

COMPRESSION BULLETIN

Robert Stemmer Library on Compression Therapy

In this issue:

- **Acceptability and practicability of elastic compression stockings in the elderly: a randomized controlled evaluation**

Twenty women complaining of venous symptoms, presenting with clinical signs CEAP C1-C5, between 68–85 years of age without major disability, were asked to put on, wear for three hours and take off French class II stockings (15–20 mmHg).

- **Impact of compression therapy on local microcirculation and histomorphology in venous leg ulcer**

Nineteen patients with chronic venous leg ulcer (ulcer size: 1 to 10 cm) were divided in two groups.

- **Compression therapy following invasive treatment in Phlebology**

A literature search was performed concerning compression therapy after varicose vein surgery, after catheter procedures and after sclerotherapy of varicose veins.

- **Cardio-respiratory and metabolic responses to different levels of compression during submaximal exercise**

Fifteen well-trained, male endurance athletes (age: 22.2 ± 1.3 years; peak oxygen uptake: 57.2 ± 4.0 ml/minute/kg) performed a ramp test to determine peak oxygen uptake.

- **Clinical trials needed to evaluate compression therapy in breast cancer related lymphoedema (BCRL). Proposals from an expert group.**

A group of experts consisting of medical persons and representants from the industry attended a meeting organized by the International Compression Club (ICC) in June 2009 in Ponzano (Veneto, Italy), reviewed the available literature regarding compression therapy for BCRL and offered an expert consensus recommendation for a research agenda concerning future trials.

- **The care of patients with varicose veins and associated chronic venous diseases: Clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum**

Recommendations of the Venous Guideline Committee are based on the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system as strong (GRADE 1) if the benefits clearly outweigh the risks, burden, and costs.

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

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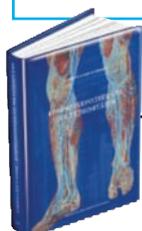
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Carpentier PH, Becker F, Thiney G, Poensin D, Satger B

Acceptability and practicability of elastic compression stockings in the elderly: a randomized controlled evaluation

BACKGROUND

Donning and doffing of compression hosiery may be a problem especially for elderly people limiting the compliance of compression stockings.

AIM

of the study was to evaluate the practical acceptability of compression stockings in elderly patients.

METHODS

Twenty women complaining of venous symptoms, presenting with clinical signs CEAP C1-C5, between 68–85 years of age without major disability, were asked to put on, wear for three hours and take off French class II stockings (15-20 mmHg). They assessed difficulties of putting on and off the stockings and the subjective feeling they experienced in comparison with their usual non-compression stockings (controls) by using a visual analogue scale with specific questions.

RESULTS

To put on and off stockings over the heel was significantly more difficult for the compression products than for the usual leg wear. However, a higher level of comfort was reported for the compression stockings when they were worn.

CONCLUSION

There are significant difficulties regarding putting on and removal of the compression stockings, but these are compensated by a better comfort when they are worn.

COMMENT

This study shows that light compression stockings are able to increase the leg comfort in general. Probably due to the small number of the tested individuals in each CEAP class this increase of comfort-feeling was not put into relationship with pre-existing various subjective symptoms which are not specified. An interesting observation of the investigators was the fact that doffing was much often more difficult from the right than from the left leg.

Phlebology 2011; 26: 107–113



Altintas AA, Gehl B, Aust MC, Meyer-Marcotty M, Altintas MA

Impact of compression therapy on local microcirculation and histomorphology in venous leg ulcer

AIM

The impact of compression therapy in the most severe outcome of chronic venous insufficiency on microcirculation and histomorphology is widely unknown. In vivo Confocal Laser-Scanning-Microscopy (CLSM) enables insight in human skin on cellular and sub cellular levels. In this study, the impact of compression therapy on local micro morphology in venous leg ulcer was evaluated using CLSM.

METHODS

Nineteen patients with chronic venous leg ulcer (ulcer size: 1 to 10 cm) were divided in two groups. Group A was treated with compression therapy and inactive wound dressing (4 m, 8 f, aged 68.4 years, BMI 26.9); Group B was treated solely with inactive wound dressing (2 m, 5 f, aged 64.2 years, BMI 28.1). Prior to start (control) and four weeks subsequently specific treatment in addition to ulcer size the following parameters were evaluated using CLSM (Vivascope 1500R, Lucid Inc, Rochester, New York; USA): individual blood cell flow (quantity of transcapillary blood cells flow), epidermal thickness, epidermal cell size, and quantity of inflammatory cells.

RESULTS

In Group A control ulcer size was 32.4 cm² (37.2 cm²; Group B) and decreased significantly to 8.2 cm² (28.1 cm²; Group B, $P < 0.05$) following four week therapy. In Group A blood cell flow was 40.04 ± 4.62/min (control) and increased up to 61.40 ± 5.16/min ($P < 0.05$) subsequently compression therapy. In Group B control blood cell flow was 38.92 ± 6.80/min and increased slightly up to 42.80 ± 5.96/min ($P > 0.05$). The epidermal thickness was found to be 69.10 ± 5.41 μm (control) and decreased significantly to 49.21 ± 4.60 μm in Group A. In Group B epidermal thickness was 71.48 ± 6.94 μm in controls and decreased slightly to 60.11 ±

5.16 μm. In both groups the epidermal cell size differ insignificantly (Group A 862.27 ± 42.96 μm² vs. 839.25 ± 61.13 μm²; Group B 870.04 ± 52.43 μm² vs. 852.73 ± 4.80 μm², $P > 0.05$). The quantity of inflammatory cells decreased following specific therapy in both groups from massive to less in Group A, and in Group B from massive to more.

CONCLUSIONS

For the first time, CLSM demonstrated the positive impact of compression therapy in chronic venous leg ulcer on local microcirculation and histomorphology in vivo on cellular level.

COMMENT

In this study local microcirculation in venous ulcer patients could be investigated for the first time with in vivo focal laser scanning microscopy (CLSM) with or without compression. It could be shown that blood cell flow is significantly enhanced with compression but not without. In addition there was a marked decrease on inflammatory cells which was more pronounced in the compression group compared with the controls. Epidermal thickness decreased in both groups but more significantly in the compression group. These results show the positive effect of compression therapy on the microcirculation in ulcer patients but also positive effect of the decrease of the inflammatory reaction. This decrease of the inflammatory reaction with compression therapy could also be important for other inflammatory diseases like vasculitis and erysipelas which can be treated by compression.

Phlebologie 2011; 40: 9–14



Noppeney T, Nüllen H

Compression therapy following invasive treatment in Phlebology

BACKGROUND

Compression therapy after invasive procedures to abolish varicose veins is a standard procedure recommended by several guidelines. However the scientific evidence for this recommendation is rather poor.

METHODS

A literature search was performed concerning compression therapy after varicose vein surgery, after catheter procedures and after sclerotherapy of varicose veins.

RESULTS

Six comparative studies could be identified using no ($n=2$) or different forms of compression after surgery. Compression obviously reduces postoperative pain and hematoma formation. The optimal pressure and duration of compression is still debated, 3-5 days may be enough.

Only one randomized controlled trial has been performed after Laser ablation demonstrating that eccentric thigh compression using special pads is able to reduce pain significantly.

After sclerotherapy the results of 6 trials are quite controversial. One study showed better results after sclerotherapy of spider veins if compression stockings (23-32 mmHg) were used for 3 weeks, another recent randomized controlled trial from France was unable to demonstrate any benefit of wearing 15-20 mmHg stockings after foam sclerotherapy of the great or small saphenous vein. However, a review of prospectively collected database on ultrasound guided foam sclerotherapy showed that compliance with post-procedure compression hosiery was significantly associated with a successful outcome and reported complications.

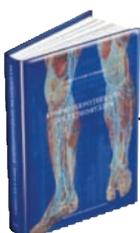
CONCLUSIONS

More trials are needed to assess the value of post procedural compression.

COMMENT

In the reported trials a broad variety of different compression stockings and bandages have been compared, coming with different pressure and materials. Experimental work has shown that a certain amount of pressure is needed in order to narrow the veins of the lower extremity in the upright position for obtaining an «empty vein» as postulated by George Fegan. In order to get more reliable comparisons a minimal prerequisite in future studies in this field should therefore be to measure the pressure under the tested compression device especially in the area of the leg where the vein has been treated.

Phlebologie 2011; 40: 15-19



Sperlich B, Haegele M, Krüger M, Schiffer T, Holmberg HC, Mester J

Cardio-respiratory and metabolic responses to different levels of compression during submaximal exercise

AIM

The effects of knee-high socks that applied different levels of compression (0, 10, 20, 30 and 40 mmHg) on various cardio-respiratory and metabolic parameters during submaximal running were analysed.

METHODS

Fifteen well-trained, male endurance athletes (age: 22.2 ± 1.3 years; peak oxygen uptake: 57.2 ± 4.0 ml/minute/kg) performed a ramp test to determine peak oxygen uptake. Thereafter, all athletes carried out five periods of submaximal running (at approximately 70% of peak oxygen uptake) with and without compression socks that applied the different levels of pressure. Cardiac output and index, stroke volume, arterio-venous difference in oxygen saturation, oxygen uptake, arterial oxygen saturation, heart rate and blood lactate were monitored before and during all of these tests.

RESULTS

Cardiac output ($P = 0.29$) and index ($P = 0.27$), stroke volume ($P = 0.50$), arterio-venous difference in oxygen saturation ($P = 0.11$), oxygen uptake ($P = 1.00$), arterial oxygen saturation ($P = 1.00$), heart rate ($P = 1.00$) and arterial lactate concentration ($P = 1.00$) were unaffected by compression (effect sizes = 0.00–0.65).

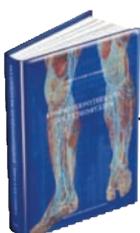
CONCLUSIONS

This first evaluation of the potential effects of increasing levels of compression on cardio-respiratory and metabolic parameters during submaximal exercise revealed no effects whatsoever.

COMMENT

Compression stockings play an increasing role in sport and fitness exercises. Aside of psychological effects an increase of blood circulation, a shortening of the recovery phase and a better and an overall performance are discussed. It could be shown in previous studies that the lactate concentration is not influenced by compression treatment. In this well performed study in trained athletes it could be shown that no cardiopulmonary effect derives from compression treatment during running. However further studies, focussing on regional blood supply in the calf muscles, are necessary to answer questions whether compression stockings have a positive effect on athletes performance.

Phlebology 2011; 26: 102–106



Partsch H, Stout N, Forner-Cordero I, Flour M, Moffatt C et al.

Clinical trials needed to evaluate compression therapy in breast cancer related lymphoedema (BCRL). Proposals from an expert group.

BACKGROUND

Compression therapy is the most important single component in Decongestive Lymphatic Therapy (DLT). Evidence is scant to direct clinicians in best practice regarding compression therapy use.

AIM

to propose further clinical trials with different kinds of compression in breast cancer related lymphedema (BCRL) concentrating on areas where randomized controlled trials (RCT's) are lacking.

METHODS

A group of experts consisting of medical persons and representants from the industry attended a meeting organized by the International Compression Club (ICC) in June 2009 in Ponzano (Veneto, Italy), reviewed the available literature regarding compression therapy for BCRL and offered an expert consensus recommendation for a research agenda concerning future trials.

RESULTS

Studies to date have failed to adequately address various forms of compression therapy and their optimal application in BCRL. Recommendations are offered for standardized compression research trials for prophylaxis of secondary arm lymphedema and for the management of chronic BCRL as well. Suggestions are also made regarding inclusion and exclusion criteria, measurement methodology and additional variables of interest for researchers. An appendix contains a list of proposals for future randomized controlled trials concerning prophylaxis of arm lymphoedema after breast cancer surgery, and for the management of BCRL in the initial phase and in the maintenance phase.

CONCLUSIONS

The document should provide help for clinical researchers, industry researchers and lymphologists in performing future studies on compression therapy.

COMMENT

Some trials in the past have compared «Complete decongestive therapy (CDT)» with different compression devices. The results of such protocols are difficult to interpret since one regime (compression) is compared with a bunch of several items (compression plus additional measures such as manual lymph drainage etc). If we want to judge the efficacy of compression alone then future trails should either compare compression versus no compression or one compression product versus another, without additional treatment.

International Angiology 2011; 2010; 29 (5): 442–453



COMPRESSION BULLETIN 21

Gloviczki P, Comerota AJ, Dalsing MC, Eklof BG, Gillespie DL, Gloviczki ML, Lohr JM, McLafferty RB, Meissner MH, Murad H, Padberg FT, Pappas PJ, Passman MA, Raffetto JD, Vasquez MA, Wakefield TW

The care of patients with varicose veins and associated chronic venous diseases: Clinical practice guidelines of the Society for Vascular Surgery and the American Venous Forum

AIM

The Society for Vascular Surgery (SVS) and the American Venous Forum (AVF) have developed clinical practice guidelines for the care of patients with varicose veins of the lower limbs and pelvis. The document also includes recommendations on the management of superficial and perforating vein incompetence in patients with associated, more advanced chronic venous diseases (CVD), including oedema, skin changes, or venous ulcers.

METHODS

Recommendations of the Venous Guideline Committee are based on the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system as strong (GRADE 1) if the benefits clearly outweigh the risks, burden, and costs. The suggestions are weak (GRADE 2) if the benefits are closely balanced with risks and burden. The level of available evidence to support the evaluation or treatment can be of high (A), medium (B), low or very low (C) quality.

RESULTS

The key recommendations of these guidelines are:

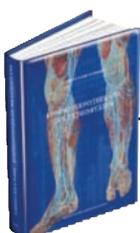
- We recommend that in patients with varicose veins or more severe CVD, a complete history and detailed physical examination are complemented by duplex ultrasound scanning of the deep and superficial veins (GRADE 1A).
- We recommend that the CEAP classification is used for patients with CVD (GRADE 1A) and that the revised Venous Clinical Severity Score is used to assess treatment outcome (GRADE 1B).
- We suggest compression therapy for patients with symptomatic varicose veins (GRADE 2C) but recommend against compression therapy as the primary treatment if the patient is a candidate for saphenous vein ablation (GRADE 1B).
- We recommend compression therapy as the primary treatment to aid healing of venous ulceration (GRADE 1B). To decrease the recurrence of venous ulcers, we recommend ablation of the incompetent superficial veins in addition to compression therapy (GRADE 1A).

- For treatment of the incompetent great saphenous vein (GSV), we recommend endovenous thermal ablation (radiofrequency or laser) rather than high ligation and inversion stripping of the saphenous vein to the level of the knee (GRADE 1B).
- We recommend phlebectomy or sclerotherapy to treat varicose tributaries (GRADE 1B) and suggest foam sclerotherapy as an option for the treatment of the incompetent saphenous vein (GRADE 2C).
- We recommend against selective treatment of perforating vein incompetence in patients with simple varicose veins (CEAP class C2; GRADE 1B).
- We suggest treatment of pathologic perforating veins (outward flow duration >500 ms, vein diameter >3.5 mm) located underneath healed or active ulcers (CEAP class C5-C6; GRADE 2B).
- We suggest treatment of pelvic congestion syndrome and pelvic varices with coil embolization, plugs, or transcatheter sclerotherapy, used alone or together (GRADE 2B).

COMMENT

In this high quality consensus document, based on the available literature evidence based recommendations are made for diagnosis and treatment of varicose veins and associated chronic venous insufficiency. Compression treatment in patients with an active venous ulcer and with healed ulcers to prevent recurrence is highly recommended. This is the case in addition to treatment of insufficient superficial veins. The recommendation for compression therapy in patients with symptomatic varicose veins reaches GRADE 2C only. This is caused by the poor study situation. However if saphenous vein ablation is indicated and possible this is recommended as first choice option of treatment. Interestingly in this consensus document there is a clear recommendation for endovenous thermal ablation of the saphenous varicose vein over open surgery.

J Vasc Surg 2011;53:2S-48S



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