



Radiofrequency ablation for VV: how to avoid bad results? How to manage complications?

Mark Whiteley

mark@thewhiteleyclinic.co.uk



Disclosure

Speaker name:

.....Mark Whiteley.....

- ☒ I have the following potential conflicts of interest to report:
- ☒ Consulting
- ☐ Employment in industry
- ☐ Shareholder in a healthcare company
- ☐ Owner of a healthcare company
- ☐ Other(s)
- ☐ I do not have any potential conflict of interest



Radiofrequency Ablation

- Microwave





Radiofrequency Ablation

- ~~• Microwave~~





Radiofrequency Ablation

- Alternating electrical current – **Medical ablation**

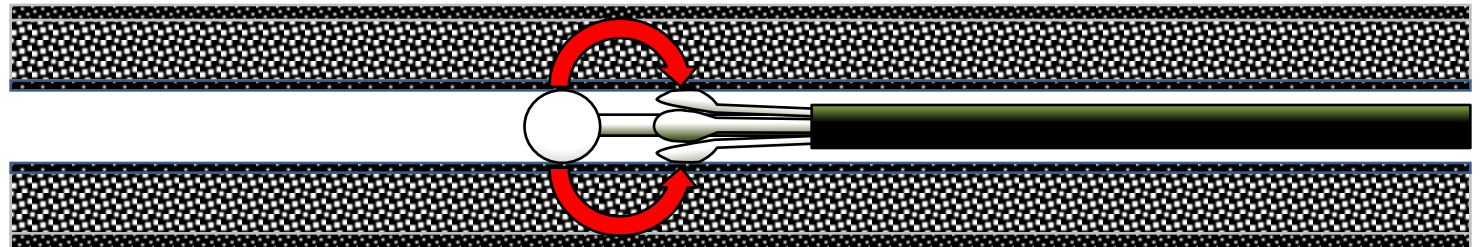
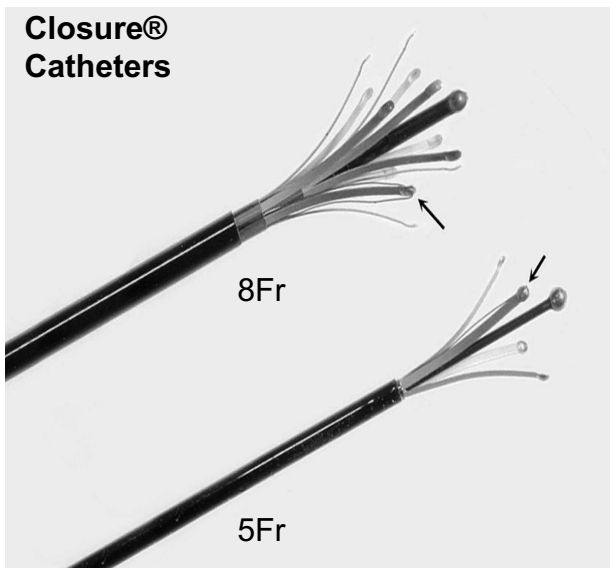
https://en.wikipedia.org/wiki/Radio_frequency
(Downloaded 12 May 2017)

Frequency	Wavelength	Designation	Abbreviation
3–30 Hz	105–104 km	Extremely low frequency	ELF
30–300 Hz	104–103 km	Super low frequency	SLF
300–3000 Hz	103–100 km	Ultra low frequency	ULF
3–30 kHz	100–10 km	Very low frequency	VLF
30–300 kHz	10–1 km	Low frequency	LF
300 kHz – 3 MHz	1 km – 100 m	Medium frequency	MF
3–30 MHz	100–10 m	High frequency	HF
30–300 MHz	10–1 m	Very high frequency	VHF
300 MHz – 3 GHz	1 m – 10 cm	Ultra high frequency	UHF
3–30 GHz	10–1 cm	Super high frequency	SHF
30–300 GHz	1 cm – 1 mm	Extremely high frequency	EHF
300 GHz – 3 THz	1 mm – 0.1 mm	Tremendously high frequency	THF



BiPolar Radiofrequency Ablation

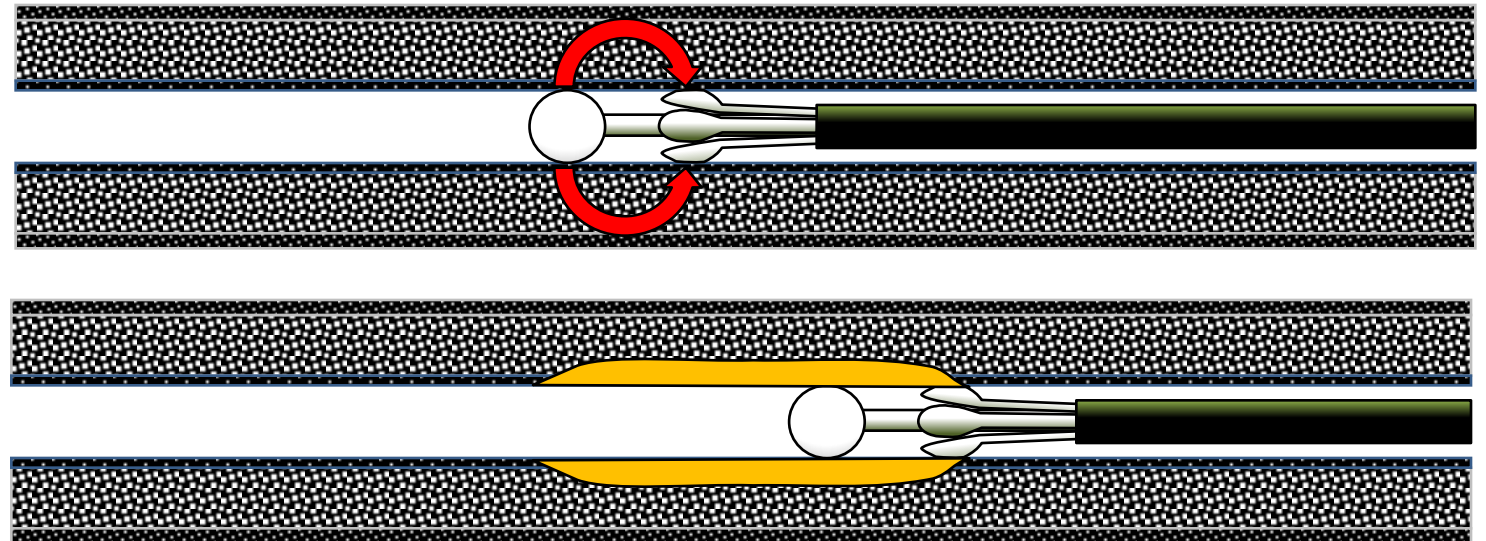
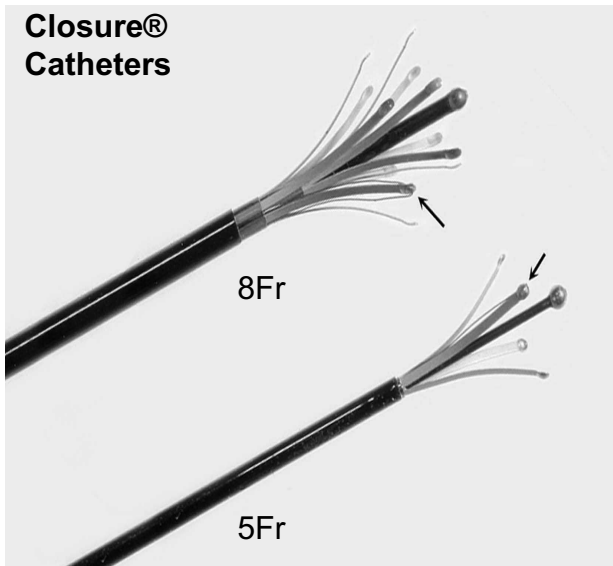
- VNUS Closure





BiPolar Radiofrequency Ablation

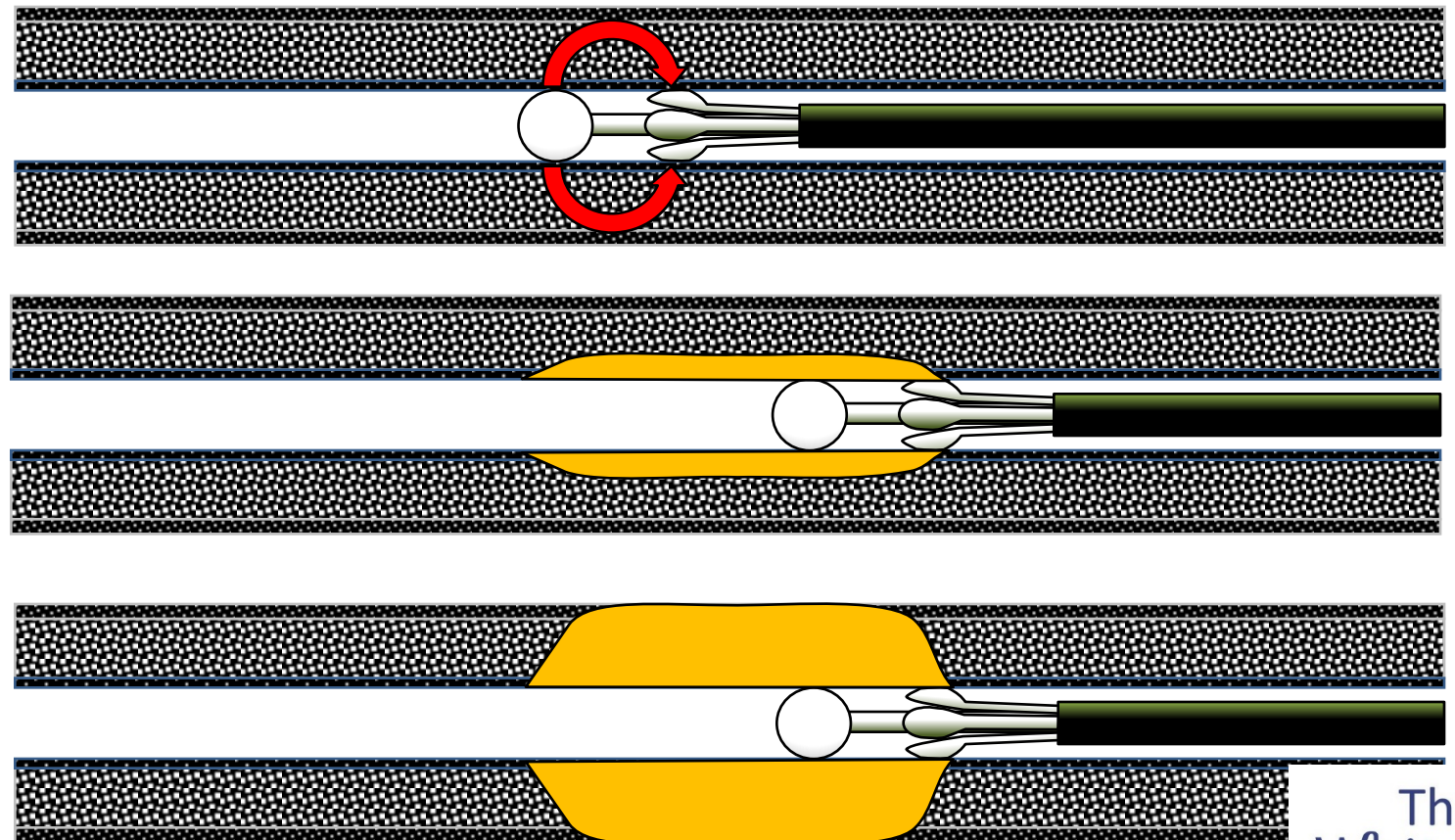
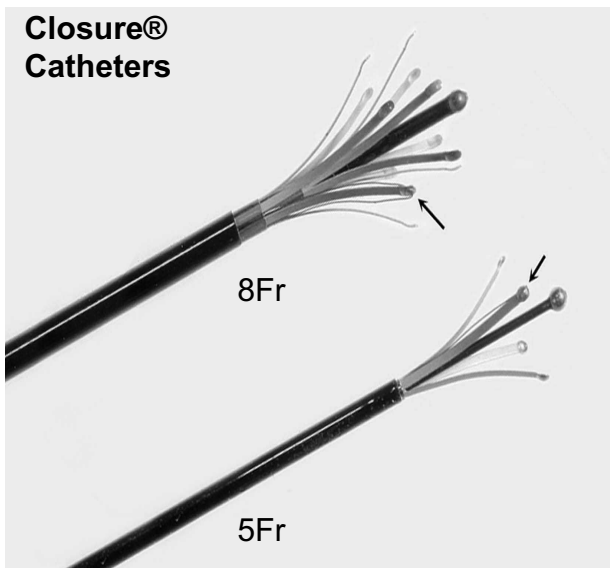
- VNUS Closure





BiPolar Radiofrequency Ablation

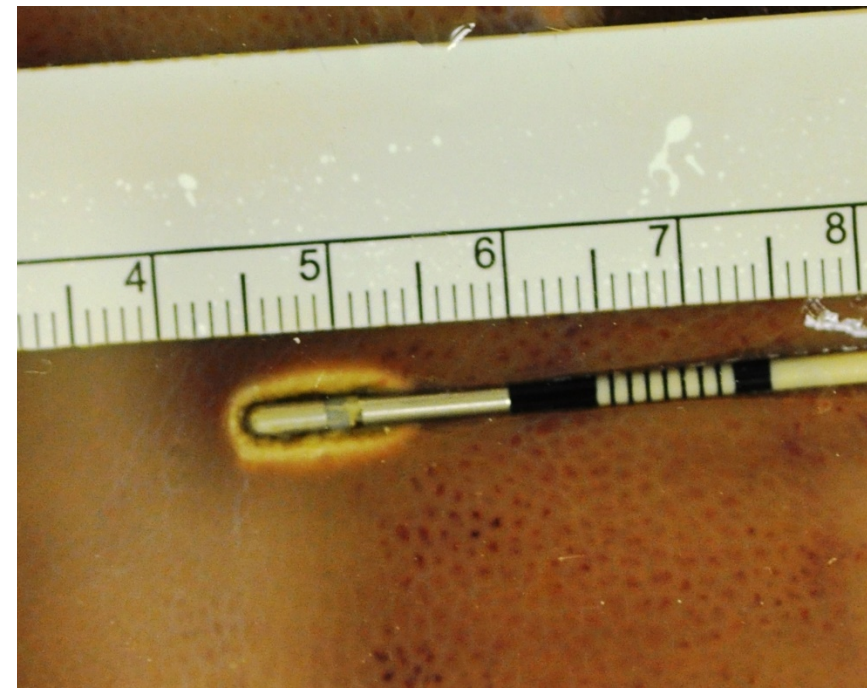
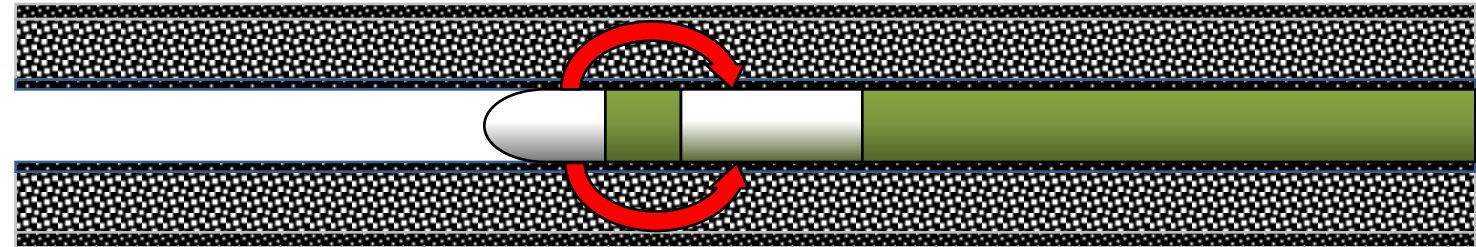
- VNUS Closure





BiPolar Radiofrequency Ablation

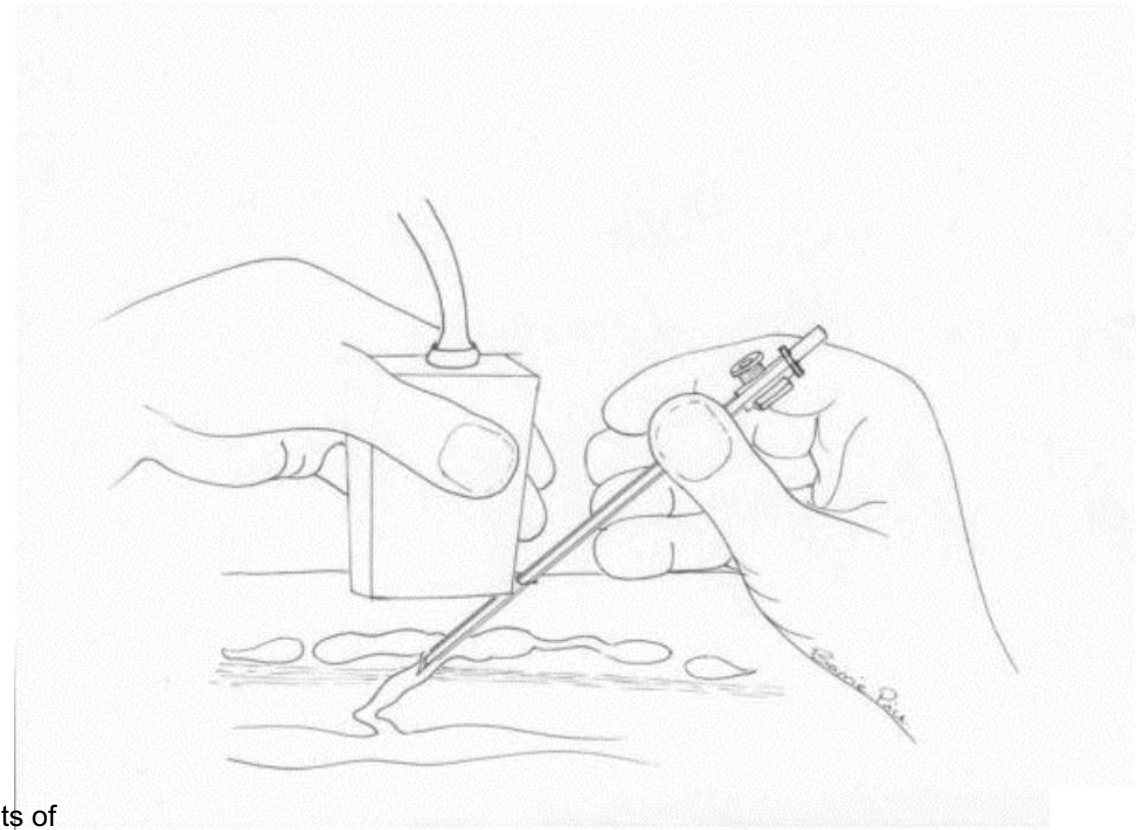
- Celon / Olympus RFiTT





BiPolar Radiofrequency Ablation

- RFS for perforators

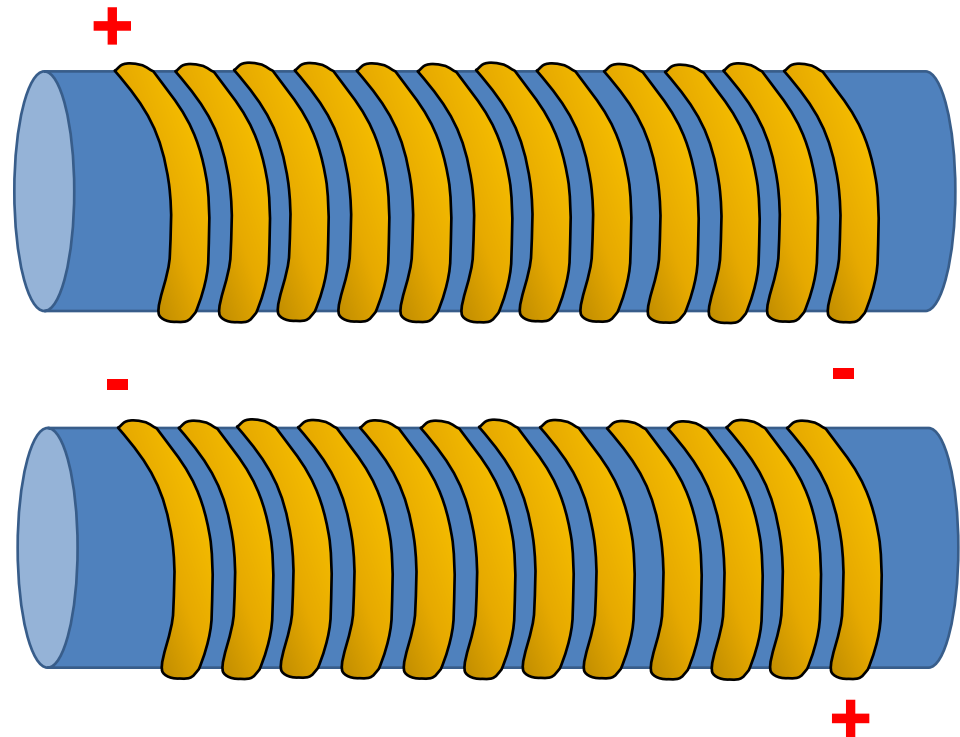
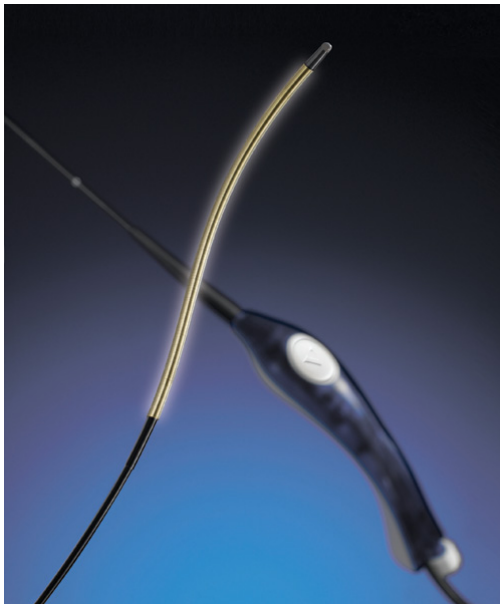


- Kianifard B, et al Surgical technique and preliminary results of perforator vein closure - TRLOPS Br J Surg. 2002; 89: 507-526
- Bacon JL et al Five-year results of incompetent perforator vein closure using TRLOP. Phlebology. 2009;24(2):74-8



Segmental Radiofrequency Ablation

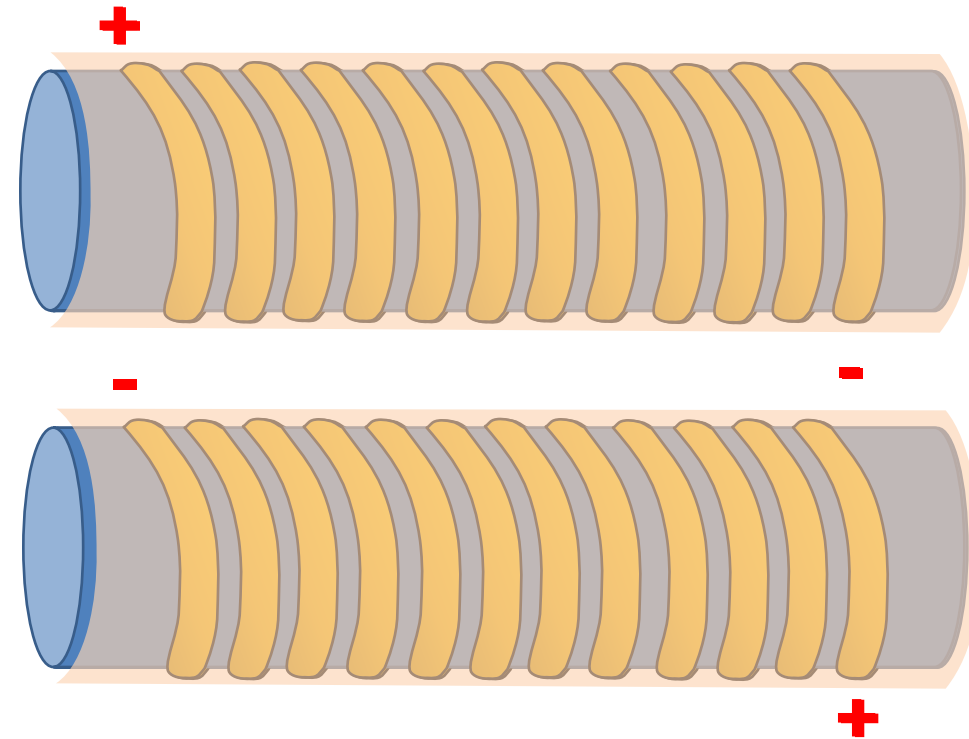
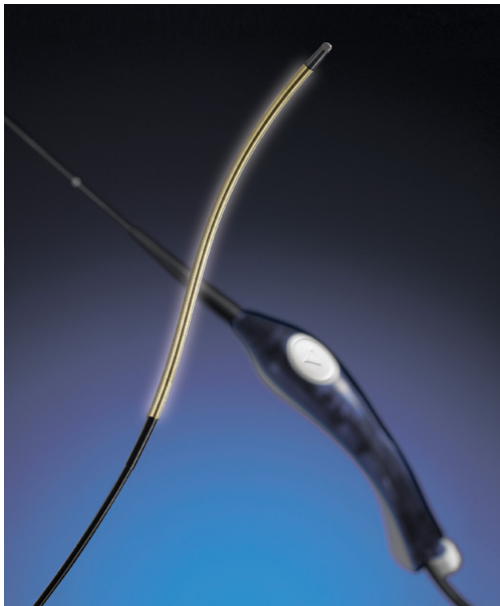
- VNUS “FAST” Venefit





Segmental Radiofrequency Ablation

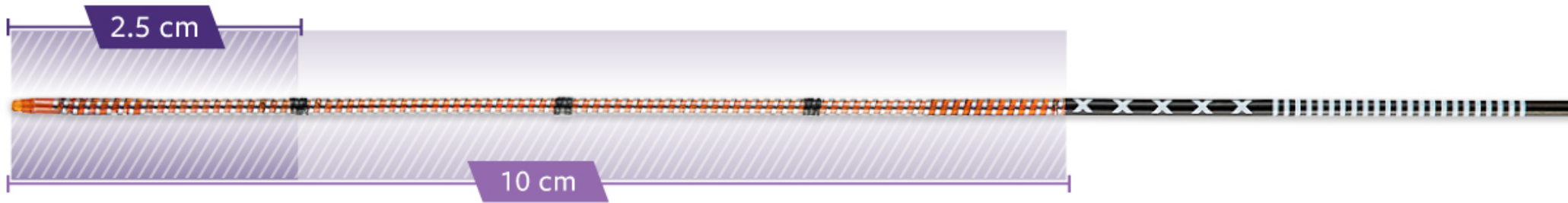
- VNUS “FAST” Venefit





Segmental Radiofrequency Ablation

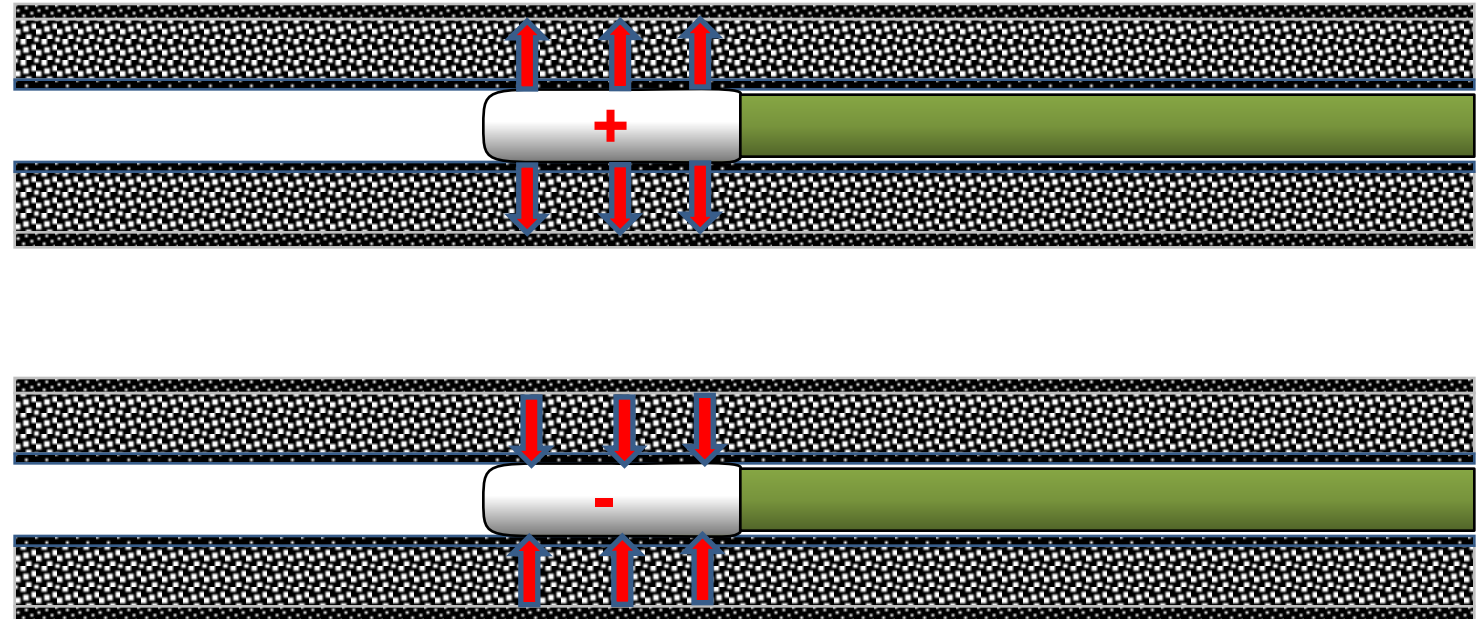
- Venclose





Monopolar Radiofrequency Ablation

- EVRF





How to Avoid Bad Results

- Know your science
- Know your principles

Success score	No. veins (n = 101)
1 (Complete success)	73 (72%)
2 (Partial success)	16 (16%)
3 (Partial failure)	12 (12%)
4 (Complete failure)	0 (0%)
(Veins treated elsewhere in the interim – presumed failure)	2 (not included)

Eur J Vasc Endovasc Surg (2017) ■, 1–6

Fifteen Year Results of Radiofrequency Ablation, Using VNUS Closure, for the Abolition of Truncal Venous Reflux in Patients with Varicose Veins

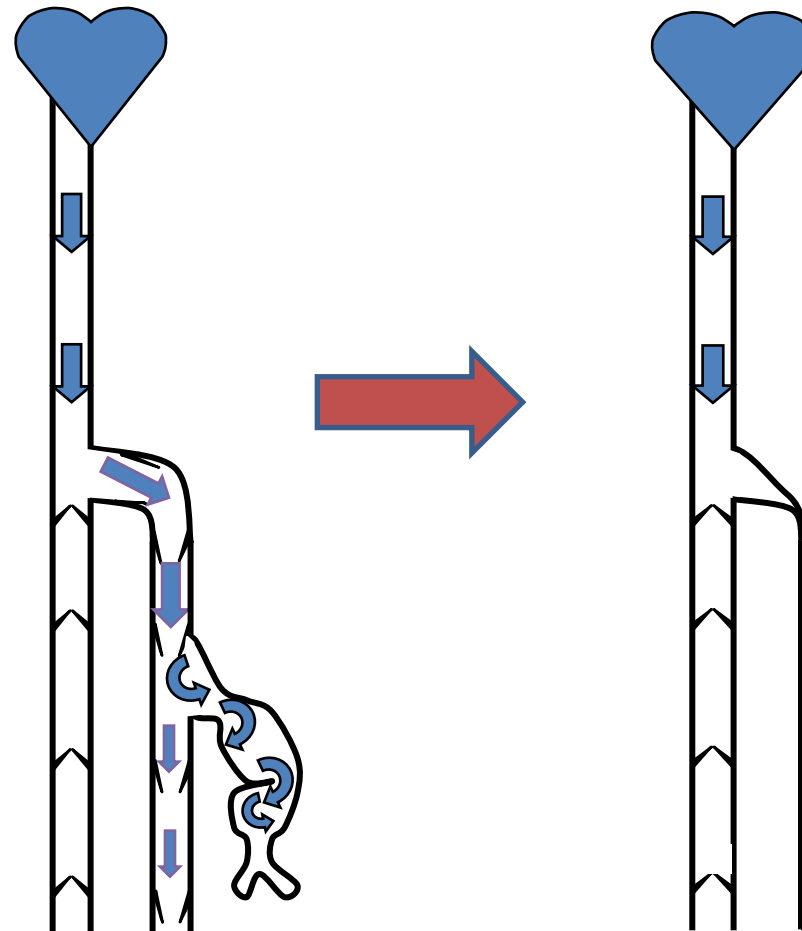
M.S. Whiteley ^{a,b,*}, I. Shiangoli ^{a,b}, S.J. Dos Santos ^{a,b}, E.B. Dabbs ^a, T.J. Fernandez-Hart ^a, J.M. Holdstock ^a

^a The Whiteley Clinic, Stirling House, Stirling Road, Guildford, UK

^b University of Surrey, Faculty of Health and Medical Sciences, Guildford, UK



What do we want to achieve with RFA?

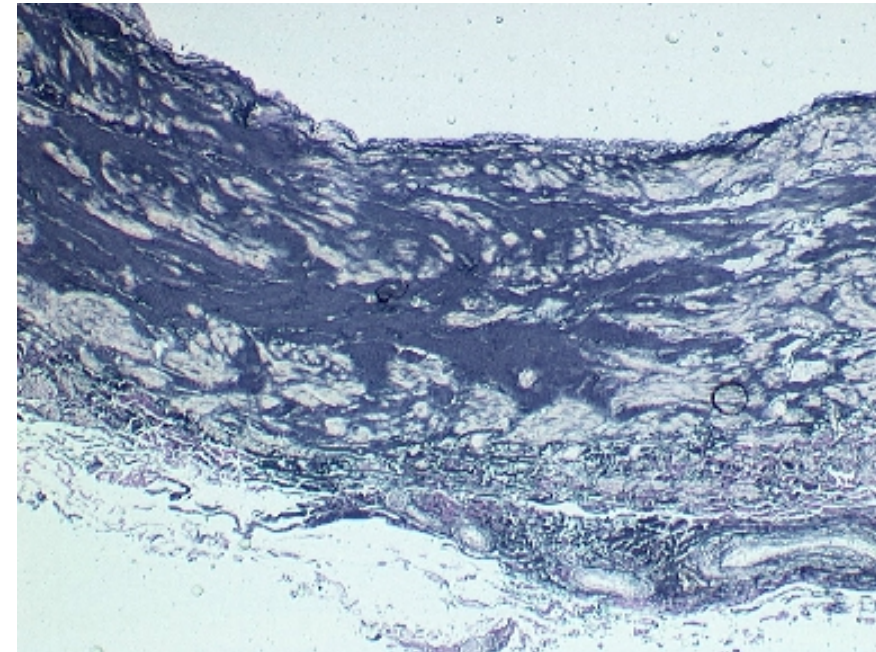
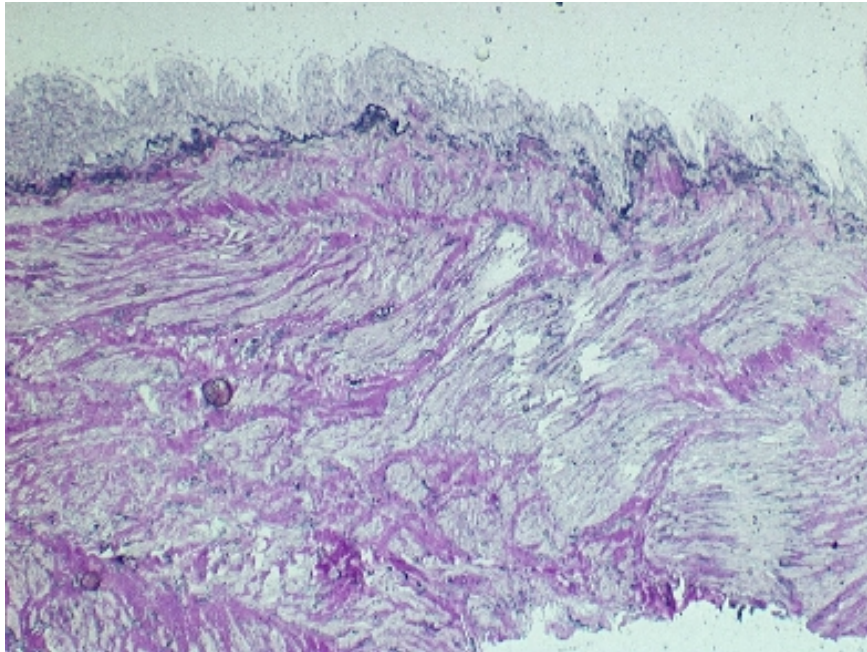


*From: Understanding Venous Reflux – The Cause
of Varicose Veins and Venous Leg Ulcers
MS Whiteley*



Transmural Death

- Aim of all endovenous ablative techniques

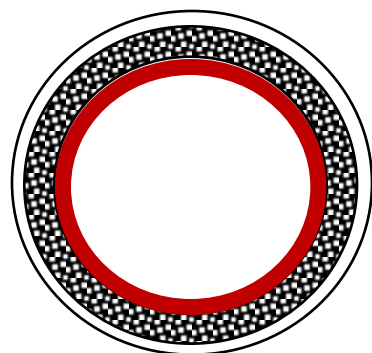


Mark S Whiteley, Judy Holdstock. Percutaneous radiofrequency ablations of Varicose Veins (VNUS Closure). In: Roger M Greenhalgh ed, Vascular and Endovascular Challenges . London; BibaPublishing 2004. p 361- 381

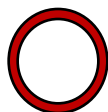


- Large vein with thick wall
- Small vein with thin wall

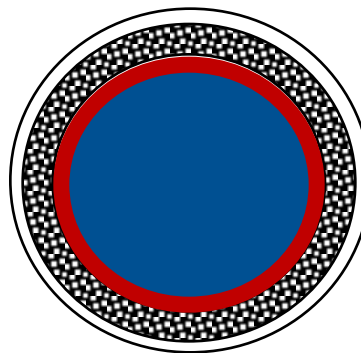
Intimal / Sub-total
Mural Damage



Transmural
Death



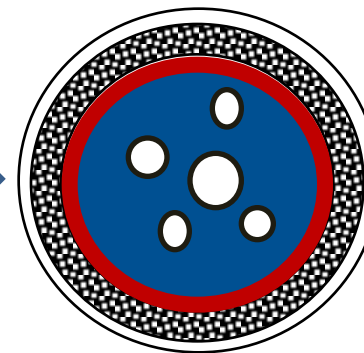
Intraluminal
Thrombosis



Fibrosis




Recanalisation



Involution



Leg Ulcer Treatment
REVOLUTION
By Prof Mark S Whiteley



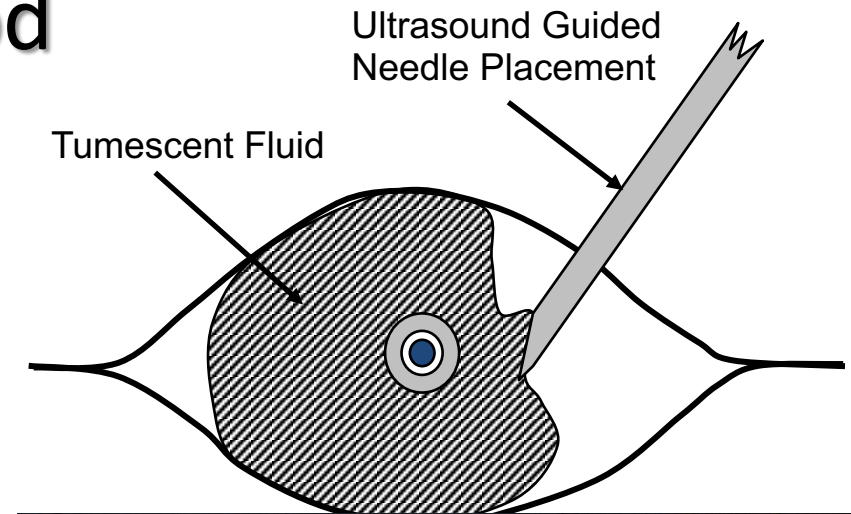
Janet Cassie
Cured by endovenous surgery after
4 years of compression

James Turpin
Cured by endovenous surgery after
11 years of compression



Don't Heat Blood

- Head down position
- Good tumescence
- ? Compression



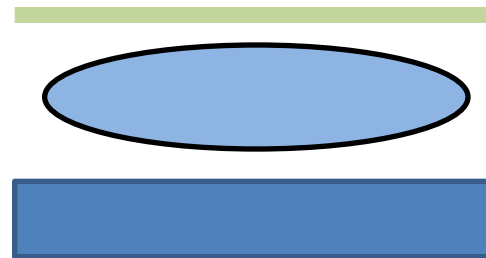


Don't Get Skin Burns

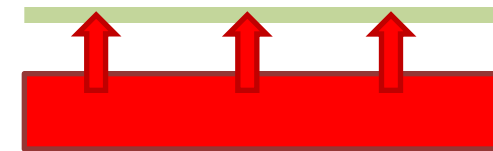
- Do not thermoablate outside of saphenous fascia (AC2 = N2 Veins)
- NB: Do NOT use tumescence to push vein deeper



Vein too close to skin




Tumescence pushes vein
away from skin



Post treatment,
Tumescence gone
inflamed vein causes
skin inflammation
- Brown Stains

Leg Ulcer Treatment
REVOLUTION
By Prof Mark S Whiteley



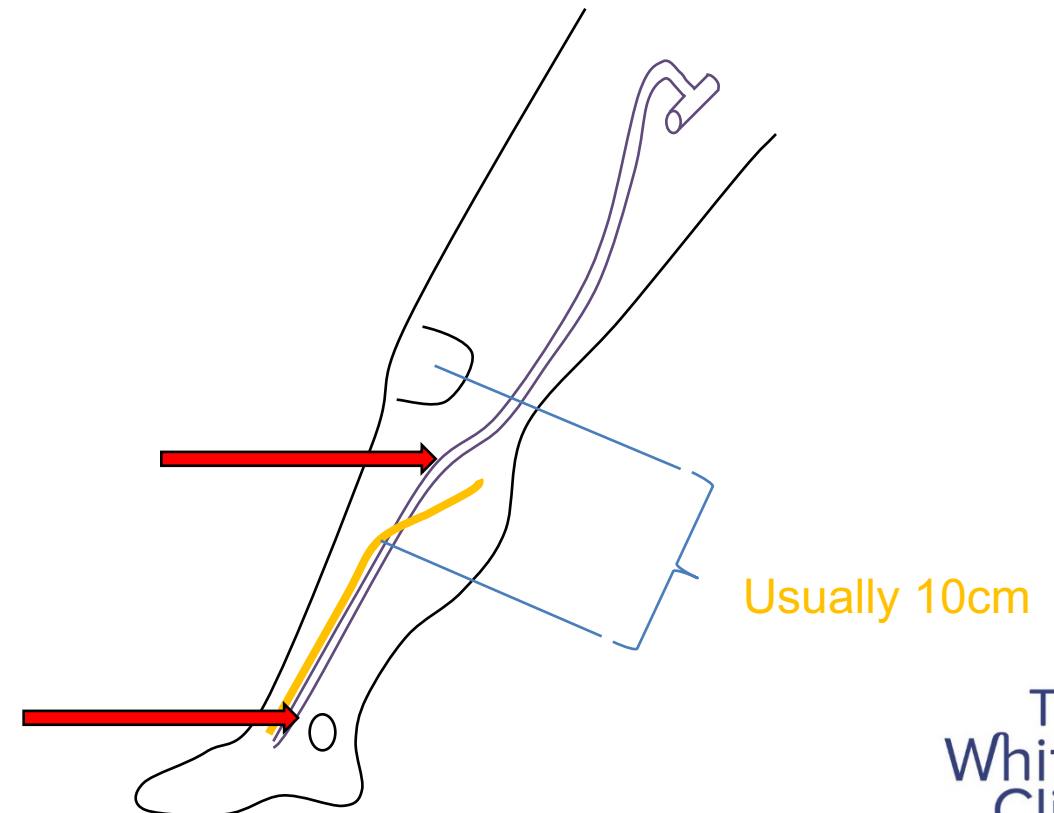
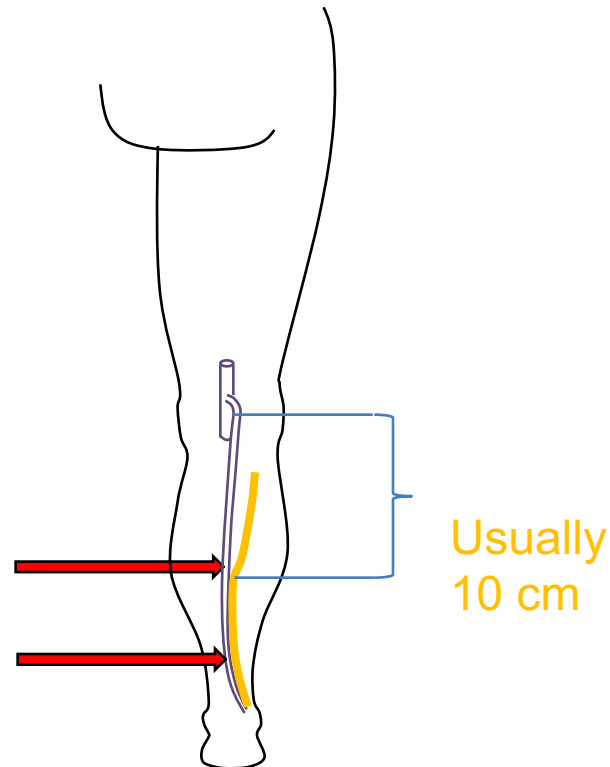
Janet Cassie
Cured by endovenous surgery after
4 years of compression

James Turpin
Cured by endovenous surgery after
11 years of compression



Avoid Nerve Damage

- Use Local Anaesthetic ONLY – No sedation / blocks / GA = “Ow” test
- Position



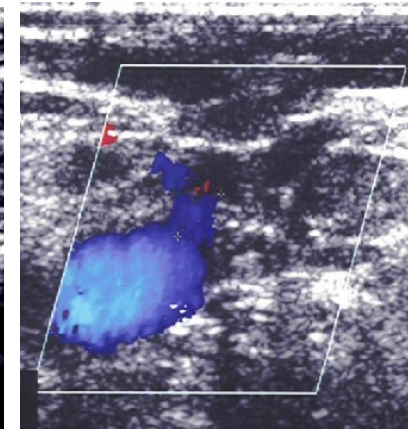
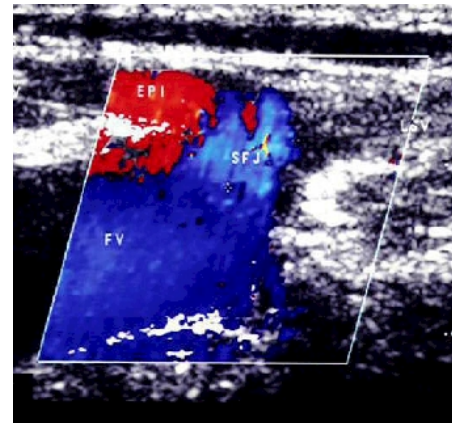
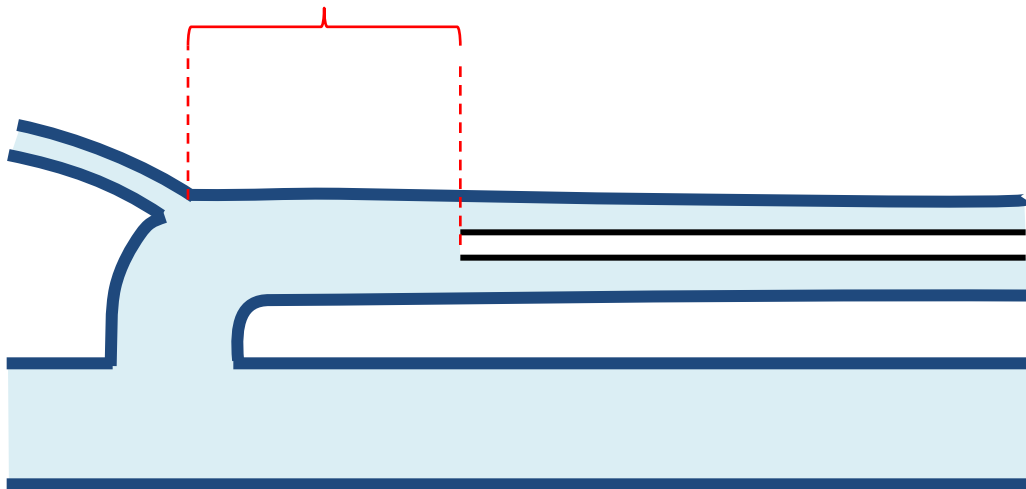


Positon at SFJ

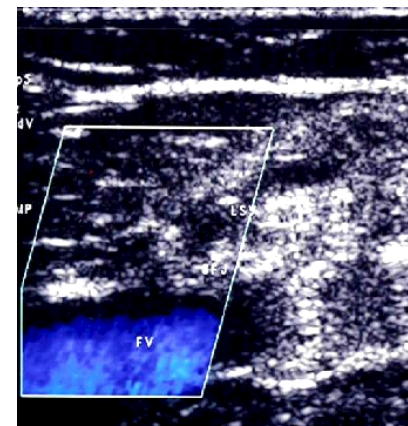
- 2 cm??? Really???

2 cm

1 Week Post
VNUS



1 Year Post
VNUS



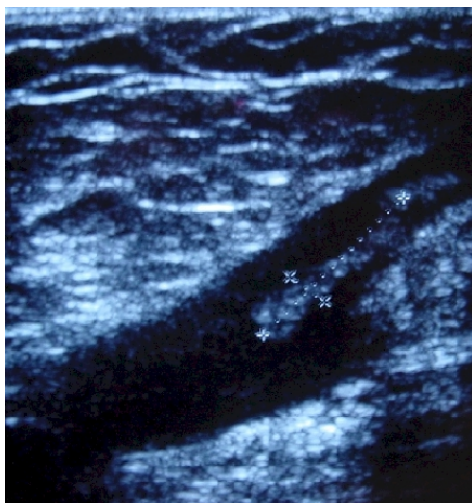
Flush closure
in 40%

Mark S Whiteley, Judy Holdstock. Percutaneous radiofrequency ablations of Varicose Veins (VNUS Closure). In: Roger M Greenhalgh ed, Vascular and Endovascular Challenges . London; BibaPublishing 2004. p 361- 381

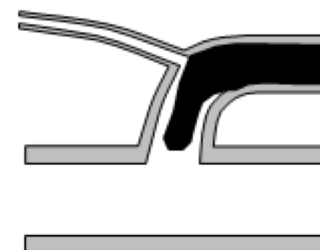


EHIT

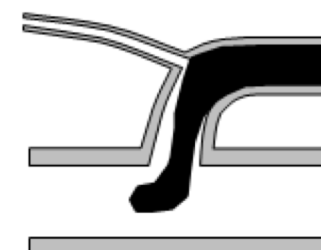
Named and Classified by L Kabnick 2005



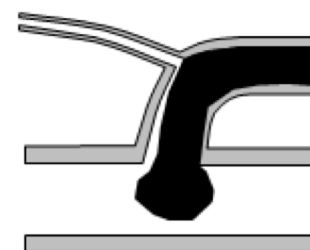
First Described 2004



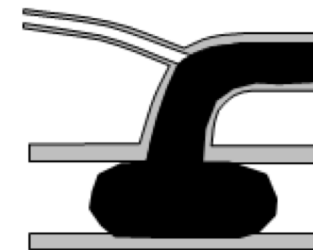
Class 1



Class 2



Class 3



Class 4

Mark S Whiteley, Judy Holdstock. Percutaneous radiofrequency ablations of Varicose Veins (VNUS Closure). In: Roger M Greenhalgh ed, Vascular and Endovascular Challenges . London; BibaPublishing 2004. p 361- 381



Avoid EHIT

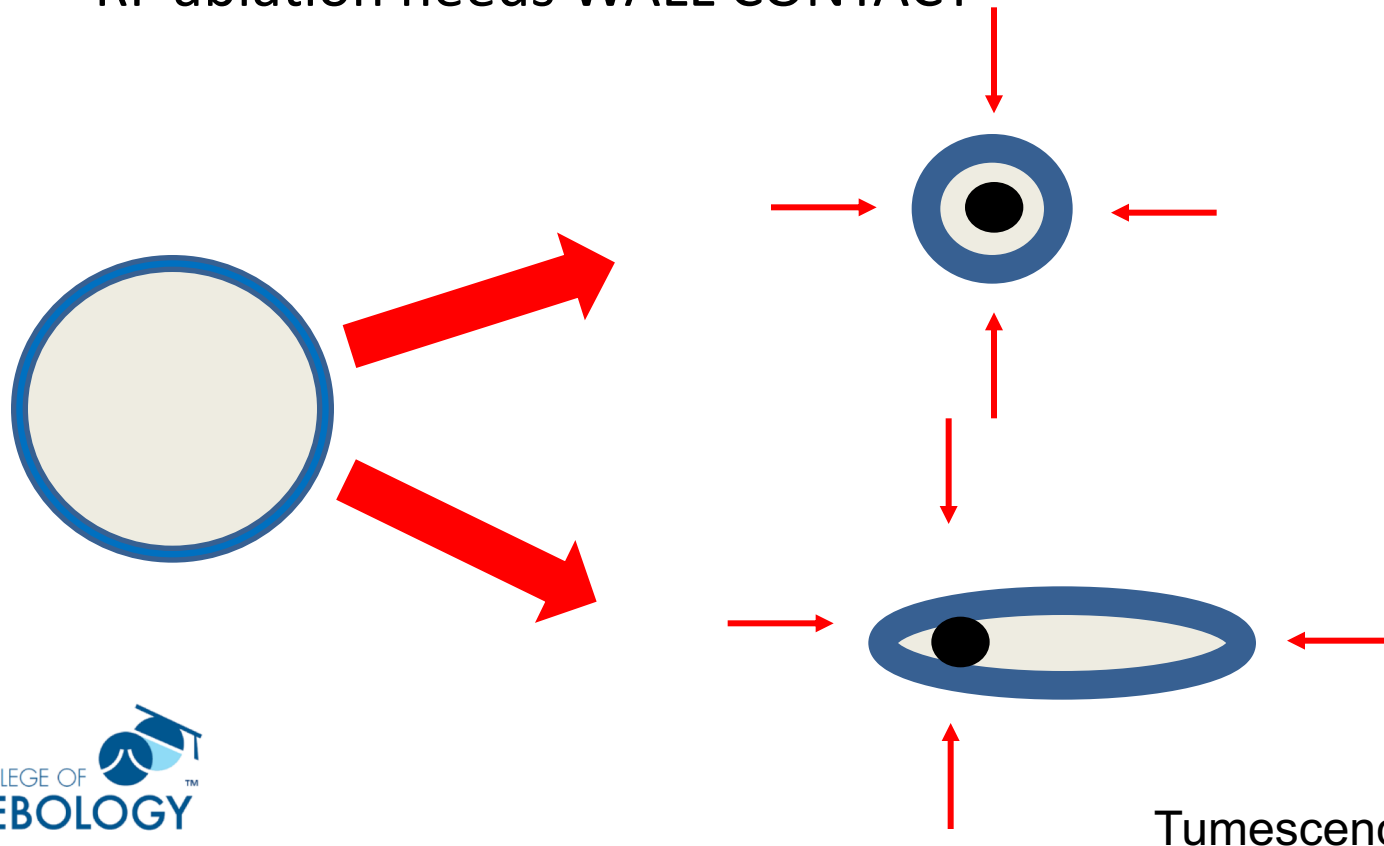
- Aim
 - 1 – IEV Washout
 - 2 - Flush





Large Veins

- RF ablation needs WALL CONTACT





Smile Sign – Multi-Pass Technique

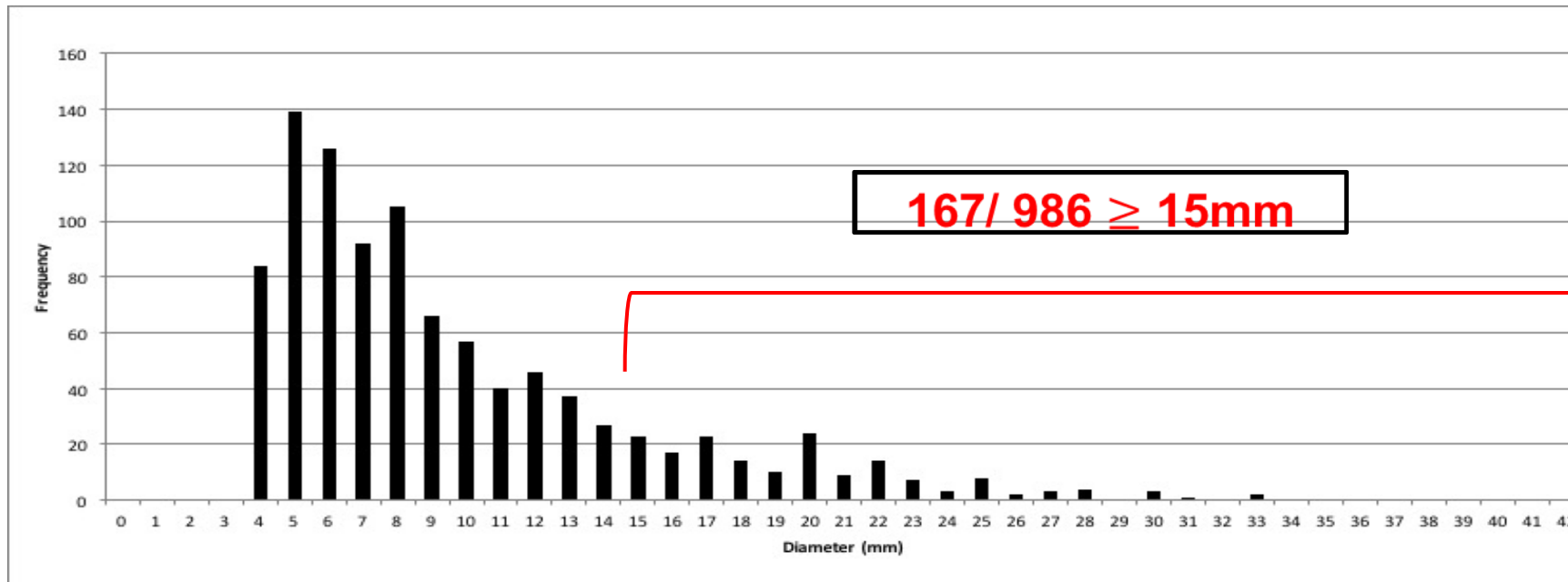
Original Article

A description of the ‘smile sign’ and multi-pass technique for endovenous laser ablation of large diameter great saphenous veins

Emma B Dabbs¹, Laurensius E Mainsiow¹,
Judith M Holdstock¹, Barrie A Price¹ and Mark S Whiteley^{1,2}

Phlebology

Phlebology
0(0): 1–6
© The Author(s) 2017
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/0268355517734480
journals.sagepub.com/home/phl
SAGE





Treat Incompetent Perforators / PAVA / Neovascular Tissue

Causes of Recurrent Varicose Veins

Neovascular tissue
Incompetent Perforating Veins (IPV)
Missed or "De Novo" vein reflux
Pelvic Veins
Inadequate operation
Previously untreated veins

AM Whiteley et al. Pelvic Venous Reflux is a Major Contributory Cause of Recurrent Varicose Veins in more than a Quarter of Women. JVS (Ven Lymph Dis) 2013; 1: 100-101

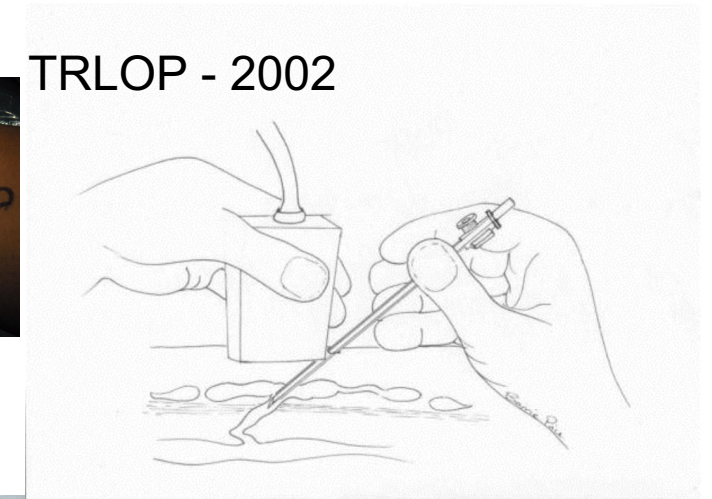
Hedgehog Technique

Thermoablation using the hedgehog technique for complex recurrent venous reflux patterns

Barrie A. Price, MD, MS, FRCS, FCPHleb, Charmaine C. Harrison, DMU, DCR, and Judy M. Holdstock, DMU, DCR, Guildford, Surrey, United Kingdom



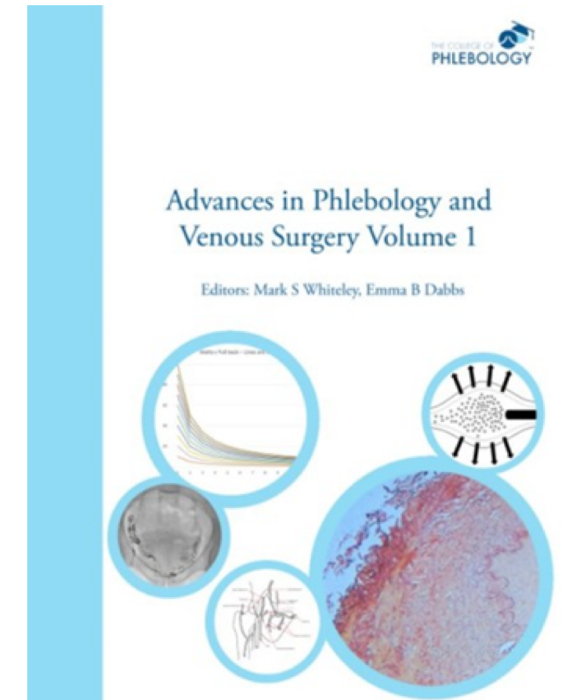
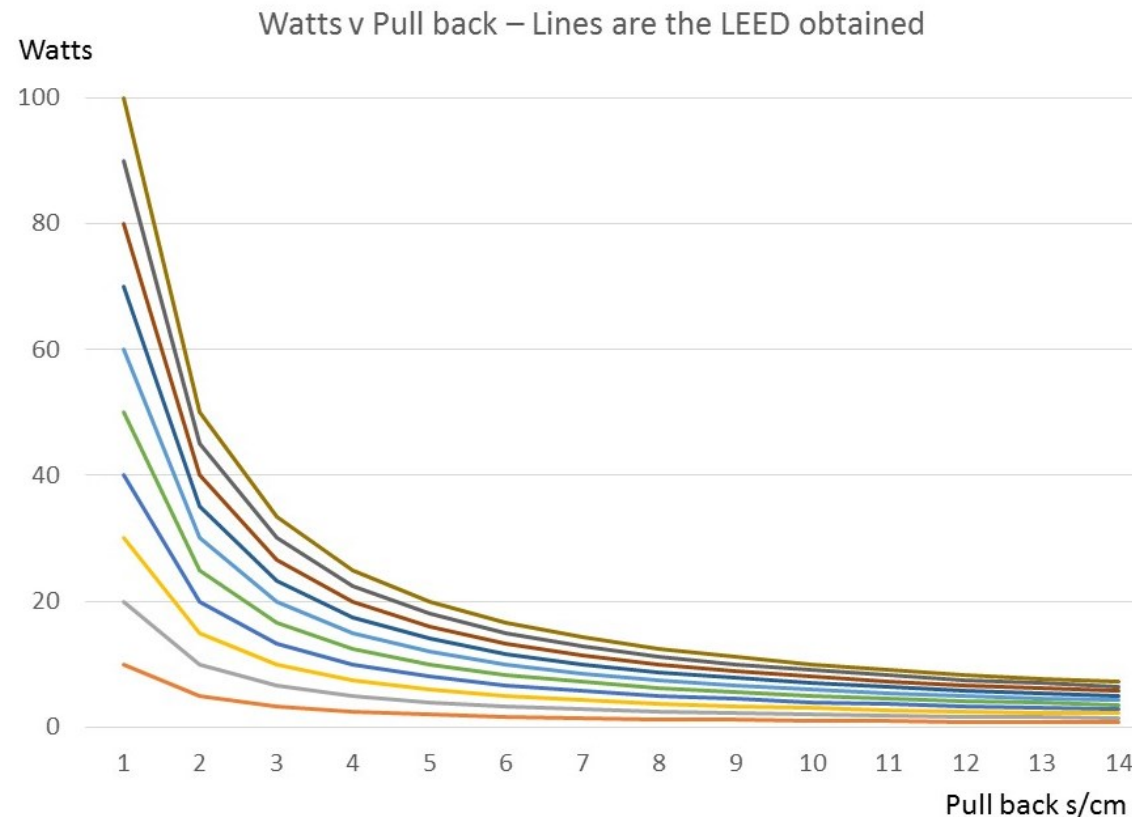
TRLOP - 2002





Understand Adequate LEED

- LEED unknown unless Power or Time quoted





Conclusions

- Know your science
- Know your device
- Choose the right device for the right vein
- Use proven techniques
- Stop all reflux
- Use proven LEED at set Powers