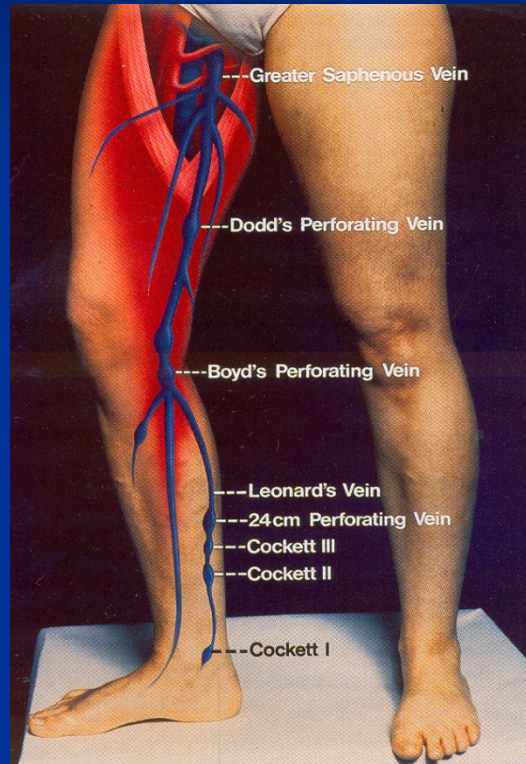


# Endovenous Laser Ablation of Varicose Veins



Dr Peter Chapman-Smith, FACP, FFMACCS  
Angela Browne, DMU sonographer

GP Conference & Medical Exhibition, Rotorua, 2008

# Disclaimer

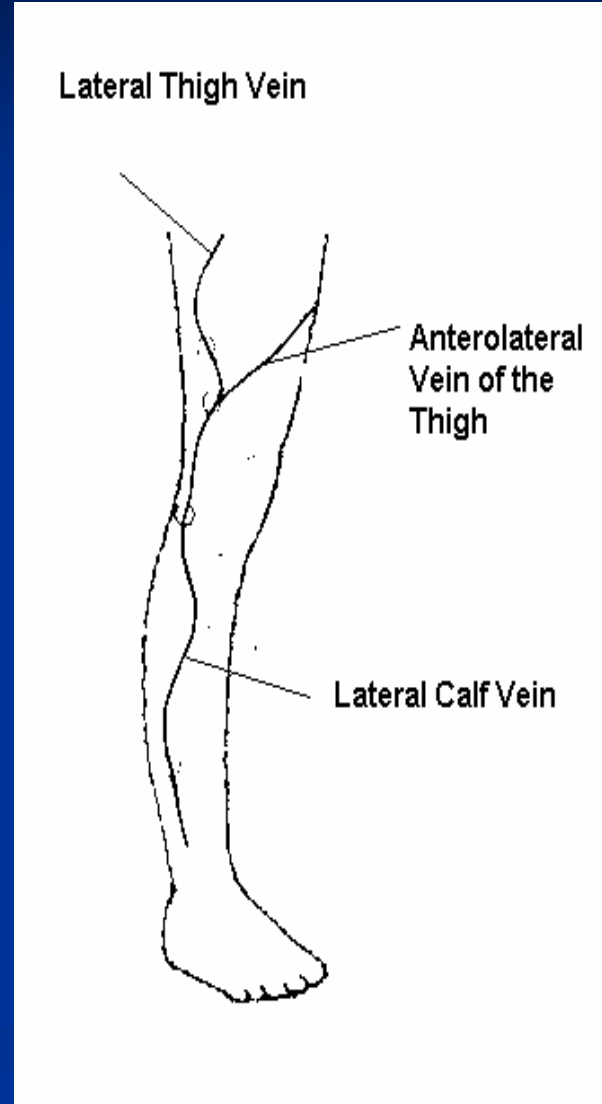
This presentation and all research quoted is self funded.

You would recognise these.

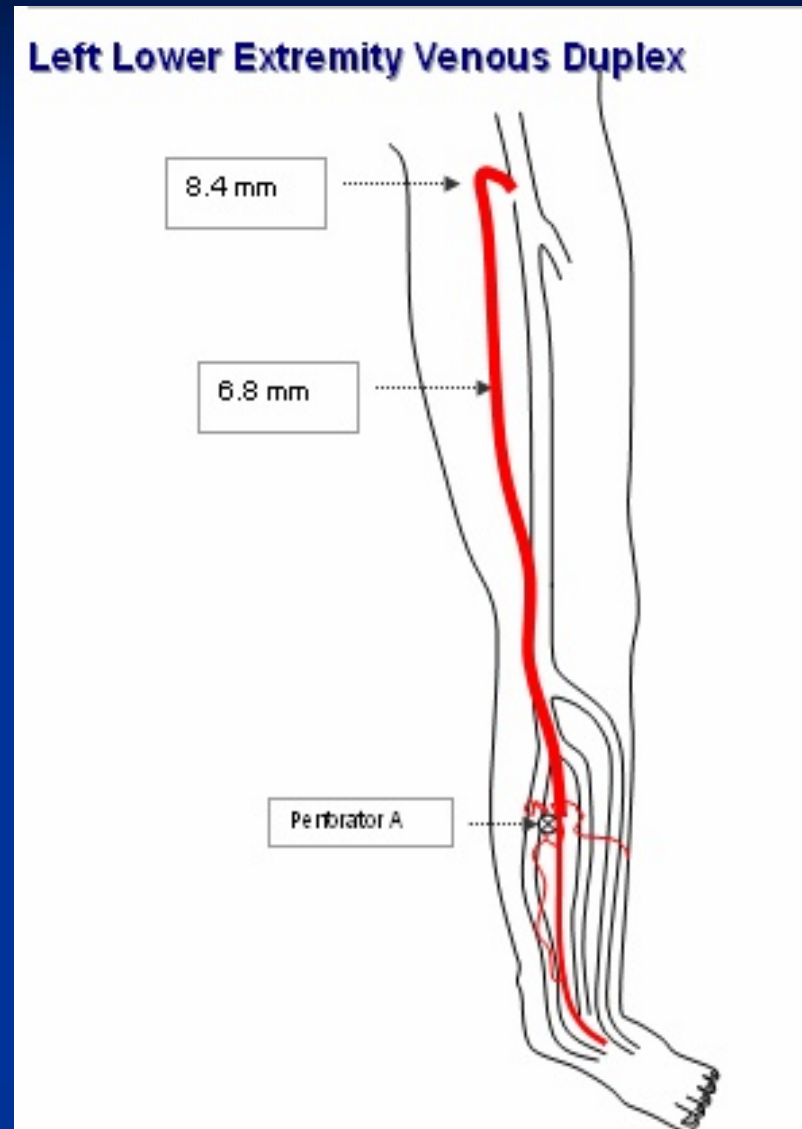


**After EVLA**

# Varicose veins may not be obvious



# You might miss these VVs



# Skin Lesion Presentation



Biopsy scar



Varicose eczema

# Varicose Veins

- Common (40+ % of population)
- Many venous symptoms
- Underdiagnosed
- Poor cosmesis
- Long term - ulcers, haemorrhage, eczema
- Public Rx funding poor

# Venous symptoms

- Aching
- Swelling
- Restless Legs Syndrome
- Cramps
- Burning sensation
- Itching, eczema
- Heaviness
- Tired legs
- Haemorrhage
- Ulceration

Worse with:

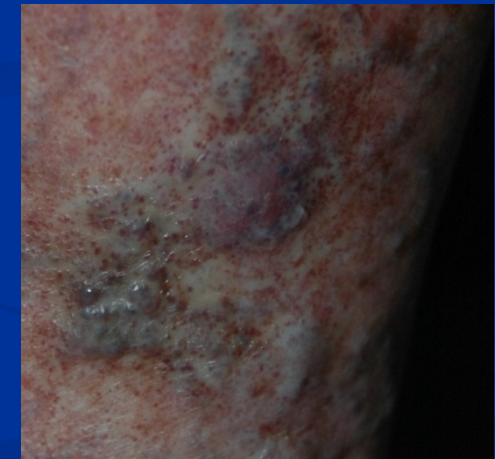
- standing
- menses
- hot weather



**Vein symptoms  
do not correlate  
with vein size.**

# Clinical Signs of VVs

- Visible veins ( not necessarily)
- Oedema
- Eczema
- Haemosiderin brown staining
- Ulcers, or scars from healed ulcers
- CVI – telangiectasiae, cyanotic feet
- Lipodermatosclerosis
- Atrophie blanche
- Vulval aching / varices in pregnancy
- Pelvic congestion syndrome

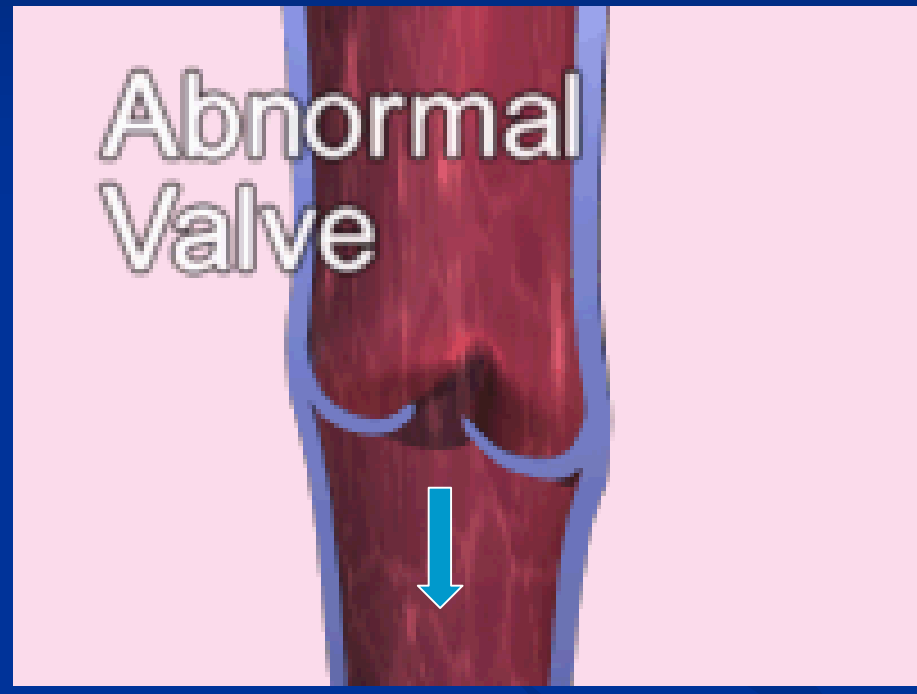
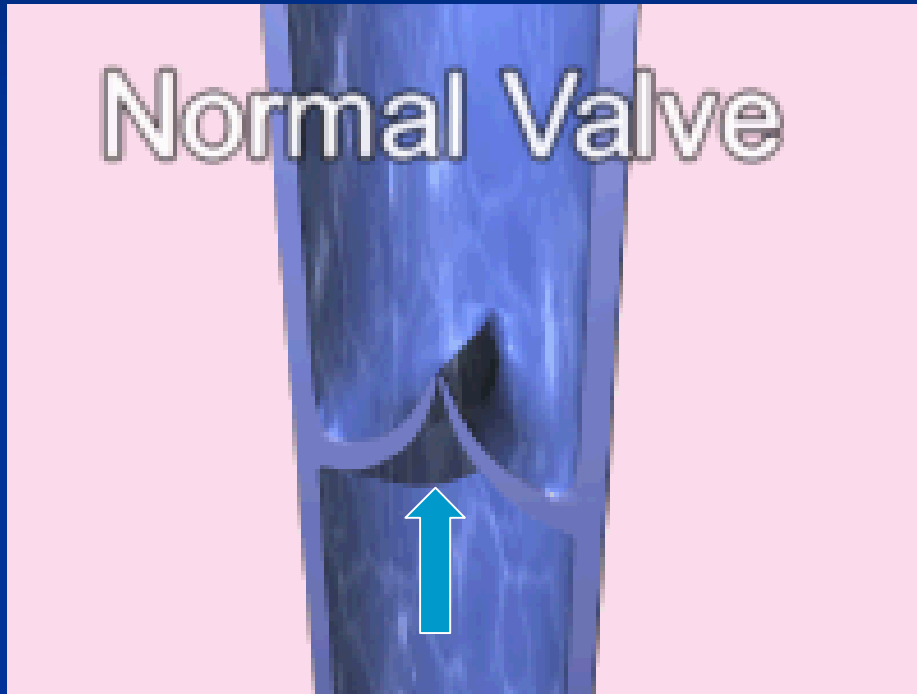


Lipodermatosclerosis

High pressure/volume/flow deep system



Low pressure/volume/flow superficial system



Venous flow **downwards**,  
distending vein walls,  
venous hypertension,  
..... CVI

# CEAP Classification

- Class 1: telangiectases and reticular veins
- Class 2: varicose veins
- Class 3: oedema
- Class 4: skin changes without ulceration, eg. eczema, pigmentation
- Class 5: healed ulcers
- Class 6: active ulcers

**GSV**: Great (long) Saphenous Vein

**SSV**: Small (short) Saphenous Vein

Caggiati et al, J Vasc Surg 2002;36:416-422

# Varicose Veins - Costs

- Public health cost : 2% healthcare resources  
Ulcers dressings @ \$185 for years  
Treat the cause of DVI.
- Personal cost :  
Sx: Poor self image, and discomfort:  
Telangiectasiae, eczema, ulcers, bleeding.  
? wear shorts, togs, sandals.  
? housebound.

# Historical Landmarks – Vein Rx

1845	1st hypodermic syringe- Rynd
1921	Hypertonic saline
1929	Tournay technique
1946	STD, STS, Fibrovein
1961	Polidocanol, Aethoxysclerol
1980's	Echo guided sclerotherapy
1989	Published UGS
1993	Laser fibre guided coagulation
1993	JR Cabrera industrial "microfoam" CO2
1990s	RF ablation, VNUS
2001	Frullini- Cavezzi : duplex foam UGS

# Treatment for VV's

None - Ignore them

Compression – graduated class 2 hose

Surgery - ambulatory phlebectomy, stripping, flush ligation, stab avulsion, endoscopy, morcellation.

Sclerotherapy –blind injection

RF – VNUS

ELLE - Long catheter UGS

External Lasers - poor

UGS - foam ultrasound guided sclerotherapy

EVLA - endovenous laser ablation

Consider ... Efficacy , cost, recurrence rates, adverse outcomes

# Assess fully

Medical & venous hx

FH or PH thrombophilia

Examine

CW Doppler

**Duplex US map mandatory**

? Thrombophilic screen





HDI  
3500

VASCULAR U/S NORTH

L12-5 38 PVasc/VEIN

12:20:12

TIs 0.5 MI 0.4

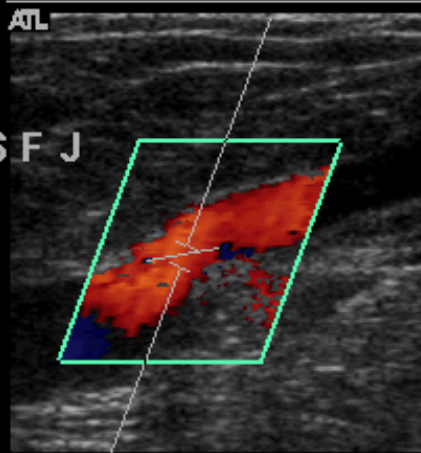
Fr #155 4.1 cm

Col 60% Map 5

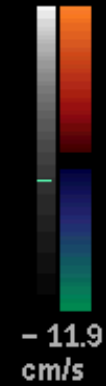
WF Low

PRF 1865 Hz L T S F J

Flow Opt: Med V



+ 11.9



- 11.9  
cm/s

SV Angle 60°

Dep 2.4 cm

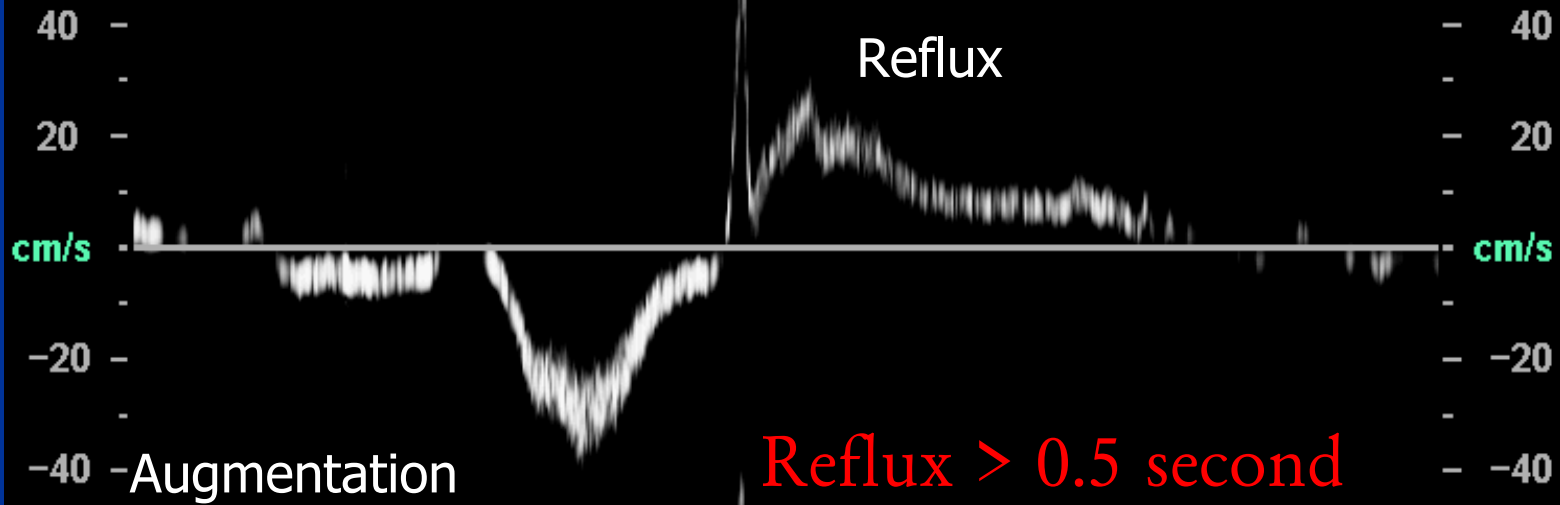
Size 2.0 mm

Freq 6.0 MHz

WF Low

Dop 41% Map 2

PRF 3731 Hz





# VASCULAR ULTRASOUND NORTH

Patient: Hemphill, Ian ID94440.D

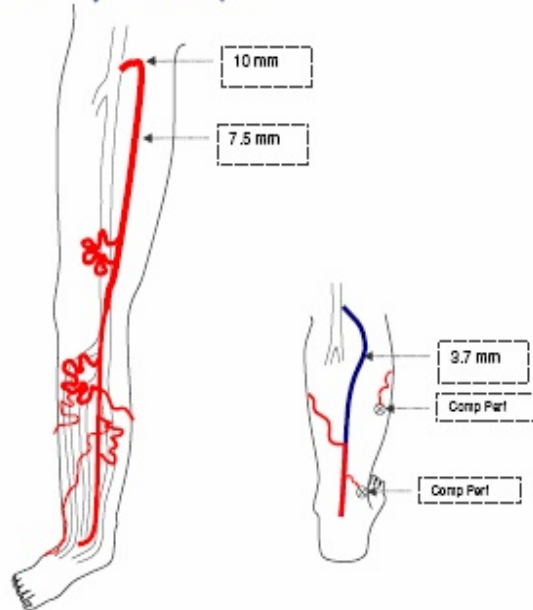
Date of Scan: Thursday, 11 May 2006

Referring Doctor: Dr P Chapman-Smith

Copy to: Dr D E

Indications: Varico

## Right Lower Extremity Venous Duplex



Legend:  Normal Deep  Normal Superficial  Reflux  Chronic Thrombus

### Comments:

Deep Veins: Patent and competent

Superficial Veins: SFJ and LSV incompetence. The LSV lies within the fascial envelope the entire length of thigh. Large knee and calf visible bunches of varicose veins. Posterior arch vein renders distal SSV incompetent.

Perforators: No incompetent perforators detected

Scanned by: Angela Browne, DMU(Gen), DMU(Vasc)

Verified by: Dr Kim Shepherd MBBCh(Wits), FFRad(D)SA, FRANZCR

VASCULAR ULTRASOUND NORTH, #67 Maunu Rd, Whangarei, New Zealand  
Telephone: 09 438 6767 Fax: 09 438 6767 Email: vasutra@clear.net.nz

# Duplex map pre EVLA

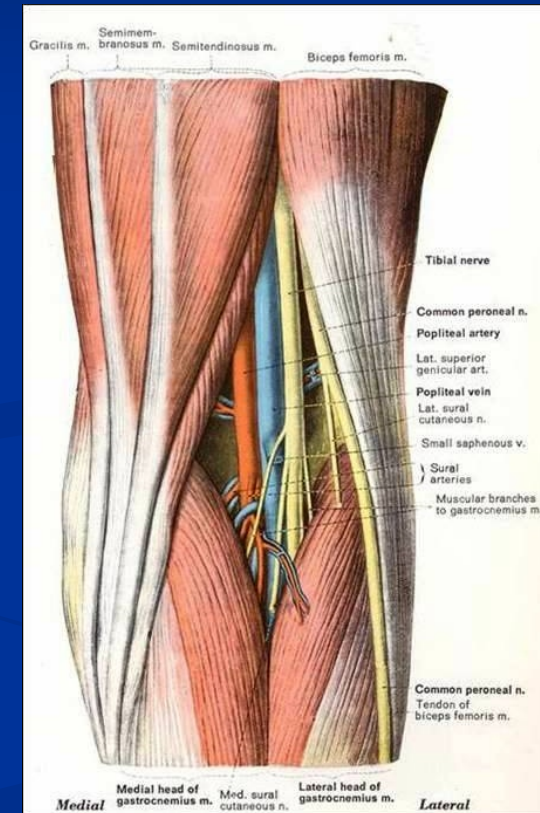
**Red: incompetent, reflux**

**Blue: competent flow**

# Non Surgical Options

## EVLA and UGS

- Popular
- Cheaper
- Quicker – procedure, time off work
- Safer- low VTE risks, no GAs,  
no nerve damage, no scars
- Ambulant stat
- 1st choice most Western countries
- Repeatable



SSV

# Sclectherapy - UGS

Foreign substance



vessel lumen



endothelial damage



thrombosis,



TOTAL FIBROSIS.

# Endothelial Effects

- Endothelial cells - swell, slough, spasm stat.
- Red thrombus forms - vessel wall reaction in 2 hrs, thrombus fills entire lumen within 15hrs.
- Spontaneous thrombolysis - endogenous /exogenous , and leucocyte migration, phagocytosis.
- Organising "thrombus" - Capillaries & fibroblasts develop, granulation, starts 24 hrs, lasts for 2-3 wks.
- Endofibrosis - with scarring, partial or complete (6 weeks).  
Some segments completely resorbed.

Foam Ultrasound Guided Sclerotherapy  
is well established, not a “new” treatment.

European Consensus Meeting 2003  
(25 international experts)





3yrs post

Before/after UGS



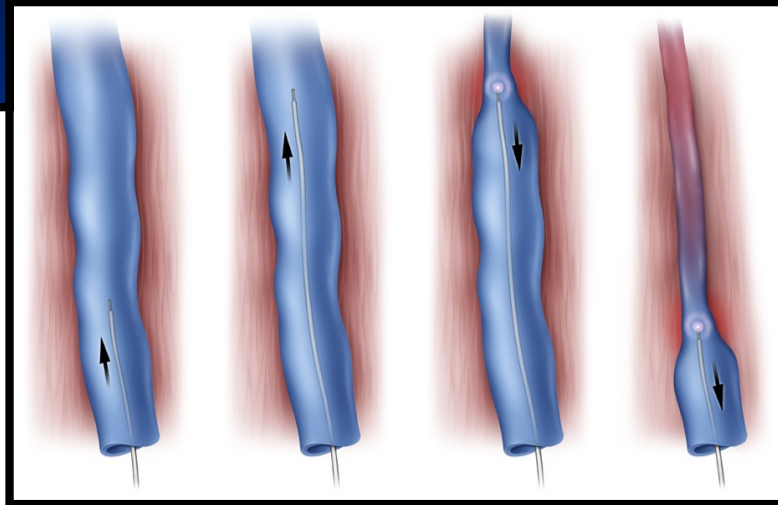
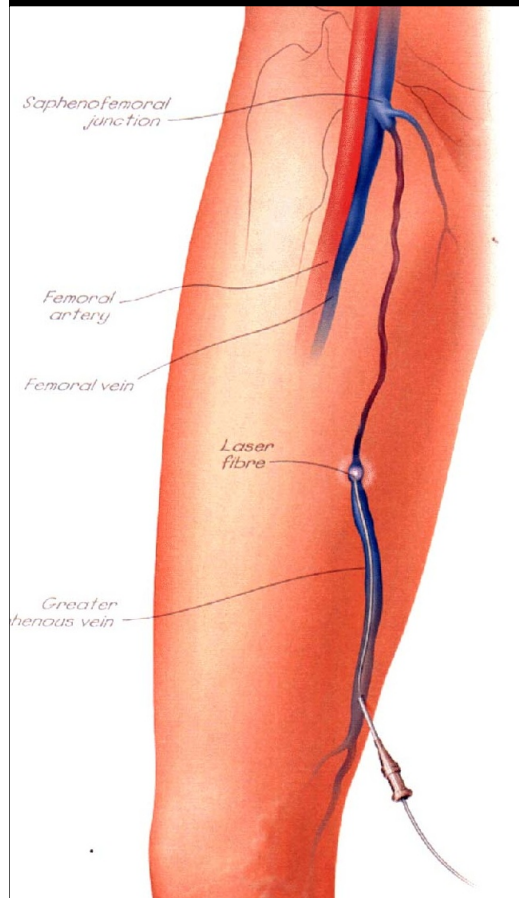
Note prior surgical scars



6 months post UGS



# Endovenous Laser Ablation (EVLA)



# Seldinger Technique with US guidance

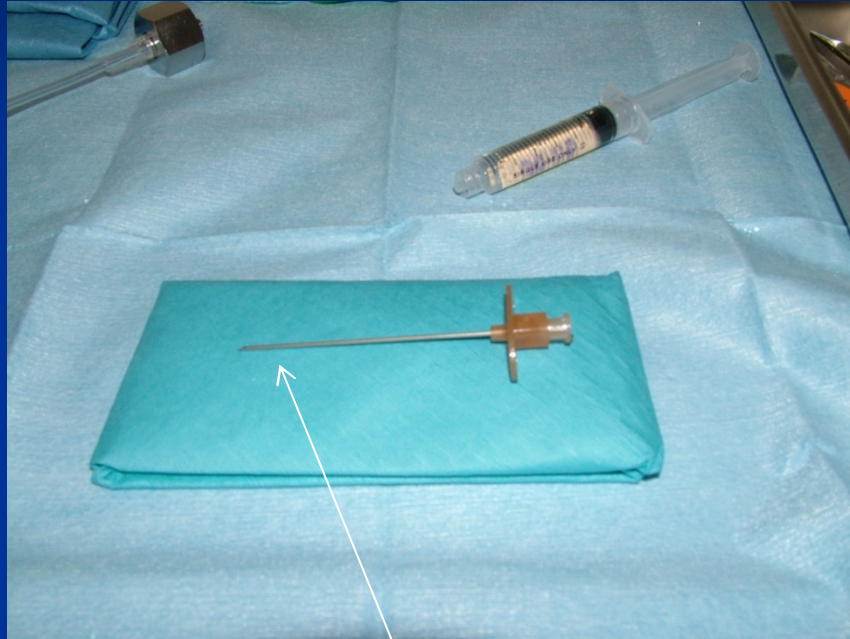
- Minimally invasive
- J guide-wire to below junction (SFJ, SPJ)
- Catheter over guide-wire
- Tumescant local anaesthesia
- Laser fibre tip placed 2 cm distal to junction
- Position : US, transillumination, saline flush.
- Relaxed warm patient ideal



Mark vein to be treated



Iodine skin prep



19g vascular access needle

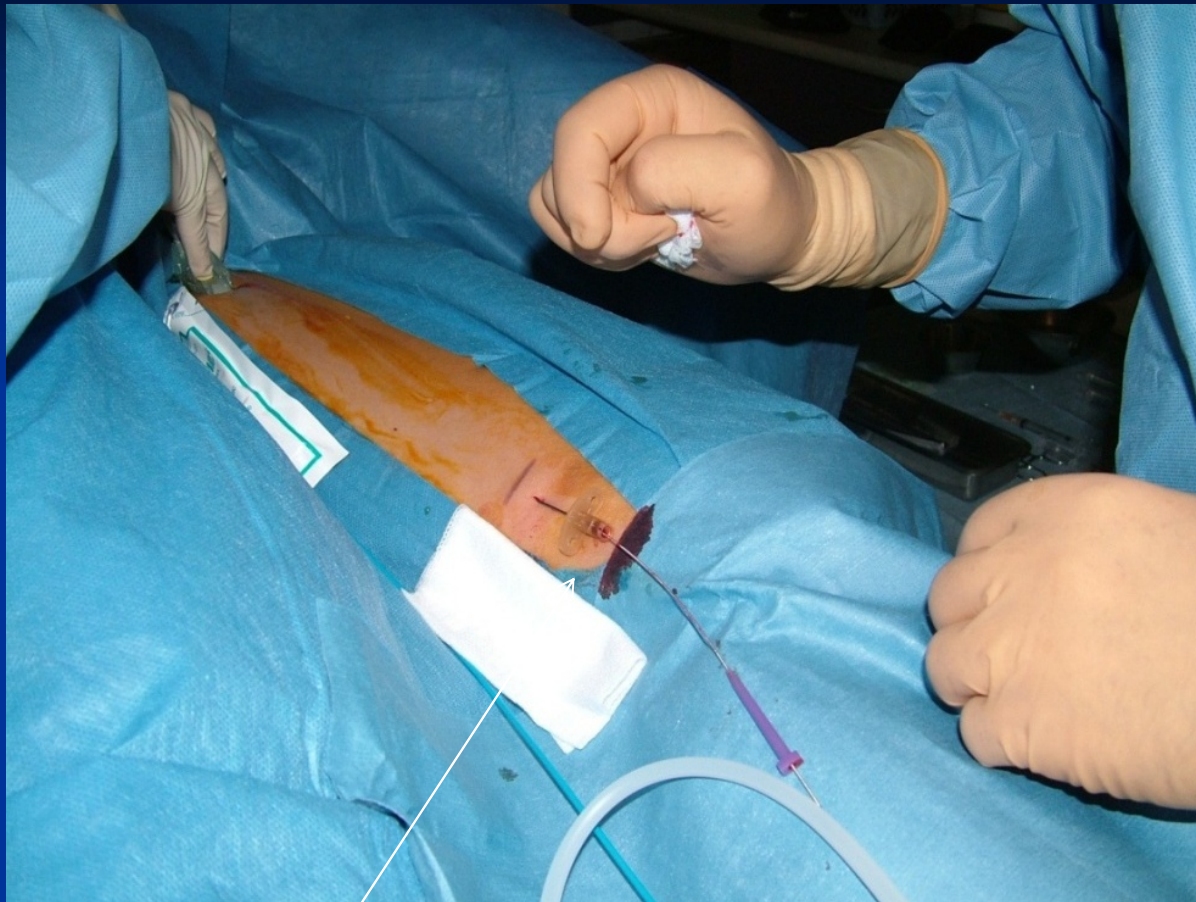


J wire

# Vein Access



Aspirate blood

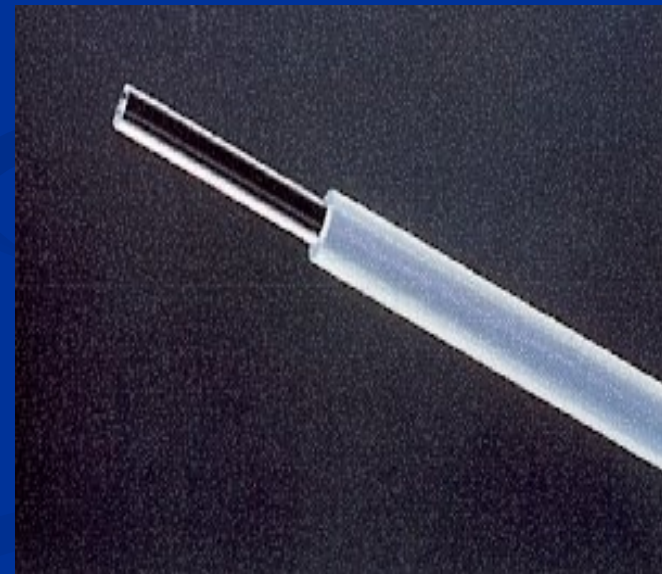
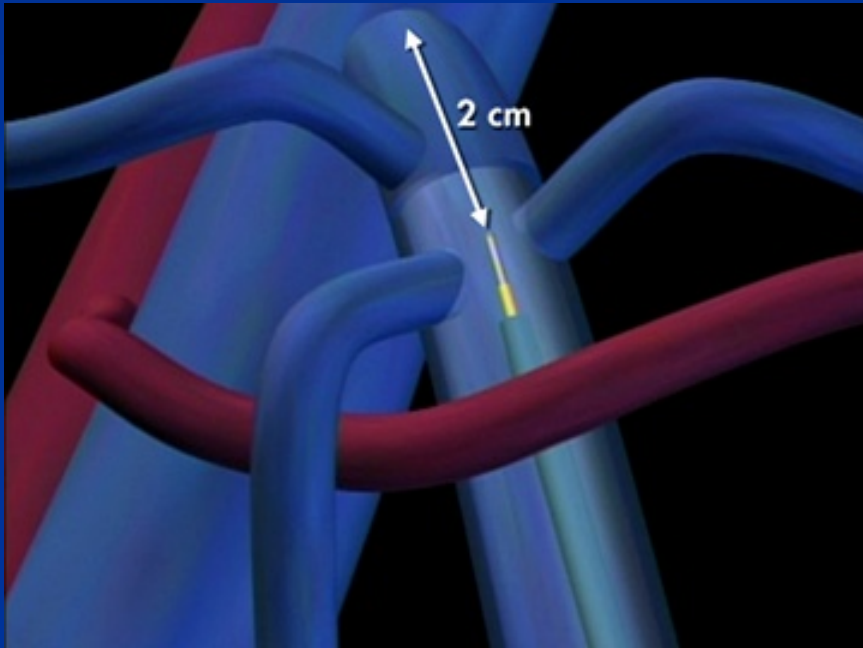


J wire inserted into access needle



Catheter sheath with stiffener

# J wire removed & laser fibre inserted



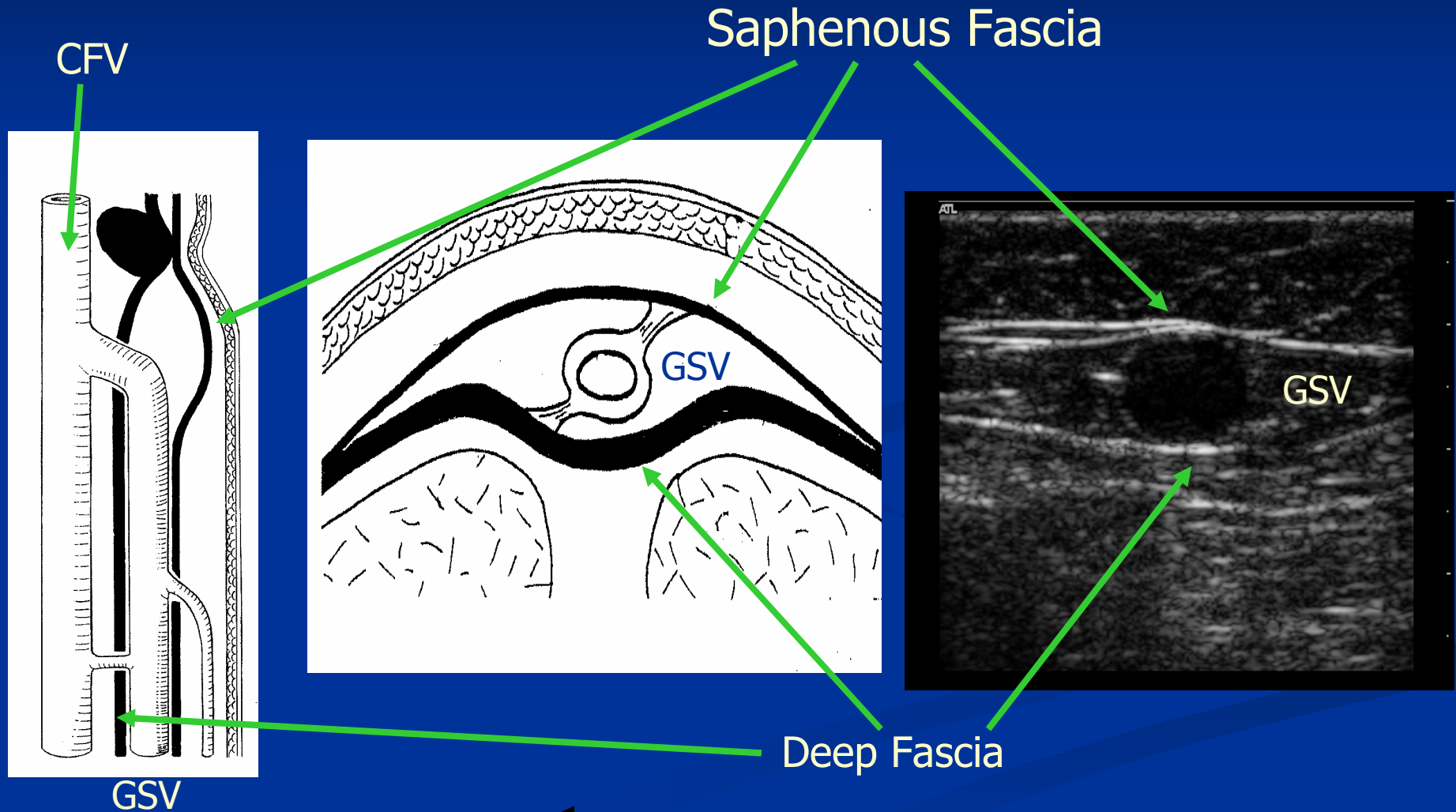


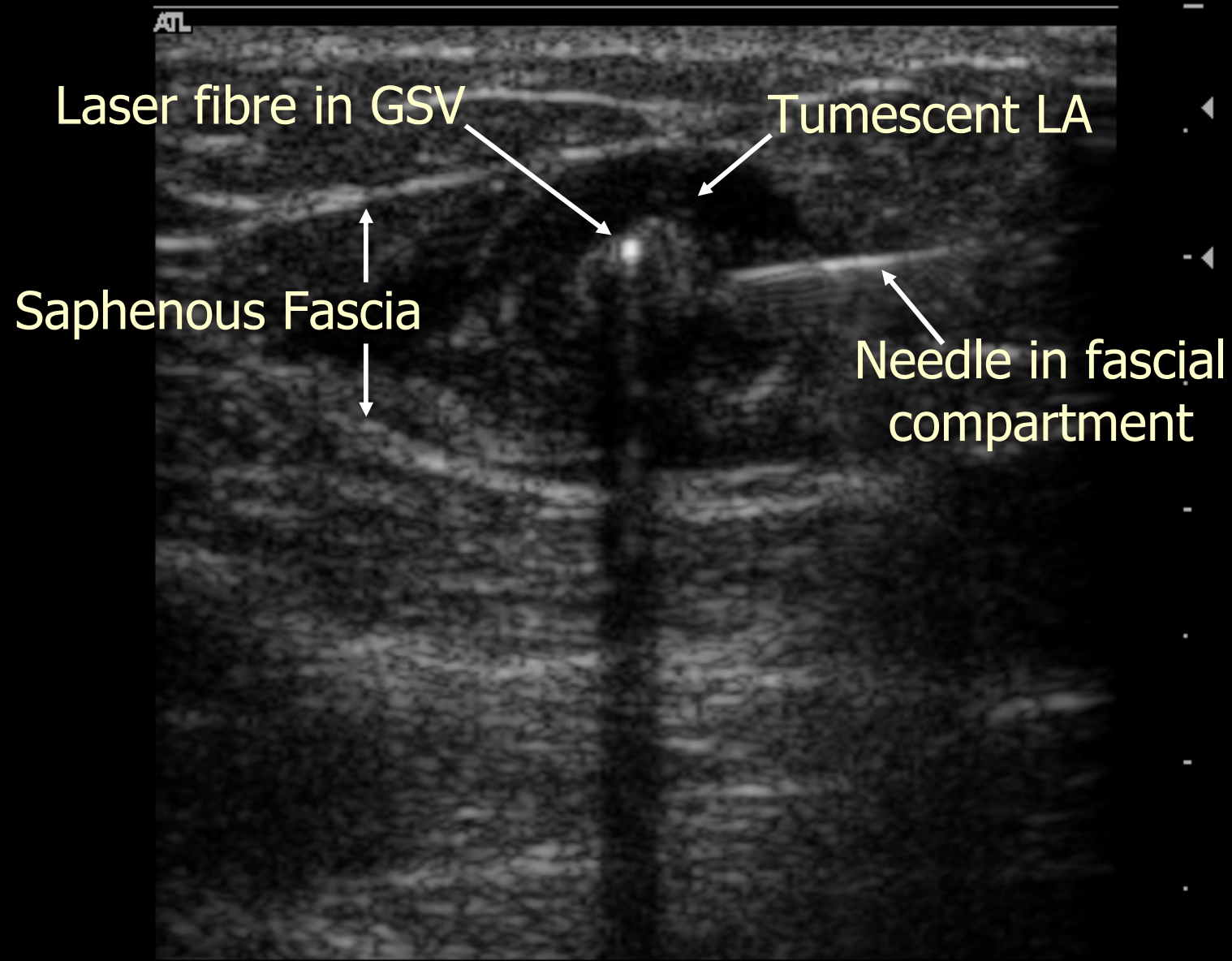
# Tumescent Anaesthesia

1. Local anaesthesia/analgesia
2. Displaces perivenous tissues
3. Heat sink for thermal energy
4. Vein compression to empty vessel

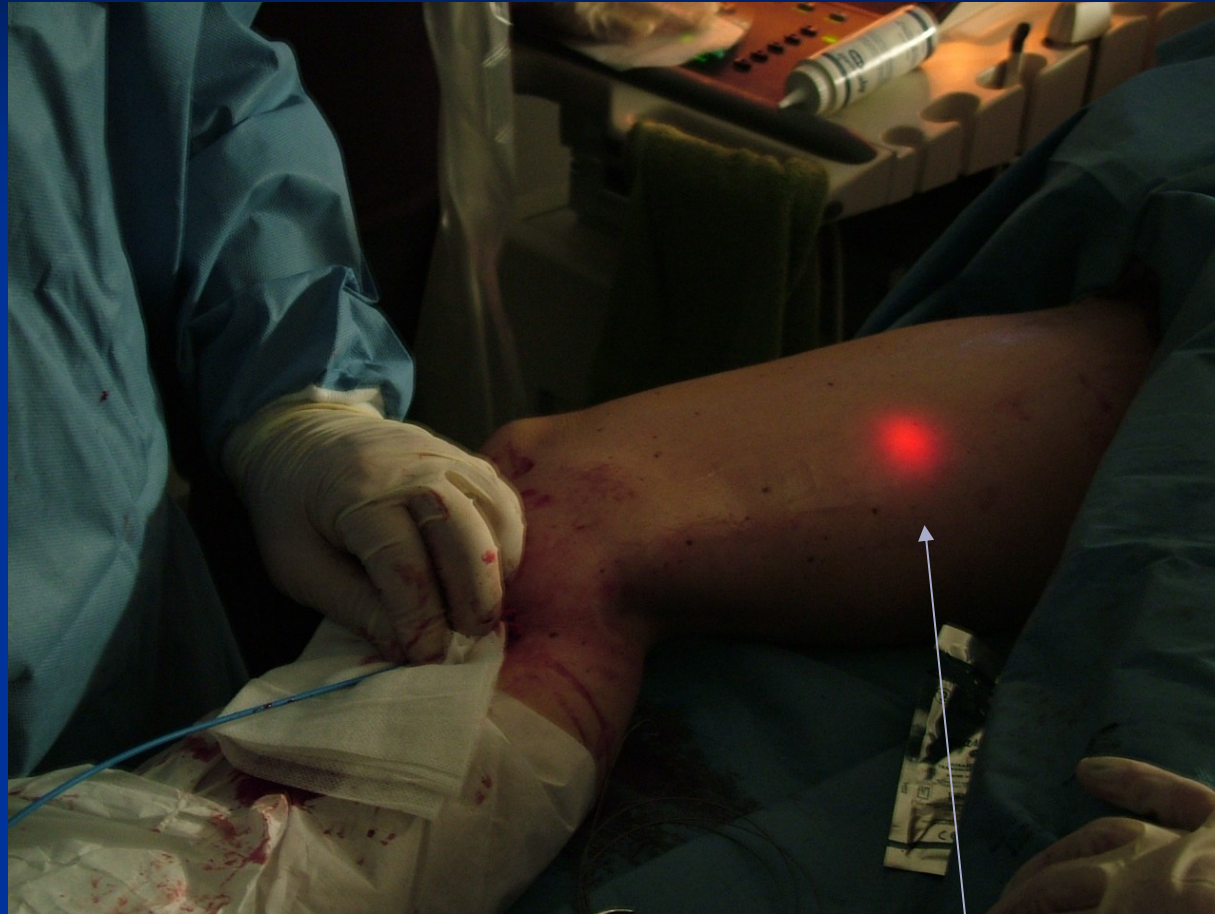


# Saphenous (Egyptian) Eye





# EVLA



Fibre withdrawal

HeNe aiming laser

# Procedure Data

- Klein formula TA

*Lignocaine 0.08% + 10mls of NaBicarb 8.4% + 1ml of Adrenaline 1:1000 per litre*

- Infiltrate volume 100-450ml
- Power 5-7 watts continuous
- Automated pullback 0.5 -1mm/second



# Combined with foam UGS

- Distal trunks and tributaries
- Repeat as required days later
- Air/sclerosant (Fibrovein 3%) ratio 3:1
- Cavezzi-Tessari foam technique
- Clexane SC if thrombophilic risk

# Post EVLA Rx

- Class 2 compression
- Ambulate stat , exercise daily
- Avoid straining, long haul flights
  
- Serial duplex US surveillance (objective)
- Annual patient assessment (subjective)



# Vaporisation Effect

- High temperatures
- Threshold reached (2.4kJ/cm<sup>2</sup>)
- Water to steam, expands
- Micro-explosions
- Vaporisation + coagulation
- Causes collagen shrinkage

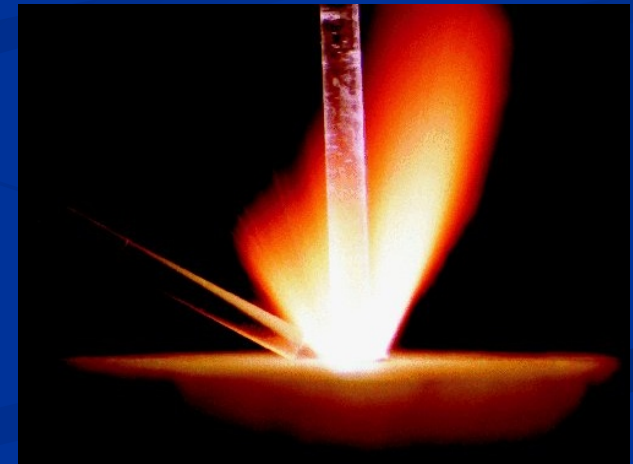
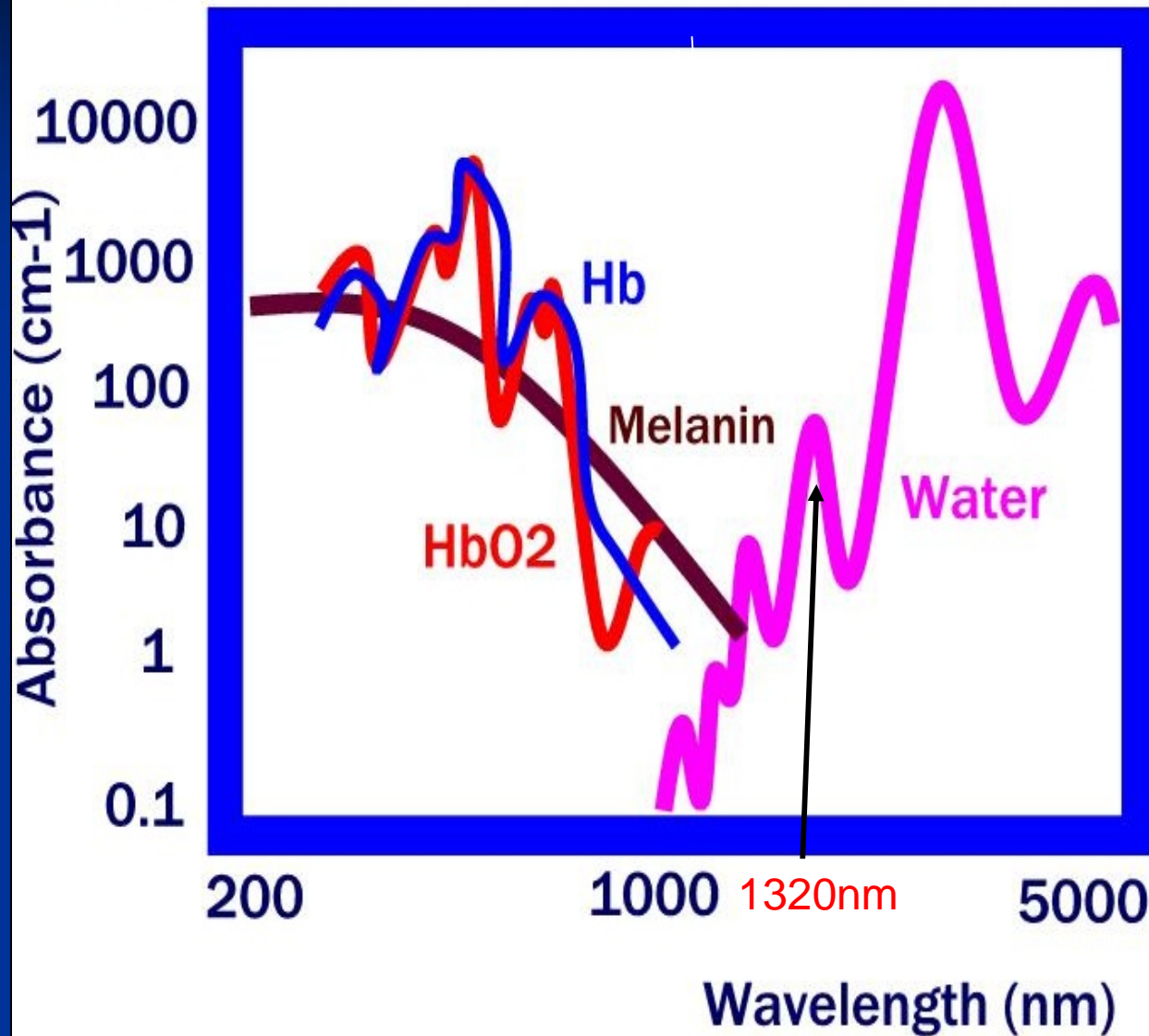




Figure 5 - Absorption of light by major skin pigments



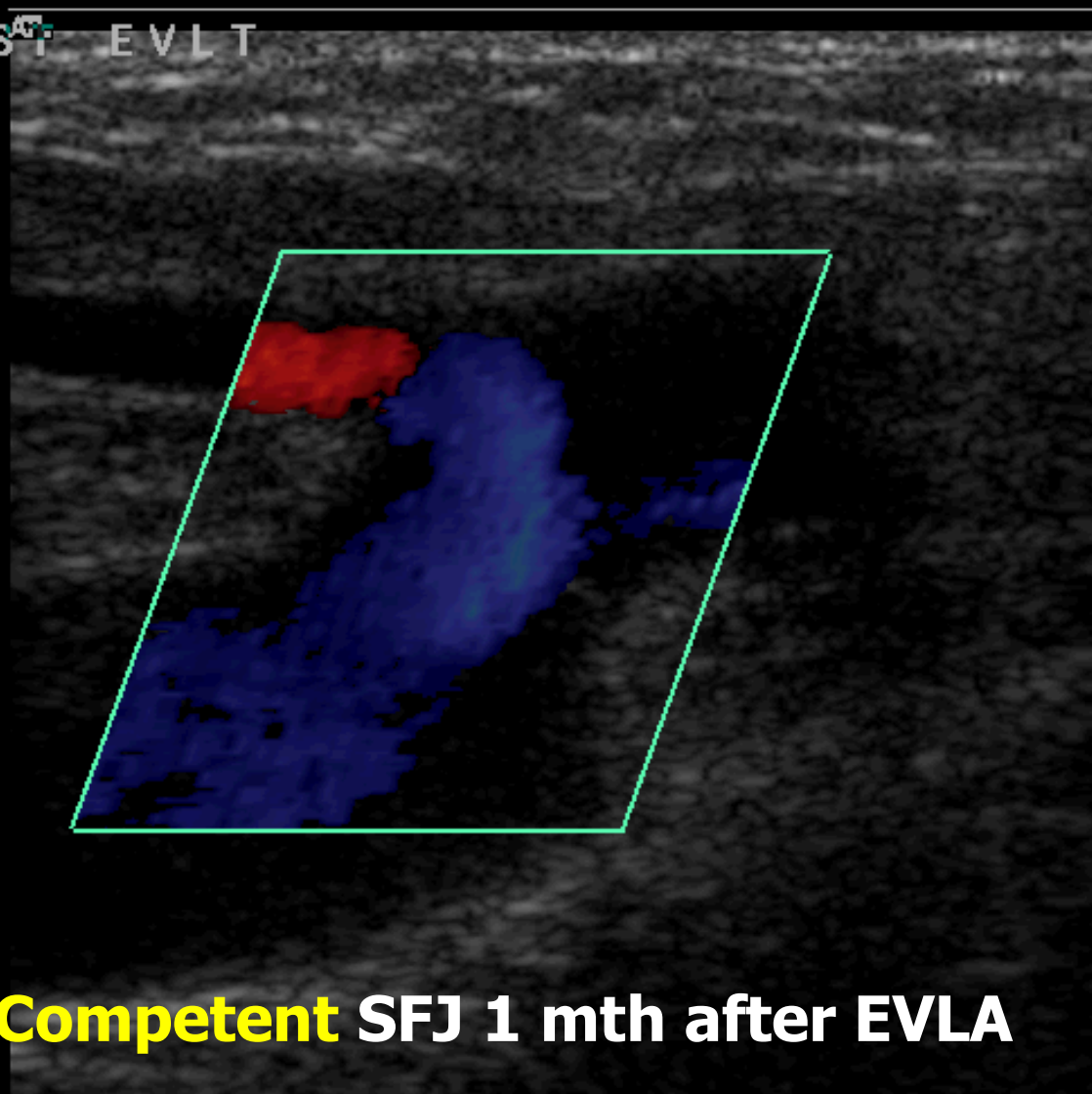
# Endovenous Laser Ablation

- Intra/extra fascial veins treated
- Excellent for SSV (surgery difficult)
- Minimum 2-3 mm diameter VV's
- Patient friendly
- Safe

1 / 12 POST EVLT

RT SFJ

COMP



**Competent SFJ 1 mth after EVLA**

# EVLA – 68yrs, Ca Prostate, CVI +++ , 1° VVs.



Pre Rx

3 months

12 months

2 yrs

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# Same High Risk Patient - EVLA

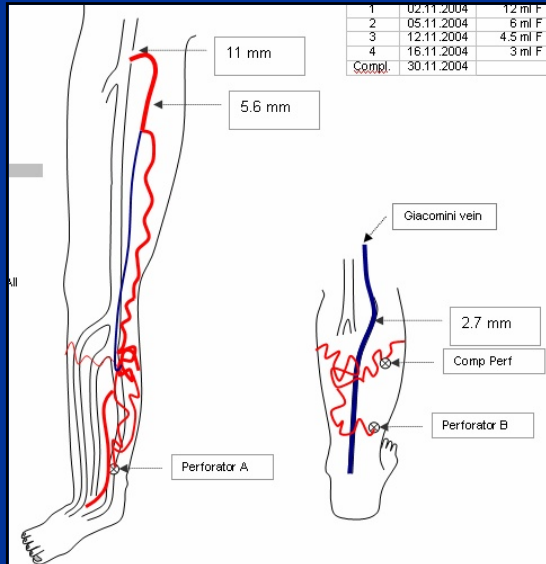
Pre Rx

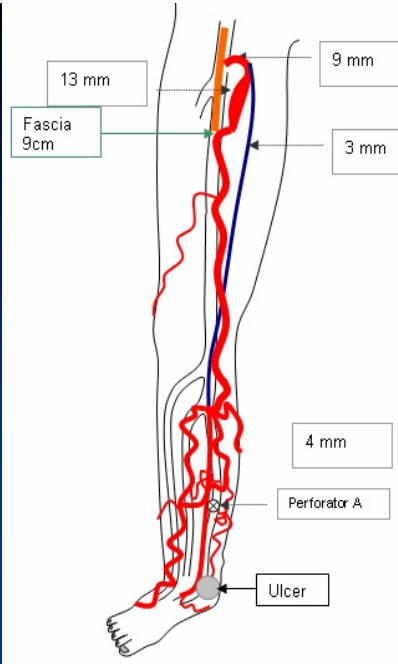


6 mths



2 yrs





53 yr farmer, ulcer present 2 yrs.  
No previous VV Rx.



Ulcer pre Rx

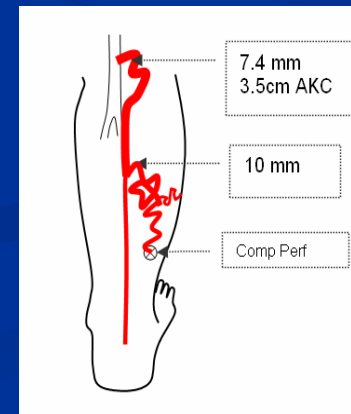
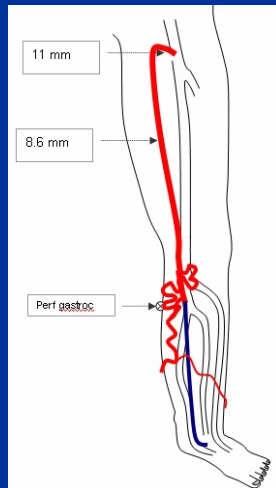


3mths post EVLA

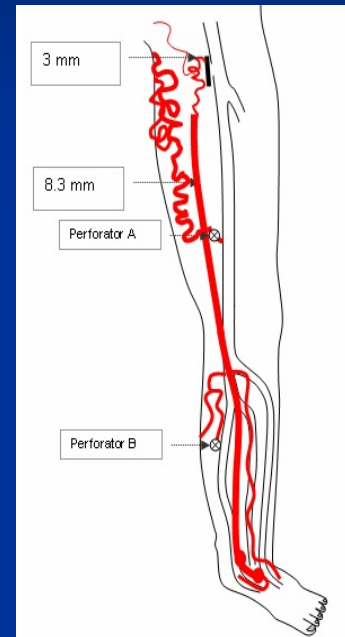
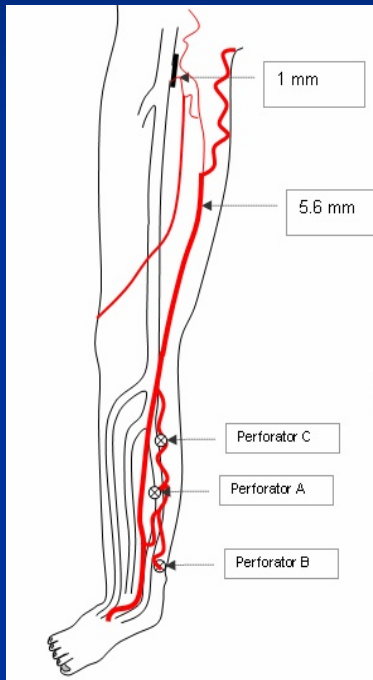


6 months post Rx

# 32 yr woman attends 3 day scout camp same day Bilateral EVLA – before/6mths post



# 53 yr active female VV surgery 25 yrs prior



Before

+ 6 months

Note improved  
quads and tan



# EVLA 3yr prospective study

2<sup>nd</sup> prize poster ACP, Tucson, Arizona, USA 2007

309 patients

459 limbs

499 vessels -	356 GSV	71.3 %
	100 SSV	20 %
	43 AASV	8.6 %

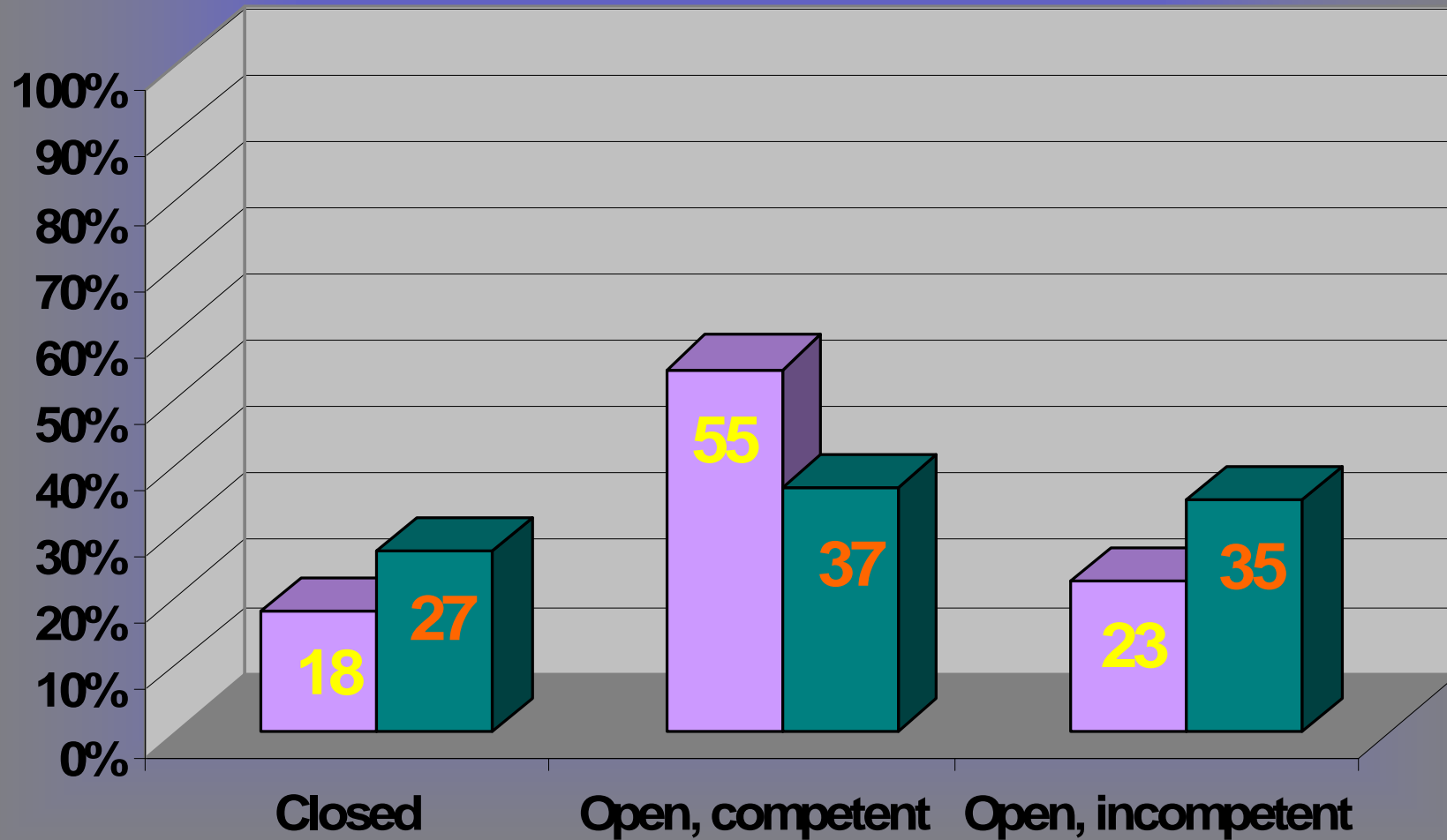
Follow up attendance rate 83%

# Results Patient Self Assessment

POST EVLA	Year 1	Year 2	Year3
Improvement in symptoms & appearance	100%	100%	100%
Would undergo again if necessary	97%	96%	100%
Would have preferred to have surgery	1%	2%	0%
Would recommend to friends	95%	96%	100%
Rated EVLA a successful treatment	96%	98%	100%
Any pain	16%	14%	6%

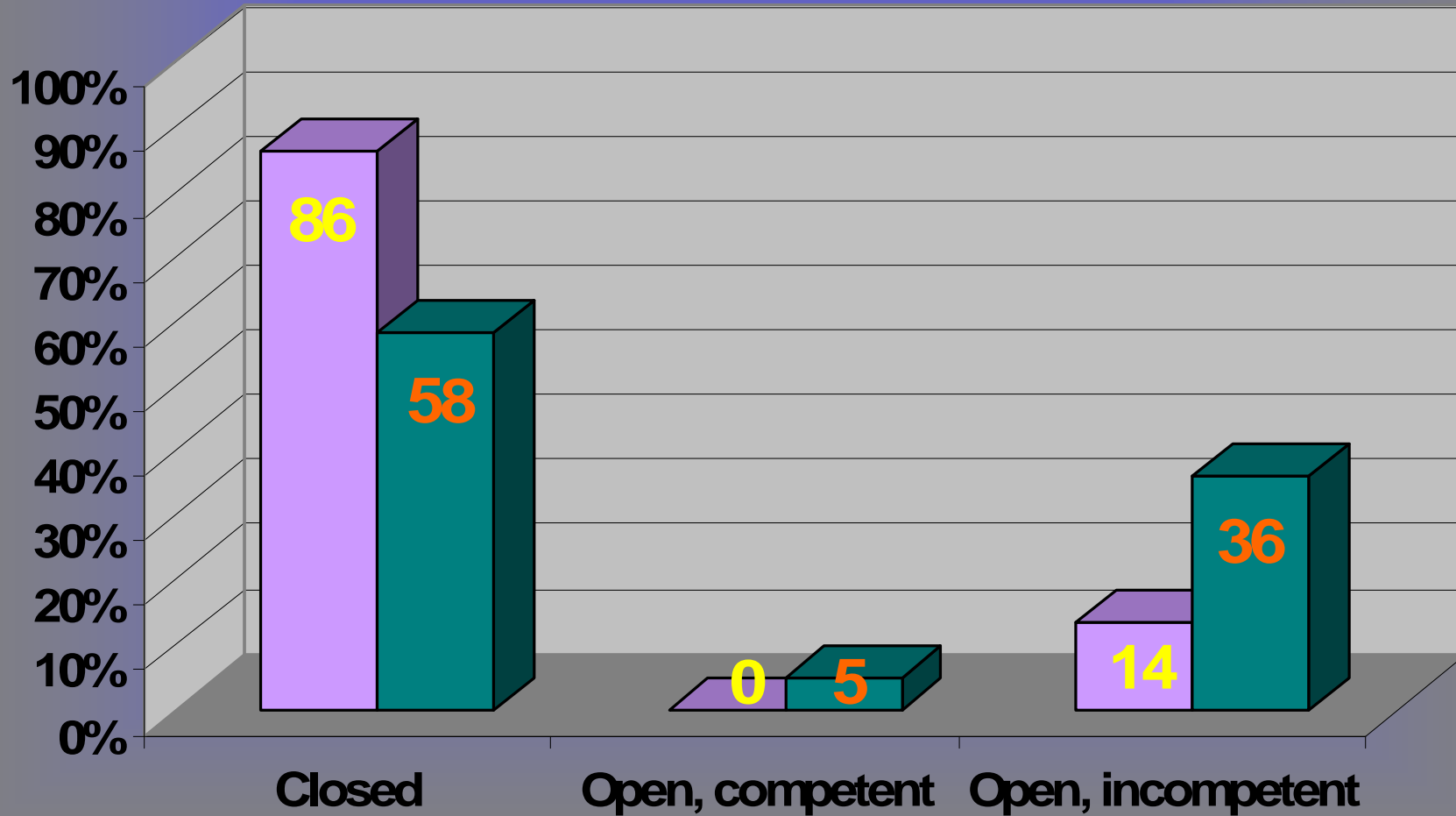
# Sapheno-Femoral Junction - Year 3

□ EVLA    □ UGS



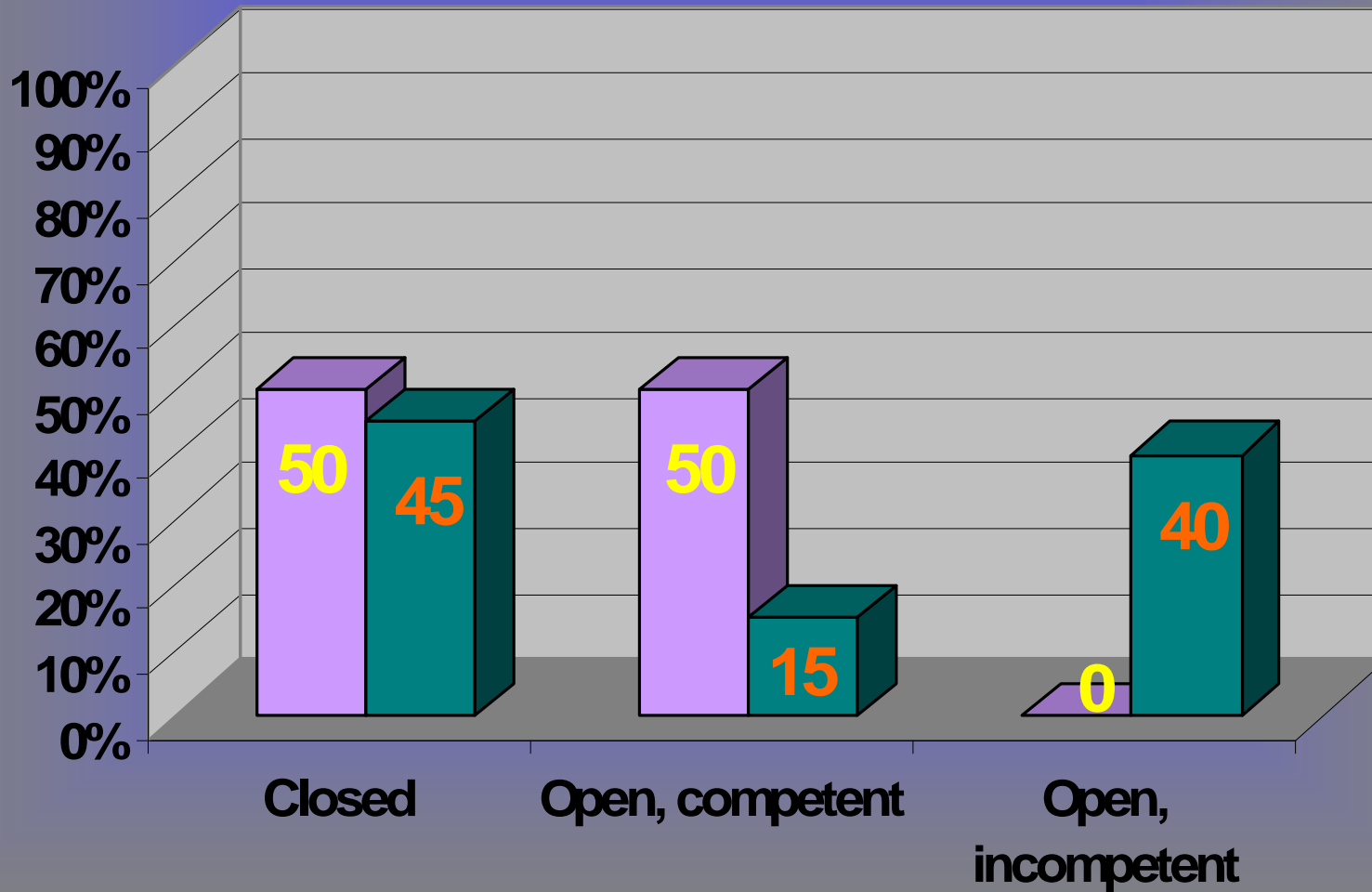
# Great Saphenous Vein - Year 3

□ EVLA    □ UGS



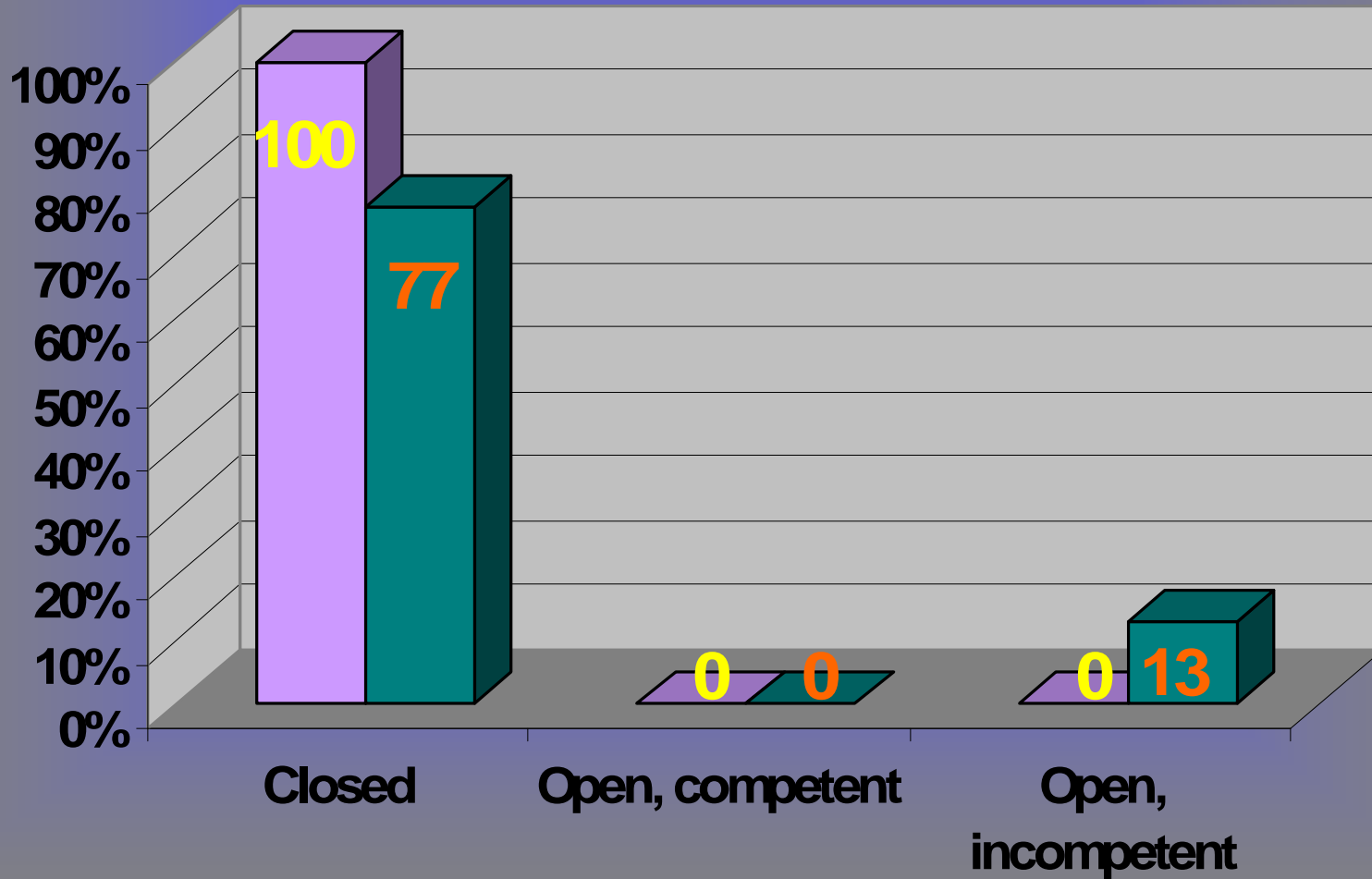
# Sapheno-Popliteal Junction - Year 3

□ EVLA    □ UGS



# Small Saphenous Vein - Year 3

■ EVLA   ■ UGS



# Complications of EVLA n = 459 limbs

Note \* = caused by UGS

N numbers

Pain	2.6 %	12
STP *	5.2 %	24*
Haemosiderin staining *	6.5 %	30*
Swelling	2.4 %	11
BK deep vein sclerosis *	0.65 %	3*
Tongue of thrombus	0.87 %	4
Ulceration *	0.2 %	1*
Sepsis	0.4 %	2
Transient hypoaesthesia *	0.65 %	3*
PE	0.2 %	1
DVT, death	zero	0

# Disadvantages

- Laser cost
- User and patient laser risks
- Disposable costs ( *NZD approx. \$650/case*)
- Cost UGS < EVLA < Surgery
- Day stay theatre cost
- More trained staff



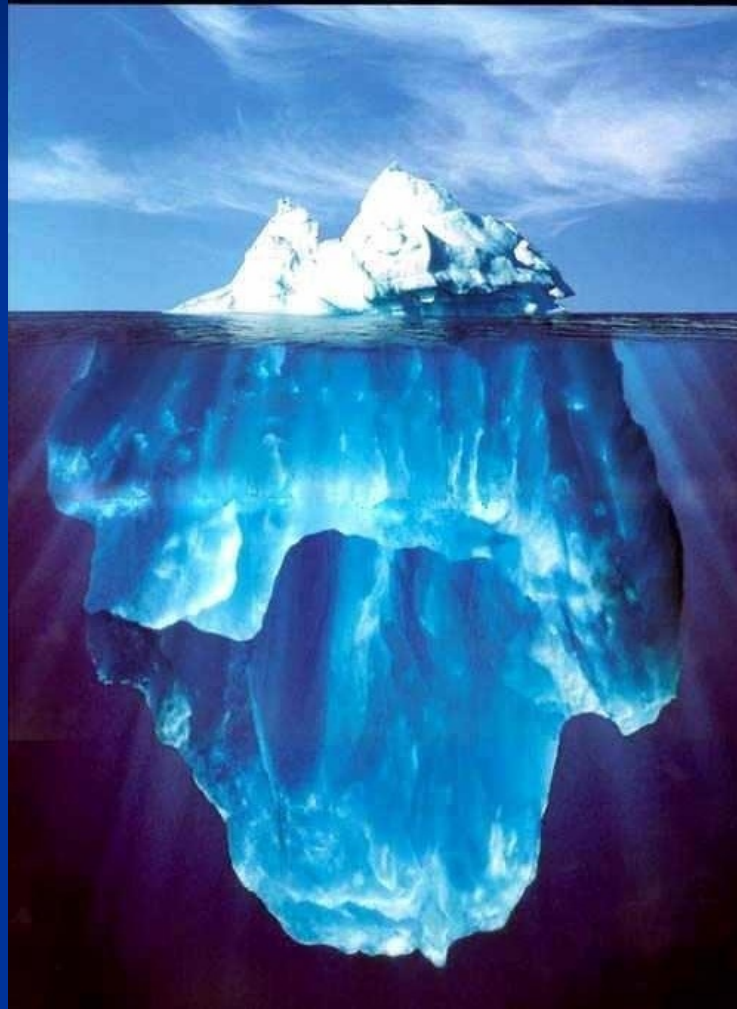
# Benefits

- Physiologic result
- High efficacy and safety
- No upper size limit veins treatable
- Popular with patients
- No scars, no downtime
- 1320nm ... less power, less side effects

# Combined EVLA and UGS

- Safe effective treatment for incompetent varicose vein trunks and tributaries
- Junctions reduce diameter to function physiologically
- Need long term efficacy results

No point just treating what is visible



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# Thanks



[www.skinandvein.co.nz](http://www.skinandvein.co.nz)

References available on request.

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