

**Radial endovenous laser (Radial EVLA)
vs
Radiofrequency ablation (RFA):
advantages disadvantages**

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Disclosures

- ▶ **Angiodynamics training course**

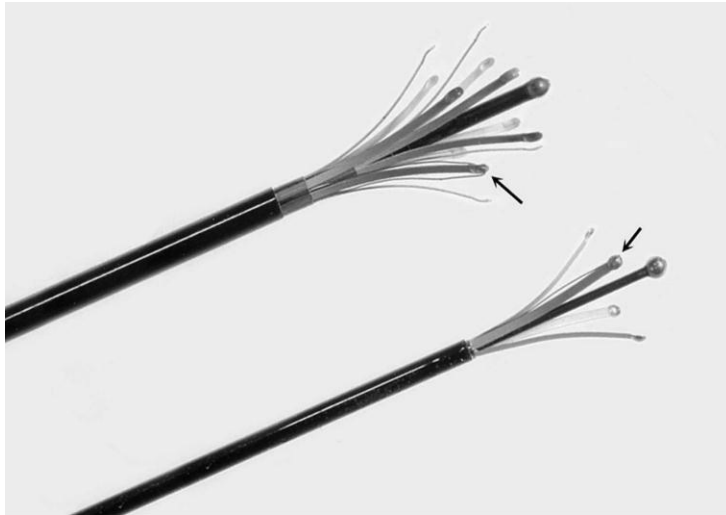
Endovenous Thermoablation

- ▶ **1998:**
 - **Radiofrequency Ablation**
 - **VNUS Closure**

- ▶ **1999:**
 - **Endovenous Laser Ablation**
 - **EVLT**

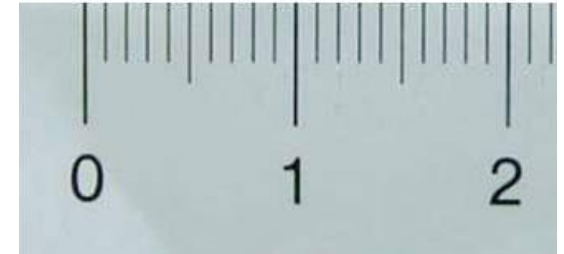
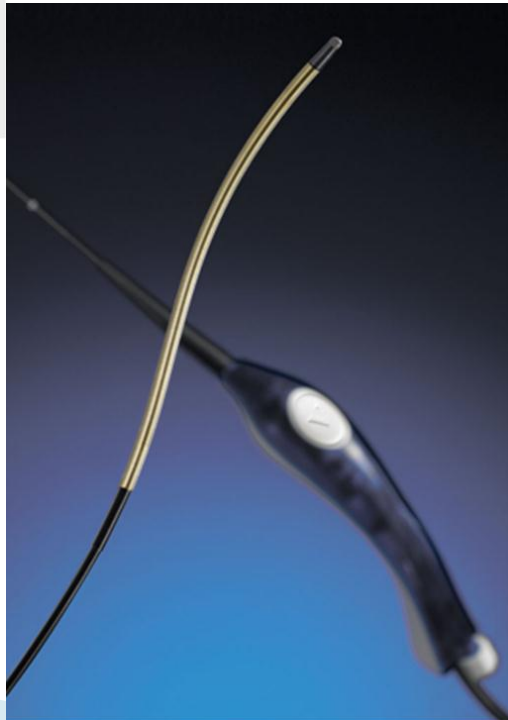
- **Both techniques highly effective**
- **Both techniques modified many times**

Radiofrequency Ablation



VNUS Closure FAST
(Segmental "RFA")

VNUS Closure
VNUS Closure PLUS



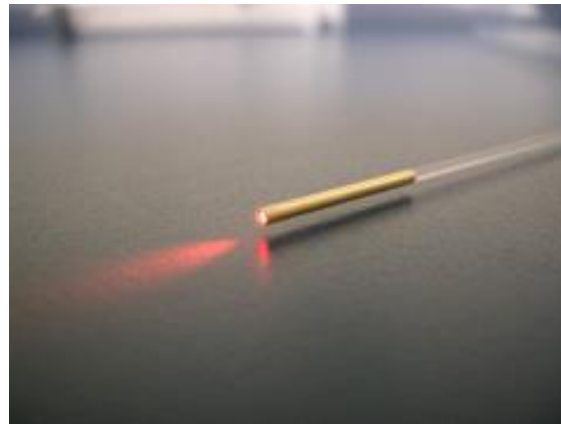
RFiTT (Celon / Olympus)

EVLA



Bare tip
End firing
- Many wavelengths

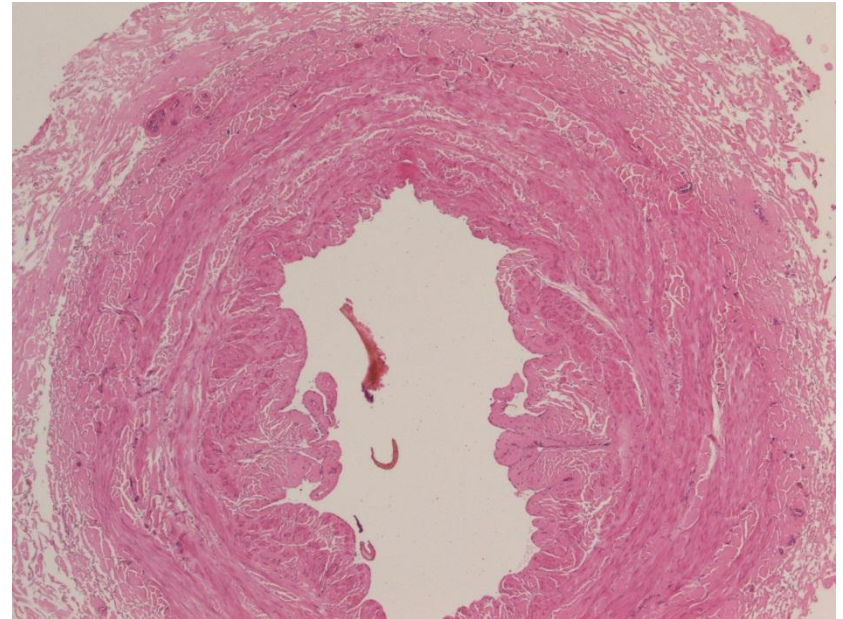
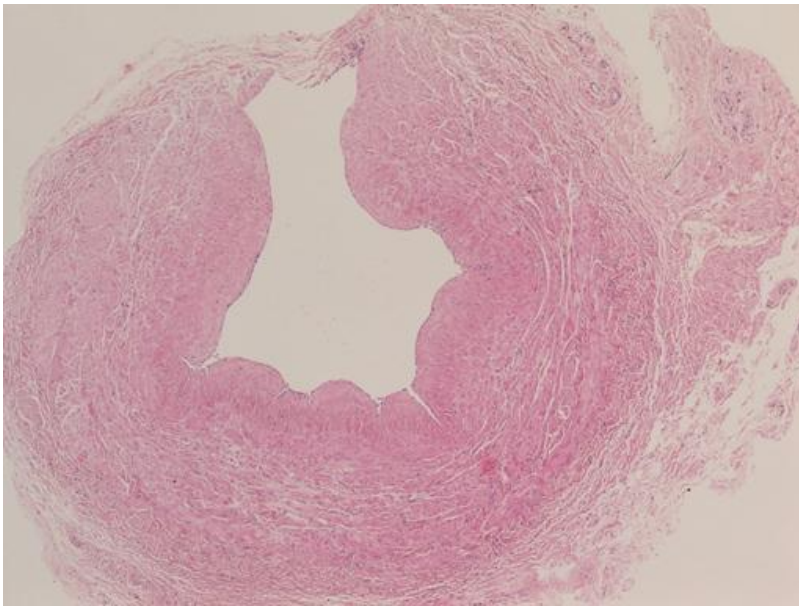
Covered tips
End firing
- Many wavelengths



Radial Firing
- 1470 nm

Aim of Thermoablation

- ▶ **Transmural death – Fibrosis**
- ▶ **NOT Thrombotic occlusion**

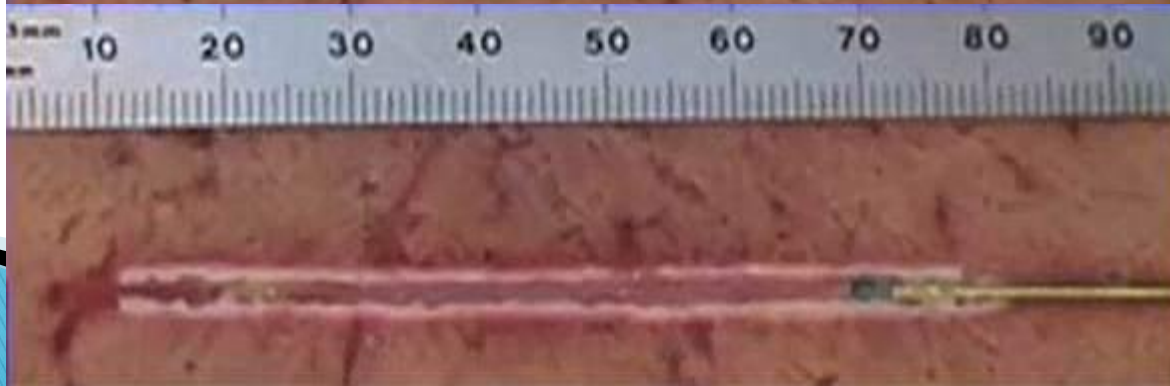
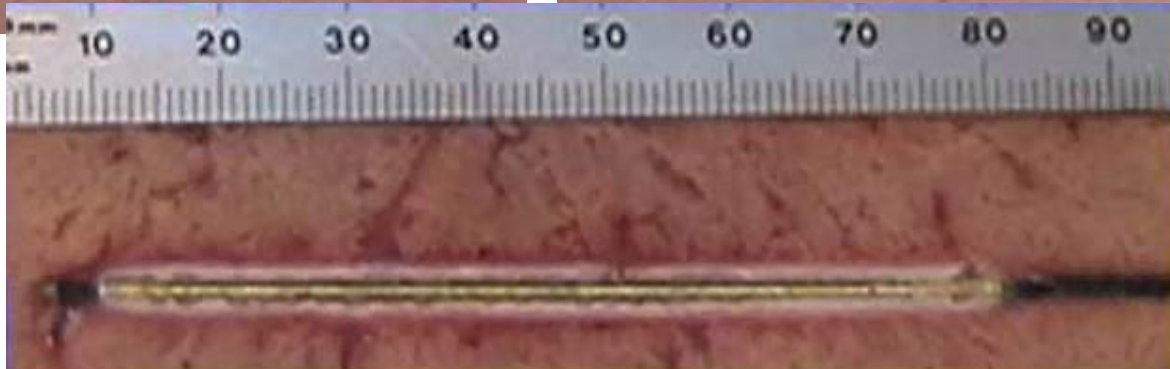
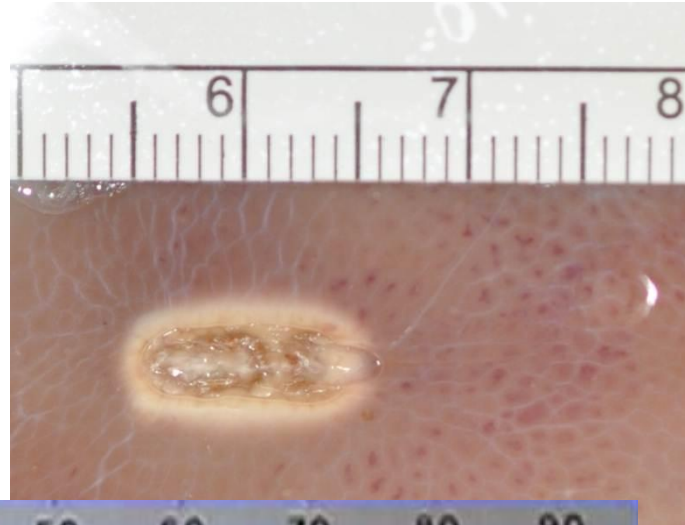
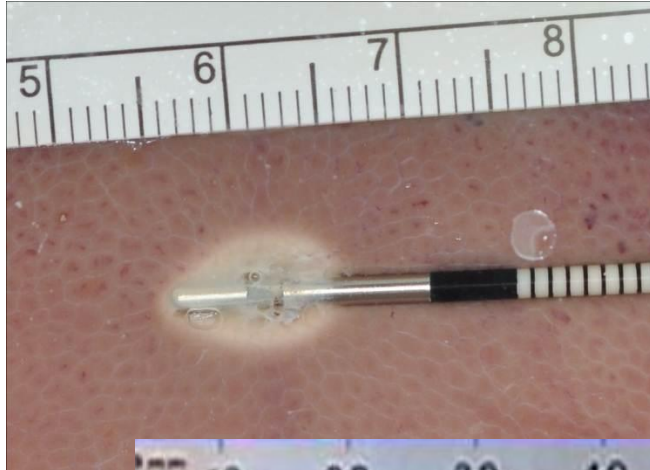


Patterns of Thermoablation

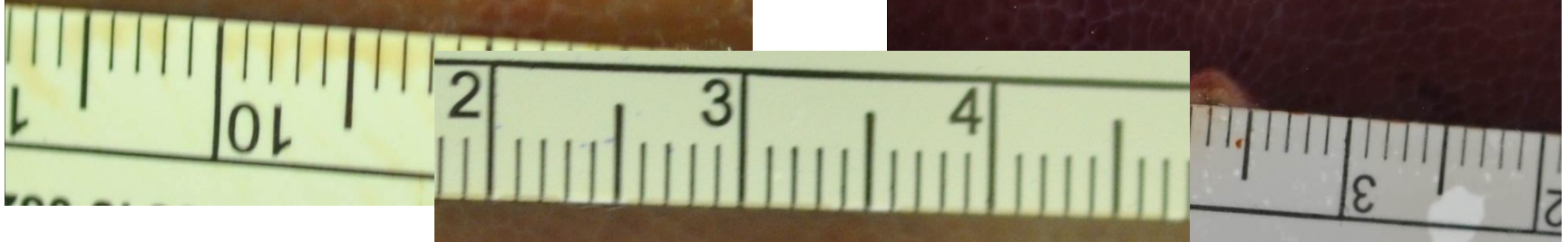
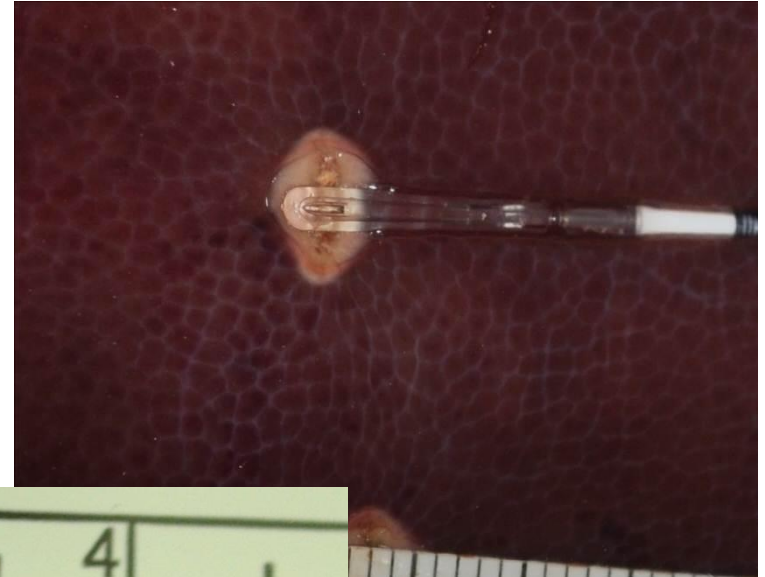
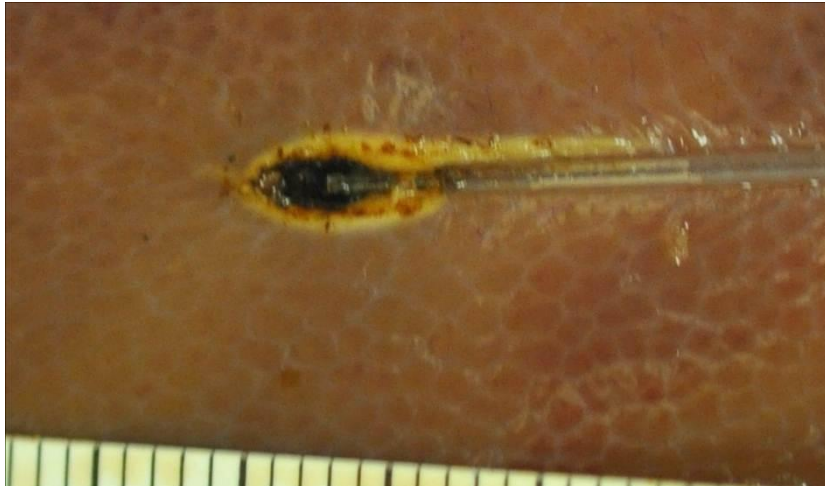
- ▶ Essential to understand:
 - Pattern of Thermal Spread
 - Tissue effects

- ▶ We investigate using:
 - Theoretical model
 - In-vitro Porcine liver model
 - Explanted human vein
 - Clinically in patients

Mechanisms RFA



Mechanisms EVLA



Efficacy:

▶ Truncal Veins:

- Should be 100% effective:
- LEED >60 J/cm (higher if very big)
- Correct technique
- Any abnormalities identified and countered

Advantages / disadvantages

▶ Radial EVLA v RFA:

- Radial EVLA



- Segmental “RFA”



- RFiTT



Morphology of Vein Wall

- ▶ Radial EVLA
 - Virtually any size vein
 - Can increase power for thrombus / calcified areas

- ▶ Segmental “RFA” and RFiTT
 - Need wall contact
 - Very large diameters may fail
 - Need concentric contraction
 - Poor contact with mural thrombus / calcification

Speed of Treatment

- ▶ Segmental “RFA”
 - 3 sec / cm [20 sec for 7cm segment]
 - (6 sec/cm for double treatment)

- ▶ Radial EVLA
 - 6 – 8 sec / cm
 - (depending on power and LEED)

- ▶ RFiTT
 - 12 sec / cm
 - (previous 1 sec / cm = Inadequate)

Length to be treated

▶ Radial EVLA

- Any length
 - Approx. 4–5 mm treatment length min

▶ RFiTT

- Virtually any length > 1 cm
 - Approx. 1 cm treatment length min

▶ Segmental “RFA” > 7 cm (*new catheter 3cm*)

- Restricted by length of segment
 - 7cm standard catheter
 - (3 cm for new catheter – but needs second device)

Treatment parameters (LEED)

- ▶ Radial EVLA
 - Fully variable POWER and pull-back

- ▶ RFiTT
 - Fully variable POWER and pull-back
 - BUT High Impedance Cut-Out

- ▶ Segmental “RFA”
 - Restricted to set Power and time
 - Only variation is number of cycles

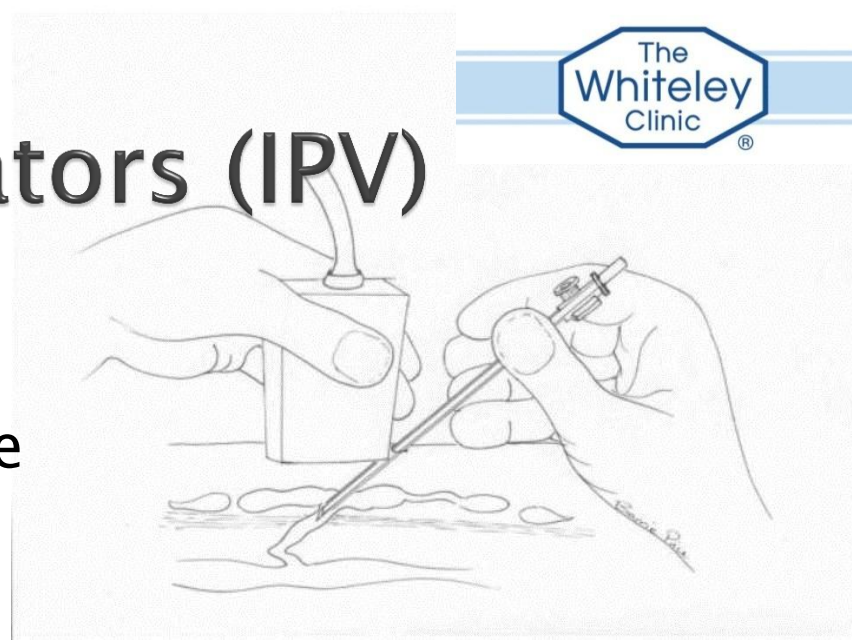
Small Saphenous Vein (SSV)

- ▶ Radial EVLA and RFiTT
 - Any pain or nerve irritation
 - If tumescence adequate
 - Stop treatment – withdraw 1 cm and re-start

- ▶ Segmental “RFA”
 - Any pain or nerve irritation
 - If tumescence adequate
 - Have to withdraw whole segment – 7cm untreated segment
 - *(or 3cm with new catheter)*

Incompetent Perforators (IPV)

- ▶ Radial EVLA
 - Perfect for TRLOP technique
- ▶ RFiTT
 - Suitable for TRLOP technique
 - BUT 1 cm length – care for surrounding structures
- ▶ Segmental “RFA”
 - Unable to treat IPV
 - Need to open another device to perform TRLOP



Ease of Treatment

- ▶ Segmental “RFA”
 - Easy to learn and do
 - No need to understand LEED etc

- ▶ Radial EVLA
 - Requires steady, constant pull-back

- ▶ RFiTT
 - Published techniques – need fast pull back, steady
 - Whiteley Clinic intermittent Technique – easy but need to measure every 5mm (*catheter not marked*)

Laser Regulations

- ▶ Segmental “RFA” and RFiTT
 - No laser regulations needed

- ▶ Radial EVLA
 - Laser regulations
 - Laser proof room
 - Locked doors
 - Eye protection

Conclusion 1

- ▶ Radial EVLA, Segmental “RFA” and RFiTT
 - All effective in truncal veins IF used optimally

- ▶ Radial EVLA – Advantages:
 - Wider range of vein sizes and wall morphologies
 - Faster than RFiTT, slower than Segmental “RFA”

Conclusion 2

- ▶ Radial EVLA and RFiTT:
 - Flexibility of power settings, pull-back speed
 - Able to treat short lengths of veins, IPV's and SSV

- ▶ Segmental “RFA”:
 - Easy to learn and perform.
 - Fastest if only 1 cycle per segment
 - BUT Only really useful in the simplest veins