

Evidence summary: Venous leg ulcers – compression stockings

July 2018

Author: Emily Haesler PhD, Grad Dip Adv Nurs (Gerontics), BN

For referencing Haesler E. Evidence summary: Venous leg ulcers – compression stockings. *Wound Practice and Research* 2019; 27(3):145-146.

DOI <https://doi.org/10.33235/wpr.27.3.145-146>

QUESTION

What is the best available evidence on effectiveness of compression stockings for healing venous leg ulcers (VLUs)?

SUMMARY

Venous leg ulcers (VLUs) are ulcers that occur on the lower leg due to venous insufficiency. Compression therapy is recognised as gold standard treatment for promoting healing of VLUs^{1,2}. The best available evidence indicates that compression stockings are one of the most effective compression therapy types for healing VLUs^{2,3} (Level 1).

Note: Compression therapy carries a higher risk for individuals with peripheral arterial disease, peripheral neuropathy, heart failure or vasculitic ulcers, but may still be indicated⁴.

BEST PRACTICE RECOMMENDATION

When there are no contra-indications, use compression stockings for promoting VLU healing (Grade A).

Note: Compression therapy carries a higher risk for individuals with peripheral arterial disease, peripheral neuropathy, heart failure or vasculitic ulcers, but may still be indicated⁴.

BACKGROUND

Venous insufficiency describes a condition in which the venous system does not carry blood back to the heart in the most efficient manner, causing blood to pool in the veins of the lower limbs. Venous insufficiency occurs due to^{2,5}:

- previous blood clots,

- impaired valves in the veins in the lower leg that do not close sufficiently after each muscle contraction, allowing blood to flow back to a previous section of the vein (venous reflux), and

- calf muscle pump function not adequately assisting in returning blood to the heart.

Compression therapy works by generating external pressure on the superficial veins and tissues, forcing fluid back into the venous and lymphatic systems, thereby assisting in venous return. This helps to reduce peripheral oedema and induration, and to promote lower limb wound healing⁶. Compression systems usually utilise graduated pressure. Traditionally, higher pressure is attained at the ankles with pressure decreasing up the leg, although some contemporary systems use a negative pressure gradient^{7,8}.

Medical grade compression stockings (also called compression hosiery) are elasticised stockings that apply compression at different levels of pressure. Different scales are used to describe stocking pressure, which ranges from 5mmHg to over 60 mmHg^{2,9}. Compression stockings may be worn in multiple layers or a single layer².

EVIDENCE

In the trials reported below, pressure applied by stockings varied from light compression 10 to 25mmHg to higher compression 30 to 40mmHg. In most studies, pressure of stockings is reported to be around 40mmHg^{2,3} (Level 1).

Compression stockings compared with no compression for healing VLUs

Most evidence for effectiveness of compression therapy compared with no compression comes from studies

SOURCES OF EVIDENCE				
Level 1	Level 2	Level 3	Level 4	Level 5
Experimental designs	Quasi-experimental designs	Observational – analytic designs	Observational - descriptive studies	Expert opinion Bench research
Systematic reviews 2, 3, 5 RCT 10 - 12	7, 8	None	None	Expert consensus 1, 4, 6, 9

on 4-layer bandaging, or other multi-layer compression systems that sometimes included a compression stocking². Combined with studies supporting the effectiveness of other compression systems, there is good evidence that applying compression therapy will promote VLU healing² (Level 1).

Compression stockings compared with other compression therapy for healing VLUs

A meta-analysis³ of 12 RCTs comparing compression stockings to compression bandaging showed that both these methods of applying pressure to the lower limbs are equally effective in prompting VLU healing (risk ratio [RR] 1.10, 95% confidence interval [CI] 0.94 to 1.28., p=0.23). No difference in effectiveness was reported when the analysis was restricted to studies comparing 4-layer bandaging to compression stockings (RR 0.97, 95% CI 0.87 to 1.08, p=0.59). However, pooling of eight studies that compared compression stockings to short-stretch bandages (SSBs) indicated that compression stockings were superior in promoting VLU healing (RR 1.33, 95% CI 1.02 to 1.64, p=0.03). These results are supported by another meta-analysis that reported that VLUs treated with high-compression stockings were more likely to be healed after 2 to 4 months compared with VLUs treated with SSBs (4 RCTs, RR 1.62, 95% CI 1.26 to 2.10, p=0.00021)². (Level 1).

In studies published more recently¹⁰, compression stockings are shown to be as effective as multi-layer bandaging for promoting VLU healing. Ulcers treated with compression stockings showed a mean decrease in wound area of 56.66%, which was significant compared to baseline (p=0.01). Reduction in wound surface area for compression stockings was also significantly better compared to surface area reduction for VLUs treated with Unna's boot (20% reduction, p=0.03) and for SSBs (16.66% reduction, p=0.03)¹⁰. In another trial, there was no significant difference in VLUs that healed with compression stockings compared to 4-layer bandaging (77% vs 86%, p=0.24)¹¹. In a trial comparing 2-layer compression stockings with 4-layer bandaging and 2-layer bandaging with an elastic layer, there was no significant difference in time to healing between the three groups (HR 0.99, 95% CI 0.79 to 1.25, p=0.96)¹² (Level 1).

METHODOLOGY

The development of this evidence summary is based on the Joanna Briggs Institute methodology¹³. A structured database search was employed using variations of the search terms describing VLUs and compression therapy. Searches were conducted in EMBASE, Medline, AMED and the Cochrane Library for evidence for 1900 to June 21018 in English.

REFERENCES

1. Partsch H. Compression therapy: clinical and experimental evidence. *Annals of Vascular Diseases*, 2012;5(4):416-22. (Level 5).
2. O'Meara S, Cullum N, Nelson EA, Dumville JC. Compression for venous leg ulcers. *Cochrane Database of Systematic Reviews*, 2012(11). (Level 1).
3. Mauck KF, Asi N, Elraiyah TA, Undavalli C, Nabhan M, Altayar O, Sonbol MB, Prokop LJ, Murad MH. Comparative systematic review and meta-analysis of compression modalities for the promotion of venous ulcer healing and reducing ulcer recurrence. *Journal of Vascular Surgery*, 2014. August;60(2 SUPPL.):71s-90s.e2. (Level 1).

4. Harding K, et al. Simplifying venous leg ulcer management. Consensus recommendations. *www.woundsinternational.com*. Wounds International., 2015. (Level 5).
5. Palfreyman S, Nelson EA, Michaels JA. Dressings for venous leg ulcers: systematic review and meta-analysis. *BMJ*, 2007;335(7613):244-56. (Level 1).
6. Wounds International. Principles of compression in venous disease: A practitioner's guide to treatment and prevention of venous leg ulcers. 2013. (Level 5).
7. Mosti G, Partsch H. Compression stockings with a negative pressure gradient have a more pronounced effect on venous pumping function than graduated elastic compression stockings. *European Journal of Vascular & Endovascular Surgery*, 2011;42(2):261-6. (Level 2).
8. Mosti G, Partsch H. High compression pressure over the calf is more effective than graduated compression in enhancing venous pump function. *European Journal of Vascular and Endovascular Surgery*, 2012. September;44(3):332-6. (Level 2).
9. World Union of Wound Healing Societies (WUWHS). Principles of best practice. Compression in venous leg ulcers. A consensus document. London (MEP Ltd), 2008. (Level 5).
10. Dolibog P, Franek A, Taradaj J, Dolibog P, Blaszczyk E, Polak A, Brzezinska-Wcislo L, Hrycek A, Urbanek T, Ziaja J, Kolanko M. A comparative clinical study on five types of compression therapy in patients with venous leg ulcers. *International Journal of Medical Sciences*, 2014. 14 Dec;11(1):34-43. (Level 1).
11. Finlayson KJ, Courtney MD, Gibb MA, O'Brien JA, Parker CN, Edwards HE. The effectiveness of a four-layer compression bandage system in comparison with Class 3 compression hosiery on healing and quality of life in patients with venous leg ulcers: A randomised controlled trial. *Int Wound J* 2014. February;11(1):21-7. (Level 1).
12. Ashby RL, Gabe R, Ali S, Saramago P, Chuang L-H, Adderley U, Bland JM, Cullum NA, Dumville JC, Iglesias CP, Kang'ombe AR, Soares MO, Stubbs NC, Torgerson DJ. VenUS IV (Venous leg Ulcer Study IV) - compression hosiery compared with compression bandaging in the treatment of venous leg ulcers: a randomised controlled trial, mixed-treatment comparison and decision-analytic model. *Health Technology Assessment*, 2014;18(57):1-294. (Level 1).
13. The Joanna Briggs Collaboration. Handbook for Evidence Transfer Centers – Version 4. The Joanna Briggs Institute, Adelaide. 2013