

下肢腫脹疾病 與治療

馬偕紀念醫院 整形外科資深主治醫師 黃宣諭

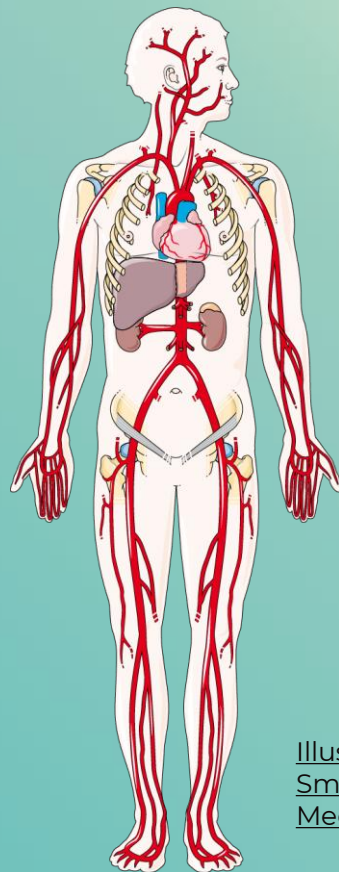
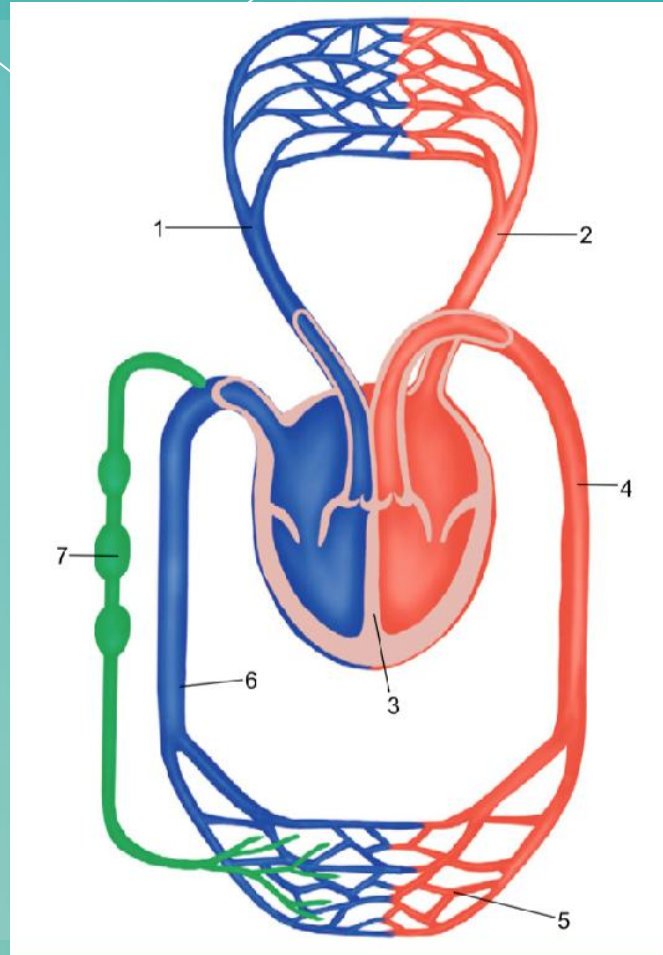
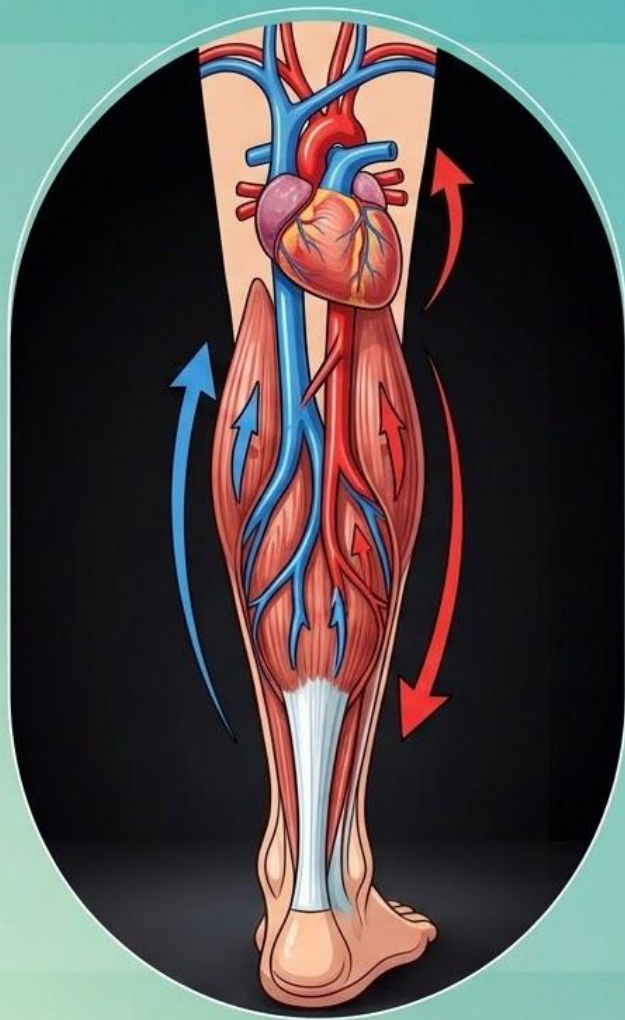


Illustration by
Smart-Servier
Medical Art

Basic Physiology of Circulation





你的小腿，其實是你的第二顆心臟 🧡

大家都知道，心臟是讓血液流動的引擎。

但你知道嗎？當你走路、踮腳、甚至只是坐著抖腳的時候——你的小腿肌肉，尤其是**腓腸肌**和**足底肌**，也在幫你「打血」。

這就是我們說的「第二心臟機制」。

👉 發生什麼事？

每次這些肌肉收縮，就像幫你的血管「擠壓」，讓血液逆著重力往上流回心臟。

這叫做**靜脈迴流循環**，對抗久坐、站太久、活動量不足造成的血液淤積。

❗ 當這個系統不運作：

- 🧡 腿部腫脹、痠重
- 🩸 血液循環差
- 🧡 嚴重還可能形成**深層靜脈血栓 (DVT)**

🕒 所以，我們才常說：

「你不只是心臟要跳，小腿也要動。」

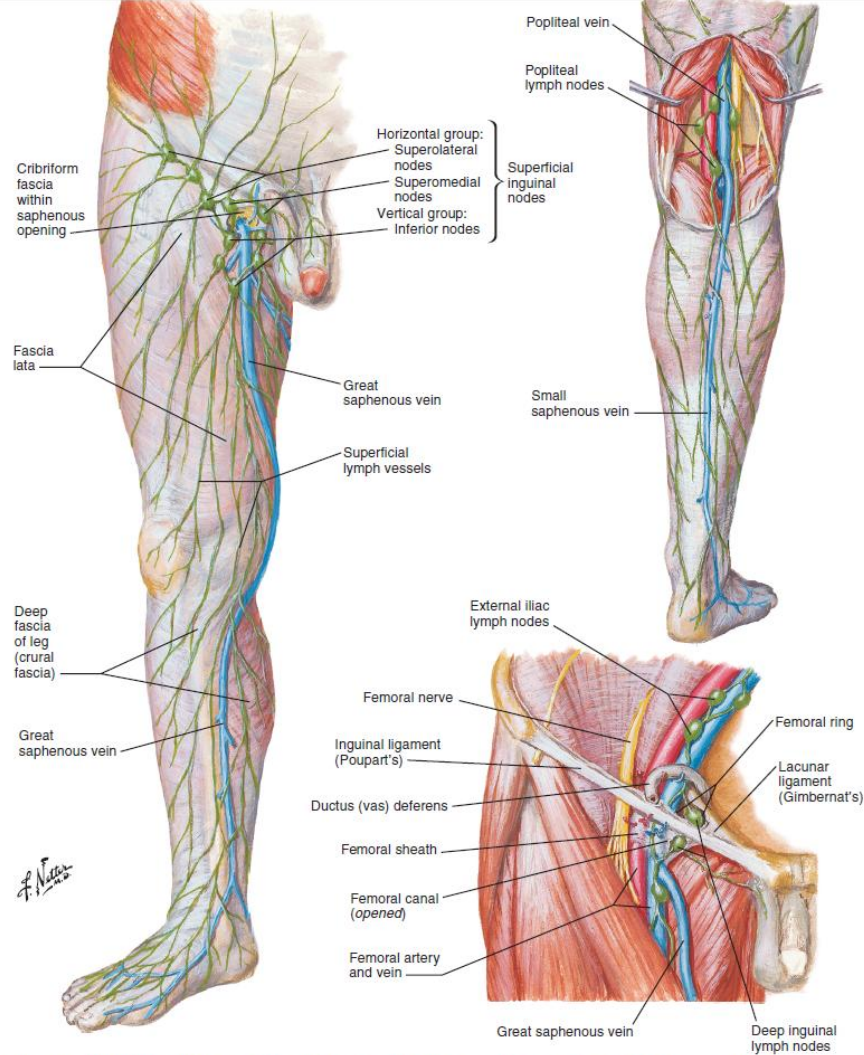


Figure 8.2 Lymphatic anatomy of the lower extremity. (Reprinted from Netter Anatomy Illustration Collection. ©Elsevier Inc. All Rights Reserved.)

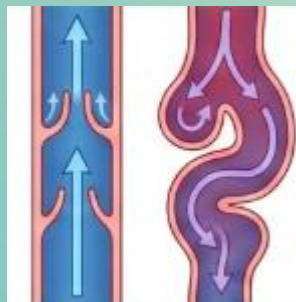
小腿是人的第二個心臟!!

Illustration by Smart-Service Medical Art

01

慢性靜脈疾患與靜脈曲張

回流不順導致血液逆流與靜脈擴張，造成腫脹、疼痛甚至慢性潰瘍



02

淋巴水腫

淋巴回流受阻致使過度累積，引起蜂窩性組織炎與皮下組織纖維化增厚



01

慢性靜脈疾患與 靜脈曲張

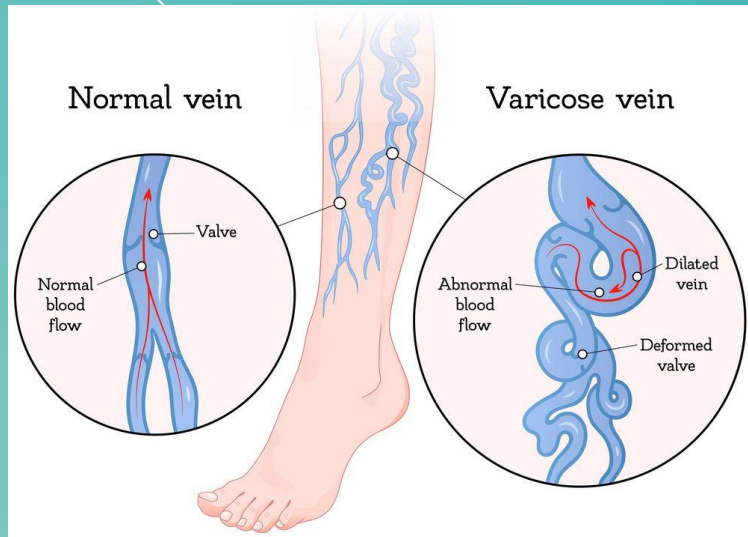


Illustration by Smart-Servier Medical Art

Different Clinical Presentations with CVD



從輕微到嚴重：辨識靜脈曲張的症狀進程



● 初期警訊： 下午雙腳痠腫沉重

午後或傍晚腳踝腫脹、鞋子變緊，且在休息後可獲得緩解。



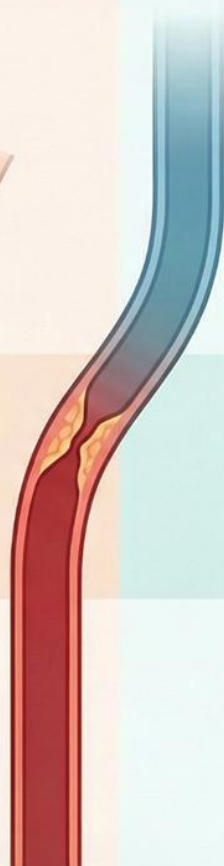
● 後期徵兆： 血管凸起與皮膚變化

腿部出現紫藍色突起血管，嚴重時會導致皮膚變色、慢性潰瘍或血栓。



● 核心病因： 瓣膜受損難以自癒

瓣膜受損後血液滯留小腿，壓力升高使血管壁擴張，此病症通常不會自癒。



舒緩與治療：日常護理與專業介入

● 日常舒緩：動起來與抬高腿



避免久站久坐，透過步行、游泳及休息時墊高雙腿來促進血液回流。



● 保守治療： 正確穿著壓力襪

經醫師建議選擇合適等級的醫療級壓力襪，能有效減輕靜脈壓力。



● 醫療介入： 藥物輔助與手術

藥物可緩解腫脹不適，若嚴重影響生活，則需考慮侵入性治療或手術。

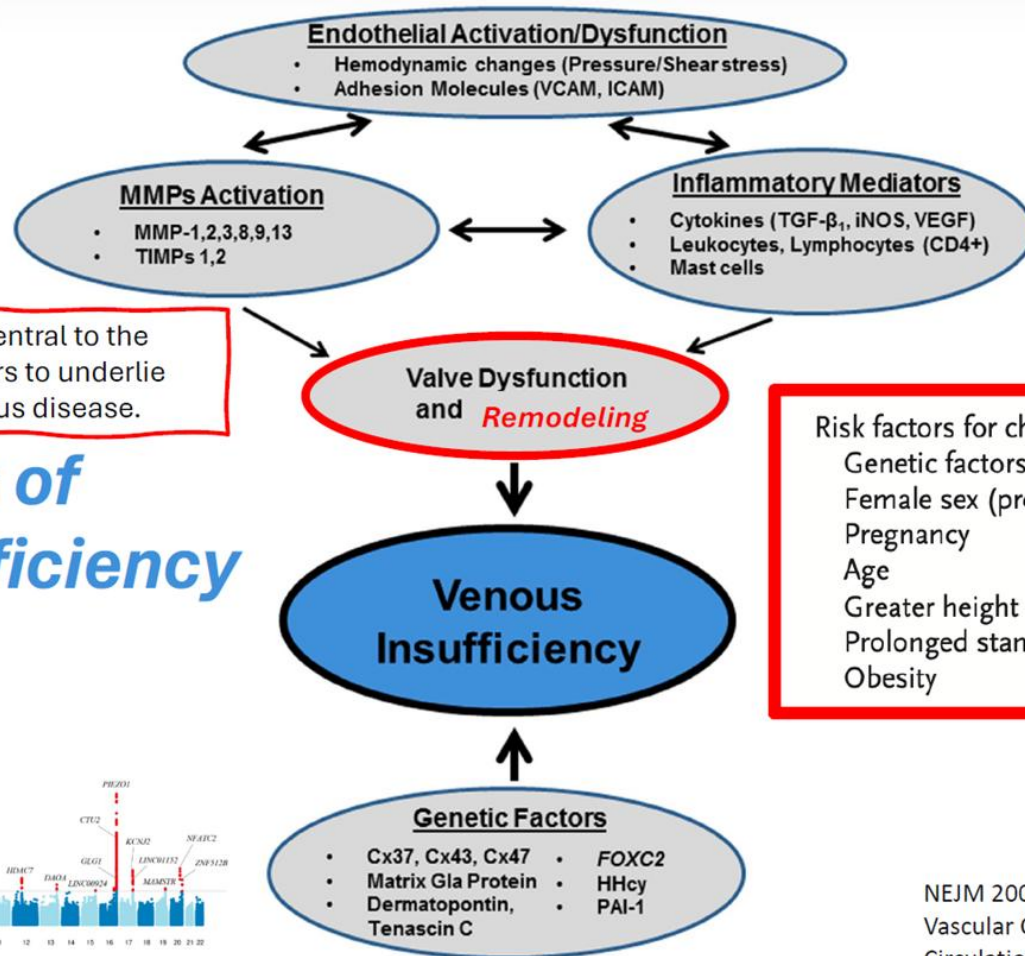
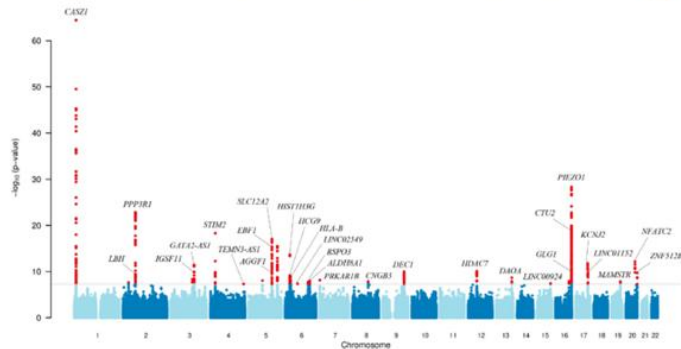
Chronic Venous Disease (CVD)

- A common progressive disorder reported to affect up to 60% of the general population ; Varicose vein and CVD impacting 10-30% of the world population.
- The symptoms varying, to different degrees of severity including asymptomatic forms to disabling pain, heaviness and ulceration of the limbs affecting quality of life (QoL).

Illustration by Smart-Servier Medical Art

Venous valve incompetence is central to the venous hypertension that appears to underlie most or all signs of chronic venous disease.

Pathogenesis of Venous Insufficiency



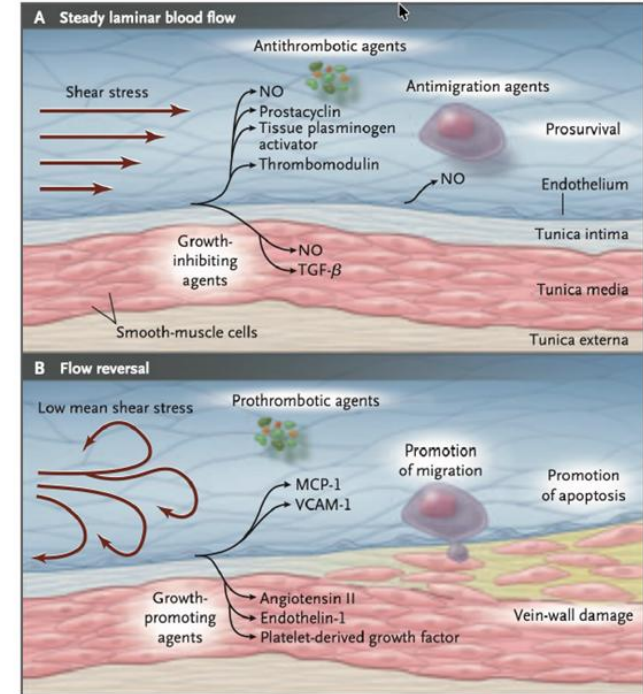
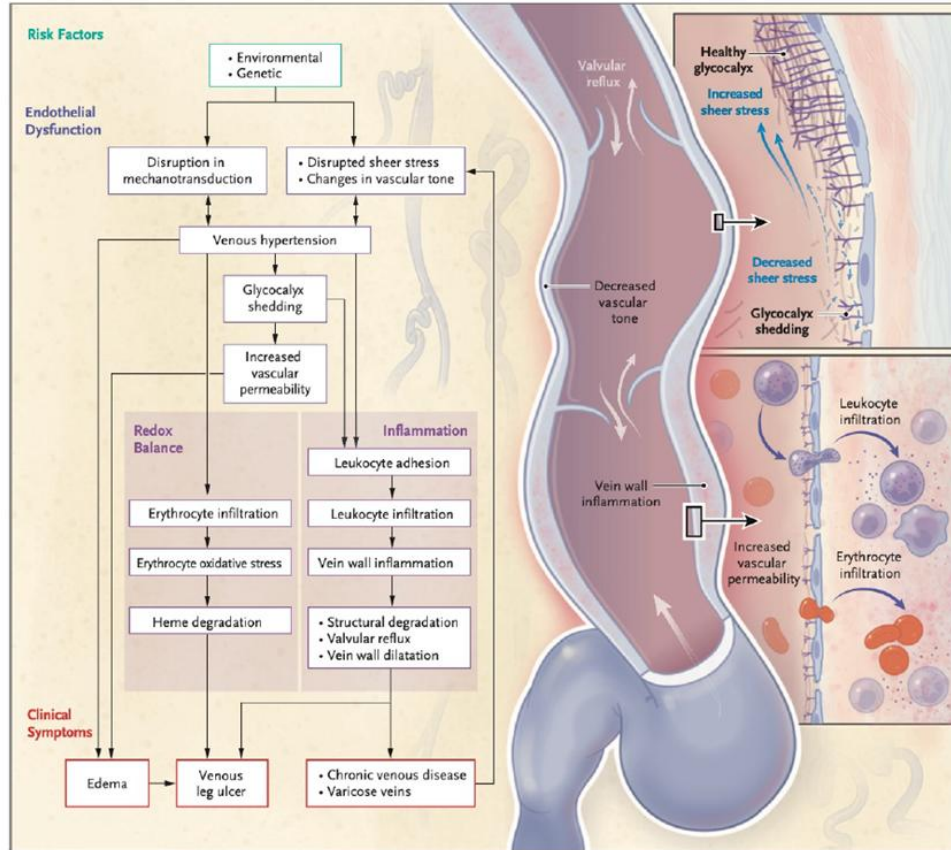
Risk factors for chronic venous disease

- Genetic factors
- Female sex (progesterone)
- Pregnancy
- Age
- Greater height
- Prolonged standing
- Obesity

NEJM 2006;355:488-98
Vascular Cell 2014, 6:24
Circulation. 2018;138:2869–2880

Venous Hypertension in Venous Insufficiency

Endothelial activation state



NEJM 2006;355:488-98.

NEJM 2024;391:2350-9.

CEAP Classification System and Reporting Standard

Revision 2020

C (Clinical Manifestations), **E** (Etiology), **A** (Anatomic Distribution), **P** (Pathophysiology)

C0	No visible or palpable signs of venous disease
C1	Telangiectasias or reticular veins
C2	Varicose veins
C2r	Recurrent varicose veins
C3	Edema
C4	Changes in skin and subcutaneous tissue secondary to chronic venous disease
C4a	Pigmentation or eczema
C4b	Lipodermatosclerosis or atrophie blanche
C4c	Corona phlebectatica
C5	Healed
C6	Active venous ulcer
C6r	Recurrent active venous ulcer

靜脈曲張

CEAP 分類系統：嚴重

靜脈曲張與慢性靜脈疾病

CEAP 分類系統：嚴重程度評估

嚴重程度增加

C0



臨床分類 C0
(無可見/觸及病變)
無可見或可觸及的
靜脈疾病跡象



無可見或可觸及的
靜脈疾病跡象

C1



C1：蜘蛛網狀/
網狀靜脈
蜘蛛網狀細小靜脈
(直徑 < 3mm)



蜘蛛網狀細小靜脈
(直徑 < 3mm)

C2



C2：靜脈曲張
靜脈曲張 (直徑 ≥
3mm)，扭曲擴張的
靜脈



靜脈曲張 (直徑 ≥
3mm)，扭曲擴張的
靜脈

C3



C3：水腫
水腫 (沒有皮膚變
化)，腿部和腳踝腫脹



水腫 (沒有皮膚變
化)，腿部和腳踝腫脹

C4



C4：皮膚色素沉著
/濕疹
皮膚色素沉著或濕疹



皮膚色素沉著或濕疹

C5



C5：已癒合的潰瘍
已癒合的靜脈性潰瘍



已癒合的靜脈性潰瘍

C6



C6：活動性潰瘍
活動性靜脈性潰瘍

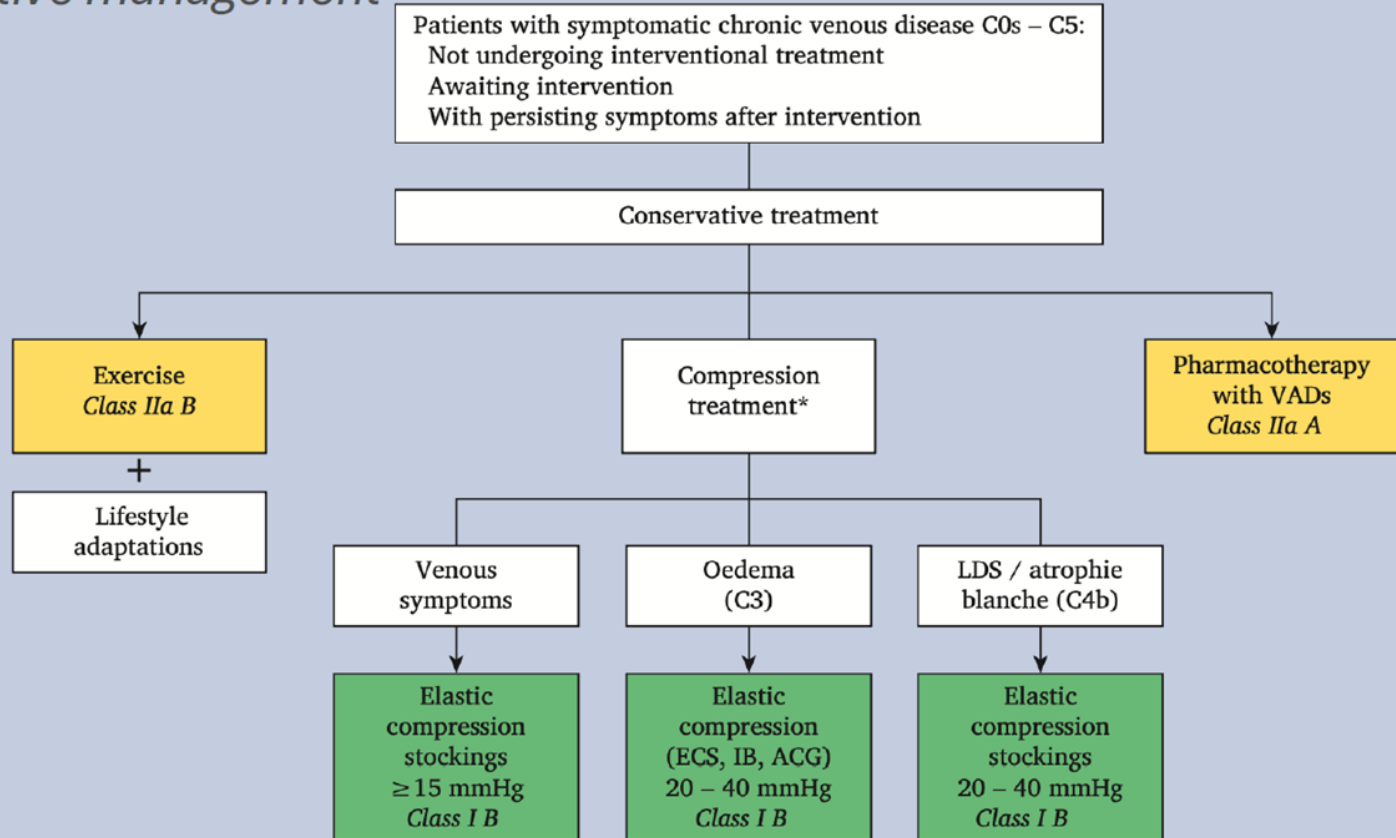


活動性靜脈性潰瘍

C3-C6 原來靜脈變化仍存在

Patient with Symptomatic CVD (C0s~C5)

Conservative management

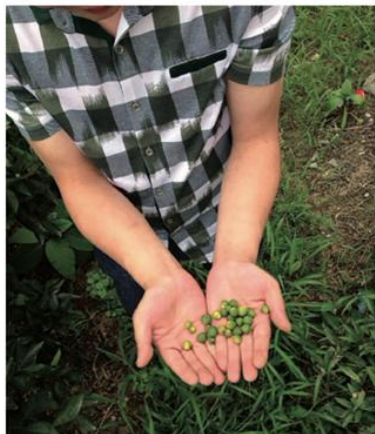


Pharmacological Treatment

3. Pharmacological treatment		
Guidelines	Grade of recommendation	Quality of Evidence
3.1. In symptomatic patients with varicose veins who are not candidates for intervention, or who are waiting for intervention or have symptoms after intervention, we suggest micronized purified flavonoid fraction or Ruscus extracts for treatment of vein related pain, leg heaviness and/or sensation of swelling. ^a	2 (weak)	B (moderate)
3.2. In symptomatic patients with varicose veins who are not candidates for intervention, or who are waiting for intervention or have symptoms after intervention, we suggest hydroxyethylrutosides, calcium dobesilate, horse chestnut extract, red vine leaf extract, or sulodexide for treatment of vein-related pain, leg heaviness, night cramps and/or sensation of swelling. ^a	2 (weak)	C (low to very low)
^a These products are not approved drugs by the U.S. Food and Drug Administration (FDA). The FDA does not approve medical food or nutritional supplements (https://www.fda.gov/).		

Micronized Purified Flavonoid Fraction (MPFF)

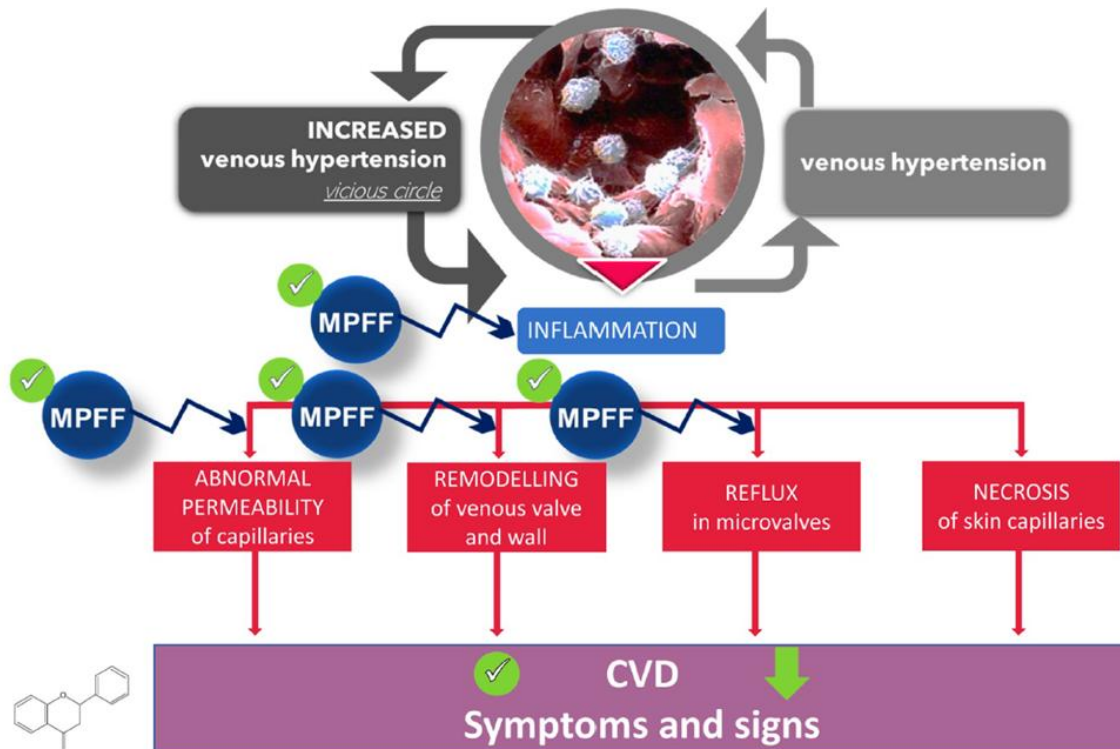
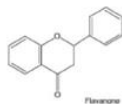
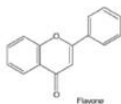
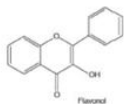
Flavonoid-based V_{eno} Active D_{rugs}



□ Diosmin 900 mg

▣ Hesperidin 100mg

- ✓ Hesperidin
- ✓ Diosmetin
- ✓ Linarin
- ✓ Isorhoifolin



Clinical Drug Investigation (2023) 43:S9–S13
Phlebology. 2016;23(2):82-91

Beyond Conservation: When Venous Intervention is Inevitable

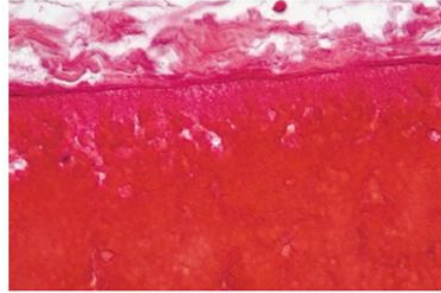
2. Compression therapy		
2.1 Compression therapy vs. intervention		
Guidelines	Grade of recommendation	Quality of Evidence
2.1.1. For patients with symptomatic varicose veins and axial reflux in the superficial truncal veins, we suggest compression therapy for primary treatment if the patient's ambulatory status and/or underlying medical conditions warrant a conservative approach, or if the patient prefers conservative treatment for either a trial period or definitive management.	2 (weak)	C (low to very low)
2.1.2. For patients with symptomatic varicose veins and axial reflux in the GSV or SSV who are candidates for intervention, we recommend superficial venous intervention over long-term compression stockings.	1 (strong)	B (moderate)
2.1.3. For patients with symptomatic varicose veins and axial reflux in the AAGSV or PAGSV, who are candidates for intervention, we suggest superficial venous intervention over long-term compression stockings.	2 (weak)	C (low to very low)
2.1.4. In patients with symptomatic varicose veins who are candidates for endovenous therapy and wish to proceed with treatment, we suggest against a 3-month trial of compression therapy before intervention.	2 (weak)	B (moderate)
2.2 Compression therapy after intervention		
2.2.1. In patients undergoing thermal ablation for saphenous incompetence, with or without concomitant phlebectomy, we suggest postprocedure compression therapy for a minimum of 1 week for pain reduction.	2 (weak)	B (moderate)

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Procedure Method and Type	Indication†	Evidence of Benefit	Data Type
Superficial vein			
Injection: sclerotherapy	Varicose veins, spider veins, bleeding veins, and peritumor venous network	Improved appearance; reduced pain, heaviness, fatigue, burning, paresthesia, and itching ²² ; and improved wound healing ²³	Observational
Endovascular approach: thermal ablation			
Laser	Axial veins and perforator veins	High percentage (93.1%) of occlusion of refluxing veins at 1 year, ²⁴ improved disease-specific quality-of-life measures, ²⁵ and improved wound healing ²³	Observational
Radiofrequency	Axial veins and perforator veins	High percentage (91.6%) of occlusion at 5 years, improved venous measures, improved venous disease-specific quality-of-life measures, ²⁶ and improved wound healing ²³	RCT
Endovascular approach: nonthermal ablation			
Microfoam	Axial veins	High percentage (73%) of occlusion at 1 year and improved venous disease-specific quality-of-life measures ²⁷	RCT
Mechanochemical	Axial veins	High percentage (94%) of occlusion at 6 months, ²⁸ reduced pain, and improved wound healing ²⁹	Observational
Cyanoacrylate glue	Axial veins	High percentage (91.4%) of occlusion at 5 years and improved venous disease-specific quality-of-life measures ³⁰	RCT
Surgical approach: ligation and stripping	Axial veins	Successful stripping and absence of veins noted in 93.5% of the treated veins at 3 years and improved patient-reported venous disease-specific quality-of-life measures ³¹	RCT
Surgical approach: phlebectomy‡	Varicose veins	—	Observational

Mechanism of Sclerotherapy



1hr Post STS

Injection of sclerosing agent



Destruction of endothelium



Exposure of basement membrane



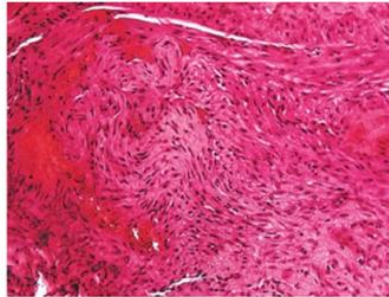
Thrombosis and phlebitis



Occlusion and fibrosis

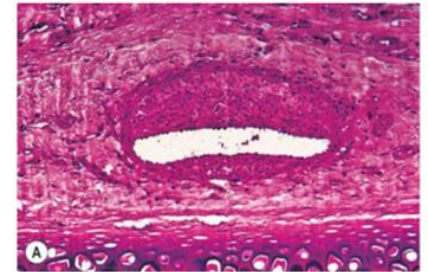


Recanalization



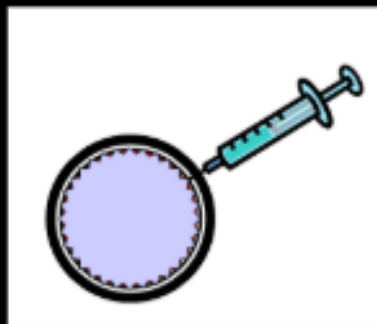
14 d Post STS

- Detergents
 - ✓ Polidocanol
 - ✓ Sodium tetradecyl sulfate (STS)
- Osmotic agents
 - ✓ Hypertonic saline
 - ✓ Glucose



60 d Post STS

硬化劑作用



2. 靜脈痙攣而引發凝血



3. 釋放膠原纖維與血栓緊密結合



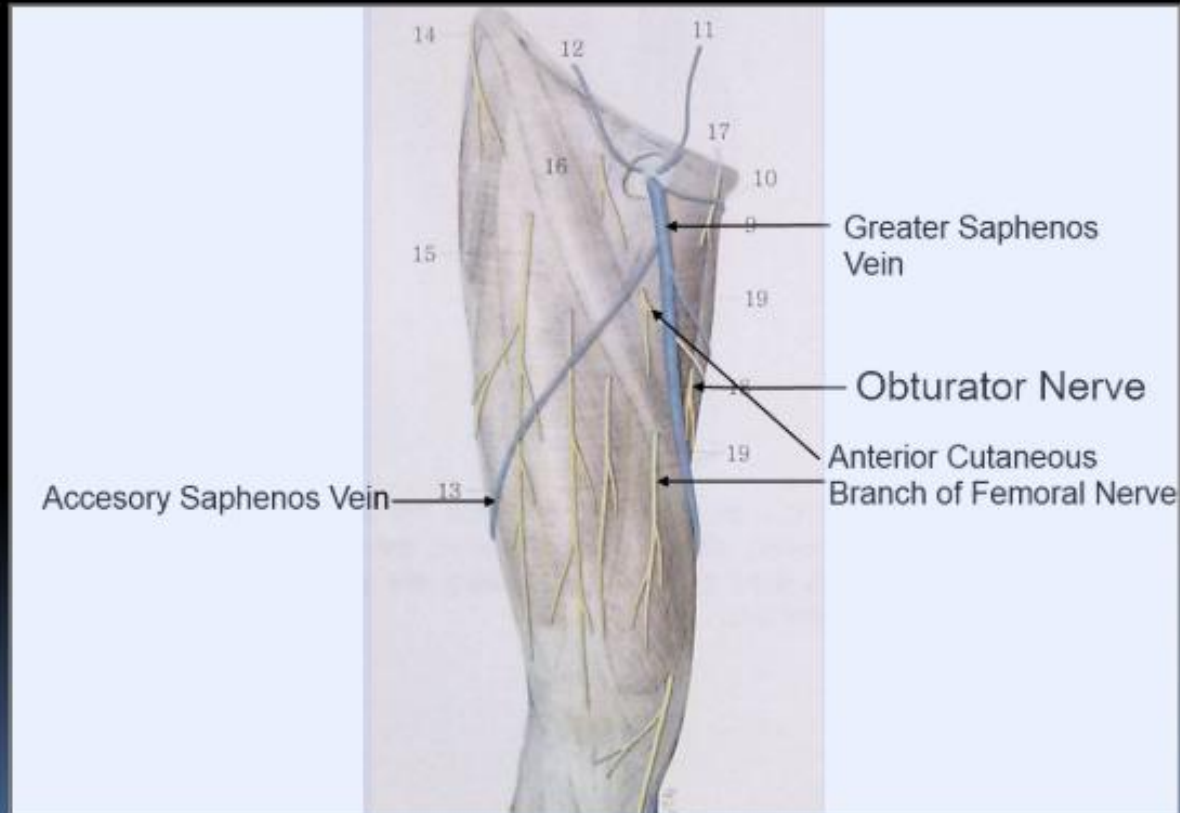
4. 血管完全堵塞



體表雷射



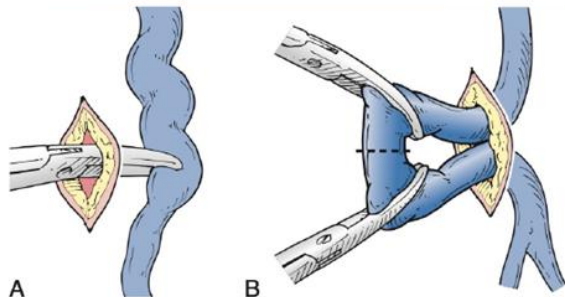
大隱靜脈逆流引發80%靜脈曲張



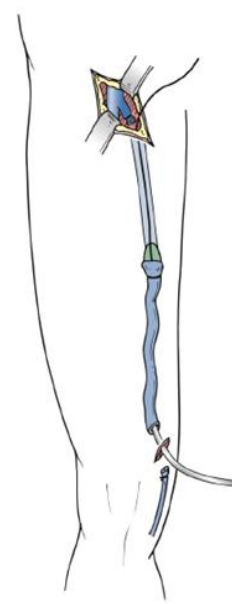
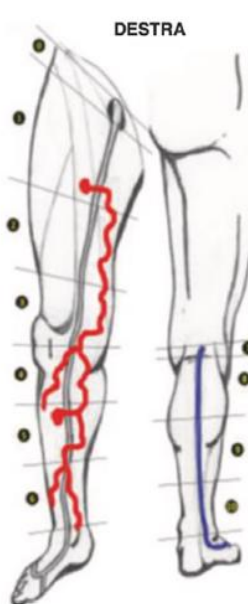
Surgical Approach Techniques

Varicose veins Ligation & Stripping Phlebectomy

Phlebectomy



Ligation & Stripping



Thermal Ablation Techniques

Varicose veins



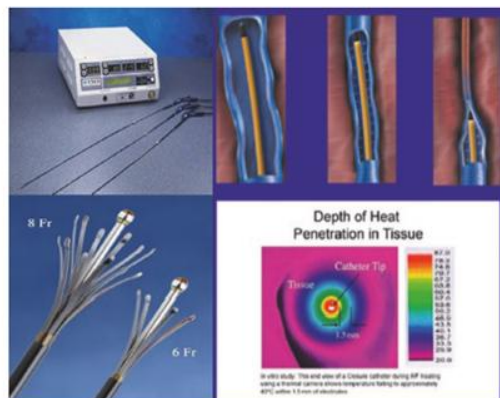
RFA 1998



LASER 1999

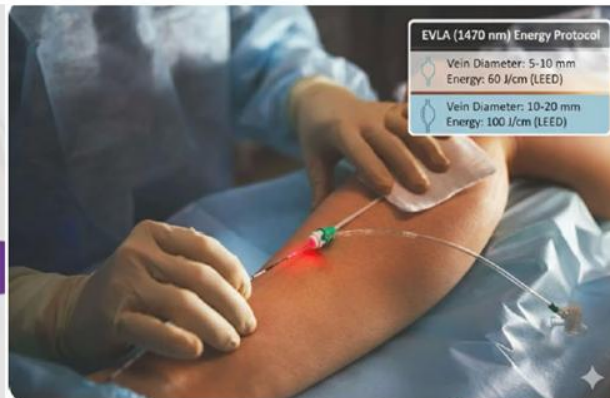


Steam 2011

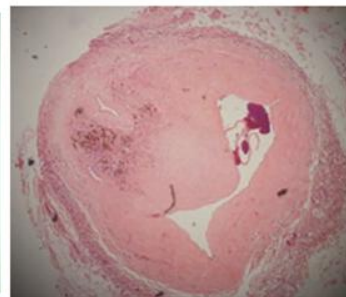
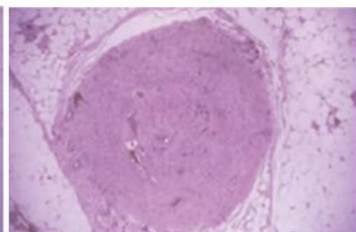
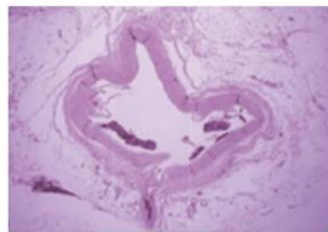


The Next Generation Endovenous RF Ablation

VenClose™
RF Ablation Catheter



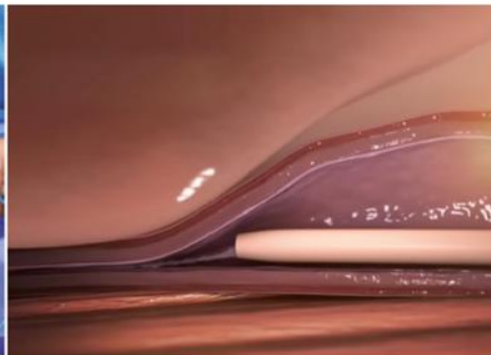
VenoSteam™



Non-Thermal Non-Tumescent (NTNT) Techniques

Varicose veins

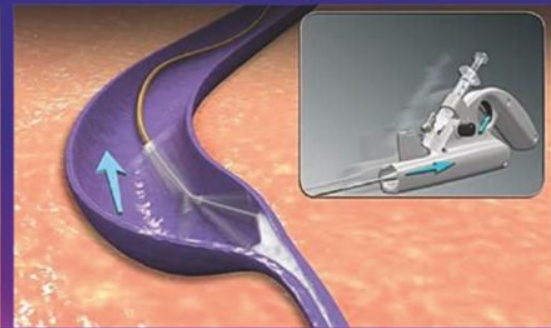
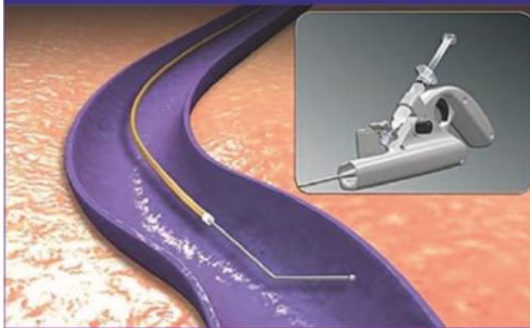
- ❑ Cyanoacrylate Adhesive
 - ✓ e.g., VenaSeal



➤ 1. Mechanical injury of the vessel endothelium (inside of the vein) by a rotating catheter tip (3500RPM).

➤ 2. A sclerosant chemical sprayed from the tip of the catheter as it is withdrawn to ensure maximum effect.

- ❑ MechanoChemical Ablation (MOCA)
 - ✓ ClariVein
 - ✓ Flebogrif



靜脈潰瘍的 傷口治療



Illustration by Smart-Servier Medical Art

(一)彈性襪或彈性繃帶的壓迫療法：利用壓迫小腿，使表層靜脈血流入深層靜脈的量增加，並減少靜脈血逆流，改善小腿部份之微小血管循環，以及促進淋巴液引流並減輕水腫。

(二)潰瘍傷口的照顧：以抗菌、非黏性且吸收滲液量較多的敷料和壓迫療法併用來緩解疼痛，促使肉芽組織及上皮化形成。若滲液量較多，需增加換藥頻率。

(三)藥物治療：作用於靜脈與小靜脈，增加血管張力而產生對抗血液與淋巴管循環停滯的作用。可改善慢性靜脈功能不全造成的相關症狀，如腿部疼痛、腿部沉重、腿部腫脹及腿部不適感。

(四)硬化劑注射治療。

(五)手術治療：在血管超音波導引下，以靜脈腔內雷射治療。





中文名稱

速必一®乳膏

英文名稱

FESPIXON® Cream

適應症

糖尿病足部傷口潰瘍

作用機制

1. 抑制發炎作用
2. 調節膠原蛋白生成
3. 促進損傷細胞的再生能力
4. 促進人類角質細胞增生
5. 減少發炎性M1型巨噬細胞，並刺激脂肪前驅細胞分泌GCSF及CXCL3兩種細胞素，增加修復型M2a/M2c巨噬細胞，進而促進傷口完全癒合¹



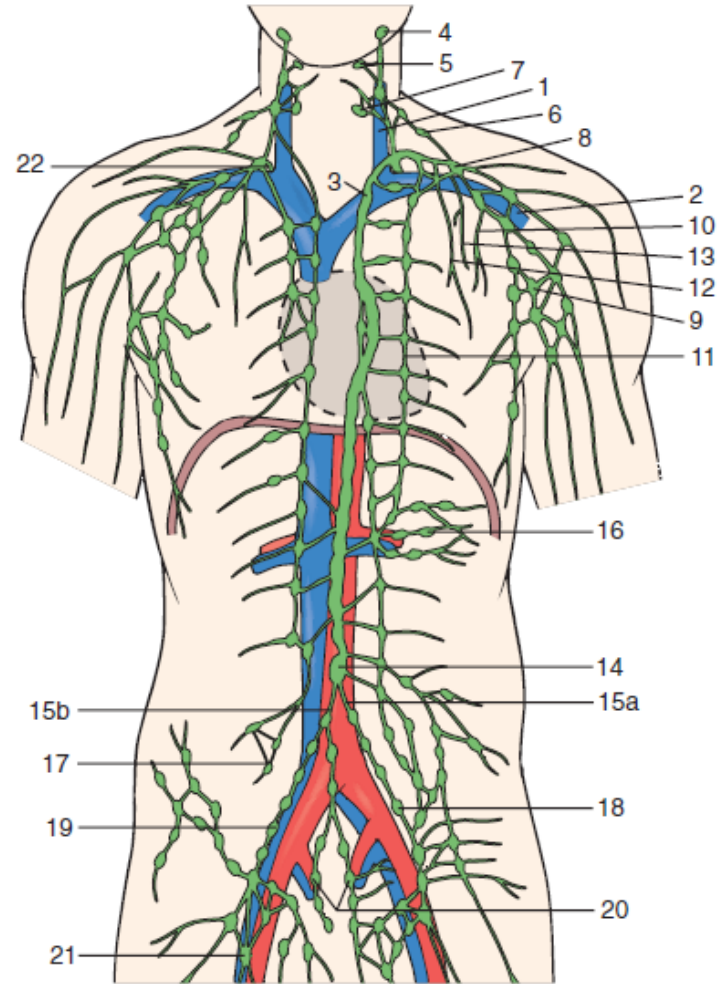
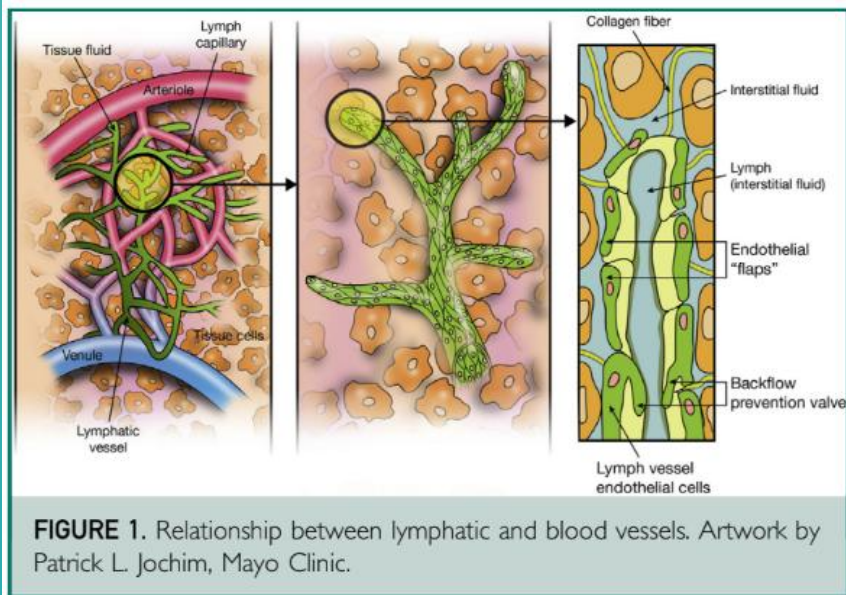
02



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淋巴水腫

Illustration by Smart-Servier Medical Art



造成淋巴水腫的原因： 淋巴回收運輸能力 <<< 淋巴負載

原發性



先天性淋巴發育不良

次發性



寄生蟲感染



癌症相關後續併發症 -
-> 淋巴廓清術後、放射治療、化學治療、免疫製劑

下肢淋巴水腫常見原因：

- Cervical / Uterine /Ovarian cancer
- Melanoma
- Prostate cancer
- Colorectal cancer
- Radiation
- Suprafemoral node dissection

Lymphedema clinical manifestations

1

潛伏水腫 偶有不適，休息就消



起初，淋巴管還在努力工作，早期的淋巴水腫，外觀並不會有任何變化，偶爾會出現脹、酸、緊、僵等類似循環不良感覺，有時在休息或抬手後，不適感就會解除。

2

輕度水腫 腫脹沈重，手臂圍變大



當淋巴液囤積到超過淋巴系統的承受量，無法回流的淋巴液會累積在組織中，肢體就會呈現浮腫現象，有沉重的感覺。



**小心！等到看見淋巴水腫
才處理已經慢一步了！**

3

重度水腫 乾硬粗皮，容易感染

淋巴系統的停滯會讓身體得不到養份也帶不走廢物，使淋巴水腫處更不健康，不僅變硬、關節難以活動，皮膚也變得粗糙、脫屑、黯沉，易成為感染的溫床，例如蜂窩性組織炎。





failure in picking up a fold of the patient's skin at the base of second toe

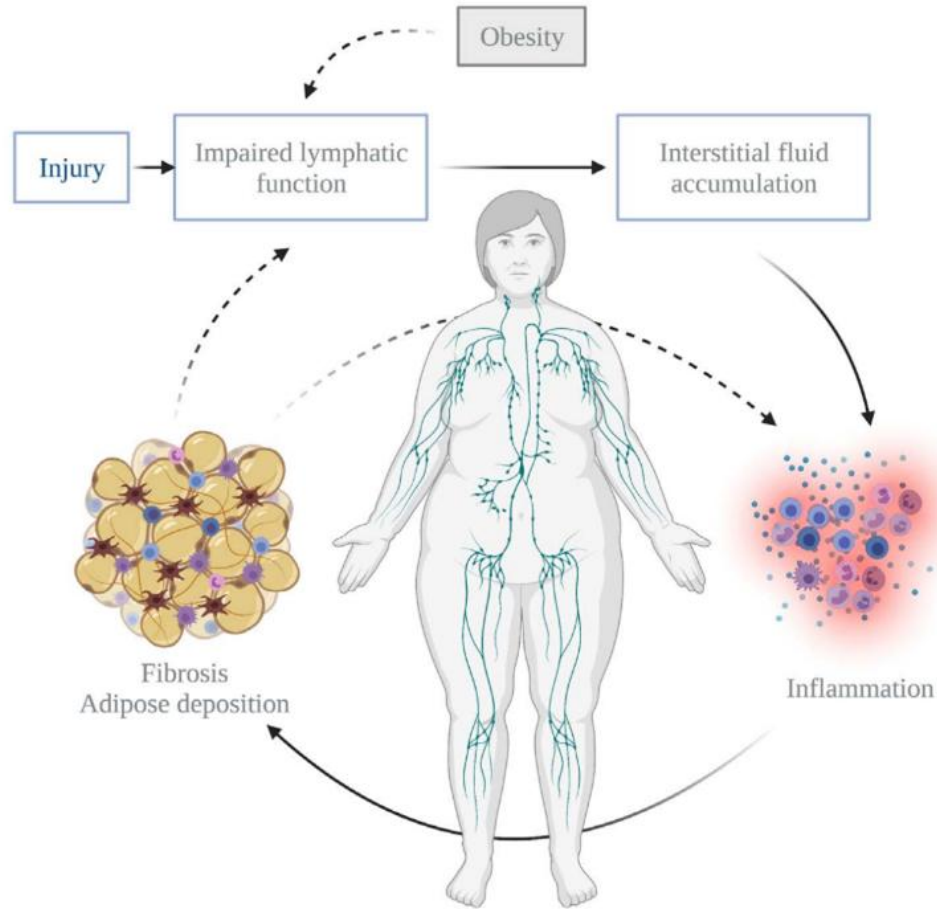
— **Stemmer's sign**

Illustration by Smart-Servier Medical Art

淋巴水腫是一種持續惡化的疾病！如果沒有好好控制，可能導致反覆發炎、關節活動力下降甚至不良於行！

Illustration by Smart-Servier Medical Art





復健與保守治療

Skin
care

MLD

Compression

Exercise

避免傷口
及感染

醫院或自
我執行

低彈力繃帶
或壓力手套

淋巴回流的
運動



淋巴水腫治療

LYMPHEDEMA – THERAPY

CDT – COMPLEX DECONGESTIVE THERAPY

medi

PHASE 1 – DECONGESTIVE PHASE

第一階段：消腫期

Objective: reduction of edema
Duration: several weeks depending on stage
→ possible on an outpatient and inpatient basis

- 目標：減少水腫
- 期間：數週不等，依水腫嚴重程度與期別定，可在門診或住院條件下進行

PHASE 2 – MAINTENANCE PHASE

第二階段：維持期

Objective: maintenance and improvement of the result from PHASE 1
Duration: usually for a lifetime

- 目標：維持並改善第一階段（消腫期）的治療成果
- 期間：通常需終身維持

5 PILLARS OF CDT

Manual
Lymph
Drainage

徒手淋巴引流按摩



Hygiene and
Skin Care

衛生與皮膚護理



Exercise and
Movement

運動與活動



Learning and
Self-
management

學習與自我管理



Compression
Therapy

壓力治療





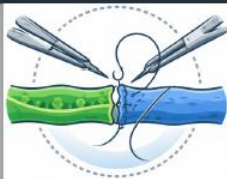
淋巴水腫治療在台灣

LYMPHEDEMA – THERAPY IN TAIWAN

medi

PRE OPERATION 術前

- 目標：減少水腫
- 期間：約3個月



LVA Surgery

POST OPERATION 術後

- 目標：優化手術結果
- 期間：約3~6個月

MAINTENANCE 維持期

- 目標：維持術後結果
- 期間：長期



- 可調式壓力
- 短期加壓



- 可調式壓力
- 短期加壓



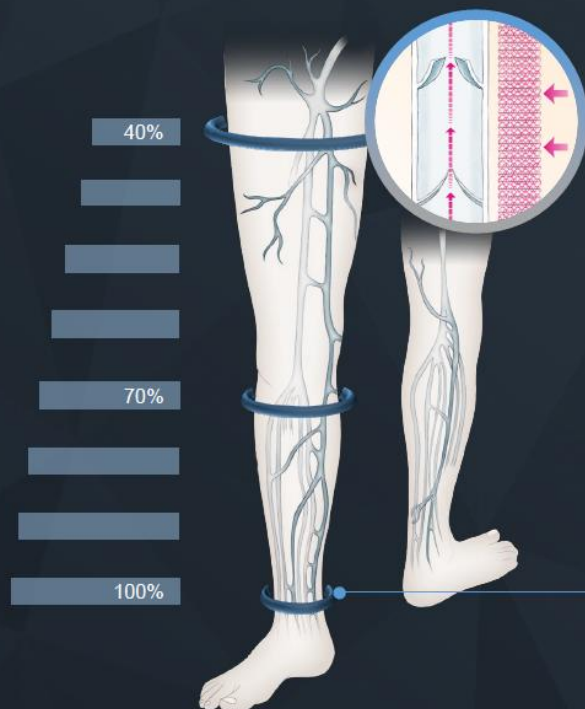
- 固定尺寸
- 長期維持



COMPRESSION THERAPY

GRADUATED COMPRESSION DEFINED BY RAL

medi



- Adaptation of compression to anatomy
- 根據身體結構提供壓力
- Decreasing pressure from distal to proximal, i.e. from bottom to top
- 由下往上遞減壓力
- Highest pressure at the ankle(腳踝): 100%
Below the knee(膝蓋以下): 70% max.
At the thigh(大腿): 40% max.



The various compression classes are defined according to the **static pressure at the ankle**

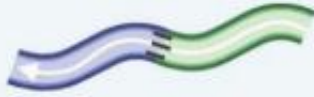
壓力等級是根據腳踝的靜態壓力定義



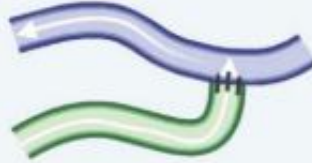
Compression classes defined by RAL Deutsches Institut für Gütesicherung und Kennzeichnung, i.e. German Institute for Quality Assurance and Certification

RAL-GZ 387

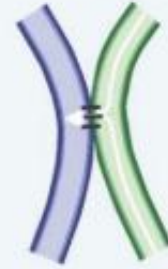
A Lymphovenous anastomosis



end-to-end

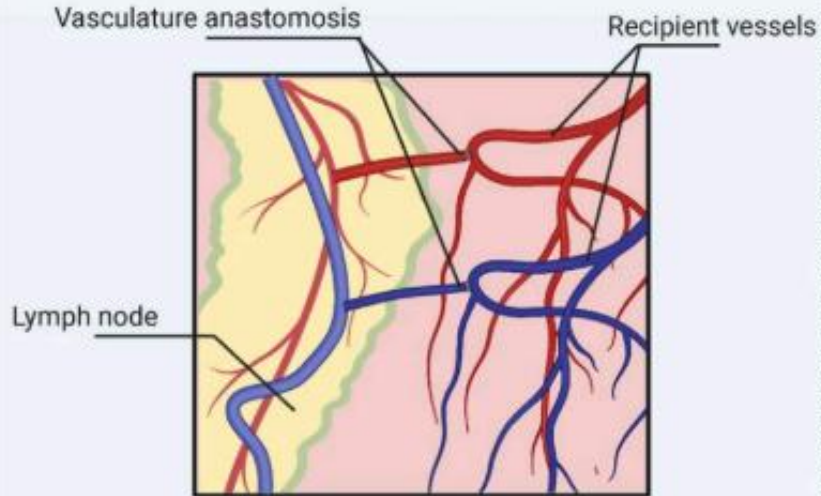


end-to-side

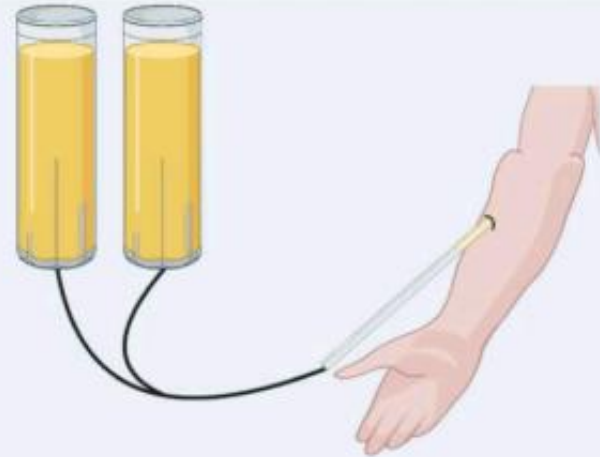


side-to-side

B Vascularized lymph node transfer (VLNT)



C Suction assisted protein lipectomy (SAPL)

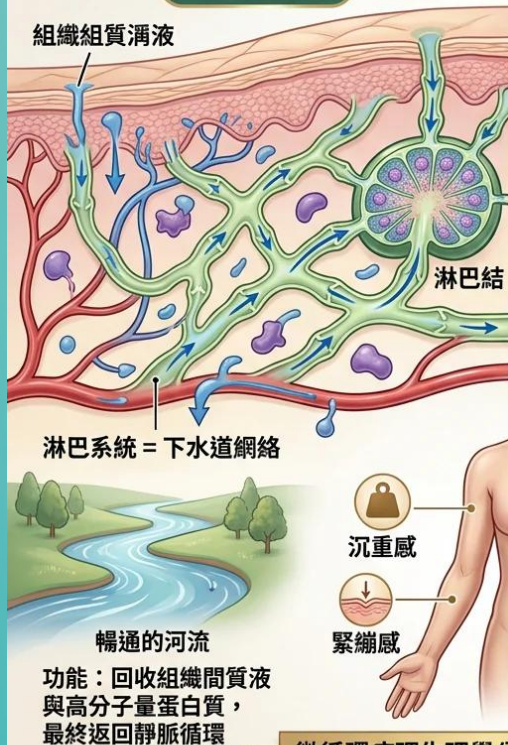


淋巴水腫與 超顯微繞道手術

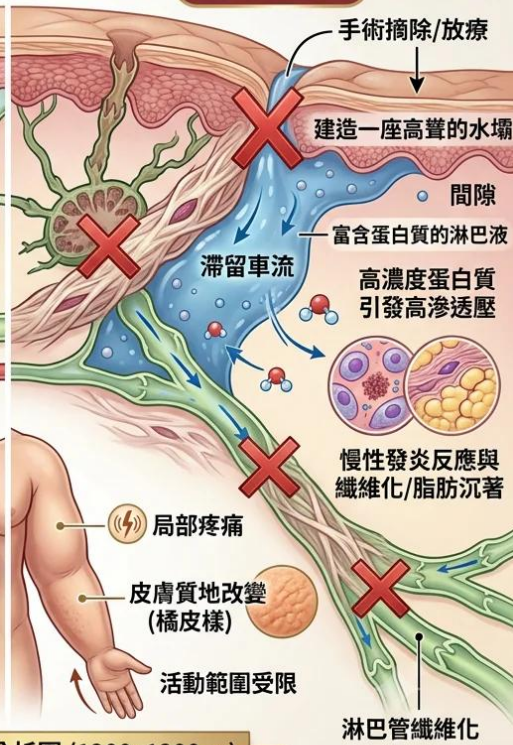


從微循環病理生理學視角： 人體淋巴水腫發病機制與影響

健康狀態

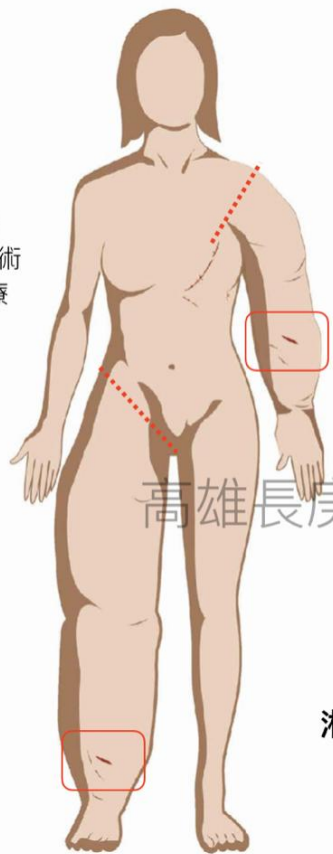


病理狀態



微循環病理生理學分析圖 (1200x1200px)

腫瘤切除
淋巴結廓清術
放射線治療

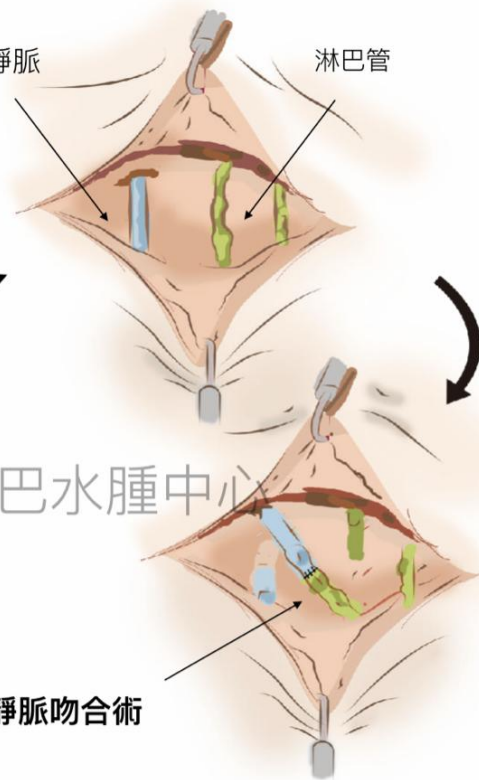


靜脈

淋巴管

淋巴管-靜脈吻合術

高雄長庚 淋巴水腫中心



Lymphovenous Bypass Surgery FOR LYMPHEDEMA



Lymphatic Vessel

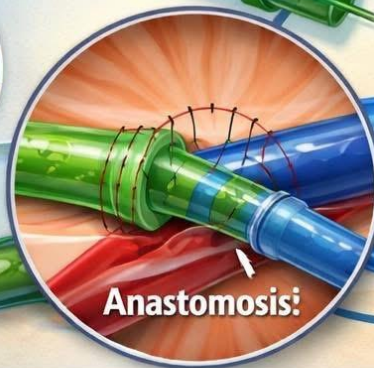
Swollen Arm
with Lymphedema



→ Tiny Incision



ICG Imaging



Small Vein
(Venule)

-0 Sutures

Lymph Fluid Drainage



Minimally Invasive



Reduces Swelling



Decrease Infection
Risk



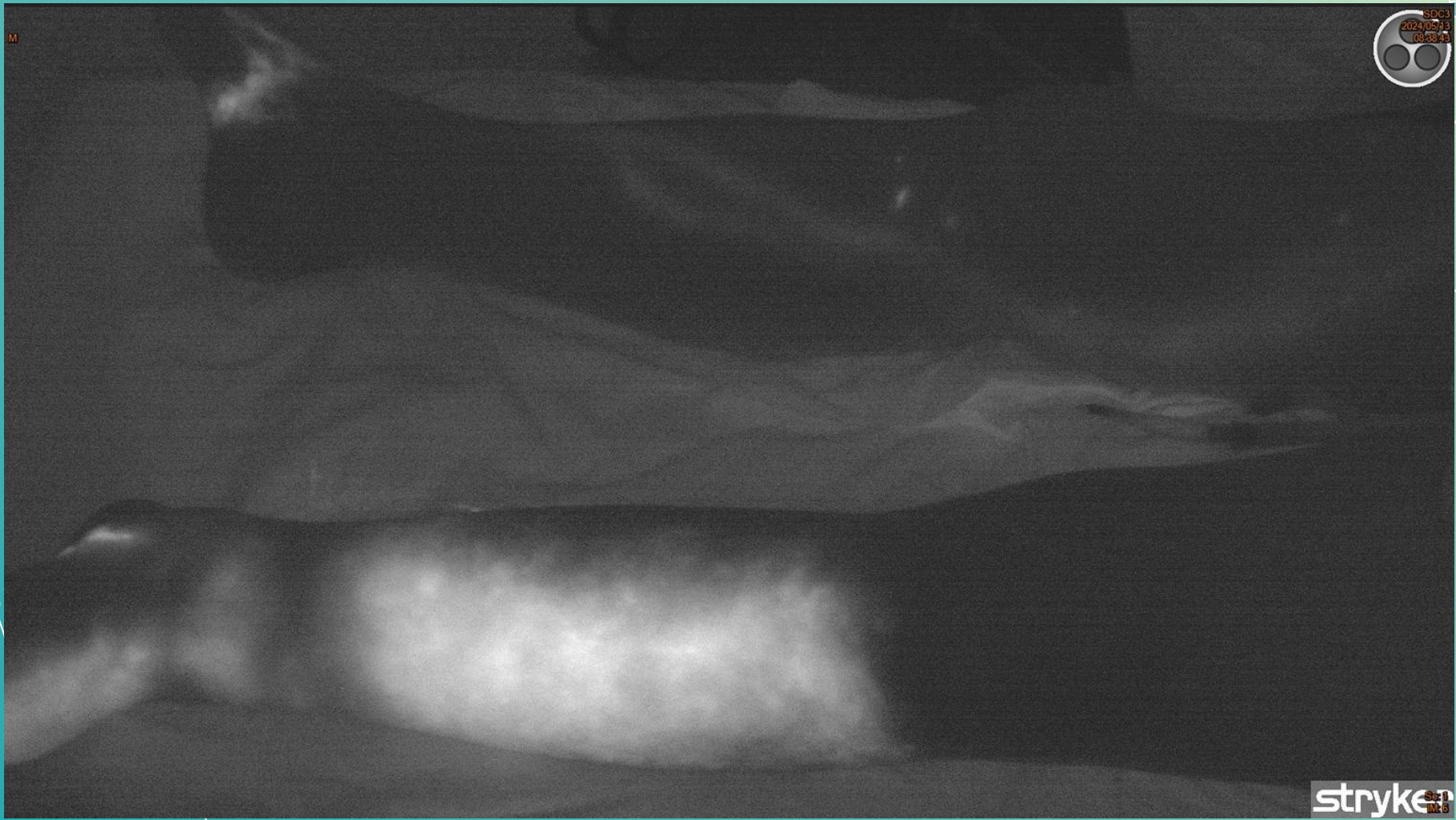
Outpatient Procedure



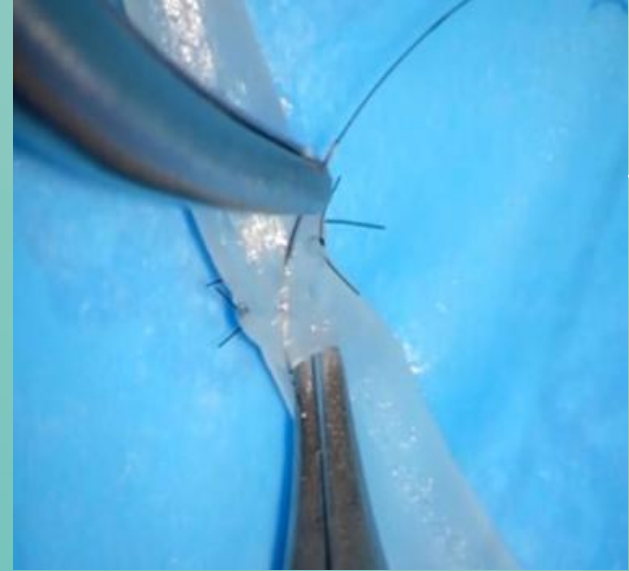
An anatomical model of a human figure, split vertically to show internal structures. The left side of the model is red and shows the musculature, while the right side is white and shows the nervous system with black lines representing nerves. The model is standing in a clinical or laboratory setting with a desk, a potted plant, and a white anatomical model of a spine in the background. The text "Workflow of LVA Supermicrosurgery" is overlaid on the image in a large, bold, black font.

Workflow of LVA Supermicrosurgery



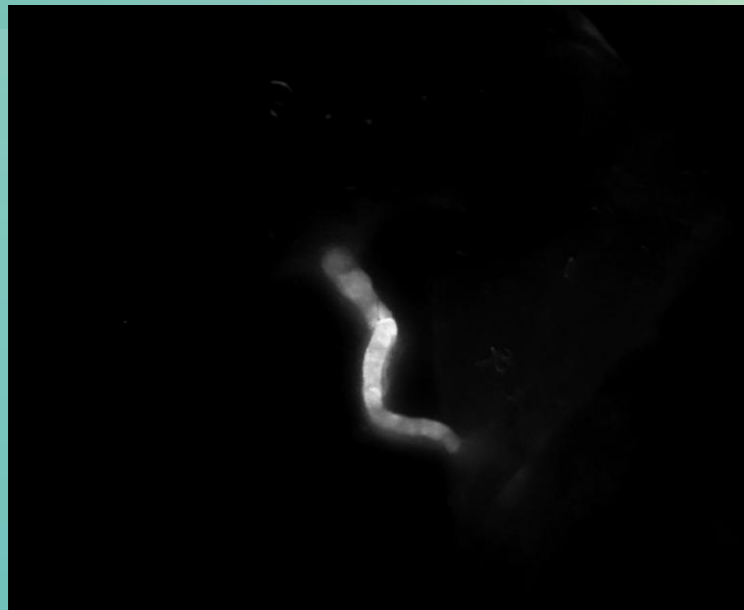
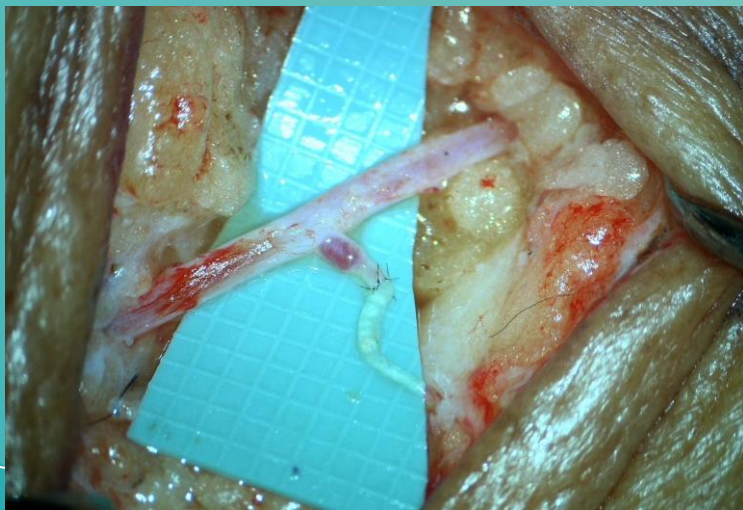
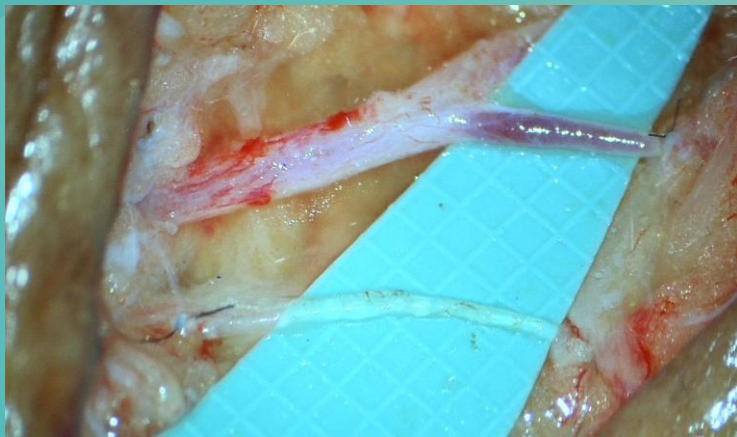


stryker

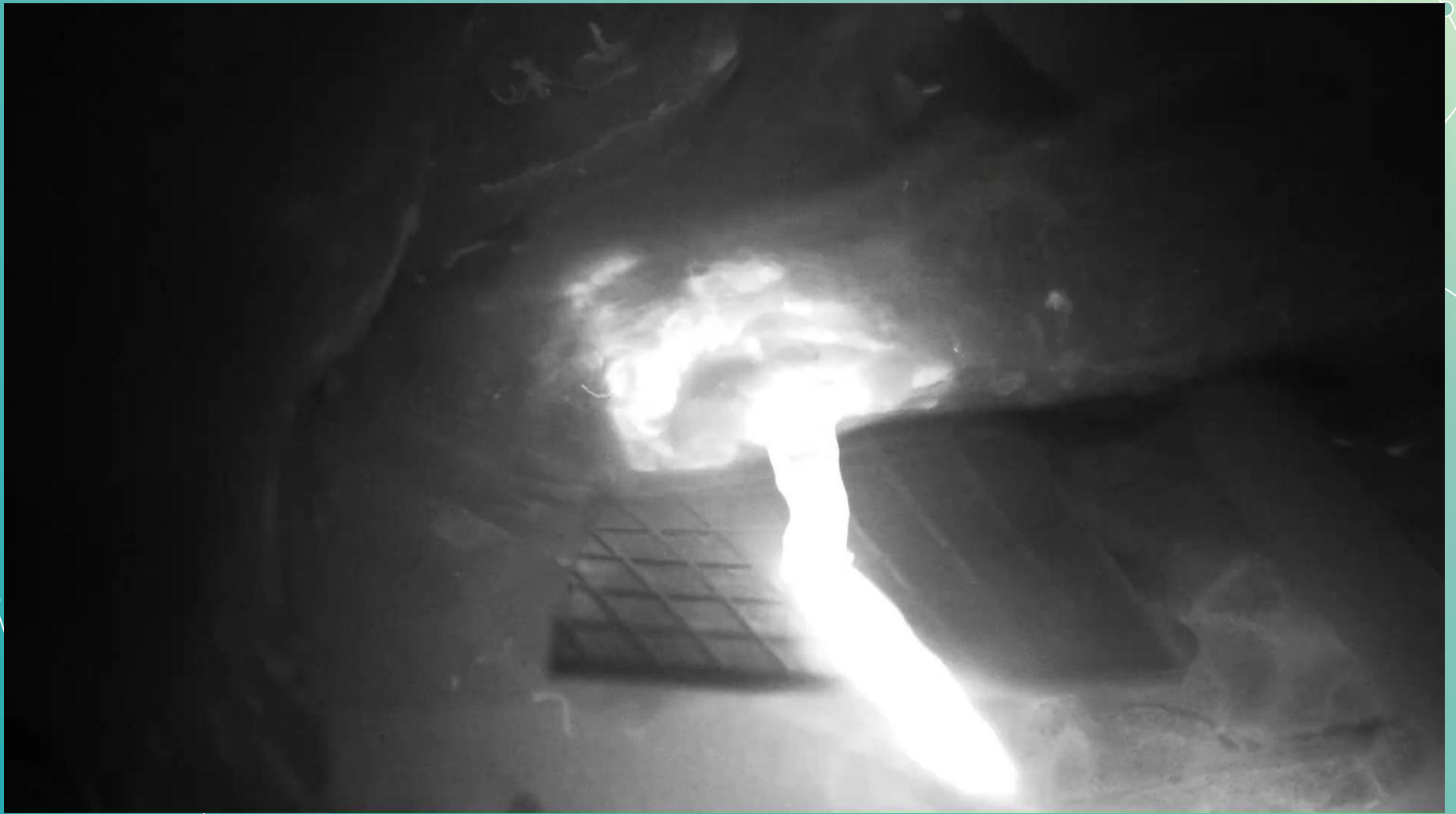


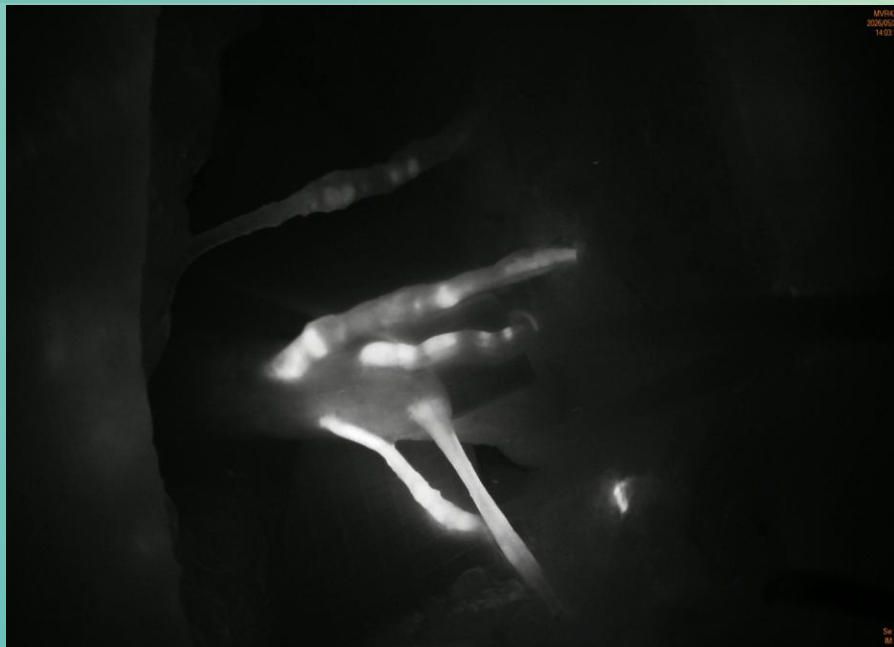
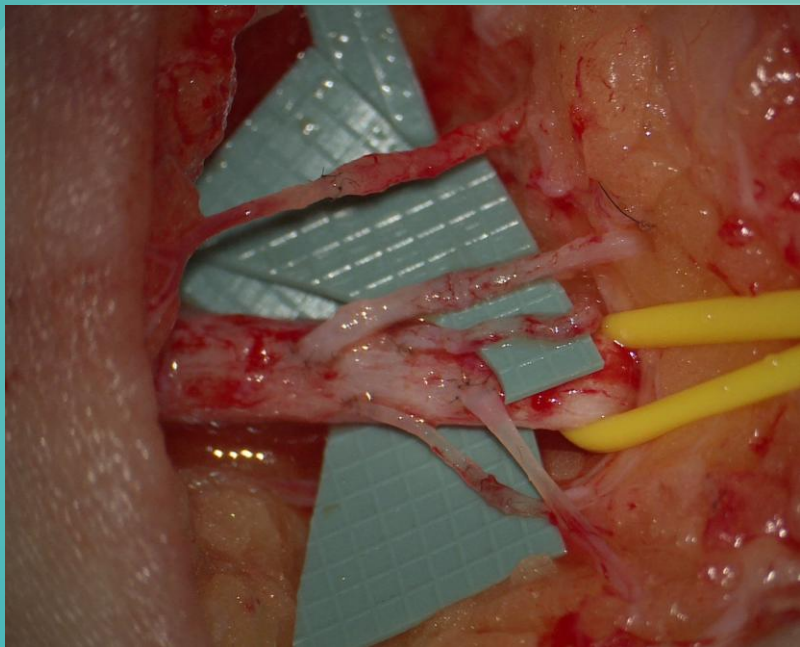
實際案例分享





經由超顯微吻合後
，術中可見淋巴液
順利流入靜脈之中



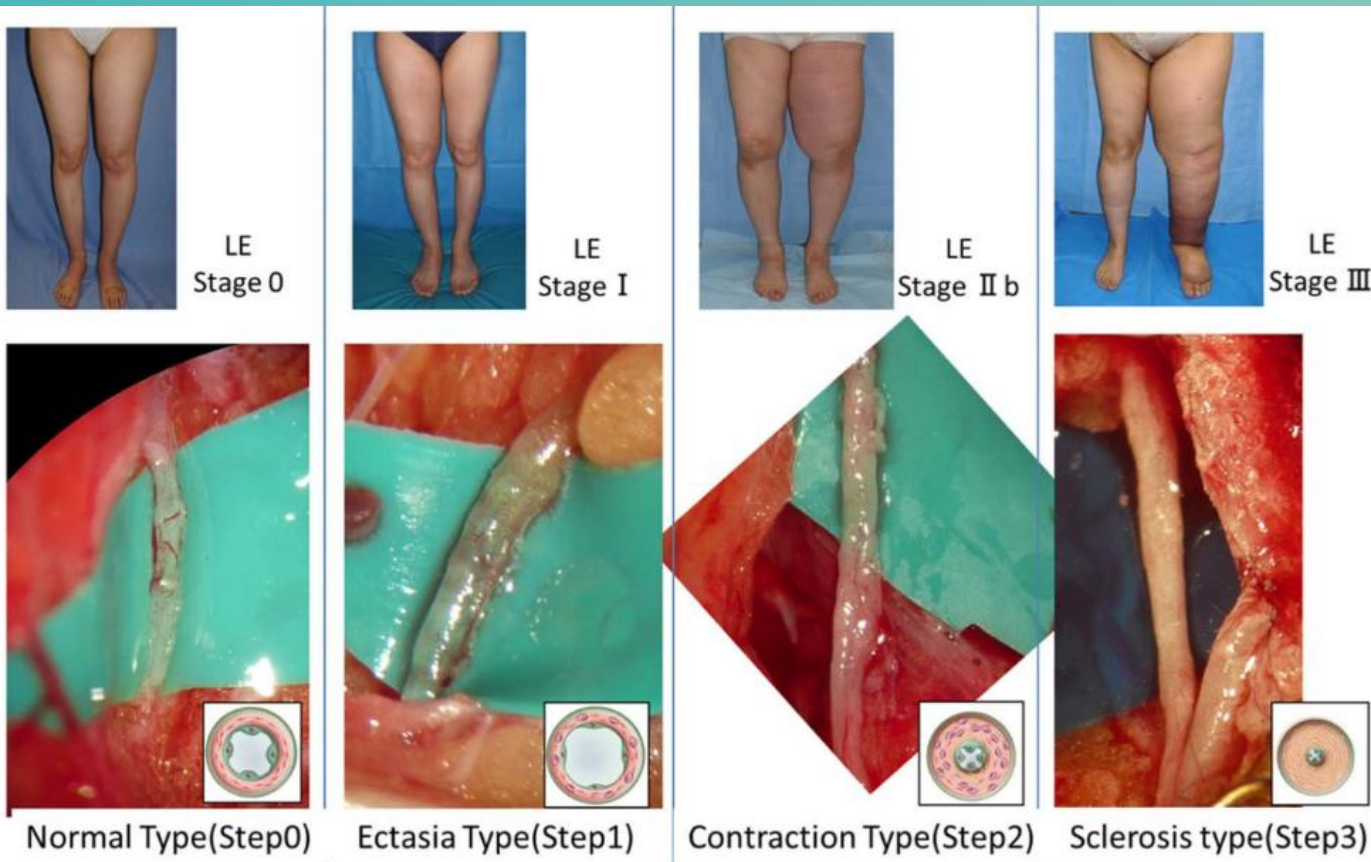


運用end to side吻合技術，可以同時將多條
淋巴管引流至大隱靜脈達到更好的效果

手術後再輔以壓力衣襪加壓，可以促進消腫



早期接受手術的好處!



Article

Lymphaticovenous Anastomosis for Treating Secondary Lower Limb Lymphedema in Older Patients—A Retrospective Cohort Study

Johnson Chia-Shen Yang^{1,2,3}, Yu-Ming Wang^{2,4}, Shao-Chun Wu^{2,5}, Wei-Che Lin^{2,6}, Peng-Chen Chien^{1,2}, Pei-Yu Tsai^{1,2}, Ching-Hua Hsieh^{1,2} and Sheng-Dean Luo^{2,7,*}

volume reduction of the lymphedematous limb, in volume and prevalence, was 867.5 mL [336.0 to 1309.0] and 32.7% [15.1 to 47.3], respectively. The one-year post-LVA volume reduction was 777.5 mL [215.0 to 1443.5] and 33.3% [15.6 to 54.4], respectively. Significant six-month and one-year post-LVA percentage volume reductions were noted compared to the pre-LVA volumes (both $p < 0.001$). However, no significant difference was found between the six-month and one-year post-LVA percentage volume reduction ($p = 0.53$)



根據醫學論文統計，手術後患肢體積平均可減少約**30%**



超顯微手術並無法完全根治淋巴水腫，卻是目前最積極的治療方式

雖然手術時間長，但是屬於微創手術，患者術後恢復期短且無甚疼痛

結論



淋巴水腫是一種會逐漸惡化的疾病，需要長期治療且無法根治



藉由超顯微繞道手術改善淋巴回流，輔以保守治療能顯著提升病患生活品質

Illustration by Smart-Servier Medical Art



Thanks!

Do you have any questions?

stanleyhuang23@gmail.com



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馬偕紀念醫院
Mackay Memorial Hospital

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