Graduated compression stockings in the prevention of venous thromboembolism
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Authors' objectives
To review the efficacy and adverse effects of stockings in preventing deep vein thrombosis (DVT).

Searching
The authors searched the electronic MEDLINE database (1966 to 1998) using the subject headings: 'stockings', 'clothing', 'bandages', 'thrombophlebitis', 'venous thrombosis', 'postoperative complications' and 'thrombosis/prevention'. The authors also searched the Cochrane Library database and the reference lists of papers found in the search.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs).

Specific interventions included in the review
Graduated compression stockings with or without pharmacological agents (low-dose heparin, low molecular weight heparin (LMWH)).

Participants included in the review
Patients undergoing and recovering from general/abdominal, gynaecological or neurosurgical surgeries.

Outcomes assessed in the review
Incidence of deep vein thrombosis and adverse effects (complications).

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
No formal assessment of quality was undertaken.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Data were extracted for the categories of study identification, year of publication, diagnostic test used to assess DVT, number of participants in the intervention (stockings) group, number of participants in the control groups, odds ratios, risk reduction (%), and number needed to treat.

Methods of synthesis
How were the studies combined?
Pooled odds ratios with 95% confidence intervals (CIs) were calculated using the Mantel-Haenszel chi-square procedure. The number needed-to-treat (NNT) was calculated based on a 25% risk of DVT in untreated patients and a 40% risk following total hip replacement.

How were differences between studies investigated?
The authors do not state how differences between the studies were investigated.
Results of the review
Fifteen RCTs were included in the review with 1,862 participants (932 in the intervention group and 930 in the control group).

Stockings reduced the relative risk of DVT by 64% in general surgical patients and 57% following total hip replacement.

Specifically, in general surgery patients the overall incidence of DVT was 7% in the treatment group versus 19% in the control group (OR 0.31, 95% CI:0.22, 0.44; NNT = 8).

In orthopaedic surgery patients (1 study) the incidence of DVT was 0% in the treatment group versus 4% in the control group (OR 0.00, 95% CI:0.00, 1.32; NNT = 7), but this was not statistically significant.

In neurosurgery patients (1 study) the incidence of DVT was 9% in the treatment group versus 20% in the control group (OR 0.38, 95% CI:0.14, 1.09; NNT = 7), but this was not statistically significant. Graduated compression stockings combined with lose-dose heparin performed better than stockings or heparin alone. LMWH combined with stockings was better than stockings alone. Compression stockings and pneumatic compression may be used during operation and postoperative mechanical prophylaxis can be continued with stockings alone.

Complications reported include: damage to the leg as a result of compression therapy; and arterial occlusion, thrombosis and gangrene over the anterior aspect of the ankle.

Authors’ conclusions
The authors state that graduated compression stockings provide an effective, safe, cheap and convenient means of preventing DVT. Stockings increase the linear velocity of venous outflow, prevent stasis and venous distension, and enhance emptying of valvular cusps. Properly used, stockings can reduce the risk of DVT in hospitalised patients by 55-70 percent. Evidence on the value of graduated compression stockings in preventing fatal PE is limited and inconclusive. In combination with LMWH or low-dose heparin, stockings provide adequate prophylaxis for the majority of patients at risk. Knee-length stockings are preferable.

CRD commentary
The authors have clearly stated their research question but not the inclusion and exclusion criteria. The literature search is not thorough: the authors do not mention the inclusion of unpublished data in the review and it is not clear whether there were any language limitations. It is therefore possible that additional relevant studies may have been missed. The quality of the included studies was not formally assessed. The authors have not reported on how the articles were selected or how many of the reviewers were involved in the data selection and extraction.

The data extraction is reported in tables and text. There were no tests reported for heterogeneity but the authors performed a statistical combining of the trials.

The authors’ conclusions appear to follow from the results but should be viewed with caution because of the stated methodological limitations of the review.

Implications of the review for practice and research
Practice: The authors stated that patients at moderate or high risk should be managed with stockings combined with LMWH or low-dose heparin. The authors also state that knee-length stockings should replace thigh-length stockings, being equally effective, cheaper, more likely to fit correctly and better tolerated by patients. Continued use of stockings to prevent late venous thrombosis following discharge from hospital may be beneficial in patients with poor mobility. Attention to the vascular and neurological status of the leg, proper sizing and regular review of the legs should limit the rare occurrence of ischaemic complications with stockings.

Research: The authors did not state any implications for further research.
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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.