C-Leg vs NMPCKs

Metabolic energy consumption

**Major Findings**

With C-Leg compared to NMPCKs:

- **Improved efficiency while walking**
  - Oxygen consumption at slow walking speed reduced by 6.2%
  - Oxygen consumption at medium walking speed reduced by 6.0%, respectively 6.7%
  - Oxygen consumption at fast walking speed reduced by 7.0%

- **Walking with C-Leg is perceived by subjects as easier**

**Decreased oxygen consumption with C-Leg**

![Graph showing decreased oxygen consumption]

Oxygen consumption was measured when subjects walked with self-selected typical and self-selected fast velocities on a treadmill, each for three minutes. Seymour et al (2007)

**Clinical Relevance**

As transfemoral amputees are less efficient ambulators the difference in energy expenditure between the use of different knee prosthesis is of interest. There are different methods measuring energy expenditure: oxygen cost, heart rate, carbon dioxide production as well as perceived exhaustion while walking.

**Summary**

Oxygen consumption was measured to be decreased with C-Leg compared to NMPCKs when walking at typical and fast velocity (Seymour et al 2007). Another group measured oxygen consumption to be decreased by 6.2% at slow walking speed and by 6.0% at self-selected walking speed (Schmalz et al 2002). Two further studies showed that oxygen cost tends to be decreased over a range of walking velocities with C-Leg compared to NMPCKs (Johansson et al 2005, Orendurff et al 2006). Even though Kaufman et al (2008) measured a slight increase in energy expenditure by 2% with C-Leg compared to NMPCKs, subjects perceived walking with C-Leg easier.

A group measuring metabolic energy consumption of a bilateral knee disarticulated amputee during walking, found that the rate of oxygen consumption (level of physiological effort) as well as oxygen cost (use of oxygen for the speed of walking) was both reduced when walking with C-Leg compared to NMPCKs (Perry et al 2004).
### References

<table>
<thead>
<tr>
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<th>Author</th>
<th>Title</th>
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<tbody>
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</tr>
<tr>
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</tr>
<tr>
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</tr>
</tbody>
</table>


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