AMBULATION AFTER DEEP VEIN THROMBOSIS: A SYSTEMATIC REVIEW
Cathy M. Anderson, Tom J. Overend, Julie Godwin, Christina Sealy, Aisha Sunderji

**ABSTRACT**
In this systematic review the question whether early ambulation vs. bed rest affects the development of a pulmonary embolism and the progression or development of a new thrombus in patients with acute DVT is examined. Out of 299 studies, four studies were selected and a meta-analysis was performed for the relative risk ratio. The studies examined ambulation and compression vs. bed rest alone and ambulation and compression vs. bed rest and compression. Results found no statistically significant differences between groups for development of a new PE. Based on these results it is possible to recommend ambulation for patients diagnosed with a DVT as opposed to bed rest because there is no increased risk for PE or thrombus formation.

**METHODS**
The literature review searched for articles published up until June 2008 and used the following databases: MEDLINE, PubMed, CINAHL, EMBASE, Cochrane Library, and PEDro. Key words included: “acute deep vein thrombosis,” “venous thrombosis,” “pulmonary embolism,“ “ambulation,” and “walking.”

The inclusion criteria were:
- Randomized control trial (RCT)
- Acute care patients >18 years old
- English language
- Standard assessment measures for the diagnosis of a pulmonary embolism (PE) or development of a thrombus

Each reviewer independently assessed the quality of each trial selected based on two scales: Jadad and PEDro, with the higher the score, the higher the quality. Meta-analyses were conducted for the selected trials. Relative risk, a ratio of the risk that an event will occur in one group compared to the risk in another group, and 95% CI were calculated for the development of a PE, progression of an existing thrombus, and development of a new thrombus. The significance level was p < 0.05. The literature review yielded 299 results. Four studies were accepted for the review. Subjects in all four studies had proximal DVT and were treated with anticoagulants as in-patients.

**RESULTS**
<table>
<thead>
<tr>
<th>Study Name</th>
<th>Risk Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jungre 2006</td>
<td>0.361</td>
<td>0.115</td>
</tr>
<tr>
<td>Schellong 1999</td>
<td>0.763</td>
<td>0.467</td>
</tr>
<tr>
<td></td>
<td>0.632</td>
<td>0.158</td>
</tr>
</tbody>
</table>

Table 1: Ambulation & compression vs. bed rest & compression. Relative risk for development of a new PE (0.63) favored ambulation & compression. Results were not significant (p = 0.16).

<table>
<thead>
<tr>
<th>Study Name</th>
<th>Risk Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blattler &amp; Partsch 2003</td>
<td>0.944</td>
<td>0.962</td>
</tr>
<tr>
<td>Ashwanden 2001</td>
<td>1.449</td>
<td>0.444</td>
</tr>
<tr>
<td></td>
<td>1.363</td>
<td>0.490</td>
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</tbody>
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Table 2: Ambulation & compression vs. bed rest alone. Relative risk for development of a new PE (1.36) favored bed rest alone. Results were not significant (p = 0.49).

<table>
<thead>
<tr>
<th>Study Name</th>
<th>Risk Ratio</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blattler &amp; Partsch 2003</td>
<td>0.556</td>
<td>0.266</td>
</tr>
<tr>
<td>Jungre 2006</td>
<td>0.385</td>
<td>0.087</td>
</tr>
</tbody>
</table>

Table 3: Ambulation & compression vs. bed rest alone and for ambulation & compression vs. bed rest & compression. Relative risk for progression or development of a new DVT were 0.56 and 0.39, respectively, favoring the ambulation & compression groups but results were not statistically significant.

**DISCUSSION**
Whether ambulation with compression was compared to bed rest alone or bed rest with compression the results still showed no statistically significant differences in the risk of a developing a PE. While results weren’t statistically significant there was a trend showing a decrease in the risk from ambulation with compression compared to bed rest with compression. On the other hand when ambulation with compression was compared to bed rest alone there was a trend towards a decreased risk in the bed rest alone group. This finding could be due to baseline differences between the treatment groups. Some limitations mentioned for this study are small number of studies and subjects included and lack of detail in description of factors such as subject information, ambulation, and compression.

**BACKGROUND**
Deep vein thrombosis (DVT) is a condition in which there is a blood clot in the deep venous system. Pulmonary embolism (PE) is when a blood clot or a part of it dislodges and travels to the lungs. The result of either of these conditions can lead to health issues and possibly be fatal. Physical therapists commonly treat patients diagnosed with a DVT in an acute care setting. Treatment of patients with this diagnosis is controversial. Conservative management is immobilization and is based off the belief that early ambulation and motion will cause the clot to dislodge. More recently patients diagnosed with DVT are treated with low molecular weight heparin and compression therapy. Recently it has been suggested that early ambulation following a diagnosis of a DVT will result in the usual benefits of exercise without an increased risk of developing a PE.

**CLINICAL SIGNIFICANCE**
The results of this review are valuable to healthcare professionals because when working with patients with a DVT in one can choose early ambulation over bed rest. This is a more beneficial option to the patient because the patient won’t suffer from risks associated with bed rest such as decreased aerobic capacity, strength, range of motion, and general function.

**CONCLUSION**
In conclusion, Physical therapists should use the most recent and best evidence when deciding interventions for patients. While in the past patients diagnosed with DVT were treated by using bed rest more recently it has been found that early ambulation along with pharmacological management and compression therapy provides no increased risk for development of a PE or thrombus progression.

**SUMMARY**
All articles reviewed support the statement that early ambulation in patients diagnosed with DVT poses no greater risk for PE or thrombus progression than bed rest.

**ARTICLE #1 EVIDENCE**
This article supports the evidence presented by the original article. The results of this systematic review showed no statistical significant difference between treatment groups for development of a PE or thrombus progression. In fact the results for some studies showed that compression and early ambulation lead to a faster reduction of pain and swelling. Recommendations for patients with a DVT are to start treatment with therapeutic doses of LMWH (low molecular weight heparin), ambulation, and good compression.

**ARTICLE #2 EVIDENCE**
This article supports the evidence presented by the original article. The results of this systematic review showed no benefit from placing patients with a DVT on bed rest. Evidence shows that early ambulation with compression does not increase the risk of thrombus progression but may actually help to inhibit it.
