Managing the Training Process

Joel Jamieson
Introduction

- Who am I?
- My Training Management story...
Introduction

- Part I: The Overtraining Continuum
- Part II: Managing the Training Process
- Part III: Managing the Training Day
- Part IV: Managing the Training Week
OVERTRAINING

Part I: The Overtraining Continuum
Fitness

Adaptation Reaction

Load

Resistance (anti-stress) Reaction

Inhibitive (stress) Reaction
“...an adaptive strategy by the body designed to minimize the impact of a chronically excessive level of allostatic load”
Allostatic Load is the cost of maintaining homeostasis (adaptation) in the face of physiological and psychological demands.

- Training Load
- Training Frequency
- Training History
- Fitness Level
- Nutrition
- Mental Stress
- Genetics
- Sleep
The Energy Cost of Adaptation

Rest & Recovery

Adaptation
Energy

Adaptability Increase

Allostatic Load
Normal Response
Normal response to allostatic load

Sympathetic OS
Decreased tissue sensitivity to stress hormones.

Parasympathetic OTS
Decreased central production of stress hormones.

The Overtraining Continuum

Compensation

Decompensation

ACTH-Response

Cortisol-Response

Training

Overreaching

Overtraining
B2–Adrenergic Receptor Downregulation and Performance Decrements During High–Intensity Resistance Exercise Exercise Overtraining

- The OT group performed 10x1 100% 1 RM daily for 2 wk, whereas the Con group performed normal training 2 days/wk.

- Muscle 2–adrenergic receptor (2–AR; fmol/mg protein) density significantly decreased by 37.0% for the OT group and was unchanged for the Con group.

- Overtraining occurred as indicated by a 5% decrease in 1–RM strength for the OT group as well as a 36.3% decrease in mean power at 100% 1–RM loads.

- 2–8 wk before the OT subjects were able to resume their normal weight training.
Chronic Stress, Glucocorticoid Receptor Resistance, Inflammation, and Disease Risk

Study 1: After covarying the control variables, those with recent exposure to a long-term threatening stressful experience demonstrated GCR; and those with GCR were at higher risk of subsequently developing a cold.

Study 2: With the same controls used in study 1, greater GCR predicted the production of more local proinflammatory cytokines among infected subjects. These data provide support for a model suggesting that prolonged stressors result in GCR, which, in turn, interferes with appropriate regulation of inflammation.

“Because inflammation plays an important role in the onset and progression of a wide range of diseases, this model may have broad implications for understanding the role of stress in health.”
**The Overtraining Continuum**

- Decreased tissue sensitivity to stress hormones preserves magnitude of stress response through increased production
  
  - HRV shows persistently higher sympathetic function and decreased parasympathetic function

- Increased localized inflammatory response

- Symptoms include: anxiety, sleeplessness, loss of appetite, lack of ability to concentrate, increased resting heart rate, decreased motivation to train, decreased strength/power and performance

- Decreased central production of stress hormones combined with poor tissue sensitivity leads to greatly diminished response to training

  - HRV shows heightened parasympathetic function with decrease in sympathetic drive

- Increase in infections

  - Symptoms include: lethargy, depression, decreased resting heart rate and HRR, lack of motivation to train, muscle loss, decreased strength/power and all around performance
Managing the Training Process

Part II: An overview of training optimization
Why Manage the Training Process?

- There is often a fine line between overreaching/overtraining and optimal loading. The goal of effective programming and coaching is to push the athlete to edge of that line without going over.

- Everyone is different

- Life Happens

- The best results are always achieved from applying the right amount of the right types of training at the right time. This is not possible without training management.
Everyone Is Different

- Training history
- Genetics
- Neuromuscular profile
- Work capacity/Adaptability
- Neurotransmitter levels
- Psychological profile
- Nutritional habits
- Personal Goals
- Age
- Gender
A Variety of Demands

- Life stress
- Family stress
- School stress
- Financial stress
- Social stress
- Travel
- Nutritional intake
- Quantity and quality of sleep
- Volume and intensity of training
- Type of loading – mechanical vs. metabolic
- Training frequency
- Competition frequency
- Periodization
- Recovery strategies between competition and training

Non-Specific Demands  Specific Demands
## Stress & Performance

<table>
<thead>
<tr>
<th></th>
<th>Bench 1</th>
<th>Bench 2</th>
<th>%Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low stress</td>
<td>129.73 (55.88)</td>
<td>148.67 (60.34)</td>
<td>14.60</td>
</tr>
<tr>
<td>High stress</td>
<td>127.16 (62.57)</td>
<td>142.02 (67.57)</td>
<td>11.68</td>
</tr>
<tr>
<td>Squat 1</td>
<td>177.66 (67.70)</td>
<td>222.19 (71.98)</td>
<td>25.06</td>
</tr>
<tr>
<td>Low stress</td>
<td>173.88 (86.54)</td>
<td>212.84 (93.58)</td>
<td>22.41</td>
</tr>
<tr>
<td>Squat 2</td>
<td>18.00 (6.97)</td>
<td>16.82 (6.78)</td>
<td>17.13</td>
</tr>
<tr>
<td>Arm size 1</td>
<td>15.04 (7.25)</td>
<td>18.00 (6.97)</td>
<td>19.68</td>
</tr>
<tr>
<td>High stress</td>
<td>14.36 (6.75)</td>
<td>16.82 (6.78)</td>
<td>17.13</td>
</tr>
<tr>
<td>Arm size 2</td>
<td>33.70 (7.83)</td>
<td>34.16 (8.93)</td>
<td>1.36</td>
</tr>
<tr>
<td>Thigh size 1</td>
<td>32.45 (8.85)</td>
<td>32.50 (9.27)</td>
<td>0.15</td>
</tr>
<tr>
<td>Thigh size 2</td>
<td>32.45 (8.85)</td>
<td>32.50 (9.27)</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Values are means (standard deviation).
Training Program Management

- Answers the simple question of “How much training is the right amount on a daily, weekly, and monthly basis?”

- Always starts with monitoring the training process to determine where an individual is on the training continuum
Training Program Management

Program Monitoring

- Intensity
- Volume
- Frequency
- Methods
- Exercises

GENERAL FITNESS / ADAPTABILITY

SPECIFIC FITNESS

PERFORMANCE
Training Management Tools

- HRV
- RPE
- Training Load
- Performance Measures

Monitoring
Heart Rate Variability

- Measures acute and cumulative changes in nervous system function in response to non-specific demands
  - Omegawave Sport Technology System
  - BioForce HRV
  - Polar RS800cx w/Polar Pro Trainer Software
  - Firstbeat Software
  - Kubios
Heart Rate Variability

Low Readiness

Reduced Readiness

Allostatic Load

High Readiness

Reduced Readiness

Recovery

Low Readiness

HRV
Heart Rate Variability

HRV

- 25 mm/sec
- 50 mm/sec
- 100%

![Heart Rate Variability Image]

- Daily Change: 1
- Weekly Change: -
- Monthly Change: -

Graphs and charts showing heart rate variability metrics.
3 Week Training Response

Three Week UFC Training Camp

- Sympathetic Index
- Vagal Index
- Linear (Sympathetic Index)
- Linear (Vagal Index)
Low cost method to pre-screen for various symptoms of overreaching/overtraining

Daily/Weekly athlete/client training session RPE

RPE Scale:
- 1–3 Very easy – low load
- 4–6 Moderate work level – minimal residual fatigue
- 7–8 Hard training – fatigue will accumulate
- 9–10 Maximum training – high fatigue
RPE & Subjective Measures

Weekly Lifestyle Questionnaire:

- Mental stress levels/ life events
- Changes in sleep patterns
- Increased/Decreased appetite
- Motivation level
- Energy levels– lethargy
- Anxiety/restlessness
- Mood/behavior
- Sex drive
Training Load

![Bar Chart for Training Load]

- Monday: 100
- Tuesday: 250
- Wednesday: 100
- Thursday: 300
- Friday: 150
- Saturday: 100
Training Load

- Polar RS400 or other Polar – Polarpersonaltrainer.com
- Training Intensity X Volume
- Total Training Time
- Time HR > 90%
- Number of sets > 90%, number of sets 80–90%
Performance Measures

- Keeping track of performance measures throughout in all aspects of training/competition can provide valuable insight into adaptation

- Monitoring methods:
  - Heart rate monitoring – changes in heart rate / power output and heart rate recovery
  - Tendo unit / Myotest speeds
  - Strength changes
  - Aerobic performance changes
  - Body composition changes
  - Sport specific performance
Managing the Training Process

Three goals of management...

1. Make sure the body is ready to handle the highest loads when they are used in training – Train each day within your adaptability threshold.

2. Avoid the accumulation of fatigue across microcycles that will trigger the body’s inhibition response.

3. Use the optimal amount of loading to ensure adaptation and improve performance.
The Training Day

Part III: Get the most out of each session
Model of the Training Response

Specificity
Specific Stress

Training Load
General Stress

Signaling

Residual Stress

Pre/Post Nutrition

Training Effect

Adaptive Response
Managing the Daily Training Load

Adaptability Threshold

High Readiness

Reduced Readiness

Low Readiness

Maximum Stress Loads

Developmental Loads

Stimulative Loads

Rest
Daily Training Readiness

“A measure of the body’s functional ability to effectively respond to the challenges to homeostasis that results from training on a given day – Current state of adaptability”
Daily Training Readiness Indicators

- HRV
- Jump tests
- Tap tests
- Morning resting HR
- RPE on previous days
- Performance measures
- Subjective feelings
# Managing the Daily Training Load

<table>
<thead>
<tr>
<th>Readiness</th>
<th>Appropriate Training Load</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong></td>
<td>Highest loading</td>
</tr>
<tr>
<td><strong>Moderate</strong></td>
<td>Reduce training load 20–30% from max</td>
</tr>
<tr>
<td><strong>Low</strong></td>
<td>No training or recovery/regeneration</td>
</tr>
</tbody>
</table>
Individual vs. Team Management

- Daily HRV
- Jump test/tap test
- Subjective discussion with athlete/client
- Individualized changes to training load
- In–Session changes

- HRV
- Morning resting HR
- Excel worksheet filters to identify potential reduced readiness
  - Previous 3–5 day RPE >
  - Training Load total
  - Subjective screenings

Individual

Team/Group
The Training Week

Part III: Get the most out of each week
Managing the Training Week

- What should the weekly training load be?
  - Restorative
  - Foundational
  - Shock
  - Competitive

- The Weekly Training Model

- Weekly HRV Load
- Weekly RPE Total
- Total Training Load
Managing the Training Week

High/Low Organization

Monday Developmental High
Tuesday Stimulative
Wednesday Stimulative
Thursday Developmental High
Friday Stimulative
Saturday Off
Sunday Off
Managing the Training Week

Traditional Organization

- Monday: Developmental High
- Tuesday: Developmental Medium
- Wednesday: Off
- Thursday: Developmental High
- Friday: Developmental High
- Saturday: Stimulative
- Sunday: Off

Loading One

Recovery One

Loading Two

Recovery Two
Heart Rate Variability

Weekly HRV Load

<table>
<thead>
<tr>
<th>Daily Change Indicator</th>
<th>HRV Load Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>+ 1 point</td>
</tr>
<tr>
<td>Amber</td>
<td>- 1 point</td>
</tr>
<tr>
<td>Red</td>
<td>- 2 points</td>
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</table>
# Heart Rate Variability

Sample Weekly HRV Load

<table>
<thead>
<tr>
<th>Day</th>
<th>HRV</th>
<th>Indication</th>
<th>HRV Load</th>
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<tbody>
<tr>
<td>Monday</td>
<td>69.7</td>
<td>G</td>
<td>+1</td>
</tr>
<tr>
<td>Tuesday</td>
<td>81</td>
<td>A</td>
<td>-1</td>
</tr>
<tr>
<td>Wednesday</td>
<td>77.7</td>
<td>G</td>
<td>+1</td>
</tr>
<tr>
<td>Thursday</td>
<td>80.3</td>
<td>G</td>
<td>+1</td>
</tr>
<tr>
<td>Friday</td>
<td>67.1</td>
<td>A</td>
<td>-1</td>
</tr>
<tr>
<td>Saturday</td>
<td>77.1</td>
<td>G</td>
<td>+1</td>
</tr>
<tr>
<td>Sunday</td>
<td>64.3</td>
<td>A</td>
<td>-1</td>
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</table>

Weekly HRV Load Total

<table>
<thead>
<tr>
<th>6-7</th>
<th>3-5</th>
<th>0-2</th>
<th>&lt; 0</th>
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<tbody>
<tr>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>Maximum</td>
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</table>
Weekly Training Load – Polar
Sample Training Week

![Graph showing training load and HRV for each day of the week]
## Individual Sample Training Week

<table>
<thead>
<tr>
<th>Day</th>
<th>Training Load</th>
<th>RPE</th>
<th>HRV Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>350</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Tuesday</td>
<td>100</td>
<td>5</td>
<td>-1</td>
</tr>
<tr>
<td>Wednesday</td>
<td>325</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>Thursday</td>
<td>125</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Friday</td>
<td>250</td>
<td>7</td>
<td>-1</td>
</tr>
<tr>
<td>Saturday</td>
<td>100</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Sunday</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Total: 1250 38 3
## Weekly Team Management

<table>
<thead>
<tr>
<th>Athlete</th>
<th>Training Load</th>
<th>RPE</th>
<th>HRV Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steve</td>
<td>1000</td>
<td>38</td>
<td>2</td>
</tr>
<tr>
<td>Mike</td>
<td>1250</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>Jason</td>
<td>1125</td>
<td>41</td>
<td>2</td>
</tr>
<tr>
<td>Rob</td>
<td>1100</td>
<td>40</td>
<td>1</td>
</tr>
<tr>
<td>Jake</td>
<td>1300</td>
<td>42</td>
<td>-1</td>
</tr>
<tr>
<td>Blake</td>
<td>800</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>Adam</td>
<td>975</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td>Chris</td>
<td>1285</td>
<td>44</td>
<td>1</td>
</tr>
</tbody>
</table>

| Average | 1104 | 40 | 1 |
| St. Dev. | 174.4 | 2.7 | 1.3 |
Consistent monitoring over time is the most important factor to effective management.

Learn how to use excel to track data, analyze trends and track results. Visual is always better than raw numbers.

Don’t get overly analytical with every number change, fluctuations are normal. Look for trends and consistently abnormal results.

Work with what you have. Large team/group settings require different strategies than one on one or small group training.

Give it time. Learning how to effectively manage the training process is not easy and requires time, effort, and persistence. The more you do it, the better you’ll get at it.
Thanks For Listening...

Everything I’ve said may be wrong