

COMPRESSION BULLETIN

Robert Stemmer Library on Compression Therapy

In this issue:

- **The treatment of venous leg ulcers with a specifically designed compression stocking kit – Comparison with bandaging**

We report on a multi-centre randomized trial with 60 patients treated with either short stretch multi-layer bandages or a two-stocking system (Sigvaris® Ulcer X® kit).

- **Guidelines for diagnosis and therapy of venous ulcers (version 8-2008) – ICD10: 183.0 (without inflammation) and 183.2 (with inflammation)**

Compression therapy, together with mobilisation, is the basis of non-invasive measures.

- **Interface pressure and stiffness of various elastic stockings during posture changes and exercise.**

9 different compression stockings were compared concerning laboratory parameters and measurements of interface pressure and stiffness in 13 female volunteers.

- **Role of MRI in investigating the effects of elastic compression stockings on the deformation of the superficial and deep veins in the lower leg.**

In 8 healthy persons the right calves were imaged by MRI without and with light compression stockings (flight stockings) in the prone position.

- **Compression stockings to prevent post-thrombotic syndrome: a role for anticoagulation clinics?**

An anonymous written survey of anticoagulation clinic providers was conducted among the attendees of a meeting of the Anticoagulation Forum.

- **Inelastic compression increases venous ejection fraction more than elastic bandages in patients with superficial venous reflux**

Venous pump function during a standardized exercise was assessed by measuring ejected volume (EV) and ejection fraction (EF) using strain gauge plethysmography without and with elastic and inelastic compression bandages on the leg in a total of 30 patients with major venous reflux in the great saphenous vein, all candidates for venous surgery.

Robert Stemmer Library on Compression Therapy was created by Robert Stemmer. It is a complete collection of publications of scientific and medical journals. It consists of three parts:

- Handbook „Compression Therapy of the extremities“, edited by Robert Stemmer in 1999 continuous literature updates, which are regular amendments of the handbook.
- The Compression Bulletin reports about important new publications.
- The table of contents of the Robert Stemmer Library:
 1. Introduction
 2. Historical overview
 3. Anatomy
 4. Venous return
 5. The basis of compression
 6. Mobilization
 7. Compression using mechanical devices
 8. Bandages
 9. Compression stockings
 10. Compression & mobilization strategies

The Library is regularly updated with new publications; a selection is presented in the Compression Bulletin.

Editors

Prof. H. Partsch, Wien
Prof. E. Rabe, Bonn

Co-Editors

Dr. Pannier-Fischer, Bonn
Dr. B. Partsch, Wien

International Advisory Board

Asia: S. Hoshino
Australia: G. M. Malouf
Europe: F. Vin
North America: L. Villavicencio
South America: E. Brizzio

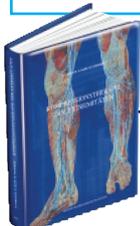
GANZONI & CIE AG

Gröblistrasse 8, CH-9014 St.Gallen,
Tel. +41 (0)71 279 33 66, Fax +41 (0)71 274 29 75

GANZONI FRANCE SA

F-68330 Huningue, Tel. +33 (0)3 89 70 2400
F-42176 St-Just-St-Rambert, Tel. +33 (0)4 77 36 08 90

Special Edition:
American Venous Forum
February 11–14, 2009



Robert Stemmer Library on Compression Therapy

Published under the auspices of the IUP since 2001

www.sigvaris.com



F. Mariani, V. Mattaliano, G. Mosti, V. Gasbarro, M. Bucalossi, W. Blättler, F. Amsler, St. Mancini

The treatment of venous leg ulcers with a specifically designed compression stocking kit – Comparison with bandaging

AIM

Traditionally, venous leg ulcers are treated with firm no elastic bandages. Medical compression stockings are not the first choice although comparative studies found them equally effective or superior to bandages.

METHODS

We report on a multi-centre randomized trial with 60 patients treated with either short stretch multi-layer bandages or a two-stocking system (Sigvaris® Ulcer X® kit). Three patients have been excluded because their ankle movement was restricted to the extent that they could not put on the stockings and 1 patient withdrew consent. Patient characteristics and ulcer features were evenly distributed. The proportion of ulcers healed within 4 months and the time to completion of healing were recorded. Subjective appraisal was assessed with a validated questionnaire.

RESULTS

Complete wound closure was achieved in 70.0% (21 of 30) with bandages and in 96.2% (25 of 26) with the ulcer X kit ($p = 0.011$). Ulcers with a diameter of up to about 4cm healed twice as rapidly, the larger ones as fast with the stocking kit as with bandages. The sum of problems encountered with bandages was significantly greater than that observed with the stocking kit ($p < 0.0001$). Pain at night and in the morning was absent with stockings but reported by 40% and 20% in the bandage group, respectively. The main features associated with delayed or absent healing were ulcer size and pain.

CONCLUSIONS

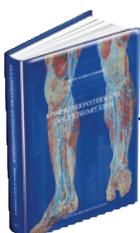
Common venous ulcers can readily be treated with the ulcer X compression kit provided the ankle movement allow its painless donning. Bandages even when applied by the most experienced staff are less effective and cause more problems.

COMMENT

The treatment of venous leg ulcers is possible with compression bandages or stocking systems. Stockings benefit from the more standardized handling by the patient himself. The stocking has special benefits in patients with relatively small ulcers and good ankle mobility. Compression stockings will not replace bandages completely. This is in particular true for large non healing ulcers in deformed legs. But in the standard ulcer patient compression stockings may improve compliance and reduce costs.

Lit.: 20/2; Publ.: Clinical study; Lan.: Eng; Abstr.: Ger, En, Fr; Chap.: 9

Phlebologie 2008; 37: 191–197.



G. Gallenkemper for the Guideline Group

Guidelines for diagnosis and therapy of venous ulcers (version 8-2008) – ICD10: 183.0 (without inflammation) and 183.2 (with inflammation)

AIM

Four years after the publication of the latest guidelines on diagnosis and therapy of venous ulcer the German Society of Phlebology defines a completely revised and expanded version after the review of the literature published in the meantime. Particular emphasis was laid on international standards; new chapters are related to socio-economic aspects, the physical perception of the patients and the implementation of the guidelines in clinical practice.

COMPRESSION

Compression therapy, together with mobilisation, is the basis of non-invasive measures. It can be used alone or in combination with invasive measures. Several, independent studies have shown that careful compression therapy accelerates the healing of venous ulcers and greatly reduces the recurrence rate. With increasing working pressure of the compression bandage and/or compression stocking, the rate of healing increases and the recurrence rate falls. Its effect is based on the fact that the venous cross-section is effectively reduced both at rest and also on muscle contraction and back-flow is thereby improved. Compression therapy is capable of reducing venous oedema and improving pathological changes in the macro- and microcirculation. As a result of the increased tissue pressure, there is a rise in reabsorption of tissue fluid in the venous limb of the microcirculation. Blood flow in the dilated capillary loops is accelerated by the compression, capillary filtration is restricted and reabsorption increased. There is strong evidence that compression treatment changes the paracellular barriers via tight junction molecules and thereby reduces oedema.

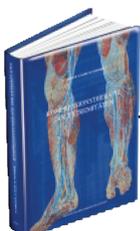
Numerous studies have shown that the quality of life (QoL) during compression therapy is improved.

COMMENT

This actual guideline on venous leg ulcers demonstrates the whole spectrum of diagnostic and treatment of the disease. Treatment with compression bandages or compression stockings is in the centre of the basic ulcer care. It enhances ulcer healing and reduces ulcer recurrence.

Lit.: 593; Publ.: Guideline; Lan.: Ger, Eng; Abstr.: Ger, En, Fr; Chap.: 10

Phlebologie 2008; 37: 308–329.



Hirai M, Iwata H, Ishibashi H, Ota T, Nakamura H.

Interface pressure and stiffness of various elastic stockings during posture changes and exercise.

BACKGROUND

The elastic properties of compression stockings and bandages play a crucial role for the effectivity of compression devices.

MATERIAL AND METHODS

9 different compression stockings were compared concerning laboratory parameters and measurements of interface pressure and stiffness in 13 female volunteers. In the laboratory thickness of the stocking, transversal extensibility and pressure and stiffness using a HOSY device were measured. In vivo interface pressure at the B1 level was measured in the supine and standing position, with tip-toes and knee-bends using an Airpack Type Analyzer.

RESULTS

Two categories of stockings could be differentiated based on the in vitro measurement of extensibility: short stretch (<105% extensibility) and long stretch (>105% extensibility). Short stretch stockings include thick round-knitted stockings, firm round-knitted stockings and flat-knitted stockings. These products showed a higher pressure-difference between standing and lying ("SSI = static stiffness index"), higher pressure peaks during exercise and larger pressure amplitudes than long-stretch stockings. Significant correlations are demonstrated between working pressure peaks and SSI, inverse correlations are shown between extensibility versus stiffness, SSI, and pressure peaks.

CONCLUSIONS

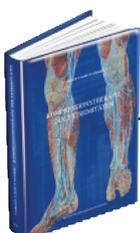
Stiffness of the used product should be taken into account when compression stockings are prescribed. The authors recommend to use stiffer materials in patients with deep venous insufficiency and lymphoedema.

COMMENT

Several studies have demonstrated that compression bandages with high stiffness are more effective concerning an improvement of the pumping function in patients with venous incompetence. Unfortunately such data are lacking for compression stockings and only few data show a stronger effect of high stiffness-stockings concerning oedema management. Such stockings are more difficult to be put on by the patients and their wide-spread prescription could therefore decrease compliance. More clinical studies are needed to clearly demonstrate the clinical superiority of compression stockings with high stiffness.

Lit. 15/1, Publ. Exper., Lan. Eng. Abstr Eng, Chapter 9

Vascular 2008; 26; 95-100



Downie SP, Firmin DN, Wood NB, Thom SA, Hughes AD, Wolfe JNH, Yun Xu X.

Role of MRI in investigating the effects of elastic compression stockings on the deformation of the superficial and deep veins in the lower leg.

AIM

of the study was to investigate the effects of compression stockings on superficial and deep veins of the lower leg.

MATERIAL AND METHODS

In 8 healthy persons the right calves were imaged by MRI without and with light compression stockings (flight stockings) in the prone position. Cross sectional areas of the deep and superficial veins were measured at mid-calf level.

RESULTS

The cross section of deep veins was generally elliptical, while superficial veins were rather circular. The cross-sectional area along the longitudinal course of the veins showed significant fluctuations. Compression stockings produced a significant reduction of the cross-sectional area, being more pronounced in the deep veins (-64% in average) than in the superficial veins (-39%). Some longitudinal movement of superficial veins was observed under the force of compression.

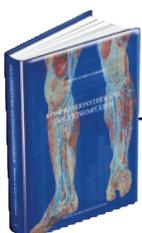
CONCLUSION

Future biomechanical studies of lower-limb compression should make use of MRI.

COMMENT

This is a very important experimental study showing impressive reductions of the cross-sections of superficial and deep veins under a light compression stocking. Although no specifications are given it may be assumed that the pressure of the stockings used was around 10-15 mmHg on the lower leg. In contrast to the common assumption deep veins were more compressed than superficial veins. However, as this is stressed by the authors, these effects could only be imaged in the prone position and can not be extrapolated to the sitting or standing position where the intravenous pressure is much higher so that the venous narrowing will be much smaller.

J Magn Reson Imaging 2007; 26: 80-85



Wittkowsky AK, Nutescu EA, Devine EB

Compression stockings to prevent post-thrombotic syndrome: a role for anticoagulation clinics?

BACKGROUND

In many parts of the world anticoagulation clinics manage anticoagulant therapy in patients after deep vein thrombosis (DVT), but frequently do not care about compression therapy in order to prevent post-thrombotic syndrome.

MATERIAL AND METHODS

An anonymous written survey of anticoagulation clinic providers was conducted among the attendees of a meeting of the Anticoagulation Forum. 151 from 646 completed the survey, most of them were clinical pharmacists and nurses affiliated to hospitals (66%) and physician group practices (28%). The total DVT population represented was 22.925 patients of whom the respondents estimated that only 17, 9% regularly wear compression stockings. 28 clinics prescribed compression stockings, 123 did not. In this latter group 59% did not know whether compression stockings were worn by the patients. Strength and duration of compression prescribed was largely unknown.

CONCLUSIONS

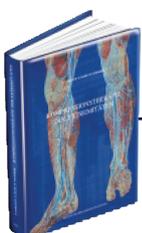
The adherence to current guidelines for wearing compression stockings after DVT should be improved.

COMMENT

This article clearly demonstrates the wide-spread ignorance and disregard of compression therapy, even in those indications where evidence medicine based data are available. Based on such trials current guidelines suggest the use of compression stockings with a pressure of 30–40 mmHg at the ankle for 2 years following the diagnosis of DVT to prevent post-thrombotic syndrome. A similar problem as discussed in this paper is the use of adequate compression in the acute stage of DVT that frequently fails just because of local organizational problems.

Lit. 10/1, Publ. Survey, Lan. Eng. Abst Eng, Chapter 9

J Thromb Thrombolysis. 2008 Dec; 26(3): 248–50.



Mosti G, Mattaliano V, Partsch H.

Inelastic compression increases venous ejection fraction more than elastic bandages in patients with superficial venous reflux

AIM

To measure the effect of different compression bandages on the reduced venous pumping function in patients with venous insufficiency.

MATERIAL AND METHODS

Venous pump function during a standardized exercise was assessed by measuring ejected volume (EV) and ejection fraction (EF) using strain gauge plethysmography without and with elastic and inelastic compression bandages on the leg in a total of 30 patients with major venous reflux in the great saphenous vein, all candidates for venous surgery. The interface pressure of the bandages was measured simultaneously in the medial gaiter area. Normal values of EV and EF were obtained from 15 healthy controls.

RESULTS

Patients with venous insufficiency showed a statistically significant reduction of EV and EF compared to controls. Inelastic bandages applied with an average resting pressure of 41 mmHg in the supine position raised EV and EF into a normal range ($p < .001$) while elastic bandages with the same pressure was much less effective. The improvement of the ejection fraction correlates well with the pressure differences between standing and lying (Static Stiffness Index) and between muscle systole and diastole during exercise (Pearson $r = 0,69$ and $0,74$ respectively, $p < .001$). In another series elastic bandages with very high standing pressures of more than 60 mmHg comparable to those of inelastic bandages were applied very tightly with

high stretch. These bandages were barely tolerable and led only to a minor improvement of the venous pumping function.

CONCLUSION

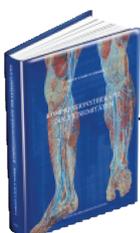
Ejected volume and ejection fraction, which are severely reduced in venous insufficiency, can be increased by compression therapy. Inelastic bandages are much more powerful than elastic bandages concerning an improvement of the venous pumping function. Elastic bandages are much less effective, even when applied with high stretch producing a resting pressure that is barely tolerable.

COMMENT

The non-invasive methodology described in this paper is a promising tool to quantify venous pumping function and to assess beneficial effects of different compression devices on the legs of patients with venous insufficiency. In contrast to several other plethysmographic methods that have been reported for this purpose volume changes are measured on the leg and not over the bandage. It is clearly demonstrated that an improvement of venous pumping function does not only correlate with the sub-bandage pressure but also with the stiffness of the bandage.

Lit 24/10; Publ Experimental, Lang. Eng, Abstr Eng., Chap. 8

Phlebology. 2008; 23(6): 287-94.



COMPRESSION BULLETIN 16

Fax registration

Please send me your Compression Bulletin regularly, free of charge

Name

First name

Speciality

Institution

Street

Town/zip

Country

Fax No.

e-mail address

Please fax to +41 (0)71 274 29 27

GANZONI & CIE AG
Gröblistrasse 8, CH-9014 St.Gallen, Tel. +41 (0)71 279 33 66, Fax +41 (0)71 274 29 75

GANZONI FRANCE SA
F-68330 Huningue, Tel. +33 (0)3 89 70 2400
F-42176 St-Just-St-Rambert, Tel. +33 (0)4 77 36 08 90

