

Venous leg ulcers - Pathophysiology

Rolf Jelnes

Overlæge, dr.med.

Sygehus Sønderjylland

Sønderjylland, Denmark



”Sår-i-Syd”

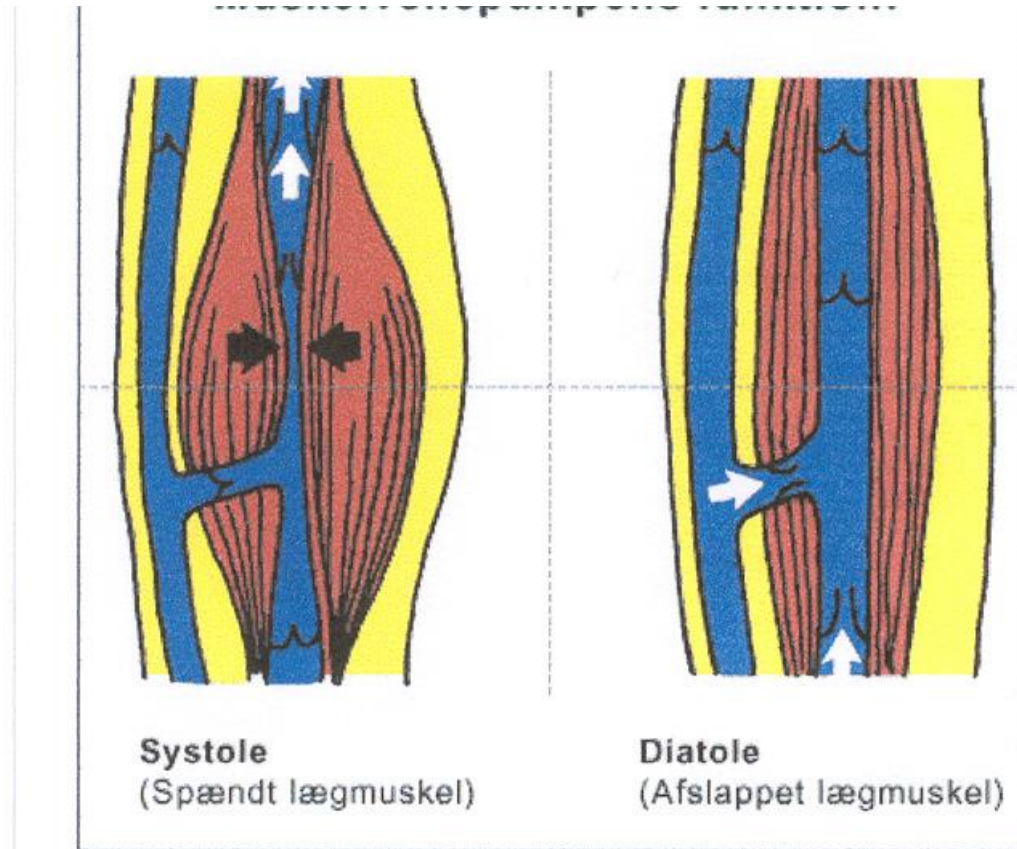
- 250.000 inhabitants
- Telemedicine as a cross-sectional communicational tool.
- Journal of Wound Care, april 2011



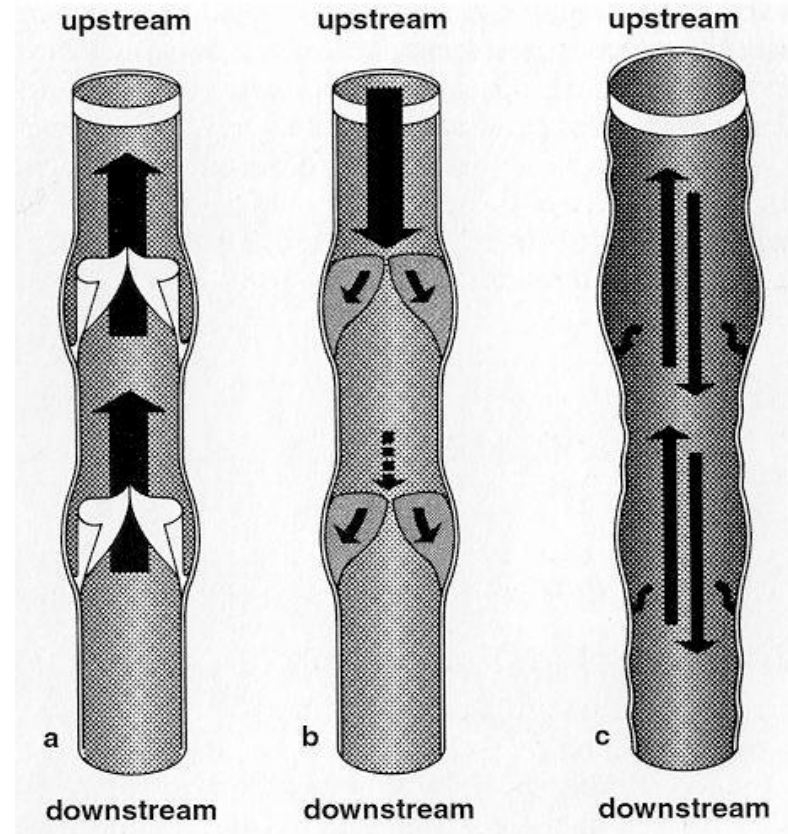
Venous leg ulcers

- for discussion to-day:
- Investigating and assessing the functioning of a pump!
- If the pump is malfunctioning, it causes:
venous hypertension

The pump



- Competence of the valves ensure an upstream
- If incompetent, blood passes up and down



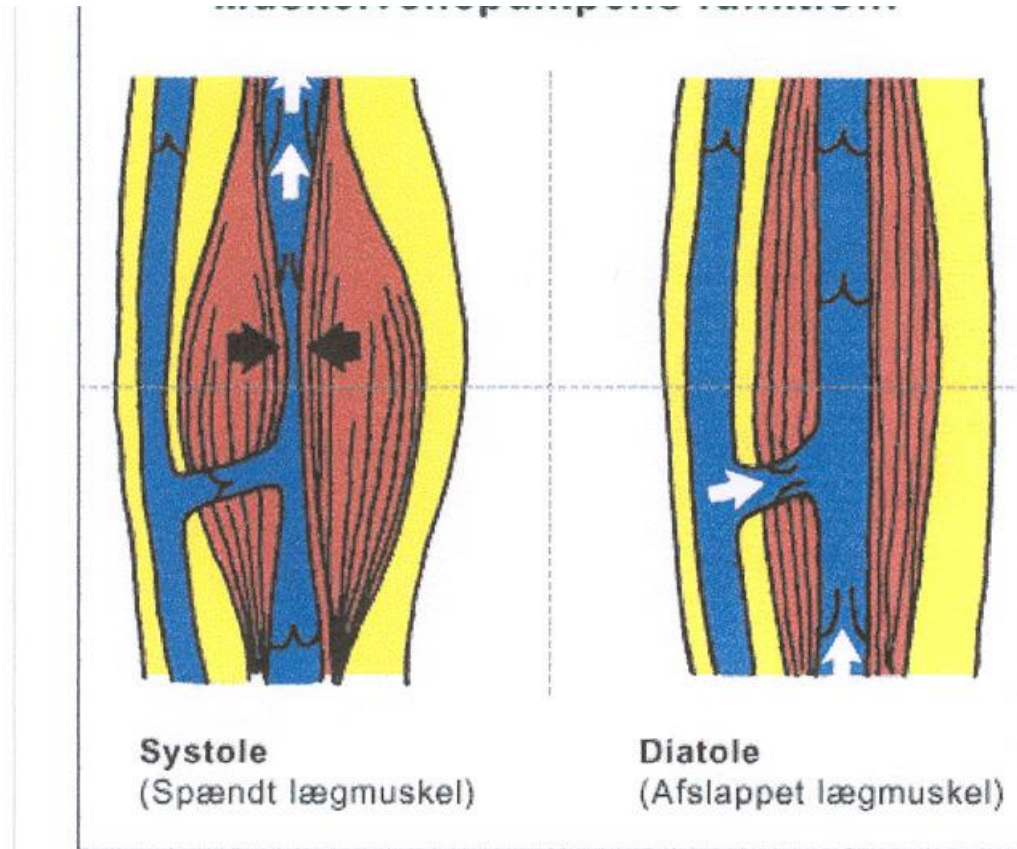
Characteristics of this pump:

- The purpose: return of blood from the lower limbs to the heart
- Components:
 - Muscular fasciae
 - Muscles - calf in particular, but also the foot
 - Venous valves
 - Joint movement
 - Safety valves – perforators (except in the foot)

Anatomy

- The foot is drained by the superficial venous system of the lower limb.
- The calf and thigh (deep compartment), by the deep venous system in the limb.
- The subcutaneous tissue and skin is drained by the superficial system
- Between the deep and superficial system we have safety valves – perforators. Whose function is to allow blood to go to the deep venous system

The pump



The deep venous system

- Smaller veins on the calf, join and create sinuses – reservoirs, located proximally
- At the level of the knee, they usually join to one – the popliteal vein – femoral vein
- In the thigh, muscular branches join the femoral vein, which at the level of the groin become the main conductor of venous blood to the pelvis- the common femoral vein

perforators

- Veins connecting the deep and superficial system – they perforate the fascia.
- Valves make sure, that passage of blood is from the superficial system to the deep system.

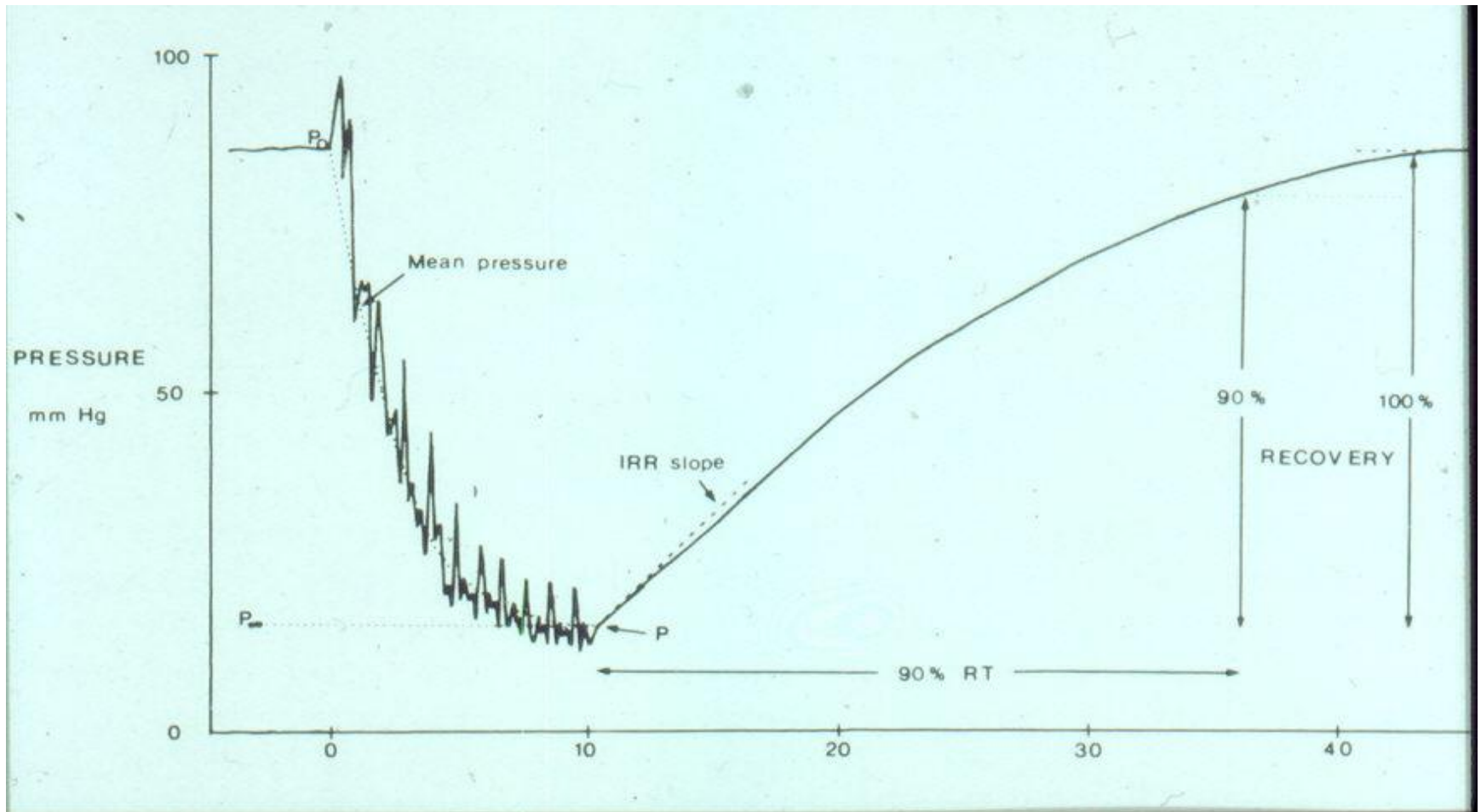
The superficial venous system

- Large number of veins located in the subcutaneous tissue.
- They create a rete – vv communicates. The purpose thereof is to function as reservoir and for thermoregulation
- At the groin or in the popliteal fossa they join and become perforators – the greater and smaller saphenous vein

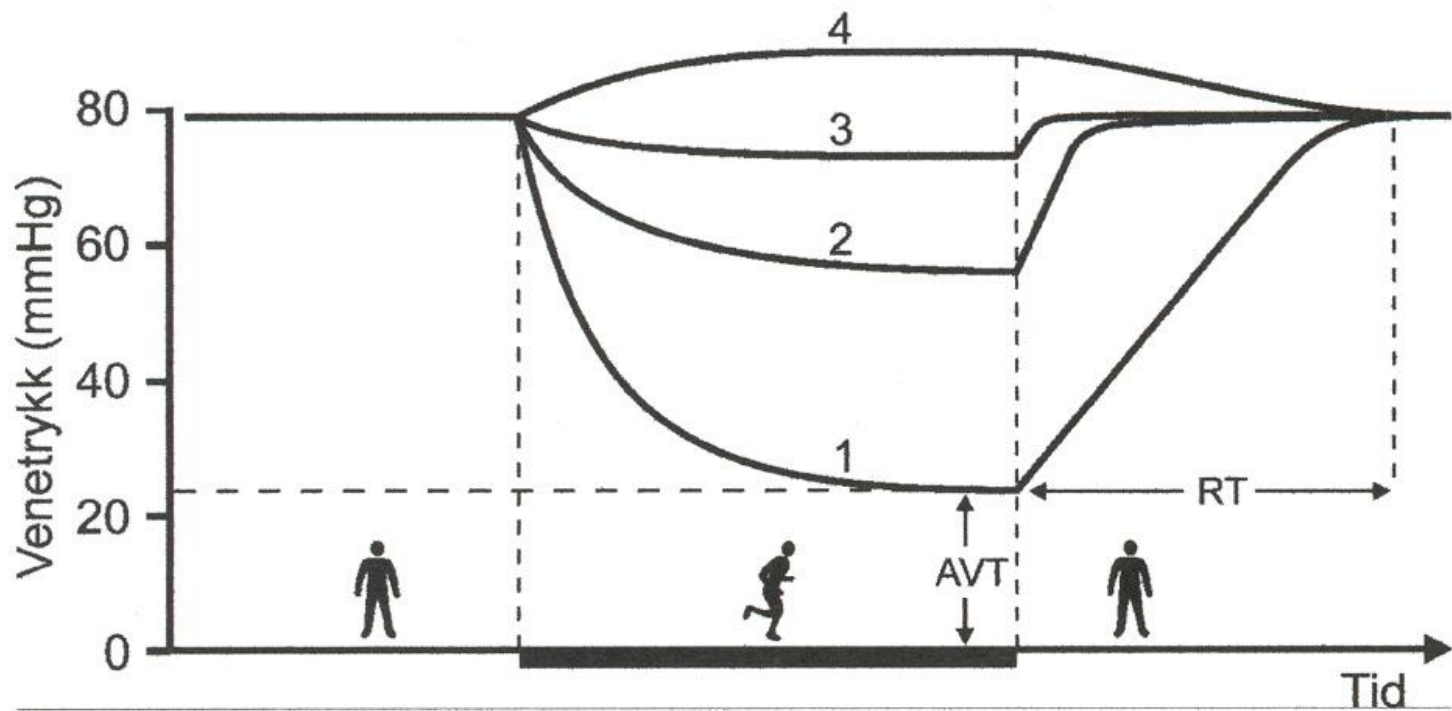
Testing the pump

- Pressure measurements, cannulating a vein on the foot, connected to transducer
- Volume changes, using plethysmography
- Duplex/triplex scanning of the veins

Venous pressure – normal function

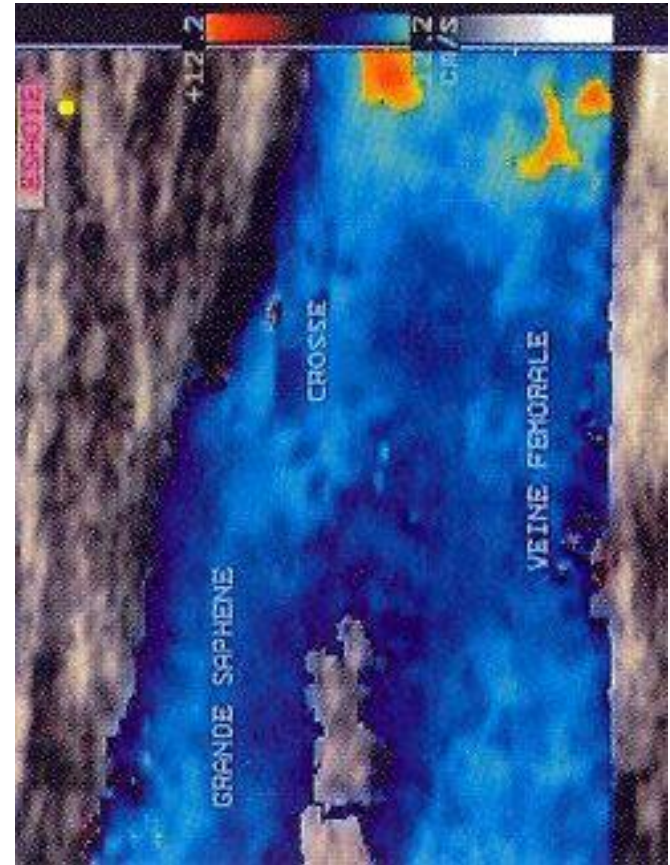


Venous pressure - abnormalities

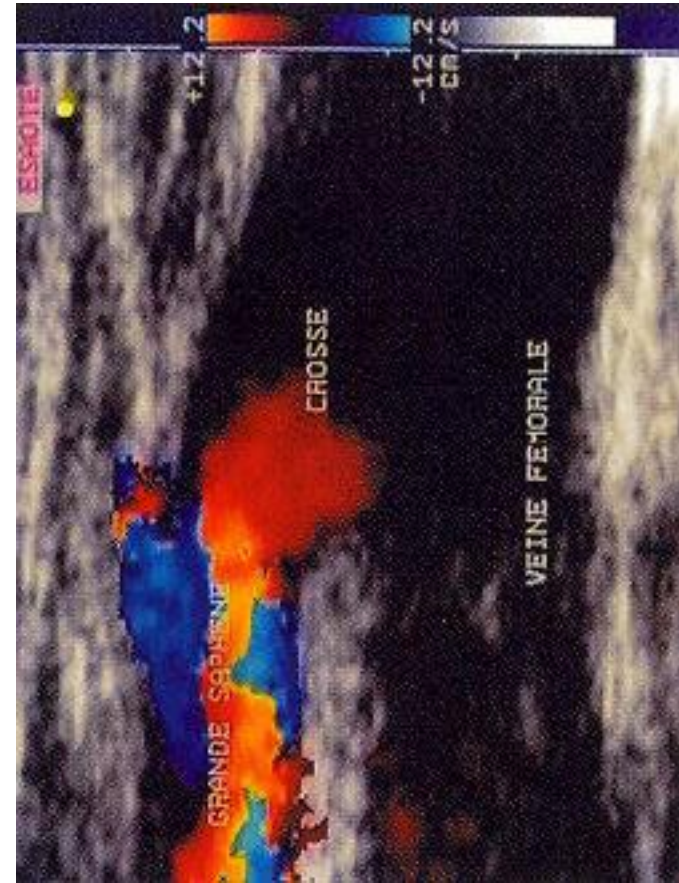
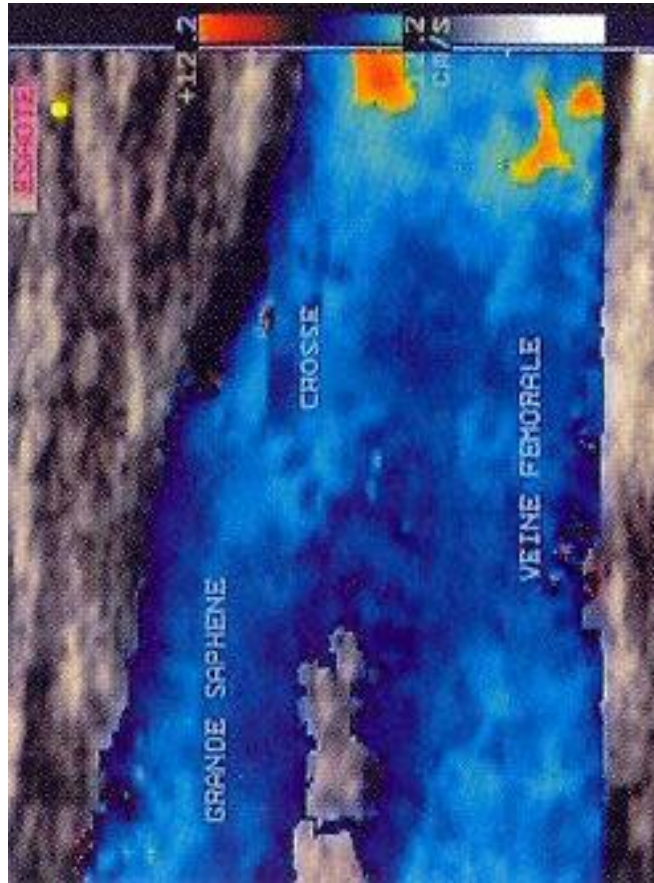


Duplex scanning

- In the standing position, pressure is exerted on the calf
- Upstream flow is detected in both the femoral vein and greater saphenous vein.



Diagnosis: Duplex scanning



Applying triplex (adding sound)

- - velocity curve
- Reflux time can be estimated
 - Normal values:
 - 0.9 s in the groin
 - 0.3 s in the popliteal fossa
 - 0.1 s in the calf
- Due to the difference in the numbers of valves

- By duplex scanning, insufficient parts of the pump can be detected
- When these are abolished, the pump will be well-functioning again
 - Surgery/compression therapy
- Venous hypertension is relieved – ulcers heal

Challenge !!!!!!!!!!!!!!!!!!!!!!!

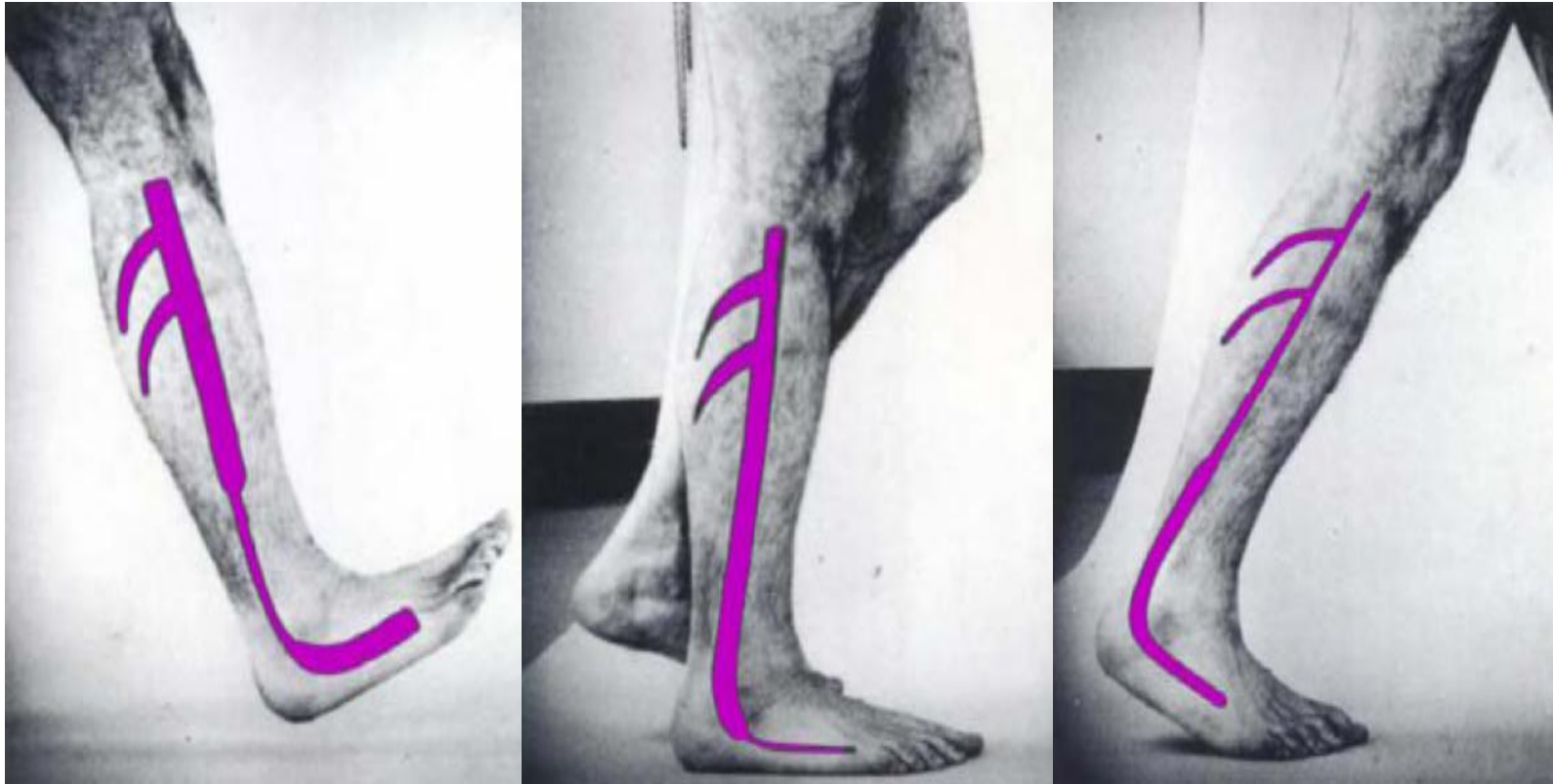
- "As the rate of cure achieved by surgery in venous vessels is low, the condition is primarily treated by reducing pressure through compression therapy"

• **THIS IS NON-SENSE !**

- 50 % of venous ulcers are caused by superficial insufficiency and thus curable by surgery !
- Pay attention to the fact, that 50 % of patients have a replica of the greater saphenous vein

- Duplexscanning is a must, to identify the malfunctioning parts of the pump.

3 pumps: Stempelpumpen, fodpumpen, læggemuskelpumpen



You have to look for it!

