What happens to veins under compression: assessment by plethysmography

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Diameter or volume reduction

Reduction of tension & transmural pressure



Compressing veins

- Muscle compression (contraction)
 - Deep veins only
- Elastic compression (MCS)
 - Deep and superficial
- Inelastic compression (Lundatex system)
 - Both, muscle movement within the enclosure
- Pure compression (Hydatic/Mercuric)
 - Both, pressure without tension

1. Elastic compression reduces the working venous volume (wVV) in VV patients

Eur J Vasc Endovasc Surg 2016; 52(1): 105-112

Haemodynamic Performance of Low Strength Below Knee Graduated Elastic Compression Stockings in Health, Venous Disease, and Lymphoedema[☆]

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2. Compression from muscle reduces the EF in VV patients

 elastic stockings make no significant difference

Phlebology 2018; 33(5): 353-360

Optimizing calf muscle pump function

Christopher R Lattimer^{1,2,3}, Claude Franceschi⁴ and Evi Kalodiki^{1,2,3}

EF: 51.9(48.9-54.3) *vs.* 37.4(26.1-46.8) n=12, *p*=.002 Elastic stockings (Class 1 or 2) had no effect!





3. The tip-toe manoeuvre is suboptimal for muscle compression

Phlebology

The journal of venous disease

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Pumping results n=22



Walking - not hopping!



Tip-toe manoeuvre



STANDING



4. Elasticated compression reduces the venous filling index (reflux) in VV patients

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5. Elasticated compression increases venous tone & recoil in healthy legs

Quantifying the Degree Graduated Elastic Compression Stockings Enhance Venous Emptying $\stackrel{>}{\sim}$

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Eur J Vasc Endovasc Surg 2014; 47(1): 75-80

es√s

European Journal of Vascular & Endovascular Surg



6. Hydatic compression reduces venous volume

- pumping is ineffective in water

Alfred Obermayer

The Weightlessness

in People

Principles of Sack Theory



Phlebology 2018; 33(10): 702-725

19th Meeting of the European Venous Forum: Athens, Greece, 28–30 June 2018

EFFECT OF UNDERWATER COMPRESSION ON LEG VENOUS DIAMETERS AND CALF VOLUME

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Underwater Sonography of Leg Veins

Abstracts

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Underwater laboratory









LAND WATER DIAMETER SGP

Results - venous diameter (u/s)



Results - calf volume (SGP)



Calf volume reduction in water (SGP):

5 (3-6)% p = .002





Evi Kalodiki (1956 - 2018)



