

COMPRESSION BULLETIN

Robert Stemmer Library on Compression Therapy

In this issue:

- **Ease of Application of Medical Compression Stocking Systems for the Treatment of Venous Ulcers**
Four kits used to provide limb compression in the management of venous ulcers were evaluated.
- **Compliance to Compression Therapy in Patients with Existing Venous Leg Ulcers. Results of a Cross-Sectional Study**
The authors conducted a cross-sectional study in 73 patients with varicose veins and/or postthrombotic syndrome and venous leg ulcers between 11/2007 and 01/2009 in the own specialized wound ambulance.
- **Lower Limb Compression Garment improves Recovery from Exercise-induced Muscle Damage in Young, Active Females**
Seventeen female volunteers completed 10 x 10 drop jumps from a 0.6m box in a special manner as this has been described as a method to induce muscle damage.
- **Venous Leg Ulcers: Patient Concordance with Compression Therapy and its Impact on Healing and Prevention of Recurrence**
The biomedical literature was searched for publications on VLU, compression therapy and concordance over the past 20 years.
- **Physiological Effects of Wearing Graduated Compression Stockings during Running**
Nine males and one female, all of them well trained Ironman sports people, performed three 40-min treadmill runs (80 +/- 5% maximal oxygen uptake) wearing either control ("0 mmHg"), low (12-15 mmHg), or high (23-32 mmHg) grade graduated below knee compression stockings in a double-blind order.

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

24th ACP Orlando FL
November 4-7, 2010



Robert Stemmer Library on Compression Therapy

Published under the auspices of the IUP since 2001

www.sigvaris.com



Willenberg T, Lun B, Amsler F, Baumgartner I

Ease of Application of Medical Compression Stocking Systems for the Treatment of Venous Ulcers

BACKGROUND

The aim of this study was to evaluate the ease of application of two-piece, graduated, compression systems for the treatment of venous ulcers.

METHODS

Four kits used to provide limb compression in the management of venous ulcers were evaluated. In previous clinical trials these have been proven to be non-inferior to various types of bandages in the treatment of venous ulcers. The interface pressure exerted above the ankle by the under-stocking and the complete compression system and the force required to pull the over-stocking off were assessed in vitro. Ease of application of the four kits was evaluated in four sessions by five nurses who put stockings on their own legs in a blinded manner. They expressed their assessment of the stockings using a series of visual analogue scales (VASs).

RESULTS

The Sigvaris Ulcer X Kit provided a mean interface pressure of 46 mmHg and required a force in the range of 60-90 N to remove it. The mediven® ulcer kit exerted the same pressure but required force in the range of 150-190 N to remove it. Two kits (SurePress-Comfort and VenoTrain-Ulcertec) exerted a mean pressure of only 25 mmHg and needed a force in the range of 100-160 N to remove them. Nurses judged the Ulcer X and SurePress kits easiest to apply. Application of the VenoTrain kit was found slightly more difficult. The Mediven kit was judged to be difficult to use.

CONCLUSIONS

The authors concluded that comparison of ease of application of compression stocking kits in normal legs revealed marked differences between them. Only one system exerted a high pressure and was easy to apply. They suggest that direct comparison of these compression kits in leg ulcer patients is required to assess

whether our laboratory findings correlate with patient compliance and ulcer healing.

COMMENT

Compression stocking systems have become better accepted in the past. However these systems differ in the pressure of the under-stocking and of the complete compression system as well as in the composition of the device. This study demonstrates these differences in pressure and the differences in application and removal in healthy nurses. These results may be different in ulcer patients. For each of these systems there are clinical studies demonstrating the effectiveness in ulcer treatment. The question if higher pressures in these compression systems lead to faster ulcer healing can only be answered in randomized comparative studies.

Eur J Vasc Endovasc Surg (2010) 40, 129-33

Chapter 8, 9, Number of references/number of self citations: 12/0
Type of publication: experimental trial, Language: en



Renner R, Gebhardt C, Simon JC

Compliance to Compression Therapy in Patients with Existing Venous Leg Ulcers. Results of a Cross-Sectional Study

BACKGROUND

The authors tried to analyze how many patients performed compression therapy at the time of data collection and the reasons for insufficient or missing compression therapy.

METHODS

The authors conducted a cross-sectional study in 73 patients with varicose veins and/or postthrombotic syndrome and venous leg ulcers between 11/2007 and 01/2009 in the own specialized wound ambulance. It was documented, if the patients performed compression therapy at all. By clinically defined criteria, the attending doctor evaluated the efficiency of the compression and documented who had been responsible for the compression therapy. Patients not wearing any compression were asked for the reasons. 25 patients were registered several times and evaluated separately. In those, the authors tried to find out, if compliance to compression therapy had changed after refreshing of the recommendation.

RESULTS

In total, 75% (n = 55) of 73 patients were performing compression therapy at the time of data collection, most of them with short stretch bandages. In 50% (n = 19), compression therapy was sufficient. Most of these patients (n = 24, 63%) applied the bandages themselves. If the bandages had been put on inadequately, the patients explained this in most of the cases with unfitting shoes or extreme overweight. In the group of patients with compression stockings, compression therapy was optimal in 91%; the patients put the stockings on by themselves in nearly all cases. 25% of the patients (n = 18) did not perform any compression. In 61% (n = 11), they explained this with their own unwillingness. 25 pa-

tients were observed more than once. 15 of them showed unchanged compression habits during follow-up, in detail with sufficient compression in 73% and an unchanged insufficient compression in 27%.

CONCLUSION

The authors conclude, that in cases of insufficient compression, possible impediments should be identified and eliminated. Patients, who do not perform any compression therapy, should be motivated with easy-to-handle compression therapy options like compression stocking systems.

COMMENT

Incompliance with compression is a big problem in treatment of venous ulcer patients. In this study 25% did not wear any compression garments. This leads to prolonged ulcer healing and higher recurrence rates. Treatment with compression bandages was judged insufficient by the physician in 50% of the cases. The majority of the patients applied the bandages themselves. In case of compression stockings treatment was judged optimal in 91%. Hopefully concordance with compression could be improved by using compression stockings if the treatment is performed by the patient himself.

Med Klin 2010;105:1-6.

Chapter 8, 9, Number of references/number of self citations: 15/0
Type of publication: cross-sectional trial, Language: German



Jakeman JR, Byrne C, Eston RG

Lower Limb Compression Garment improves Recovery from Exercise-induced Muscle Damage in Young, Active Females

BACKGROUND

Unaccustomed physical activity may lead to exercise induced muscle damage. Typical symptoms are impaired muscle function, delayed muscle soreness, decreased exercise performance and increased perceived exertion during exercise.

AIM

of this study was to investigate the efficacy of lower limb clothing on recovery from EIMD after strenuous activity.

MATERIAL AND METHODS

Seventeen female volunteers completed 10 x 10 drop jumps from a 0.6m box in a special manner as this has been described as a method to induce muscle damage. Participants were randomly allocated to a passive recovery (n = 9) or a compression treatment wearing full leg compression stockings for 12 h immediately following damaging exercise (n = 8). Indirect indices of muscle damage (muscle soreness, creatine kinase activity, knee extensor concentric strength, and vertical jump performance) were assessed prior to and 1, 24, 48, 72 and 96 h after the exercise. The ankle to waist compression stockings are declared to exert an average pressure of 17,3 mmHg on the calf and of 14,9 mmHg at thigh level and were applied immediately after exercise for 12 hours. Both groups had a rest of 1 hour after exercise.

RESULTS

The performed exercise had a significant effect on all indices of muscle damage. The compression treatment improved jump performance, squat jump performance, and knee extensor strength loss, and reduced muscle soreness from 4,0 to 2,4 on a visual analogue scale. There was no significant effect on creatine kinase activity.

DISCUSSION

It is speculated that the significant effect of compression on muscle soreness is due to a reduction of oedema and on a secondary inflammatory process after muscle injury. This effect is important for athletes to continue with consistent training. The mechanical effects of compression may reduce oscillatory muscle displacement, which had been described as an important factor for performance and recovery. A positive influence on cellular repair after muscle damage and a stabilizing effect on muscle fibre alignment may be assumed.

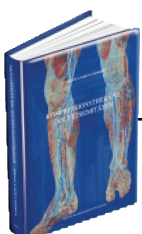
CONCLUSION

The results indicate that compression clothing is an effective recovery strategy following exercise-induced muscle damage.

COMMENT

This is an interesting study supporting the use of compression stockings after damaging exercise as a practical, non-invasive method of post-exercise recovery. Usually sport stockings are below-knee products, which are worn already during and not only after exercise, but this was – unfortunately – not the subject of this study.

Eur J Appl Physiol. 2010 Apr 8. [Epub ahead of print]



Moffatt Ch, Kommala D, Dourdin N, Choe Y

Venous Leg Ulcers: Patient Concordance with Compression Therapy and its Impact on Healing and Prevention of Recurrence

BACKGROUND

The aim of this study was to review available data on the reasons attributed to patient non concordance with compression therapy for the treatment of venous leg ulcers (VLUs), the frequency of non concordance and its effects on clinical outcomes.

METHODS

The biomedical literature was searched for publications on VLUs, compression therapy and concordance over the past 20 years.

RESULTS

The search identified 10 studies reporting patient concordance with compression stockings or bandages. While non concordance ranged from 2% to 42% of patients in three randomised controlled trials, it was generally higher in real-world studies, ranging from 9.7% to 80%. Physical, aesthetic and cosmetic factors, patient lack of education about VLUs, cost of therapy and issues with treatment by clinicians were all reported to influence concordance with compression therapy. Another set of six studies indicated that the healing rate was half and the median time to complete healing was twice as long when patients were not concordant. Further, recurrence rates were 2–20 times greater when patients did not comply with the use of stockings following VLU healing.

CONCLUSION

The authors concluded that non concordance with compression therapy negatively impacts the outcome of VLUs, highlighting the need to improve patient concordance to maximise therapeutic benefits.

COMMENT

There is international consensus that compression is the basis of venous leg ulcer treatment. The vast majority of patients report improvement of venous symptoms and signs when wearing compression devices¹. Nevertheless concordance with compression is still insufficient even in those patients having the most severe clinical stage of chronic venous disease – venous ulcers. In consequence the ulcers are healing later and recur earlier. This means not only less quality of life for the patients but also higher costs for the community. All efforts have to be done to improve concordance with compression in venous patients.

International Wound Journal 2009; 6: 386–93

1. Pannier F, Hoffmann B, Stang A, Jöckel KH, Rabe E. Prävalenz und Akzeptanz der Therapie mit medizinischen Kompressionsstrümpfen – Ergebnisse der Bonner Venenstudie. Phlebologie 2007; 36: 245–9

Chapter 8, 9, Number of references/number of self citations: 44/5
Type of publication: review, Language: en



Ali A, Creasy RH, Edge JA

Physiological Effects of Wearing Graduated Compression Stockings during Running

AIM

of this study was to measure the influence of different grades of graduated compression stockings (GCS) on physiological and perceptual measures during and following treadmill running in competitive runners.

MATERIAL AND METHODS

Nine males and one female, all of them well trained Ironman sports people, performed three 40-min treadmill runs (80 +/- 5% maximal oxygen uptake) wearing either control ("0 mmHg"), low (12-15 mmHg), or high (23-32 mmHg) grade graduated below knee compression stockings in a double-blind order. The interface pressure was measured using a Kikuhime probe above the lateral malleolus and on the lateral aspect of the widest calf circumference. The control garment was designed to produce a pressure of "0 mmHg" at both measuring sites. Oxygen uptake, heart rate and blood lactate were measured. Changes in muscle function, soreness, pre- and post-run comfort, tightness and any pain associated with wearing GCS were determined before, immediately after running and 24 and 48 h post-run by measuring creatine kinase and myoglobin, counter-movement jump height, perceived soreness diagrams, and pressure sensitivity.

RESULTS

There were no significant differences between trials for oxygen uptake, heart rate or blood lactate during exercise. High pressure stockings were perceived as tighter and more pain-inducing while the zero pressure and the low pressure stockings were rated more comfortable. Creatine kinase, myoglobin and jump height were higher and pressure sensitivity was more pronounced immediately after running but not after 24 and 48 h. Only four participants reported muscle soreness during recovery from running.

CONCLUSIONS

No physiological benefit from compression stockings during or following treadmill running could be demonstrated in healthy well-trained runners. Athletes felt more comfortable wearing low-grade compression stockings whilst running.

COMMENT

This study was not able to demonstrate better sports performance in competitive runners by wearing different compression stockings during maximal high-intensity treadmill runs. This is in contrast with earlier findings from the same group showing that 10 km time runners were better able to maintain jumps performance when wearing low or medium grade compression stockings compared with a zero stocking. (1). This discrepancy clearly shows that the training level of the tested population but also the performed exercise plays a considerable role. Therefore the results of this study can not be generalized and extrapolated also to less well trained sports people and to less exhaustive stress tests.

As the authors emphasize, physiological benefits of sport stockings in terms of muscle repair and recovery, but also concerning perceptual advantages are possible.

Eur J Appl Physiol. 2010 Mar 31.

1) Ali A. et al. The effect of graduated compression stockings on running performance. J Strength Cond Res 2010: in press



COMPRESSION BULLETIN 19

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



