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[Intervention Review]

Compression for venous leg ulcers

Susan O'Meara¹, Nicky Cullum², E Andrea Nelson³, Jo C Dumville¹

¹Department of Health Sciences, University of York, York, UK. ²School of Nursing, Midwifery and Social Work, University of Manchester, Manchester, UK. ³School of Healthcare, University of Leeds, Leeds, UK

Contact address: Susan O'Meara, Department of Health Sciences, University of York, Area 3 Seebohm Rowntree Building, Heslington, York, YO10 5DD, UK. smo4@york.ac.uk.

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ABSTRACT

Background

Up to one percent of people in industrialised countries will suffer from a leg ulcer at some time. The majority of these leg ulcers are due to problems in the veins, resulting in an accumulation of blood in the legs. Leg ulcers arising from venous problems are called venous (or varicose or stasis) ulcers. The main treatment is the application of a firm compression garment (bandage or stocking) in order to aid venous return. There is a large number of compression garments available and it was unclear whether they are effective in treating venous ulcers and, if so, which method of compression is the most effective.

Objectives

To undertake a systematic review of all randomised controlled trials (RCTs) evaluating the effects on venous ulcer healing of compression bandages and stockings.

Specific questions addressed by the review are:

1. Does the application of compression bandages or stockings aid venous ulcer healing?
2. Which compression bandage or stocking system is the most effective?

Search methods

For this second update we searched: the Cochrane Wounds Group Specialised Register (31 May 2012); the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* Issue 5, 2012); Ovid MEDLINE (1950 to May Week 4 2012); Ovid MEDLINE (In-Process & Other Non-Indexed Citations 30 May 2012); Ovid EMBASE (1980 to 2012 Week 21); and EBSCO CINAHL (1982 to 30 May 2012). No date or language restrictions were applied.

Selection criteria

RCTs recruiting people with venous leg ulceration that evaluated any type of compression bandage system or compression stockings were eligible for inclusion. Eligible comparators included no compression (e.g. primary dressing alone, non-compressive bandage) or an alternative type of compression. RCTs had to report an objective measure of ulcer healing in order to be included (primary outcome for the review). Secondary outcomes of the review included ulcer recurrence, costs, quality of life, pain, adverse events and withdrawals. There was no restriction on date, language or publication status of RCTs.

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Data collection and analysis

Details of eligible studies were extracted and summarised using a data extraction table. Data extraction was performed by one review author and verified independently by a second review author.

Main results

Forty-eight RCTs reporting 59 comparisons were included (4321 participants in total). Most RCTs were small, and most were at unclear or high risk of bias. Duration of follow-up varied across RCTs. Risk ratio (RR) and other estimates are shown below where RCTs were pooled; otherwise findings refer to a single RCT.

There was evidence from eight RCTs (unpooled) that healing outcomes (including time to healing) are better when patients receive compression compared with no compression.

Single-component compression bandage systems are less effective than multi-component compression for complete healing at six months (one large RCT).

A two-component system containing an elastic bandage healed more ulcers at one year than one without an elastic component (one small RCT).

Three-component systems containing an elastic component healed more ulcers than those without elastic at three to four months (two RCTs pooled), RR 1.83 (95% CI 1.26 to 2.67), but another RCT showed no difference between groups at six months.

An individual patient data meta-analysis of five RCTs suggested significantly faster healing with the four-layer bandage (4LB) than the short stretch bandage (SSB): median days to healing estimated at 90 and 99 respectively; hazard ratio 1.31 (95% CI 1.09 to 1.58).

High-compression stockings are associated with better healing outcomes than SSB at two to four months: RR 1.62 (95% CI 1.26 to 2.10), estimate from four pooled RCTs.

One RCT suggested better healing outcomes at 16 months with the addition of a tubular device plus single elastic bandage to a base system of gauze and crepe bandages when compared with two added elastic bandages. Another RCT had three arms; when one or two elastic bandages were added to a base three-component system that included an outer tubular layer, healing outcomes were better at six months for the two groups receiving elastic bandages.

There is currently no evidence of a statistically significant difference for the following comparisons:

- alternative single-component compression bandages (two RCTs, unpooled);
- two-component bandages compared with the 4LB at three months (three RCTs pooled);
- alternative versions of the 4LB for complete healing at times up to and including six months (three RCTs, unpooled);
- 4LB compared with paste bandage for complete healing at three months (two RCTs, pooled), six months or one year (one RCT for each time point);
- adjustable compression boots compared with paste bandages for the outcome of change in ulcer area at three months (one small RCT);
- adjustable compression boots compared with the 4LB with respect to complete healing at three months (one small RCT);
- single-layer compression stocking compared with paste bandages for outcome of complete healing at four months (one small RCT) and 18 months (another small RCT);
- low compression stocking compared with SSB for complete healing at three and six months (one small RCT);
- compression stockings compared with a two-component bandage system and the 4LB for the outcome of complete healing at three months (one small, three-armed RCT); and,
- tubular compression compared with SSB (one small RCT) for complete healing at three months.

Secondary outcomes: 4LB was more cost-effective than SSB. It was not possible to draw firm conclusions regarding other secondary outcomes including recurrence, adverse events and health-related quality of life.

Authors' conclusions

Compression increases ulcer healing rates compared with no compression. Multi-component systems are more effective than single-component systems. Multi-component systems containing an elastic bandage appear to be more effective than those composed mainly of inelastic constituents. Two-component bandage systems appear to perform as well as the 4LB. Patients receiving the 4LB heal faster than those allocated the SSB. More patients heal on high-compression stocking systems than with the SSB. Further data are required before the difference between high-compression stockings and the 4LB can be established.

PLAIN LANGUAGE SUMMARY

Compression bandages and stockings to help the healing of venous leg ulcers

Venous leg ulcers can occur when blood returning from veins in the legs to the heart is slow or obstructed. These ulcers can take a long time to heal (weeks or months) and can cause distress to patients, as well as being very costly to the health service. Compression bandages help blood to return to the heart from the legs, and there are a variety of types of bandage systems available; some are just a single bandage, while others require the application of several different types of bandages to the leg. Compression stockings are sometimes used as an alternative to compression bandages. This review examined the effectiveness of compression bandages versus no compression, and compared different types of compression bandages and stockings. We looked at how well these different treatments work in terms of ulcer healing. We found that applying compression was better than not using compression, and that multi-component bandages worked better than single-component systems. Multi-component systems (bandages or stockings) appear to perform better when one part is an elastic (stretchy) bandage. A very detailed analysis showed that a system called the 'four-layer bandage' or '4LB' (i.e. four different bandages applied to the leg, including an elastic one) heals ulcers faster than the 'short-stretch bandage' or 'SSB' (a type of bandage with very minimal stretch).

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