

Compression Bulletin

Special Edition

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Medical Compression Stockings in Venous and Lymphatic Disorders

Consensus Group: Eberhard Rabe, Hugo Partsch, Juerg Hafner, Christopher Lattimer, Giovanni Mosti, Martino Neumann, Tomasz Urbanek, Monika Hübner, Sylvain Gaillard, Patrick Carpentier

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Background & Objectives

Background

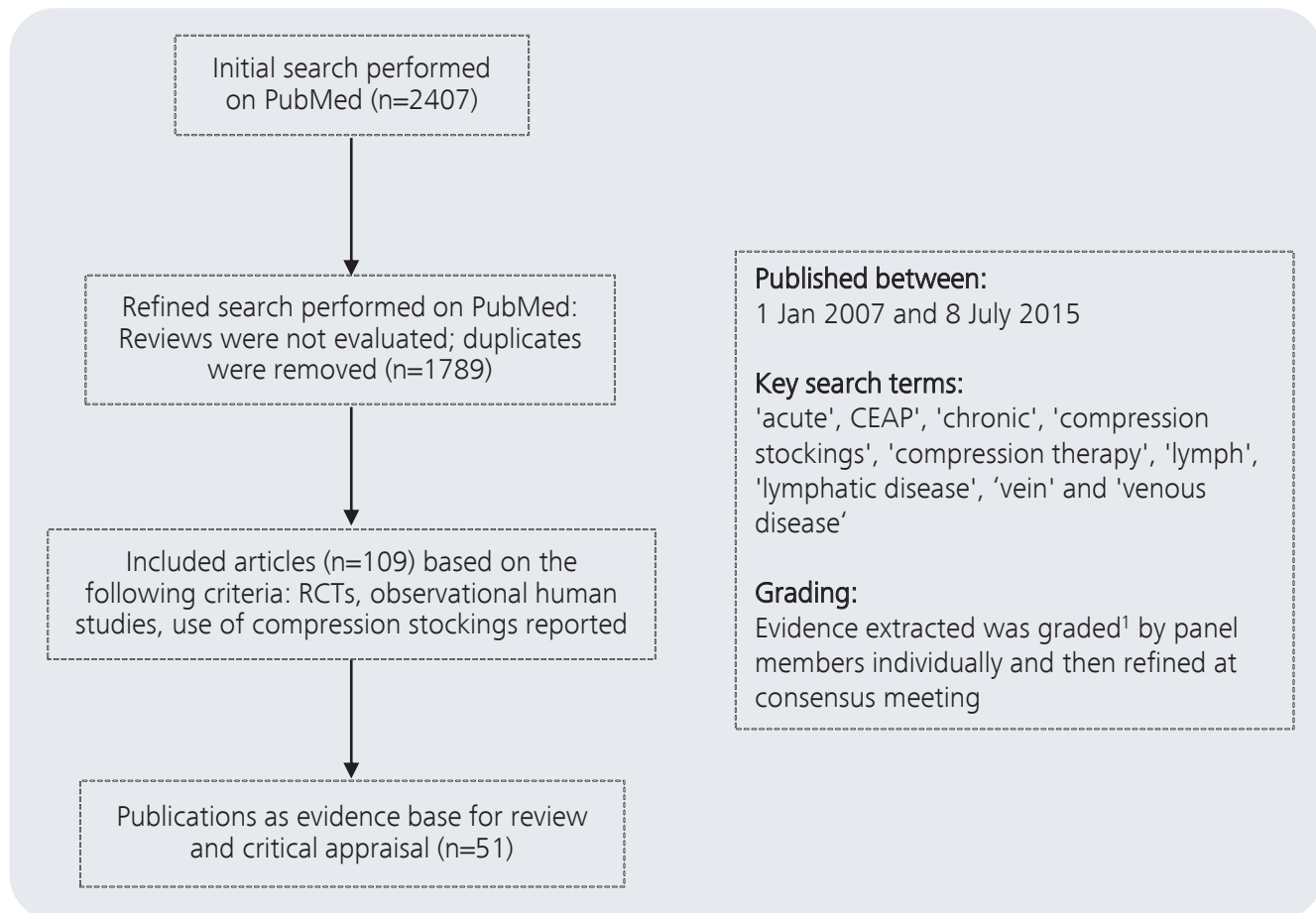
In 2008, the ICC published a consensus statement on the use of compression therapy in the management of venous and lymphatic diseases

For several clinical questions, however, there were gaps in the available evidence

Objectives

1. Provide update of the recommendations in the 2008 consensus statement
2. Fill gaps identified in the earlier consensus statement
3. Provide graded recommendations for the clinical goals of treatment using MCS

Study Design: *PRISMA flow diagram of relevant literature*



Recommendations 1-9

No.	Recommendation	Evidence
Chronic Venous Disorders: Symptoms, QoL and Oedema		
1	Use of MCS to alleviate venous symptoms in CVD	Five studies have reported compression provides relief of aching, pain, leg cramps and restlessness ²⁻⁶ (<i>Grade 1B</i>)
2	Use of MCS to improve QoL and venous severity in CVD	Three studies have reported compression either improves QoL, healing and pain or treatment effectiveness as measure by the VCSS ⁷⁻⁹ (<i>Grade 1B</i>)
3	Use of MCS to prevent leg swelling in CVD and in healthy individuals at risk of leg swelling	RCT conducted in Australia demonstrated that low-ankle pressure GCTs help to prevent flight induced ankle edema ¹⁰ (<i>Grade 1B</i>)
4	Use of MCS to reduce leg swelling in CVD and occupational leg swelling	Three studies have reported compression stockings are able to reduce ankle and leg edema ^{11,12} (<i>Grade 1B</i>)
Chronic Venous Disorders: Skin Changes		
5	Use of MCS for improvement of skin changes in patients with CVD	Regularly observed in routine clinical practice; there is a paucity of evidence from RCTs (<i>Grade 1C</i>)
6	Use of MCS for improvement of lipodermatosclerosis in patients with CVD	RCT of 153 patients randomized to either below-knee MCS or no MCS showed MCS can improve skin changes in patients with lipodermatosclerosis ¹³ (<i>Grade 1B</i>)
Chronic Venous Disorders: Venous Leg Ulcers		
7	Use of MCS to reduce recurrence of VLU	Three RCTs and a Cochrane review show trends of lower rates of venous ulcer recurrence with higher-compression MCS; compliance was lower in "high" compression groups and had positive outcome ¹⁴⁻¹⁷ (<i>Grade 1A</i>)
8	Use of ulcer MCS ("ulcer kits") to improve VLU healing	Five RCTs reported improvement in VLU healing with use of ulcer MCS ¹⁸⁻²² (<i>Grade 1A*</i>)
9	Use of ulcer MCS ("ulcer kits") to reduce pain in patients with VLU	RCT showed that, in patients treated with MCS and bandages, pain is alleviated promptly and effect is equivalent between two treatment modalities ¹⁸ (<i>Grade 1A</i>)

*Upgraded from 1B in the 2008 consensus statement.

Recommendations 10-17

No.	Recommendation	Evidence
Chronic Venous Disorders: Post-Venous Interventions		
10	Further studies needed to provide data on use of MCS for prevention of CVD progression	Insufficient information from RCTs on prevention of CVD progression by MCS to allow for evidence-based recommendation (<i>No Grade</i>)
11	Use of MCS in initial phase after GSV treatment to reduce postoperative side effects	Five RCTs reported reduction of side effects with use of MCS ²³⁻²⁷ (<i>Grade 1B</i>)
12	Use of additional eccentric compression to enhance effectiveness of MCS in reducing postoperative side effects	Two RCTs reported postoperative reduction in pain ^{28,29} and one RCT reported reduction in pain and hematoma ³⁰ (<i>Grade 1B</i>)
13	Limit prolonged use of MCS to improve clinical success after GSV interventions	Seven RCTs either did not follow patients for long enough or failed to demonstrate benefits from ongoing MCS use ^{23,24,28-32} (<i>Grade 1B</i>)
14	Use of MCS after liquid sclerotherapy of C1 veins to achieve better outcomes	RCT reported improved vessel disappearance with MCS ²⁷ (<i>Grade 2B</i>)
Acute Venous Disorders: Deep Vein Thrombosis		
15	Use of immediate compression to reduce pain and swelling, thereby allowing instant mobilisation in acute DVT. <i>Compression should be used immediately after DVT event</i>	Two RCTs reported reduction in pain and swelling with use of immediate compression ^{33,34} (<i>Grade 1B*</i>); One RCT reported that when compression is initiated ≥ 2 weeks, there is no effect on resultant pain levels ³⁵ (<i>Grade 1B*</i>)
16	Use early compression and mobilization in addition to anticoagulation to avoid thrombus propagation after the DVT event. <i>Compression should be used immediately after the DVT event</i>	Two RCTs reported less thrombus progression with immediate compression, compared with no compression or delayed compression ^{33,36} (<i>Grade 1B</i>)
Acute Venous Disorders: Superficial Vein Thrombosis		
17	Use of MCS in patients with SVT*	A Cochrane review supports that compression of thrombosed vein relieves symptoms of SVT and accelerates healing ³⁷ (<i>Grade 1C</i>); One RCT reported that in patients with SVT treated with LMWH, aside from reduction of thrombus growth after 1 week, no additional benefit for symptomatic outcomes has been demonstrated ³⁸ (<i>Grade 1C</i>)

*Downgraded from 1A in the 2008 consensus statement.

Recommendations 18-25

No.	Recommendation	Evidence
Acute Venous Disorders: Post-Thrombotic Syndrome		
18	Use of MCS as early as possible after diagnosis of DVT in order to prevent PTS	Six RCTs have reported benefit of compression in reducing PTS incidence ³⁹⁻⁴⁴ . One RCT emphasizes importance of immediate application of MCS in acute phase of DVT ⁴⁴ . One RCT reported no benefit from compression to prevent PTS when compression was started 2 weeks after diagnosis and when at ≥ 3 days compression per week was accepted as good compliance ⁴⁵ . Current evidence still supports compression therapy for PTS prophylaxis in clinical practice, at least in symptomatic patients (<i>Grade 1B*</i>)
19	Use of MCS for treatment of symptomatic PTS	Data on the physical management of PTS are sparse ⁴⁶⁻⁴⁸ . RCT reported significant improvement in haemodynamic parameters ⁴⁹ (<i>Grade 1B</i>)
Acute Venous Disorders: Thromboprophylaxis		
20	Use of TPS as basic component of mechanical prophylaxis in patients undergoing major surgery	Several studies support use of TPS in patients undergoing surgery ⁵⁰⁻⁵⁴ (<i>Grade 2C</i>)
21	Mechanical methods of thromboprophylaxis, including TPS, should be considered, especially where anticoagulants are contraindicated	Current guidelines ⁵⁵⁻⁵⁶ and a meta-analysis support use of compression where anticoagulants are contraindicated ⁵⁷ (<i>Grade 2B</i>)
22	Use of MCS during long-distance travelling, to prevent DVT incidence in patients at risk; in high-risk patients, combine use of MCS with anticoagulant thromboprophylaxis	An RCT ⁵⁸ , Cochrane review ⁵⁹ and several consensus meetings ⁶⁰ support use of MCS for preventing DVT in long-haul travellers and high-risk patients (<i>Grade 2B</i>)
23	Do not use below-knee TPS as sole method for DVT prophylaxis in stroke patients	A Cochrane review reported there is insufficient high-quality evidence to say whether thigh-high or knee-high TPS is more effective ⁶¹ (<i>Grade 2B</i>)
24	If TPS is considered in stroke patients for DVT prophylaxis, we suggest use of thigh-length TPS over knee-length TPS stockings	An RCT reported less frequent DVT with thigh-length TPS ⁶² (<i>Grade 1B</i>)
Lymphedema: Prevention and Improvement of Lymphedema		
25	Use of MCS for lymphedema maintenance therapy <i>Not enough evidence to make a recommendation on the use of compression for the prevention of lymphedema</i>	2013 consensus of ISO reports MCS are mainly used to maintain long-term lymphedema reduction; the highest level of compression that patients can tolerate (20-60mmHg) is likely to be most beneficial ⁶³ (<i>Grade 1A*</i>)

*Downgraded from 1A in the 2008 consensus statement; *Upgraded from 1B in the 2008 consensus statement.

Conclusion & Comments of the Editors

- ❖ This consensus document, an update from the 2008 ICC document, reports the scientific evidence on the use of MCS in venous and lymphatic disorders. In contrary to the 2008 consensus the recommendations given do not focus on the C-classes of the CEAP classification but mainly on the clinical outcome of the treatment. In the last years several new RCTs have been published showing the improvements that MCS provide in reducing venous symptoms and signs. In chronic venous disease, MCS are a main indication for the improvement of venous symptoms, QoL and oedema (*Grade 1B*) independently from the underlying venous disease.
- ❖ In addition to the use of MCS on venous leg ulcer (VLU) recurrence prevention which is well documented (*Grade 1A*) recent studies have now added good evidence on the use of specially designed ulcer MCS (ulcer kits) in treatment of VLUs (*Grade 1A*) and in reducing pain in these patients (*Grade 1A*).
- ❖ As recommended in most of the current recommendations and guidelines, compression has become standard practice after varicose vein surgery to reduce bruising, pigmentation, pain and oedema, and also to improve efficacy. Now that venous interventions have become less invasive fewer side effects may be expected. Consequently, the need for compression is less clear. Recent studies indicate that in most of the interventions for varicose veins (C2) there is still a benefit of MCS during the first post-interventional week for the reduction of pain, oedema and bruising (*Grade 1B*) but no benefit of longer compression could be demonstrated. However, in patients with ongoing CVD symptoms, despite previous interventions, a continuation of compression therapy with MCS is still indicated.
- ❖ There is still insufficient information available to recommend the use of MCS for the prevention of CVD progression. Further studies are required for an evidence-based recommendation.
- ❖ Despite controversies about the use of compression in DVT caused by results from recent studies the authors of this consensus document recommend the immediate use of compression in DVT patients to reduce pain and swelling (*Grade 1B*) and the ongoing use of compression with MCS to prevent PTS (*Grade 1B*).
- ❖ The beneficial effect of MCS in the maintenance of long-term lymphedema reduction is undisputed and well documented (*Grade 1A*).
- ❖ Thromboprophylactic stockings (TPS) were recommended for bedridden patients in the 2008 consensus (*Grade 1A*). However, their value has been questioned in the light of recent trials. This is because prescription of the newer and very effective anti-thrombotic drugs make it difficult to attribute a potentially positive treatment effect to the use of TPS. Consequently this document recommends the use of TPS as a component of mechanical prophylaxis in patients undergoing major surgery (*Grade 2C*) and in all patients where anticoagulation is contraindicated (*Grade 2B*) on a low level of evidence.
- ❖ In future studies small electronic devices sewn into the fabric and able to measure interface pressure or temperature may improve information about true compliance with compression.
- ❖ Although more research is always required, the place of MCS as a treatment is now firmly established for most venous and lymphatic conditions, as well as for venous symptoms in people without any morphological venous changes.

Grading Recommendations

Grade	Description of Recommendation	Benefit <i>versus</i> Risk	Methodological Quality of Supporting Evidence	Implications
1A	Strong recommendation, high-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs without important limitations or overwhelming evidence from observational studies	Strong recommendation, can apply to most patients in most circumstances without reservation
1B	Strong recommendation, moderate-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	RCTs with important limitations* or exceptionally strong evidence from observational studies	Strong recommendation, can apply to most patients in most circumstances without reservation
1C	Strong recommendation, low-quality or very low-quality evidence	Benefits clearly outweigh risk and burdens, or vice versa	Observational studies or case series	Strong recommendation but may change when higher-quality evidence is available
2A	Weak recommendation, high-quality evidence	Benefits closely balanced with risks and burden	RCTs without important limitations* or overwhelming evidence from observational studies	Weak recommendation; best action may differ depending on circumstances or patients' or societal values
2B	Weak recommendation, moderate-quality evidence	Benefits closely balanced with risks and burden	RCTs with important limitations or exceptionally strong evidence from observational studies	Weak recommendation; best action may differ depending on circumstances or patients' or societal values
2C	Weak recommendation, low-quality or very low-quality evidence	Uncertainty in the estimates of benefits, risks and burden; benefits, risk and burden may be closely balanced	Observational studies or case series	Very weak recommendations; other alternatives may be equally reasonable

*Important limitations = inconsistent results, methodological flaws, indirect, or imprecise.

Abbreviations & References

Abbreviations: CB, compression bandage; CEAP, Clinical-Etiology-Anatomy-Pathophysiology; CVD, chronic venous disease; DVT, deep vein thrombosis; GCTS, graduated compression tights; GSV, great saphenous vein; ICC, International Compression Club; ISO, International Society of Lymphology; LMWH, Low-molecular-weight heparin; MCS, medical compression stockings; No., number; PRISMA, Preferred Reporting Items for Systemic reviews and Meta-Analyses; PTS, post-thrombotic syndrome; QoL, quality-of-life; RCT, randomized controlled trial; SVT, superficial vein thrombosis; TPS, thromboprophylactic stockings; VCSS, venous clinical severity score; VLU, venous leg ulcers.

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