

## COMPRESSION BULLETIN

### Robert Stemmer Library on Compression Therapy

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The population of this cross-sectional study was randomly recruited between November 2000 and March 2002 from the registers of residents of the city of Bonn and two rural townships in the area.

- **Efficacy of elastic compression stockings used early of after resolution of the oedema on recanalization after deep venous thrombosis: The COM.PRE Trial.**

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- **Randomised clinical trial of the duration of compression therapy after varicose vein surgery.**

Randomised controlled trial. 300 patients aged between 18-80 years underwent unilateral varicose vein surgery in a Day Procedure Unit.

- **Simultaneous Changes of Leg Circumference and Interface Pressure under Different Compression Bandages**

Changes of interface pressure (Kikuhime transducer) and of segmental circumference (strain-gauge plethysmography) in the gaiter area (B1-level) were measured simultaneously under different bandages in 50 patients in the supine and standing position, with dorsiflexions and tip-toeing exercises.

- **Prevention of recurrence of venous ulceration: randomized controlled trial of class 2 and class 3 elastic compression.**

This study was a randomized controlled trial with a 5-year follow-up.

- **Superimposed elastic stockings: Pressure measurements.**

Laboratory measurements of interface pressure of four different premade compression stockings were performed separately and superimposed and the results were compared with the arithmetic sum of the pressures produced by each stocking.

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- 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:
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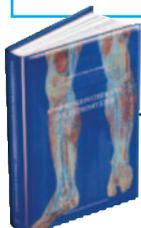
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F. Pannier, B. Hoffmann, A. Stang, K. H. Jöckel, E. Rabe

# Prevalence and acceptance of therapy with medical compression stockings – Results from the Bonn Vein Study

## OBJECTIVE

The aim of this study was to assess the prevalence of use of medical compression stockings (MCS) in the general adult population in Germany, to comment the indications for which MCS therapy has been described and the patients' experience with it.

## METHODS

The survey is based on the Bonn Vein Study. The population of this cross-sectional study was randomly recruited between November 2000 and March 2002 from the registers of residents of the city of Bonn and two rural townships in the area. In total, 3.072 men and women were included in the trial. In addition to clinical examination and duplex-ultrasound, participants were asked whether any phlebological treatment had been carried out due to a leg disorder or disease. If compression stockings had been worn, we asked for details such as compression class and length of stockings, wearing time, effectiveness, and recognition.

## RESULTS

In total, 22.9% of people providing information (12.7% of male, 31% of female) mentioned having received a specific phlebological treatment in the past. Therapy with compression stockings had the highest prevalence with 14.6% in the general population (7.5% of males, 20.3% of females). The mean age at the first prescription was 45.5 years (SD = 14.3 years). With increas-

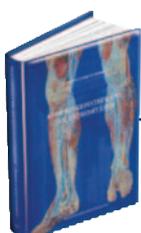
ing severity of venous disease, as rated according to the CEAP classification, the prevalence increased from 1% in C0 patients to 82% in C5/C6 patients. Of 450 participants who had used compression stockings in the past, 309 (68.6%) did not wear CS at the time of the survey. The remainder had generally been wearing them on five or more days per week (73%) for 8 or more hours per day (89.4%). On average, 71.3% of the participants said that the disease for which MCS were prescribed, had improved as a result of MCS therapy. Improvement concerned a reduction of sensations of swelling (84.2%), of heaviness (89.4%), leg pain after long periods of standing (60.9%), and tension in the legs (78.9%).

## COMMENT

This study demonstrates the high prevalence and effectiveness of medical compression stocking treatment in the general population in Germany. The fact, that only one third of the ever supplied patients is actually wearing the stockings does not necessarily reflect bad compliance but is also due to the fact that many indications are not permanent. This is for example true after surgery or sclerotherapy where the stockings are worn for only 3-6 weeks after treatment.

**Epidemiologic study, Chapter 9, Lang: Ger, Lit. 16, Sum: Ger, Eng, Fr**

Phlebologie 2007; 36: 245-249



Arpaia G; Cimminiello C, Mastrogiacorno O, de Gaudenzi E.

# Efficacy of elastic compression stockings used early of after resolution of the oedema on recanalization after deep venous thrombosis: The COM.PRE Trial.

## BACKGROUND

It had been shown that wearing of elastic compression stockings after acute deep thrombosis is able to reduce the incidence of postthrombotic syndrome. However, it is not clear whether early application of class II elastic hosiery (23-32 mmHg) achieves faster and more complete recanalization of deep veins after DVT than the usual schedule to prescribe such stockings some weeks after the episode.

## MATERIAL AND METHODS

In two centres 73 consecutive patients with an acute DVT diagnosed by Duplex were enrolled. 36 received immediate compression, 37 only after 2 weeks (control group). The length of the stockings was adjusted to the extension of the thrombosis, proximal DVT receiving thigh length stockings (21 and 17 respectively) and distal thrombosis lower leg stockings. All got therapeutic dose of low molecular weight heparin and were encouraged to walk. During the study period (follow-up after 14 and 90 days) 11 patients died and 10 were lost.

## RESULTS

82% of occluded venous segments recanalized in the treatment group, 60% in the control group after 90 days. Recanalization of popliteal DVT, expressed as the reduction of vein diameter, was significantly better in the early compression group than in the controls.

On day 14 the mean score for popliteal patency was significantly better for the early compression patients.

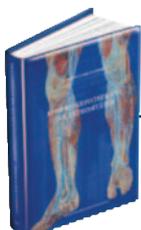
## CONCLUSION

The application of medical compression stockings applied immediately after diagnosis of DVT is safe and effective and leads to a faster recanalization.

## COMMENT

Some centres still wait for swelling or subjective complaints before compression stockings are prescribed. In spite of the short duration of the study and the restricted number of patients the reported data strongly support the use of compression therapy in the acute stage of thrombosis. The faster diminution of the thrombus load could explain the reduction of the postthrombotic late sequelae as reported by Brandjes and coworkers and by Prandoni et al.

Blood Coagulation and Fibrinolysis 2007; 18: 11131-137



Biswas S, Clark A, Shields DA

# Randomised clinical trial of the duration of compression therapy after varicose vein surgery.

### OBJECTIVE

To determine whether a period of one or three weeks of compression following varicose vein surgery influenced the outcome.

### METHODS

Randomised controlled trial. 300 patients aged between 18-80 years underwent unilateral varicose vein surgery in a Day Procedure Unit. Compression bandaging was applied post-operatively for three days. Patients then wore graduated elastic compression stockings randomised to a period of either one or three weeks. Patients were assessed by questionnaire on pain scores at rest and during mobilisation for up to six weeks, total analgesic consumption, duration of time off work, any complications, and patient perception of cosmetic results at various periods up to 12 weeks following surgery.

### RESULTS

The mean pain score reported by patients over 6 weeks was similar in the two groups (1 week group: mean 2.18, three week group: mean 1.87). The 95% confidence interval (CI) for the mean difference in pain was (-0.05-0.66). Analysis of the pain curves at 1 week, 4 weeks and 6 weeks, showed equivalence at 4 and 6 weeks, but not for 1 week, with the group wearing stockings for only one week complaining of more pain for this period. A significant increase in the total number of analgesia tablets consumed was also found in the group wearing stockings for only one week. No significant differences were found in the other secondary endpoints – return to work (categorised as <2 weeks, 2-6 weeks or 6-12 weeks), patient satisfaction or post-operative complications.

### CONCLUSION

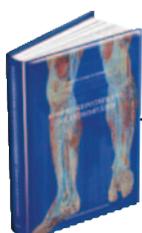
We found no benefit in wearing compression stockings for more than one week following uncomplicated high saphenous ligation with stripping of the great saphenous vein with respect to post-operative pain, number of complications, time to return to work, or patient satisfaction for up to 12 weeks following surgery.

### COMMENT

Although compression treatment after varicose vein surgery is a recommended standard in most of the guidelines there is no study available comparing compression with no compression in the postoperative period. Publications concerning the duration of compression therapy after varicose vein surgery are known from the 70's. This actual paper used TED™ stockings and found no benefit in wearing these stockings for more than one week following uncomplicated high saphenous ligation and stripping. This result is not surprising since TED™ stockings are designed for the use in non-ambulatory, bed-confined patients to prevent deep vein thrombosis and should not be considered as a substitute for an efficient compression therapy in mobile individuals. The pressure exerted by these „support stockings“ is between 10 and 20 mmHg on the distal lower leg, and around 5 mmHg on the thigh. Such pressure may effectively narrow the veins in the supine but not in the upright position. The statement that no benefit could be found wearing support stockings postoperatively does not exclude the fact that proper compression therapy is quite effective.

**Clinical study, Chapter 9, Lang: Eng, Lit. nn, Sum: Eng**

Eur J Vasc Endovasc Surg. 2007; 33: 631-7



Mosti G, Mattaliano V.

# Simultaneous Changes of Leg Circumference and Interface Pressure under Different Compression Bandages

## BACKGROUND

The stiffness of a compression device is defined by the increase in compression per centimetre increase in the circumference of the leg. This parameter characterizes the elastic property of compression stockings and of bandages. The aim of this study was to measure the stiffness for several compression bandages in vivo.

## MATERIAL AND METHODS

Changes of interface pressure (Kikuhime transducer) and of segmental circumference (strain-gauge plethysmography) in the gaiter area (B1-level) were measured simultaneously under different bandages in 50 patients in the supine and standing position, with dorsiflexions and tip-toeing exercises.

## RESULTS

The most consistent parameter to differentiate elastic from inelastic bandages was the pressure-difference between the standing and lying position corrected for the actual increase of leg circumference. However, for practical purposes the simple difference between the standing and the supine pressure („Static Stiffness Index, SSI“) can be used to differentiate elastic (SSI < 10) from inelastic (SSI > 10) bandages.

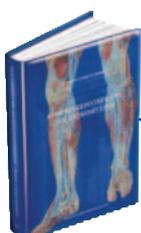
## CONCLUSION

The SSI is a useful tool to assess the elastic property of the compression device even without correction for the individual increase of leg circumference.

## COMMENT

Most compression bandages used today consist of several components being applied with different amount of layers. Mainly due to the friction-forces between the layers the elastic property of the final compression system can not be predicted based on the elasticity of the textiles used. In vivo measurements like those presented by the authors are the only possibility to assess the effect of a compression device on the individual leg, both concerning pressure and stiffness of the final product.

Eur J Vasc Endovasc Surg 2007; 33: 476-82



Nelson EA, Harper DR, Prescott RJ, Gibson B, Brown D, Ruckley CV.

# Prevention of recurrence of venous ulceration: randomized controlled trial of class 2 and class 3 elastic compression.

### OBJECTIVE

To compare venous ulcer recurrence and compliance with two strengths of compression hosiery.

### METHODS

This study was a randomized controlled trial with a 5-year follow-up. The setting was the leg ulcer clinics of a teaching and a district general hospital in Scotland, United Kingdom. Patients were 300 outpatients with recently healed venous ulcers, with no significant arterial disease, rheumatoid disease, or diabetes mellitus. Interventions were fitting and supply of class 2 or class 3 compression hosiery. Four-monthly refitting by trained orthotists and surveillance by specialist nurses were performed. The main outcome measures were recurrence of leg ulceration and compliance with treatment.

### RESULTS

36% (107/300) of patients had recurrent leg ulceration by 5 years. Recurrence occurred in 59 (39%) of 151 class 2 elastic compression cases and in 48 (32%) of class 3 compression cases. One hundred six patients did not comply with their randomized compression class, 63 (42%) in class 3 and 43 (28%) in class 2. The difference in recurrence is not statistically significant, but our estimate of the effectiveness of class 3 hosiery is diluted by the lower compliance rate in this group. Restricted ankle movement and four or more previous ulcers were associated with a higher risk of recurrence.

### CONCLUSIONS

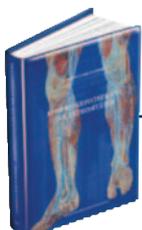
There was no evidence of a difference in recurrence rates at the classic level of significance (5%), but the lowest recurrence rates were seen in people who wore the highest degree of compression. Therefore, patients should wear the highest level of compression that is comfortable.

### COMMENT

Although this important study shows no statistical significant difference in ulcer recurrence rates comparing 18 to 24 mmHg with 25 to 35 mmHg compression stockings, the lowest recurrence rates were seen in patients who wore the highest degree of compression. The study also documents an important difference in the compliance with lower or higher pressures. In the patients supplied with 25 to 35 mmHg stockings, the compliance rate was only 58% whereas in the lower compression group it was 72%. One might speculate that the ulcer recurrence rate might be lower if the high compression stockings are consequently worn and that the better compliance with the low compression stockings may lead to the same overall effect comparing the two groups. The authors therefore emphasize that patients should wear the highest level of compression that is comfortable.

**Clinical study, Chapter 9, Lang: Eng, Lit. 19, Sum: Eng**

J Vasc Surg. 2006; 44: 803-8



Cornu-Thénard A, Boivin P, Carpentier PH, Courtet F, Manager RD, Ngo P.

# Superimposed elastic stockings: Pressure measurements.

### BACKGROUND

Medical compression stockings with high pressure (more than 40 mmHg) are difficult to apply which is the reason that patients frequently do not wear them. The compliance can be improved when two light stockings are applied, one on top of the other.

### AIM

of the study was to evaluate if the pressure of two and three stockings applied over each other is additive.

### MATERIAL AND METHODS

Laboratory measurements of interface pressure of four different premade compression stockings were performed separately and superimposed and the results were compared with the arithmetic sum of the pressures produced by each stocking.

### RESULTS

There is an excellent correlation ( $r > 0,9$ ) between the measured and the calculated pressure obtained by superposition of several stocking layers.

### CONCLUSION

By superposition of stockings the interface pressure obtained corresponds to the sum of the pressure of each individual stocking.

### COMMENT

The principle to obtain higher compression pressures by applying several stockings over each other may facilitate the donning of stockings in patients which need a higher compression pressure. It may be assumed that this simple and pragmatic idea will increase the compliance in many patients. If a light basic stocking is used as the first layer this may stay over night and the second stocking can be superimposed for the day-time.

Dermatol Surg 2007; 33: 269-275



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