Venous diseases

김창수·수 흉부외과
김창수

Anatomy

- 3 system
  - Superficial
  - Deep
  - Perforating
- 2 compartment
  - Superfitial
  - Deep

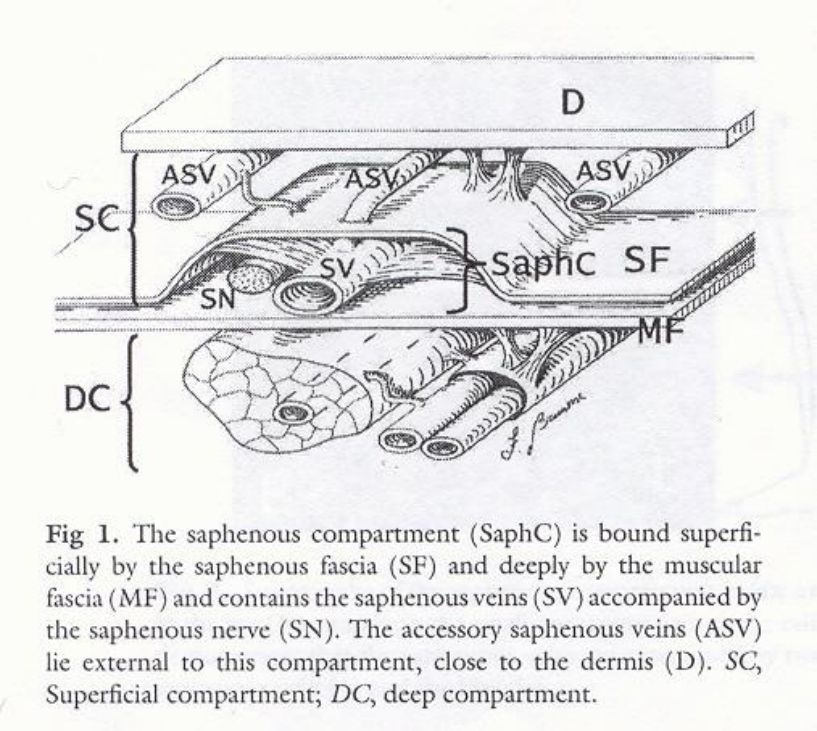


Fig 1. The saphenous compartment (SaphC) is bound superficially by the saphenous fascia (SF) and deeply by the muscular fascia (MF) and contains the saphenous veins (SV) accompanied by the saphenous nerve (SN). The accessory saphenous veins (ASV) lie external to this compartment, close to the dermis (D). *SC*, Superficial compartment; *DC*, deep compartment.

- Communicating vein ; interconnection with other veins of the same system

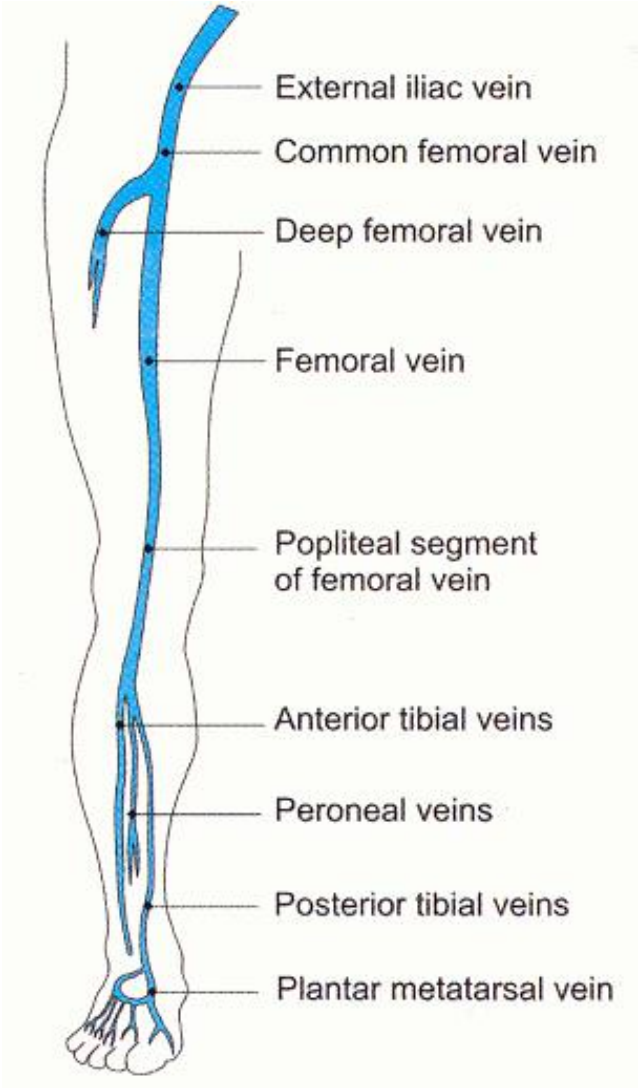
Superficial venous system

- **GSV (Great saphenous vein)**
  - SFJ 에 5개의 branch
    ; epigastric, circumflex iliac, external pudendal, ant.& post accessory V.
  - Below knee ; anterial, posterior accessory V.
- **SSV (Small saphenous vein)**

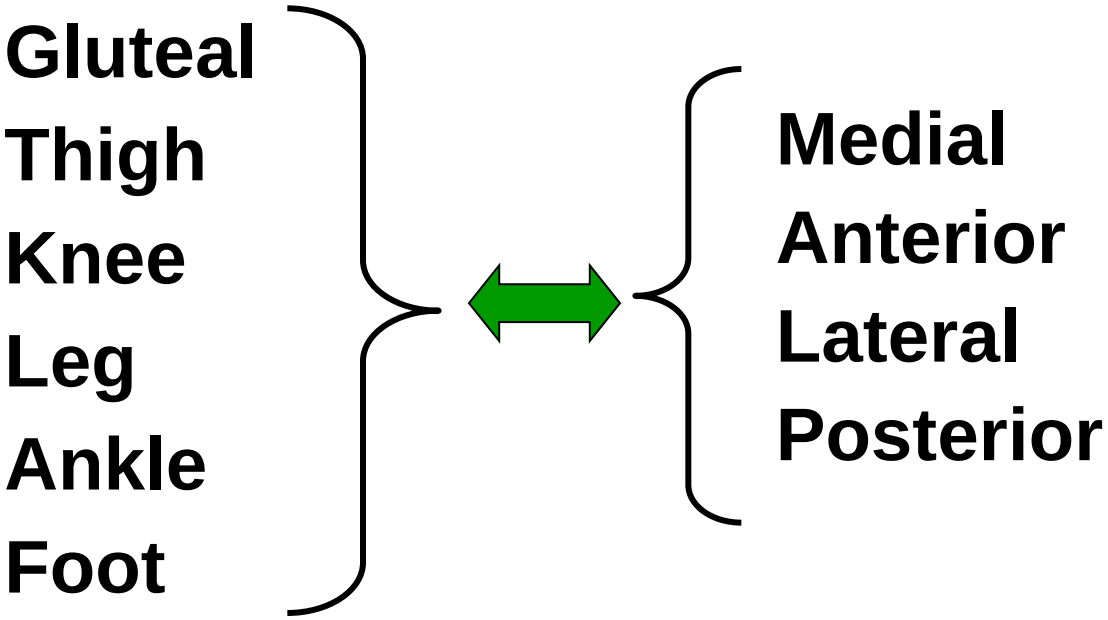
Normal veins

Normal valve movement

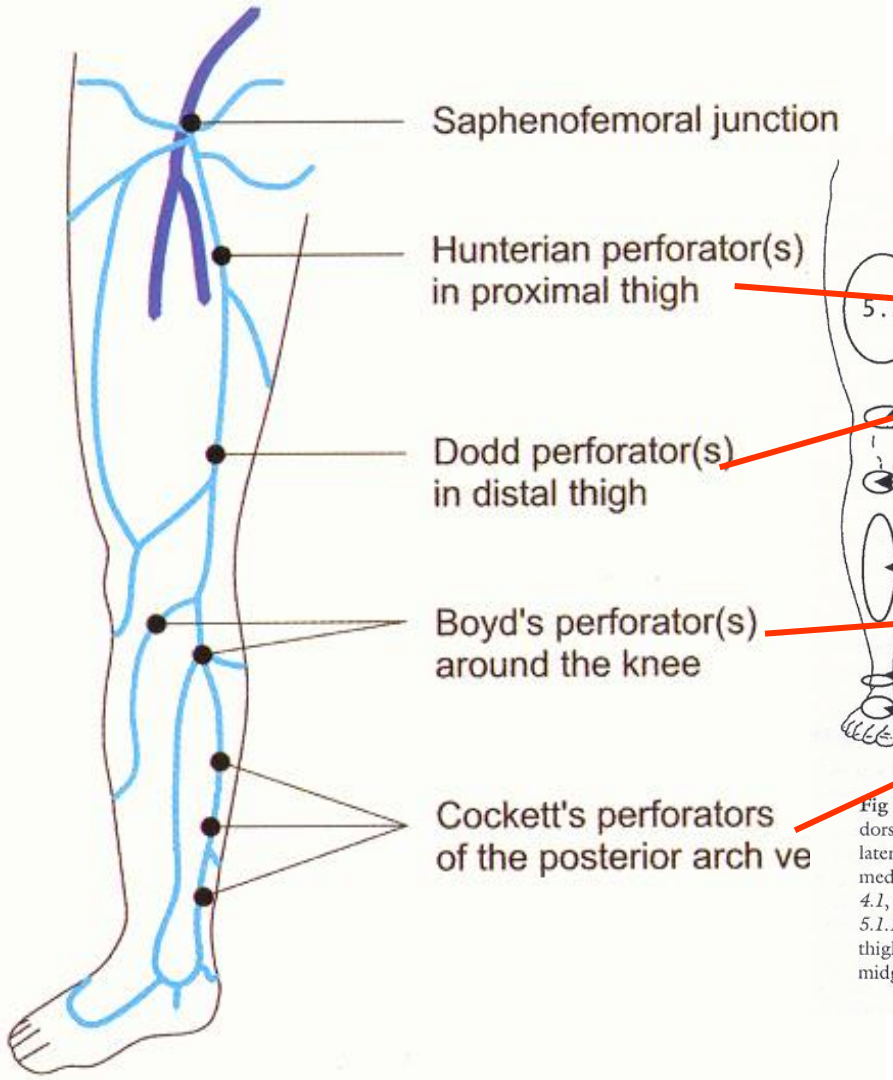
Deep venous systems



Perforating veins



J Vasc Surg 2002;36;416-22



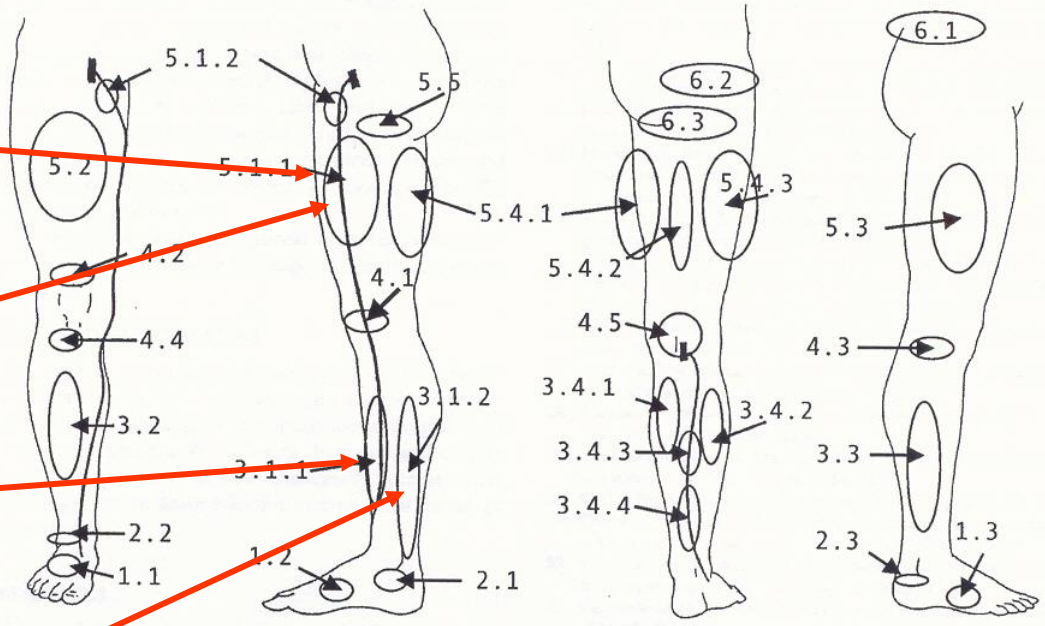
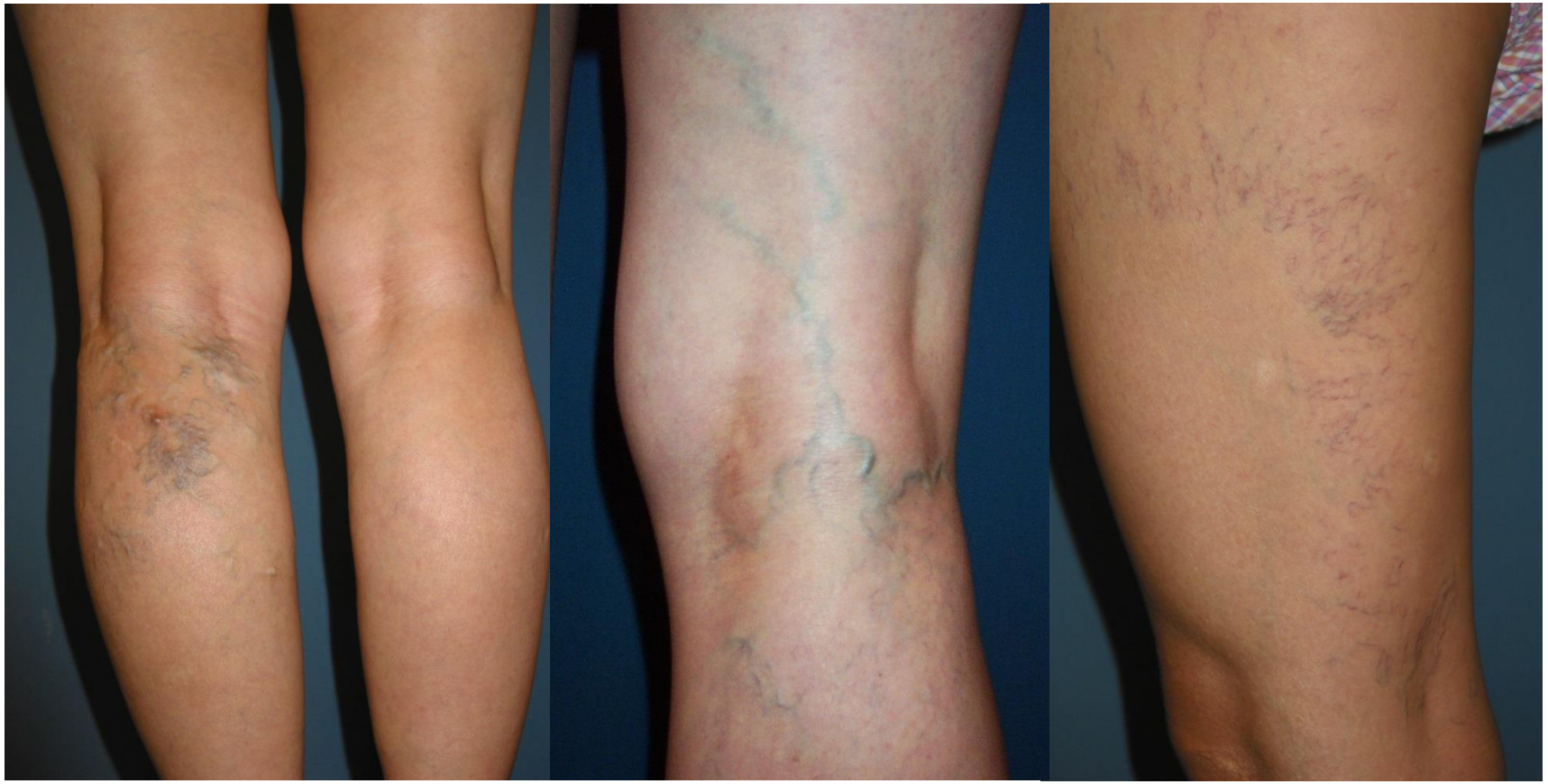


Fig 5. Schematic representation of the topography of the main groups of perforating veins (PVs). Foot PVs: *1.1*, dorsal foot PV; *1.2*, medial foot PV; *1.3*, lateral foot PV. Ankle PVs: *2.1*, medial ankle PV; *2.2*, anterior ankle PV; *2.3*, lateral ankle PV. Leg PVs: *3.1.1*, paratibial PV; *3.1.2*, posterior tibial PV; *3.2*, anterior leg PV; *3.3*, lateral leg PV; *3.4.1*, medial gastrocnemius PV; *3.4.2*, lateral gastrocnemius PV; *3.4.3*, intergemellar PV; *3.4.4*, para-achillean PV. Knee PVs: *4.1*, medial knee PV; *4.2*, suprapatellar PV; *4.3*, lateral knee PV; *4.4*, infrapatellar PV; *4.5*, popliteal fossa PV. Thigh PVs: *5.1.1*, PV of the femoral canal; *5.1.2*, inguinal PV; *5.2*, anterior thigh PV; *5.3*, lateral thigh PV; *5.4.1*, posteromedial thigh PV; *5.4.2*, sciatic PV; *5.4.3*, posterolateral thigh PV; *5.5*, pudendal PV. Gluteal PVs: *6.1*, superior gluteal PV; *6.2*, midgluteal PV; *6.3*, lower gluteal PV.

Clinical classification

- C0 ; No visible or palpable signs
- C1 ; Telangiectasia or reticular veins
- C2 ; Varicose veins - C1/C2 cut off diameter = 3mm
- C3 ; Edema - Corona phlebectasia는 논의중
- C4 ; Skin change
  - C4a ; pigmentation – eczema
  - C4b ; lipodermatosclerosis – white atrophy
- C5 ; as C4 with healed ulceration
- C6 ; as C4 with active ulceration



Reticular and Spider veins

(CEAP C1)

Varicose veins

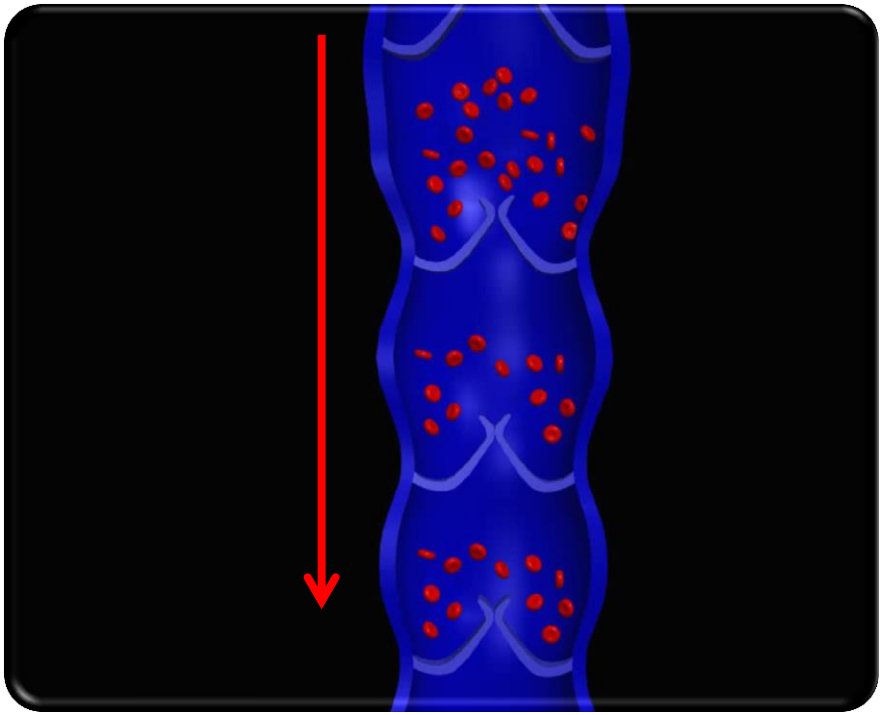
(CEAP C 2,3)

Complicated varicose veins

(CEAP C4,5,6)

판막의 역류가 원인

정상



비정상

Symptoms

- Aching ; 77%, F>M
- Heaviness
- Itching
- Night cramp, tiredness ; 10-15%
- Swelling

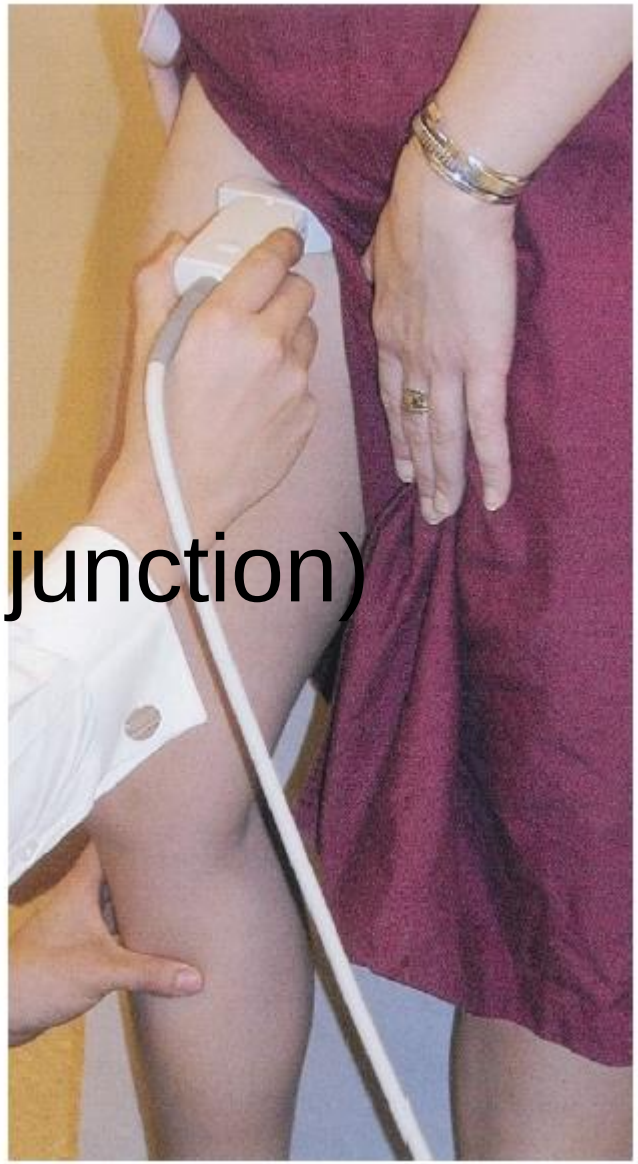
Thrombophlebitis

Duplex scan(혈관초음파)

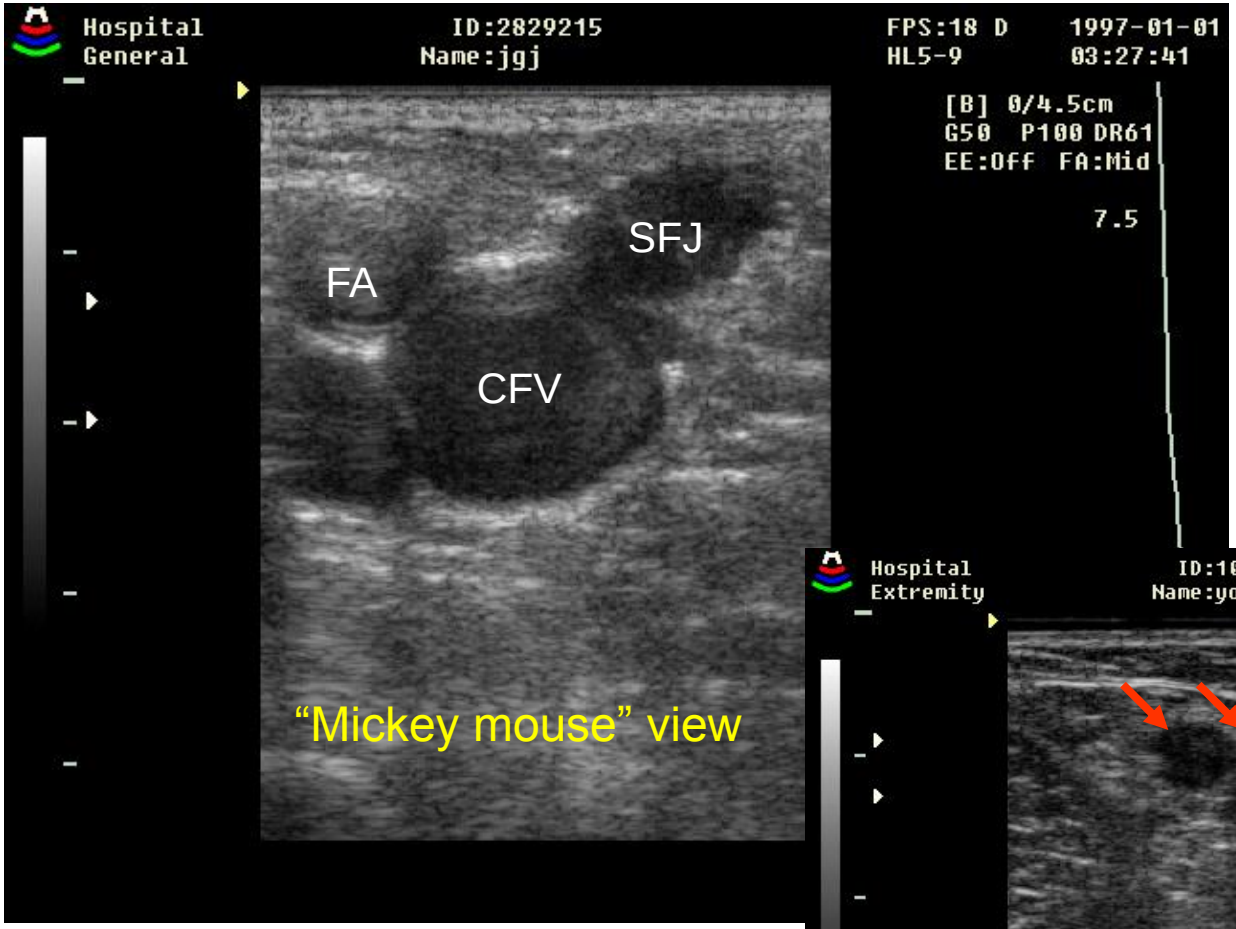
- B-mode + continuous wave Doppler
- Color flow image : triplex
- Erect position에서 시행.
- 특별한 경우에 supine position에서 시행 (secondary varicose vein, DVT)
- Probe position : longitudinal, transverse
- Reflux augmentation : Valsalva maneuver
  calf / foot compression and release

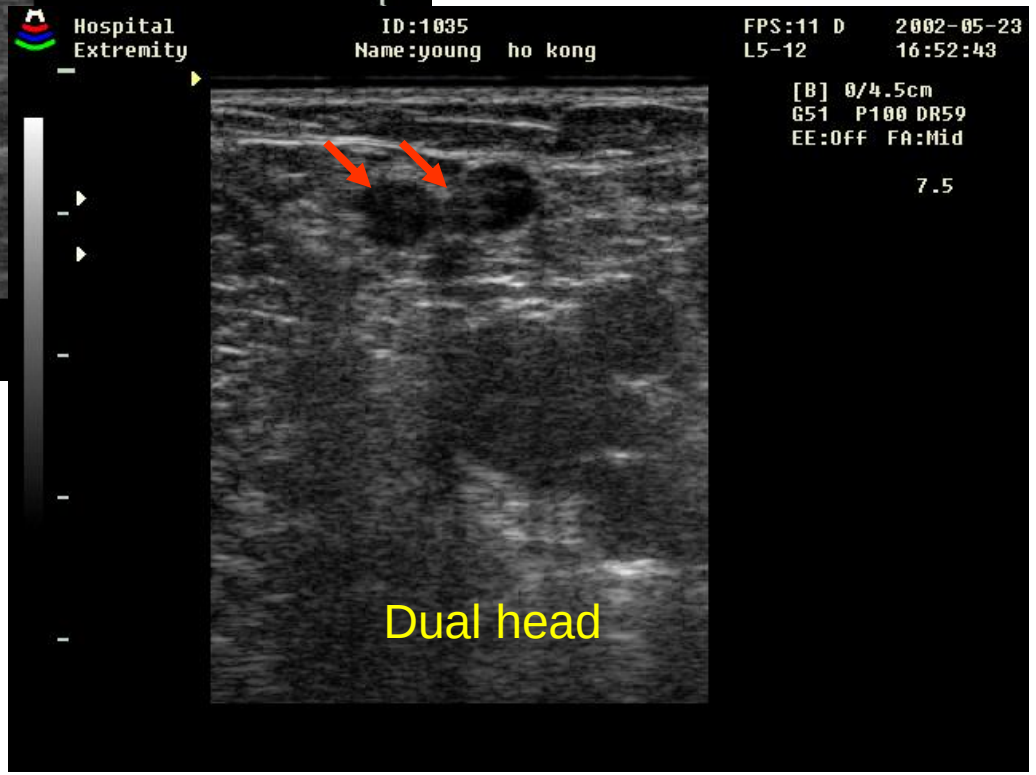
SFJ

(Saphenofemoral junction)

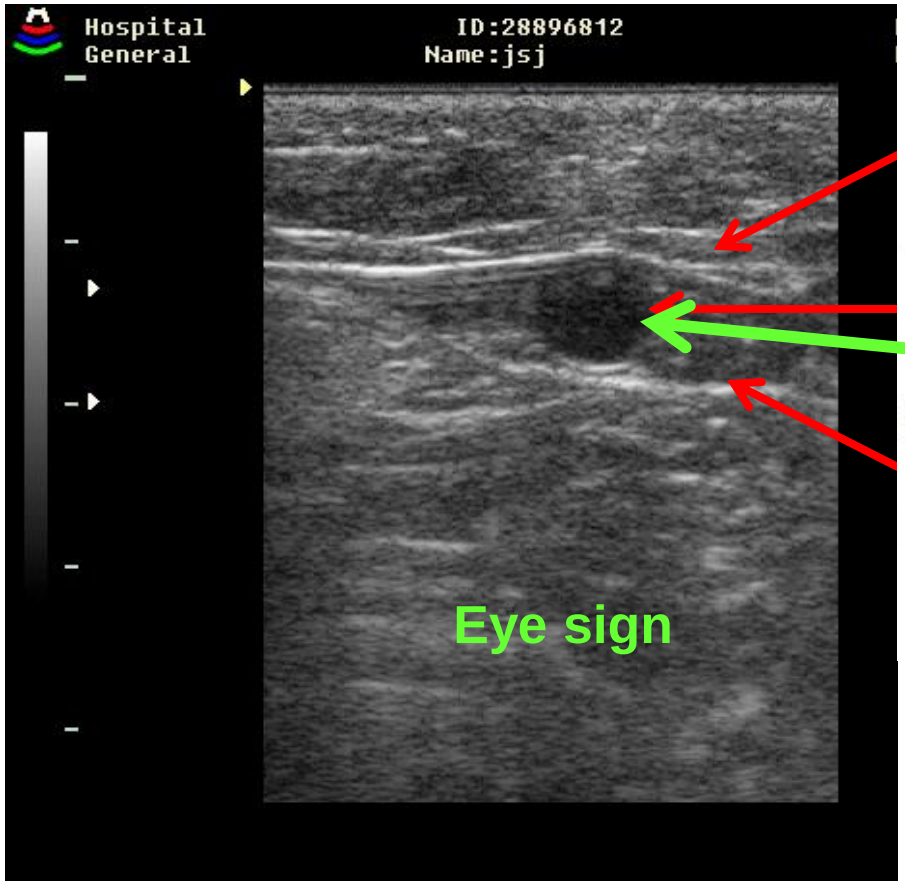


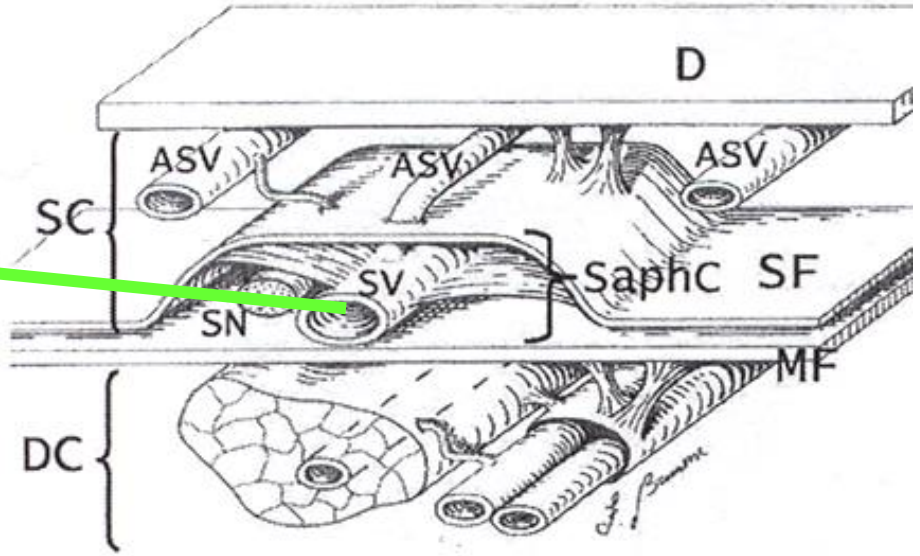
Transverse view

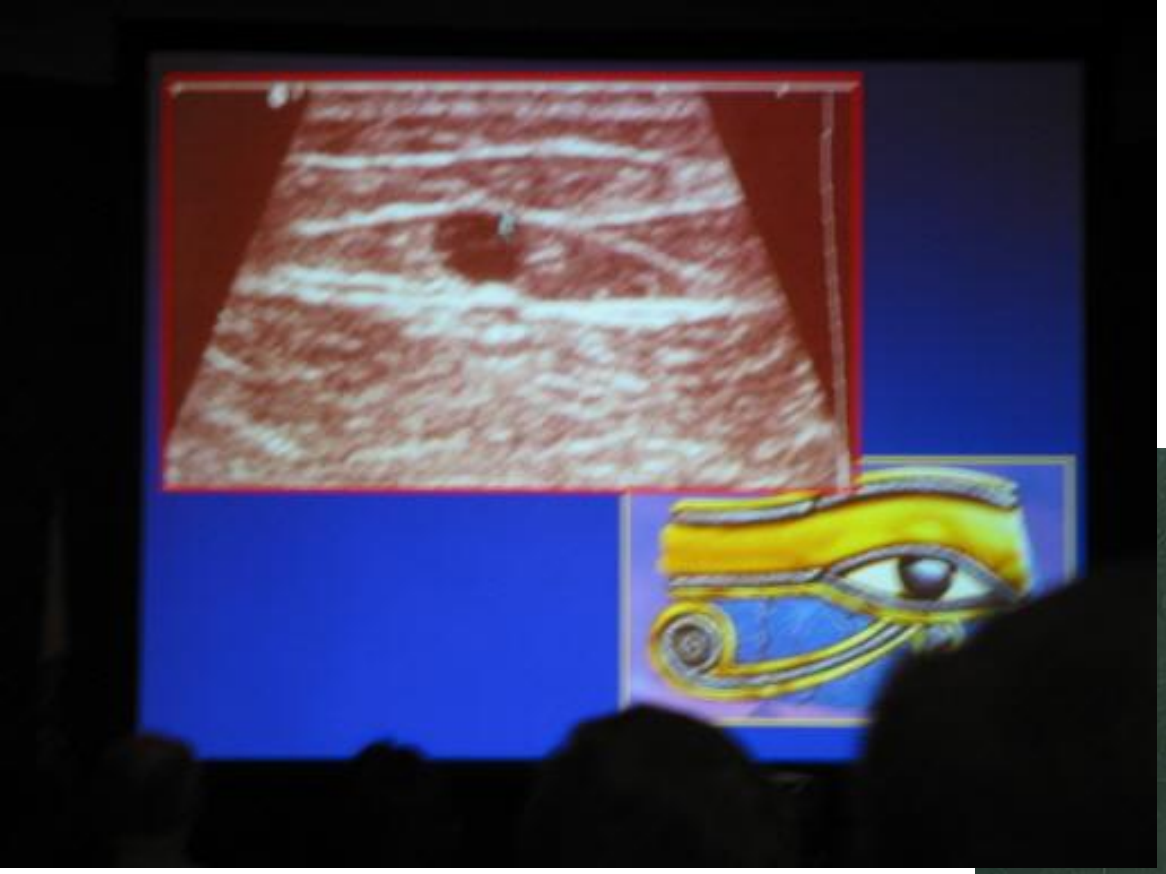


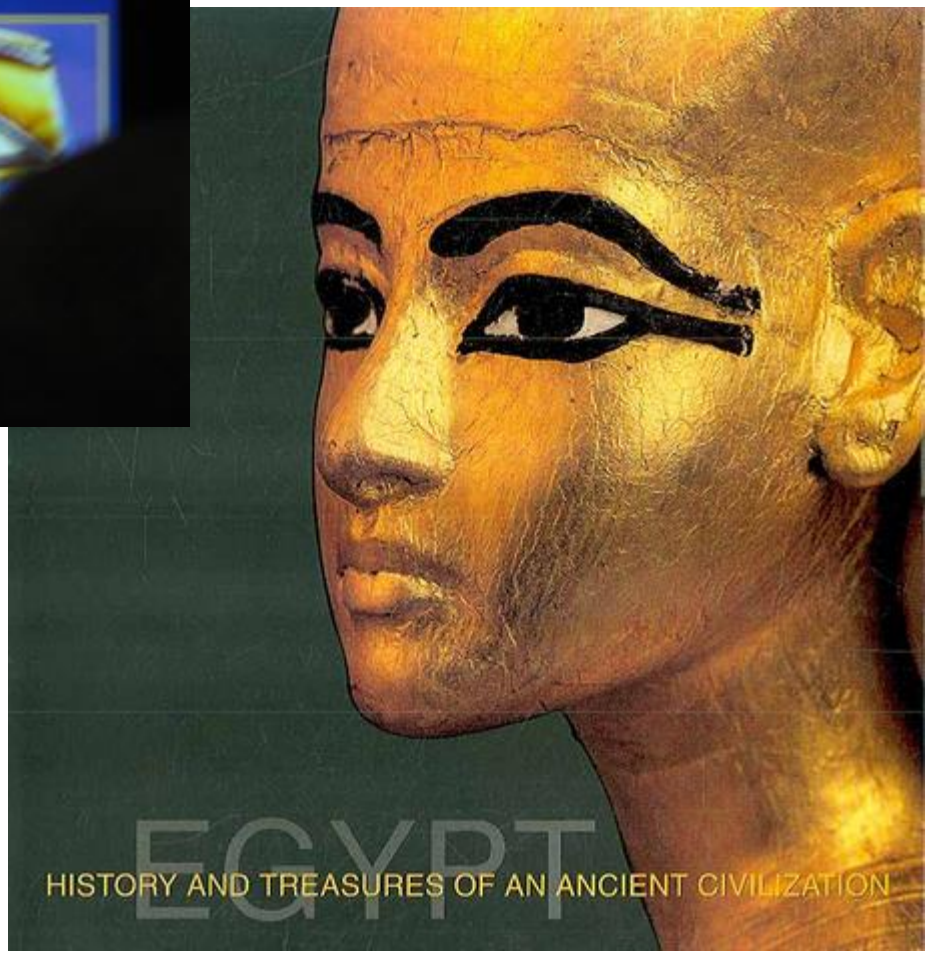


Saphenous compartments





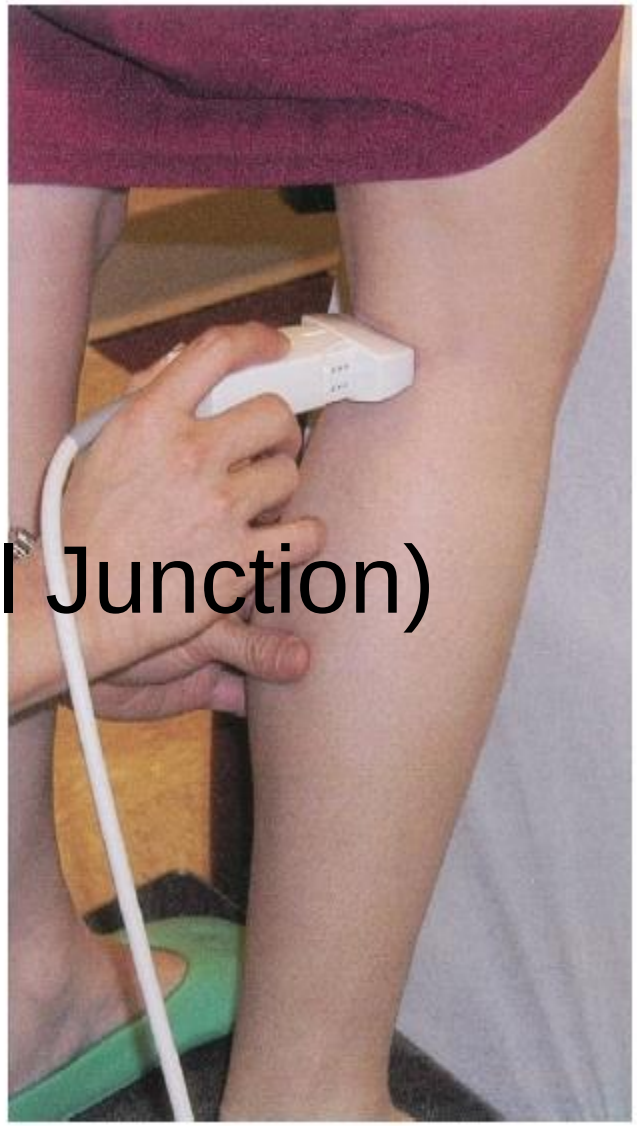


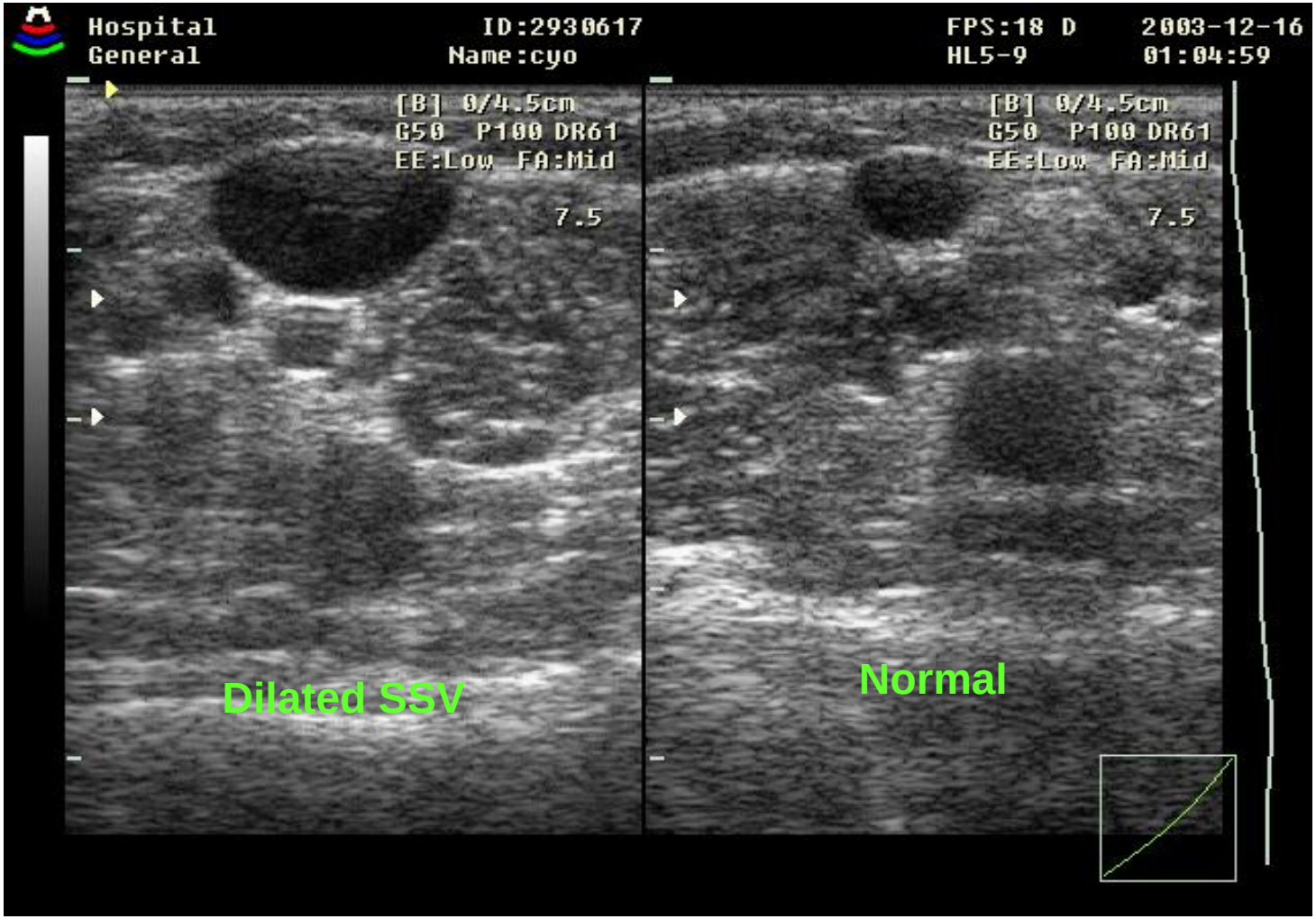


Egyptian eye

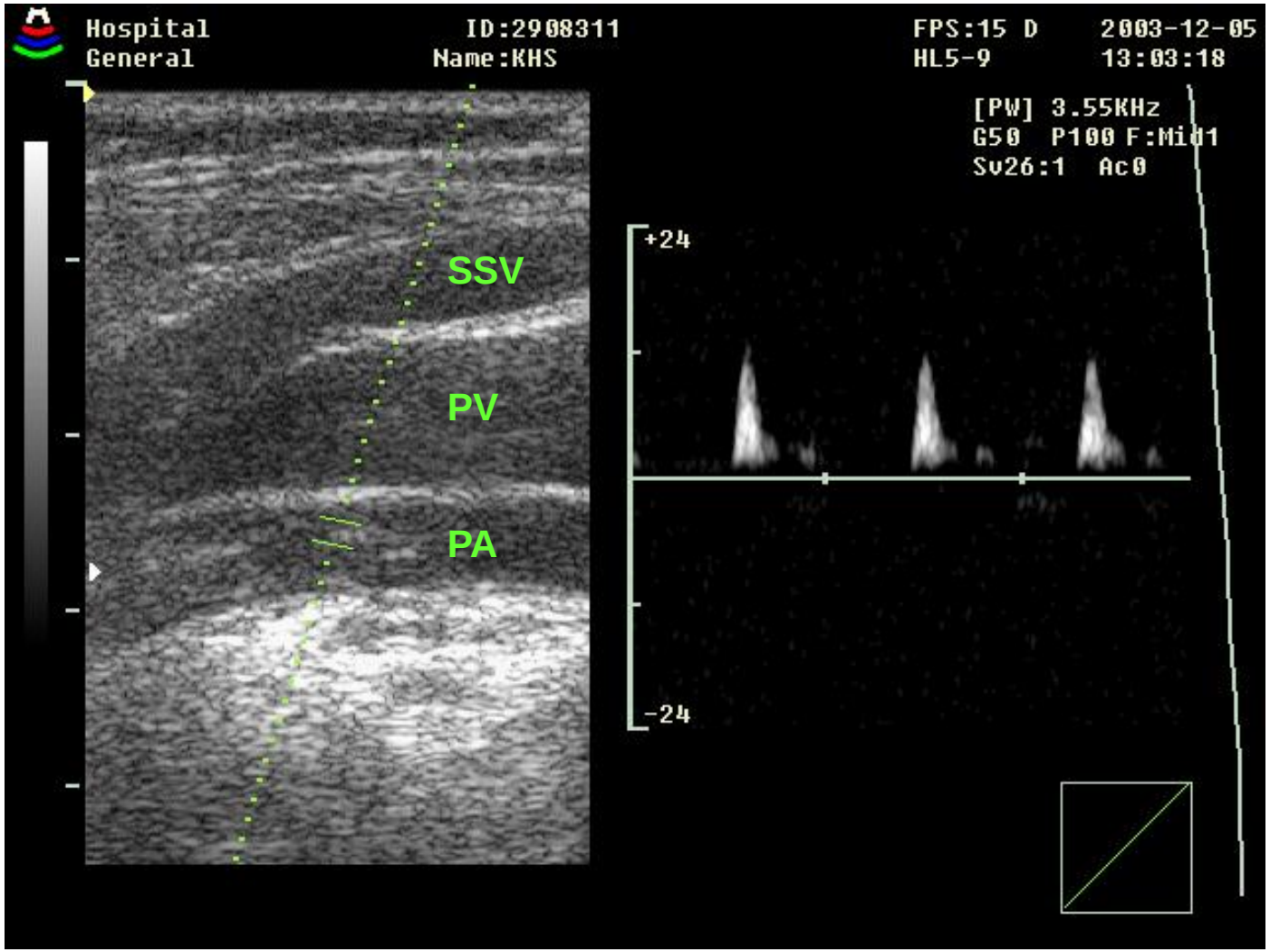
SPJ

(Saphenopopliteal Junction)



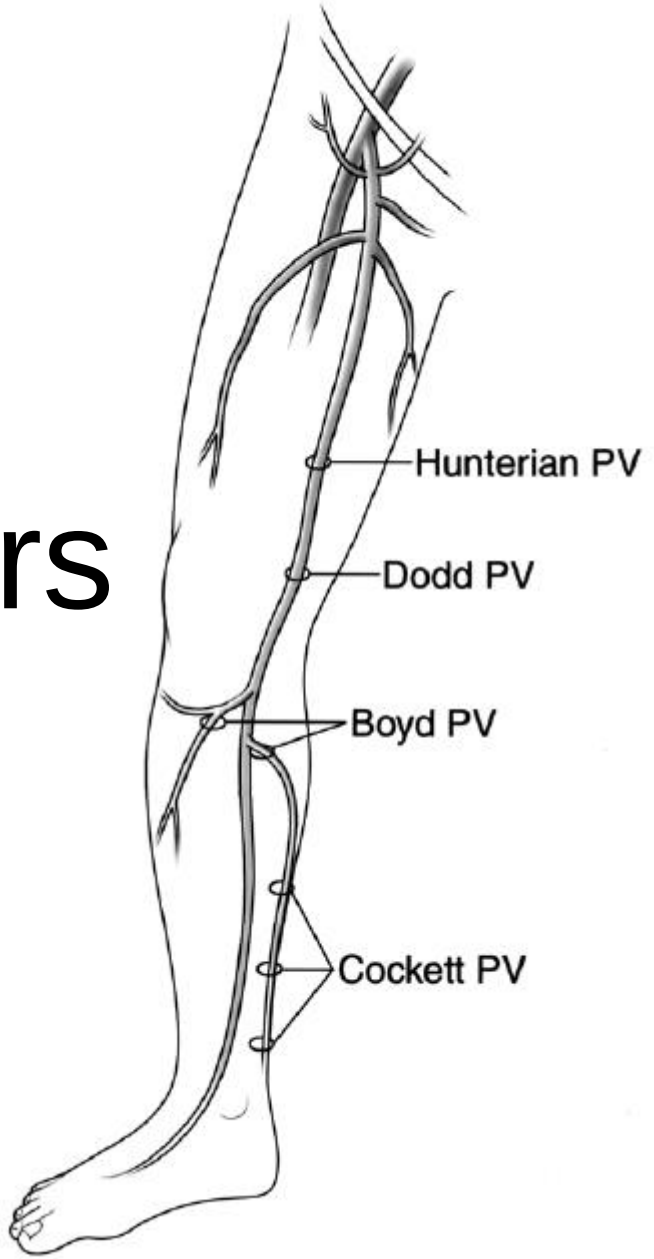


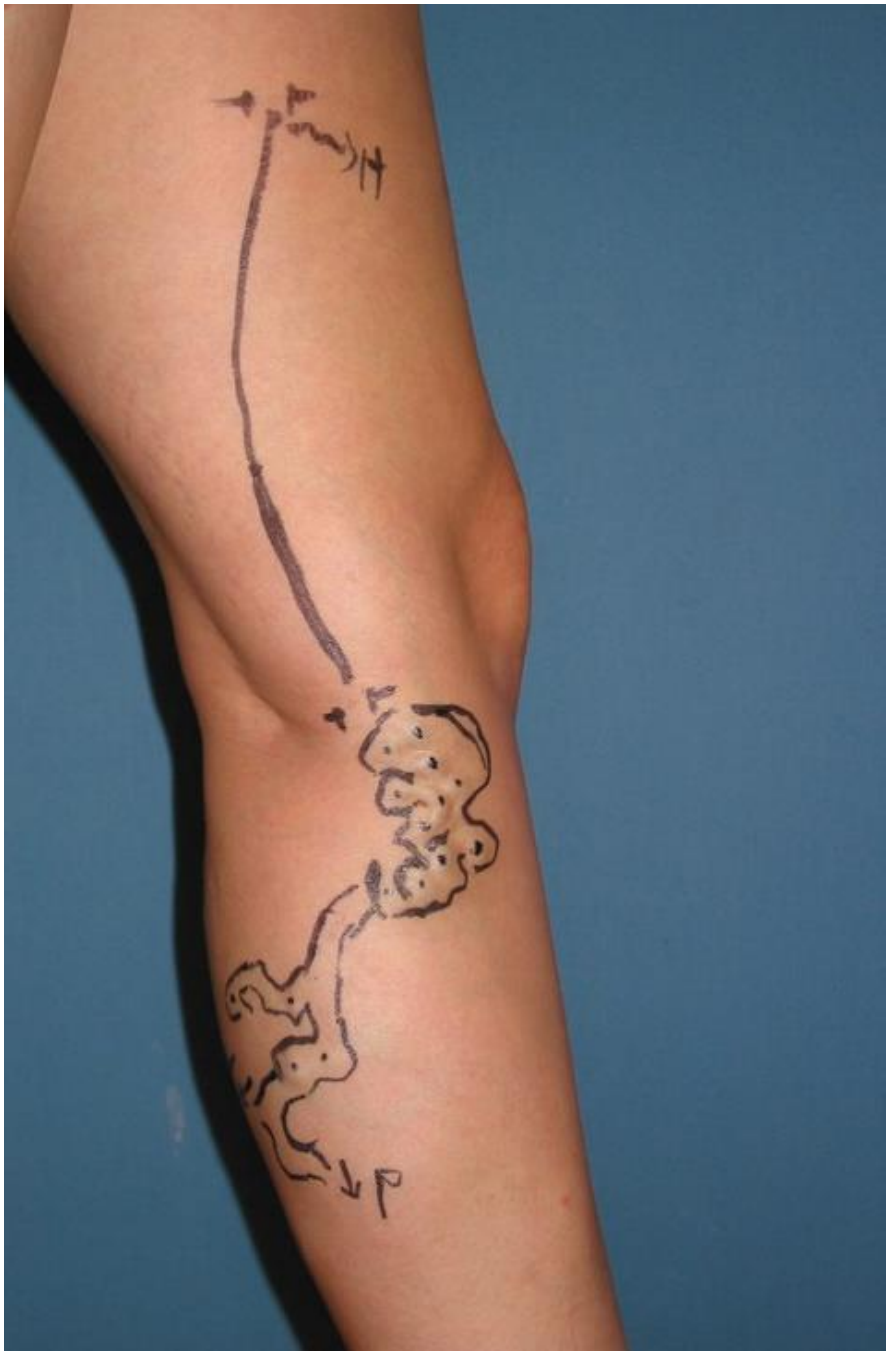
Popliteal fossa transverse view

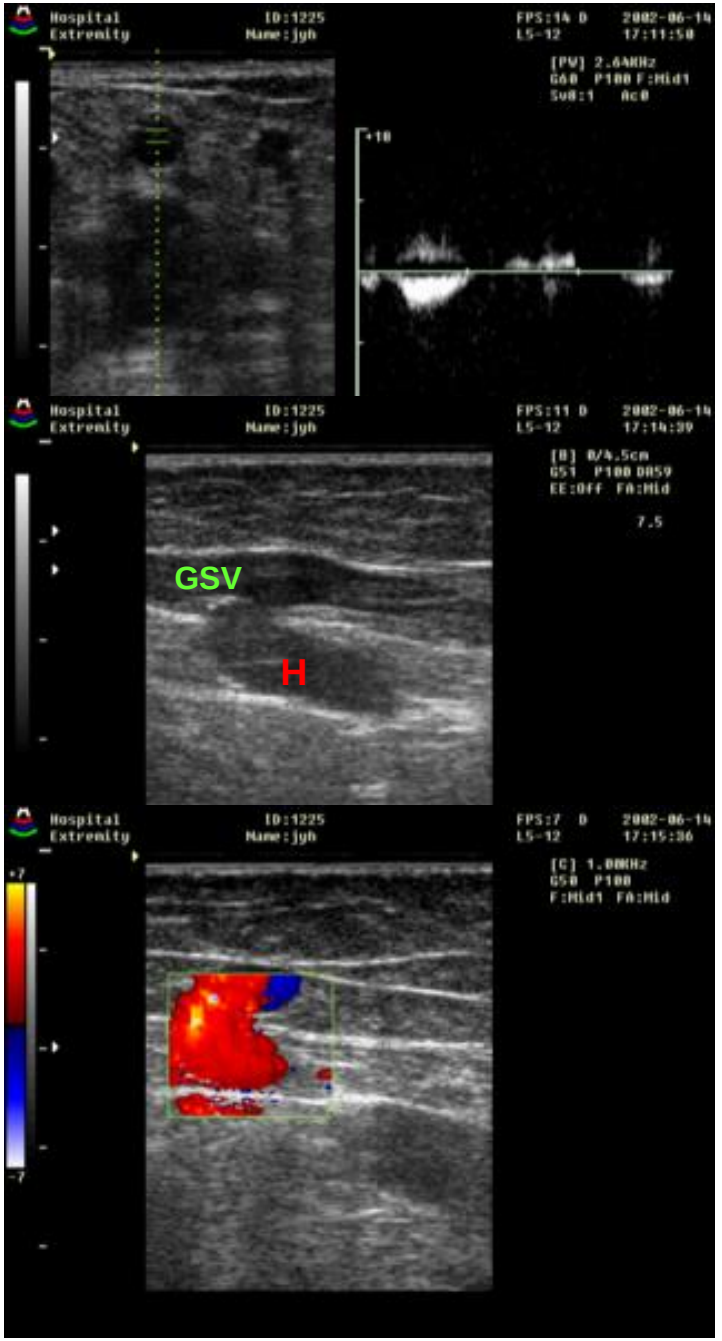


Popliteal fossa longitudinal view

Perforators



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2002-06-14
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G60 P100 F:Mid1
Sv0:1 Ac0
+10
Hospital
Extremity
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2002-06-14
17:14:39
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7.5
GSV
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Hospital
Extremity
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17:15:36
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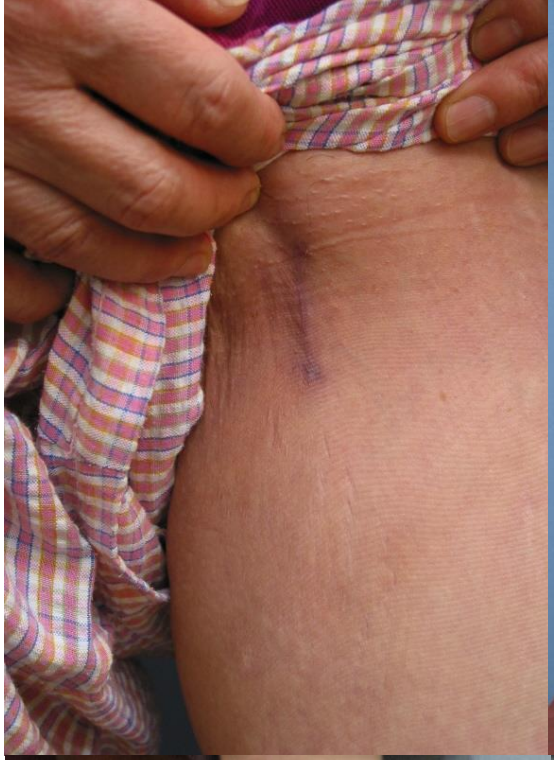
F:Mid1 FA:Mid
+7
-7

Current Tx. Strategies

- **Ablation**
  - 1) **Endovenous Thermal ablation(EVTA)**
    - * Radiofrequency (Venefit, RFITT, Fcare sys.)
    - * LASER (810, 940, 980, 1320, 1470, 1520nm)
    - * Steam
  - 2) Chemical ablation
    - * Foam sclerotherapy
    - * MOCA(mechanochemical ablation)
    - * Glu(cyanoacrylate) embolization
    - * V block
- **Surgical stripping :** high ligation and stripping, cryostripping
- **Saphenous preservation :** CHIVA, ASVAL

High ligation and stripping




Endovenous laser ablation (EVLA)

Goal : transmural **vein wall** destruction
→ irreversible **obliteration**


CORTOCH

EHIT

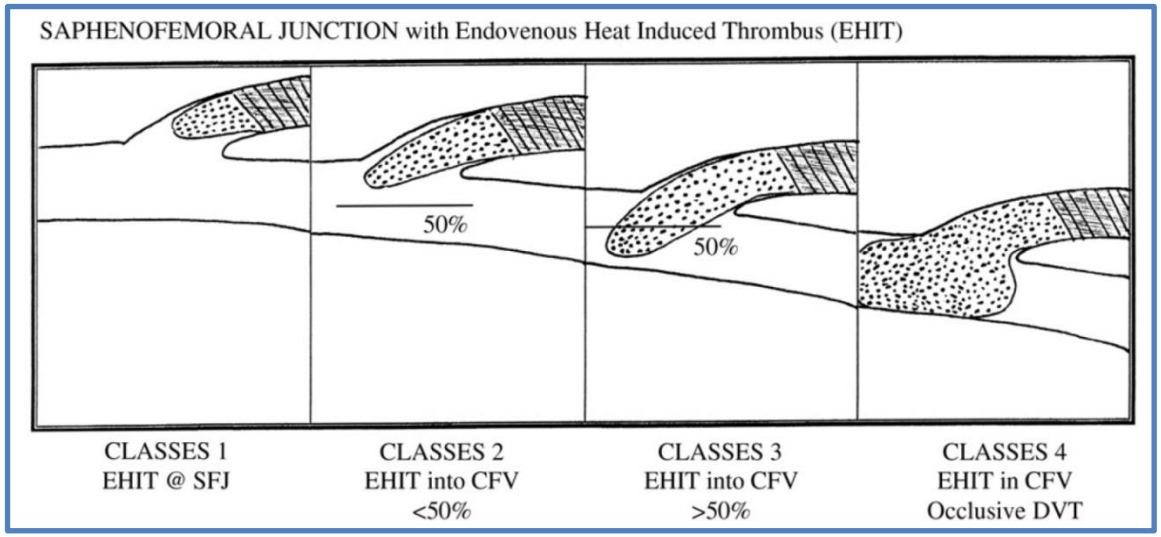
(Endovenous Heat induced thrombosis)

Table II. Summary of the incidence of endovenous heat-induced thrombosis in various series by type of thermal ablation

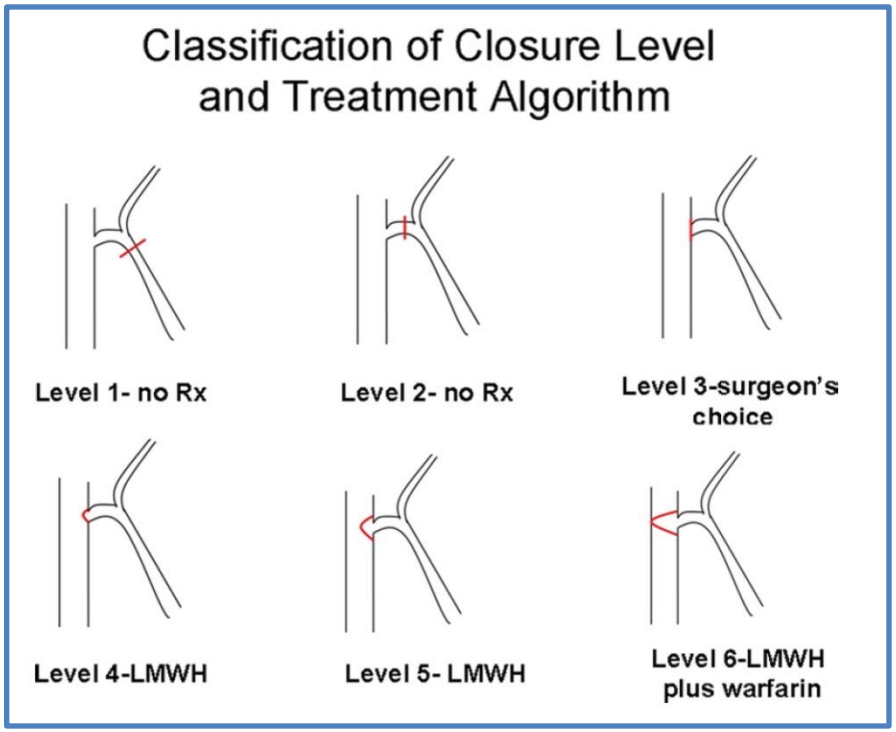
Author	*Year*	*Procedure*	*Duplex FU (days)*	*Complication rates*
Welch[19]	2006	RFA	7	0
Vasquez et al[20]	2007	RFA	4	0.2%
Passman et al[21]	2007	RFA	NA	0.8%
Ravi et al[22]	2006	EVLT/RFA	14	0.1%
Merchant et al[23]	2002	RFA	NA	0.4%
Nicolaides[24]	2000	RFA	NA	1.9%
Weiss and Weiss[25]	2002	RFA	7	0
Gradman[26]	2007	EVLT: 10,290 RFA: 6275	NA	0.15% DVT: 34%; PE, 2%
Knipp et al[27]	2008	EVLT	NA	DVT: 2.2%; Thrombus extension: 7.8%
Hingorani et al[12]	2004	RFA	10 (mean)	16%
Mozes et al[28]	2005	EVLT	7 (mean)	2.3%

EVLT, Endovenous laser treatment; *FU*, follow-up; *NA*, no regular duplex follow-up, *PE*, pulmonary embolism; *RFA*, radiofrequency ablation.

Kabnick classificiation (2006)



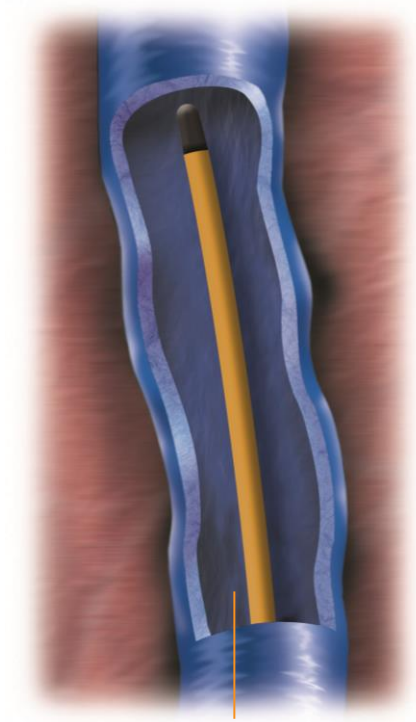
Lawrence classification (2010)



EHIT 예방

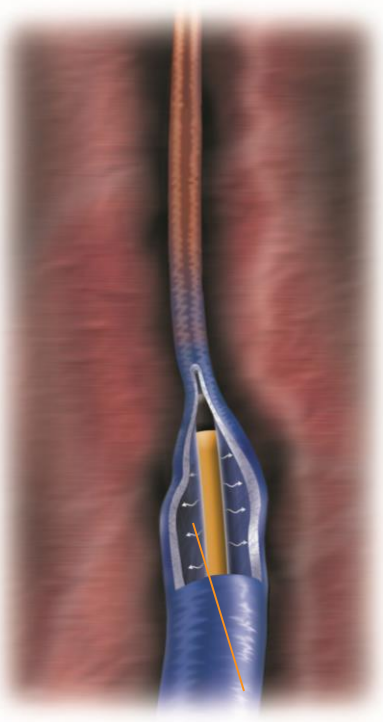
- Catheter position :
  Deep vein junction으로부터 **2 - 2.5cm**
- Early Postop Duplex scanning & proper Mx.
- Early ambulation : Local rather than general anesthesia

Radiofrequency ablation(RFA)



Disposable catheter inserted into vein

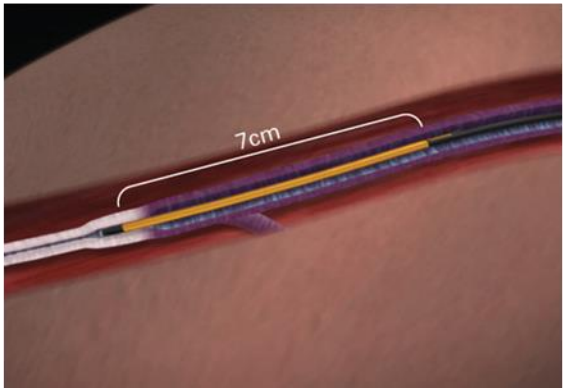
Vein heats and collapses

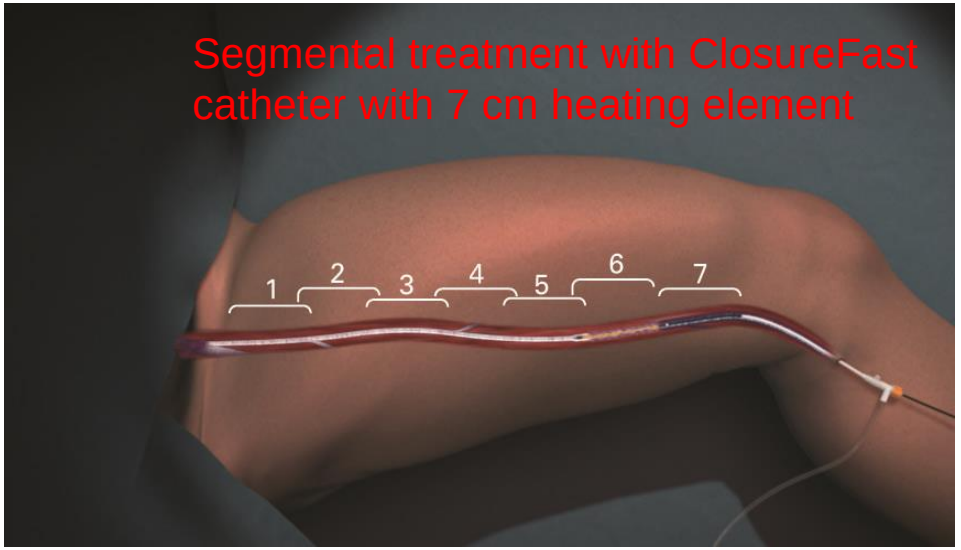


Catheter withdrawn, closing vein

Segmental Ablation

20 sec treatment at 120 degrees Celsius





Images courtesy of Antonios Gasparis, MD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RF
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Foam Sclerotherapy

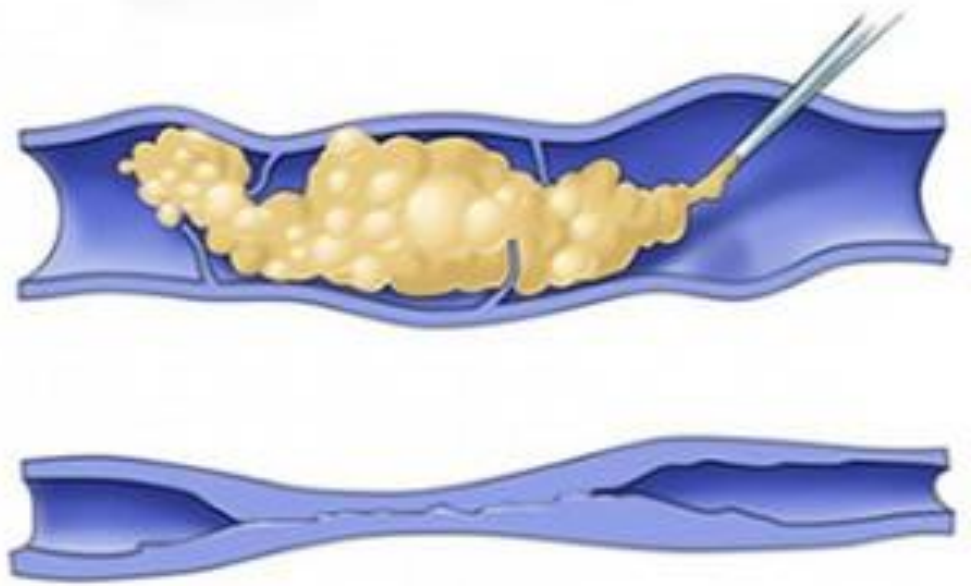


Table 2: Sclerosing agents

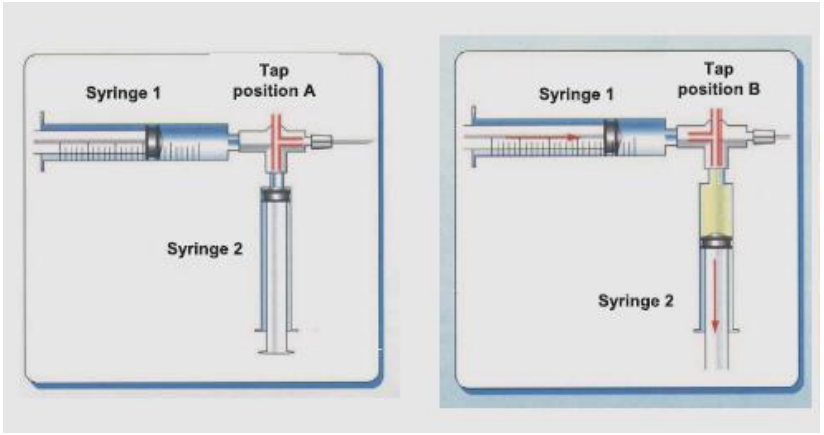
- Detergents: Disrupt vein cellular membrane
  - Sodium tetradecyl sulfate (Sotradecol)
  - Polidocanol (Aethoxysclerol)
  - Sodium morrhuate (Scleromate)
  - Ethanolamine oleate (Ethamolin)
- Osmotic agents: Damage the cell by shifting the water balance
  - Hypertonic sodium chloride solution
  - Sodium chloride solution with dextrose (Sclerodex)
- Chemical irritants: Damage the cell wall
  - Chromated glycerin (Scleremo)
  - Polyiodinated iodine (Sclerodine)
  - Alcoholic solution of zein (Ethibloc)
  - OK 432 (Picibanil)
  - Bleomycin

Indications

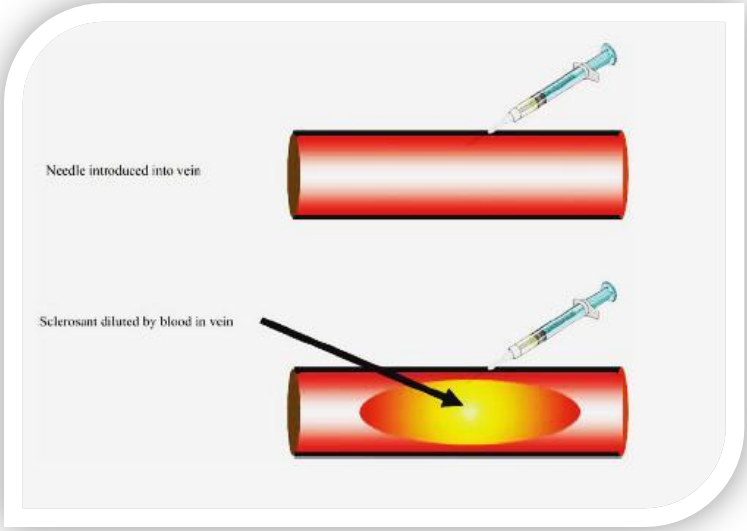
- In principle all types of varicose veins are amenable to foam sclerotherapy. In particular:
  - Saphenous veins (great saphenous vein (GSV) and short saphenous vein (SSV))
  - Accessory veins
  - Varicose veins associated with perforator incompetence
  - Reticular varicose veins
  - (Spider veins, Telangiectasias)
  - Residual and recurrent varicose veins after treatment
  - Pudendal and genital varicose veins
  - Peri-ulcerous veins
  - Venous malformations

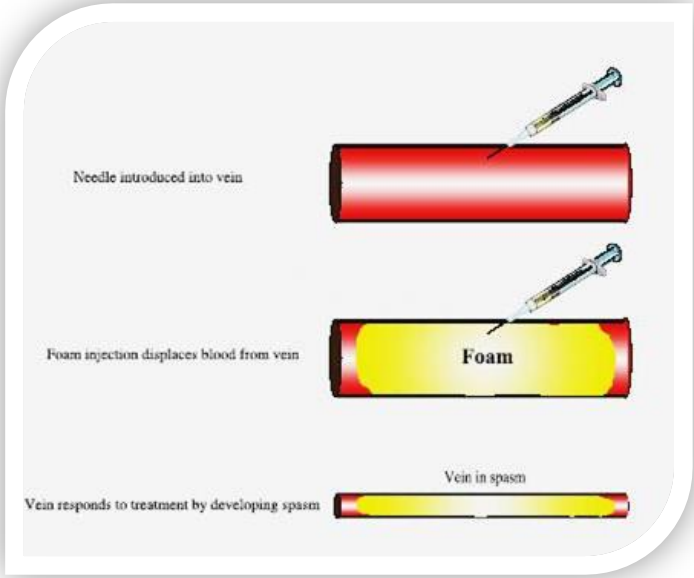
Foam perparations

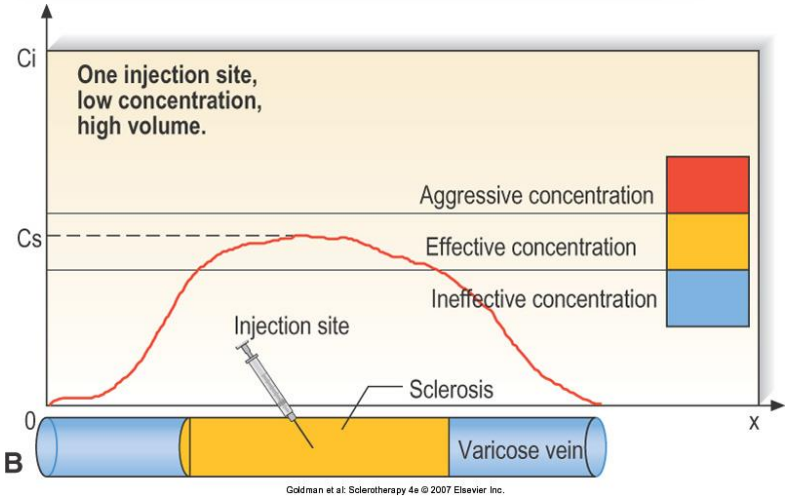
- Tessari’s method
- 1 part STS or POL + 4 or 5 part of air
- Two syringe and 3 way tap
- Increase the efficacy and safety of treatment

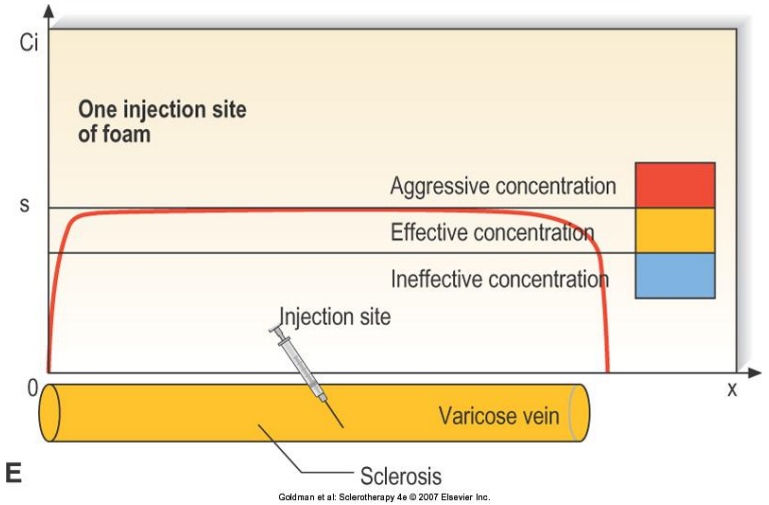


Liquid Vs. Foam



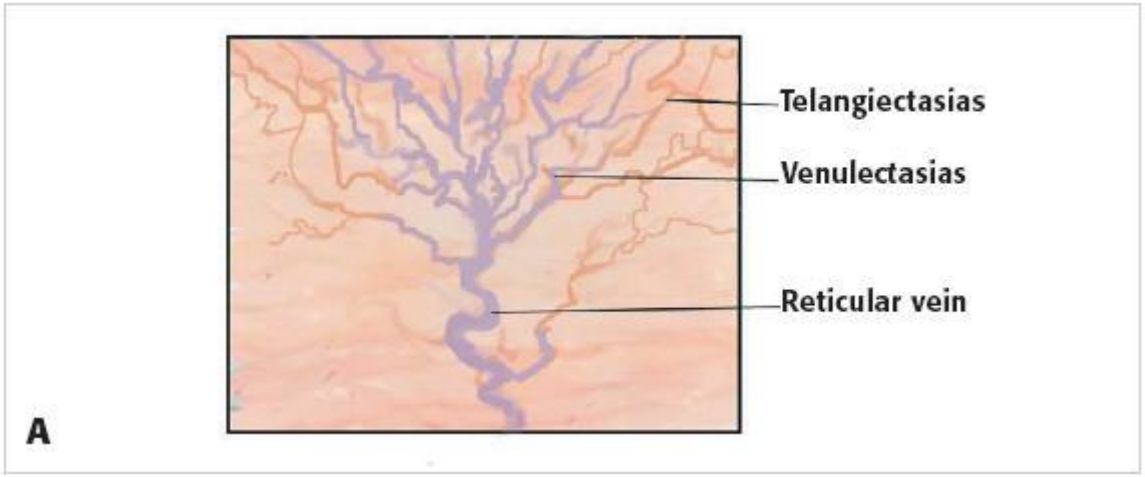






Foam sclerotherapy 장점

- Increased volume injected for an identical amount of agent
- Less dilution in blood, sclerosing capacity ↑
- Obliteration of the entire cross section of vein
- Persistence of the sclerosing agent - intima contact
- Easy echo verification in view of the particular echogenicity of foam
- Safety of injection



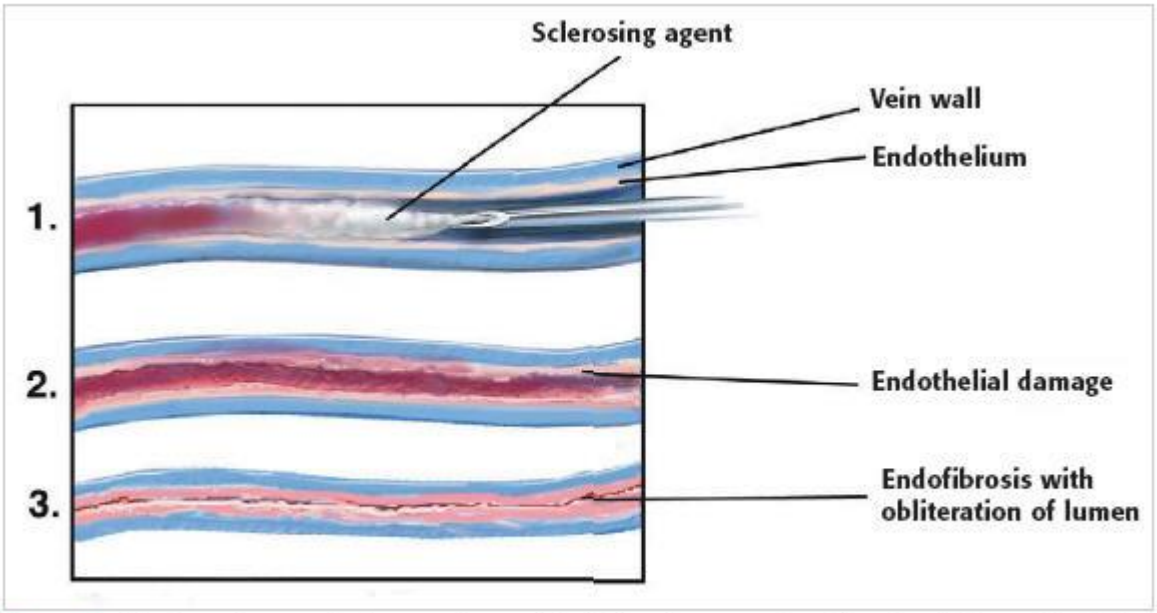


Figure 5. All sclerosing agents damage the endothelial surfaces, causing fibrosis, which results in the obliteration of the vessel lumen.

Maximal foam volumes

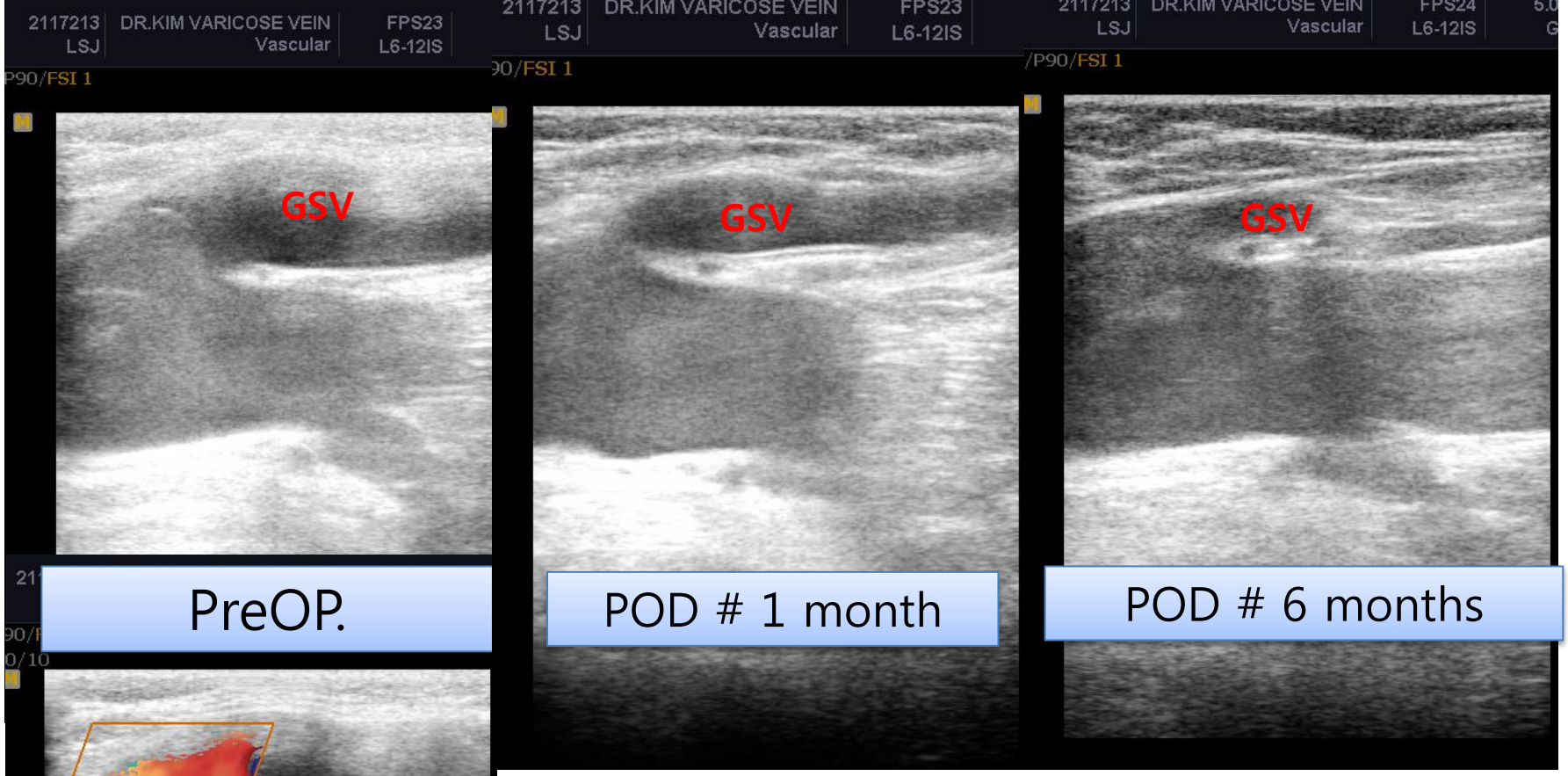
- **The recommended maximum foam volume per leg and session is 10 ml.**
- When treating large-caliber varicose veins, the foam sclerosant should be as viscous as possible.

PostSCT. management

- Compression cotton ball
- Class II compression stocking
- 10-30min activity
- 3일 후부터는 stocking 만 착용(3 ~ 6주)
- 2nd session은 2 ~ 4주 뒤에 시행

혈관경화요법 후 6 개월

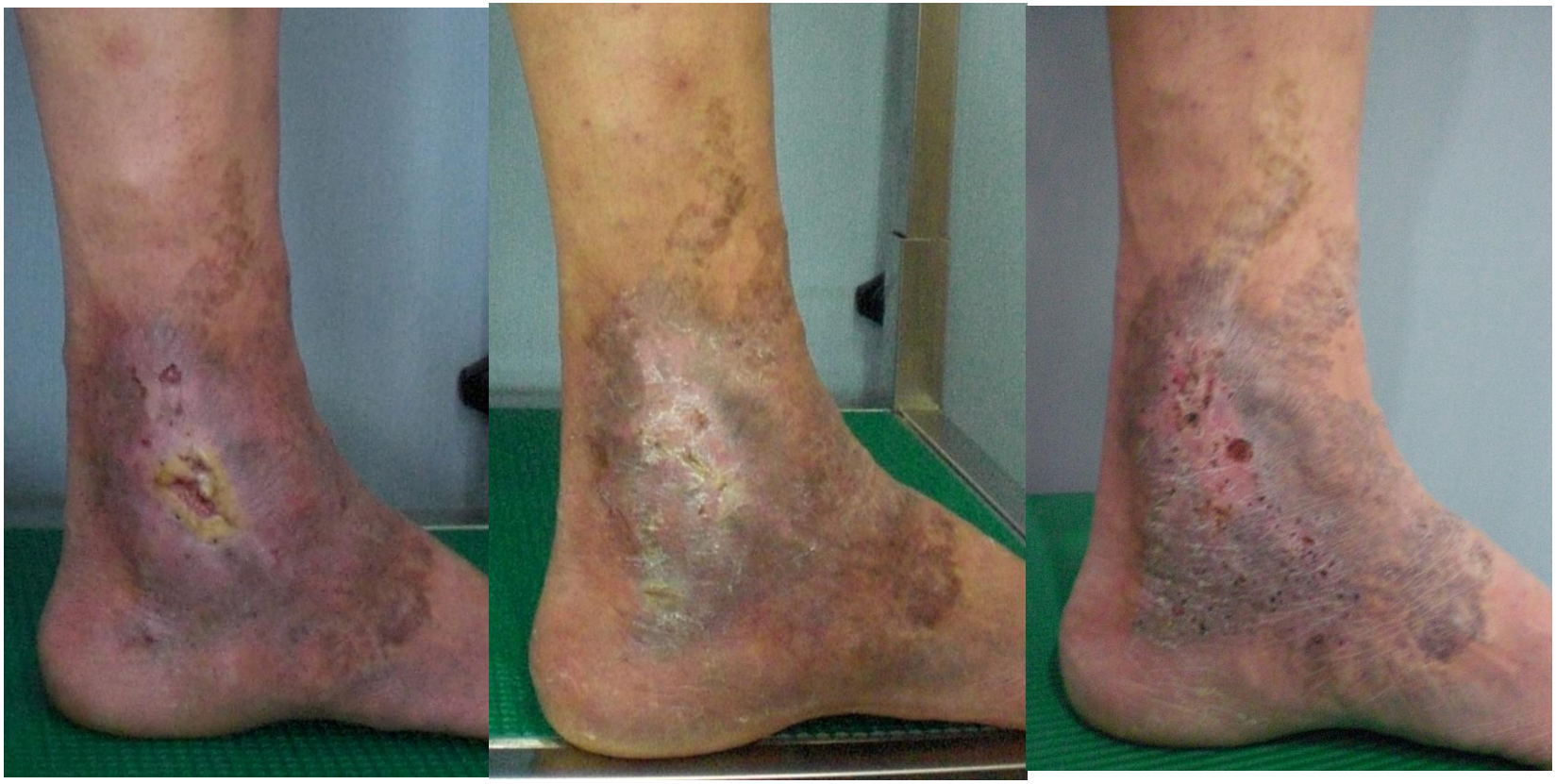
Pre/post OP


2117213
LSJ
DR.KIM VARICOSE VEIN
Vascular
FPS23
L6-12IS
P90/FSI 1
GSV
PreOP.
POD # 1 month
POD # 6 months

수술후 2주

수술전 하지궤양 합병증 동반

수술후 1개월



수술전 2주일 1개월

수술후 1개월

수술 후 6개월사진

감사합니다.