ELVeS Radial Flush - Vein Ablation from the very first start

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Live from Maastricht the Netherlands

Overview

- Why we do it ?
- How we do it ?
- Special cases and pitfalls
- Live demo puncture technique

Overview

- Why we do it ?
- How we do it ?
- Special cases and pitfalls
- Live demo puncture technique

Why we do it?

Stripping or EVT ?

RFA or Laser ?

Wavelength & Fiber?

Stripping or EVT ?

Recurrence
Complications
Limitations

Postop pain
Nerve dammage
Sick leave

Stripping or EVT ?

Eur J Vasc Endovasc Surg (2015) 49, 678—737

Editor's Choice — Management of Chronic Venous Disease

Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

C. Wittens[a], A.H. Davies[a], N. Bækgaard[a], R. Broholm[a], A. Cavezzi[a], S. Chastanet[a], M. de Wolf[a], C. Eggen[a], A. Giannoukas[a], M. Gohel[a], S. Kakkos[a], J. Lawson[a], T. Noppeney[a], S. Onida[a], P. Pittaluga[a], S. Thomis[a], I. Toonder[a], M. Vuylsteke[a],
ESVS Guidelines Committee[b] P. Kolh, G.J. de Borst, N. Chakfé, S. Debus, R. Hinchliffe, I. Koncar, J. Lindholt, M.V. de Ceniga, F. Vermassen, F. Verzini,
Document Reviewers[c] M.G. De Maeseneer, L. Blomgren, O. Hartung, E. Kalodiki, E. Korten, M. Lugli, R. Naylor, P. Nicolini, A. Rosales

Recommendation 43	Class	Level	References
For the treatment of great saphenous vein reflux in patients with symptoms and signs of chronic venous disease, endovenous thermal ablation techniques are recommended in preference to surgery.	I	A	328, 354, 356, 357, 359, 361-378, 391, 392
Recommendation 44			
For the treatment of great saphenous vein reflux in patients with symptoms and signs of chronic venous disease, endovenous thermal ablation techniques are recommended in preference to foam sclerotherapy.	I	A	322, 328, 329, 355, 356, 414-416

Recommendation 45	Class	Level	References
For the treatment of small saphenous vein reflux in patients with symptoms and signs of chronic venous disease, endovenous thermal ablation techniques should be considered. Access to the small saphenous vein should be gained no lower than mid-calf.	IIa	B	386, 387, 389

RFA or Laser ?

- Data:

  cross-sectional survey 10 years after EVLT

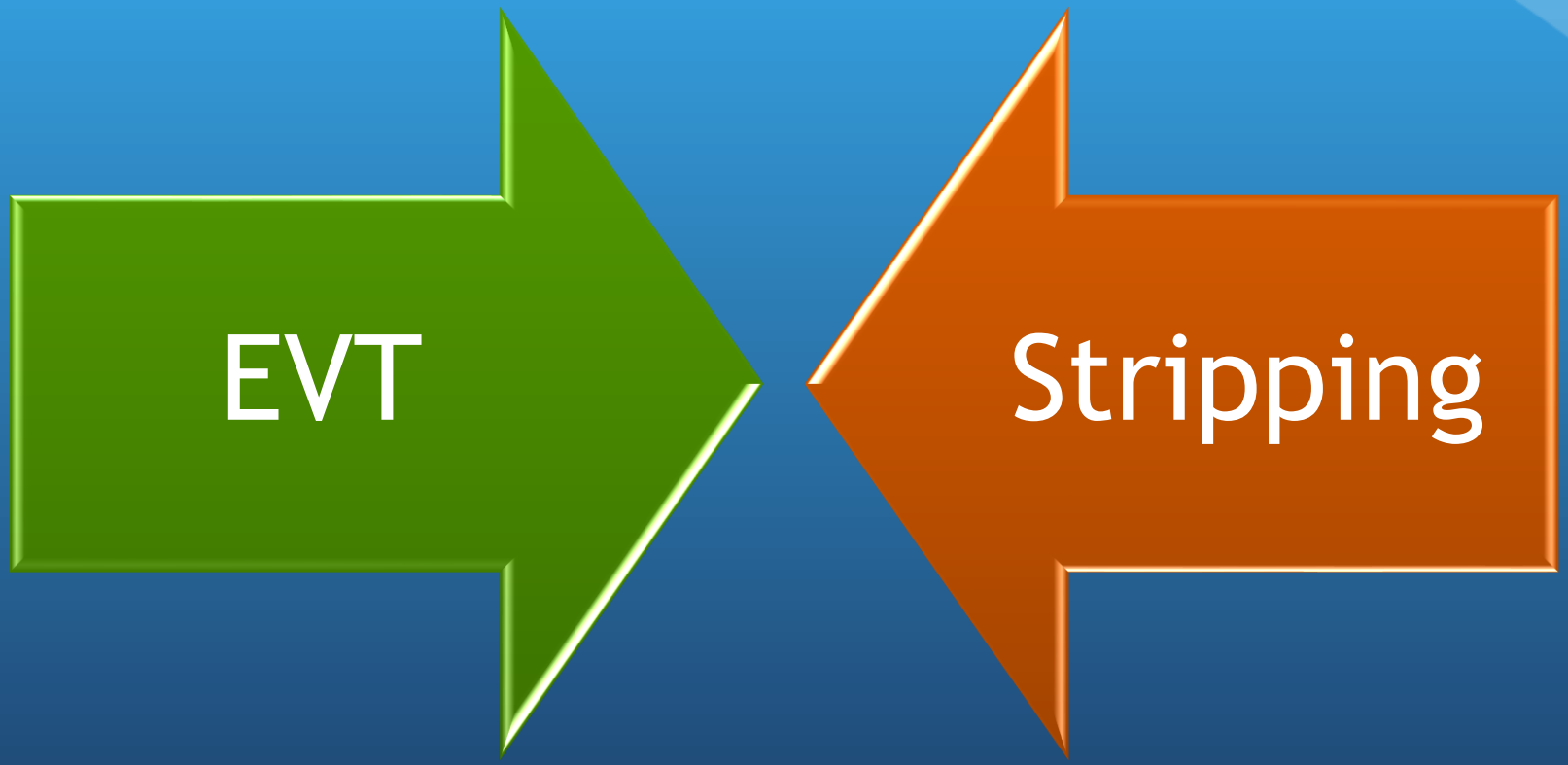
  clinical and duplex evaluation

  n = 203 (out 240) GSV: 161 SSV: 42

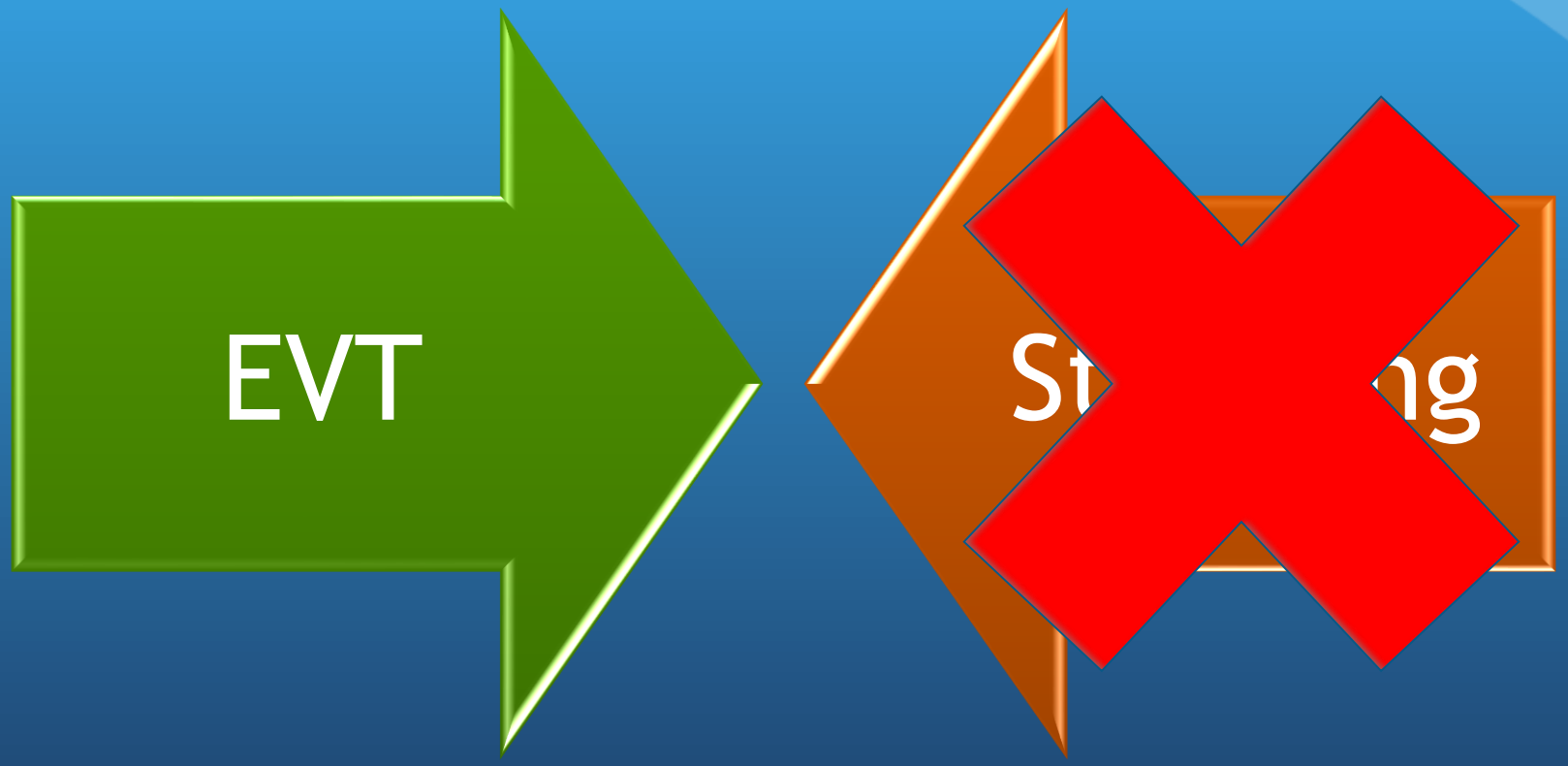
- Occlusion rate: 99.5% (mean FU 114 m)
- 98% assymptomatic or significant improvement
- Additional subsequent treatment in 21% (GSV) and 5% (SSV)

P. Pavei ea: *Journal of Vascular Surgery: Venous and Lymphatic Disorders;*
https://doi.org/10.1016/j.jvsv.2020.06.015

Stripping or EVT ?



Stripping or EVT ?



Why we do it?

EVT

RFA or Laser ?

Wavelength & Fiber?

RFA or Laser ?

- Data:

  Prospective double blind RCT

  VNUS Closure Fast vs. EVLT (810 nm!)

  n = 159

- Occlusion rate (3m): 90% vs 96%
- Bruise area thigh: 0,6% vs 3,8%
- Pain after 7 days: <
- QOL at 3 months: =

Nordon ea: Ann Surg 2011 Dec; 254(6): 876-81

RFA or Laser ?

- Data:

  Varico 2 study

  Prospective comparative cohort study

  RFA vs. EVLT (1470 nm, radial fiber) in GSV

  n = 311

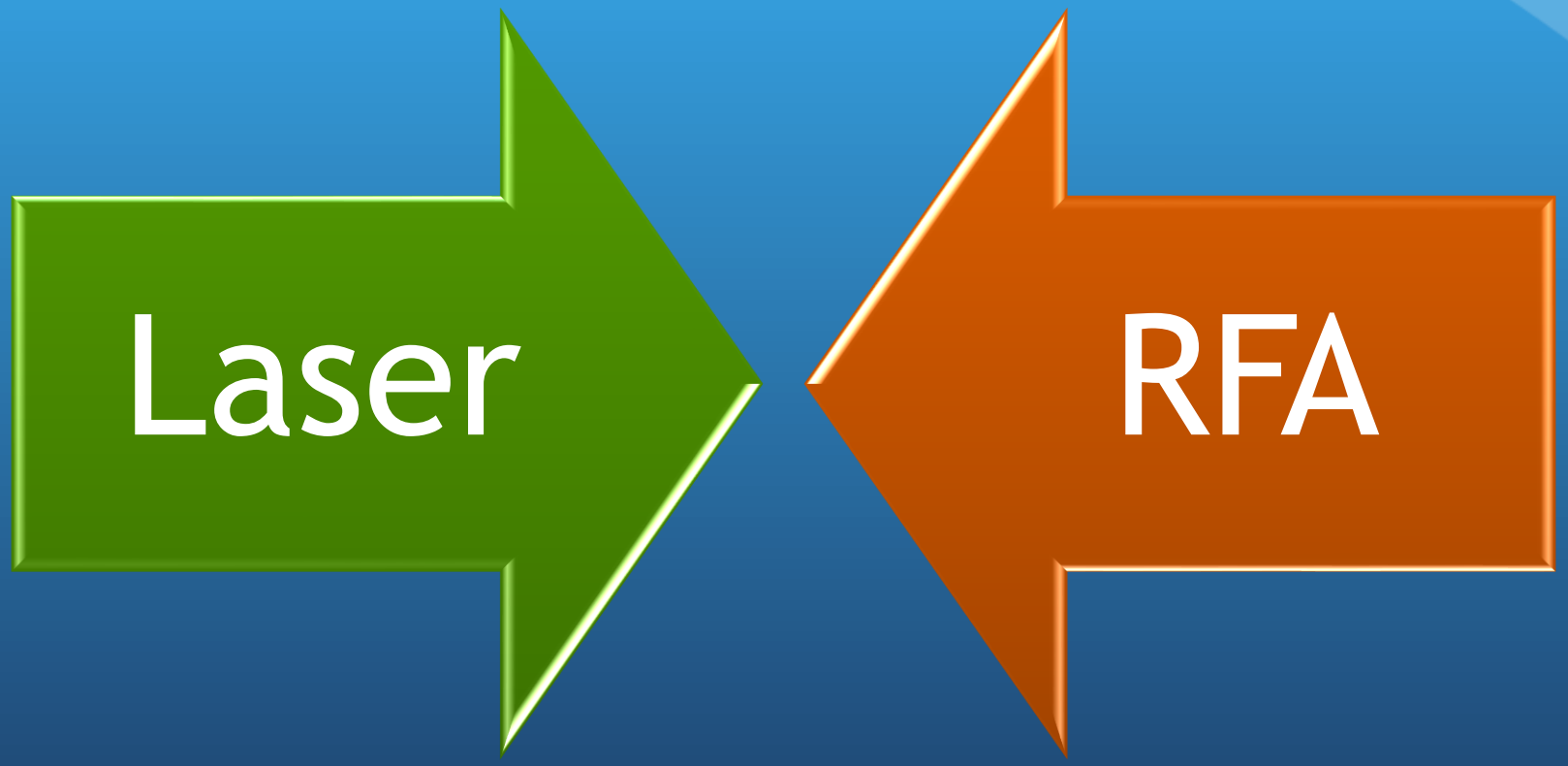
- Occlusion rate (5y): 96.2% vs 96.7%
- similar low postprocedure pain and short recovery
- similar improvements in quality of life

Lawson ea: Society for Vascular Surgery; http://dx.doi.org/10.1016/j.jvsv.2017.06.016

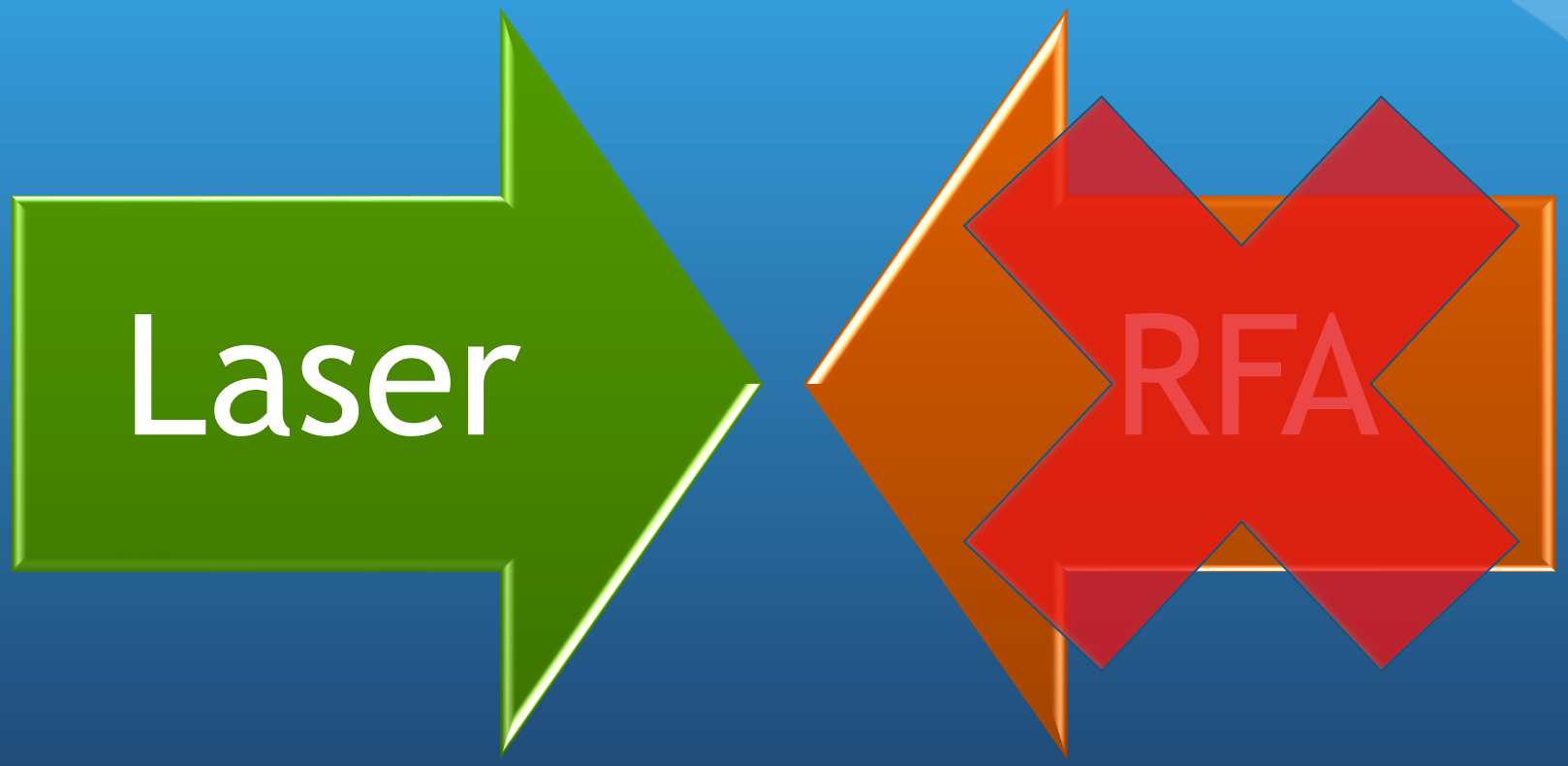
RFA or Laser ?

- Laser is …
  - Slimmer
  - More versatile (sidebranches, perforators, …)
  - Safer (pilot beam)

RFA or Laser ?



RFA or Laser ?



Theoretical Considerations

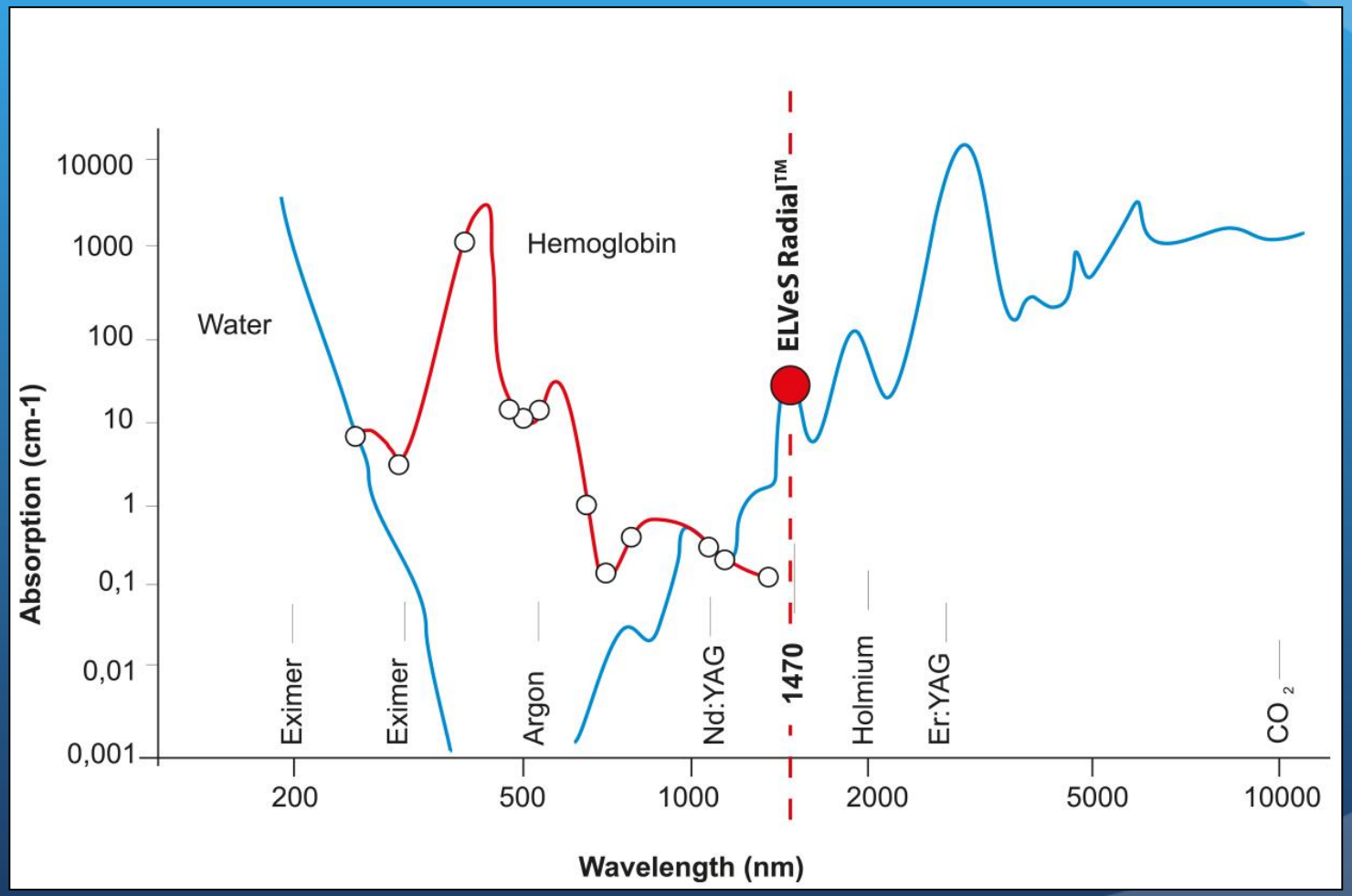
EVT

Laser

Wavelength & Fiber?

Laser: wavelength & fiber ?

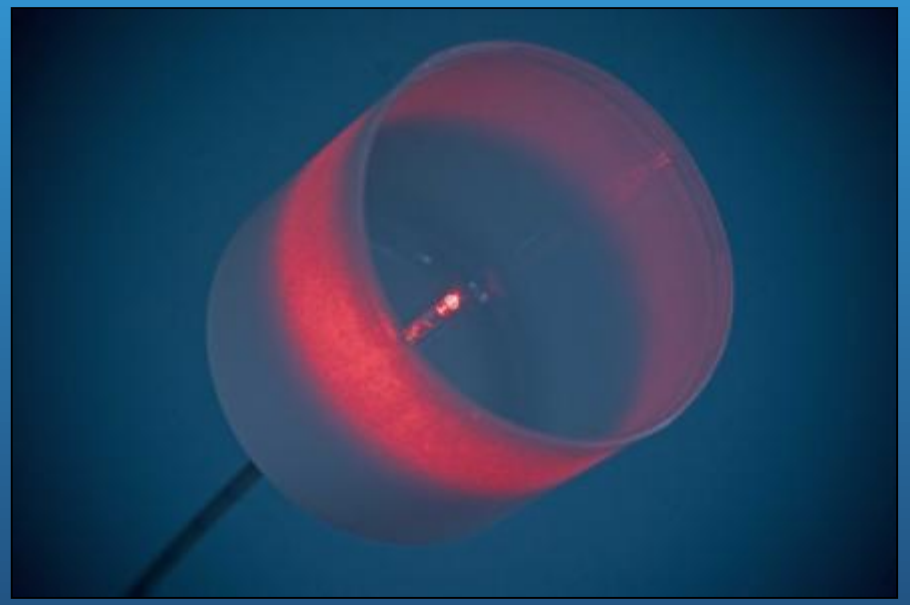
1470nm - Why wavelength matters …

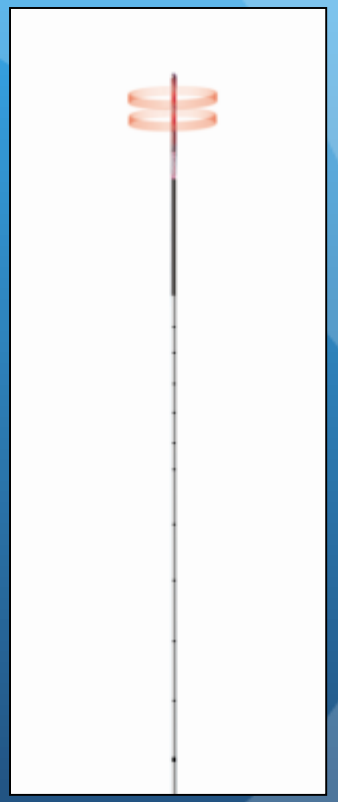


Laser: wavelength & fiber ?

Why fiber design matters …

Bare tip fiber

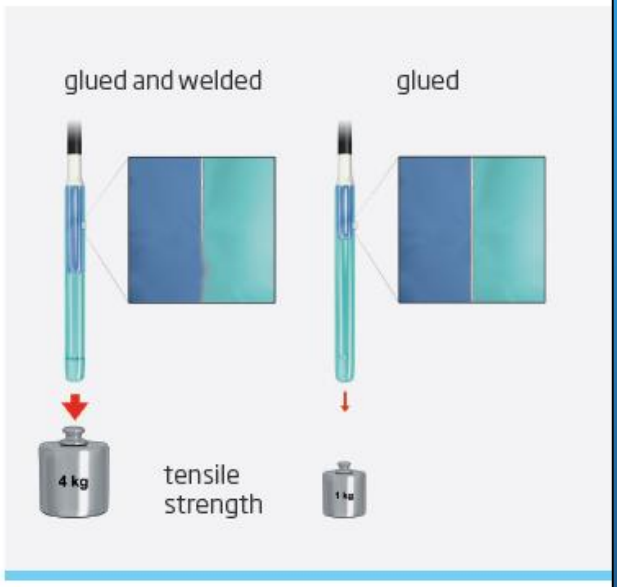




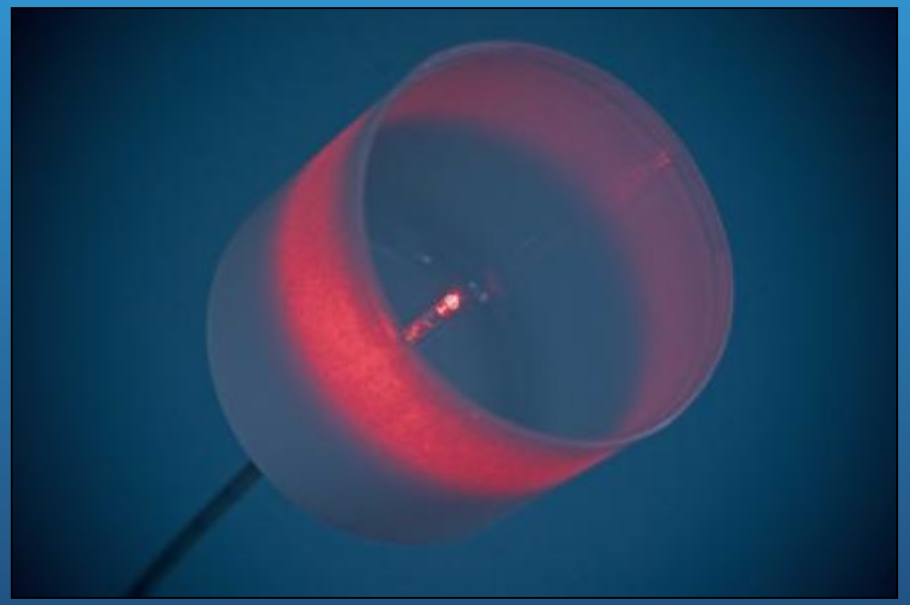
ELVeS Radial 1ring and 2ring fiber

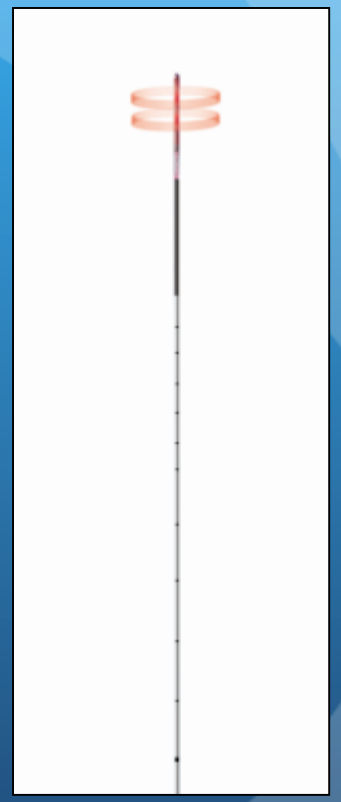
Laser: wavelength & fiber ?

Why fiber design matters …



On the right are the standard tensile forces that a catheter must meet.
On the left, you can see the tensile strength achieved through the Fusion® technology (internal biolitec® tests).





ELVeS Radial 1ring and 2ring fiber

Laser: wavelength & fiber ?

Why fiber design matters …

Recommended Cathetertip position

Laser (IFU ELVeS Radial)

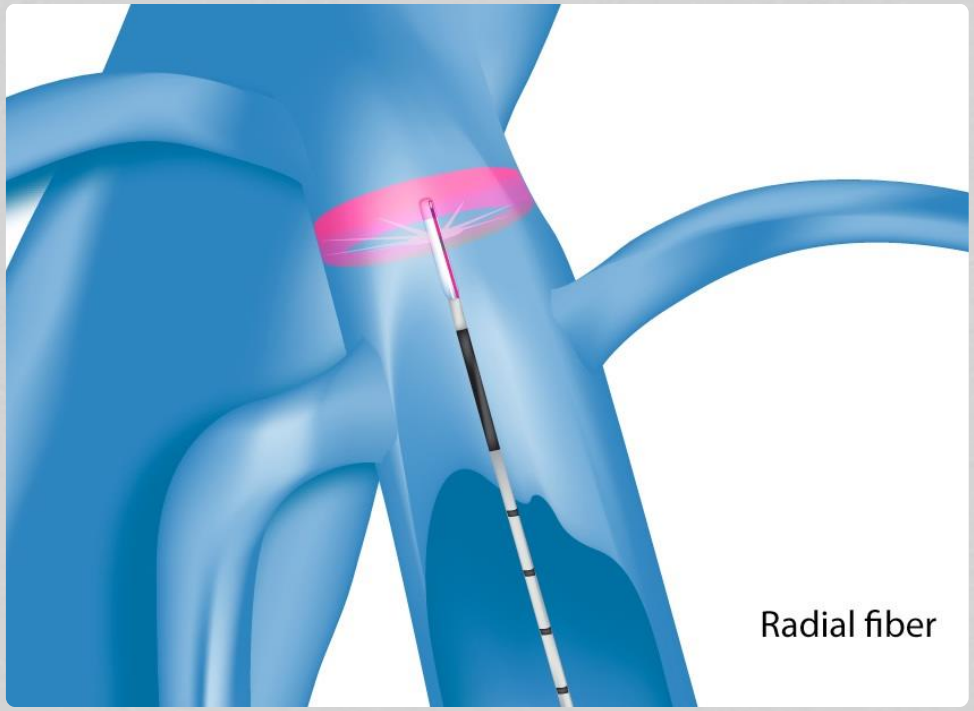
5 mm

Segmental RFA

20 mm

Glue

50 mm



Radial fibers give you the ability to decide “exactly” where you want to start your laser ablation according to patient anatomy.

Laser: wavelength & fiber ?

Why fiber design matters …

Table 2 Sources of clinical recurrence up to 5 years detected by duplex ultrasonography

	Source of reflux on DUS	No. of patients
Surgery ($n = 47$)	Groin neovascularization	19
	Residual GSV	14
	Non-axial varicosities alone	9
	AASV	8
	SSV	8
	Above-knee perforator	4
	Below-knee perforator	2
EVLA ($n = 29$)	SFJ into AASV	19
	Residual below-knee GSV	5
	Above-knee perforator	2
	Below-knee perforator	1
	Compete GSV recanalization	1
	Segmental GSV recanalization	2
	Non-axial varicosities alone	2
	SSV	2
	Duplex GSV	1
	Giacomini	1

Some patients had more than one identified source of reflux feeding clinically recurrent varicosities, so the total frequency is higher than the number of patients with recurrence. DUS, duplex ultrasonography; GSV, great saphenous vein; AASV, anterior accessory saphenous vein (anterolateral thigh vein); SSV, small saphenous vein; SFJ, saphenofemoral junction.

5y outcome EVLA vs HLS for GSV

n = 276

Clinical recurrence: 20.9% (EVLA) vs 34.3% (HLS)

Different pattern of recurrence

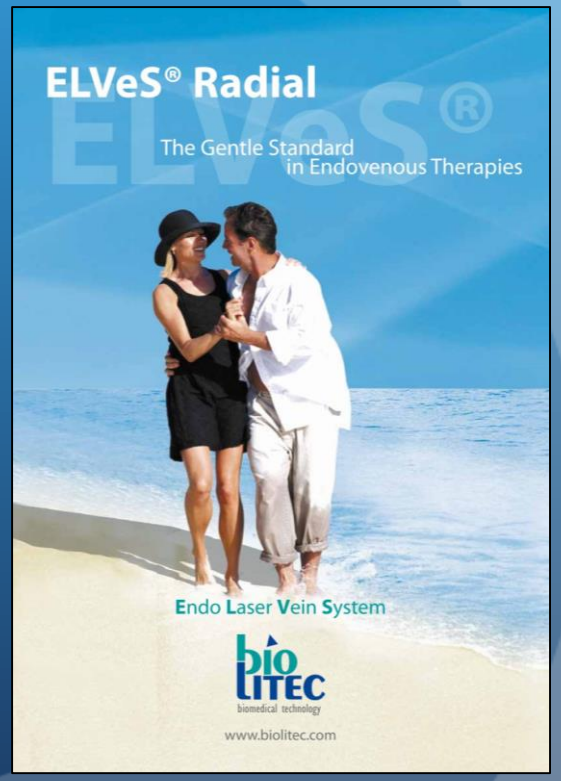
- aim for a flush SFJ ablation
- treat below knee GSV by EVLA

T. Wallace e.a. BJS 2018; 105:1759-1767 DOI: 10.1002/bjs.10961

Laser: wavelength & fiber ?

Combination of 1470 nm laser and radial fiber

- Results in …
  - Less carbonisation
  - lower temperature
  - No dammage to fibertip
  - No perforations of the vein
  - Accurate direct dammage of vesselwall
  - Immediate shrinkage of the vein
  - Less hematoma formation and inflammation



High efficiency, low morbidity

Overview

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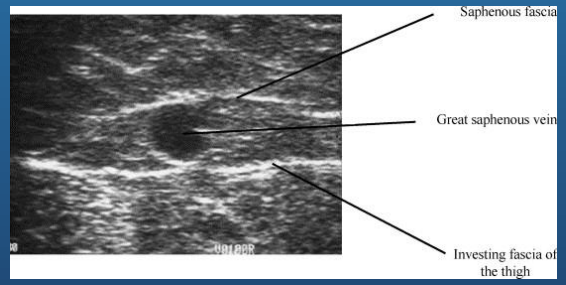
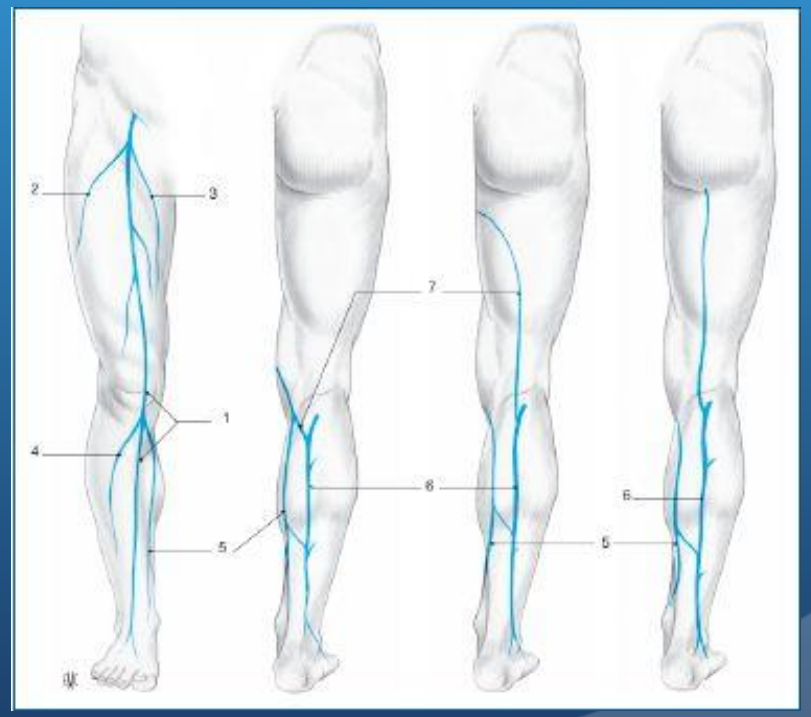
Practical Application

- Patient Selection
  - Inclusion criteria
    - Truncal varicosis GSV
    - Truncal varicosis SSV
    - Insufficient perforators





Practical Application

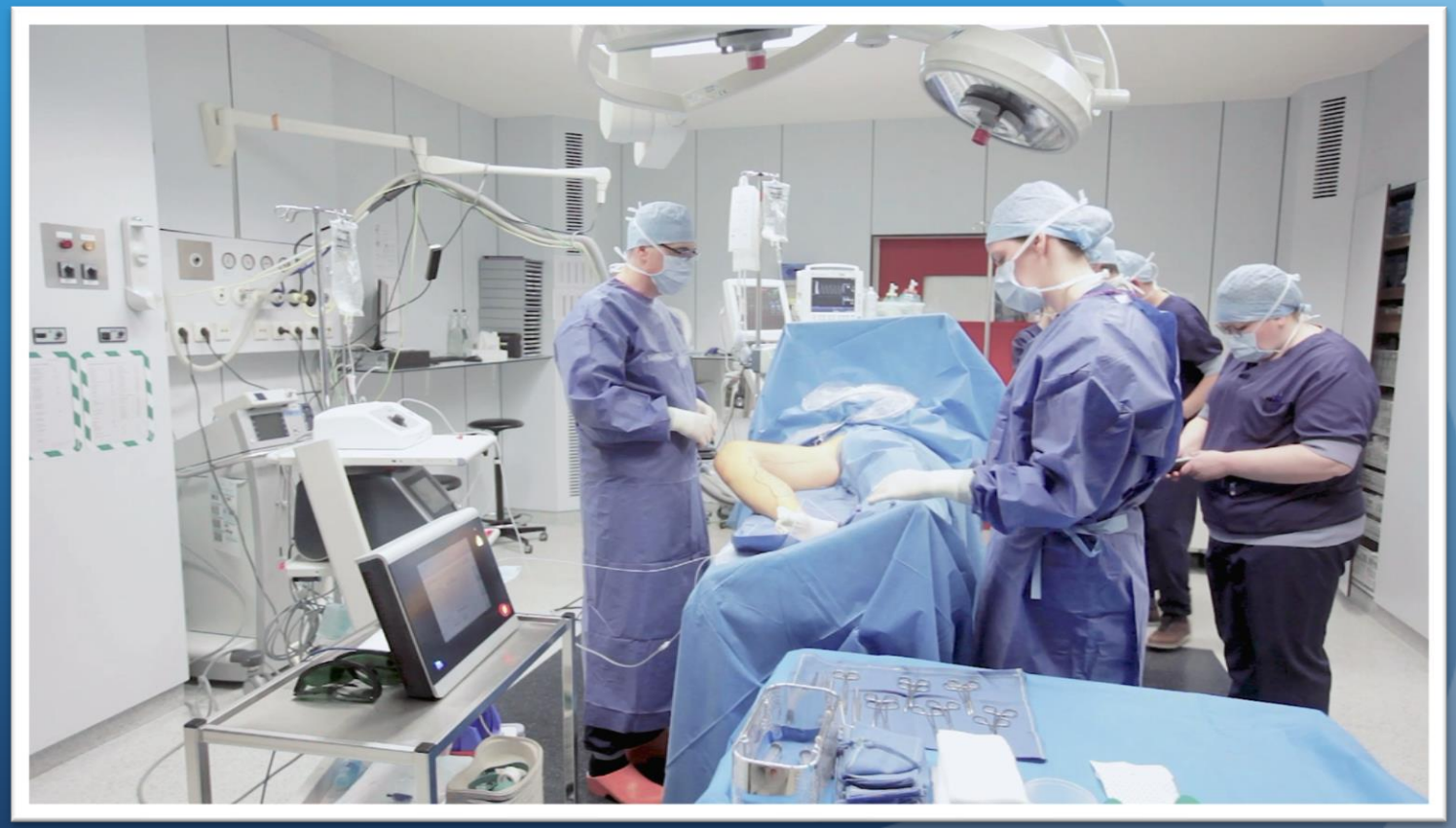
- Patient Selection
  - Exclusion criteria ???
    - Vein diameter > 20 mm
    - Coagulation disorders
    - Superficial course of vein
    - Multiple insufficient sidebranches at the cross

Practical Application

- Materials
  - Sonography
  - Laser generator
  - Laser fiber
  - Tumescence fluid
  - Infusion pump
  - Acces set
  - Surgical instruments
- Anesthesia

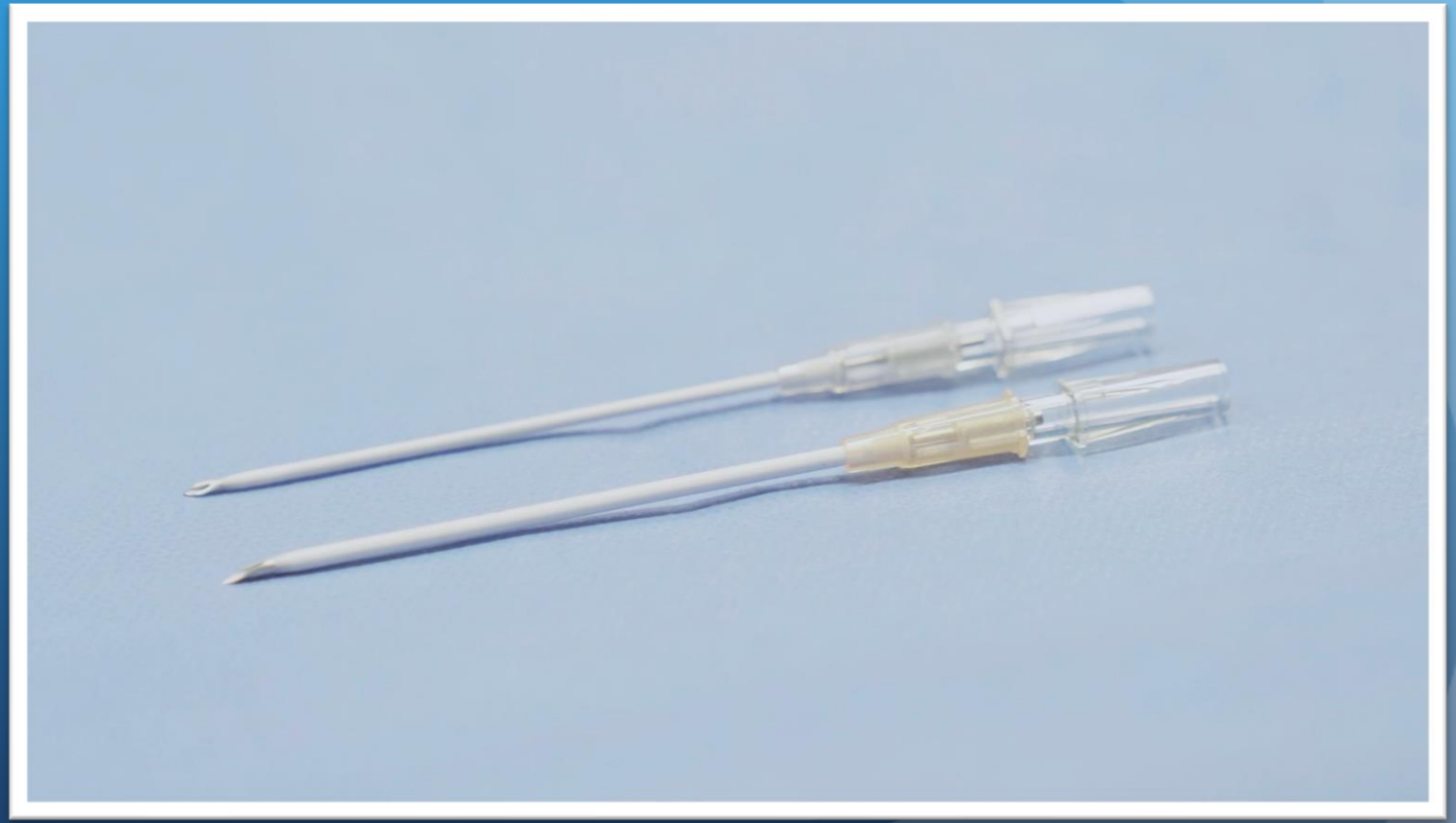
Practical Application

- Patient installation
  - Suppine (also SSV)
  - Anti-Trendelenburg
  - Trendelenburg
- Vein access



Practical Application

- Vein access
  - Access set
  - Needle catheter (14/16G)
  - US guided puncture
  - SSV in supine position



Practical Application

- Fiber insertion
- Fiber positioning
  - Use pilot beam and US
  - Chech and double check
  - Don’t change leg position
- Tumescence
  - 1l NaCl + 20ml Xylo/adrenaline
  - Retro-accoustic shadow
  - Inject within saphenous eye
- Laser activation

Practical Application

- Phlebectomies
- Bandages

Practical Application

- Postoperative care
  - Steri-strips (1week)
  - Extra compression of treated truncal vein (24 hours)
  - Compression stockings (2weeks)
  - Mobilisation
  - Analgetics + NSAID
  - LMWH low dose (10 days)
- Follow up
  - 1 week
  - 1 month (+duplex)
  - 6 months (+duplex)

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ENDOVENOUS RADIAL LASER THERAPY – TECHNOLOGY FOR ADVANCED USERS

24th European Vascular Course 2021, **Maastricht**

Thomas Weiler MD

General surgeon, Vascular surgeon, Phlebologist

Venenzentrum Pforzheim, Germany

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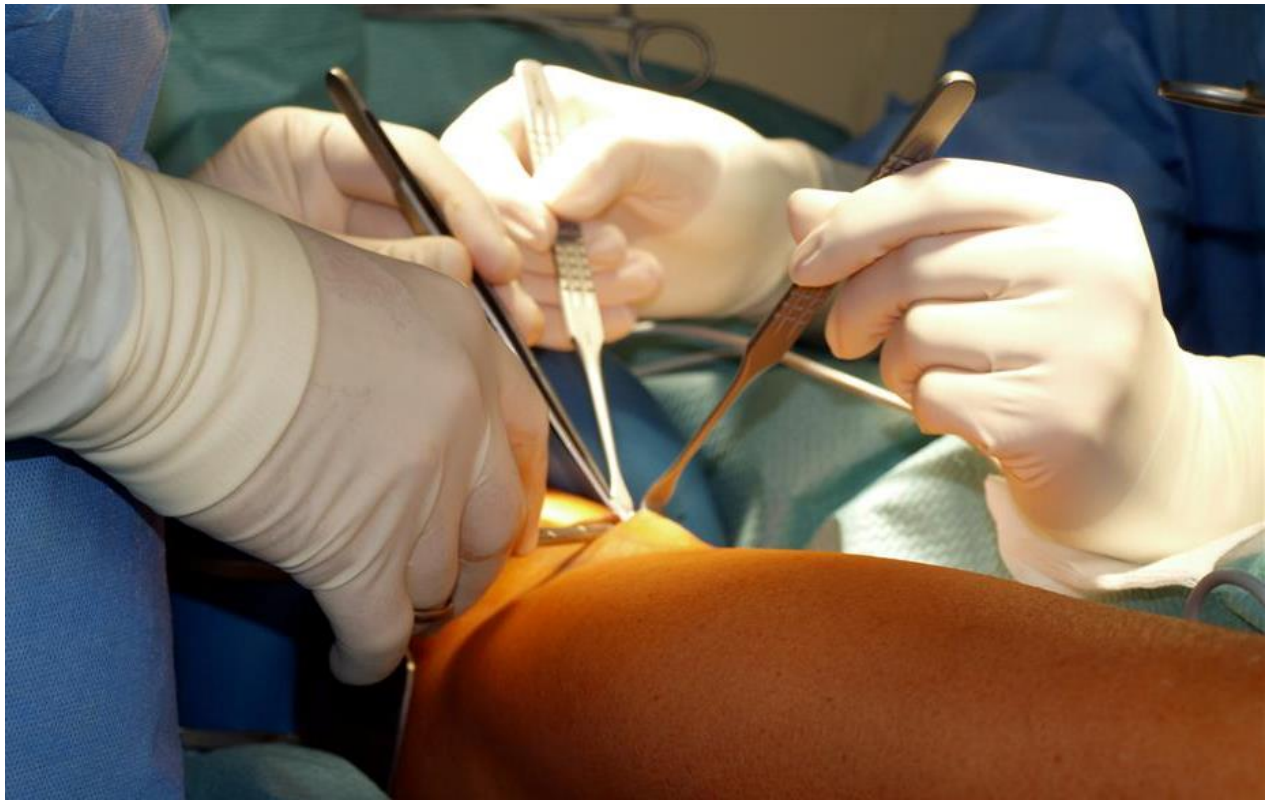
SURGERY VERSUS ENDOVASCULAR



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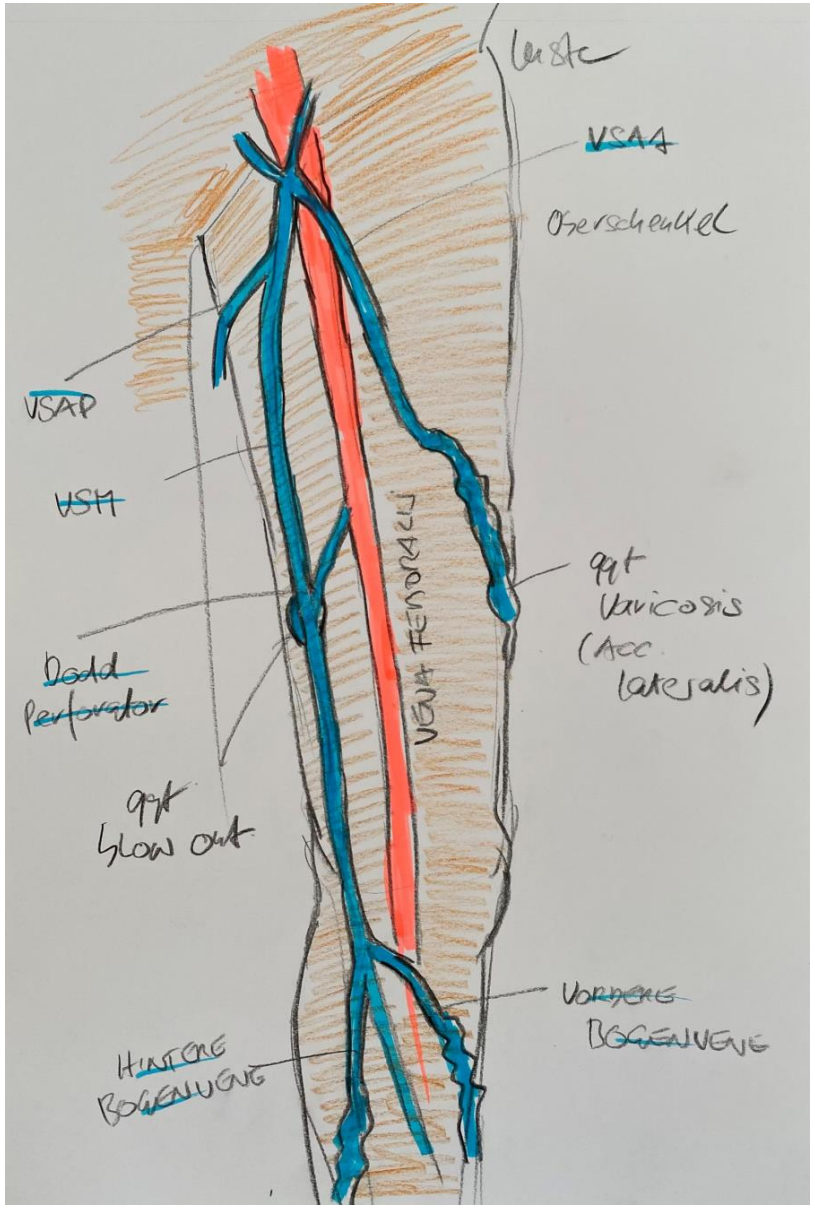
THE CREATIVE TECHNOLOGY



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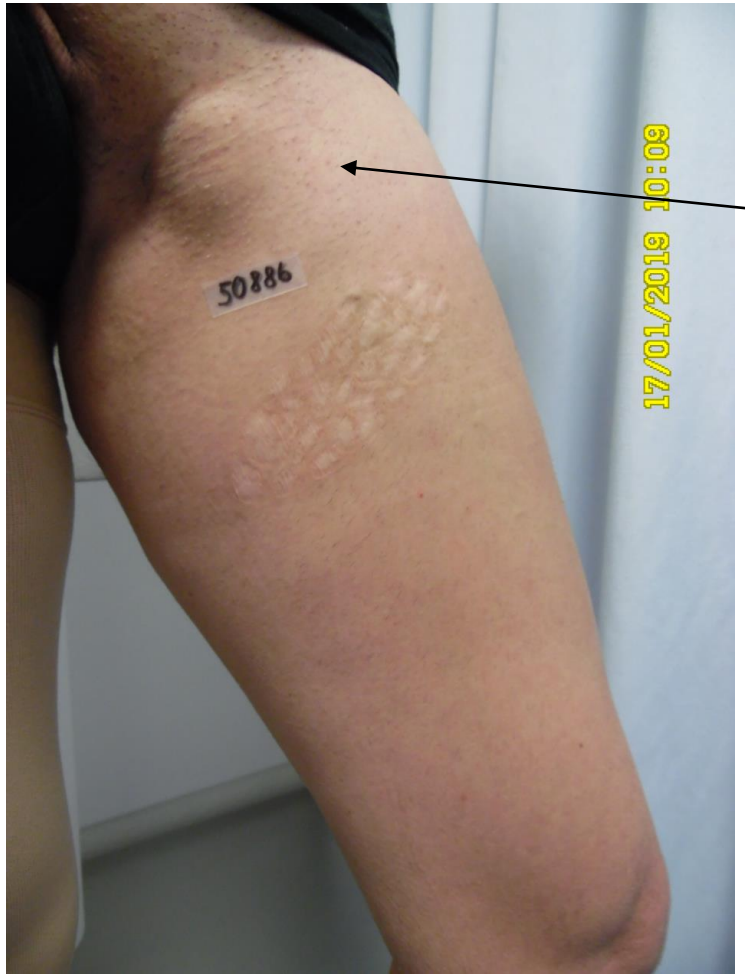
ENDOVASCULAR TREATMENT ?

- GSV/SSV > 3 CM
- REVAS (RECURRENT VARICES AFTER SURGERY)
- SUBCUTANEOUS SIDEBRANCHES AND TRIBUTARIES
- PERFORATING VEINS

GSV DIAMETER > 3 CM ENDOVASCULAR ?



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RECURRANCIES ENDOVASULAR ?

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SIDEBRANCHES ENDOVASCULAR ?

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SSV ENDOVASCULAR ?

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SUBCUTANEOUS GSV ENDOVASCULAR ?

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C 4b ENDOVASCULAR?

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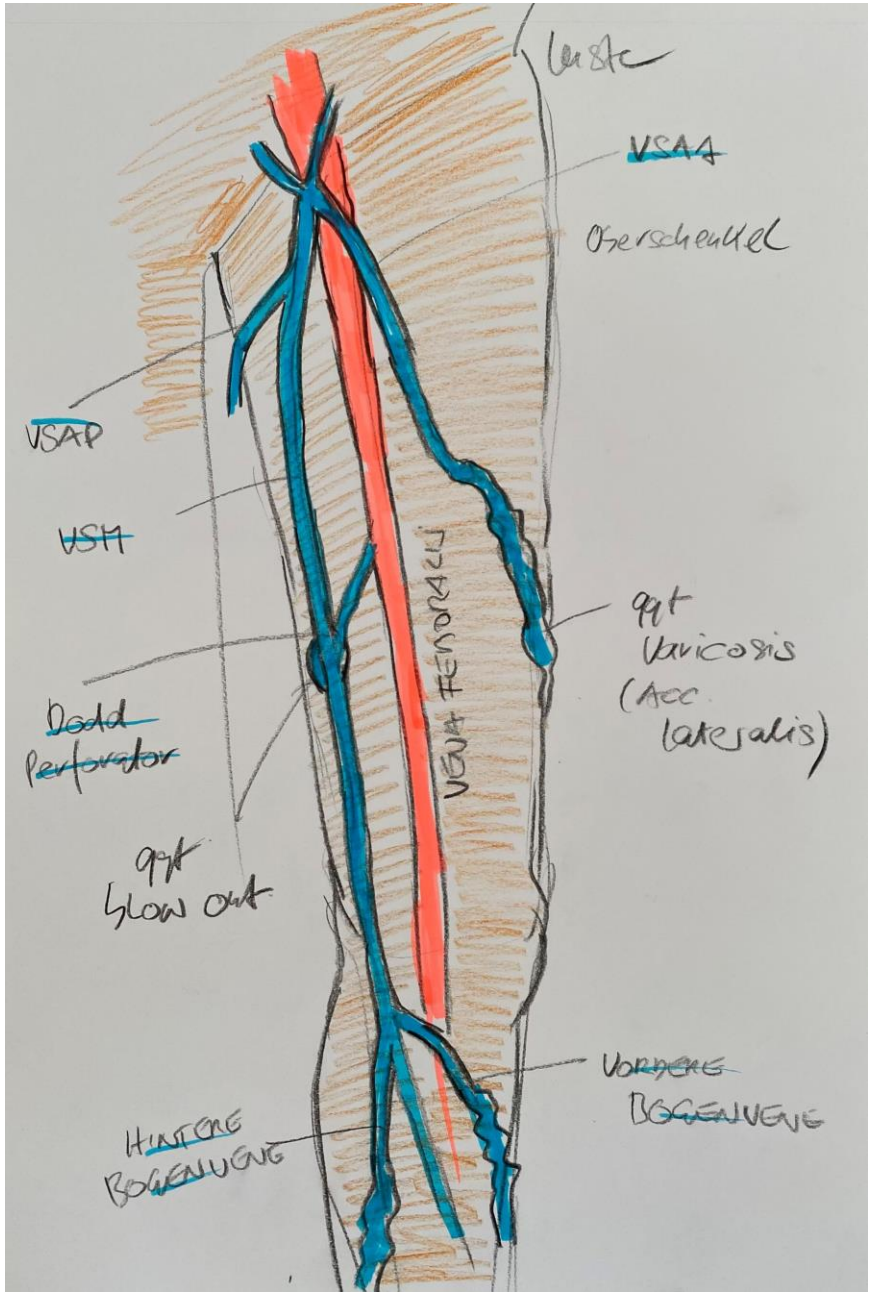
ADVANCED LASER ABLATION

- DIRECT PUNCTURE (tranverse approach)
- HIGH POWER LEVEL (W) adjusted to vein diameter
- HIGH LEED for main reflux source (=> 100 J/cm)
- FIRST: Truncal vein / Recurrancy (main reflux source)
- SECOND: Accessory veins, sidebranches, tributaries, perforators
- ONLY ADDITIONAL SCLEROTHERAPY



- 1 Truncal reflux GSV SSV
- 2 AAGSV / PAGSV
- 4 Varices medial and anterior thigh
- 5 Varices medial and posterior calf
- 6 Perforators

GSV > 3 CM

- Diameter GSV 3,99 cm
- Mean diameter GSV 9 mm
- Catheter 1 Ring swift 10 W
- $LEED_{max}$ 180 J/cm
- $LEED_{total}$ 5040 J

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BEFORE

DAY 255

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RECURRENT VARICES GSV

- **Second treatment**
- 7 cm stump AASV
- $LEED_{Max}$ 140 J/cm
- $LEED_{Total}$ 2741 J
- Warfarin (cardial) not interrupted

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BEFORE

DAY 95

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RECURRENT VARICES SSV

- **Second treatment**
- Max diameter SSV 22 mm
- Catheter 1 Ring swift 9 W
- $LEED_{max}$ 180 J/cm
- $LEED_{total}$ 3108 J

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DAY 160

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SIDEBRANCHES ENDOVASCULAR

- **GSV, C4 b**
- Max diameter GSV 15 mm
- Mean diameter GSV 10 mm
- 1 Ring swift 10 W
- $LEED_{max}$ 100 J/cm
- $LEED_{total}$ 4392 J

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BEFORE

DAY 81

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SIDEBRANCHES ENDOVASCULAR

- **GSV, C4 b**
- Max diameter GSV 15 mm
- Mean diameter GSV 10 mm
- 2 Ring Swift 10 W
- $LEED_{max}$ 100 J/cm
- $LEED_{total}$ 4767 J

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DAY 50

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SSV ENDOVASCULAR ?

- **SSV, C 3**
- Max diameter SSV 18 mm
- Mean diameter SSV 10 mm
- 2 Ring Slim 10 W
- $LEED_{max}$ 100 J/cm
- $LEED_{total}$ 2732 J

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BEFORE

DAY 189

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SUBCUTANEOUS GSV ENDOVASCULAR

- **GSV, C4 a**
- Max diameter GSV 20 mm
- Mean diameter GSV 10 mm
- 2 Ring slim 10 W
- $LEED_{max}$ 120 J/cm
- $LEED_{total}$ 5012 J

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SUBCUTANEOUS GSV ENDOVASCULAR

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C 4b ENDOVASCULAR

- **C 4b (REVAS)**
- Max diameter SSV 1,0 cm
- Mean diameter GSV 7 mm
- Catheter 2R slim
- $LEED_{max}$ 150 J/cm
- $LEED_{Total}$ 3922 J
- Rivaroxaban (cardial) not interrupted

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BEFORE

DAY 120

USED TECHNOLOGY

- 1470 (1940) NM Biolitec
- 2 Ring slim / 1 Ring Swift / 2 Ring Radial
- Direct puncture access (16 G, 14 G)
- Cooled tumescence
- Additional Sclerotherapy only
- Anesthesia

THE ADVANCED APPLICATION

▪ LARGER DIAMETER GSV/SSV	ARE TREATABLE > 3 cm
▪ RECURRENT VARICES AFTER SURGERY	IDEAL INDICATION
▪ SIDEBRANCHES, SUBCUTANEOUS TRIBUTAIRIES	SHOULD BE TREATED
▪ STILL LIMITATIONS ?	? ? ?
▪ WHAT IS FUTURE TECHNOLOGY ?	New Fibers ? 1940 NM ?

CONCLUSION

- Max LEED: 100 - 180 J/cm in larger diameter
- Technical limits: Carbonisation of fiber
- Medical limits: Persistent foramen oval
- Individual limits: Experience


WATER AND LIGHT

THANK YOU FOR YOUR ATTENTION!

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Overview

- Why we do it ?
- How we do it ?
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Ultrasound guided puncture

Take home message

- look for optimal puncture site
- aim - puncture - hit
- and remember …

Ultrasound guided puncture

Take home message

look for optimal puncture site

aim - puncture - hit

and remember …

IT'S ALL ABOUT THE NEEDLE TIP

&

DON'T TRY AGAIN AND AGAIN