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A Compression Kit of a Stocking and Three Superimposed Leggings Is Easy to Don and Dose Adjustable

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Background

- Compression therapy is the mainstay for both prevention and treatment of postthrombotic syndrome and venous leg ulcer
- **Forty percent*** of patients with advanced chronic venous insufficiency **do not comply with compression therapy**
- **Difficulties in donning*** the prescribed compression stocking represent the most common cause of non-compliance
- The **heel region** is the main obstacle in donning strong compression stockings
- Leg compression should be **dose-adjustable** (like medication)

* Ref: Nelson EA et al.: J Vasc Surg 2006;44:803-808
Ref: Reich-Schupke S et al.: Int Angiol 2009;28:385-395

Objectives

- To develop and test a compression stocking system composed of a light understocking (foot to below-knee) with three superimposed leggings (ankle to below-knee).
- Which is easy-to-done
- Which is dose-adjustable

A

B

SLLL Study

Parameters examined

- Donning success
- Static substocking pressure at level cB
- Dynamic Stiffness Index (DSI) at level cB1

Participants

- 20 healthy volunteers
- 20 patients with advanced chronic venous insuff.

  (>65-years-old and C4-6 [CEAP])

Donning success in patients with CVI

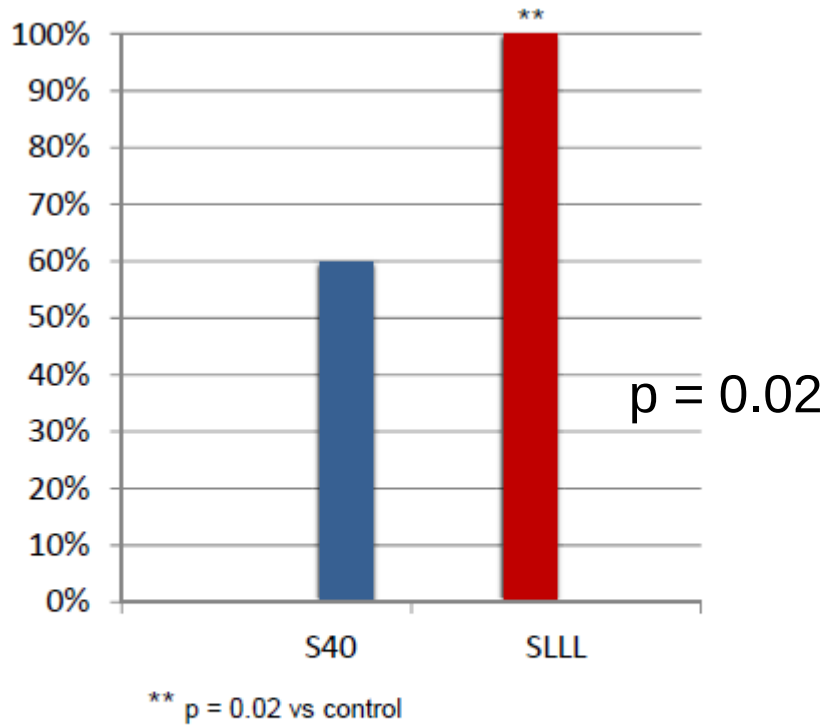


Figure 2. Donning success with a strong (40 mmHg) compression stocking (S40) versus the SLLL leg compression kit (17 + 15 +10 + 10 mmHg).

1 Stocking and

3 Leggings*:*

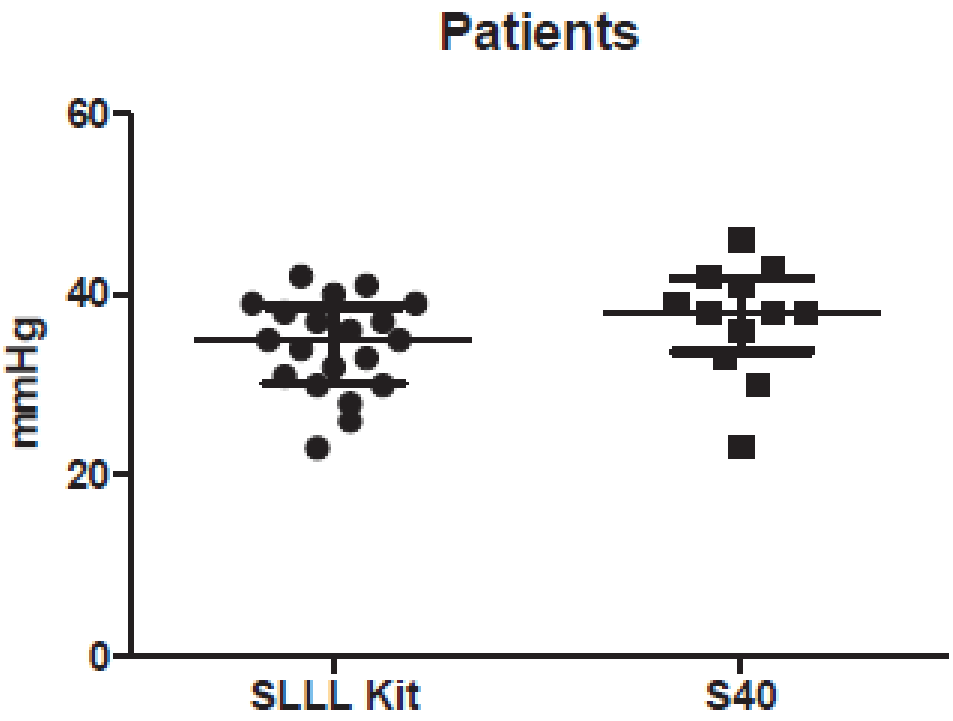
Easier to done

than a strong

compression stock

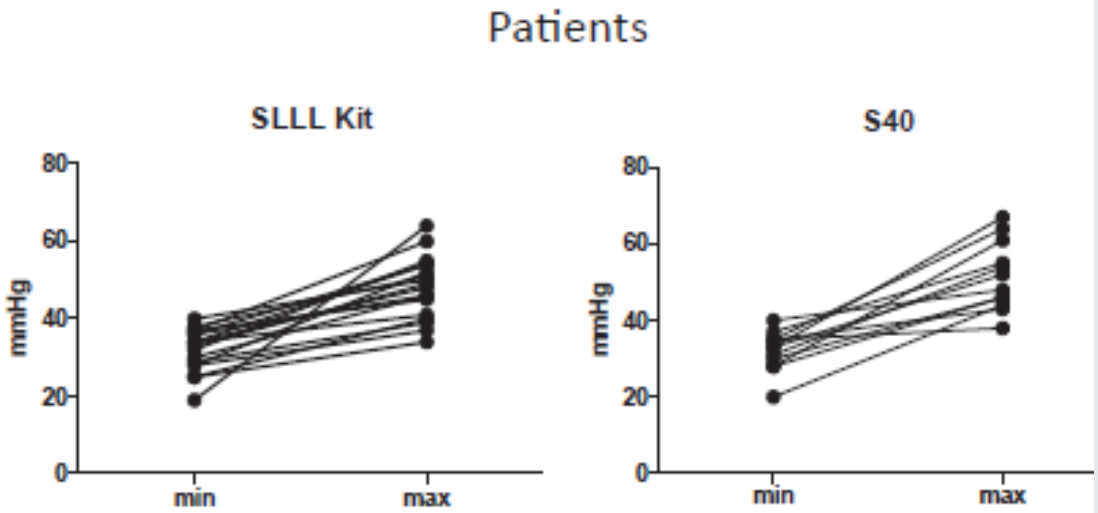
Static substocking pressures are comparable with strong stocking (40 mmHg level cB)

p = 0.1



Minimum	23.00	23.00
25th Percentile	30.25	33.75
Median	35.00	38.00
75th Percentile	38.75	41.75
Maximum	42.00	46.00

Dynamic Pressure Index:
Comparable to strong stocking (40 mmHg at level cB1)



	min	max
Minimum	19.00	34.00
25th Percentile	28.00	40.75
Median	33.50	48.50
75th Percentile	36.25	54.00
Maximum	40.00	64.00

	min	max
Minimum	20.00	38.00
25th Percentile	28.50	44.50
Median	33.00	50.00
75th Percentile	35.00	59.50
Maximum	40.00	67.00

p = 0.79

Conclusions

- The SLLL compression system displays comparable physical properties (static substocking pressure and stiffness) as a strong compression stocking
- 100% of patients with CVI can done the SLLL system
- Principally, the SLLL is dose-adjustable
- Clinical effectiveness has to be tested in according trials

Conclusions

- Superimposing leggings does not add pressure arithmetically* (34.4 mm Hg vs theoretically 52 mmHg)
- → removing the foot of compression stockings changes physical properties
- → further development of superimposable stocking systems remain of interest
- *Cornu-Thénard A: Dermatol Surg 2007;33:269-275

Eur J Vasc Endovasc Surg (2016) 51, 434–440

A Compression Kit of a Stocking and Three Superimposed Leggings Is Easy to Don and Dose Adjustable

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WHAT THIS STUDY ADDS
A compression stocking kit composed of an understocking and superimposable leggings is easier to don.

Background: Forty percent of patients with chronic venous insufficiency (CVI) do not wear their indicated and prescribed compression stockings. Difficulties in donning and a feeling of constraint are the most common reasons for non-adherence.
Objective: The aim was to develop a compression stocking system that is easy to don and dose adjustable.
Methods: A modular compression stocking kit composed of an understocking and three superimposable leggings (SLLLs) was developed. Substocking pressures (*P*) at the thinnest part above the ankle (cB level) were 17 mm (understocking) + 15 + 10 + 10 mmHg (3 superimposed leggings; Hatra method). Twenty healthy subjects and 20 patients over 65 years with CVI donned the SLLL compression kit. *P* was measured in vivo (Picopress method) at the transition of the Achilles tendon to the calf muscle (level cB1) during rest and ankle movements (DSI; dynamic stiffness index) and compared with a strong compression stocking of 40 mmHg (S40).
Results: Twenty (20/20) patients aged over 65 with CVI (C4–6) successfully donned the SLLL compression kit without aid, compared with 12 (12/20) who were able to don the S40 without aid ($p = .02$). *In vivo* resting *P* at level cB1 was 34.3 mmHg (SLLL) compared with 37.3 mmHg (S40) ($p = .1$). The DSI was 16.1 (SLLL) compared with 17.9 ($p = .79$; S40; CVI group).
Conclusion: The physical properties of the SLLL compression stocking kit correspond to the characteristics of a strong stocking at rest and exercise (DSI). The donning success rate is excellent (100%). A further potential advantage is that the SLLL leg compression kit is dose adjustable, according to indication or patient tolerance. Wearing comfort over periods of several days and clinical effectiveness need to be investigated in future trials.

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Keywords: Chronic venous insufficiency, Leg compression kit, Superimposed leggings, Substocking pressure, Dynamic stiffness index, Donning compression stockings, Dose-adjustable leg compression


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