

COMPRESSION BULLETIN

Robert Stemmer Library on Compression Therapy

In this issue:

- Use of MCS in the general population – Data from the Bonn vein study
- Compression after sclerotherapy for telangiectasias and reticular veins: A randomized controlled study
- Compression therapy for occupational leg symptoms and chronic venous disorders – A meta analysis of randomised controlled trials
- Leg symptoms of healthy people and their treatment with compression hosiery
- Moderate strength MCS for the treatment of recalcitrant venous ulcers are not inferior to multilayer short-stretch bandages
- The treatment of venous leg ulcers with a specifically designed compression stocking kit. Comparison with bandaging
- Management of venous ulcers: A meta analysis of randomized studies comparing bandages with specifically designed stockings
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- Comparison of round with flat knitted medical compression stockings for the treatment of advanced stable lymphedema
- Experiences by doctors and patients of MCS 20-36 mmHg in France
- Biomechanics of MCS donning process
- Key parameters of the putting on process: hydration, rubbing, friction, texture of the MCS (medical compression stocking)
- How to improve compliance of compression therapy (20-36 mmHg):
 - How patients put on, wear and pull off their medical compression stockings (MCS)
 - Testing an innovative MCS

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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.
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 2. Historical overview
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 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.

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16th UIP Monaco
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Use of MCS in the general population – Data from the Bonn vein study

AIM

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 population of the Bonn Vein Study I 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. In the Bonn Vein Study II we re-investigated 861 men and 1109 women for venous findings who have been already investigated 6.6 years before in the Bonn Vein Study I. The response at follow-up was 85.6%.

RESULTS

In total, 22.9% of participants providing information (12.7% of male, 31.0% 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 increasing 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

(73.0%) 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%).

In the follow-up survey 16% had ever worn medical compression stockings. Not all of these had a permanent indication for this kind of treatment. Reasons for a non-permanent prescription of compression were varicose vein surgery, sclerotherapy or pregnancy. 40.1% of the compression population had such a non-permanent indication. Among those with a permanent indication, 45.8% were wearing the compression stockings permanently also at the time of the investigation. Reasons for non-compliance were widespread. In 7.5% medical compression stockings were just no longer prescribed. In 75.8% compression stockings were well tolerated and 76.1% were content or very content with the treatment results.

CONCLUSIONS

Taking into account that indications for compression treatment are not permanent, the compliance for this treatment option is almost 50%. Medical compression stockings are very well tolerated and the treatment success is well accepted by the patients.



Kern Ph, Ramelet AA, Wütschert R, Hayoz D

Compression after sclerotherapy for telangiectasias and reticular veins: A randomized controlled study

BACKGROUND

The use of compression following sclerotherapy for telangiectasias varies much between different countries. In France and Italy postsclerotherapy compression in these patients is used only rarely whereas in Germany and Switzerland it is the rule. Only few published data exist concerning this topic. In addition it is suspected that compliance for compression after sclerotherapy might be low.

AIM

To perform a prospective randomized open-label trial to determine the relative efficacy of three weeks compression stockings 23 to 32 mmHg following sclerotherapy treatment of telangiectasias and reticular veins of the thigh.

METHODS

100 women presenting with telangiectasias and reticular veins on the lateral aspect of the thigh (C_{1A} or $sEPAS_{1P_N}$) were randomly assigned to either wear thigh-long MCS providing 23-32 mmHg at the ankle (SIGVARIS 702 Top Fine®, Switzerland) daily for 3 weeks or to no compression. Liquid sclerotherapy was performed during a single session with 60 to 100 injections and maximum of 10 ml of chromated glycerin. Outcome was assessed a) by patients' satisfaction analysis and b) by quantitative evaluation of photographs taken before and again at fifty-two days on the average after sclerotherapy by two blinded expert reviewers. In addition patients completed a Quality of Life questionnaire (SF36) before treatment and again at the control.

RESULTS

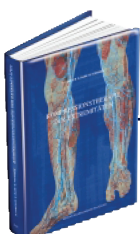
Data were analysed from 96 of 100 randomized patients. Patients' satisfaction was similar in both groups. The objective rating of vessel disappearance was significantly better with compression ($p = 0.026$) (figure 1). The inter-observer agreement was excellent (intraclass correlation coefficient = 0.93). Compression was well tolerated with a very low rate of discomfort claims. (17.5% discomfort). Micro-thrombi were less prevalent in the compression group (10% versus 15.2%). The incidence of pigmentation and matting was very low with no significant difference but a slightly better result in favour of the compression group. Compression treatment did not influence quality of life.

CONCLUSION

Wearing compression stockings (23-32 mmHg) for three weeks enhances the efficacy of sclerotherapy of leg telangiectasias by improving clinical vessel disappearance.

COMMENT

In recent studies, although with a small number of patients, it could be demonstrated that postsclerotherapy compression enhances effectivity of sclerotherapy and reduces side effects like pigmentation and matting. This is the first study showing these effects in a sufficient number of randomized patients. In addition it shows that compression does not interfere with quality of life in these patients.



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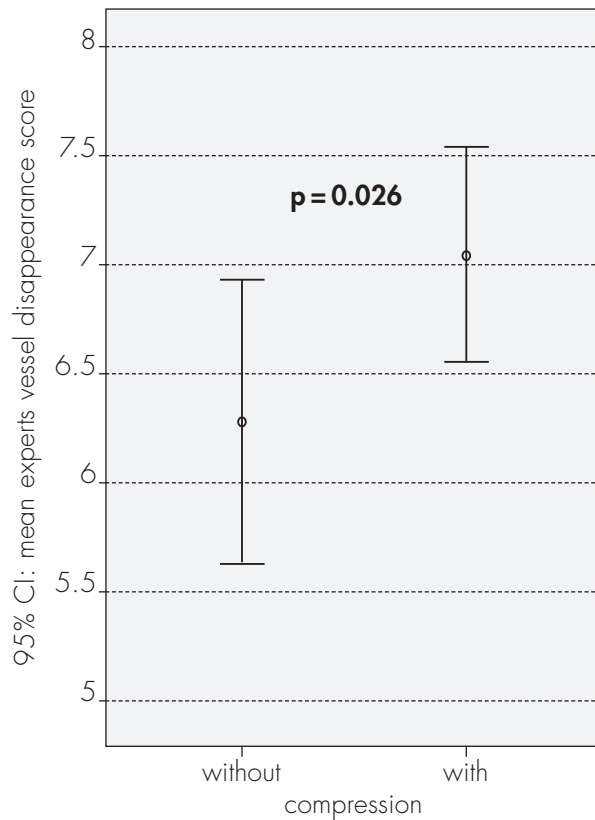


Fig. 1: Objective assessment by two independent blinded experts using a visual „a priori” score of vessel disappearance showed a significant better result for the patients wearing compression.

J Vasc Surg 2007; 45: 1212-1216

RCT, randomized prospective clinical trial, Chapter 10, Lan: Eng, Lit: 12/1, Sum: Eng



COMPRESSION BULLETIN 17

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Compression therapy for occupational leg symptoms and chronic venous disorders – A meta analysis of randomised controlled trials

OBJECTIVE

Leg discomfort and oedema are commonly attributed to a venous disorder (CVD) or chronic venous insufficiency (CVI) and are treated with compression hosiery. The pressure needed to achieve clinical benefit is a matter of debate.

METHODS

We performed a meta analysis of randomised controlled trials (RCT) that compared stockings exerting an ankle pressure of 10-20 mmHg with placebo or no treatment and with stockings exerting a pressure of more than 20 mmHg. RCT were retrieved and analysed with the tools of the Cochrane Collaboration. Each study was reviewed independently. Subjective dichotomous and continuous factors and objective findings were pooled for statistical treatment.

RESULTS

Eleven RCT fulfilled the predefined criteria. They included 1453 randomised subjects, 11 to 341 per study, 794

healthy people exposed to various forms of stress, 552 patients with a chronic venous disorder or chronic venous insufficiency (C_{1-3S}), and 141 patients after varicose vein surgery. Over all, compression with 10-20 mmHg had a clear effect on oedema and symptoms as compared with <10 mmHg, placebo stockings, or no treatment (p<.0001). Not one study showed a difference between 10-20 and >20 mmHg stockings.

CONCLUSION

Despite important methodological heterogeneity and sometimes sub-standard reporting the meta-analysis suggests that leg compression with 10-15 mmHg is an effective treatment for CVD. Less pressure is ineffective and higher pressure adds nothing to the benefit.

Amsler F, Blättler W. Compression therapy for occupational leg symptoms and chronic venous disorders – a meta-analysis of randomised controlled trials.

Eur J Vasc Endovasc Surg. 2008, 35(3),366-372.

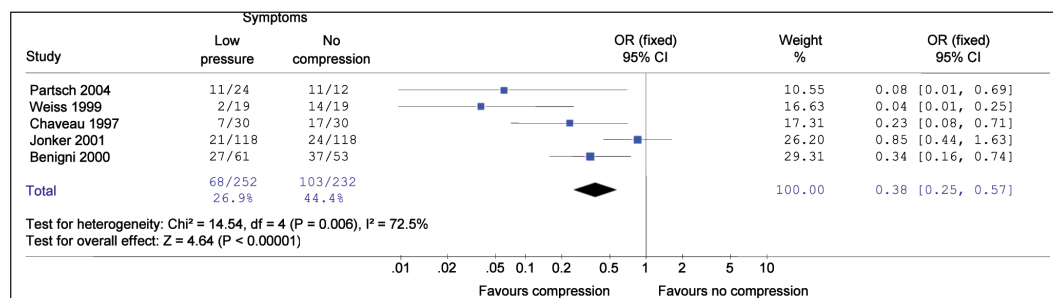
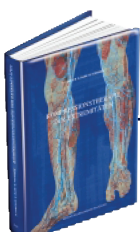


Figure 1:

Subjective dichotomous factors comparing low compression (10–20 mmHg) with placebo (≤6 mmHg) or no compression



COMPRESSION BULLETIN 17

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Leg symptoms of healthy people and their treatment with compression hosiery

OBJECTIVES

Occasional leg symptoms, like feelings of heaviness and tension, and occupational or evening oedema are considered typical features of a venous disorder but show low specificity in epidemiological and observational studies. We evaluated the prevalence and nature of such symptoms in subjects with no history or signs of venous disease and investigated the optimal strength that medical compression stockings (MCS) should exert in order to alleviate the symptoms and to prevent leg swelling.

METHODS

Specifically designed questionnaires were used to assess the symptoms of 40 healthy employees of a factory producing MCS. Lower leg volumes were quantified in the morning and evening. Calf size hosiery providing documented ankle pressures of 4-9 (mean 7.3), 12-18 (mean 14.9), and 18-22 (mean 19.5) mmHg, respectively, were tested in a prospective, open-label, randomised trial lasting three weeks. Endpoints were the relief of symptoms, prevention of vesperal oedema, and comfort in wearing the stockings.

RESULTS

Sixty-five percent of the participants reported at least occasional leg symptoms and oedema. Somatic-type symptoms (i.e. pain, heaviness, swelling, unattractive legs) were present in 2, psychic-type symptoms (i.e. leg- and personality-related unrest and stress) in 17 and both components in 7 of the 40 subjects. MCS exerting 15 and 20 mmHg prevented the symptoms and oedema. Stockings providing <10 mmHg were ineffective and those providing >19 mmHg were not well-tolerated. The

effect on the somatic-type symptoms was strongly correlated with the amount of lower leg volume which could be reduced by wearing stockings ($p=.005$). No correlation was found between the efficacy of compression and the emotional component of the symptoms.

CONCLUSION

The cause of occasional pain in the legs of apparently healthy people is unknown. Some features of the syndrome reflect an emotional disorder while others mirror venous insufficiency. MCS of 15 mmHg effectively relieve the symptoms resembling venous insufficiency, prevent oedema, and are well-tolerated.

Blättler W., Kreis N, Lun, B, Winiger J, Amsler F.
Leg symptoms of healthy people and their treatment with compression hosiery

Phlebology 2008; 23: 214-221.



Eugenio Brizzio, MD,^a Felix Amsler, MS,^b Bertrand Lun, MS,^c and Werner Blättler, MD,^{c,d}
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Moderate strength MCS for the treatment of recalcitrant venous ulcers are not inferior to multilayer short-stretch bandages

BACKGROUND

Compression is the mainstay of therapy for chronic venous leg ulcers. Medical compression stockings (MCS) are suitable to heal small ulcers and to prevent recurrence. The role of low-strength MCS in the treatment of refractory ulcerations is not clear.

METHODS

A randomised, single-centre, open-label study was performed on 60 legs of 56 consecutive patients with no prior compression therapy. Sigvaris prototype MCS providing 20.7 mmHg (± 5.5) at the ankle (measured without eccentric compression) were compared with multi-layer short-stretch bandages. Eccentric padding was used in all patients. Wound treatment was individually tailored. Compression was left on the leg day and night and changed every week until healing was completed. Endpoints were healing within 90d and 180d, time to healing, and quality of life measured monthly with the chronic venous insufficiency questionnaire (CIVIQ).

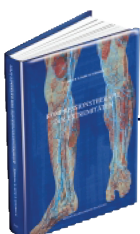
RESULTS

Four patients (5 legs) dropped out, 2 (3 legs) in the MCS and 2 in the bandage group for ulcer progression (2), systemic infection (2), and death unrelated to venous disease (1). Characteristics of patients and ulcers were evenly distributed. The pressure exerted by the MCS was much lower than that of bandages and garment elasticity not different. The ratio and rate of ulcer healing did not differ significantly between MCS and bandage groups nor did quality of life. Overall, risk factors for non-healing were advanced patient

age (64.8yrs vs. 57.6yrs; $p=0.021$), lower BMI (30.2kg/m² vs. 34.1kg/m²; $p=0.028$), longer presence of ulcers (36.3mos vs. 13.4mos; $p=0.025$), and larger initial ulcer area (17.9cm² vs. 5.5cm²; $p=0.001$). Ulcer recurrence and deep venous reflux had no influence on healing. Ulcers that were not healed at 90d had diminished their size from 17.9cm² to 8.7cm² ($p<0.001$).

CONCLUSION

In conclusion, our study confirms the absence of a benefit of bandages over MCS for the treatment of recalcitrant venous ulcerations. The option to use MCS renders long-term care much easier and allows the implementation of many more advantages. Data gathered since we started this trial suggest that compression treatment with two superposed stockings is probably the most reasonable choice (19). The first stocking, which fixes the dressing and exerts a pressure of about 16 mmHg, is kept on the leg day and night, (fixed use) whereas the second stocking provides additional 20-30 mmHg and is worn during day time (orthostatic use).



COMPRESSION BULLETIN 17

Mariani F,^{1,2} Mattaliano V,^{2,3} Mosti G,^{2,3} Gasbarro V,^{2,4} Bucalossi M,^{1,2} Blättler W,⁵ Amsler F,^{5,6} Mancini St^{1,2}

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⁶Amsler Consulting, Biel-Benken, Switzerland.

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

SUMMARY

Traditionally, venous leg ulcers are treated with firm non elastic bandages. Medical compression stockings are not the first choice although comparative studies found them equally effective or superior to bandages.

PATIENTS, METHODS

We report on a multi-center randomized trial with 60 patients treated with either short stretch multi-layer bandages or a two-stockings-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 ulcers 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 4 cm 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 cardinal features associated with delayed or absent healing were ulcer size and pain.

CONCLUSION

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.

Phlebology 2008; 37: 191–197



COMPRESSION BULLETIN 17

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Management of venous ulcers: A meta analysis of randomized studies comparing bandages with specifically designed stockings

OBJECTIVE

In search of an optimal compression therapy for venous leg ulcers a systematic review and meta analysis was performed of randomized controlled trials (RCT) comparing compression systems based on stockings (MCS) with divers bandages.

METHODS

RCT were retrieved from 6 sources and reviewed independently. The primary endpoint, completion of healing within a defined time frame, and the secondary endpoints, time to healing and pain were entered into a meta analysis using the tools of the Cochrane Collaboration. Additional subjective endpoints were summarized.

RESULTS

Eight RCT (published 1985-2008) fulfilled the predefined criteria. Data presentation was adequate and showed moderate heterogeneity. The studies included 692 patients (21-178/study, mean age 61yrs, 56% women). Analyzed were 688 ulcerated legs, present for 1wk-9yrs, sizing 1-210cm². The observation period ranged from 12-78 wks. Patient and ulcer characteristics were evenly distributed in 3 studies, favoured

the stocking groups in 4, and the bandage group in 1. Data on the pressure exerted by stockings and bandages were reported in 7 and 2 studies, amounting to 31-56 and 27-49 mmHg, respectively. The proportion of ulcers healed was greater with stockings than with bandages (62.7% versus 46.6%; $p < .00001$; Fig 1). The average time to healing (7 studies, 535 pts) was 3 wks shorter with stockings ($p = .0002$). Bandages were not superior to MCS in any of the studies. Pain was assessed in 3 studies (219 pts) revealing an important advantage of stockings ($p < .0001$). Other subjective parameters and issues of nursing revealed an advantage of MCS as well.

CONCLUSION

Compared with bandages, leg compression with stockings yields a higher rate of healing and relieve of pain and is easier to use.

Amsler F, Willenberg T, Blättler W. Management of venous ulcer: A meta-analysis of randomized studies comparing bandages to specifically designed stockings

Journal of Vascular Surgery, 2009 in press.

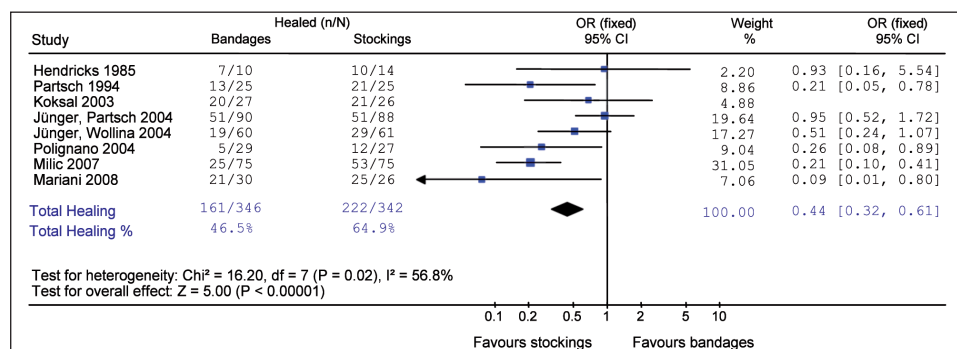
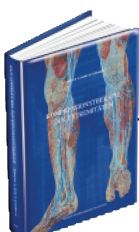


Figure 1: Comparison of ulcer healing with stockings and bandages



COMPRESSION BULLETIN 17

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Analysis of risk factors relevant to choose compression therapy for venous ulcers

BACKGROUND

Ambulatory venous hypertension is considered the cause of venous ulcerations. External leg compression with bandages materialized as the treatment of choice. However, this treatment often fails – possibly because secondary phenomena respond in the negative to high pressure. We analyzed risk factors for non-healing which might help to optimize compression therapy.

METHOD

Prediction of healing was addressed in 3 ways: weighing (1) the implicit clinical judgment of an experienced phlebologist, (2) the relative value of objectively assessed risk factors, and (3) the presence of single nucleotide polymorphisms (SNP) relevant for wound healing. The analysis is based on 99 patients taking part in 2 studies comparing various modalities of leg compression.

RESULTS

(1): The expert phlebologist predicted healing based on patient's history, ulcer features, ultrasound findings, and knowledge of the allocated compression modality. Prediction of healing and non-healing was correct in 61 % and 81 %, respectively.

(2): Factors associated with non-healing in a univariate analysis were older patient age ($p=.032$), longer ulcer presence ($p=.005$), recurrence ($p=.008$), surface area ($p=.001$), edema ($p=.008$), deep venous reflux ($p=.035$), prior surgery ($p=.038$), and treatment with bandage instead of stockings ($p=.021$). In a multivariate analysis the ulcer surface area remained as the only factor predicting factor ($p=.002$).

(3): The SNP FXIIIIV34L and HFEH63D were independently associated with non-healing (FXIIIIV34L: prevalence 48 %, 33 % healing versus 54 % for wild type, $p=.034$; and HFEH63D: prevalence 29 %, healing 35 % versus 63 % for wild type, $p=.010$). Patients with HFEH63D had their ulcers healed within 180days in 47 % (7 of 15) when they were treated with stockings but in 21 % (3 of 14) only when they were treated with bandages. Wild type patients experienced healing in 66 % and 60 %, respectively. The negative effect on healing of FXIIIIV34L was not correlated with the type of compression.

CONCLUSION

Implicit clinical prediction of healing of venous ulcers appears imperfect even when made by an expert. Common risk factors for non-healing have been supplemented with the use of bandages instead of stockings but their individual predictive value is limited as they all convene to the size of the ulcer. SNP relevant for making the fibrin/collagen network and detoxification of iron deposited in the ulcer area are newly identified predictors. Carriers of the SNP HFEH63D may experience a worse healing tendency when treated with bandages instead of stockings. Our inability to anticipate healing shows that important pathomechanisms are still not known. Nevertheless, this information is in accord with data from a meta analysis which documents the clinical benefit of MCS as compared with bandages.



COMPRESSION BULLETIN 17

S. Wagner, F. Angst, R. Riegel, K. Habich

Comparison of round with flat knitted medical compression stockings for the treatment of advanced stable lymphedema

BACKGROUND

Flat knitted medical compression stockings (fMCS) are preferred to round knitted stockings (rMCS) for the treatment of advanced stable lymphedema of the legs. We compared the two stocking systems with regard to interface pressure and patients' acceptance in an open clinical trial.

METHODS

Between May 06 and June 09 26 patients (median age 52 yrs, 18 women, median BMI 25) with a primary or secondary lymphedema (Földi stage II 18 pts, stage III 8 pts) known to the centre and most of them previously treated with fMCS were recruited to this survey. At the end of a in-hospital rehabilitation (mean duration 19d) made to measure fMCS (Elvarex®) and rMCS (Sigvaris traditional®) were fitted and one pair of each was handed out to the patients for use at home. Compression classes (CC) II-IV were prescribed, the lower CC primary to adipose (p=.006) and elderly people (p=.015). Static interface pressures were assessed above the ankle and at the maximal calf circumference with the SIGaT® both in the laying and standing position. The ratio of pressure while standing and laying was termed stiffness index (SI). Patients used either stocking at home and reported their experience after 2-3 weeks using visual analogue scales (VAS).

RESULTS

The clinically desired interface pressures were achieved with either type of stockings. The following differences were observed between fMCS and rMCS: rMCS exerted a higher interface pressure at the calf level, fMCS provided a higher pressure in the standing as compared with the laying position and, corresponding to a higher SI (Tab. 1). The SI did not depend on the selected CC. The questionnaire was returned by 15 patients only and revealed contradictory results. The subjective experience documented on VAS of both pressure and ease of donning revealed a statistically insignificant preference of fMCS (p=.279 and p=.129, respectively). Eleven of 15 patients preferred to continue using the fMCS further rather than the new rMCS (p=.071).

CONCLUSION

The clinically intended interface pressure was provided by either MCS. A slightly higher stiffness of the fMCS was observed only above the ankle. The meaning of this finding is unclear. The subjective experience is considered unreliable because of the small number of patients returning the questionnaire. We tentatively conclude that the relatively objective VAS-based judgment barely uncovered a difference between the stockings while the direct question about the patients' view revealed a preference of the fMCS which he had been using before.

	Ankle			Calf		
	Flat knitted (fMCS)	p	Round knitted (rMCS)	Flat knitted (fMCS)	p	Round knitted (rMCS)
Recumbant	34.8	.691	34.1	27.0	.041	29.2
p	.009		.311	.518		.056
Standing	38.0	.137	34.9	27.6	.015	30.7
Stiffness Index (SI)	1.10	0.45	1.02	1.05	.877	1.05

Tab1: Interface pressures measured in 26 patients [mmHg]; Mean values and statistical significance of differences (t-Test for paired comparison)



COMPRESSION BULLETIN 17

Guex J.J.

Experiences by doctors and patients of MCS 20-36 mmHg in France

INTRODUCTION

In France, class 3 MCS correspond to a pressure between 20-36 mmHg. In this range of pressure, stockings and bandages with different technical characteristics are prescribed for similar indications. This is the Medical Doctor's responsibility to prescribe the compression class, the brand and the type. Does he have all the data to decide the pertinent choice? Are the professional and institutional recommendations relevant and followed? The MCS 20 to 36 mmHg are recommended for chronic venous diseases (chronic venous insufficiency and severe situations). The MCS 20 to 36 mmHg sales represent 180 000 pairs per year. Is that number coherent with the chronic venous insufficiency figures in France? Are the different available products adapted to the prescribers and users expectations?

METHODS

The survey was carried out in 2007 with 71 vein specialists and 188 venous patients. The doctors filled a questionnaire on their prescription activity. Then, 188 patients were followed in order to know their points of view regarding prescription and products' effectiveness. The aims were to understand the physician's behaviour and prescription choice and to assess the effect of treatment based on the patients' appreciation.

DOCTORS' SURVEY

A/ Results

1/ All the interviewed MDs prescribe MCS 20-36 mmHg. The average prescription number corresponds to 10 pairs per month (from 1 to 40 pairs per month).

2/ Most of the MCS 20 to 36 mmHg are worn by women (62% of the interviewed doctors). This female dominance seems logical due to the prevalence in venous diseases.

3/ MCS 20 to 36 mmHg are complementary to:

- bandages in post therapeutic treatments such as surgery
- MCS 15-20 mmHg after endovenous treatments and sclerotherapy

4/ Oedema:

In oedema treatment, doctors prescribe bandages during the severe stage, then the stockings after oedema reduction and other severe situations.

5/ Post thrombotic syndrome

In this chronic disease, the MCS 20 to 36 mmHg are used in 80% of the cases. We know that this kind of stockings worn just after the thrombosis, reduce the risks to develop deep venous insufficiency.

6/ Skin changes and ulcers

MCS 20-36 mmHg are adapted to skin changes and ulcers. Bandages are preferred to MCS in the most severe situations.

B/ Comments

1/ The MDs refer to their knowledge on physiopathological basis and on the international consensus (Vasa 2003, Anaes 2003)

2/ There is a lack of references in the new treatments such as laser, sclerotherapy, radiofrequency

3/ All MDs explain the treatment objectives to the patients, they spend time and use tools in order to explain the disease and treatment (such as documents, samples, diagrams). The success of the treatment depends on the MD argumentation.

4/ Textures choice: usually MDs indicate the MCS brand (80%). Cotton and microfiber are preferred to natural rubber.

5/ Compliance: The donning process seems to be the main difficulty to assure a good compliance. The MD's motivation could generate patient's motivation to wear MCS.

PATIENTS' SURVEY

A/ Results

The CEAP classification of these patients shows a good adequation between patients' status (therapeutic indications) and compression level. 78% of the patients have a good level of compliance, 20% have partly respected the treatment. The treatment was extended for 94% of the patients.

B/ Comments

MCS 20-36 mmHg correspond to specific CEAP situation (C2 to C6) and severe pathologies with TVP and leg lymphoedema. Compliance could be improved by:

- the MD's ability to convince patients
- the improvement of MCS design regarding the donning process



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Rastel D.

Biomechanics of MCS donning process

SUMMARY

We report the results of a survey carried out in 2007 with 71 vein specialists and 188 venous patients. The survey allowed to analyze the physicians' behaviour and prescription choice, the effect of the treatment and the patients' appreciation. Considering the importance of EBM, of official recommendations and guidelines, observing that French veins specialists have reasonable and appropriate prescriptions is reassuring, even more satisfactory when thinking of the fragility of these patients, concerned by a severe venous pathology.

KEYWORDS

Compression therapy, compliance, physicians' survey, patients' survey, compression (20–36 mmHg)



COMPRESSION BULLETIN 17

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Key parameters of the putting on process: hydration, rubbing, friction, texture of the MCS (medical compression stocking)

INTRODUCTION

Skin, the largest and outermost organ of the human body, accomplishes multiple defensive and regulatory functions. Physical contact and friction at the skin-textile interface plays an important role in the consumer evaluation of fabrics concerning comfort and tactile perception as well as in the onset of mechanical skin irritations and skin injuries such as abrasions, blisters, ... For MCS it is a key factor for an easy putting on process. The friction coefficient of the skin is a highly complex problem. It involves: skin hydration, skin elasticity, skin micro-relief, skin wettability, ... The objective of this study was to measure the friction coefficient (μ) between the skin and five textures of MCS.

MATERIALS AND METHODS

15 healthy volunteers, aged over 60 years were included. Friction coefficient (μ), Hydration index (HI), transepidermal water loss (TEWL), skin micro-relief, skin elasticity, and skin wettability (θ_w : water contact angle) were assessed after friction of the MCS on skin. Results and discussion: The skin in the dorsal aspect of the foot was relatively well hydrated with a low TEWL. The tensed position of the foot during measurement gave the skin, a relatively smooth pattern and high elasticity. The value of θ_w indicated that the site is hydrophobic and its μ with a metal ball is very high. μ decreased significantly in the case of 4 on 5 textures.

CONCLUSION

The skin/textile friction is a very complex interplay between textile construction parameters (e.g., yarn design/morphology, surface structure of fabric type, finishing), and skin surface. More extended and detailed investigations are necessary in the future to elucidate the key factors of friction at the skin – textile biointerface, helping to understand the tribology of human skin in contact with textiles. Nevertheless the study shows the influence of nature of the textile regarding hydrophilic/hydrophobic properties.



Dr E. Le Floch and Dr D. Rastel.

How to improve compliance of compression therapy (20-36 mmHg):

- How patients put on, wear and pull off their medical compression stockings (MCS)
- Testing an innovative MCS

Compression therapy is one of the major elements of the superficial venous disorders therapeutic strategy. Compression therapy based on MCS is generally preferred to bandages thanks to the better control of the delivered pressure. Nevertheless it is admitted that the compliance to MCS remains insufficient due to difficulties to put on, to wear MCS and sometimes discomfort. To find solutions to improve compliance to MCS over long term periods of treatment such as it is required to treat post thrombotic syndrome or severe venous pathologies, two different studies have been carried out.

First study: Analysis of body movements during putting on and pulling off processes.

To optimise the ergonomic description of patients' body movements during putting on and pulling off processes, morphological parameters and a physiotherapist approach have been considered. Muscle activities were investigated using surface electromyography measurements.

Second study: To test an innovative MCS (> 30 mmHg).

Based on an especially studied MCS to facilitate the daily use of this therapy, a test including 30 patients in different situations was conducted. The design of

this new MCS is based on a better understanding of the putting on process and patients' morphologies: the yarns used were selected to reduce friction with the skin during putting on process.

First results and following steps will be presented during the symposium.



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