

**La compression Veineuse
Elastique,
Quelle évolution en 10 ans!**

**Elastic Venous Compression,
these last ten years evolution .**

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Affaires Médicales INNOTHERA

► Disclosure

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1- From empiric use.....

Venous disease history

- ▶ 250 000 à 28 000 ans Before Christ **Homo erectus**

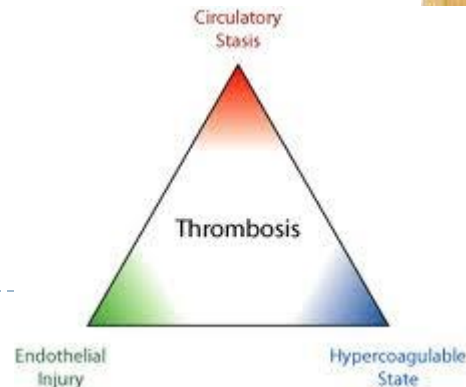


- ▶ 1550 B C **Ebers Papyrus (Smith & Ebers)**
 - ▶ 1st description of a varicose vein in Egypt
 - ▶ Ulcer and edema treatment description



- ▶ 400 BC **Hippocrate**

- ▶ 19 ème **R.Virchow**



From bandages to current stockings -1-



Bandage

History of Venous Diseases of the legs ...H. Kohler 1986
La contention élastique dans l'insuffisance veineuse... JF. Telitsine, A. Bernadou 1996
Histoire de la phlébologie de J. Chevallier 1997

From bandages to current stockings -2-



An increasing use of
compression in France:

in 2005:

4 millions pairs

in 2013:

10 millions pairs

2-to an evidence based use

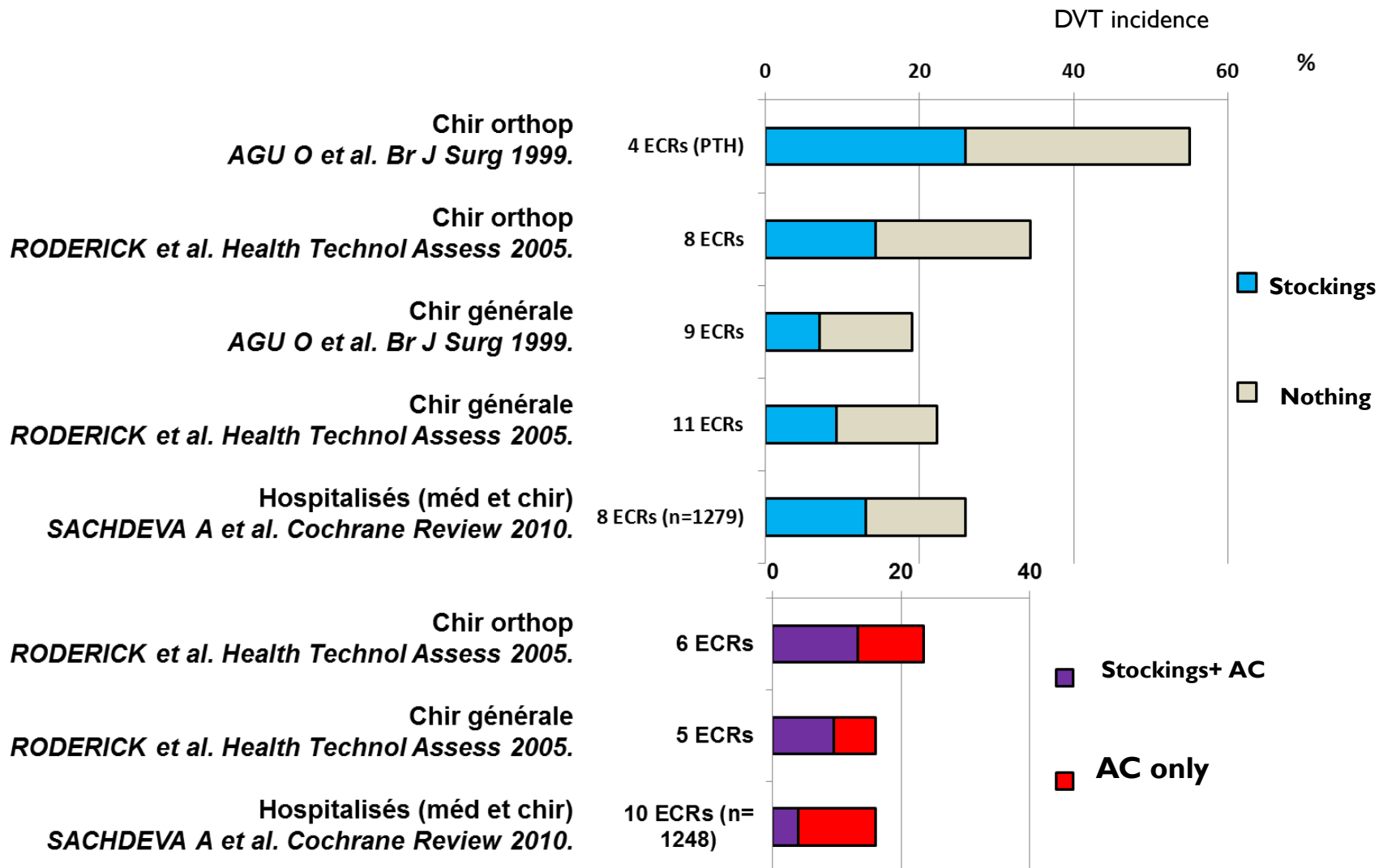
Clinical Proofs – HAS -

- ▶ HAS 2010 : Evaluation of compressive medical devices – Use in vascular pathology
- ▶ Indications on demonstrated clinical efficacy :
 - ▶ Venous ulcer treatment (C5 et C6)
 - ▶ Acute deep venous thrombosis treatment
 - ▶ Deep Venous Thrombosis prevention during flights of more than 7 hours
 - ▶ Post Thrombotic Syndrom prevention
 - ▶ Chronic venous disease Treatment

And recommendations:

- ▶ In a medical context
- ▶ In case of situations at risk, in particular in case of bed rest:
 - ▶ Previous DVP
 - ▶ Cancer with thrombosis risk
 - ▶ Infections with long lasting fever
 - ▶ Cardiac insufficiencyCompression is not recommended after a stroke
- ▶ In a context of surgery.
 - ▶ in case of known thrombotic-embolic risk: orthopaedic surgery, carcinologic & abdominal, neurosurgery.
- ▶ Pregnancy and post-partum.
 - ▶ Compression is recommended during pregnancy and six weeks after birth (6 months if caesarian section)
- ▶ Post-varicosis surgery & endovascular procedures:

Clinical Proofs – DVT Prevention -1-



Clinical Proofs –DVT prev. -2 -

FAISABILITE innothéra(5)
000-121012-01
M 4/29/1972
Scan Nr. 69, 1 - Slice 3/4
T1FFE/NONE
TE 8ms - TR 54ms
Flip Angle 25°

SHFJ
Zoom 112%



FAISABILITE innothéra(5)
000-121012-01
M 4/29/1972
Scan Nr. 63, 1 - Slice 3/4
T1FFE/NONE
TE 8ms - TR 54ms
Flip Angle 25°

SHFJ
Zoom 108%



Basal

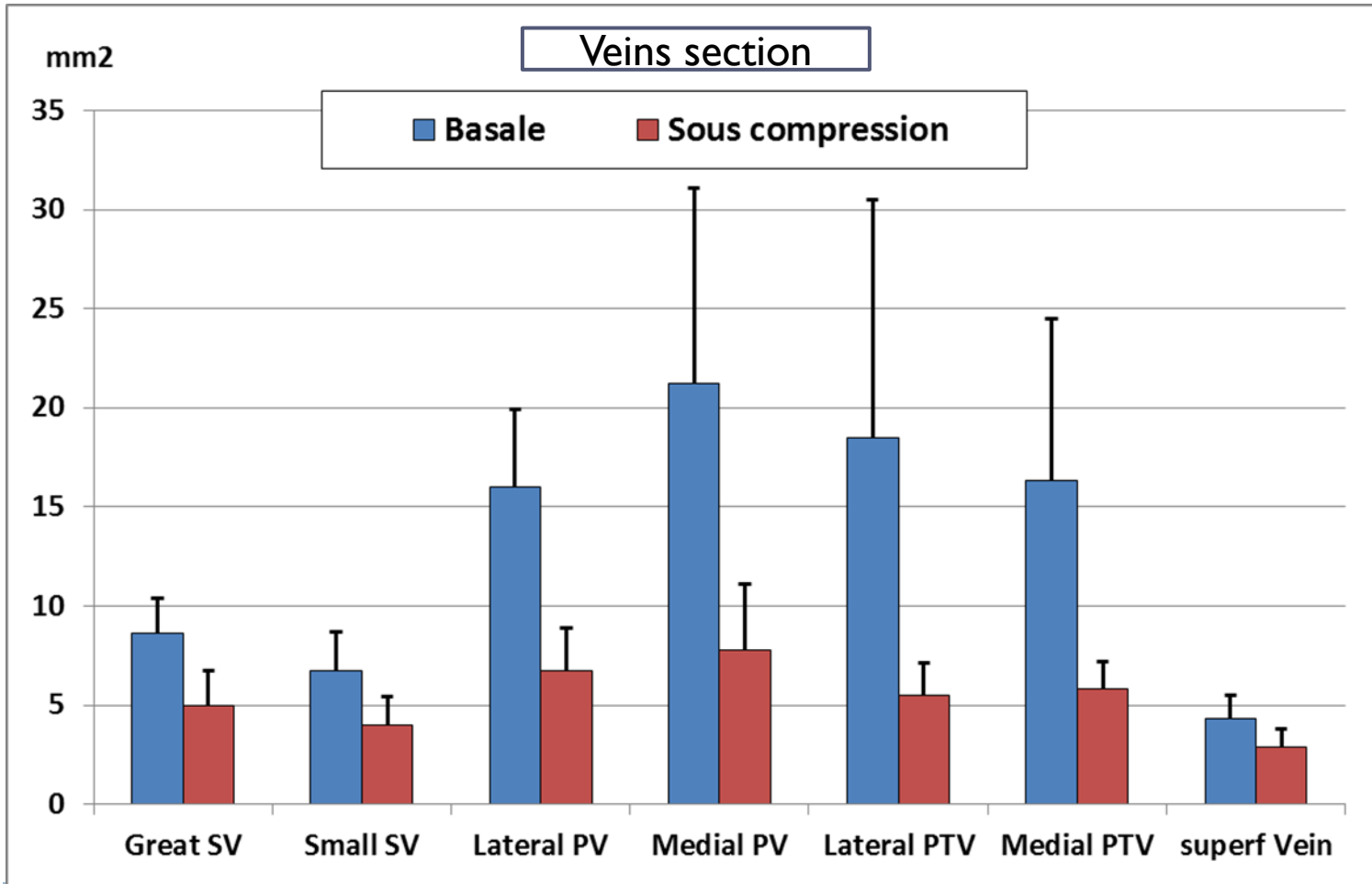
Socks class 2 Fr

Deep veins section size reduction

Clinical Proofs – DVT prev. - 3 -

IRM in 8 normal subjects.

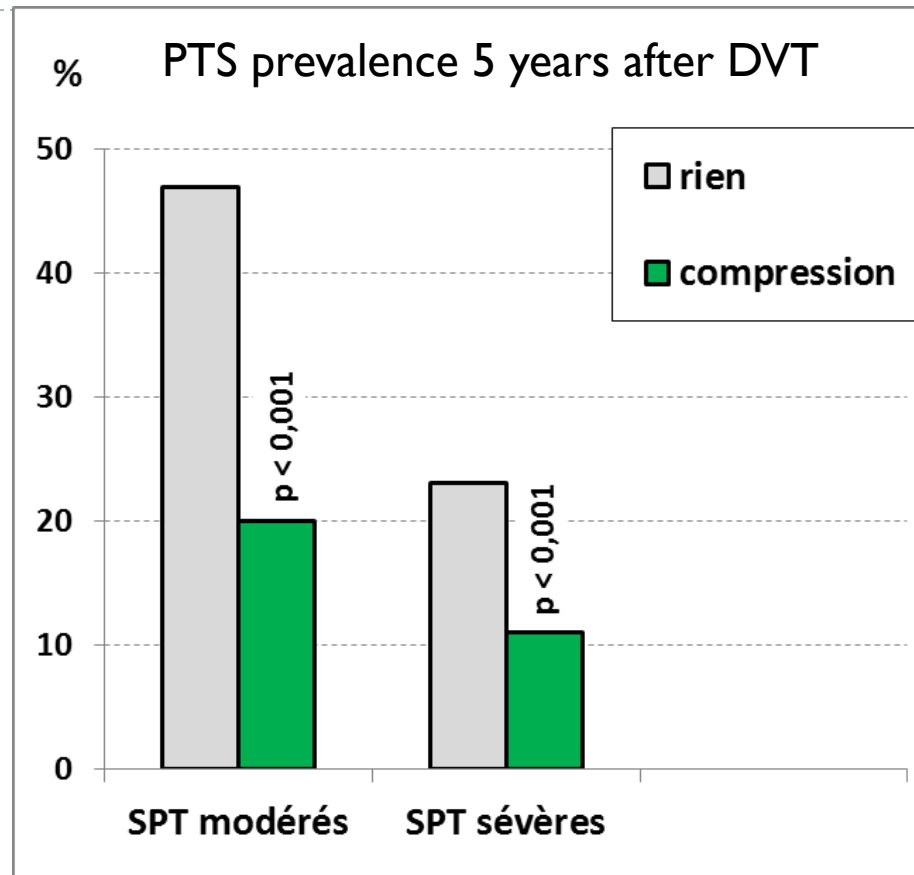
Anti thrombosis socks (16-20 mm Hg) reduce cross section area of deep veins (- 64%) and superficial veins (- 39%) in decubitus.



DOWNIE SP et al.

Role of MRI in investigating the effects of elastic compression stockings on the deformation of superficial and deep veins of the lower limbs. J Magn Reson Imaging 2007; 26:80-85

PTS Prevention -1-



194 patients: proximal DVT

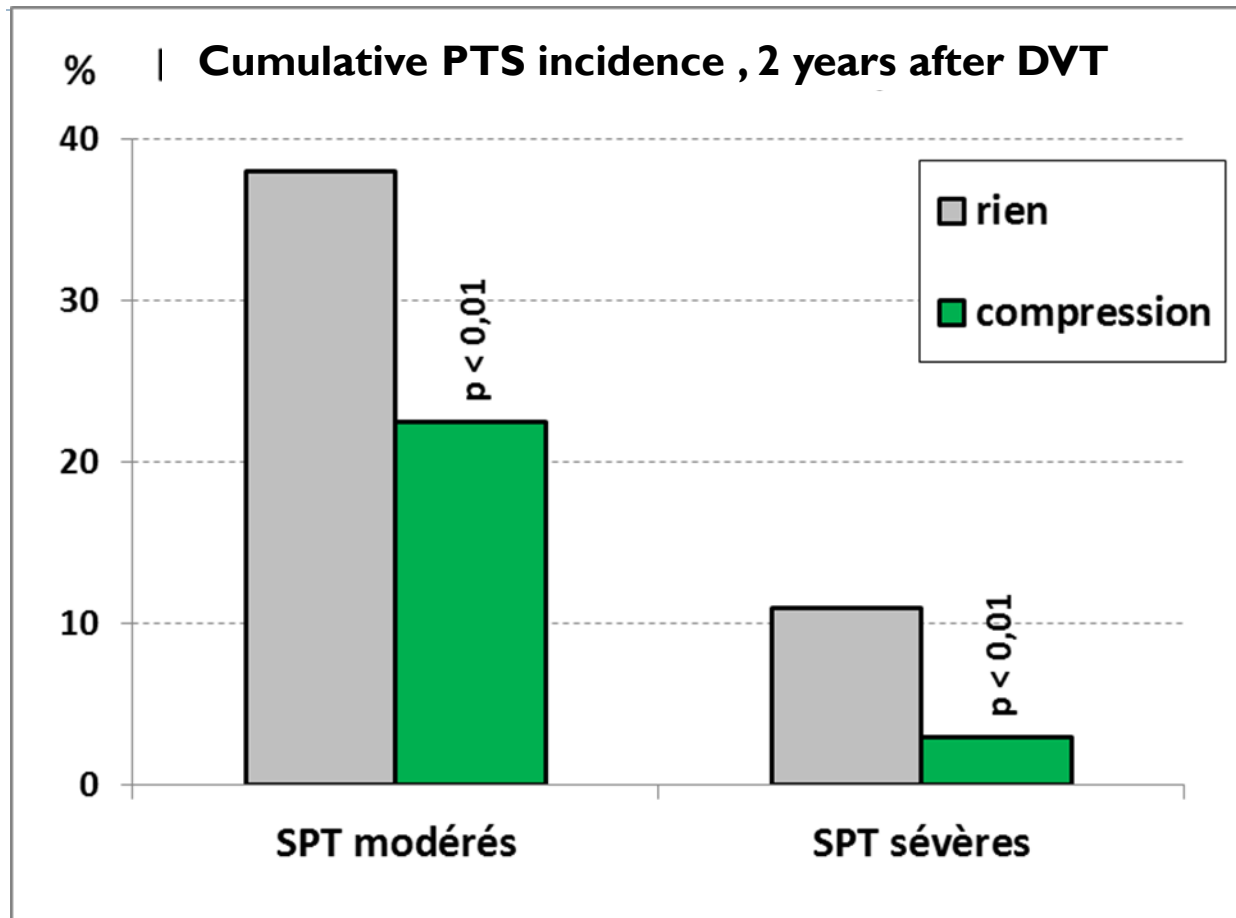
**RCT: compression 40 mm Hg at least 2 years
vs no stocking**

BRANDJES DPM et al.

Randomised trial of effect of compression stockings in patients with symptomatic proximal-vein thrombosis

Lancet 1997; 349: 759-662

PTS Prevention -2-



180 patients: symptomatic proximal DVT RCT: Stockings 30-40 mm Hg vs no compression

PRANDONI P et al.

Below-Knee Elastic Compression Stockings To Prevent the Post-Thrombotic Sy

A Randomized, Control

Ann Intern Med. 2004;141:2

PTS Prevention -3 -

▶ KANH study, the SOX trial, on line Dec.2013

- ▶ 806 patients + prox. DVT
- ▶ DVT in the last 14 days before inclusion
- ▶ GCS 30-40 mm Hg vs placebo stockings
- ▶ 2 years
- ▶ 2 PTS definitions: Ginsberg criteria + Villalta score ≥ 5

Questions:

- ▶ Precise applied pressure on the leg?
- ▶ Double-blind ?
- ▶ Compliance ? +++
 - ☐ Indulgent definition
 - ☐ Patient's education
 - ☐ Declarative reports

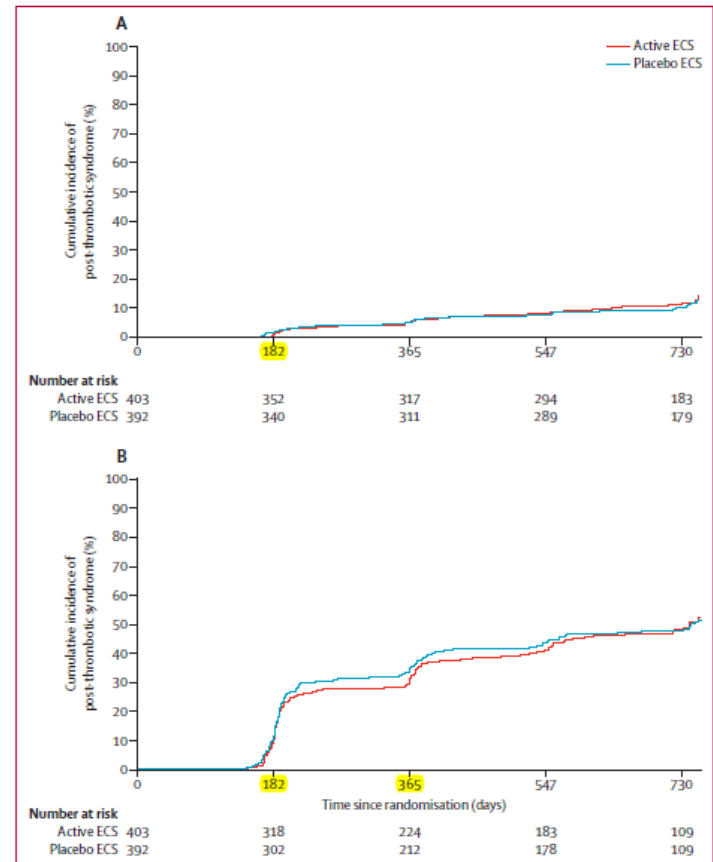


Figure 2: Cumulative incidence of post-thrombotic syndrome
The primary outcome (A; Ginsberg's criteria) was first assessed at the 6 month visit and each 6 months thereafter. Cumulative incidence of PTS (at 750 days) was 14.2% in active ECS versus 12.7% in placebo ECS (hazard ratio [HR] adjusted for centre 1.13, 95% CI 0.73-1.76; $p=0.58$). The secondary outcome (B), PTS diagnosed using Villalta's criteria, was first assessed at the 6 month visit and each 6 months thereafter. Cumulative incidence of PTS by Villalta's criteria (Villalta score ≥ 5 or ulcer at or after the 6 month visit; at 750 days) was 52.6% in active ECS versus 52.3% in placebo ECS (HR adjusted for centre 1.00, 95% CI 0.81-1.24; $p=0.96$). For both criteria, data from patients who withdrew consent or who were lost to follow-up were censored at the time of the last follow-up assessment.

Chronic Venous Disease -1-

- ▶ **Amsler** Meta analysis 11 RCTs, 1453 individuals :
 - 794 healthy exposed to long lasting orthostatism
 - 552 patients + mild CVI (C1-C3),
 - 141 post-varicose veins surgery.

→ **On edema and symptoms:**

A 10-20 mmHg compression is superior to :

- < 10 mmHg compression ($p < 0,0001$)
- a placebo compression stocking,
- no compression

- ▶ **O'Meara** Meta analysis 48 RCTs , 4321 patients:

→ Compression accelerates **ulcers healing**.

→ Multicomponents bandages++

*AMSLER F, Blattler W.
Compression Therapy for Occupational Leg Symptoms and Chronic Venous Disorders
- a Meta-analysis of Randomised Controlled Trials.*

Eur J Vasc Endovasc Surg 2008; 35:366-372.

*O'MEARA S, Cullum NA, Nelson EA, Dumville JC.
Compression for venous leg ulcers (Review)
Cochrane Review 2012*

3-....With Imagery & numerical technics development

An innovative approach: **NUMERICAL SIMULATION**

Pressions measurement Software(LP)



**Pressions actually applied on
the skin, by the product**

Brevet INNOTHERA FR 0304931

Venous Return Simulator (VRS)

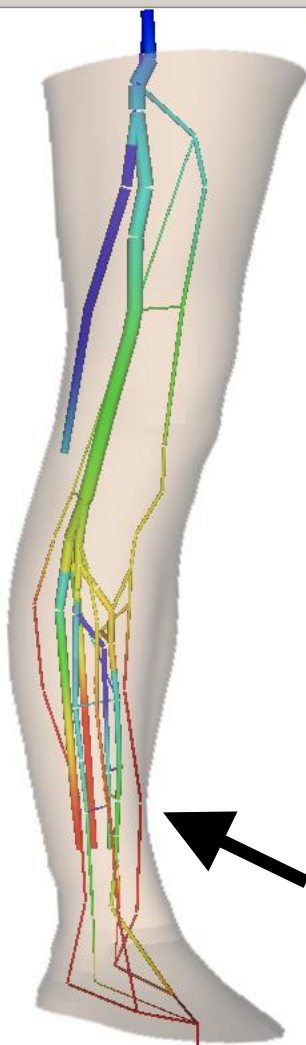


**Product action on the venous
hemodynamic**

Brevet INNOTHERA FR 0501569



Pression(mmHg)



0.9



Temps : 00.90 s

Cote du curseur : 97.29 cm

Nom du tronçon : GVS2

Noeud départ : Z8N1

Noeud fin : Z17N1

Loi d'état : GVS

Loge musculaire : non

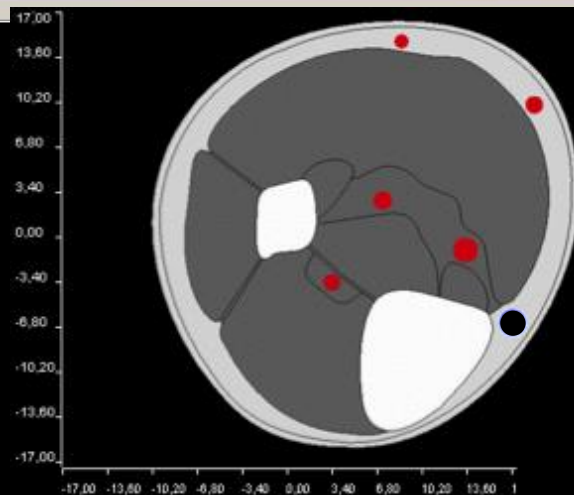
Seuil Valvule : 3.0

Calibre Initial : 0.217 cm

Calibre final : 0.233 cm

Abscisse curviligne : 05.40 cm

Longueur : 09.55 cm



Vites0.5 m/s)

-0.1

■ sujet sain

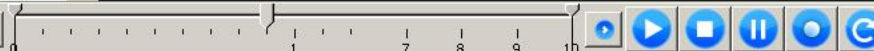
Vitesse (cm/s)

3
2
1
0
-1
-2
-3
-4
-5
-6
-7

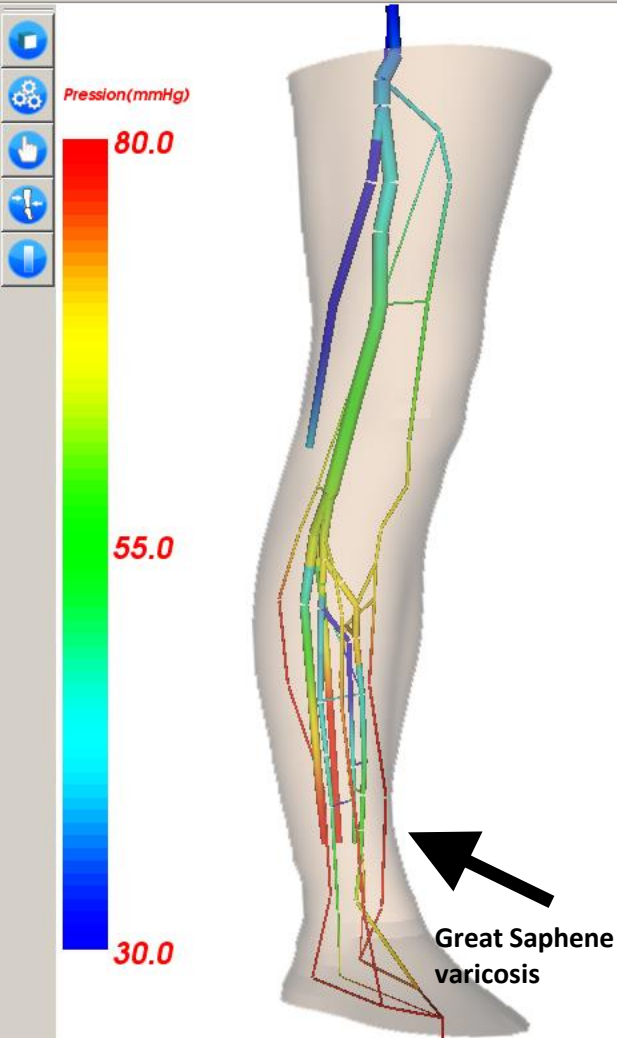
Temps (s)



x1 vitesse



0%



0.9



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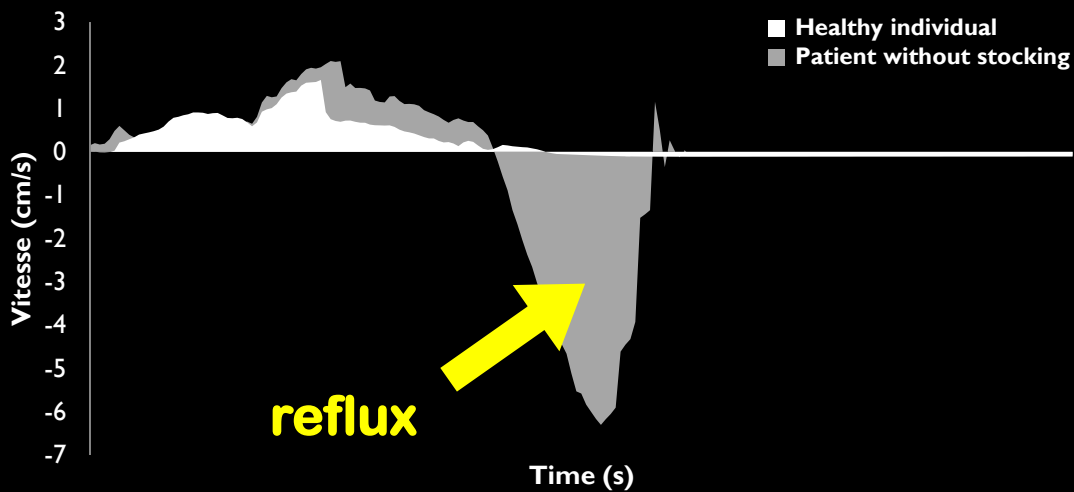
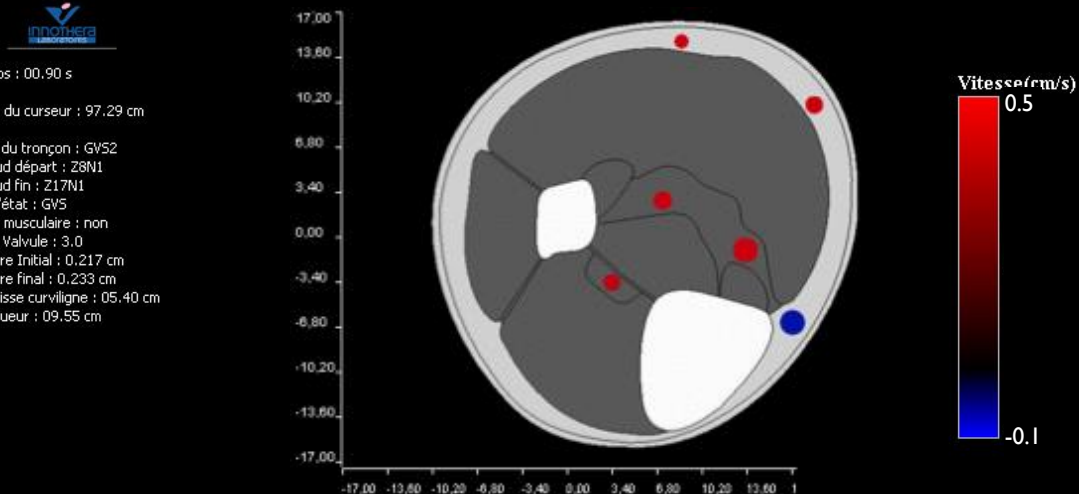
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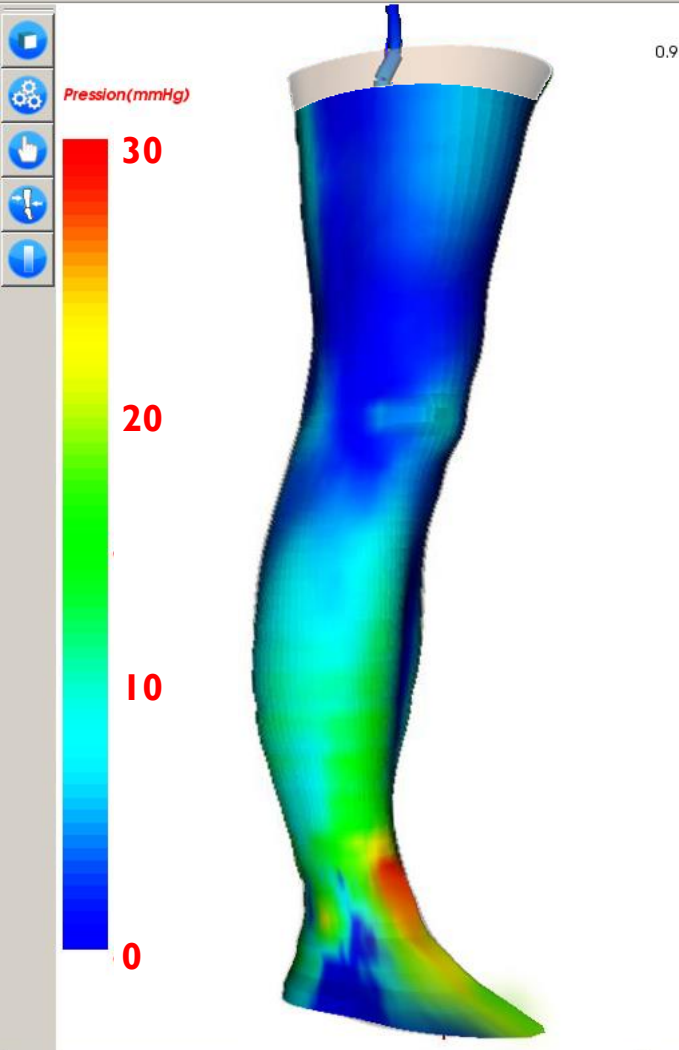
Abscisse curviligne : 05.40 cm

Longueur : 09.55 cm



x1 vitesse

0%



Temps : 00.90 s

Cote du curseur : 97.29 cm

Nom du tronçon : GVS2

Noeud départ : Z8N1

Noeud fin : Z17N1

Loi d'état : GVS

Loge musculaire : non

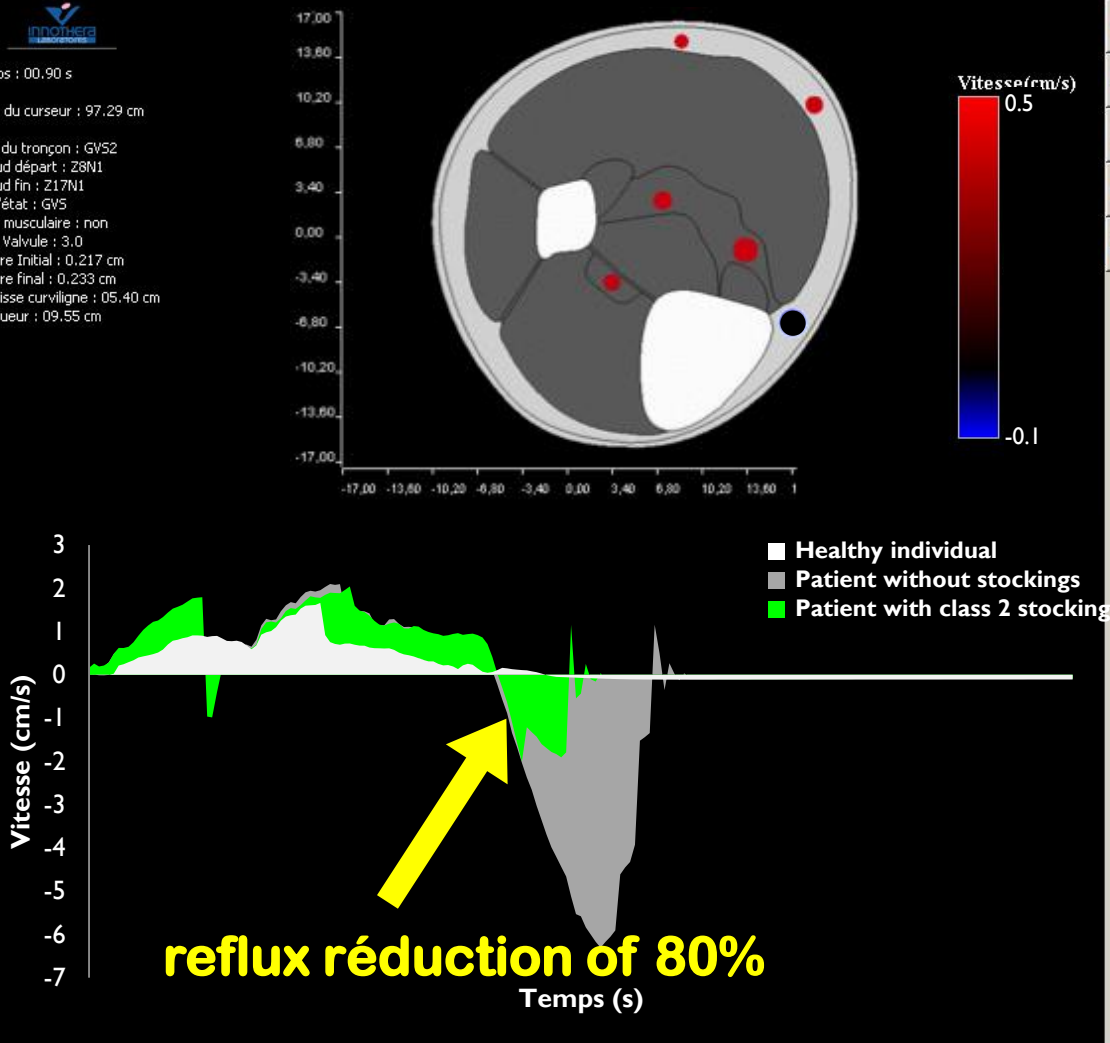
Seuil Valvule : 3.0

Calibre Initial : 0.217 cm

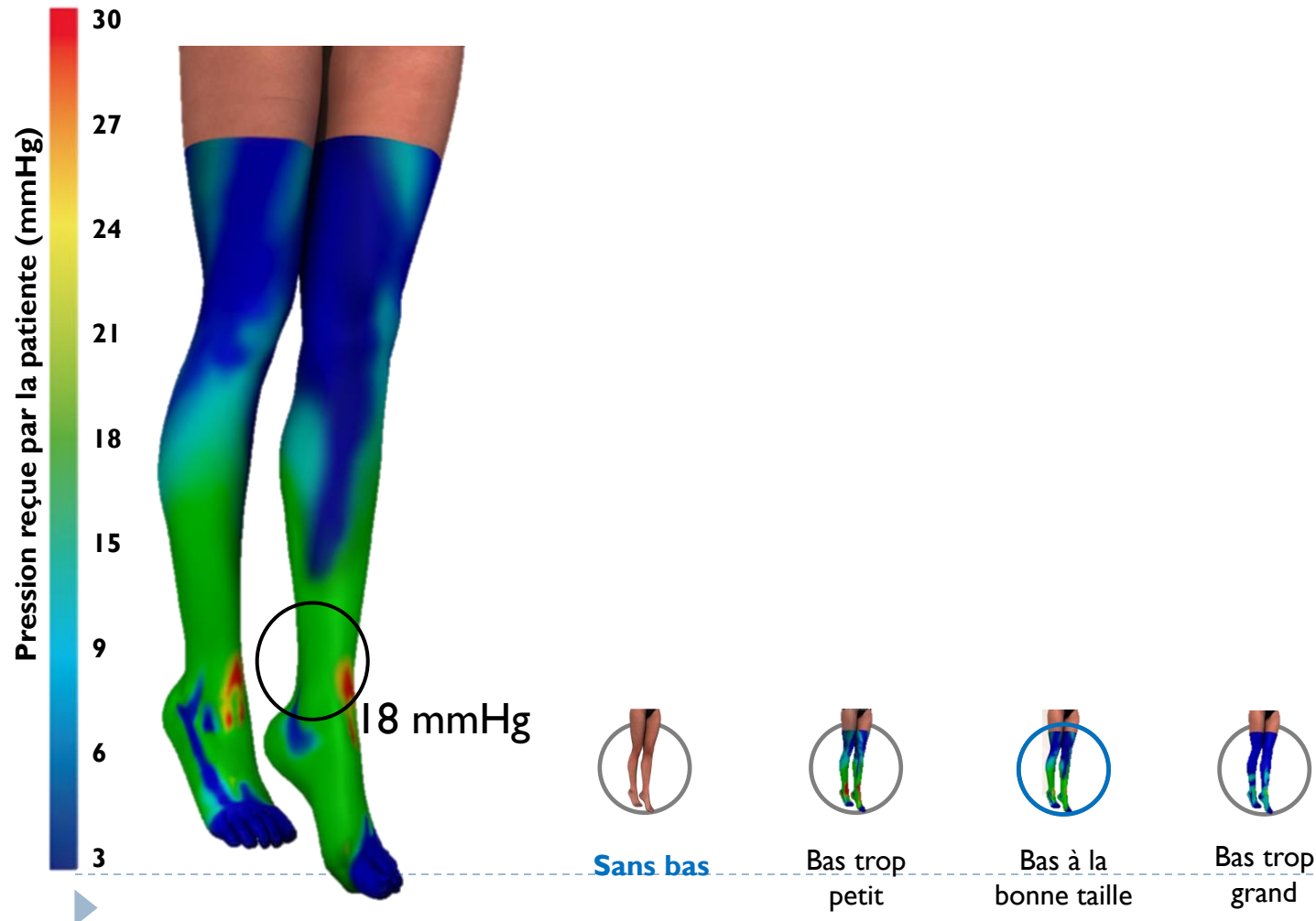
Calibre final : 0.233 cm

Abscisse curviligne : 05.40 cm

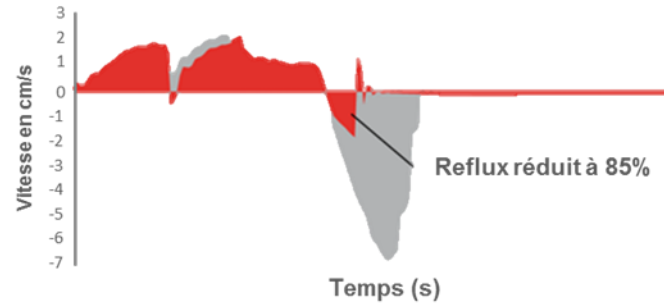
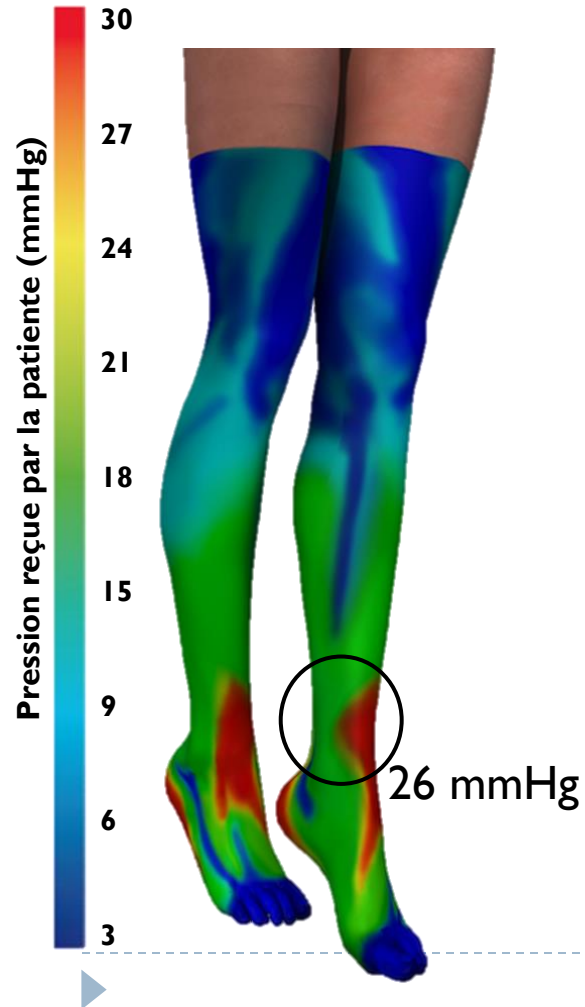
Longueur : 09.55 cm



Proper size of a class 2 stocking



Stocking class 2, too small



Sans bas



Bas trop
petit

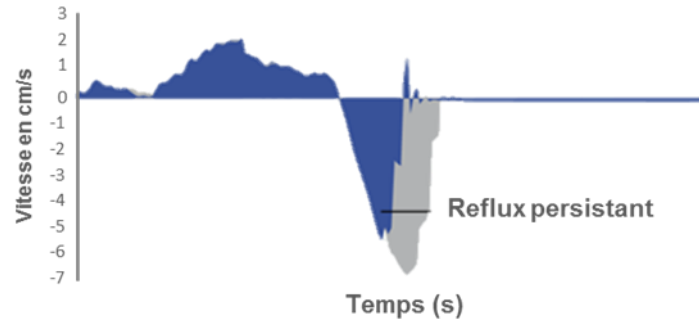
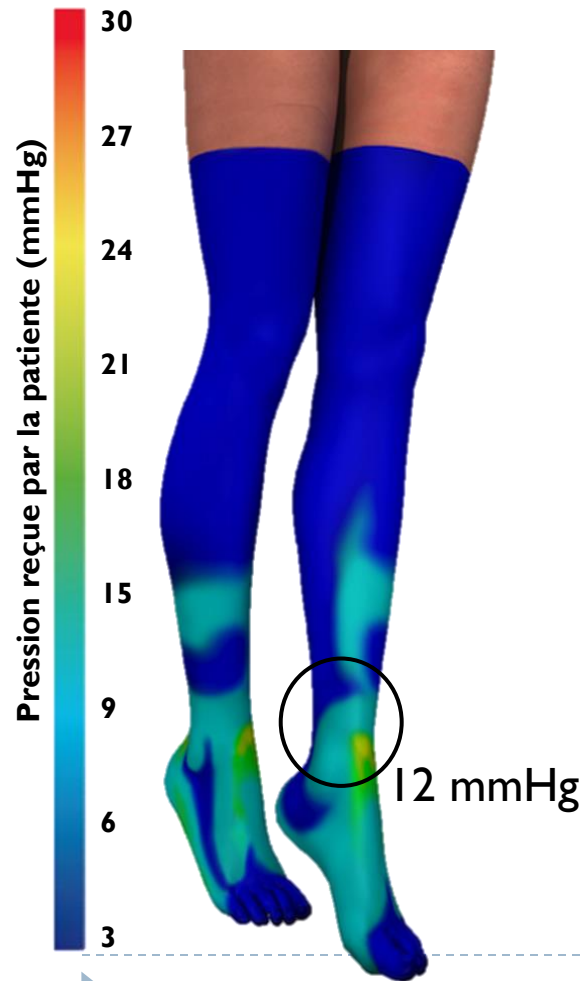


Bas à la
bonne taille



Bas trop
grand

Stocking class 2, too large



Sans bas



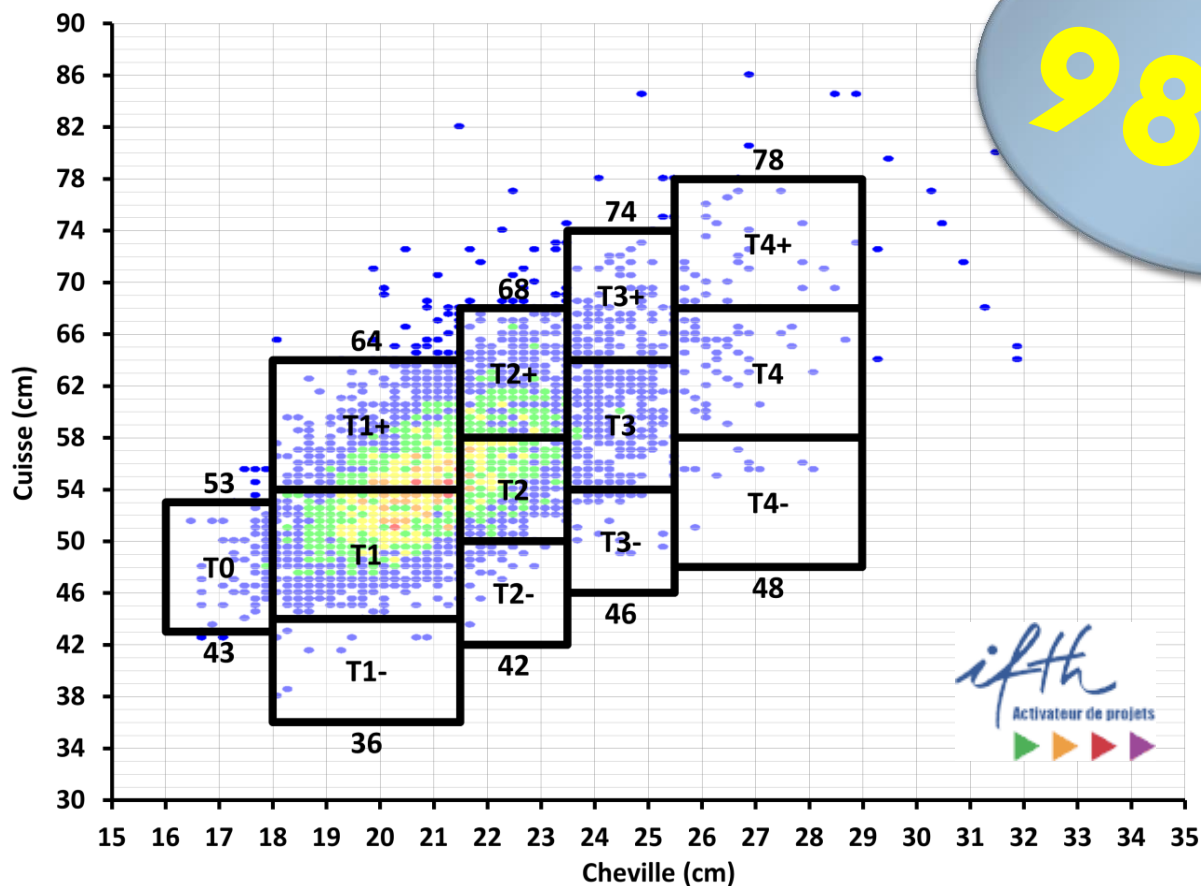
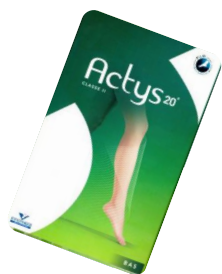
Bas trop
petit



Bas à la
bonne taille



Bas trop
grand



Varisma Comfort, Veinus et Actys 20

Chauveau & al, Taille des bas de compression médicale et hémodynamique veineuse. Phlébologie 2011

Chauveau & al, Les chaussettes de compression pour homme sont-elles bien adaptées à la population masculine française ? Quel impact sur la pression délivrée ? Phlébologie 2012

4.....and qualitative improvements

- ▶ Sizing
- ▶ Donning, or easy to put on (FIP)
- ▶ Stay up without Tourniquet's syndrom (3up)
- ▶ Soft touch
- ▶ Fine material
- ▶ Transparency
- ▶ Esthetism, colors, patterns...

Efficacy, Comfort & Elegance



Merci de votre attention

