Optimizing the conditioning of new recruits

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TSAC CONFERENCE
APRIL 15 – 17, 2014 | SAN DIEGO, CA
THE WAY YOU TRAIN

NSCA
NATIONAL STRENGTH AND CONDITIONING ASSOCIATION
everyone stronger
NSCA.com
Optimizing the conditioning of new recruits

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(Australia)
rorr@bond.edu.au
B.L.U.F.

• While threats to optimisation do exist, a well developed periodized training program can be used to meet targeted physical capability end-states in recruit training environments
Overview

• The Training Needs Analysis / Review
• The Periodised Plan
• Threats to the Program
• Needs for success
The Training Needs Analysis / Review

• Data Collection
• Findings
• Outcomes – The Periodised Plan
Data Collection

• Desktop
  • Interview with cadets and staff
  • Interrogation of doctrine, policies and procedures
  • Data mining from Injury Surveillance System
  • REVIEW OF CURRENT PT PROGRAM
Data Collection

• Field
  – Heart Rate Data

Data Collection

• Field
  – GPS

Data Collection

- Field
  - Observation

Data Collection

- Triangulation

Findings

• Pattern Overload
• Low synergy requirements
• Informal loading
• One-size-fits-all approach for many sessions
Findings

- Pattern Overload
Findings

• Pattern Overload

Findings

• Low synergy requirements

Level of Synergy Required for Different Activities

Findings

• Informal loading
  – Approx. 7.5km/day
  – Excluding all PT/Drill
  – Many new recruits direct from High School (ltd phys acty as seniors)

Findings

• One-size-fits-all
  – Much of the PT was group based (eg. Group march/run)
  – Work efforts mismatched

Findings

• One-size-fits-all
  – Much of the PT was group based (eg. Group march/run)
  – Work efforts mismatched
  – Plateauing in fitness
The Periodised Plan

- CO’s Intent
- Identification of End-state requirements
- All major activities (field exercises, parades, sporting and unit events)
### The Periodised Plan

<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>Recond</td>
<td>Recond</td>
</tr>
<tr>
<td></td>
<td>Complex Skills Development</td>
<td>Physical Hardening</td>
<td>Maintain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Regen</td>
<td>Corp Specific</td>
</tr>
<tr>
<td>Macrocycle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Microcycle</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Individual Fitness and Healthy Lifestyle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic Fitness</td>
</tr>
<tr>
<td>Neuromuscular Skills and Fitness</td>
</tr>
<tr>
<td>Injury Prevention</td>
</tr>
<tr>
<td>Healthy Lifestyle Education</td>
</tr>
<tr>
<td>Personal Training and Fitness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Military Specific Fitness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load Carriage</td>
</tr>
<tr>
<td>Complex Warfighting Skills and Fitness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sports Specific Fitness</th>
</tr>
</thead>
</table>

| Remedial Training and Rehabilitation    |

### Training Plan (18 Months)

The Periodised Plan

The Periodised Plan

<table>
<thead>
<tr>
<th>Phase of Training</th>
<th>Training Plan (18 Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Physical Development Phase</td>
</tr>
<tr>
<td>(III CLASS)</td>
<td>Regen</td>
</tr>
<tr>
<td></td>
<td>Anatomical Adaptation</td>
</tr>
<tr>
<td></td>
<td>Volume &amp; Intensity</td>
</tr>
</tbody>
</table>

Load Carriage Continuum

Dist | Load | Sod
---|-----|-----
30 | 47% |
15 | 35% |
11 | 15% |
8  | DPCU + F88 | 6 5 5

The Periodised Plan

The Periodised Plan

The Periodised Plan


<table>
<thead>
<tr>
<th>Anatomical Adaptation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Establish metabolic and neuromuscular base fitness</td>
</tr>
<tr>
<td>Macrocycle 1</td>
</tr>
<tr>
<td>Intro MI PT and Teaching Functional movement patterns.</td>
</tr>
<tr>
<td>100</td>
</tr>
</tbody>
</table>

### Predicted Lesson Allocation %

<table>
<thead>
<tr>
<th>Individual Fitness and Healthy Lifestyle</th>
<th>Macrocycle 1</th>
<th>Macrocycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metabolic Fitness</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Neuromuscular Skills &amp; Fitness</td>
<td>35</td>
<td>20</td>
</tr>
<tr>
<td>Injury Prevention</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Healthy Lifestyle Education</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>Personal Training &amp; Fitness</td>
<td>15</td>
<td>0</td>
</tr>
<tr>
<td>Sports Specific Fitness</td>
<td>10</td>
<td>35</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective Specific Fitness</th>
<th>Macrocycle 1</th>
<th>Macrocycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-Training Skills &amp; Fitness</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

### TOTAL (% of cycle)

<table>
<thead>
<tr>
<th>Individual Fitness and Healthy Lifestyle</th>
<th>Macrocycle 1</th>
<th>Macrocycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lesson Allocations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metabolic Fitness</td>
<td>15</td>
<td>2</td>
</tr>
<tr>
<td>Neuromuscular Skills &amp; Fitness</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Injury Prevention</td>
<td>25</td>
<td>15</td>
</tr>
<tr>
<td>Healthy Lifestyle Education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Personal Training &amp; Fitness</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Sports Specific Fitness</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objective Specific Fitness</th>
<th>Macrocycle 1</th>
<th>Macrocycle 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-Training Skills &amp; Fitness</td>
<td>15</td>
<td>2</td>
</tr>
</tbody>
</table>

### TOTAL (Number of lessons per microcycle)

| Objective Specific Fitness | 7 | 12 | 12 | 8 | 8 | 8 | 8 |

39 Periods
<table>
<thead>
<tr>
<th>Session 1</th>
<th>Session 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Control</td>
</tr>
<tr>
<td>INT</td>
<td>INT</td>
</tr>
<tr>
<td>Size n</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Injuries n (%)</td>
<td>4 (14%)</td>
</tr>
<tr>
<td></td>
<td>1 (4%)</td>
</tr>
<tr>
<td>Injury site</td>
<td>Foot x 1</td>
</tr>
<tr>
<td></td>
<td>Knee x 2</td>
</tr>
<tr>
<td></td>
<td>Back x 1</td>
</tr>
<tr>
<td></td>
<td>Ankle x 2</td>
</tr>
<tr>
<td></td>
<td>Calf x 1</td>
</tr>
<tr>
<td></td>
<td>Lower leg x 3</td>
</tr>
<tr>
<td></td>
<td>Wrist x 2</td>
</tr>
</tbody>
</table>

Ford, K., Stierli, M. & Orr, R. Implementation of an ABT program in police force recruits
Threats to the Program

• Ad Hoc Training
• PICO
• JIT Training
• Seasonal / Diurnal Variations
• Poor recovery
Threats to the Program

• Ad Hoc Training
  – Training that is often added within the unit/company without formal integration into the overall program
    • E.g. Sending personnel for a run as ‘corrective’ training
    • ‘Cyclone’ training
    • In-lines development programs
Threats to the Program

- Ad Hoc Training


Figure 17. Actual load for the week 10 microcycle of the training program.
Threats to the Program

• Ad Hoc Training


### Diagram

- **In Lines Training (Push Ups)**
  - Muscle Fatigue and Anatomical Structure Stressing (E.g. Muscle Protein Degradation and Micro tears)
  - **Obstacle Course**
  - Upper Limb Musculature Fatigued
  - Inability of the Active subsystem to withstand loading increasing Passive subsystem loading
  - **SHOULDER INJURY**
  - Alteration in technique (Drop from wall rather than lower using upper body strength)
  - **PELVIS INJURY**
Threats to the Program

• Program Induced Cumulative Overload (PICO)
  – This is an unseen overload caused by the nature of the overarching training program
    • Includes additional kms/mi’s covered marching around the area
    • Other physical activities (drill, weapons training, MUC)
## Threats to the Program

- **Program Induced Cumulative Overload (PICO)**

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Activity</th>
<th>PT Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>y1</td>
<td>AM</td>
<td>Final Fitness Assessment (2p)</td>
<td>PT s1</td>
</tr>
<tr>
<td></td>
<td>AM-PM</td>
<td>Navigation Day and Night Assessment (10p)</td>
<td></td>
</tr>
<tr>
<td>y2</td>
<td>PM</td>
<td>In Lines Training</td>
<td>-</td>
</tr>
<tr>
<td>y3</td>
<td>AM</td>
<td>Rope Climbing (1p)</td>
<td>PT s2</td>
</tr>
<tr>
<td></td>
<td>AM-PM</td>
<td>Navigation Day and Night Assessment (10p)</td>
<td></td>
</tr>
<tr>
<td>y4</td>
<td>AM</td>
<td>Obstacle Course (2p)</td>
<td>PT s3</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>Individual Drill Assessment (2p)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>In Lines Training</td>
<td></td>
</tr>
<tr>
<td>y5</td>
<td>AM</td>
<td>15 Km Endurance March (4p)</td>
<td>PT s4</td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>Perform as a member in a section attack (3p)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PM</td>
<td>Swim 6 (1p)</td>
<td>PT s5</td>
</tr>
</tbody>
</table>
Threats to the Program

• Just In Time (JIT) Training
  – JIT Training involves a short notice change to the conditioning focus to respond to a new conditioning priority.
    • Company decides to have a Sports Week
    • Changes in activity dates to accommodate another priority (moving the cross country / or Battalion March forward by several weeks)
    • New unplanned events (invitation to Mil Skills competitions)
Threats to the Program

• Seasonal conditions
  – Hotter / cooler periods but the recruit program is inflexible (10d Food and Sleep Deprivation exercise)

• Diurnal variation
  – Amount of visible light per day
    • E.g. Increased number of soft tissue injuries during field exercises in winter vs summer for same programmed recruit field training exercise
Threats to the Program

- Poor Recovery
  - Nutrition intake
    - Hygiene
    - Meal Timings and Glycogen Depletion
  - Reduced sleep
    - Culture shock
    - Hyper-arousal (Battle inoc at 2000h, lights out at 2100h)
Inadequate Breakfast time leads to low Energy Stores

No Energy Replacement Opportunities (Morning Tea or Meal Supplementation)

Low Energy (Glucose / Glycogen Stores)

Demanding Physical Training Session further diminishes Energy Stores

Reduced Energy Intake
Increased Energy Demand

Demanding Physical Training Session further diminishes Energy Stores


Acute Effect
- Decreased Concentration
- Increased Metabolic Fatigue

Chronic Effect
- Overtraining

INCREASED INJURY RISK AND POTENTIAL DECREASE IN COGNITIVE PERFORMANCES
Needs for Success

• Conditioning program developed with course programmers (reduce PICO and accommodate seasonal variations)
• Once developed program becomes stable (No Ad Hoc Training / Programs and no JIT)
• Monitoring recovery (Nutritional / Sleep)
• Ongoing review
Needs for Success

- Ongoing review

  - Food and Sleep Deprivation Ex
  - High incidence of heat illness
  - Implementation of electrolytes
  - Heat illness reduced to zero
  - Decrease in training intent due to high CHO content
  - Electrolytes changed
  - Heat illness reduced to zero
  - Training intent met

Needs for Success

- Ongoing support
  - Middle and Upper Command elements
Summary

- In training environments, a well-periodized training program can be used to meet targeted physical capability end-states.
- However, for optimal results, threats that can impact on the program need to be identified and addressed.
- For longevity of the program, ongoing review and command support are vital.
References


Pictures / photographs

• Australian Army pictures from Defence Media or from the referenced sources above

• All other pictures are open source
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