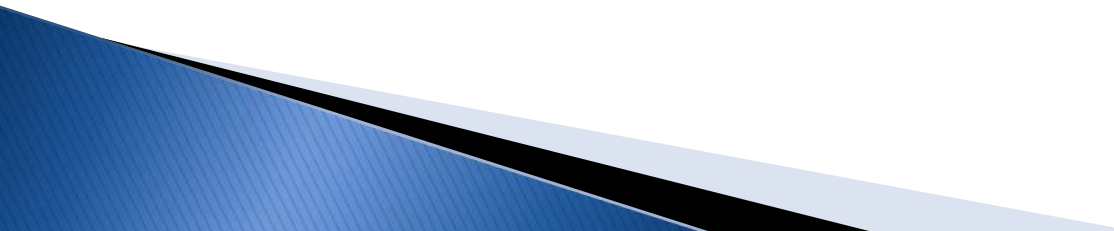


# Chronic venous insufficiency

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Phlebology Board Review, March 2014

# Plan

- ▶ Definition of CVI
  - ▶ Symptoms & signs
  - ▶ Pathophysiology
  - ▶ Differential diagnosis
  - ▶ Treatment – compression, saphenous vein
  - ▶ Incompetent perforator veins
  - ▶ Other venous sources – iliocaval, pelvic
  - ▶ Longitudinal tracking – VCSS
  - ▶ Conclusions
- 

# Definition of CVI

## ▶ CEAP class C3–C6

C<sub>3</sub> Edema.

C<sub>4</sub> Changes in skin and subcutaneous tissue secondary to CVD, now divided into 2 subclasses to better define the differing severity of venous disease:

C<sub>4a</sub> Pigmentation or eczema.

C<sub>4b</sub> Lipodermatosclerosis or atrophie blanche.

C<sub>5</sub> Healed venous ulcer.

C<sub>6</sub> Active venous ulcer.

# Symptoms

- ▶ Leg ulcers
- ▶ Healed leg ulcers
- ▶ Ankle/gaiter area skin changes
- ▶ Pain & discomfort
- ▶ Swelling @ ankle/gaiter
- ▶ Varicose veins

# Signs

- ▶ Leg ulcer
- ▶ Healed leg ulcer
- ▶ Skin changes
- ▶ Ankle → calf



# Leg ulcers

**Table 4.5** Differential diagnosis of leg ulcer

Venous ulcer
Peripheral arterial disease
Neuropathic ulcer
Pressure ulcer
Skin cancer

# Leg skin changes



# Hyperpigmentation

- ▶ Brownish skin discoloration of skin
- ▶ From extravasated blood
- ▶ C4a





# Venous eczema

- ▶ Erythemaous dermatitis
- ▶ Can progress to blistering, weeping, scaling
- ▶ C4a



# Lipodermatosclerosis

- ▶ Chronic inflammation & fibrosis of skin & subcutaneous tissues
- ▶ C4b



# Atrophie blanche (white atrophy)

- ▶ White, localized, circular, atrophic areas
- ▶ Usually surrounded by dilated capillaries & hyperpigmentation
- ▶ C4b



# Corona phlebectatica

- ▶ Left out of CEAP
- ▶ Malleolar flare
- ▶ Fan-shaped intradermal veins
- ▶ At medial or lateral ankle or foot
- ▶ Sign of advanced CVD



Vasquez & Munschauer, Presentation of Chronic Venous Disease, in EML et al. (eds), *Phlebology, Vein Surgery & Ultrasonography*, 2014

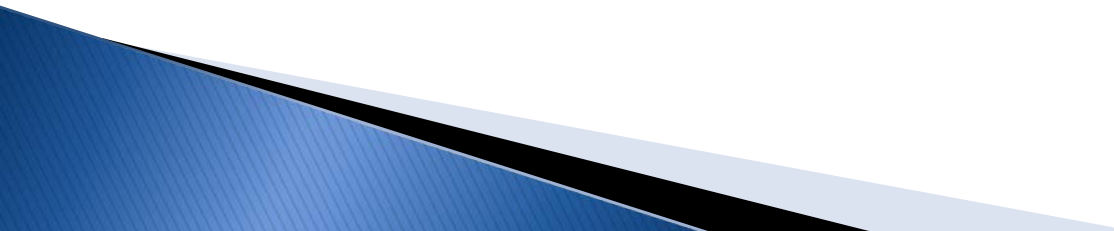
# Ultrasound findings

**Table II**  
*Distribution of Reflux in All 7 CVD Classes*

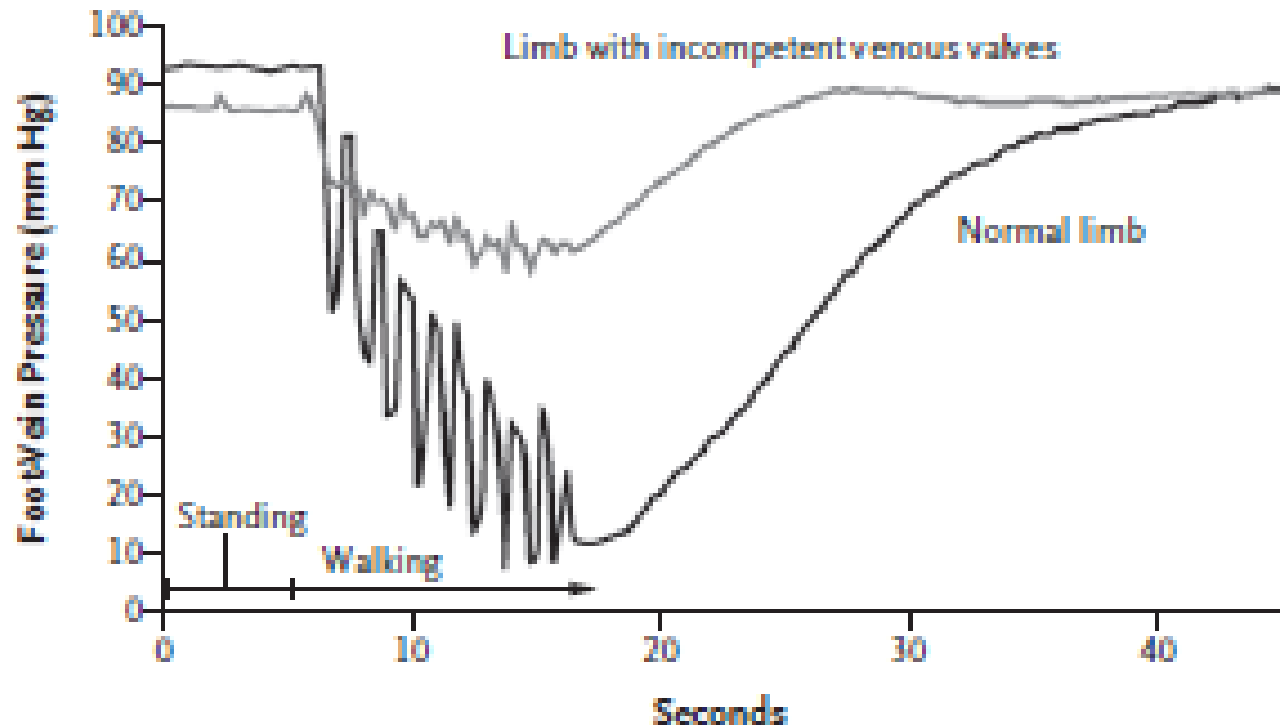
Sites of Reflux	CVD Class (n/%)							Total
	0	1	2	3	4	5	6	
S	9/82	9/69	89/82	22/59	11/21	5/23	5/16	150/54
P	0	1/8	0	0	0	0	0	1/0.4
D	2/18	1/8	0	2/5	2/4	1/4	2/6	10/3.6
S+P	0	2/15	11/10	4/11	13/24	5/23	7/22	42/15
S+D	0	0	6/5	5/14	9/17	4/18	6/19	30/11
P+D	0	0	0	1/3	1/2	0	0	2/0.7
S+P+D	0	0	3/3	3/8	17/32	7/32	12/37	42/15
Total	11	13	109	37	53	22	32	277

S: superficial, P: perforator, D: deep.

# CVI vs. CVD

- ▶ Greater likelihood of axial vs. segmental saphenous vein involvement
  - ▶ Greater likelihood of deep and perforator vein involvement
  - ▶ Greater likelihood of combined obstruction & reflux = worse prognosis
- 

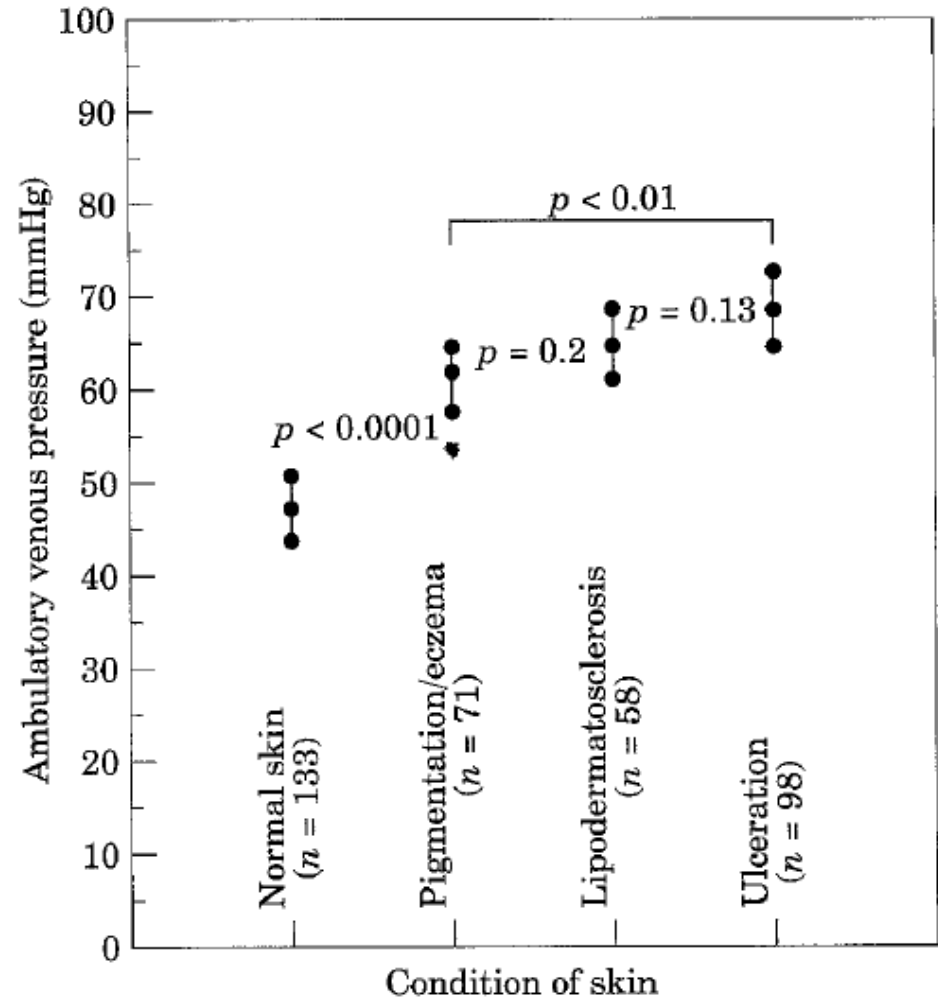
# Ambulatory venous hypertension



Coleridge Smith, Vasc Med 1997

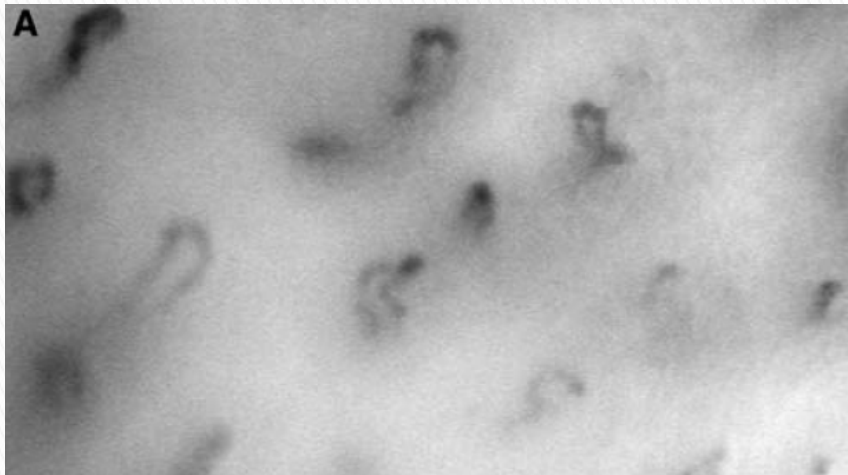
# Pressure -> skin changes

Payne et al, EJVES 1996

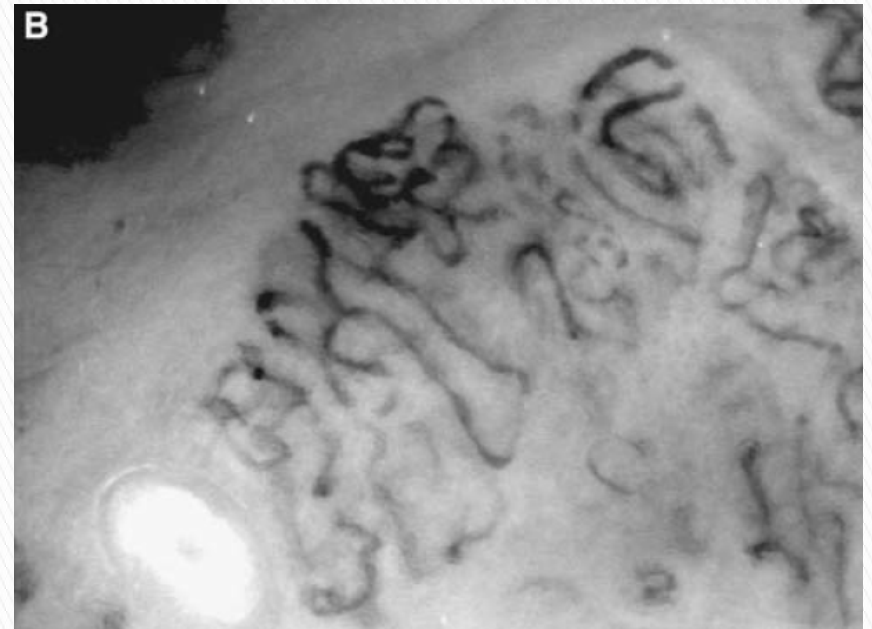




# Microvascular changes



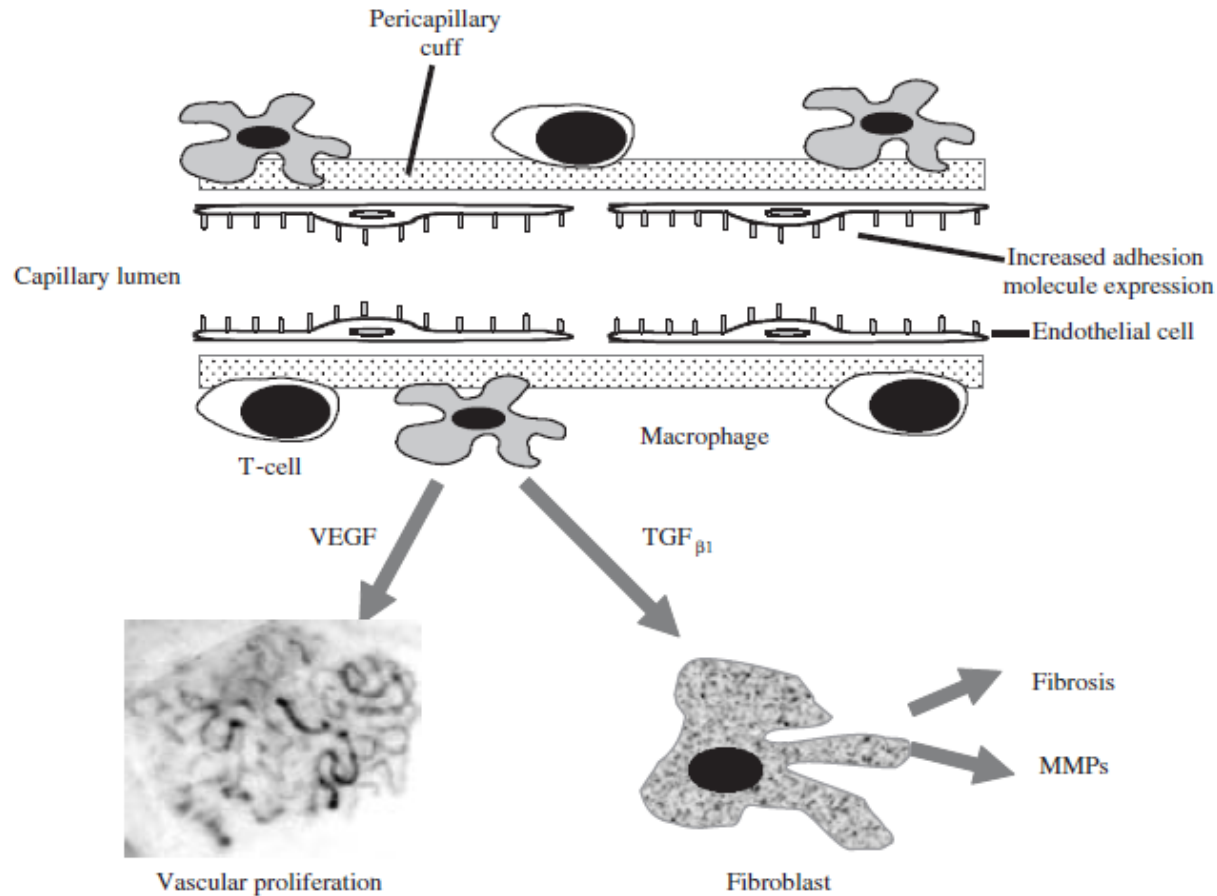
Normal skin



Lipodermatosclerosis

Coleridge Smith, Lower Extremity Wounds, 2006 - capillary microscope

# Cellular changes



# Initial management

- ▶ Compression improves ulcer healing rates
- ▶ Compression reduces risk of ulcer recurrence
- ▶ Wound care

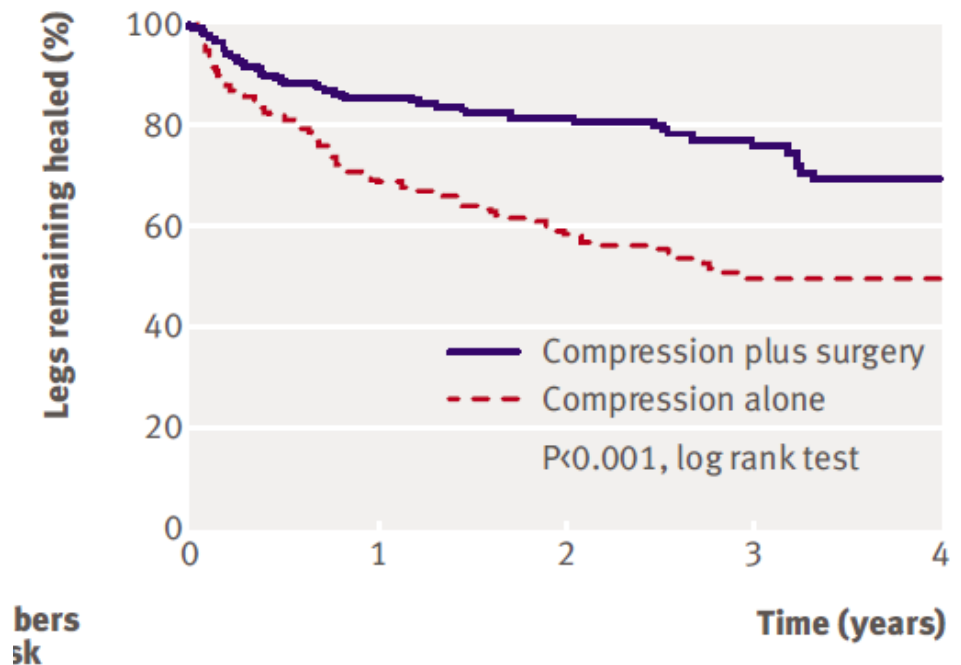
Cochrane review, 2009



# Saphenous vein ablation

- ▶ Treatment of saphenous vein reflux reduces ulcer recurrence rate by 25% absolute (50 → 25%) at 4 years
- ▶ May improve ulcer healing

Gohel, ESCHAR trial, BMJ 2007



# Incompetent perforator veins

- ▶ Associated with clinically worse disease
- ▶ Association or cause?
- ▶ Unclear patient benefit from treatment (concomitant saphenous treatment)
- ▶ Isolated perforator reflux is rare (1)
- ▶ Many IPV correct after saphenous treatment (2)

1 O'Donnell, JVS 2008

2 Stuart, JVS 1998

# THE ANKLE BLOW-OUT SYNDROME

## A NEW APPROACH TO THE VARICOSE ULCER PROBLEM

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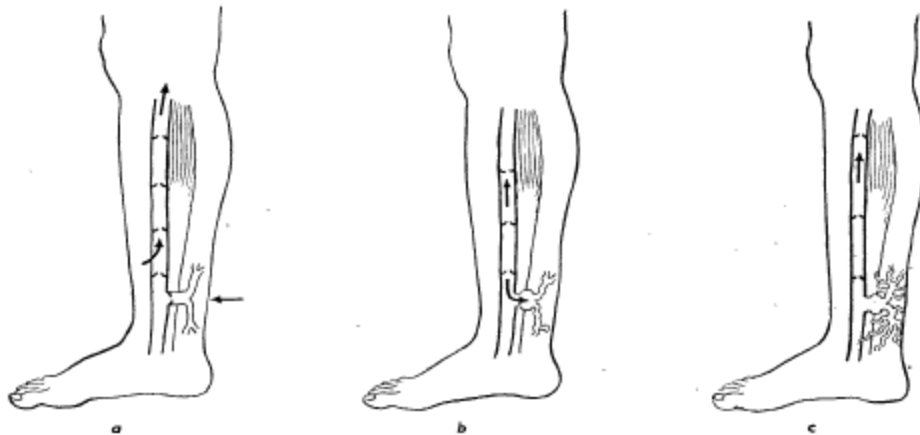
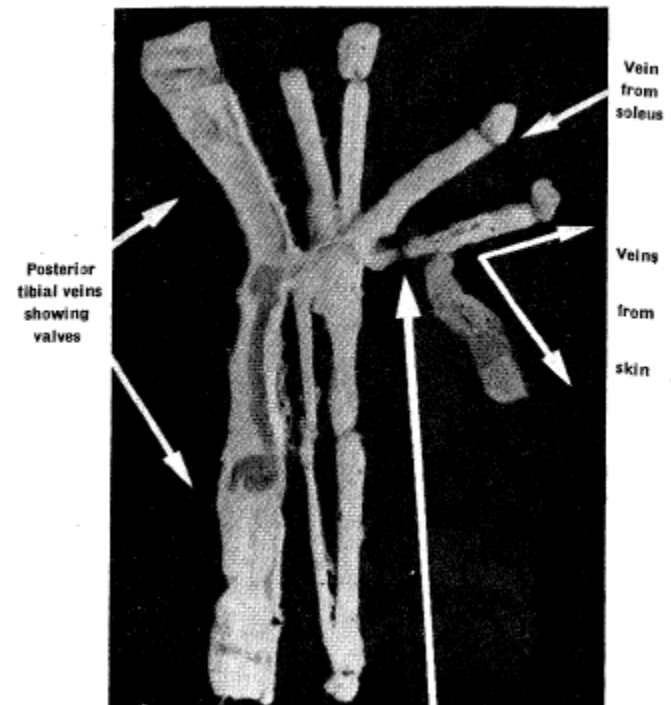
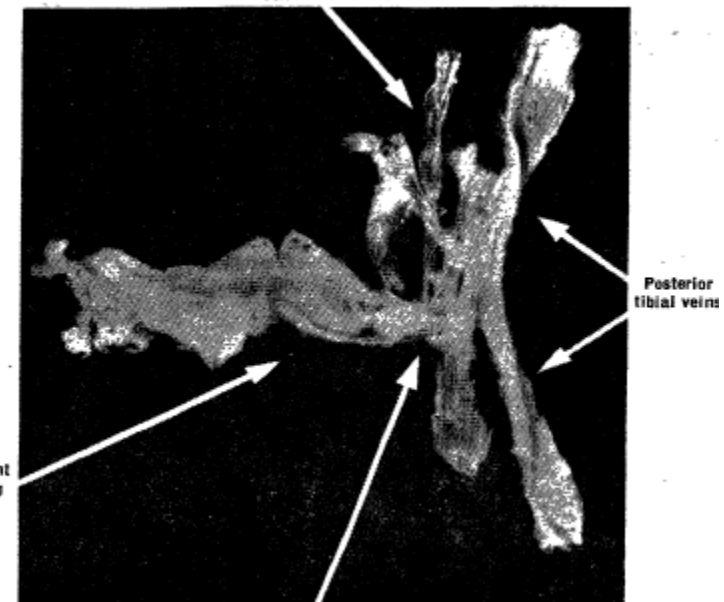


Fig. 6—Effect of incompetence of perforating vein below powerful calf pump: a, normal arrangement of valves (arrows indicate direction of blood-flow); b, effect of incompetence of valve where perforating vein penetrates deep fascia (arrows indicate direction of blood-flow on contraction of calf); c, final result—dilatation of stump of perforating vein, and dilatation and tortuosity of all veins in subcutaneous tissues draining into it.

Cockett, Lancet 1953



Site of perforation of deep fascia  
Vein from soleus



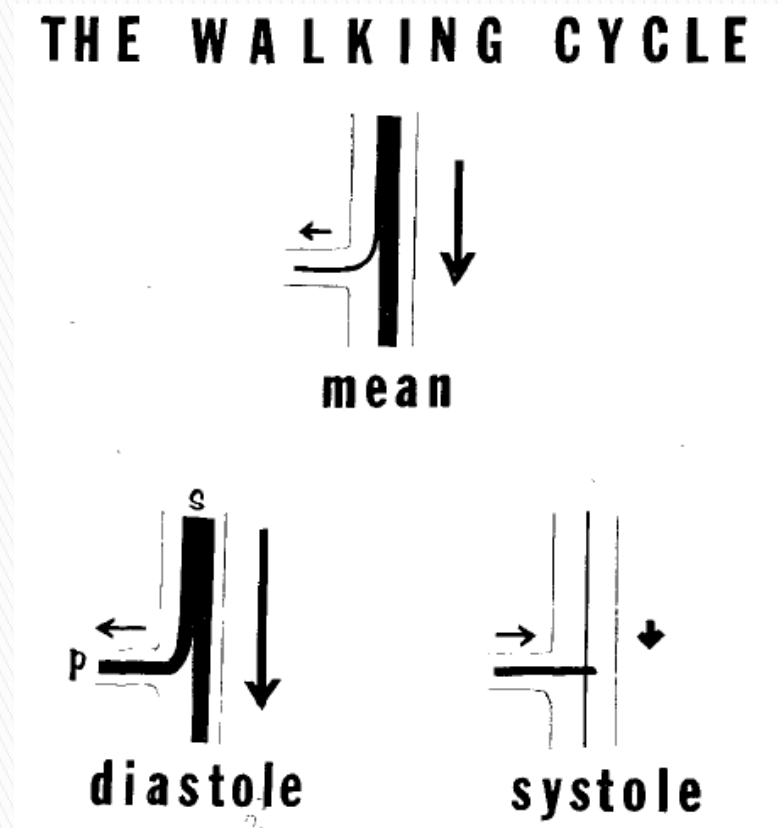
Dilated incompetent perforating vein

Site of perforation of deep fascia

# Reentry IPV

- ▶ Calf IPV
- ▶ Primary varicosities
- ▶ Reflux in GSV
- ▶ IPV correction common

Bjordal, Angiology 1972



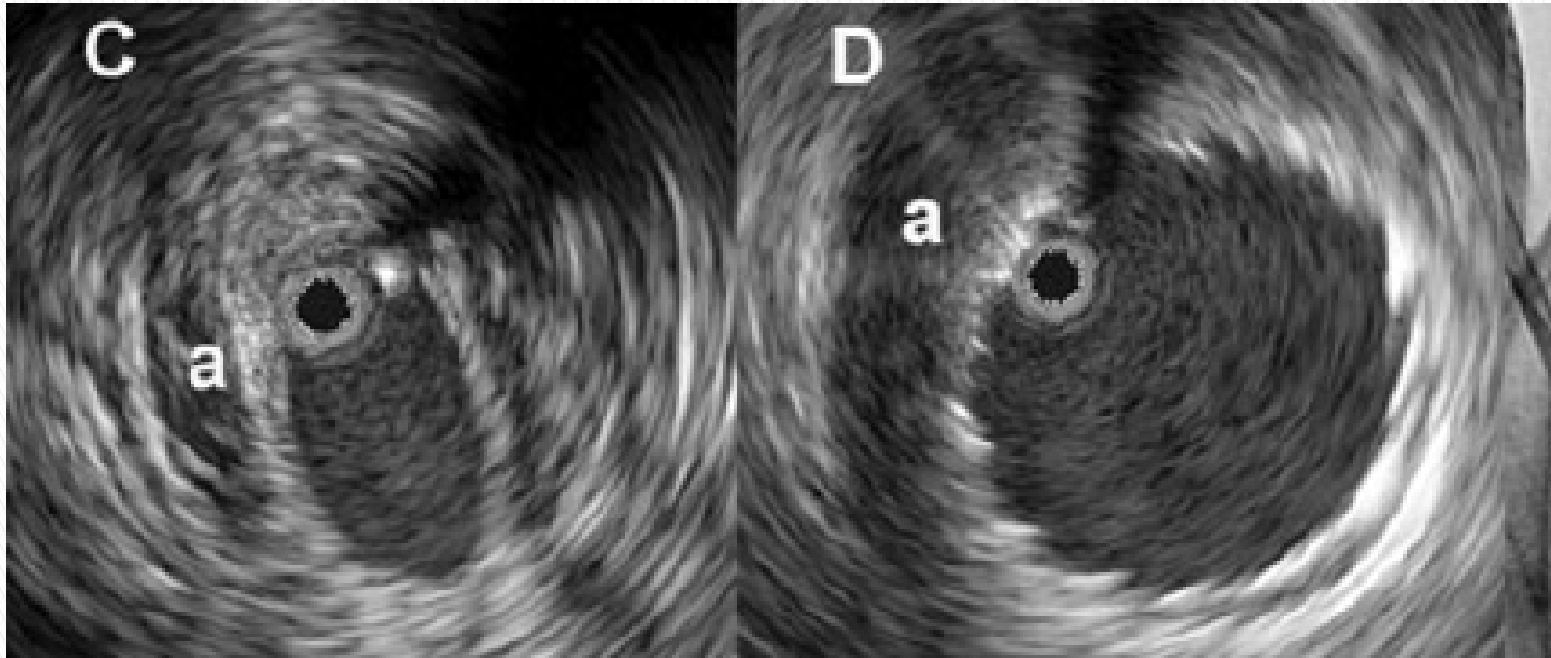
# AVF IPV recommendations

- ▶ Deep to superficial flow  $> 500$  ms
- ▶ Diameter  $> 3.5$  mm
- ▶ Located beneath an open or healed ulcer

Gloviczki, AVF consensus guidelines, JVS 2011



# Consider ilio caval obstruction

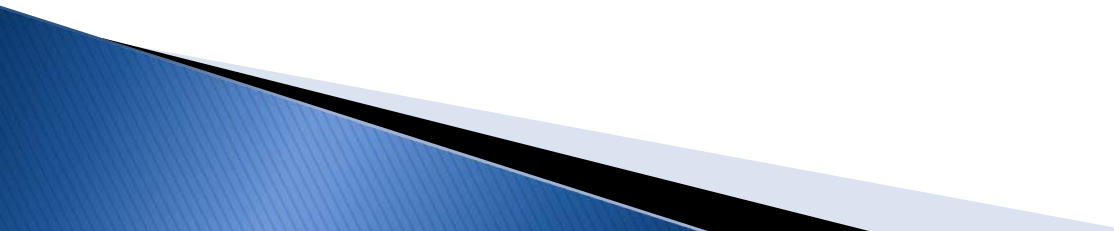


Neglen, JVS 2007

Courtesy M Cox



# Treatment strategy

- ▶ Compression
  - ▶ Wound care
  - ▶ Eliminate superficial reflux
  - ▶ Eliminate selected perforator reflux (controversial)
  - ▶ Eliminate ilio caval obstruction
  - ▶ Eliminate other areas of reflux (e.g. pelvic)
  - ▶ Consider deep vein valve reconstruction
- 

# VCSS

- ▶ Venous clinical severity score
- ▶ Allows longitudinal tracking
- ▶ Designed to supplement CEAP
- ▶ Additional weight to advanced CVD

# VCSS calculation

- ▶ 0–3 score for 10 criteria = score 0 – 30
- ▶ Pain
- ▶ Varicose veins
- ▶ Venous edema
- ▶ Skin pigmentation
- ▶ Inflammation
- ▶ Induration
- ▶ Active ulcers – number, duration, size (3 criteria)
- ▶ Use of compression therapy



C6-V18 to C5-V11  
Vasquez, JVS 2010

Fig 8. A, Prior to treatment, clinical C6-V18. Pain = 3, VV = 3, Edema = 2, Pigmentation = 3, Inflammation = 1, Induration = 2, Active ulcers = 1, size = 1, duration = 1, Compression = 1. Total VCSS = 18. B, One month after treatment, clinical C5-V11. Pain = 1, VV = 2, Edema = 1, Pigmentation = 3, Inflammation = 0, Induration = 2, Active ulcers = 0, size = 0, duration = 0, Compression = 2. Total VCSS = 11.

# Conclusions

- ▶ CVI = CEAP classes C3 - C6
- ▶ Pathophysiology is ambulatory venous hypertension
- ▶ Compression heals ulcers and reduces ulcer recurrences
- ▶ Ablation of saphenous reflux reduces ulcer recurrences and may help heal ulcers
- ▶ Incompetent perforator vein treatment is controversial
- ▶ Consider proximal venous obstruction & reflux

