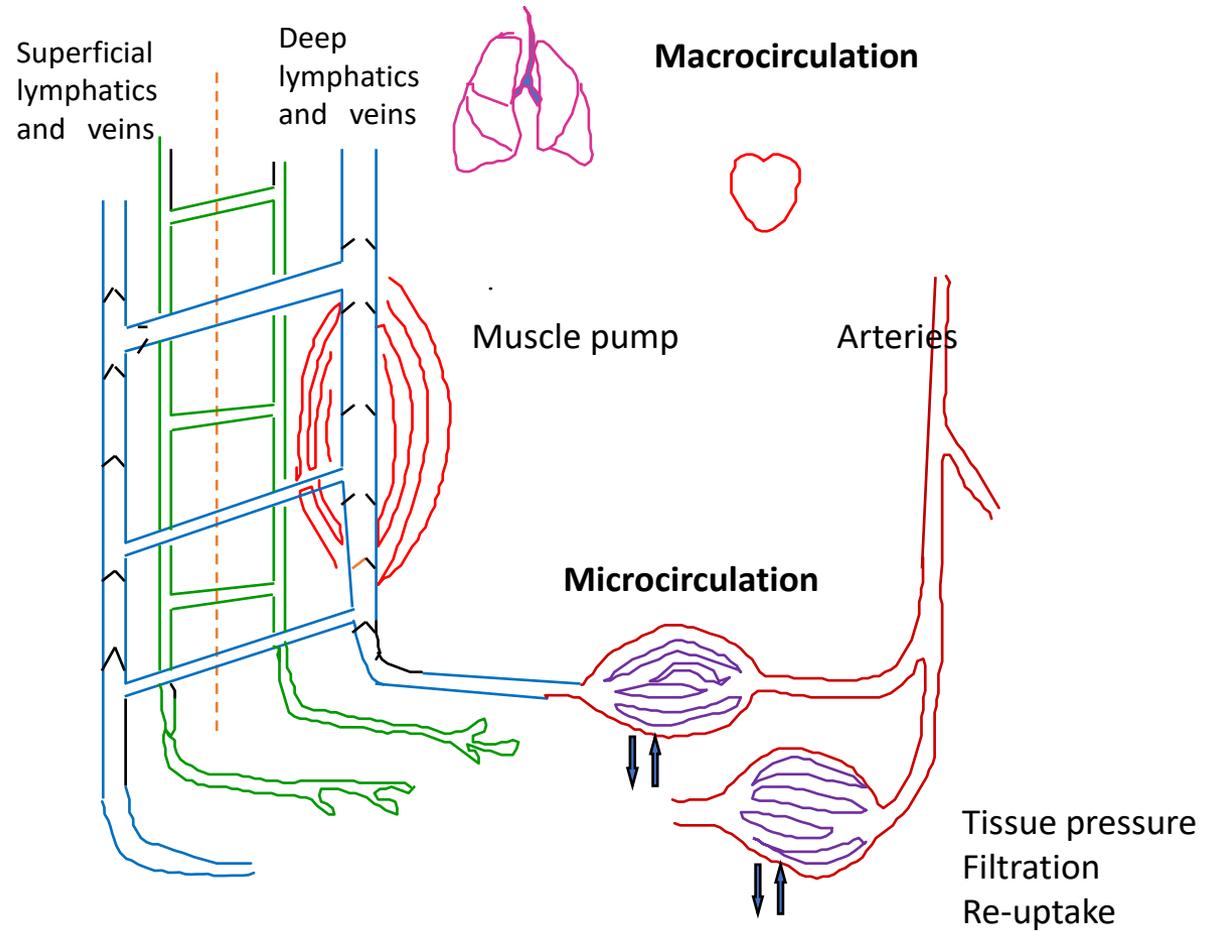


“chronic oedema” is a divers problem

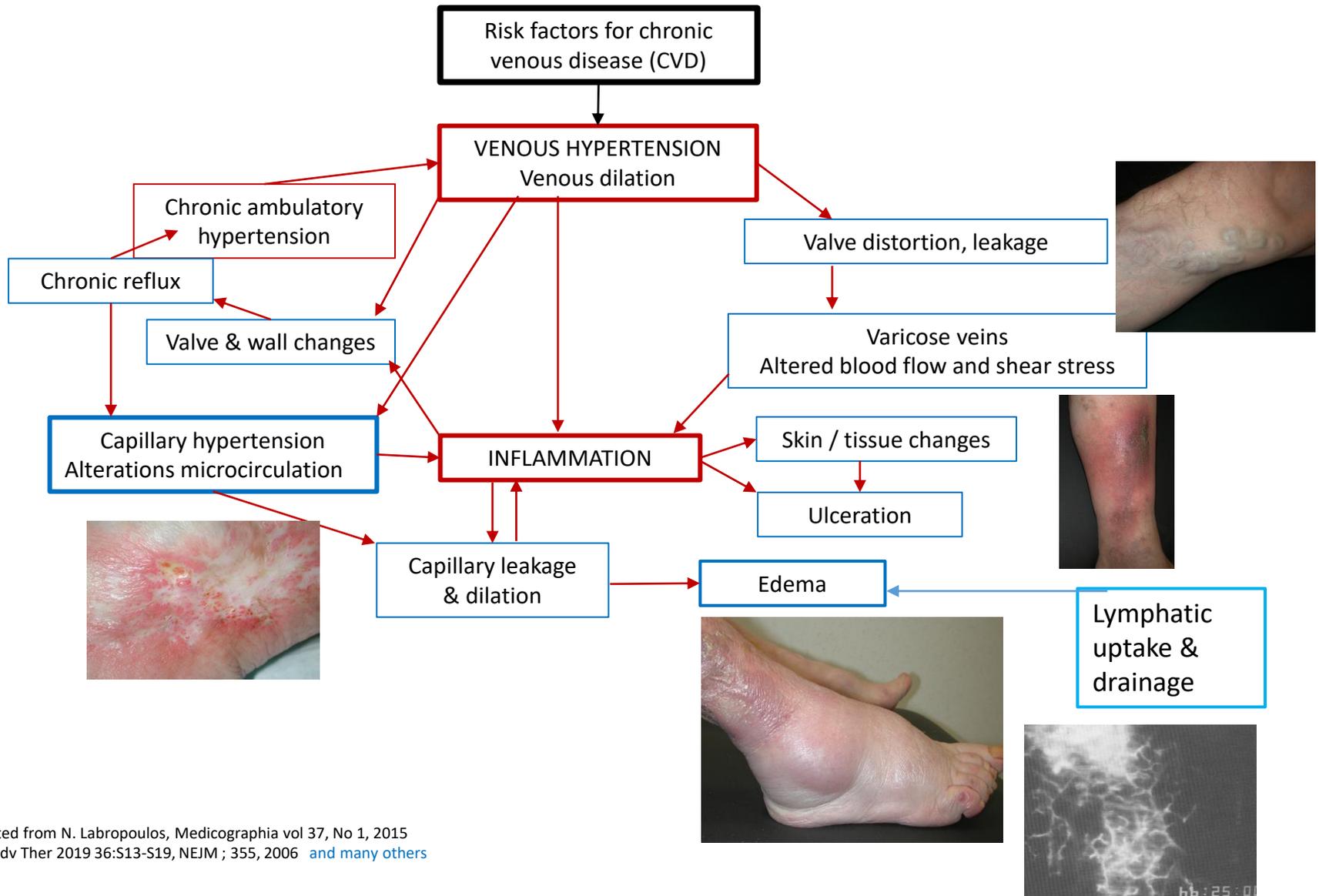


The circulation

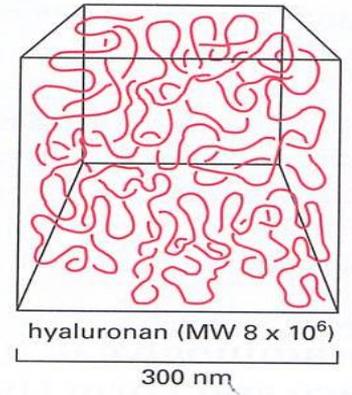
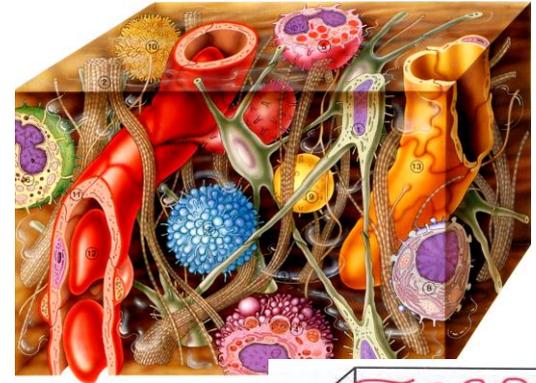
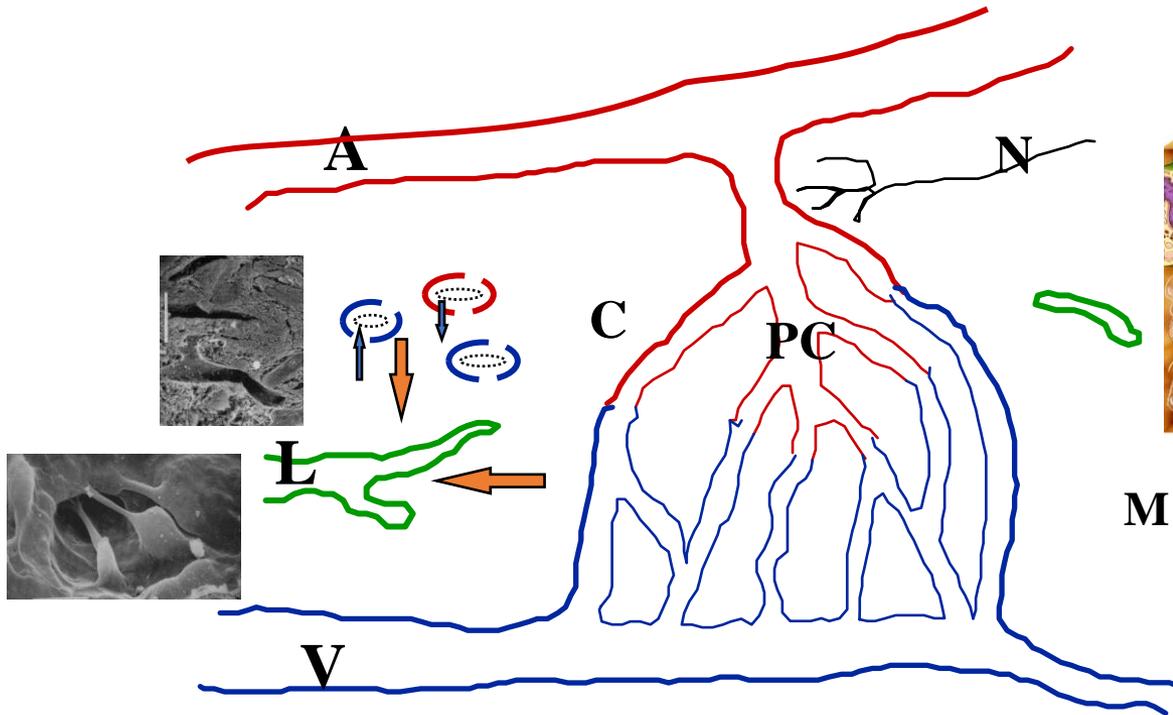


from: Diagram of the microcirculatory unit
(C. Allegra, Phlebology, 1994; 2: 3 - 8)

Pathophysiology of Venous hypertensive microangiopathy



The microcirculation & interstitial tissue



A: Terminal arteriole

V: Venule

M: Matrix: groundsubstance, cells

PC: Preferential channel

C: Capillary

L: Lymphatic

N: Nerve fiber

See: Revised Starling principle:
R Levick, C Michel. Cardiovasc Research 2010

from: Diagram of the microcirculatory unit
(C. Allegra, Phlebolympology, 1994; 2: 3 - 8)

MCS for edema: guidelines, recommendations

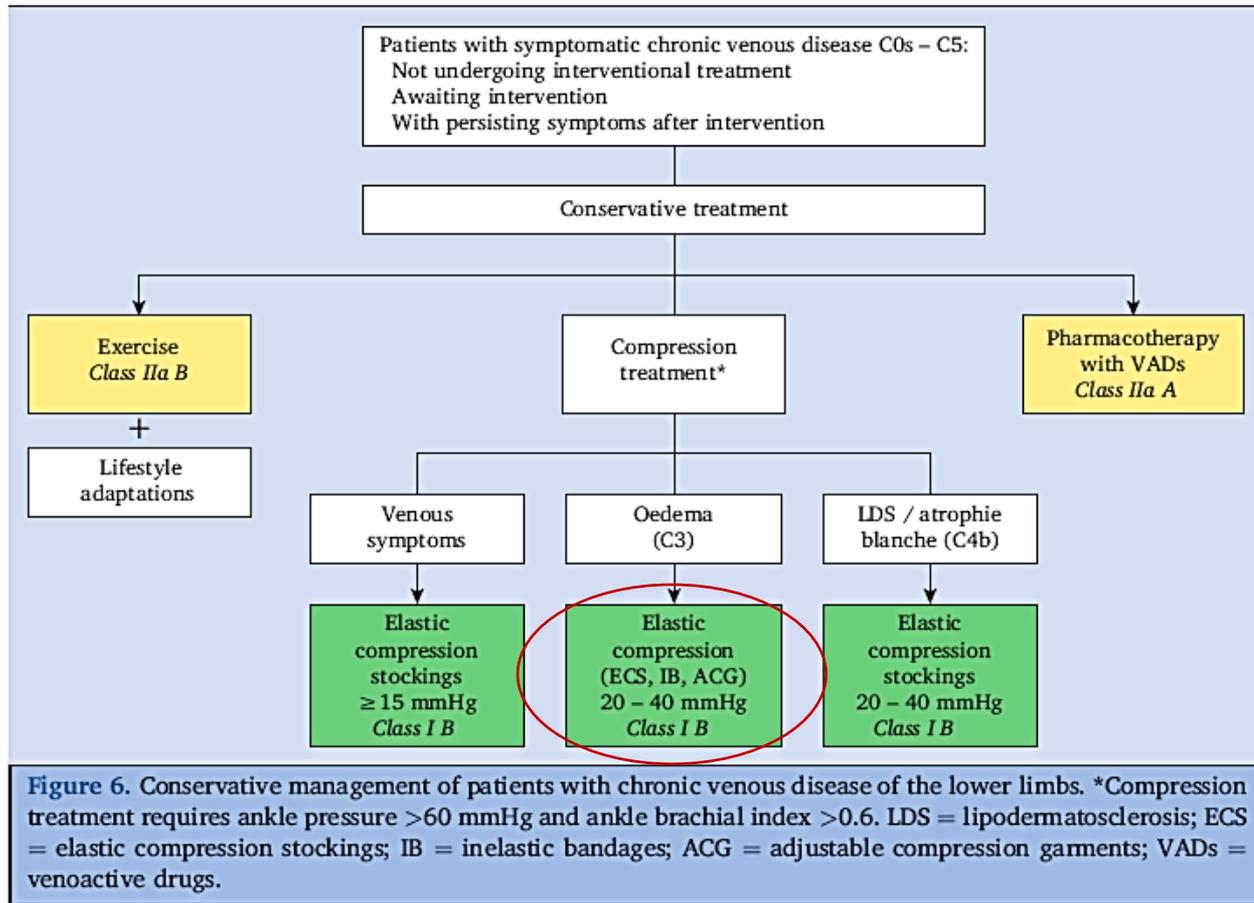
Compilation of +/- recent guidelines

- ICC consensus documents: Int Angiol 2008;27:193-219; Int Angiol 2012;31:316-29
- E Rabe et al : Phlebology 2018, Vol 33(3):163-184
- Giancesini et al : Phlebology 2019, Vol 34(1S):4-66
- M De Maeseneer et al : Eur J Vasc Endovasc Surg,2022
<https://doi.org/10.1016/j.ejvs.2021.12.024>

Guidelines on MCS in edema treatment: what P (in mmHg) do we need?

	ICC	Rabe	Gianesini	ESVS 2021
C3 prevention	10-20 ➤ 10	10-20	Low P	Low P Progressive
C3 treatment			27-32	15-32 20-40 superposition
QoL C1-C3s Symptoms	10-15	10-20		➤ 15 Progressive
C3-C6	20-30 30-40	➤ 30		
Lymphedema	Maintenance Arm 20-30 Leg > 36	Maintenance 30-40 Combined Tt	Highest tolerated ➤ 30	

Recommendations ESVS 2022



'Elastic' ?

Elastic or stiff?

In terms of edema treatment,

23–32mmHg graduated compression stockings and elastic kits demonstrated to be almost as effective as rigid bandaging.

Recommendation on ECS for oedema

Even low-pressure MCS (10–20 mmHg) are able to reduce symptoms and oedema. In consequence, the pressure level should be adapted to the severity of the disease and limited to the lowest pressure leading to symptom and oedema relief. This will also improve patient compliance.

Finally, we conclude that all levels of compression improve venous symptoms and oedema.

Recommendation 1: We recommend the use of MCS to alleviate venous symptoms in patients with CVD (GRADE 1B)

Recommendation 2: We recommend the use of MCS to improve QoL and venous severity scores in patients with CVD (GRADE 1B)

Recommendation 3: We recommend the use of MCS to prevent leg swelling in patients with CVD and in healthy individuals at risk of leg swelling (e.g. during long flights; occupational leg swelling) (GRADE 1B)

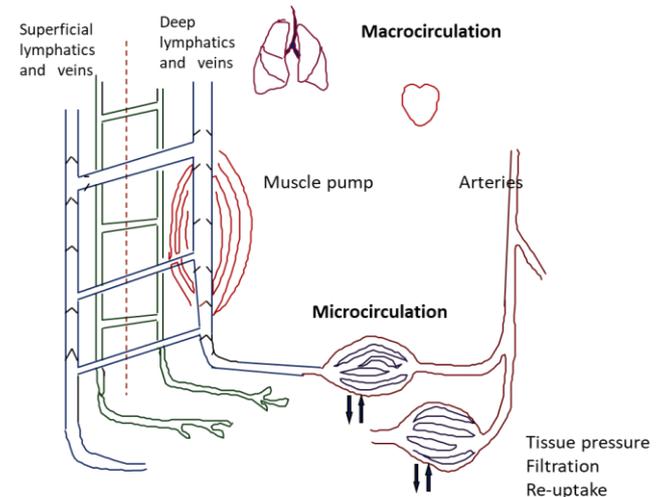
Recommendation 4: We recommend the use of MCS to reduce leg swelling in patients with CVD and occupational leg swelling (GRADE 1B)

2 main effects define the P we need

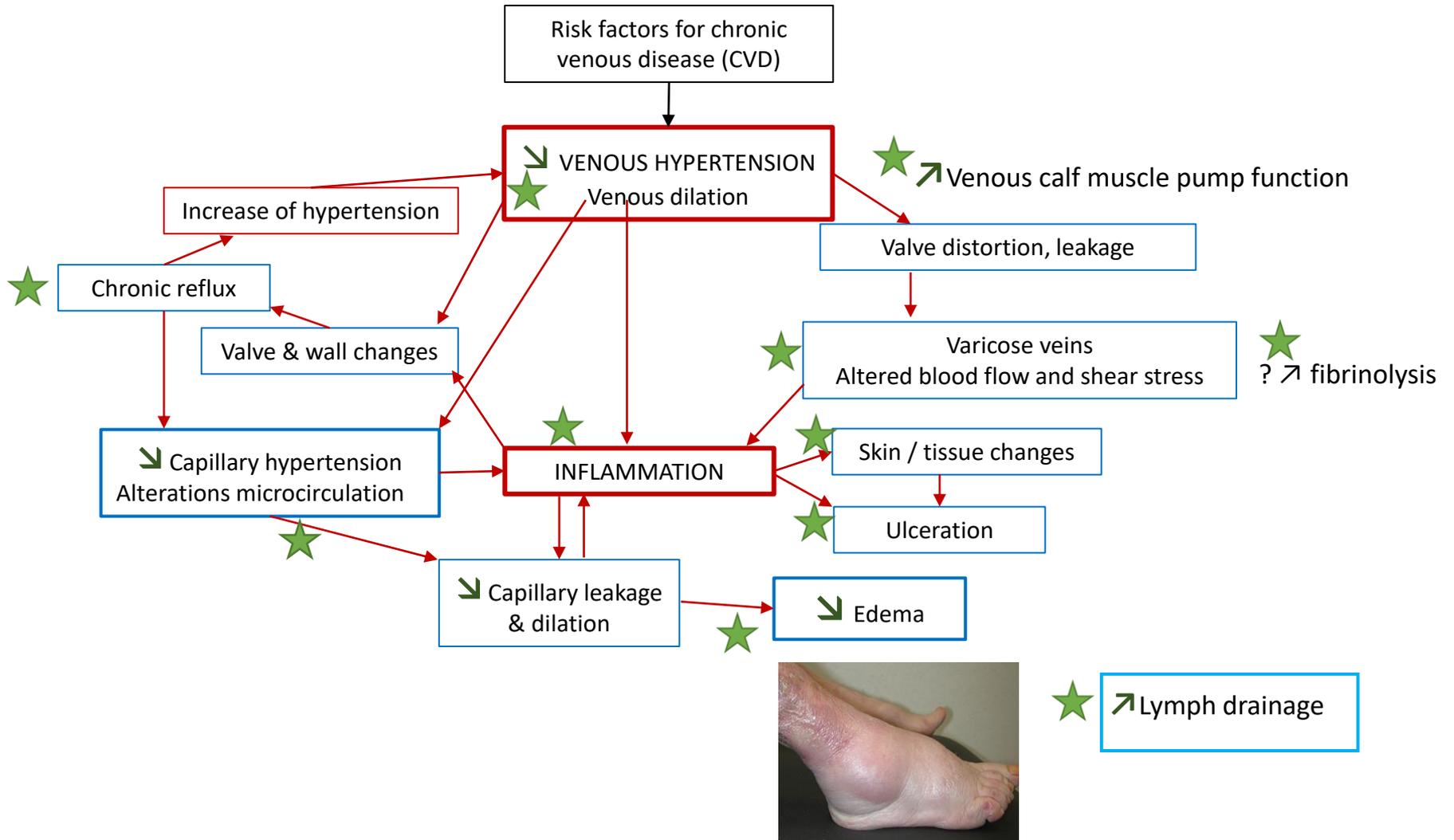
There are two main compression effects:

A hemodynamic effect requires a vein narrowing, which requires a high pressure : pressure from outside > intraluminal vein pressure .

Edema reduction can be obtained also with minor pressure: Effect reached with > 10 mmHg



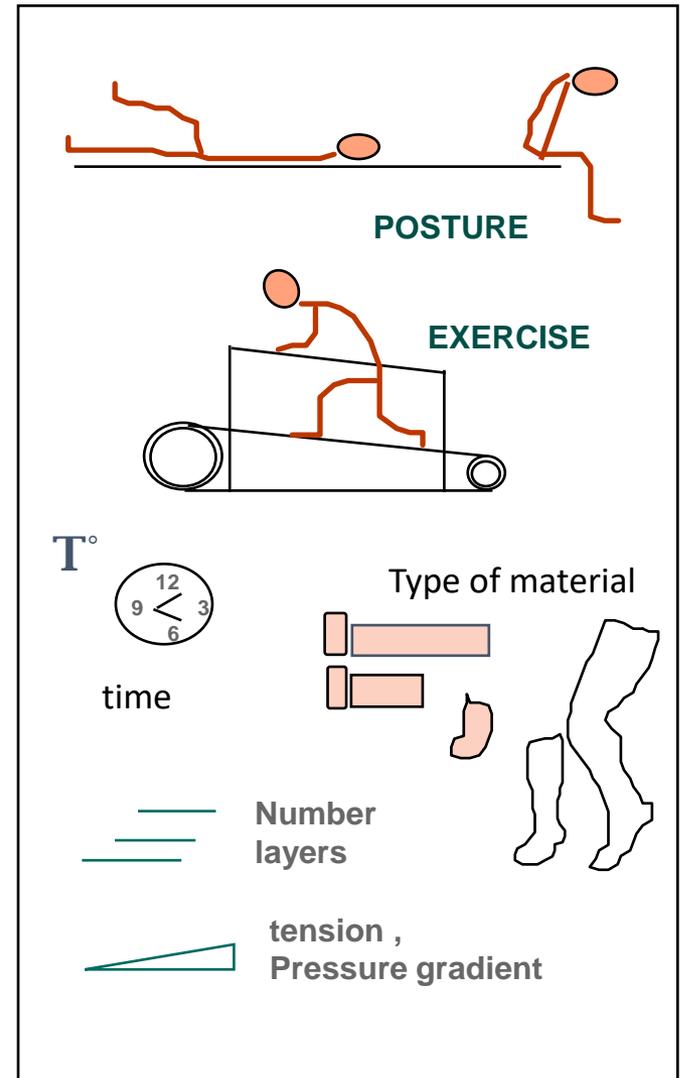
Pathophysiology of CVD, effects of compression therapy ★



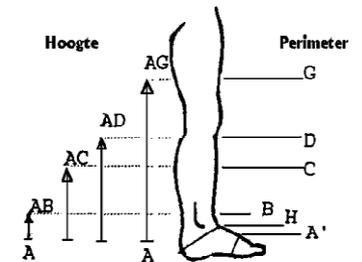
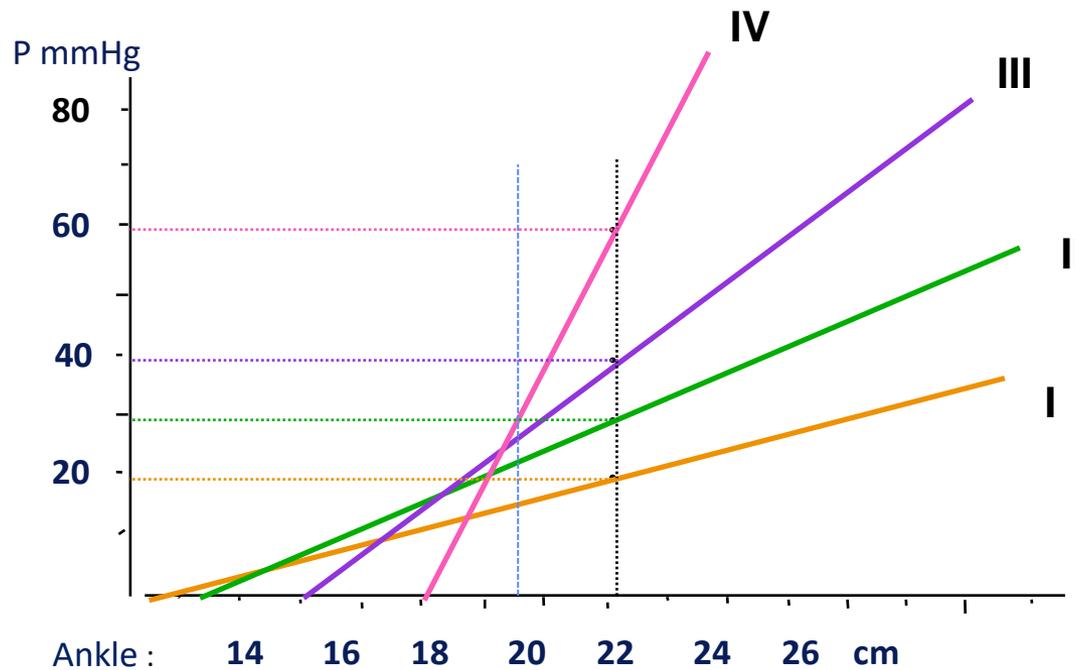
The choice of compression hosiery type for an individual patient is influenced by many patient- and disease-related factors. Effects of compression can / must be adapted to the circumstances



Wide variation in - limbs: . morphology
 . mobility
 - pathology, etiology

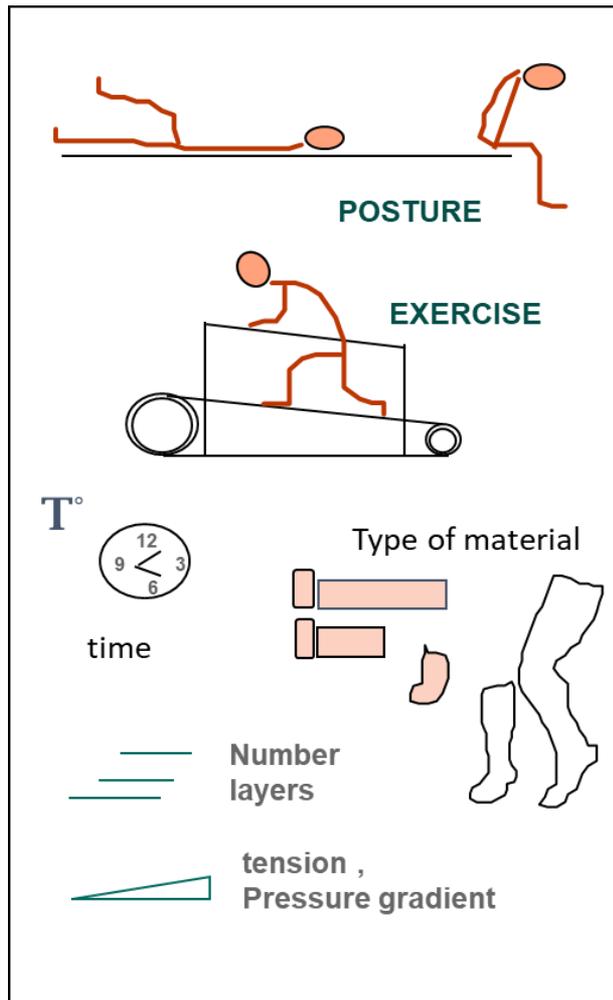


Stockings: P in function of classes and of ankle circumference



→ A correct fit is important

R/ Adapt compression to the patient's needs

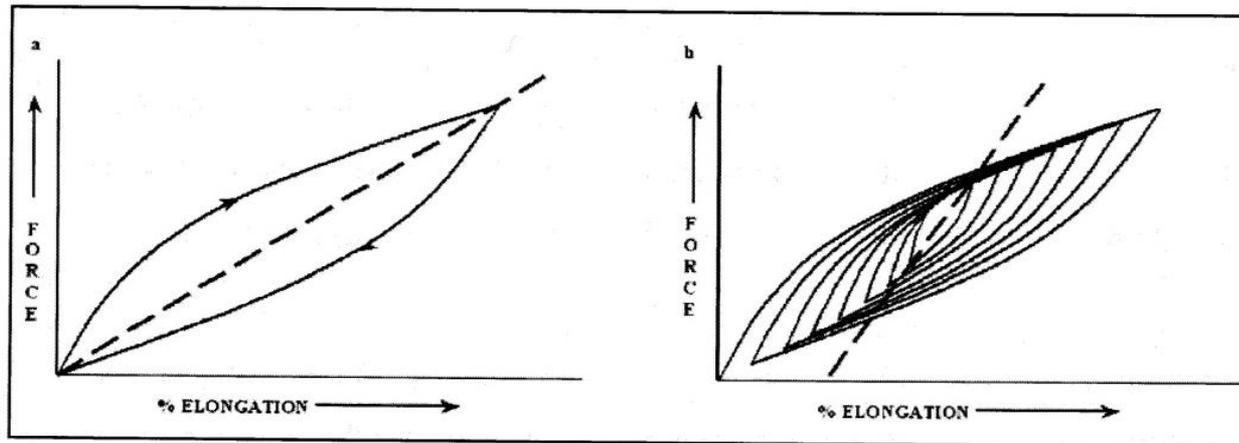


- Posture and exercise will enhance the effect of compression
- Stiffness does play a role for hemodynamics, but results are varied for oedema reduction
- Activity defines the Static versus dynamic stiffness and hysteresis
- Superposition of stockings will result in higher pressure and stiffness
- R/ Timing of pressure (peaks) according to activity / posture, while lower pressures when supine
- Compression does not stand alone: additional treatment modalities enhance (and confound) the results

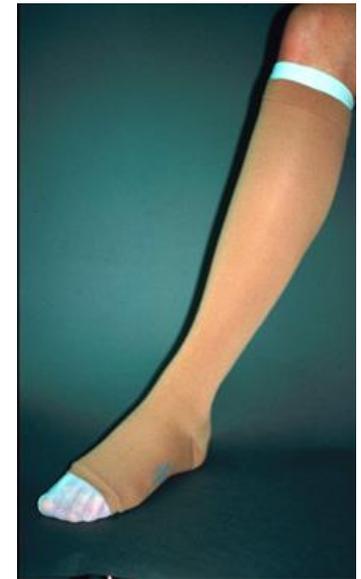
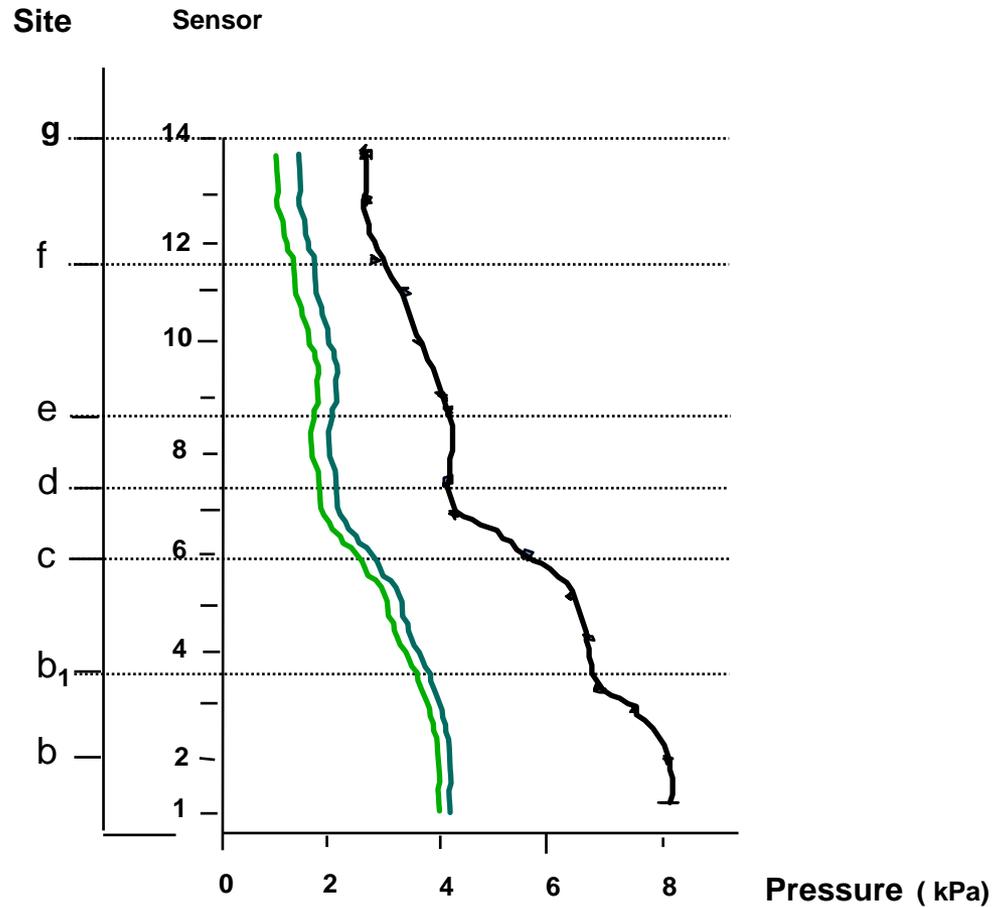
static \neq dynamic hysteresis of MCS

Curves of static and dynamic hysteresis differ :

- The slope reflects the stiffness: static curve : start from basic state until maximal elongation
- During walking, the variation of the leg perimetry (=consecutive elongation) is more limited + more frequent + more rapid, \rightarrow the curve is more steep in the centre, the dynamic stiffness index is higher during walking than at rest



Superposition of two stockings :
the pressure values are almost additive (sum – 10%),
As is the resulting stiffness (sum – 15%)



Oedema of the foot



Oedema management with elastic stockings?



