Compression therapy for occupational leg symptoms and chronic venous disorders: a meta-analysis of randomised controlled trials

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CRD summary
This review evaluated the effectiveness of medical compression stockings (MCS) in reducing leg discomfort and oedema in people with symptoms of venous insufficiency. The authors concluded that patients with mild venous insufficiency benefit from wearing MCS providing moderate ankle pressure of 10-20 mmHg, lower pressure is ineffective and higher pressure is no more effective than moderate. Due to methodological and analytical limitations, these results should not be considered reliable.

Authors' objectives
To evaluate the effectiveness of medical compression stockings (MCS) in reducing leg discomfort and oedema in people with symptoms of venous insufficiency.

Searching
The reports from two consensus conferences on compression therapy were reviewed, as were the associated references. EUROCOM (group of companies producing MCS in Europe) were contacted to retrieve details of studies sponsored by their members. MEDLINE was searched (terms reported, no dates given) but did not find any additional articles. Only studies published in English, French or German were eligible.

Study selection
Randomised controlled trials (RCTs) comparing MCS delivering 10-20 mmHg of pressure at the ankle with a control group were considered. Eligible controls could be no compression, placebo stocking, or an MCS delivering more than 20 mmHg at the ankle. Participants were either healthy people exposed to conditions associated with chronic venous disorders (CVD) or patients diagnosed with mild to moderate chronic venous insufficiency (CVI); criteria were based on CEAP classes. Studies of pregnant women were excluded. Outcome measures of interest were measures of pain, discomfort or quality of life and quantification of oedema.

Included studies were a mixture of parallel group, within-participant comparisons and cross-over trial designs, all of which used randomisation. The participant mean age was 44.1 years (range 23 - 48.7 yrs) and nearly two-thirds were female. The healthy participants were a mixture of volunteers exposed to stress or provocation tests, or flight attendants. Included patients were diagnosed with CVD, CVI or had received varicose vein surgery. All studies used calf-length bandage. The control groups were given placebo bandages, less than 10 mmHg pressure, or more than 20 mmHg with a maximum of 40 mmHg. Outcomes measures included visual analogue scales for pain, discomfort and symptoms, feelings of compression or pain in the subjective domain. Objective measurements of leg oedema were reported as ankle and calf circumference, water plethysmography, leg volumetry and and optical leg volume meter.

The authors did not state how the papers were selected or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity, but did discuss aspects of validity within the review.

Data extraction
Continuous outcomes were extracted as both absolute values and before-after differences. It appears that mean effect sizes were calculated from different outcome measures if more than one outcome measure fitted the inclusion criteria. Dichotomous outcomes were extracted as odds ratios (OR).

The authors did not state how the data were extracted or how many reviewers performed the data extraction.
Methods of synthesis
Meta-analysis was carried out using a fixed effects model to calculate pooled OR and 95% confidence intervals (CIs) for the dichotomous data and standardised mean differences (SMD) plus 95% CIs for the continuous variables.

Results of the review
A total of eleven trials were included according to the authors, however 12 were reported in the tables (n=1,453) ranging from 11 to 341 participants in each. Trial designs included cross-over (4 trials), within-participant comparisons of left and right legs (2 trials) and parallel groups (5 trials). All studies were randomised and, in eight, either the participant or investigator was blind to allocation.

Dichotomous subjective outcomes (5 RCTs, n=484): pooled analysis found a significant benefit giving an OR 0.38 (95% CI: 0.25, 0.57; p<0.00001) in favour of low compression bandages.

Continuous subjective outcomes (5 RCTs, n=1209): pooled analysis produced a SMD of -1.45 (95% CI: -1.60, -1.29; p<0.00001) significantly in favour of low compression bandages.

Leg oedema (6 RCTs): the pooled analysis found a significant benefit in favour of the low compression bandages (SMD -1.01; 95% CI: -0.83, -1.2; p<0.00001, 3 RCTs, n=898).

Comparison of high and low compression MCS: pooled analysis of three trials (n=211) indicated no difference in impact on symptoms, OR 0.99 (95% CI: 0.56, 1.74; p=0.97).

Authors’ conclusions
Despite methodological short comings in the primary data, meta-analysis suggests that subjects with symptoms of mild venous insufficiency benefit from wearing MCS providing moderate ankle pressure of 10-20 mmHg, lower pressure is ineffective and higher pressure is no more effective than moderate.

CRD commentary
The review question and inclusion criteria were clearly specified. The searches covered only one database thus increasing the chances of relevant studies not being identified. The language restrictions and apparent exclusion of any unpublished studies may have introduced further bias in the review. Overall the review methodology was poorly reported for all stages of the review process, so it was unclear whether measures to reduce reviewer error and bias were employed. It is unclear if the decision to employ meta-analyses was appropriate as statistical heterogeneity was neither reported nor investigated. In view of the clinical and methodological heterogeneity of the studies, this was problematic. It is also unclear how the data from different trial designs were combined. Different outcome measures appear to have been combined within and between trials without clear justification or explanation. Also, it should be noted that there were discrepancies between the numbers cited in text and in the tables in this review. In view of these issues, it is not clear how reliable or meaningful the results of the statistical synthesis can be considered to be.

Implications of the review for practice and research
Practice: The authors did not state any implications for practice.

Research: The authors suggested that more and larger studies are needed to optimise the use of compression therapy.

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