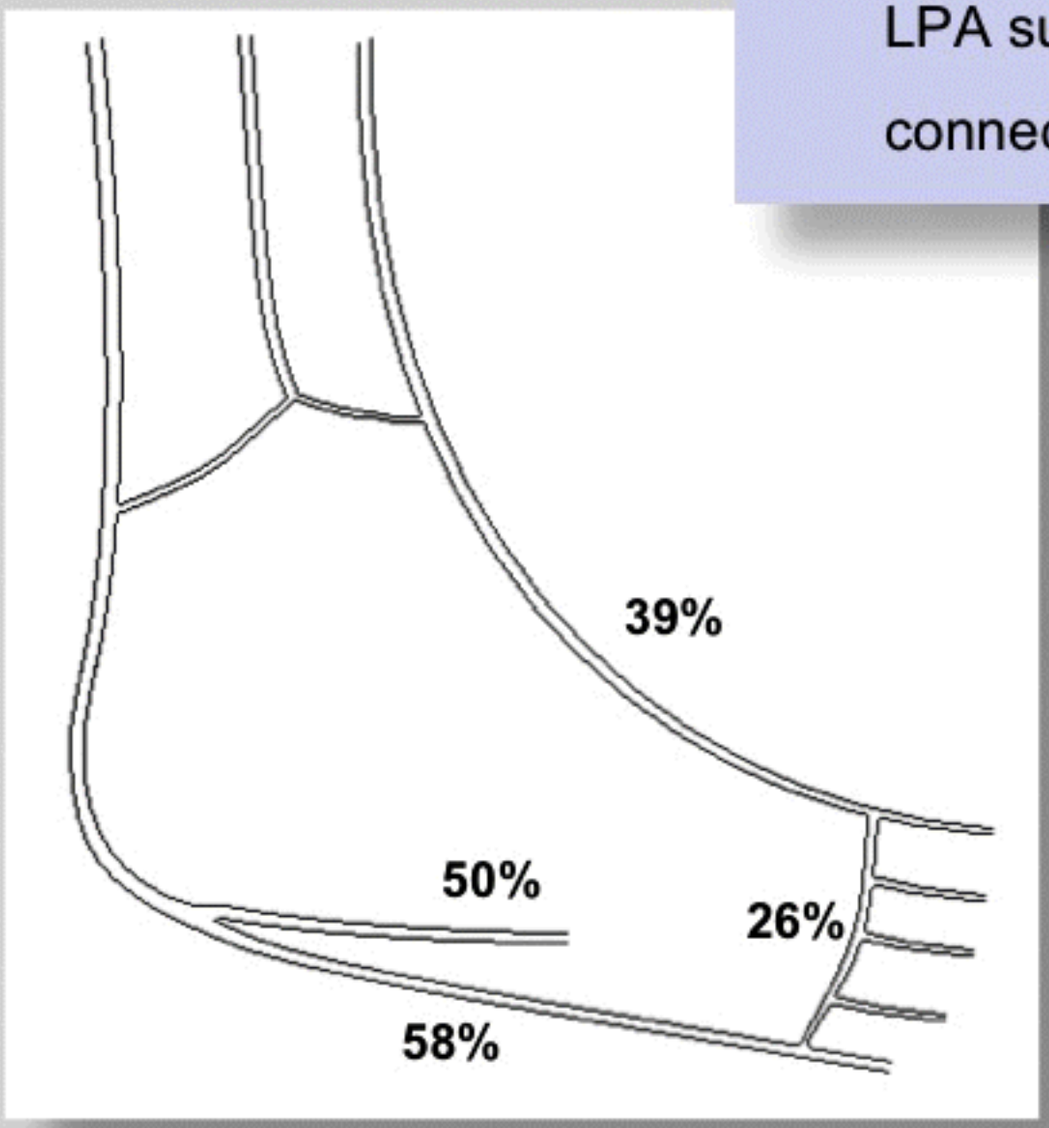
95% BTK

TPT	32%	
0 BTK vessel	5%	
1 BTK vessel	15%	
2 BTK vessels	43%	80%
3 BTK vessels	37%	

Obstructive disease pattern in CLI “real world”

FOOT VESSEL DISEASE CLASSIFICATION

- We considered 3 foot vessels: dorsalis pedis artery (DPA), lateral plantar artery (LPA), medial plantar artery (MPA).
- Plantar arch was considered the distal arch originating from LPA supplying the forefoot distribution system and generally connecting to DPA through the 1st perforating branch



0 FOOT vessel	**26%**	
1 FOOT vessel	**22%**	
2 FOOT vessels	**31%**	**52%**
3 FOOT vessels	**21%**	
ARCH	**26%**	

Obstructive disease pattern in CLI “real world”

5% ATG

53% FEM-POP

95% BTK

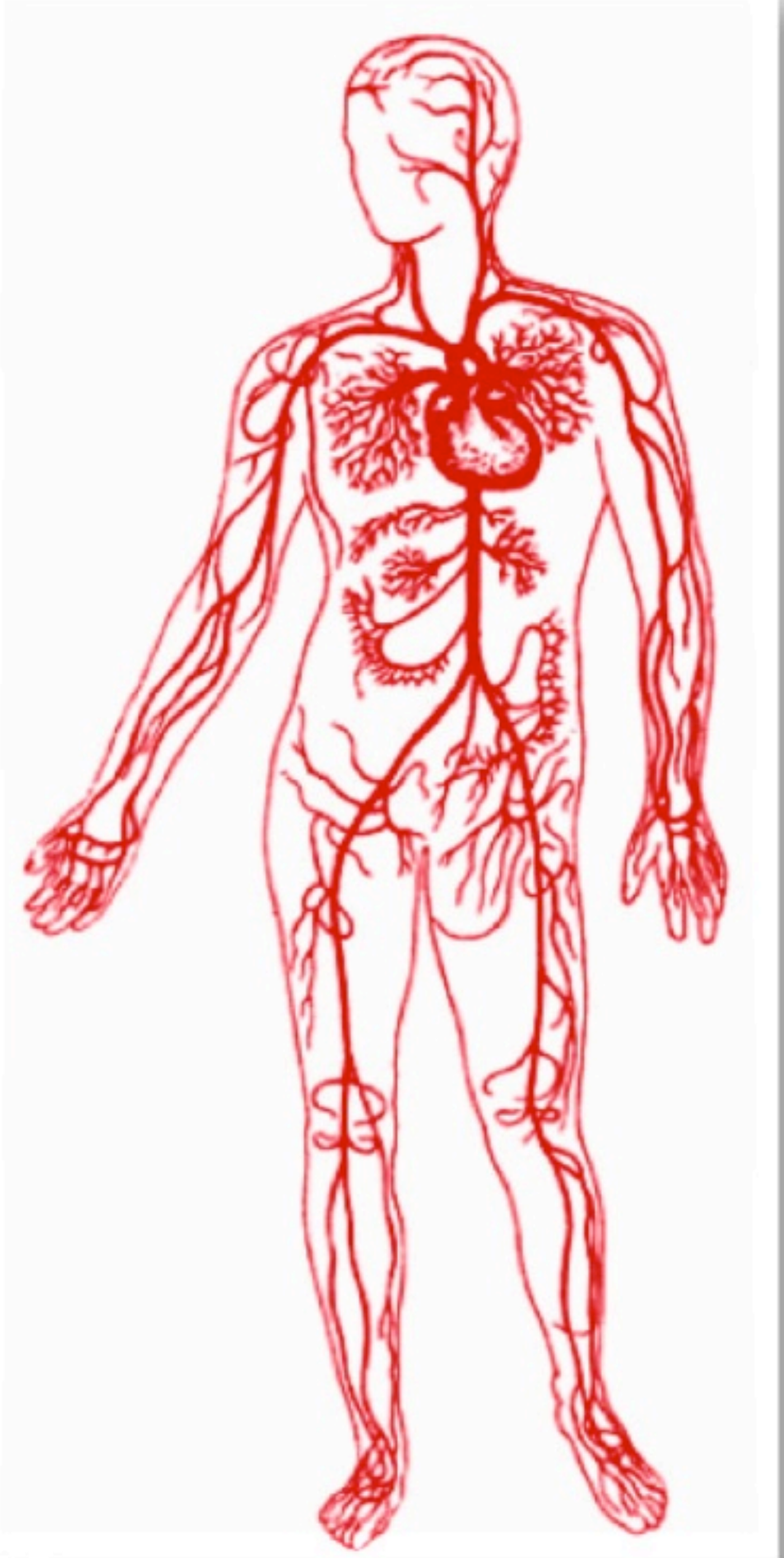
74% FOOT

Conclusions

1. ATG disease is not common in a diabetic-foot clinic, because this localization is not related to diabetes

2. Fem-pop disease is present in more than half of the patients

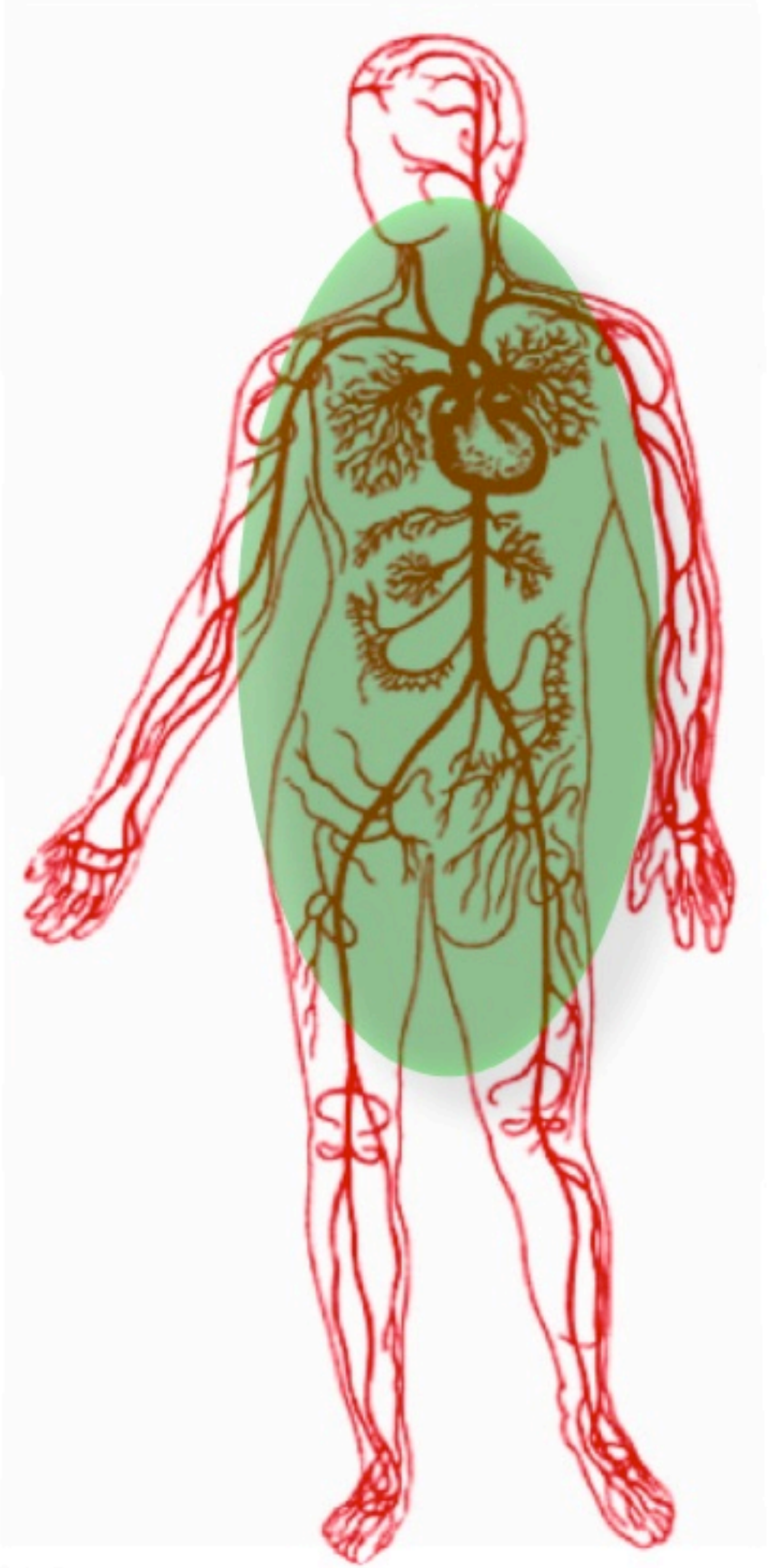
3. BTK & FOOT vessel disease is an emergent cause of CLI: 80% of the patients have two or three BTK vessels disease, 52% of the patients have two or three FOOT vessels disease



What is PAD?

- One single disease in different stages and in different vascular sections? Two or more different diseases affecting different patients and/or different arteries?

- Are we (diabetologists, cardiologists, vascular surgeons, nephrologists etc.) seeing and talking about the same disease and the same patients or not?



PAD

1. **Elastic artery central core disease: smoking, hypercholesterolemia…**

ANNALS OF SURGERY

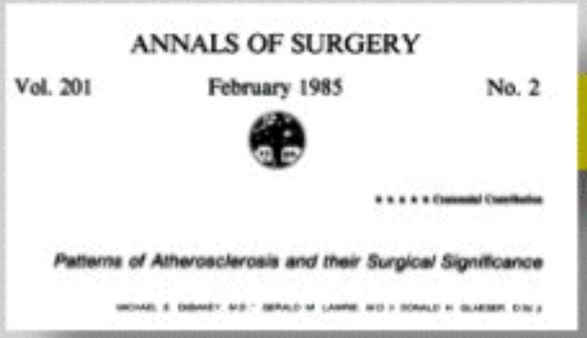
Vol. 201 February 1985 No. 2

★ ★ ★ ★ ★ Centennial Contribution

Patterns of Atherosclerosis and their Surgical Significance

MICHAEL E. DEBAKEY, M.D.,* GERALD M. LAWRIE, M.D.,† DONALD H. GLAESER, D.Sc.‡

The records of 13,827 patients admitted on one or more occasions to The Methodist Hospital in Houston on the service of the senior author for the treatment of arterial atherosclerotic occlusive disease from 1948 to 1983 were analyzed. The data

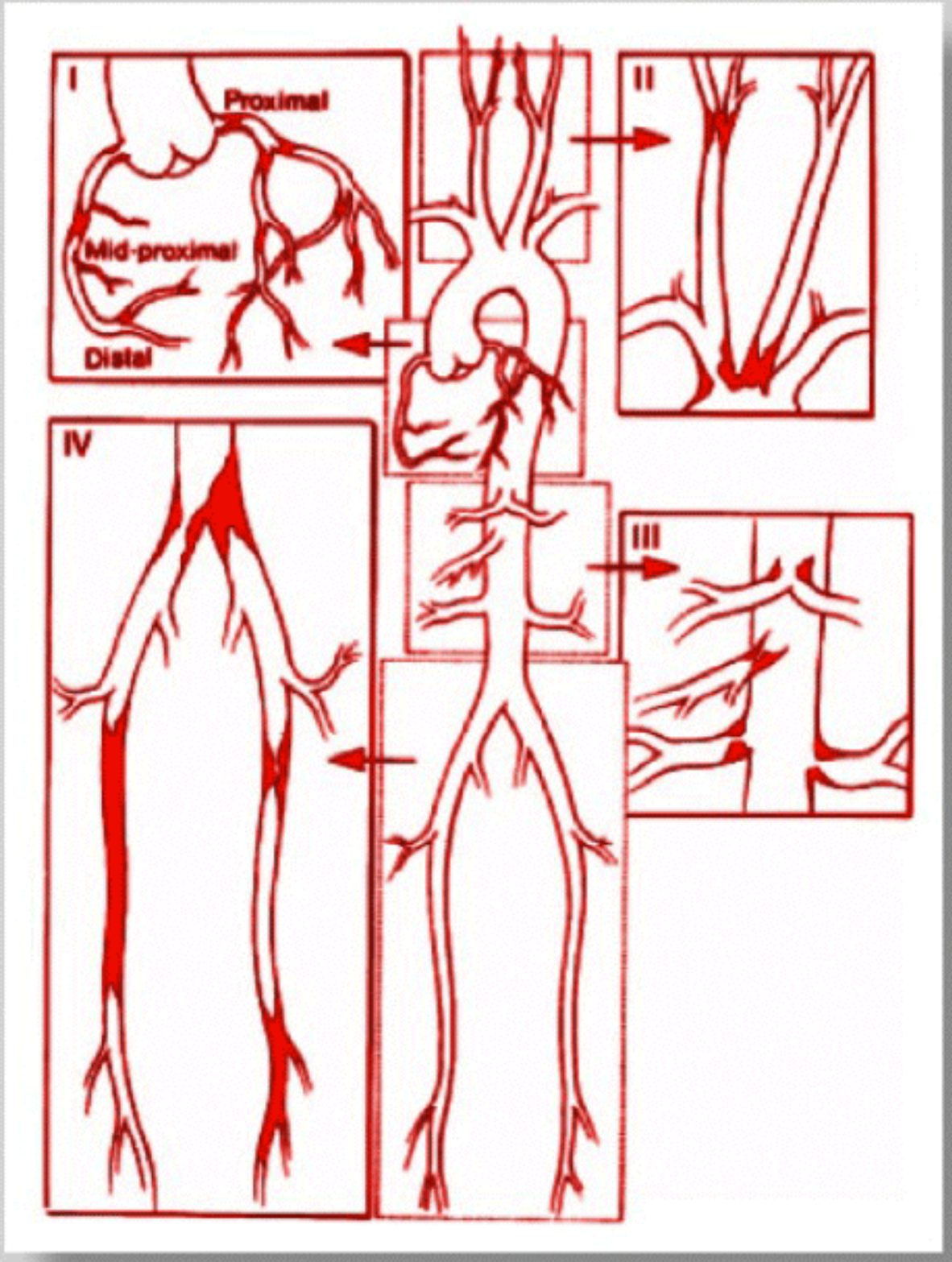

ANNALS OF SURGERY

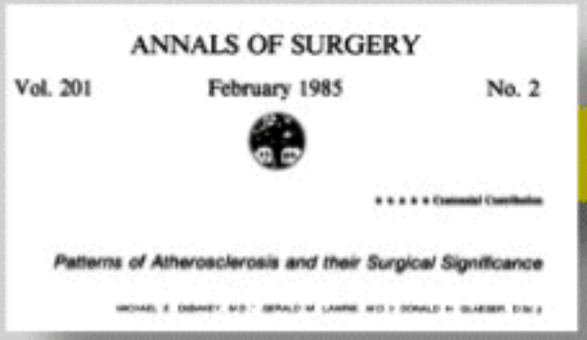
Vol. 201 February 1985 No. 2

Patterns of Atherosclerosis and their Surgical Significance

13,827 pts
mean age 59 yrs

"Particularly important is the fact that atherosclerotic lesions often tend to be segmental and fairly well localized, with relatively normal proximal and distal arterial beds. Such atheromas are ***usually*** located in the proximal and/or midproximal portions of the arterial bed"

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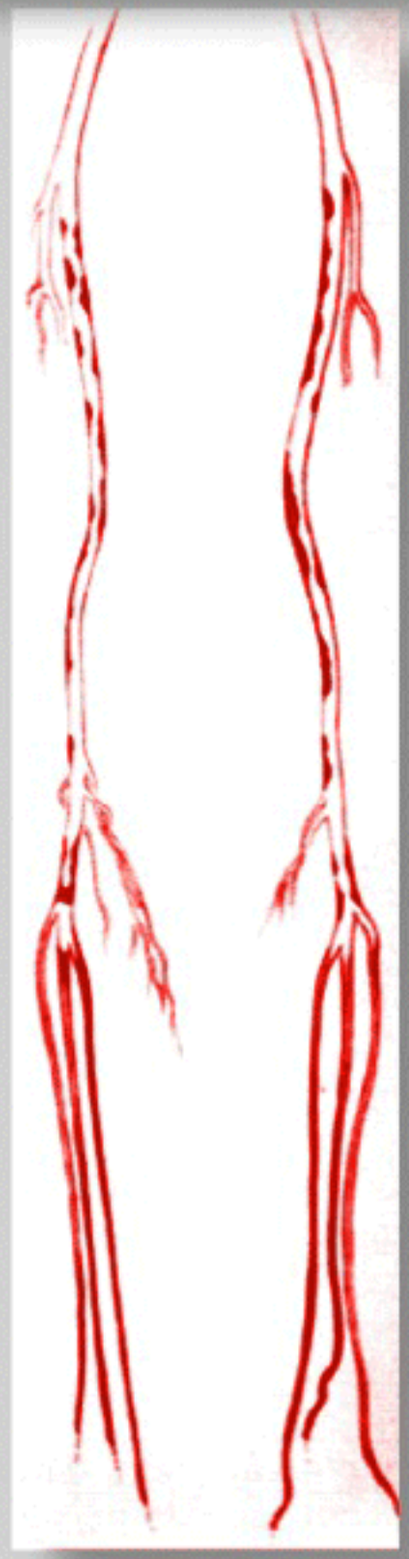
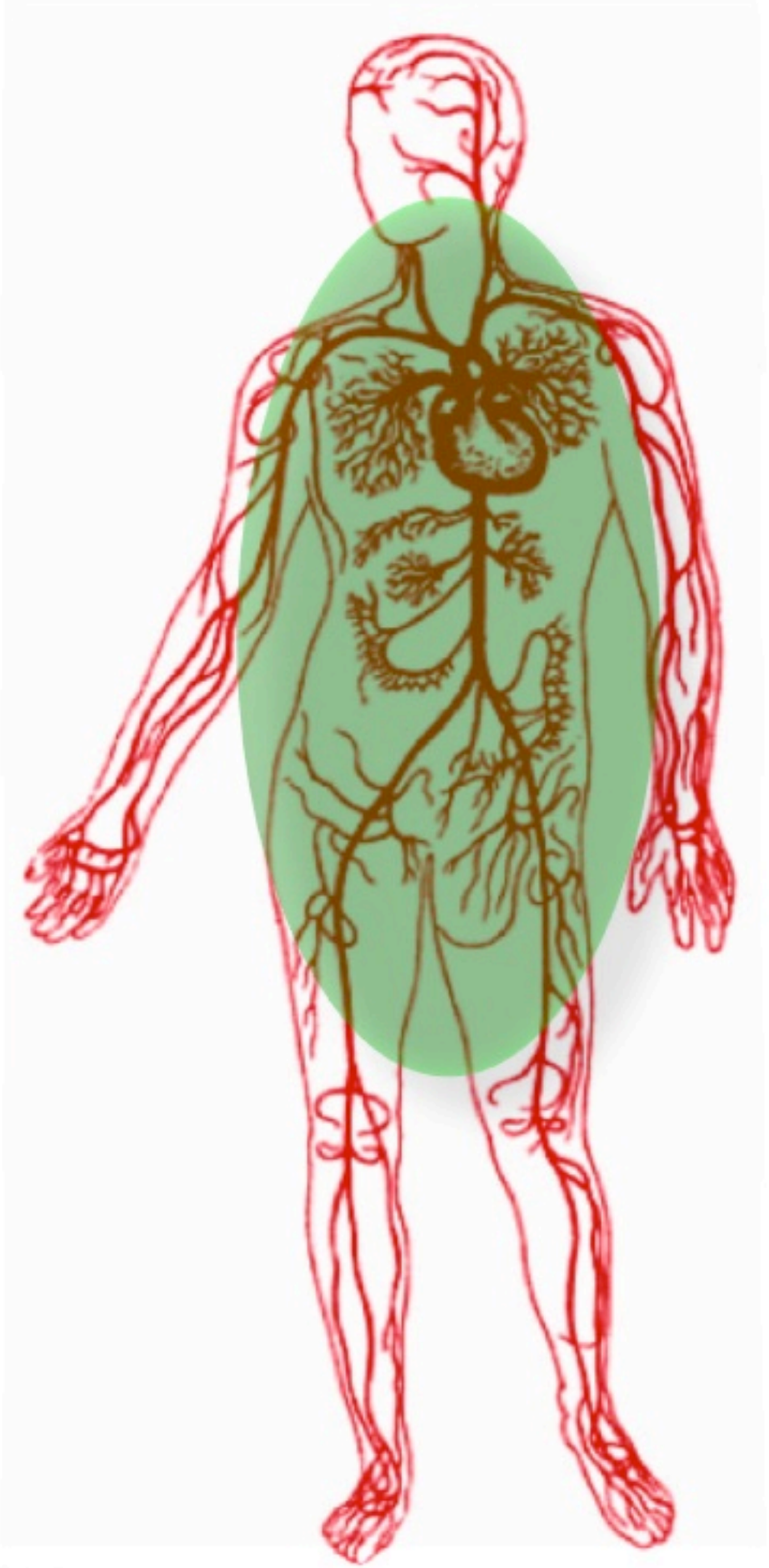


Less commonly, the arteriosclerotic process occurs predominantly in the distal portion of the arterial bed…

Observe: foot vessels were not considered!



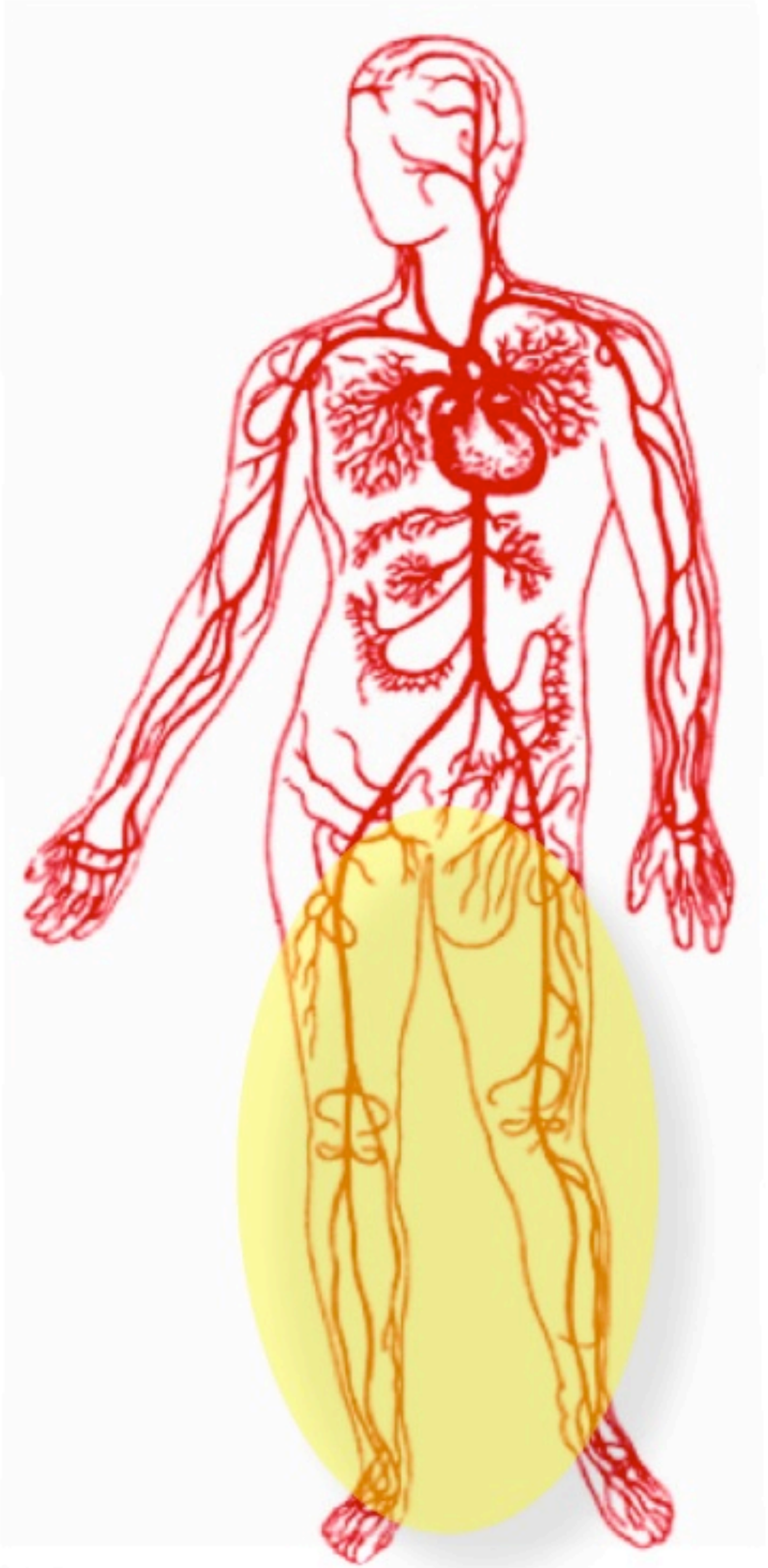
PAD

1. **Elastic artery central core disease: smoking, hypercholesterolemia…**

Vascular surgery & peripheral angioplasty were born to fight against large-vessels disease in middle aged patients

1st statement

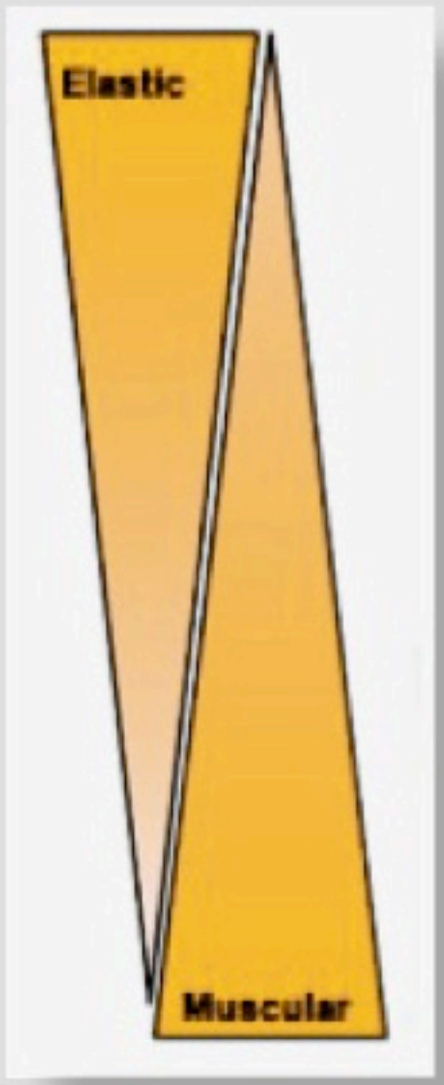
PAD

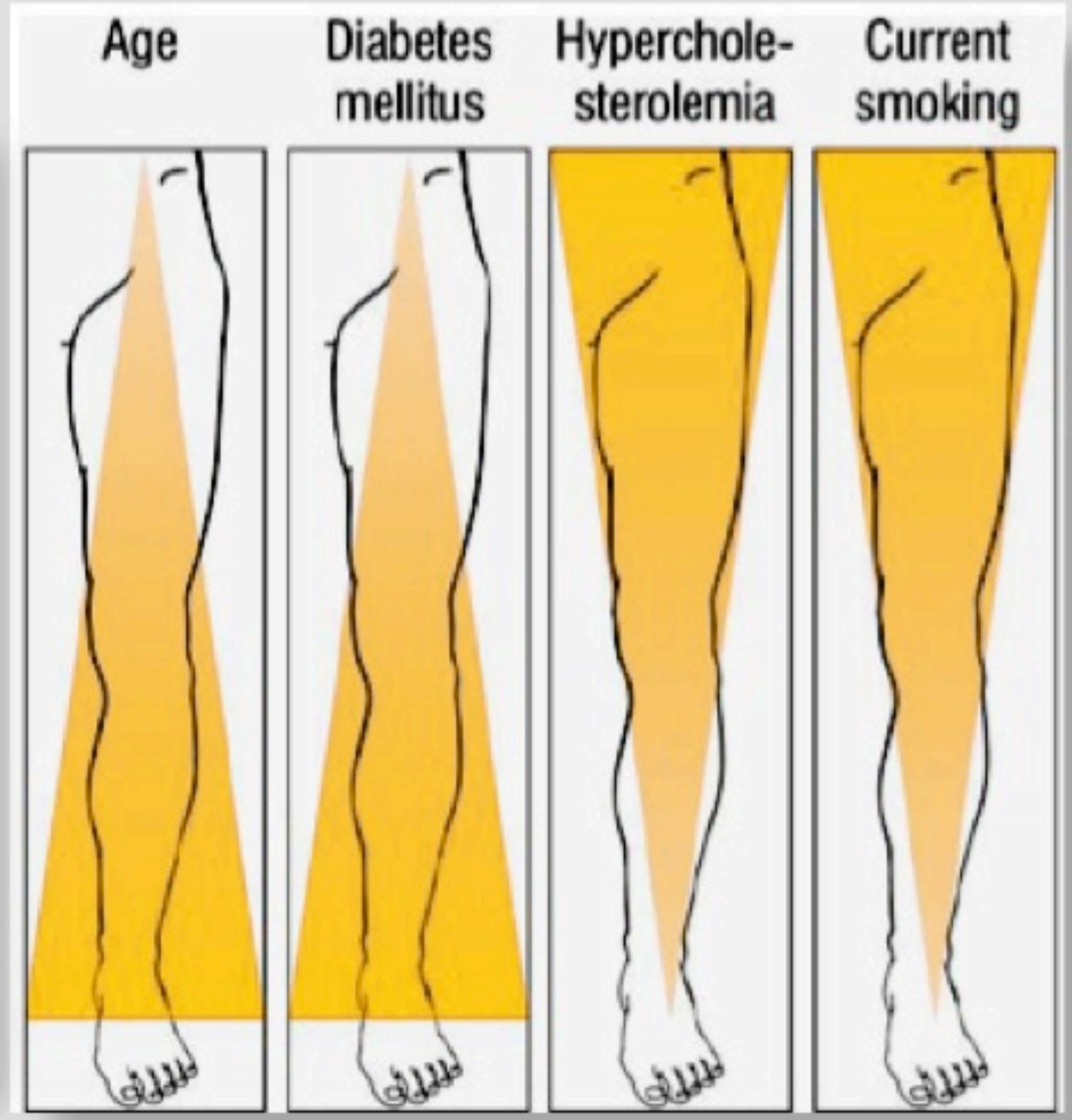


2. Muscular mid-distribution system: diabetes, aging…

Association of Cardiovascular Risk Factors with Pattern of Lower Limb Atherosclerosis in 2659 Patients Undergoing Angioplasty

N. Diehm,[1] A. Shang,[2] A. Silvestro,[1] D.-D. Do,[1] F. Dick,[3] J. Schmidli,[3] F. Mahler[1] and I. Baumgartner[1*]





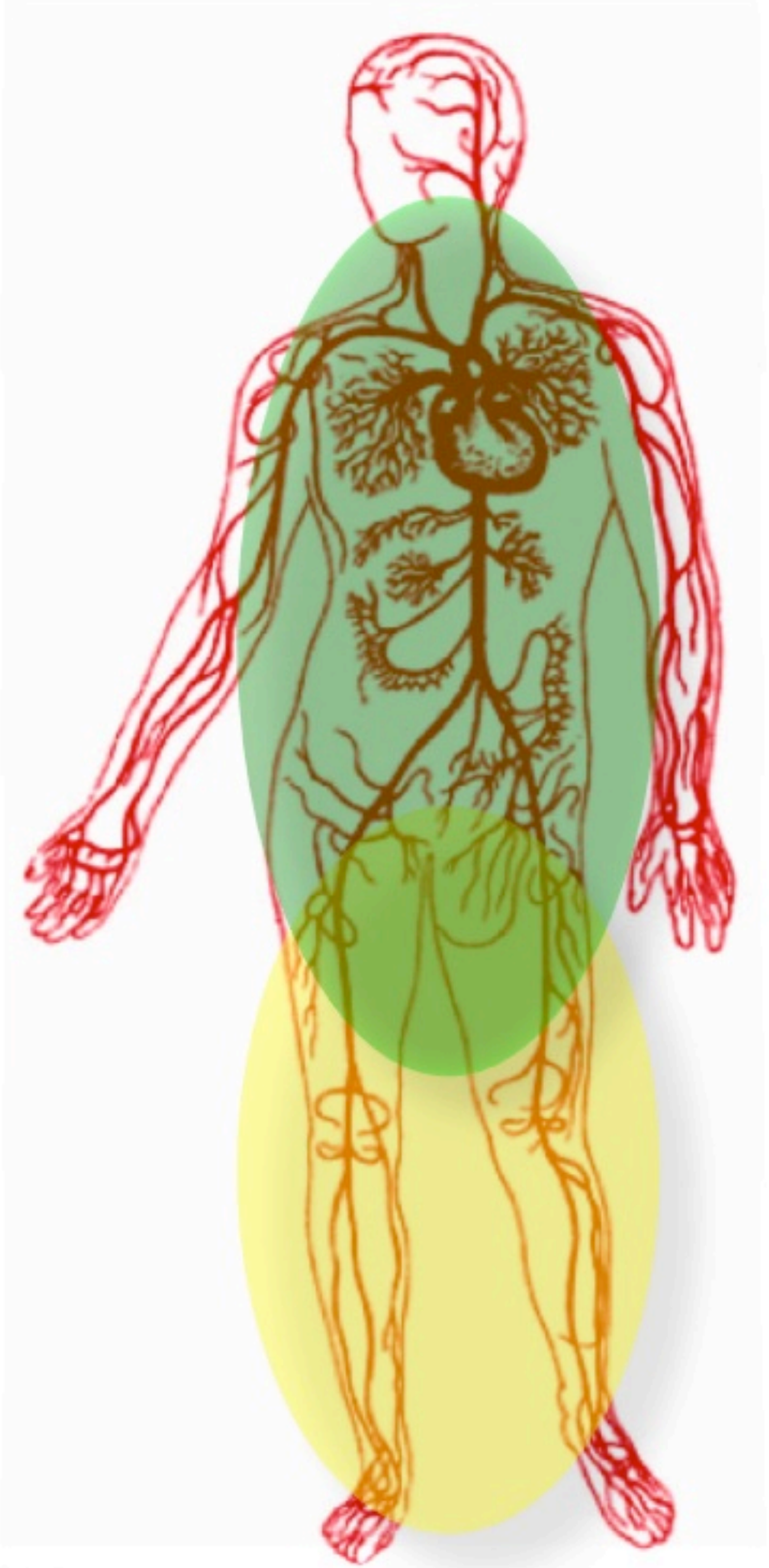
Modified from N. Diehm et al. Eur J Vasc Endovasc Surg 2006;31:59–63

Obstructive Disease pattern in diabetics and nondiabetics

Author	Title	Reference
Ciavarella A. et Al.	Angiographic Evaluation of The Anatomic Pattern of Arterial Obstructions in Diabetic Patients with Critical Limb Ischemia	Diabetic Medicine 1993;19:586-89
Jude E.B. et Al.	Peripheral Arterial Disease in Diabetic and Non-diabetic Patients. A comparison of severity and outcome	Diabetes Care 2001;24,1433-37
C. van der Feen et Al.	Angiographic distribution of lower extremity atherosclerosis in patients with and without diabetes.	Diabetic Medicine 2002;19:366-70
American Diabetes Association	Peripheral arterial disease in people with diabetes	Diabetes Care 2003; 26, 3333-3341
Diehm N. et Al.	Association of cardiovascular risk factors with pattern of lower limb atherosclerosis in 2,659 patients undergoing angioplasty	Eur J Vasc Endovasc Surg 2006;31:59-63
Graziani L. et Al.	Vascular involvement in Diabetic Subjects with Ischemic Foot Ulcer: A New Morphologic Categorization of Disease Severity	Eur J Vasc Endovascular Surg 2007;33:453-60

PAD in DM & non-DM

	Diabetics	Nondiabetics
Distribution	Extensive & distal: • *Fem-Pop* • *BTK* • *Foot vessels*	Less extensive & more proximal: • *Iliac* • *Fem-Pop*
Type	• Calcification +++ • Occlusion +++	• Calcification +/- • Stenosis ++
Evolution	• ***Fast & aggressive***	• Slow & benign
		



PAD

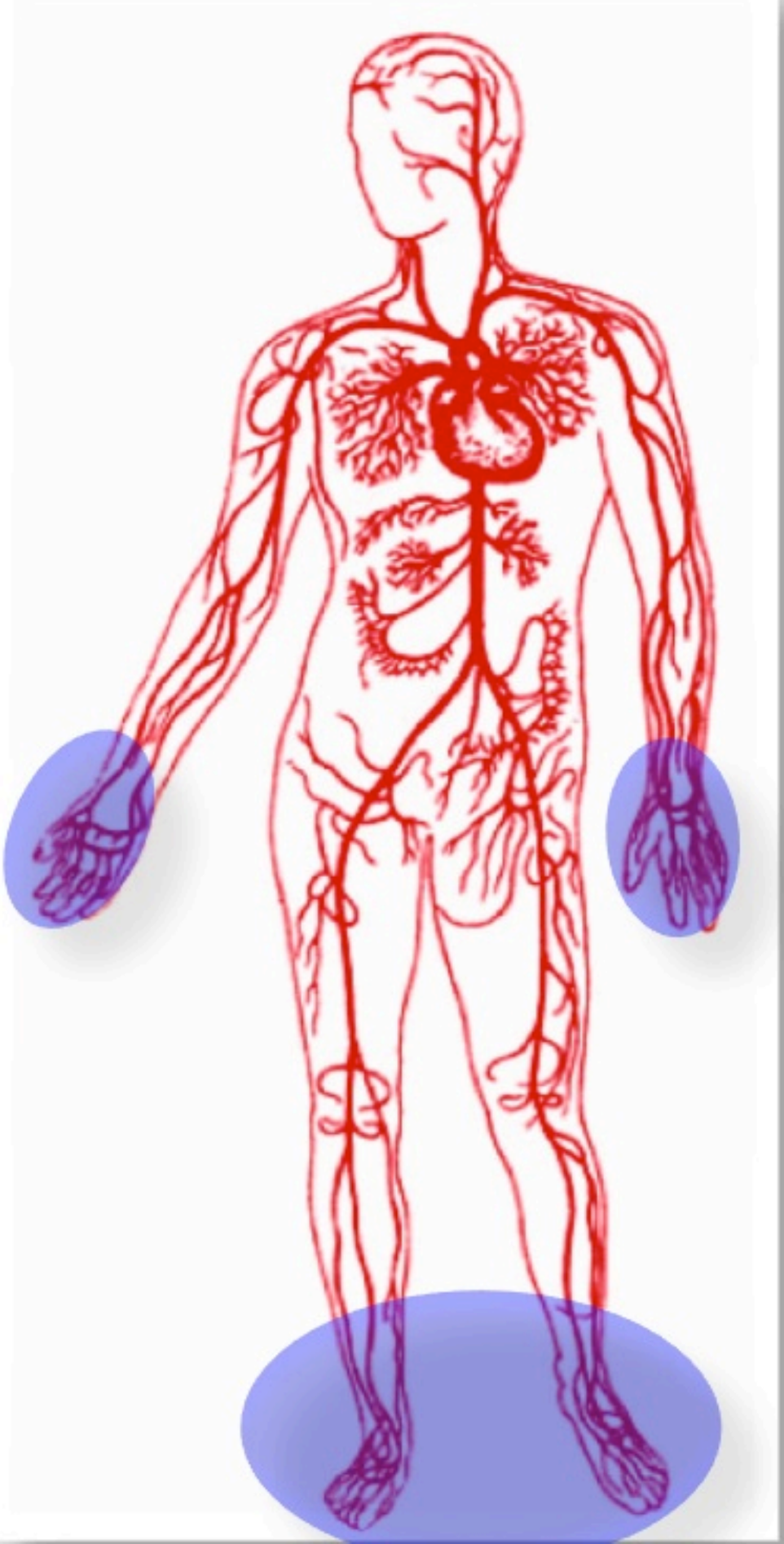
1. **Elastic artery central core disease: smoking, hypercholesterolemia…**

2. **Muscular mid-distribution system: diabetes, aging…**

In our society we must face the epidemic of old and diabetic patients characterized by a selective involvement of the muscular vessels

2nd statement

PAD



3. **Muscular distal-distribution system: diabetes + ESRD…**

Lancet 2012; 380: 2095–128

Articles

Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010

	All ages deaths (thousands)		
	1990	2010	%Δ
Diabetes mellitus	665·0 (593·3–757·5)	1281·3 (1065·2–1347·9)	92·7%
Acute glomerulonephritis	135·2 (57·4–357·3)	84·2 (41·4–191·8)	–37·7%
Chronic kidney diseases	403·5 (354·5–468·9)	735·6 (612·1–810·4)	82·3%
Chronic kidney disease due to diabetes mellitus	91·9 (79·7–109·9)	178·3 (147·7–198·4)	94·1%
Chronic kidney disease due to hypertension	91·5 (80·1–106·9)	175·3 (147·0–193·3)	91·5%
Chronic kidney disease unspecified	220·2 (191·9–252·9)	382·0 (317·9–422·3)	73·5%

Chronic kidney disease due to diabetes mellitus is growing up

CASE 1

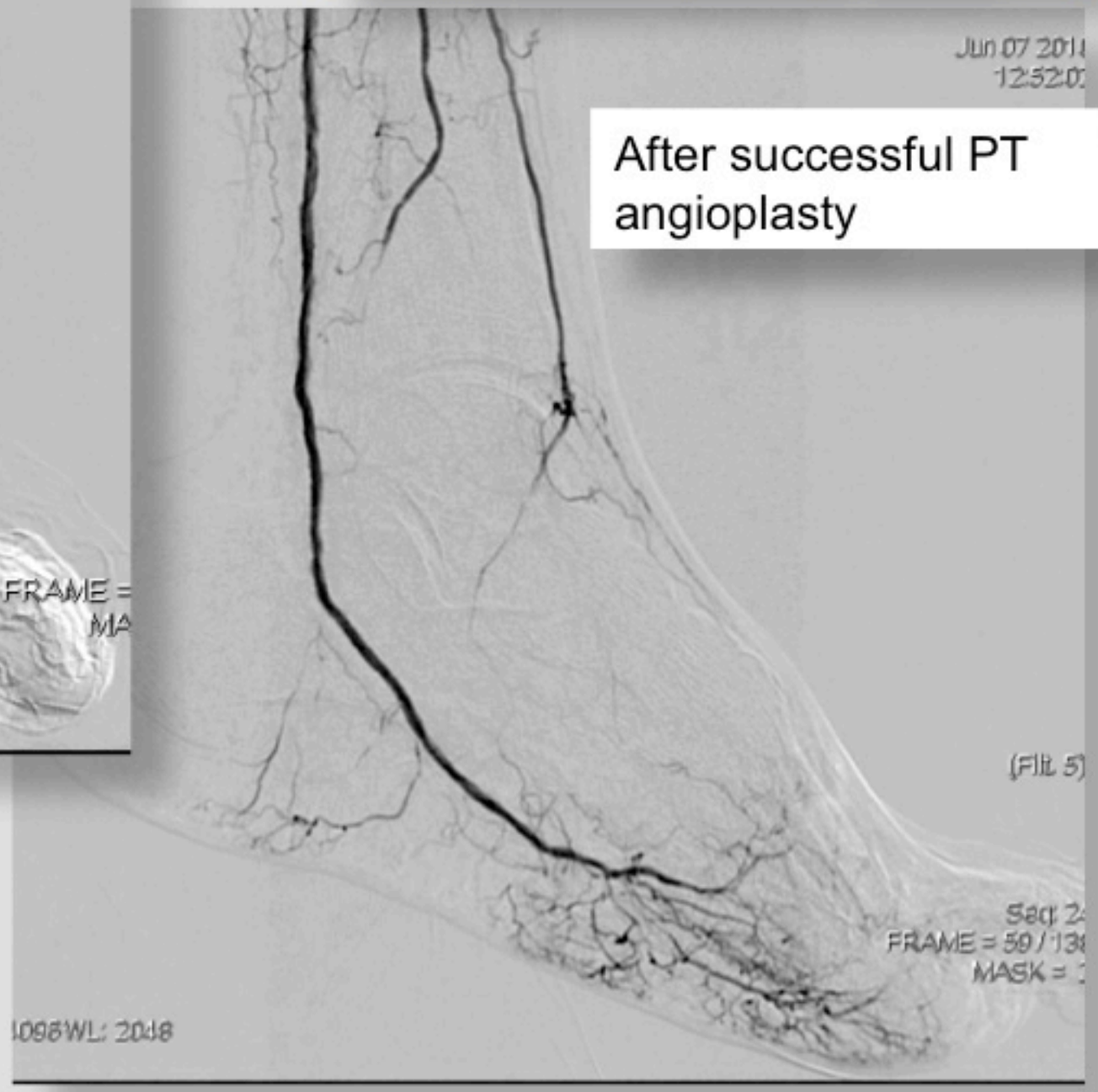
- 36-years-old female
- Type 1 DM (32 yrs of disease!!!)
- ESRD → hemodialysis

CASE 1

Diffuse severe calcification of the arterial tree, extending to the finger vessels. Diffuse obstructions, complete occlusion of the smallest arteries. Angioplasty failure due to inability to cross the lesions and/or to dilate the balloon.

CASE 2

- 64-year-old male
- Type 2 DM
- ESRD in Hemodialysis
- Forefoot plantar ulcer



CASE 3

- 29-year-old female
- Type 1 DM
- ESRD in Hemodialysis
- Toes gangrene

Basal angio: the "desert foot"

After successful PT angioplasty

PAD

1. **Elastic artery central core disease: smoking, hypercholesterolemia…**

2. **Muscular mid-distribution system: diabetes, aging…**

3. **Muscular distal-distribution system: diabetes + ESRD…**

There is a new epidemic of patients (generally long survivors with diabetes and/or ESRD) with a diffuse obstructing disease affecting the small distal vessels: the "desert foot"

3rd statement

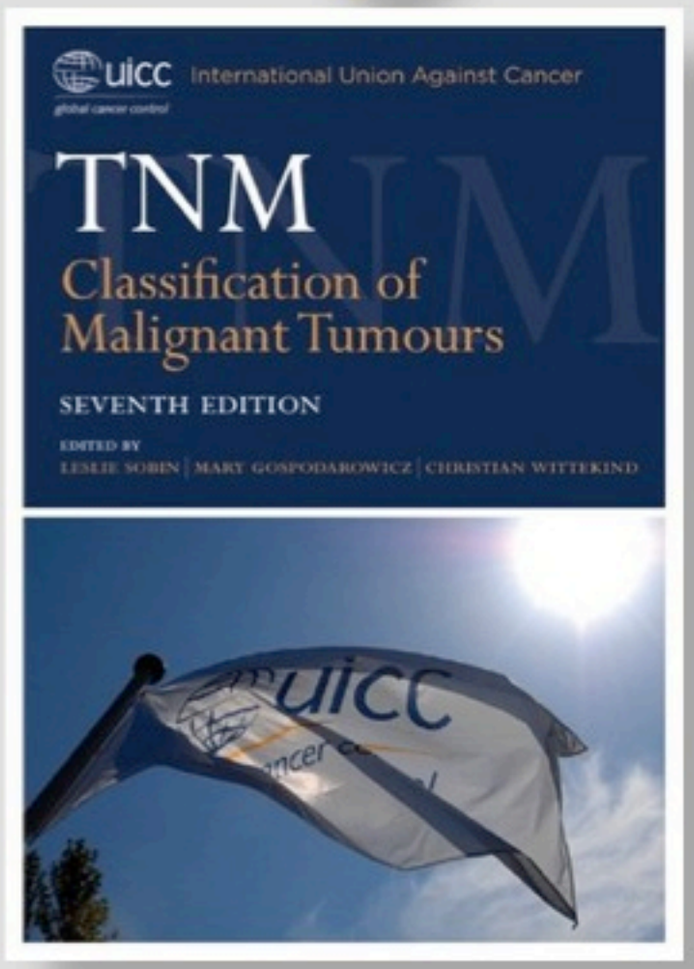
In my opinion the main source of misunderstanding is related to the different pattern of disease we are used to treat in our daily work.

Diabetologists, vascular surgeons, cardiologists, nephrologists, interventional radiologists see a wide variety of patients with critical limb ischemia

Atherosclerotic disease varies greatly in different countries and races. Patterns of disease in Europe, USA, Asia, South America, present differently.

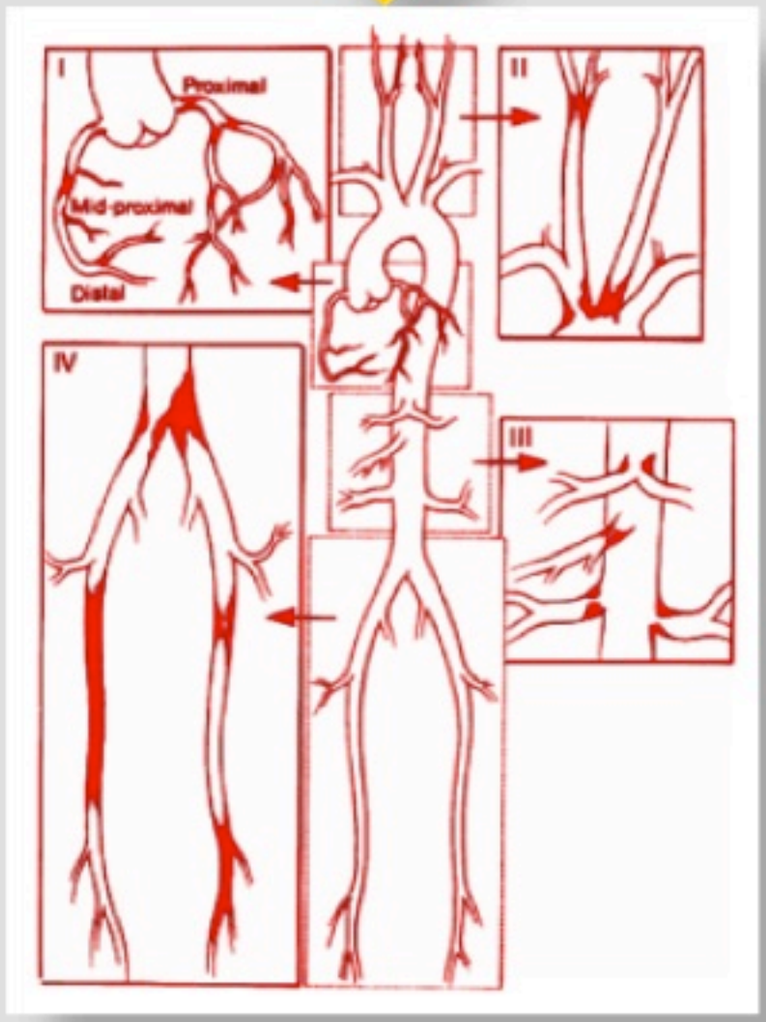
Atherosclerosis is a changeable disease that lacks a defined classification

Cancer classification



> 300 pages!

Atherosclerosis classification



Do you know something better?

PAD

1. **Elastic artery central core disease: smoking, hypercholesterolemia…**

2. **Muscular mid-distribution system: diabetes, aging…**

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the times they are A-changin' …
(Bob Dylan)