11-9-2012

Load carriage: Impacts and conditioning

Rob Orr
Bond University, rorr@bond.edu.au

Follow this and additional works at: http://epublications.bond.edu.au/hsm_pubs

Part of the Sports Sciences Commons

Recommended Citation


This Conference Paper is brought to you by the Faculty of Health Sciences & Medicine at ePublications@bond. It has been accepted for inclusion in Faculty of Health Sciences & Medicine Publications by an authorized administrator of ePublications@bond. For more information, please contact Bond University's Repository Coordinator.
TACTICAL STRENGTH & CONDITIONING AUSTRALIA
RAPID FIRE MINI CONFERENCE
Load Carriage: Impacts and Conditioning
A/Prof Rob Orr (Bond University)
BLUF:

•A well-structured and periodised load carriage conditioning program can reduce the negative impacts of carrying load and optimise operational performance
Introduction:

• Tactical operators are required to carry load as part of their occupation

• Carrying these loads can place the operators at risk through reducing occupational task performance and causing injury
Risks Associated with Load Carriage

When you get shot at, you move as fast as you can…but it wasn’t very fast. You are just tired. So tired.

Justin Kalentis, US Army, wounded in Afghanistan, discussing the loads they were carrying quoted in *The Seattle Times* (14 Feb 11)
Risks Associated with Load Carriage

- Injuries: Associated with a variety of injuries (from skin blistering to muscle, ligament, tendon, bone and nervous system injuries)
RISKS ASSOCIATED WITH LOAD CARRIAGE

- Decrements in performance:
  - ↓ Mobility
RISKS ASSOCIATED WITH LOAD CARRIAGE

- Decrements in performance:
  - ↓ Lethality (Marksmanship / Grenade throw ability)
Risks Associated with Load Carriage

- Decrements in performance:
  - ↓ Mobility + ↓ Lethality
Risks Associated with Load Carriage

- Decrements in performance:
  - ↓ Attention to task
    - Hidden weapons, weakened structures
• Decrements in performance:
  – ↓ Attention to task
    • Noticing IED sign
Load Carriage Conditioning

• Concept is not new
Load Carriage Conditioning

<table>
<thead>
<tr>
<th>Database</th>
<th>Search terms</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEDLINE (Ovid)</td>
<td>load AND carr*; load AND march*; pack AND march*; endurance AND march*</td>
</tr>
<tr>
<td>PUBMED</td>
<td>load AND carriage; load AND carry; load AND marching; load AND march; pack AND march; pack AND marching; endurance AND march; endurance AND marching.</td>
</tr>
<tr>
<td>PROQUEST</td>
<td>load AND carriage; load AND carry; load AND marching; load AND march; pack AND march; pack AND marching; endurance AND march; endurance AND marching.</td>
</tr>
<tr>
<td>CINAHL</td>
<td>load AND carriage OR carry; endurance AND march OR marching; pack AND march OR marching; load AND march OR marching.</td>
</tr>
<tr>
<td>DEFWEB</td>
<td>load AND carriage; load AND carry; load AND marching; load AND march; pack AND march; pack AND marching; endurance AND march; endurance AND marching.</td>
</tr>
</tbody>
</table>

**Exclusion Criteria**

<table>
<thead>
<tr>
<th>Example:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adolescents</td>
</tr>
<tr>
<td>Walking poles</td>
</tr>
<tr>
<td>Ergonomic aids</td>
</tr>
<tr>
<td>Idiopathic scoliosis</td>
</tr>
<tr>
<td>Microgravity, high altitude</td>
</tr>
<tr>
<td>General military conditioning programs</td>
</tr>
<tr>
<td>Commercial backpacks</td>
</tr>
</tbody>
</table>

Load Carriage Conditioning

- Initial literature search identified 8,053 papers.
- Further 36 papers gathered from colleagues.
- 8089 papers reduced to 214 papers following implementation of exclusion criteria
- Secondary literature search reduced papers to seven original research papers, one conference paper and four secondary source papers (military reports, journal articles).
F.I.T.T Formula (Frequency, Intensity, Time & Type)

- F. 10-14 days per load carriage session
- I. To loads required (Last decade 40-50kg) at the speeds and over the terrains required
- T. Duration of load carriage operations
- T. Load carriage preferable, but combined resistance and cardio may be of some benefit

**Evidence Based, Tactically Tested, Operationally Proven**
### Training Plan (18 Months)

<table>
<thead>
<tr>
<th>Phase of Training</th>
<th>Physical Development Phase (III CLASS)</th>
<th>Physical Hardening Phase (II CLASS)</th>
<th>Self Management and Corp Specific Phase (I CLASS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub Phase of Training</td>
<td>Anatomical Adaptation</td>
<td>Complex Skills Development</td>
<td>Recon</td>
</tr>
<tr>
<td>Load Carriage Continuum</td>
<td>Volume &amp; Intensity</td>
<td>Volume</td>
<td>Intensity</td>
</tr>
</tbody>
</table>


**EVIDENCE BASED • TACTICALLY TESTED • OPERATIONALLY PROVEN**
Load Carriage Conditioning

Knapik et al., (2012)

- Method: Review of several literature databases
- Results: 11 Publications from 10 original studies
- Discussion:
  - Substantial trg effect with Progressive RT combined with Aerobic trg (3x4/52)
  - Effects greater when LC added specifically
  - Field based training (inc LC) also very effective
  - RT or Aerobic trg alone had varying effects
Take Home:

To improve load carriage performance and reduce the risks associated with load carriage (including injury and reduced tactical performance) a well designed and progressive LC program is needed.

This program would include specific LC events, preferably ever 7-14 days.
References:


References:

References:


