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Mastering Compression Therapy

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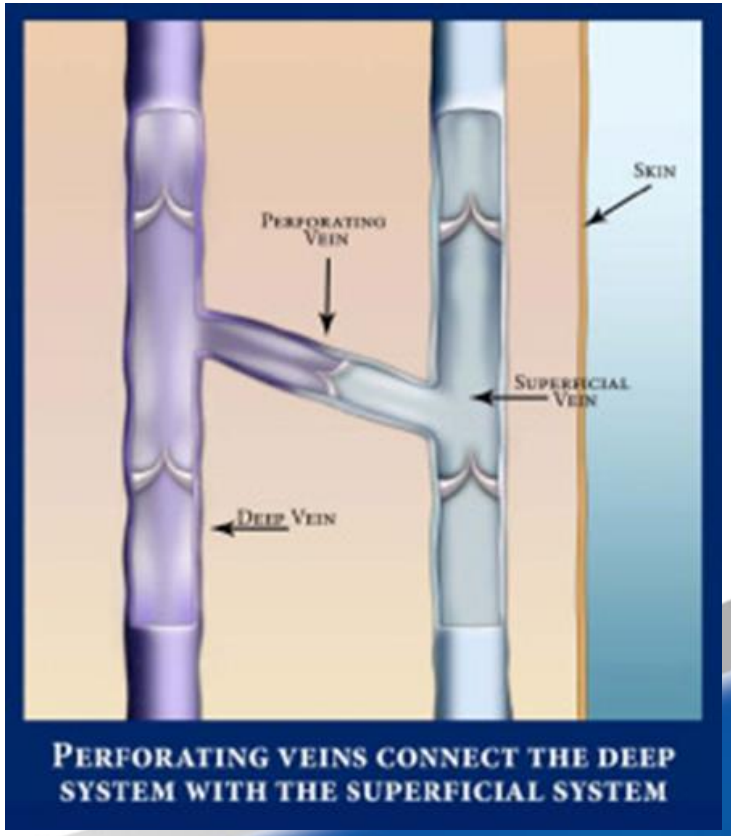
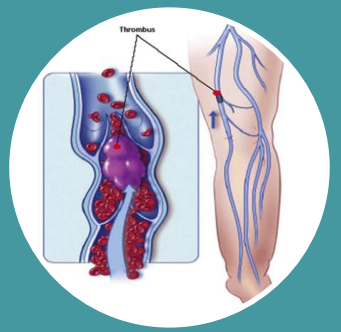
Venous system

- Superficial veins
  - lie in the subcutaneous tissues
- Deep veins
  - are located below the fascia and surrounded by muscle
- Perforating veins
  - are connected between 2 system



Causes of Chronic venous insufficiency



Tumor compression

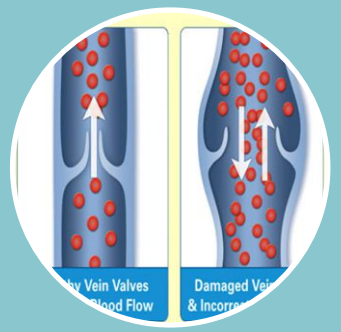
Retroperitoneal fibrosis

Tissue infection or herniation

Venous thromboembolism

Thrombophlebitis

Aneurysm



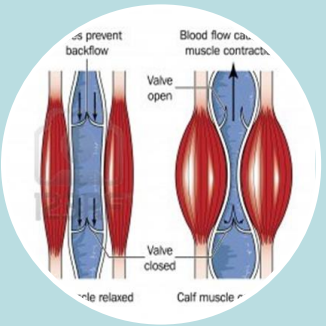
Prior DVT,Obesity,Pregnancy

Prolong standing occupation

AV Fistula, AV Malformation

Previous surgery or trauma

Valves incompetence



Elderly or

other with muscle disuse

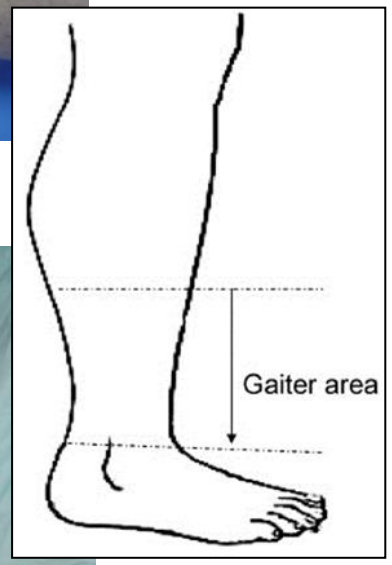
Neuromuscular disease

(multiple sclerosis,

spinal cord injury)

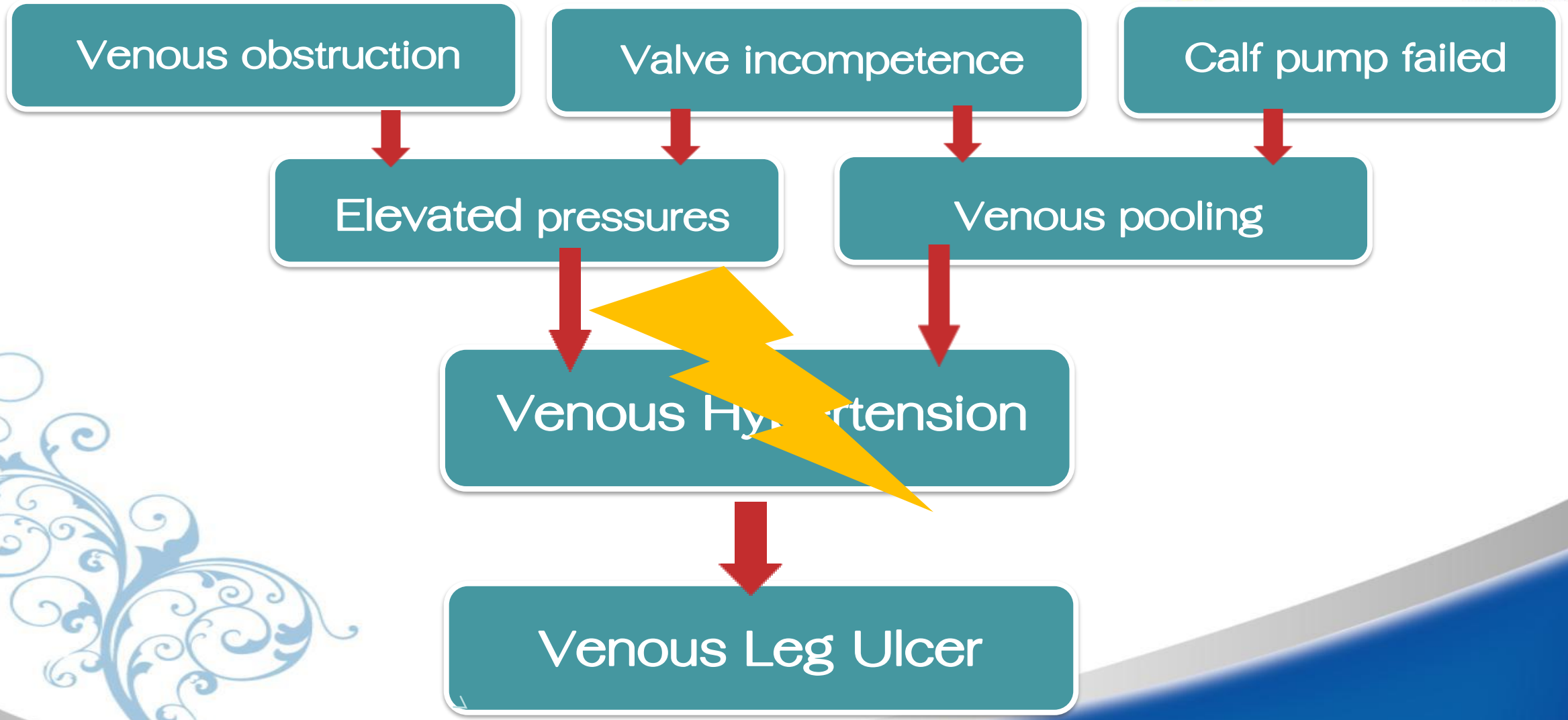
Venous Hypertension

Signs & Symptoms



- Swelling of the lower extremities and an aching of the legs
- Hyperpigmentation
- Lipodermatosclerosis :

  fibrin layer in subcutaneous tissue
- Champagne bottle deformity


Venous obstruction
Valve incompetence
Calf pump failed
Elevated pressures
Venous pooling
Venous Hy rtension
Venous Leg Ulcer

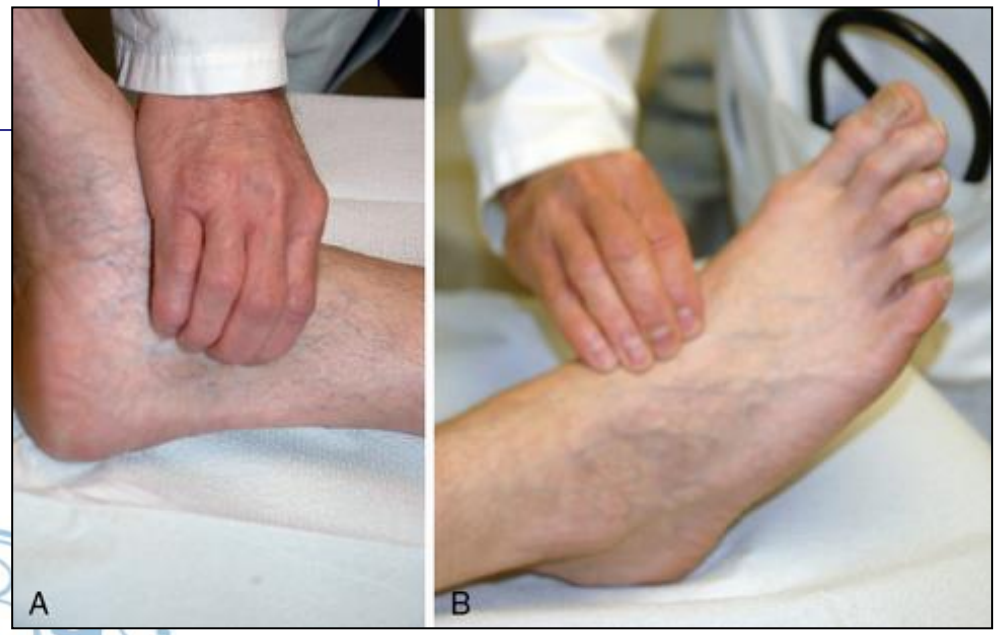
Compression therapy Clinical Practice Guidelines of the European Society for Vascular Surgery (ESVS)

Recommendation 23	**Class**	**Level**	**References**
Elastic stockings are recommended as an effectivetreatment modality for symptoms and signs of chronic venous disease.	I	B	213, 215
Recommendation 24			
Temporary use of elastic stockings may be considered in patients with chronic venous disease awaiting further investigation, and as a definite treatment in patients who are not managed by invasive methods.	IIb	C	
Recommendation 25	**Class**	**Level**	**References**
Compression bandages and walking exercises are recommended as the initial treatment modality to promote healing in patients with venous leg ulcers.	I	A	217, 218
Recommendation 26			
The use of high compression pressures of at least 40 mmHg at the ankle level should be considered, to promote ulcer healing.	IIa	B	221

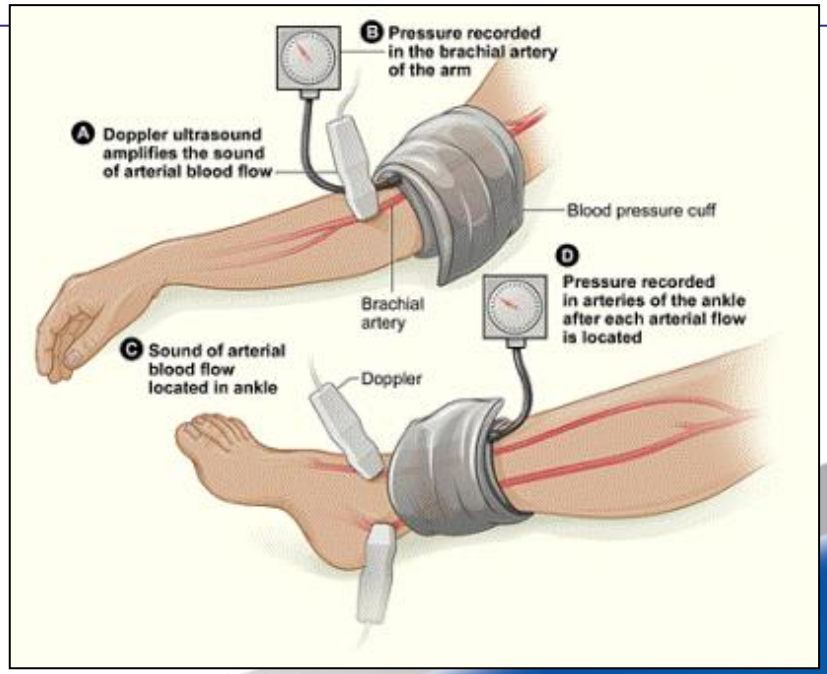
Eur J Vasc Endovasc Surg (2015) 49, 678-737

Forewarning before compression

Peripheral pulse palpations



Ankle brachial index

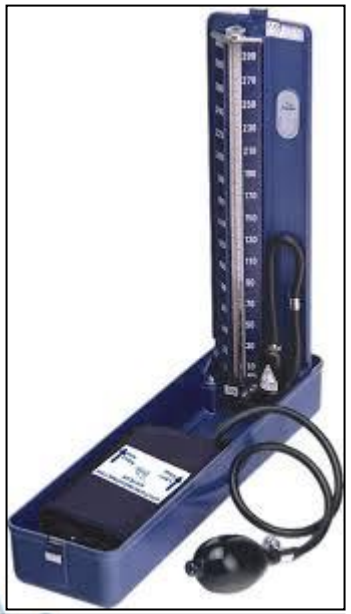


Absolute contraindication:

ABI < 0.5 or ankle pressure < 60 mmHg

ABI Measurement

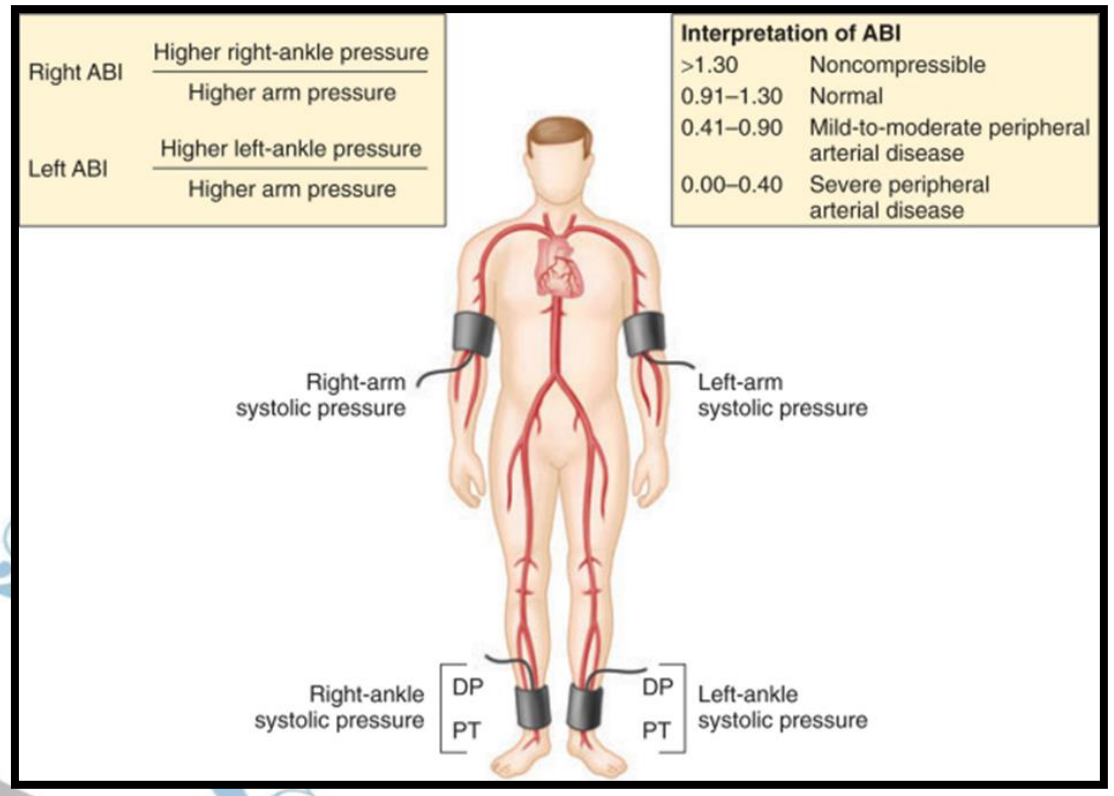
Sphygmomanometer



Ultrasound transmission gel

Portable Doppler with 8-10 MHz probe

ABI Procedure : Calculate the ABI



- Divide SBP of the ankle by SBP of the arm.
- Use the highest value from your readings of the left ankle arteries and divide it by the value of the brachial artery.
- Example: The SBP of the left ankle is 120 and SBP of the arm is 100,

  ABI = 120/100 = 1.20

How to Calculate the ABI

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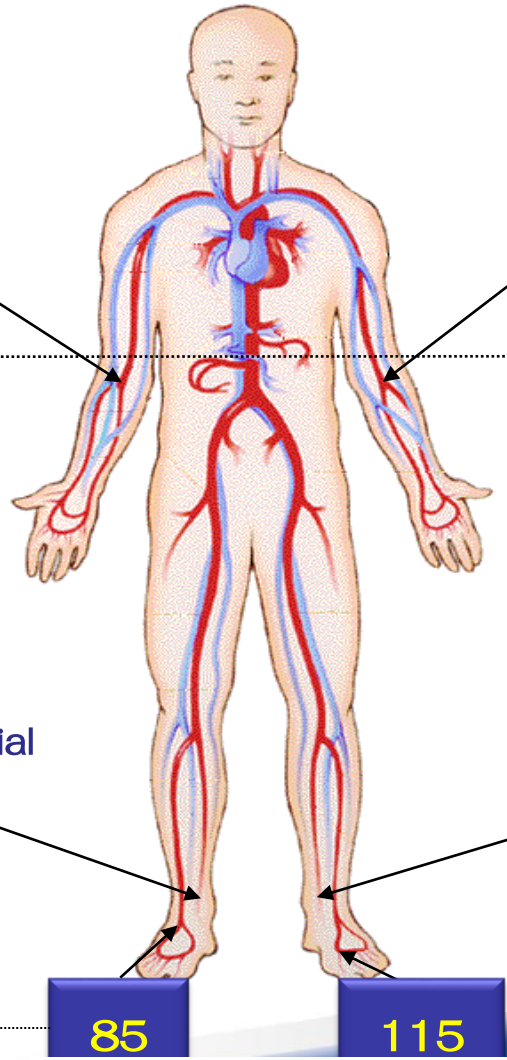
ABPI calculations

Highest ankle systolic pressure (for each leg)

Highest brachial systolic pressure

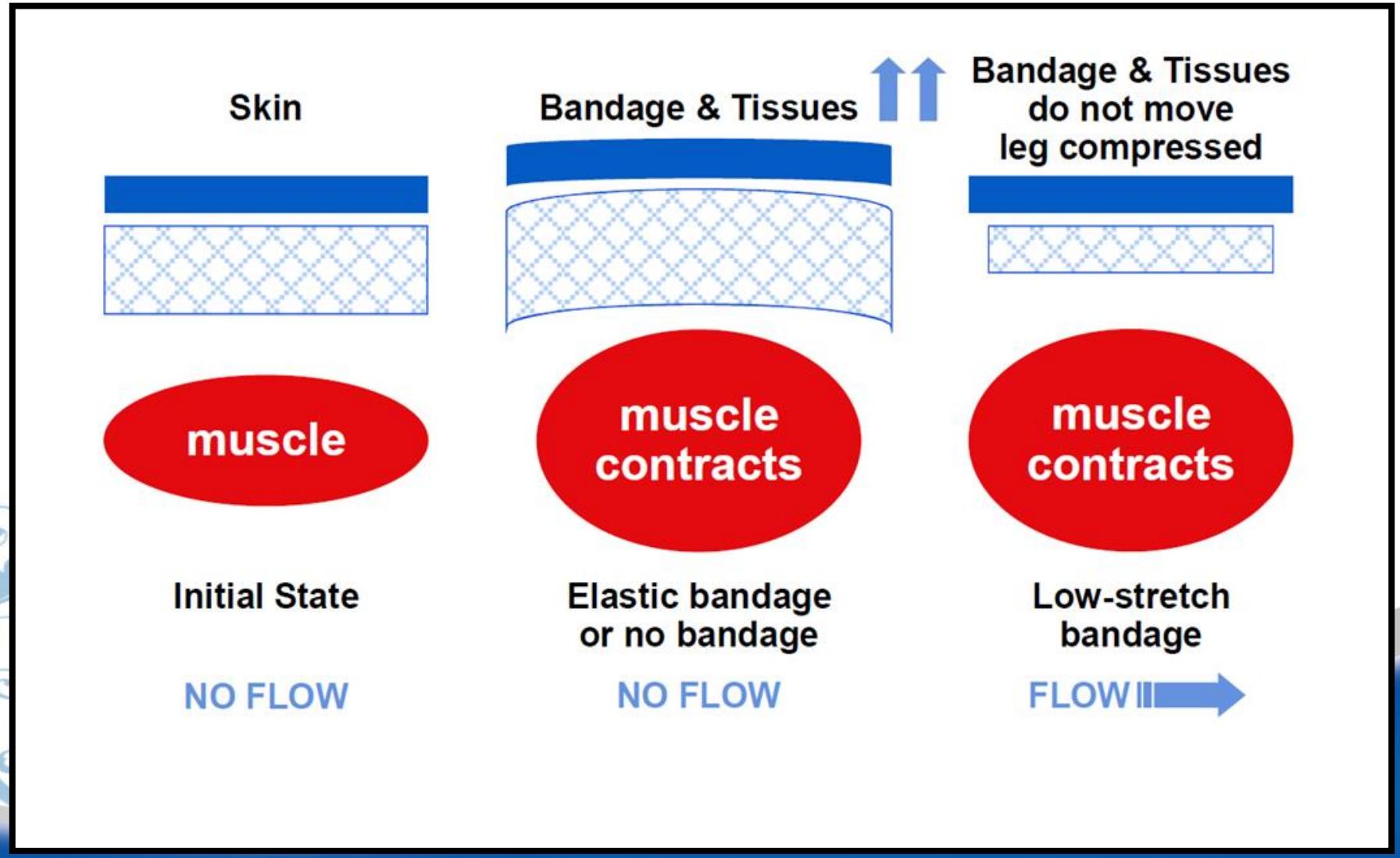


Normal ABPI ratio is equal or greater than 1.00 but not greater than 1.3 (check local policy)

ABI Value	Interpretation	Recommendation
Greater than 1.4	Calcification / Vessel Hardening	Refer to vascular specialist
1.0 - 1.4	Normal	None
0.9 - 1.0	Acceptable	
0.8 - 0.9	Some Arterial Disease	Treat risk factors
0.5 - 0.8	Moderate Arterial Disease	Refer to vascular specialist
Less then 0.5	Severe Arterial Disease	Refer to vascular specialist

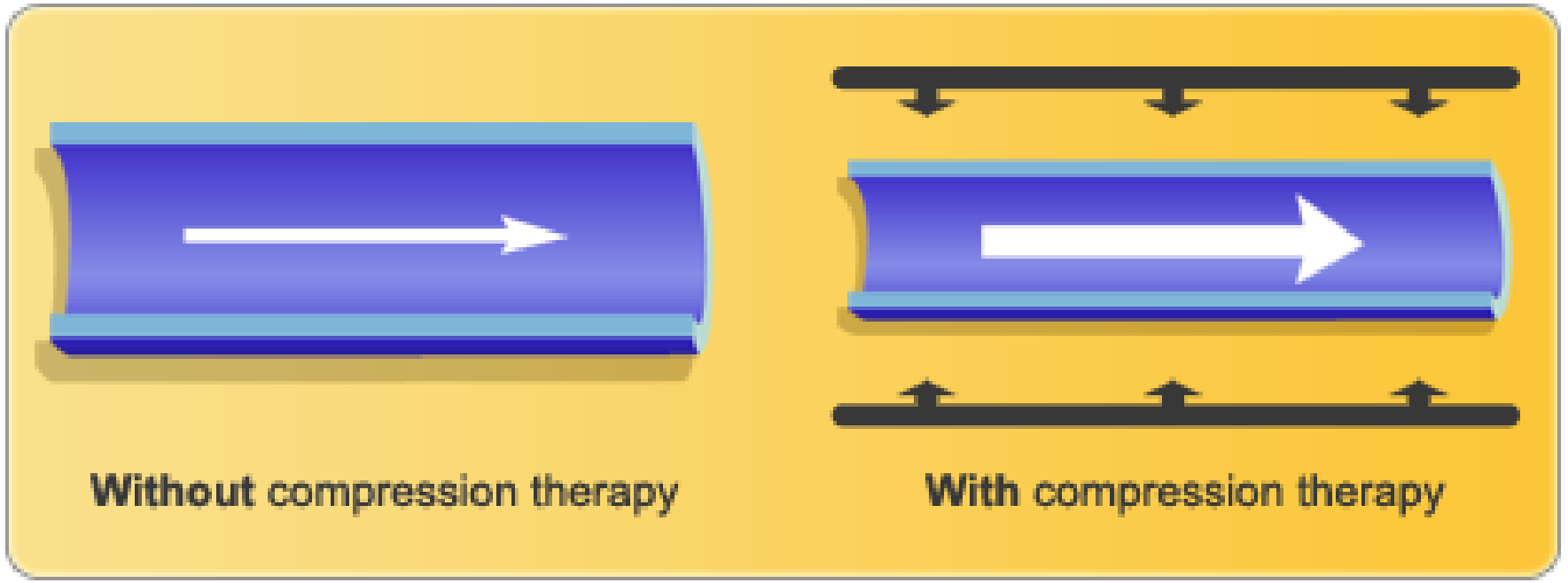
Stanford Medicine 25

Bandage Effects



The mechanism of action of the compression

1. Reduction in vein diameter

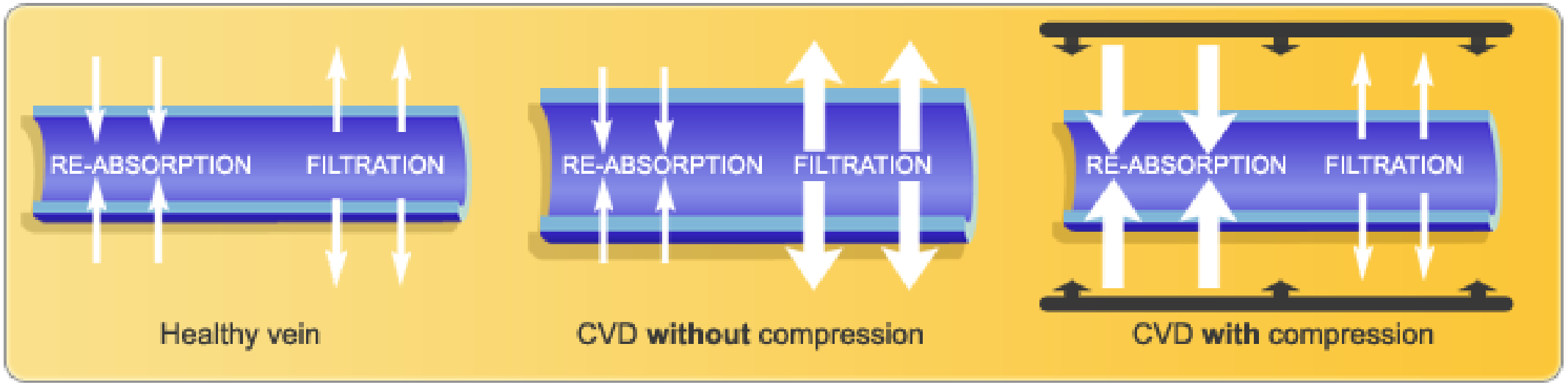


The mechanism of action of the compression

2. Restoration of valvular function

The mechanism of action of the compression

3. Re-absorption of interstitial liquids into the veins



Types of Compression therapy

Long-stretch Bandaging (Elastic Bandage)

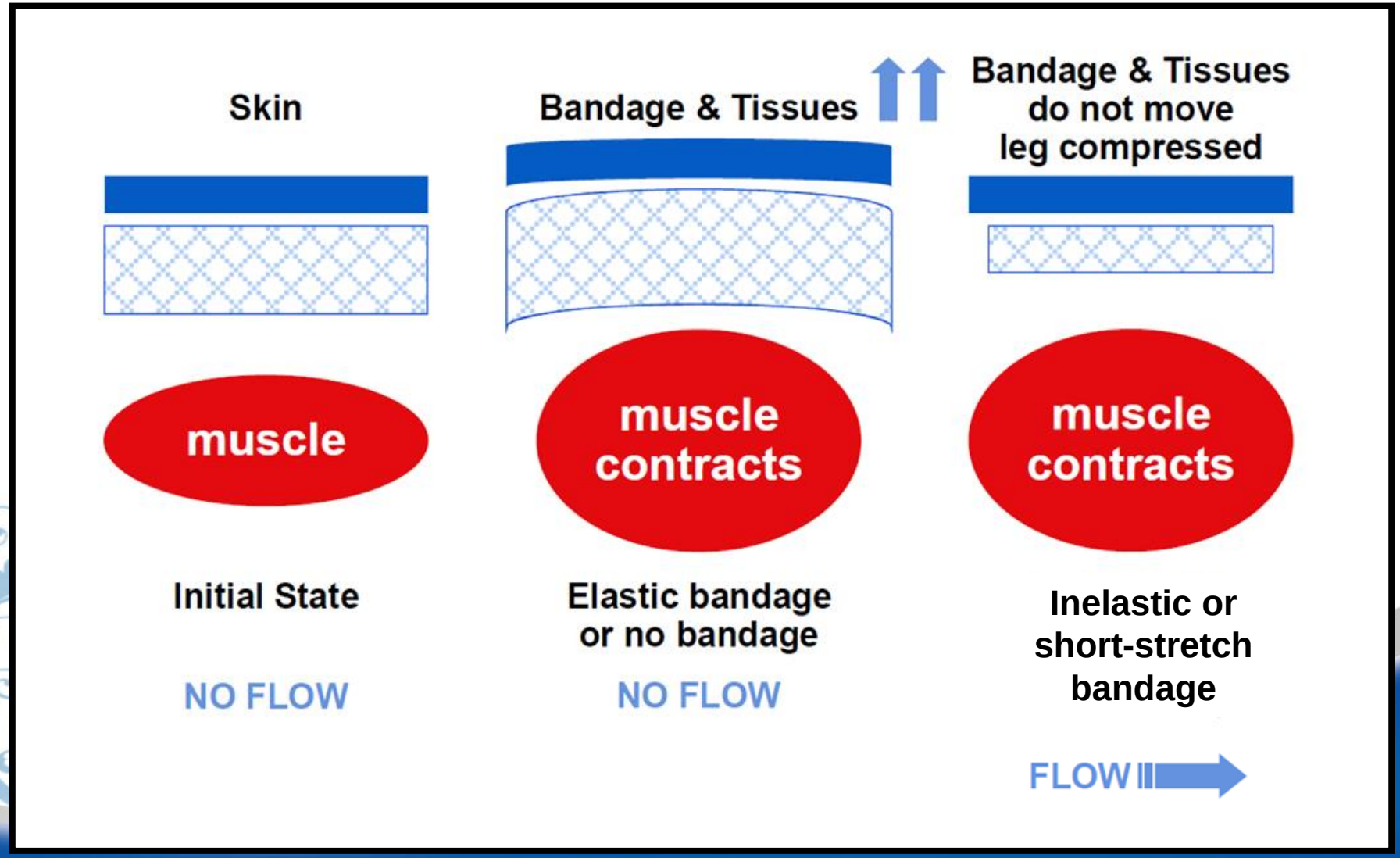
Multicomponent Compression Bandaging

Types of Compression therapy

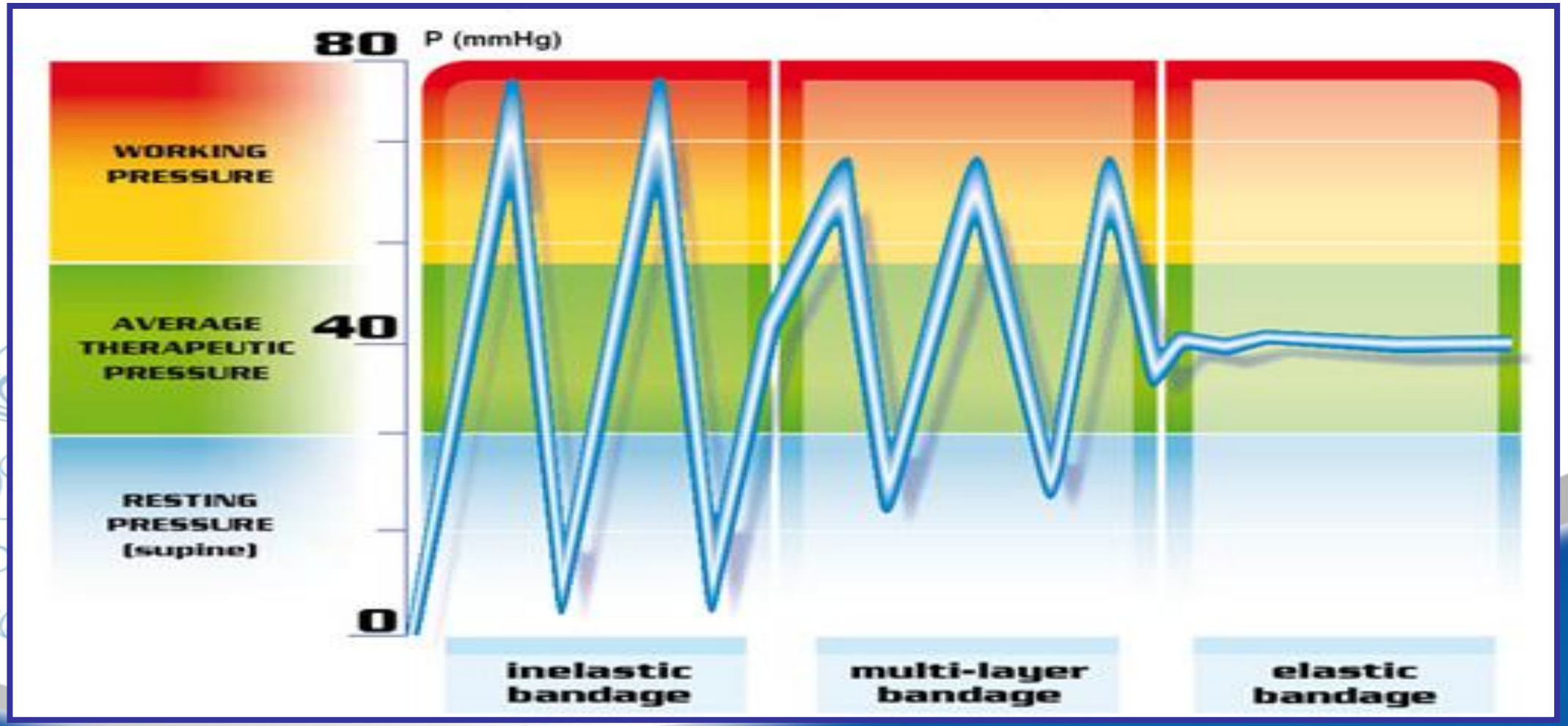
Compression Stockings

Compression Garments

Bandage Effects



The different types of bandages



http://www.urgo.co.uk/293-the-different-types-of-bandages

Long-stretch or elastic bandage

- less activates the muscle pump
- provides constant pressure
- incapable of activating the calf-muscle pump
- need for re-apply in everyday

www.hartmann.com.au

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Multicomponent Compression Bandaging

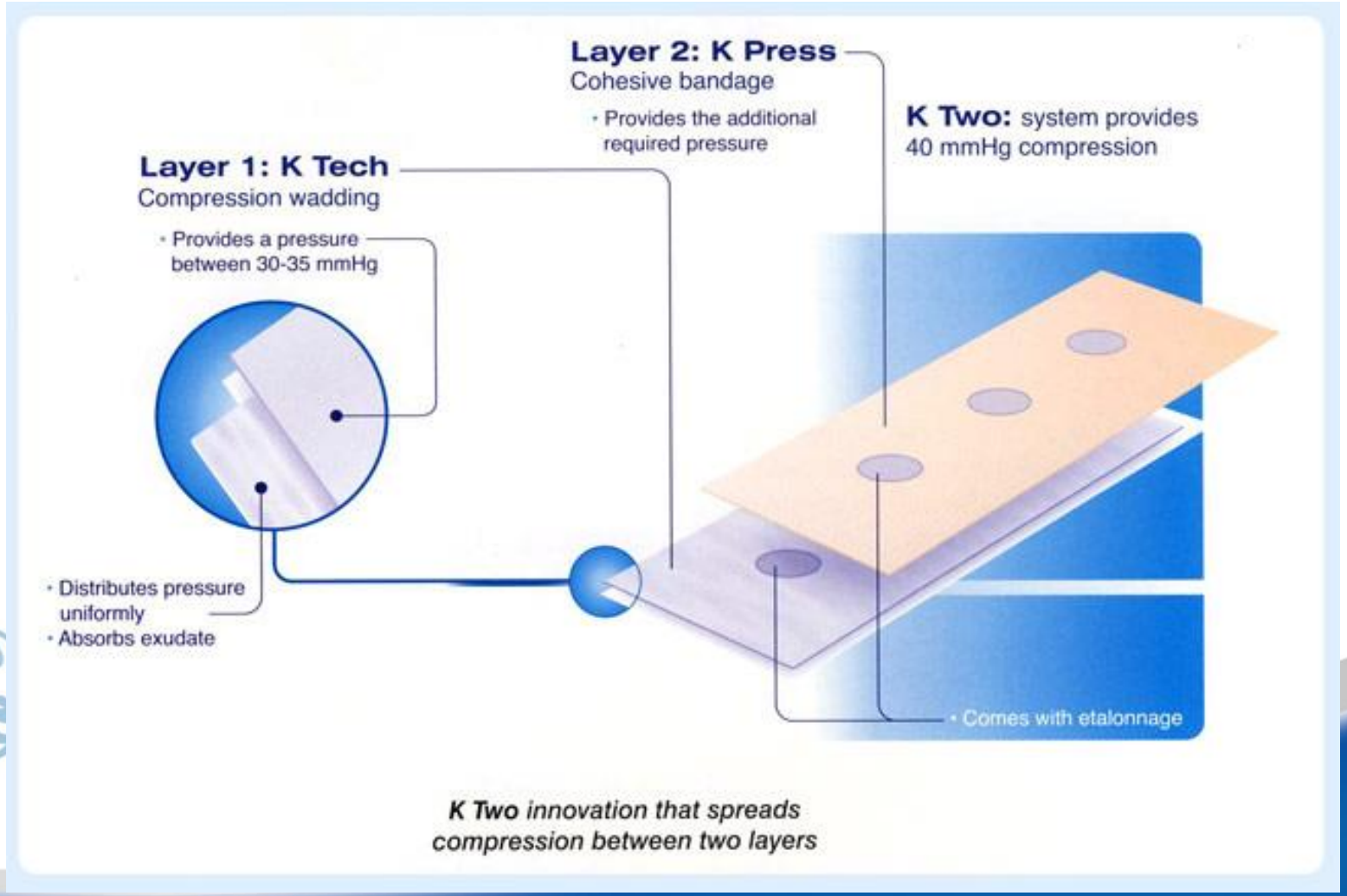
Advantage

- Sustained compression keep the system on for up to 7 days
- Rapid edema control, high compression in the region of 40 mmHg
- Fit for any shape, without loss of pressure or slipping.

Disadvantage

- Difficulty with bathing and may lead to dermatitis
- Hot, odor (not fit for highly exudate)
- Expensive but may be cost-effective

2 layers Multilayer bandage



K Two innovation that spreads compression between two layers

Graduated Compression Stocking

- Strong-compression hosiery (30-40 mmHg)
- More effective than median-or low-compression stocking in ulcers healing

Int Angiol 2008;27:193-219.

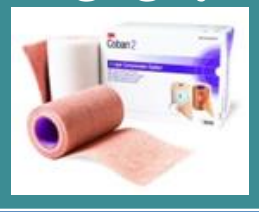
Intermittent Pneumatic Compression

- Using when other compression are not available
- Having failure in VLU healing after prolonged compression therapy
- Frozen ankle or failure to calf muscle pumping

Types of compression therapy

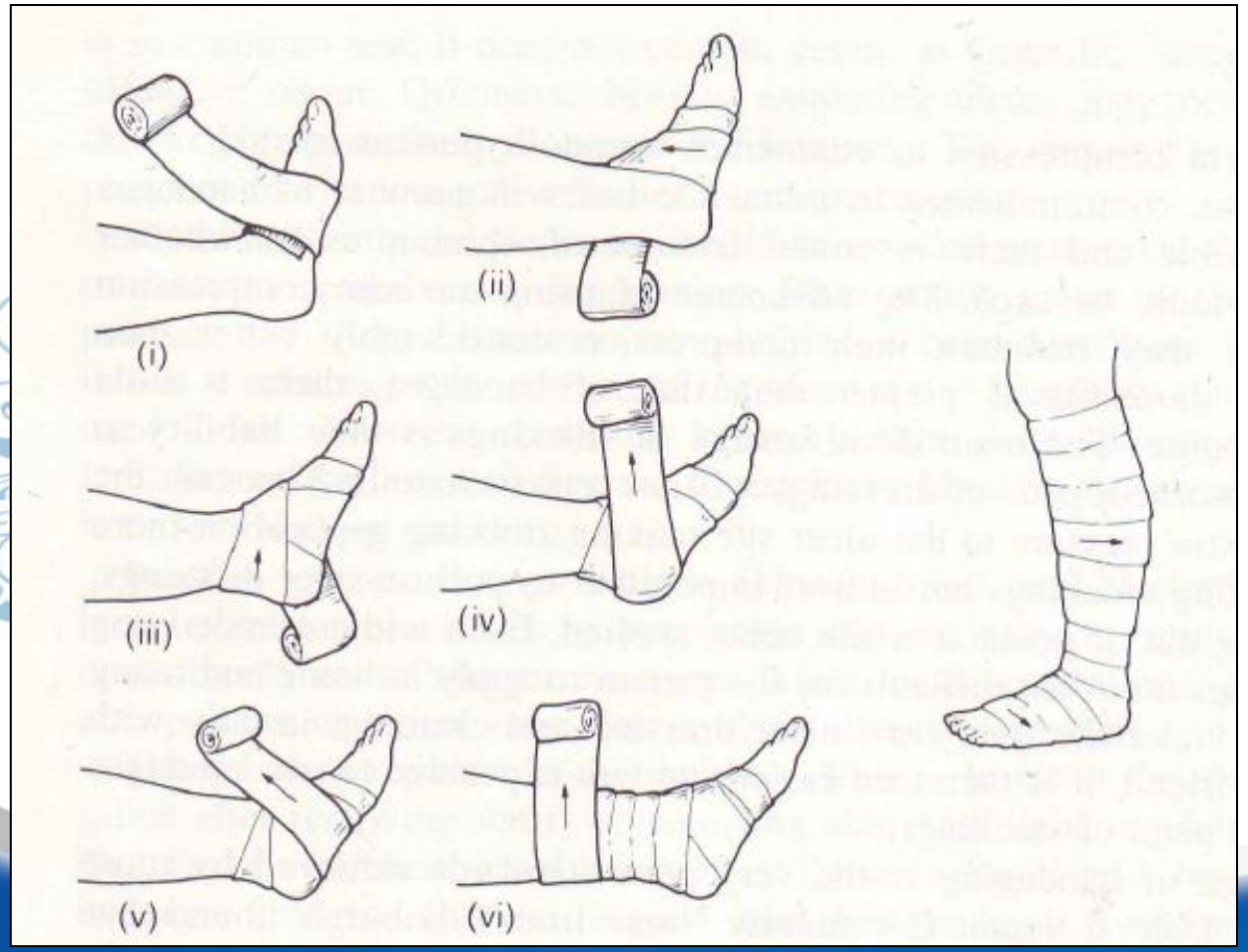
Bandage	Advantage	Disadvantage
Elastic 	Inexpensive, can be reused	Applied incorrectly, do not maintain sustained compression, lose elasticity after washing
Self-adherent 	Self adherent, maintain compression	Expensive; cannot be reused, very high compression, not fit for highly exudates wound
Unna boot 	Comfortable; protects against trauma; fit for ambulatory status	Pressure changes over time; needs applied by well-trained provider, not fit for highly exudates wound

Types of compression therapy

Bandage	Advantage	Disadvantage
Multi-layer 	Comfortable, can maintains pressure for 7 days, used in highly exudative	Need to be applied by well-trained providers, not fit for shoe or pants, take more time, expensive, unusable
GCS 	Accommodate for shoe, can change dressing frequently, cost effectiveness, washable	Poor compliance: put it on difficultly and tropical climate
Compression bandaging system 	Comfortable; protects against trauma; fit for ambulatory, maintains pressure for 7 days,	Need to be applied by well-trained providers but easier than multi-layer, expensive, unusable

The standard bandaging technique

(more than 15 mmHg at the ankle)

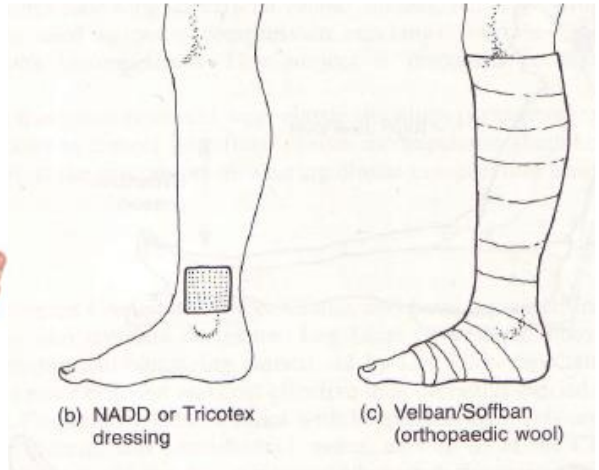


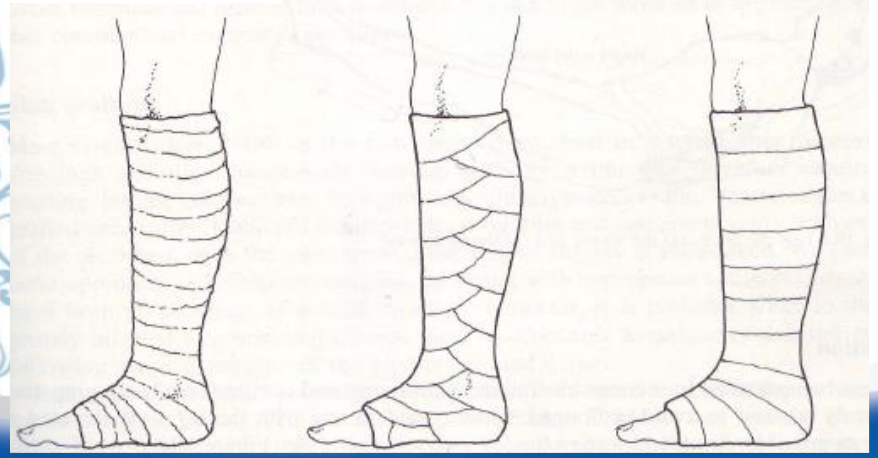
Two important points

1. Enclose the heel
2. Each turn 50% overlaps the previous turn

Four-layer bandaging

(30-40 mmHg at the ankle)





The four layers are:

1. Orthopedic wool
2. Crepe bandage
3. Elastic bandage with figure-of-eight technique
4. Cohesive bandage

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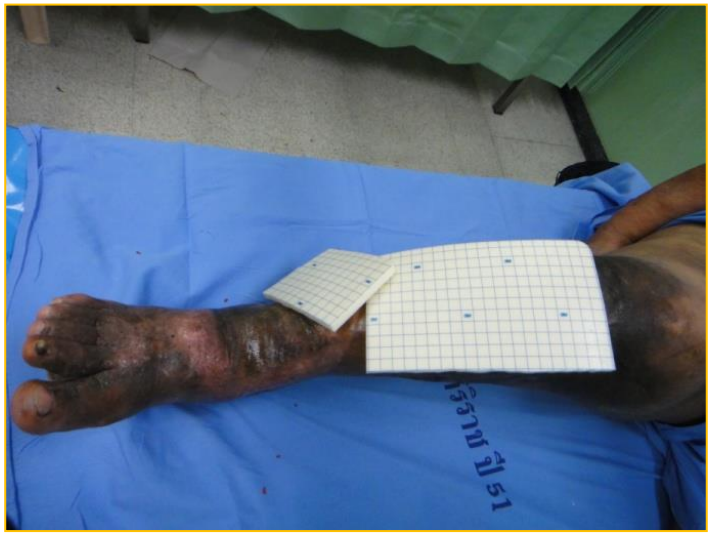
Case study



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Customized pressure-guided elastic bandage

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Use of customised pressure-guided elastic bandages to improve efficacy of compression bandaging for venous ulcers

Nuttawut Sermsathanasawadi, Choedpong Chatjaturapat, Rattana Pianchareonsin, Nattawut Puangpunngam, Chumpol Wongwanit, Khamin Chinsakchai, Chanean Ruangsetakit & Pramook Mutirangura

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Key words
Compression; Elastic bandage; Sub-bandage pressure; Venous leg ulcer

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Sermsathanasawadi N, Chatjaturapat C, Pianchareonsin R, Puangpunngam N, Wongwanit C, Chinsakchai K, Ruangsetakit C, Mutirangura P. Use of customised pressure-guided elastic bandages to improve efficacy of compression bandaging for venous ulcers. Int Wound J 2016; doi: 10.1111/iwj.12656

Abstract

Compression bandaging is a major treatment of chronic venous ulcers. Its efficacy depends on the applied pressure, which is dependent on the skill of the individual applying the bandage. To improve the quality of bandaging by reducing the variability in compression bandage interface pressures, we changed elastic bandages into a customised version by marking them with circular ink stamps, applied when the stretch achieves an interface pressure between 35 and 45 mmHg. Repeated applications by 20 residents of the customised bandage and non-marked bandage to one smaller and one larger leg were evaluated by measuring the sub-bandage pressure.
The results demonstrated that the target pressure range is more often attained with the customised bandage compared with the non-marked bandage. The customised bandage improved the efficacy of compression bandaging for venous ulcers, with optimal sub-bandage pressure.

In volunteer, adequate-quality bandaging was achieved by 25% of the residents applying the OEB and 70% applying the CPG-EB ($P < 0.05$)

Adequate quality was achieved by 33% of the patients applying the OEB and 60% applying the CPG-EB (P = 0.02)

Original Article

Phlebology

Phlebology
2018, Vol. 33(9) 627–635

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journals.sagepub.com/home/phl
SAGE

Customizing elastic pressure bandages for reuse to a predetermined, sub-bandage pressure: A randomized controlled trial

Nuttawut Sermsathanasawadi, Tanakorn Tarapongpun, Rattana Pianchareonsin, Nattawut Puangpunngam, Chumpol Wongwanit, Khamin Chinsakchai, Pramook Mutirangura and Chanean Ruangsetakit

Abstract

Objective: A randomized clinical trial was performed to compare the effectiveness of unmarked bandages and customized bandages with visual markers in reproducing the desired sub-bandage pressure during self-bandaging by patients.

Method: Ninety patients were randomly allocated to two groups ("customized bandages" and "unmarked bandages") and asked to perform self-bandaging three times. The achievement of a pressure between 35 and 45 mmHg in at least two of the three attempts was defined as adequate quality.

Results: Adequate quality was achieved by 33.0% when applying the unmarked bandages, and 60.0% when applying the customized bandages ($p = 0.02$). Use of the customized bandage and previous experience of bandaging were independent predictors for the achievement of the predetermined sub-bandage pressure ($p = 0.005$ and $p = 0.021$, respectively).

Conclusion: Customized bandages may achieve predetermined sub-bandage pressures more closely than standard, unmarked, compression bandages.

Clinical trials registration: ClinicalTrials.gov (NCT02729688). Effectiveness of a Pressure Indicator Guided and a Conventional Bandaging in Treatment of Venous Leg Ulcer. https://clinicaltrials.gov/ct2/show/NCT02729688

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Thank you for your attentions