# The Impact of Monitoring Strategies on a Team Sport Through an Olympiad: Physical Development, Taper & Recovery

*Dave Hamilton Lead Strength and Conditioning Coach: Great Britain Women's Hockey*


X 24
ASHLEIGH BALL
adidas
XTREME 24

# Overview

- Program and Competition: Demands and Challenges (10)
- Monitoring: Defined (3)
- Physical Development: Overview 2009-2012 (10)
- Monitoring Strategies – Impact & Findings
  - Year 1 (2009-10)– Goal: Develop Understanding of Program Demands (10)
  - Year 2 (2019-11)– Goal: Finalise Monitoring Model for Olympic Year 2012 (15)
  - Year 3 (2011-12)– Goal: Actualisation Phase (15)
  - General Findings (5)
- Summary: Learning

GREAT BRITAIN HOCKEY TEAM GB ENGLISH INSTITUTE OF SPORT


# Program and Competition

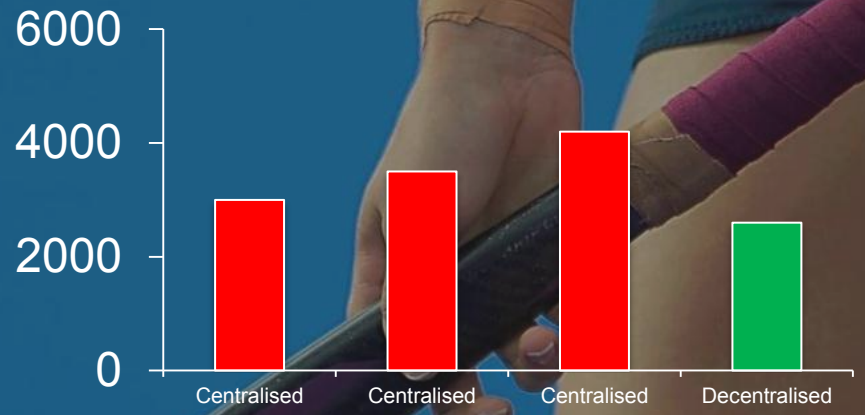
*Demands and Challenges*

# Demands and Challenges

Structure
- 30 Athletes (3 Nations)
- 48 Week Season

Purpose
- High Frequency Training
- Work Capacity

Challenges
1. Club v Country
2. Concurrent – High Loading
3. Player Management



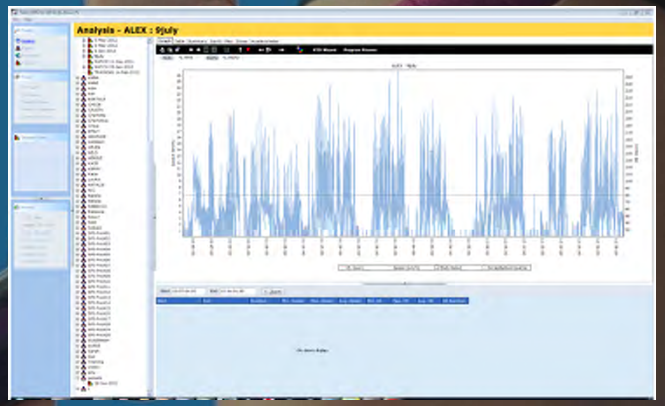

| Mon | Tues | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|
| Gym (legs) | Hockey (tech) | Gym (Upper & Robustness) | Hockey (Tech) | Gym (Total-Body) | Club Game/ Conditioning | Mobility |
| Hockey | Hockey (inter-squad) | Rest | Hockey (SSG) | Rest | Rest | Rest |

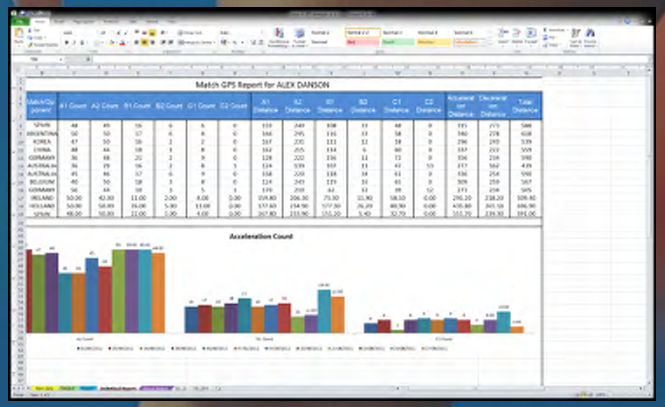
GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Demands and Challenges

Sport

| Match Demands | Average (Range) |
|---|---|
| Distance Covered | 7km (6-9km) |
| Work Rate (m/min) | 148 (137-165) |
| Heart Rate (% max) | 90 (85-98) |
| % Time High Intensity Actions (15km/h+) | 23 |
| Low to Ground Actions | 110 (90-140) |
| Distance covered (m) Acc/Dec | 500-620 |





Competition

- Consecutive Matches
- Multiple Competitions

video

# Monitoring

*Definition*

# Definition

Monitoring: A set of activities designed to help establish the acute training status of an athlete, so that appropriate and timely training adjustments can take place to ensure on going performance targets are attained.

Why?

- Physiological Stress = Physiological Change
- Individuals within Team
- Impact (Recovery Strategy, Physical Development, Competition)
- Coach Interaction - value

It does not need to be complicated – Just Reliable

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Physical Development

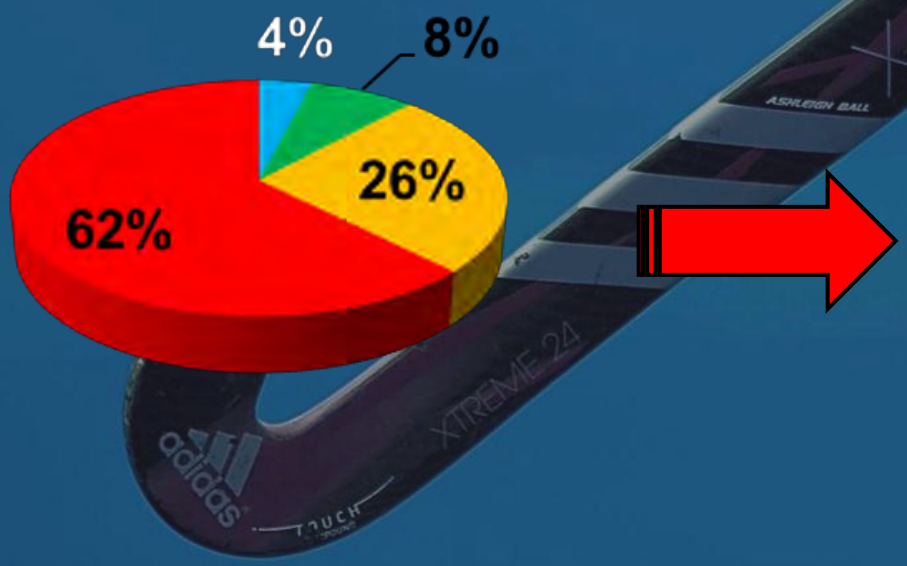
*Overview 2009-2012*

# Overview: 2009-2012

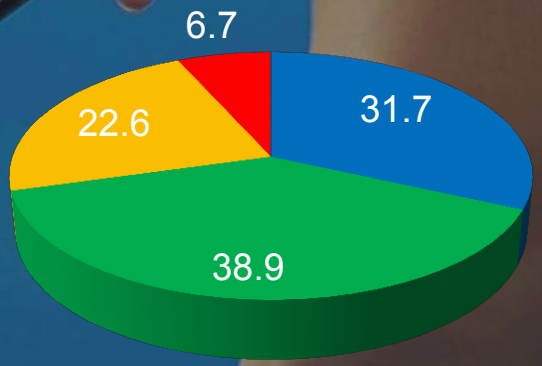
## Strength & Conditioning Targets

| | Speed | | | Strength | | | | Conditioning | |
|---|---|---|---|---|---|---|---|---|---|
| | 5m | 10m | 40m | ISO Pull | Back Sq | Bench Press | Wide Pull Ups | Mean RSA | 30-15iIFT |
| Elite & 2012 | 0.99 | 1.75 | 5.4 | 3.75 | 2 | 1.05 | 12 | 7.2 | 21 |
| Green | 1.04 | 1.8 | 5.65 | 3 | 1.75 | 0.9 | 9 | 7.45 | 20 |
| Amber | 1.1 | 1.87 | 5.85 | 2.4 | 1.5 | 0.75 | 6 | 7.7 | 19.5 |
| Red | 1.15 | 1.93 | 6 | 2 | 1.25 | 0.6 | 3 | 7.9 | 19 |

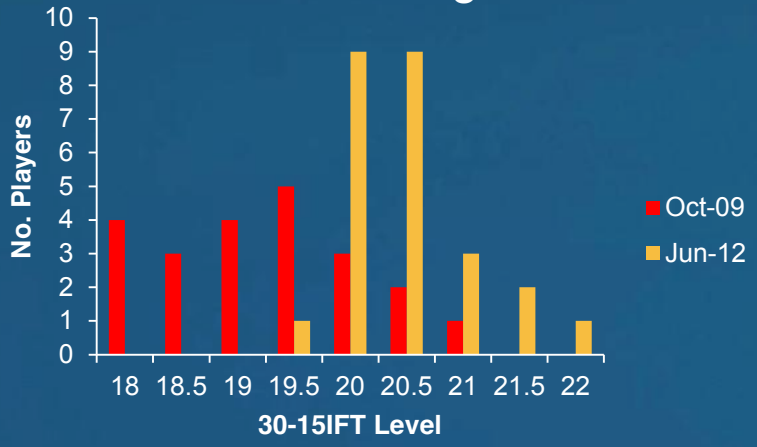
Oct 09



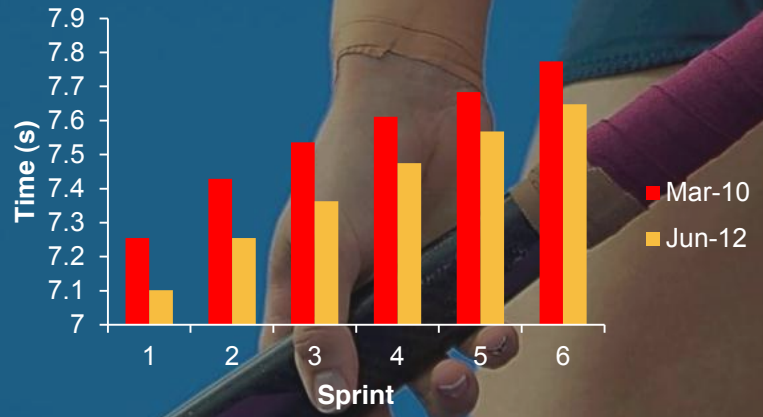

June 12



## Aerobic Conditioning



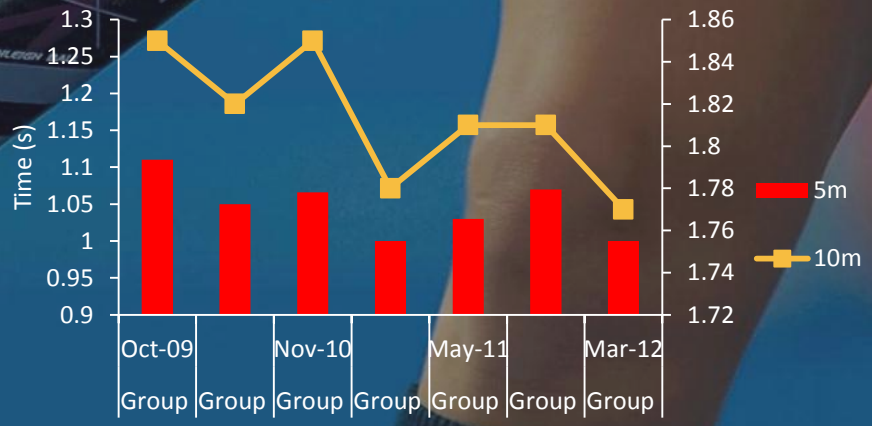

## Anaerobic Shuttle 6x40m




## Strength Tests

| | Oct 2009 | June 2012 |
|---|---|---|
| Back Squat (kg) | 82 (17) | 109 (11) |
| Rel. Back Squat | 1.21 | 1.74 |
| Bench Press (kg) | 42 (8) | 62 (7) |
| Rel. Bench Press | 0.65 | 0.97 |
| Wide Chins | 1.5 | 12 |

## Speed




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Performance?

## GPS: Performance Changes

| | *2008 Team 6th Beijing | 2012 Team 3rd London |
|---|---|---|
| Ave Distance (m) | 5541 | 6604 |
| Percentage Time % covered in each activity (Distance, m) | | |
| Standing/Walking | 56 | 30 |
| Jogging | 25 | 27.4 |
| Running | 12.5 (1226) | 23.4 (1591) |
| Fast Running | 5 (620) | 13.6 (912) |
| Sprinting | 1.5 (232) | 5.6 (378) |

*Macutkiewicz, D and Sunderland, C (2011)

| Players | Ave. Distance (m) | % time (Fast running/Sprinting) | Minutes Played | 30-15IFT Score | Ave RSA (s) |
|---|---|---|---|---|---|
| **Senior GB 20.5+** | 6698 | 20.8 | 45.4 | 20.8 | 7.26 |
| **Senior 20-** | 6508 | 17.4 | 44.8 | 19.98 | 7.48 |
| **U21's** | 5807 | 14.9 | 45.9 | 19.05 | 8.05 |

GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT


Year 1
Develop Understanding of
Program Demands

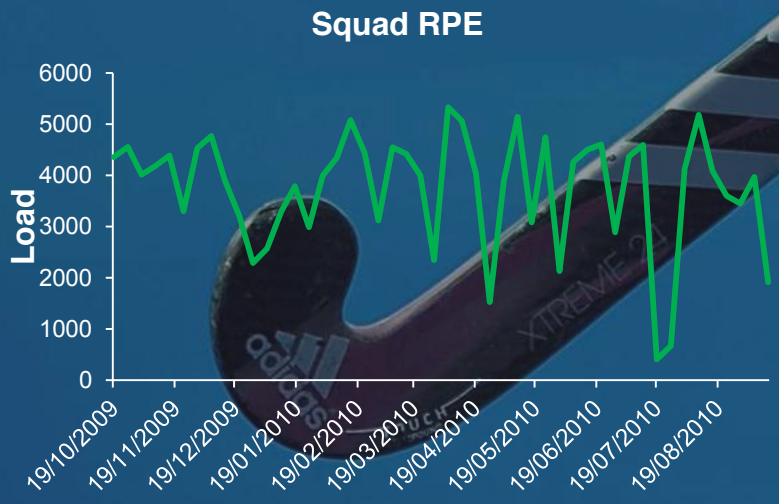
# Develop Understanding of Program

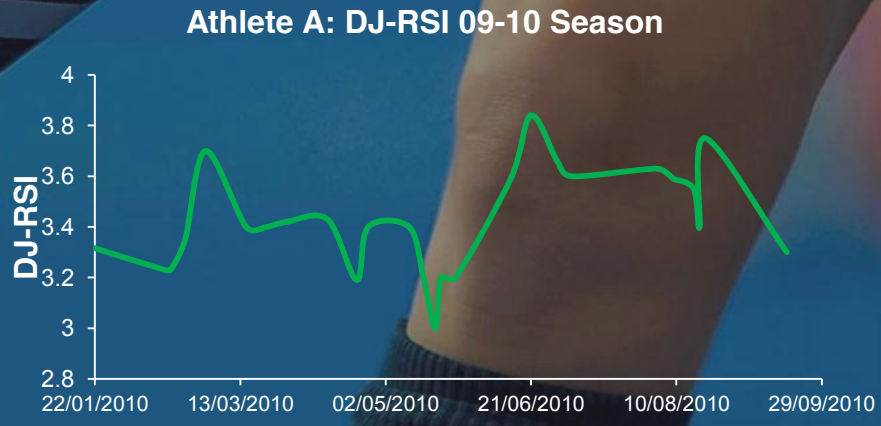
Need to know:-

- How hard do they think they are working?
- What is the impact of this work on their performance and readiness level?

Tools

1. Rate of Perceived Exertion
2. Drop Jumps – Reactive Strength Index



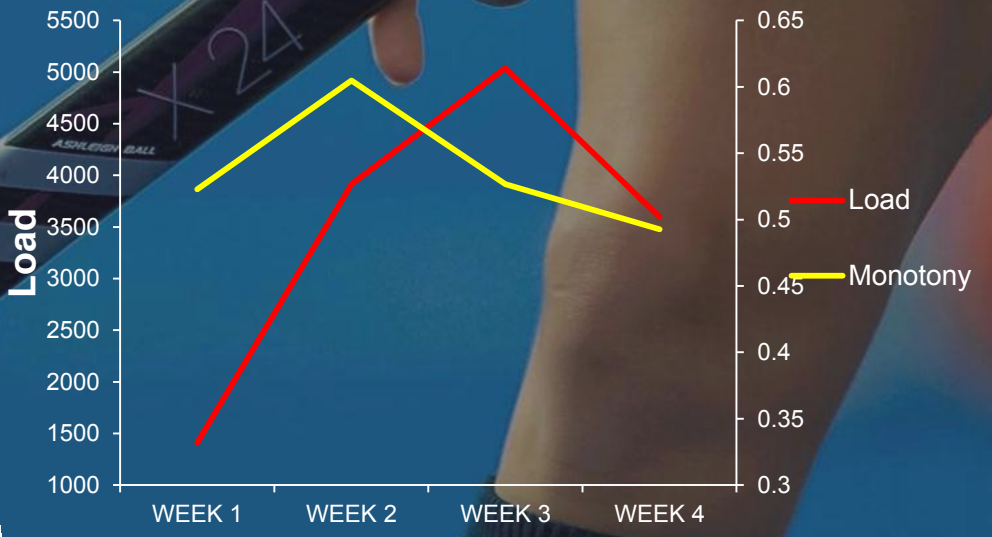




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Why RPE?

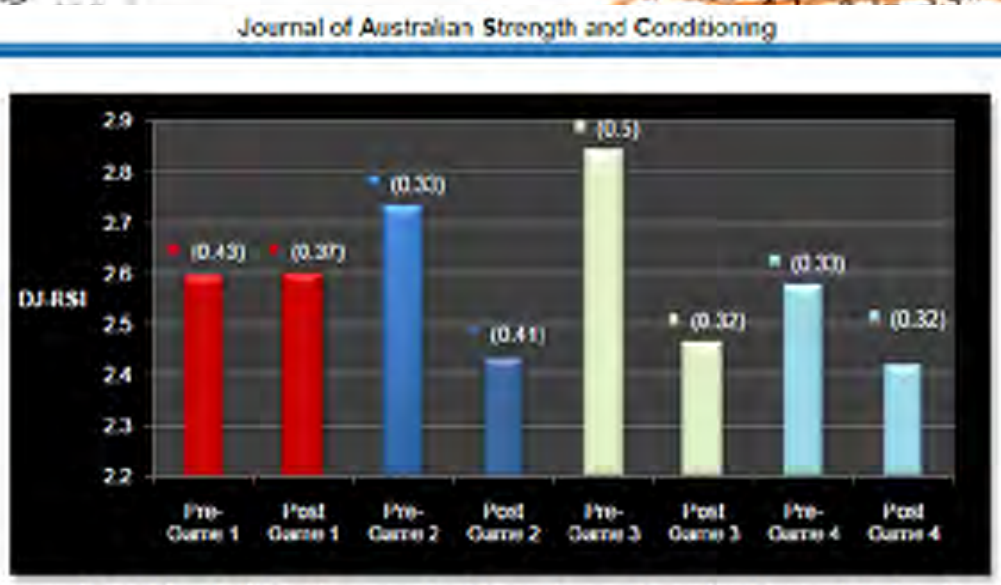

- Quantify individual and team training load
- Able to Quantify multiple training modalities
- Easy to use, reliable and consistent with physiological indices for exercise intensity

RPE (1-10) x Session Duration (min) = Load




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Why DJ-RSI?




Journal of Australian Strength and Conditioning




**Figure 3 - Pre and Post Match (following morning) Drop Jump –Reactive Strength Index data & (SD) (Only subjects who completed full game)**

*Key Words*: electrical stimulation, force, fitness testing,

It is well understood that elite athletes are required to train aggressively to perform at a high level. These athletes are in a cyclic state of training-fatigue adaptation, and this cycle is often imperfect (ie, athletes often train fatigued). Monitoring fatigue is important because effective monitoring identifies the athletes' recovery abilities and helps determine appropriate training loads to maximize performance.

Recommendations from a recent review[1] indicated that future work in fatigue should emphasize (1) quantifying fatigue in competitive sport, (2) evaluating the role of perceived exertion in limiting performance, (3) assessing power output rather than force, (4) moderate rather than severe force fatigue, (5) protocols with dynamic (and stretch-shortening cycle) contractions rather than static contractions, and (6) protocols with submaximal rather than maximal contractions. These recommendations suggest that additional research in the applied sport setting is required to further our understanding of fatigue.

Low-frequency fatigue (LFF) is a multifactorial fatigue resulting from high-intensity, moderate- to high-force, repetitive eccentric or stretch-shortening cycle

The author is with the School of Recreation Management and Kinesiology, Acadia University, Wolfville, NS, Canada B4P 2R6.



GREAT BRITAIN HOCKEY · TEAM GB · ENGLISH INSTITUTE OF SPORT

# DJ-RSI

Why?

1. Simple, reliable, repeatable
2. Can be performed anywhere – KMS

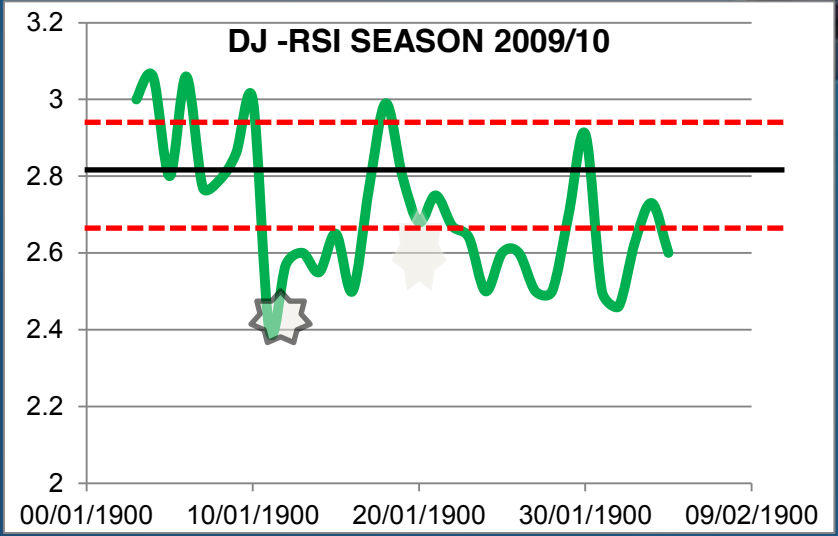
Drop Jump – Reactive Strength Index

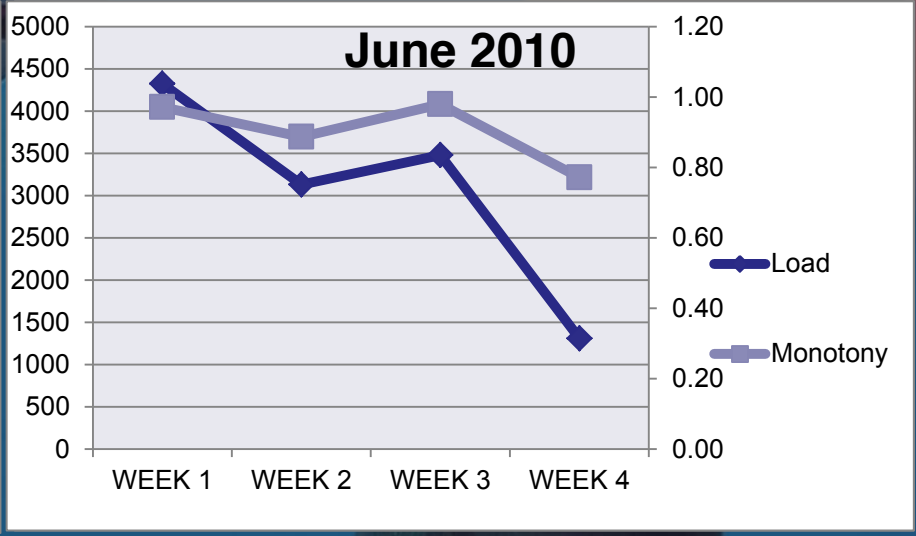
| CV | SWC |
|---|---|
| 4% | 0.1 |

# Findings – Year 1 Acute

## 2 Cases - Over-Training?

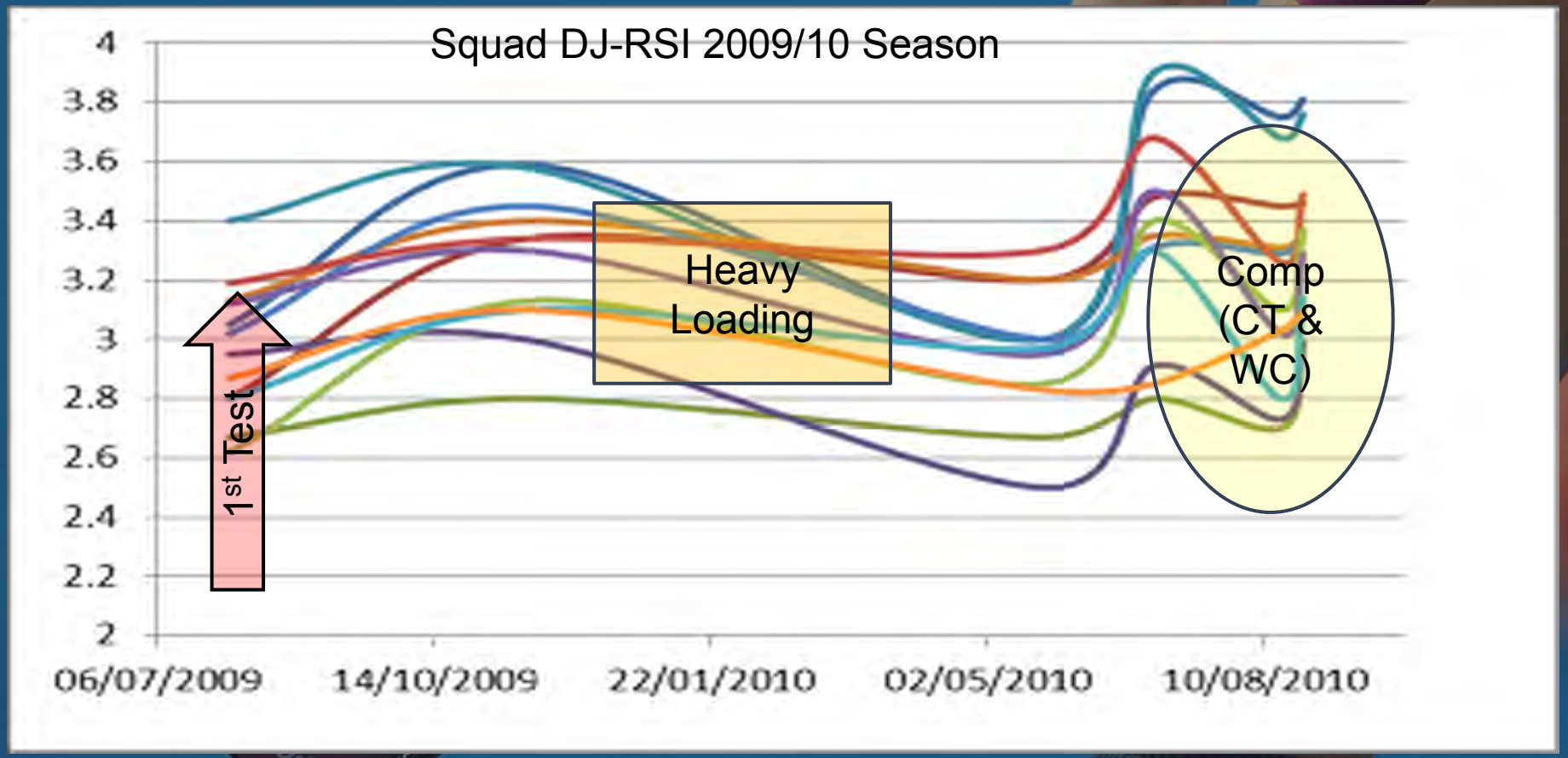
| | Athlete 1 | Athlete 2 |
|---|---|---|
| Date | Mar-April 2010 | June-July 2010 |
| 'Coaches Eye' | Poor Form | Sluggish |
| Field Testing Results | Decline | No Change |
| Session RPE | Load High | Monotony Score High |
| DJ-RSI | Low | Low |
| Decision | 3 wks. @ 25% reduced load | 2 wks. @ 25% reduced loading – no change |



# Findings – Year 1 Chronic

Trend: Squad DJ-RSI

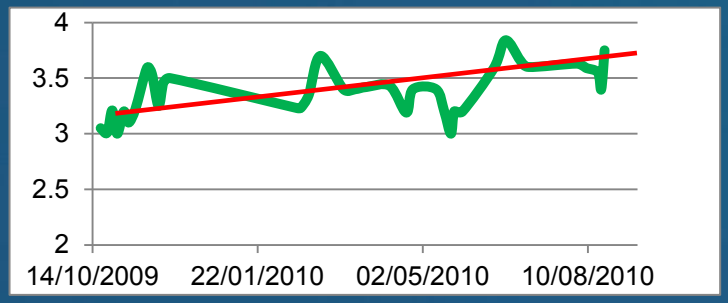


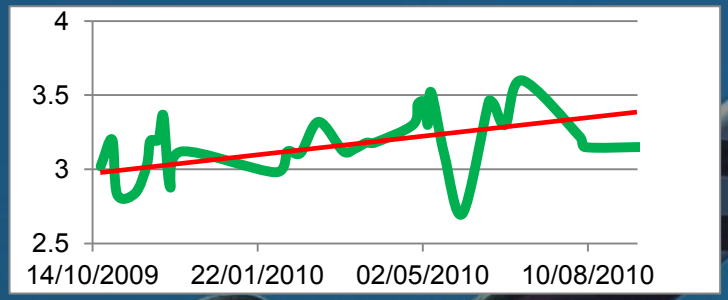

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

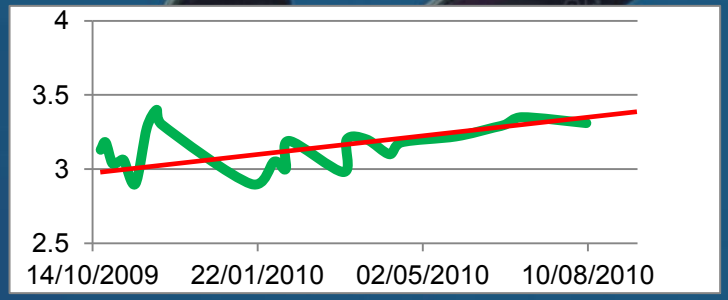
# Findings – Year 1 Chronic

Individual DJ Trends

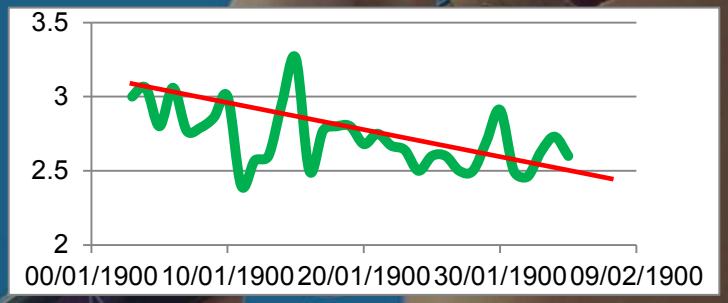
Older (Training Age)

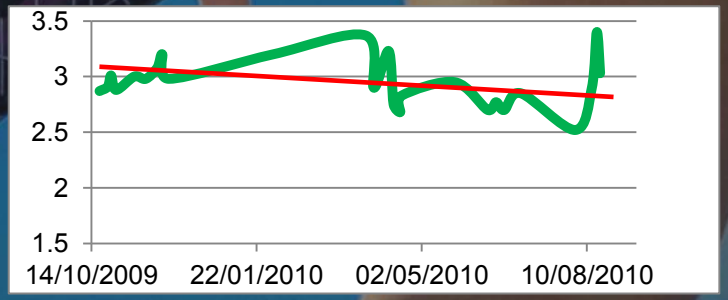


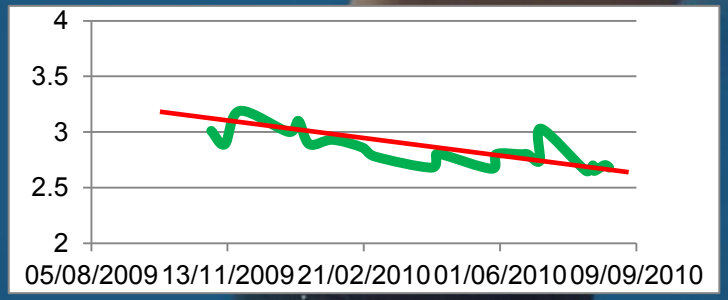




Younger (Training Age)

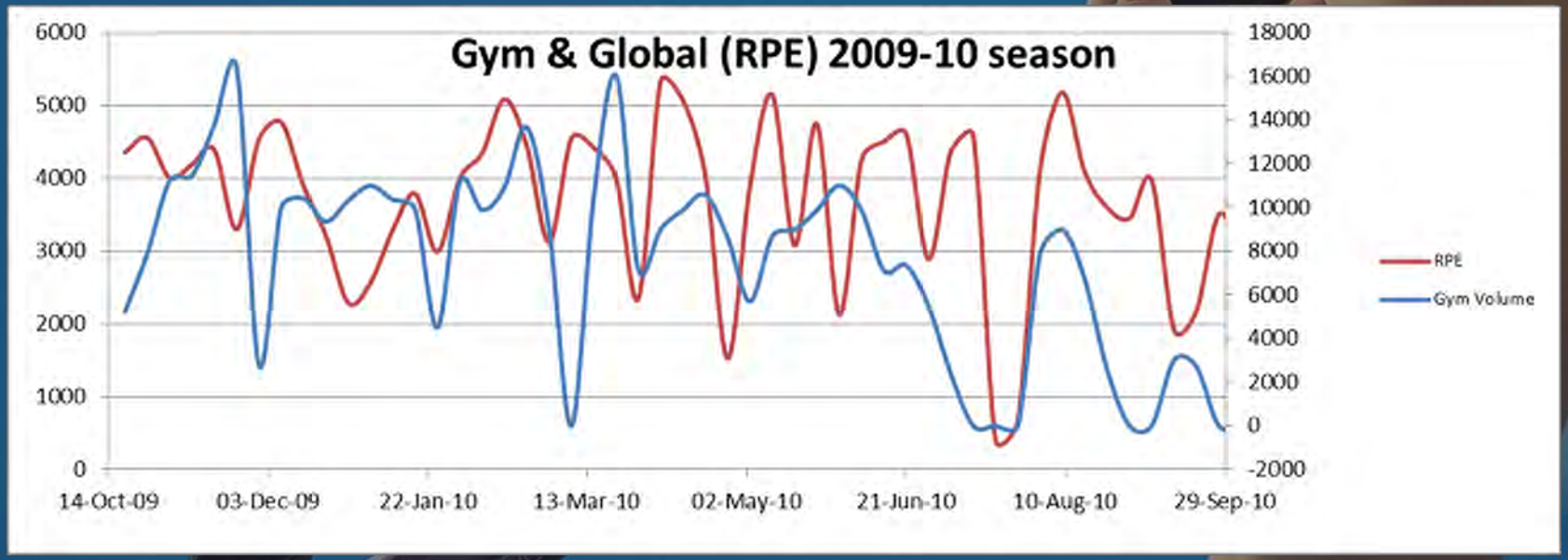


# Summary

- DJ-RSI Useful Marker - NM fatigue in Hockey Players
- Session RPE + DJ-RSI – Over-training Gauge (more cognitive, somatic markers needed)
- Session RPE - Gym Loading = Hockey Demands




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT


Year 2
Finalise Monitoring Model for
Olympic Year 2012

# Finalise Monitoring Model

Additions: Monitoring Model V.2

1. Hormone Profiling (UKSPORT – R&I)
2. Menstrual Data
3. Online Monitoring (Restwise)
4. DJ-RSI in Competitions

Constants

1. Session RPE
2. DJ-RSI (3 x wk.)


GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Hormone Profiling

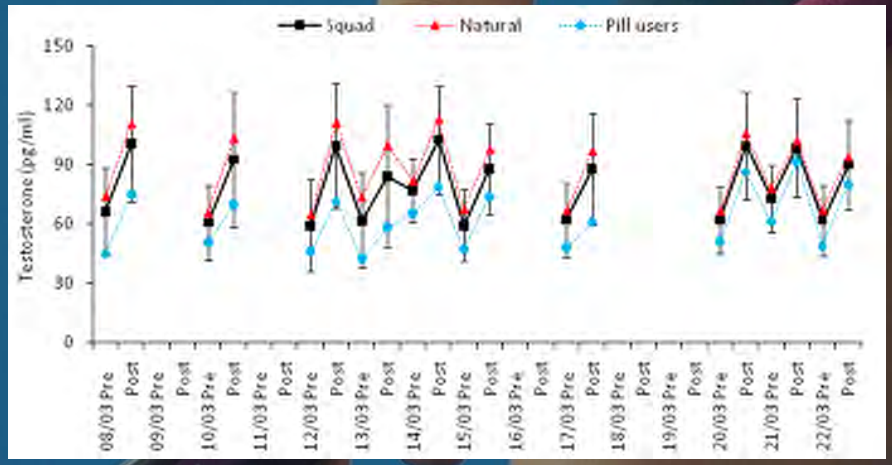
March 2010 – UKSport R&I

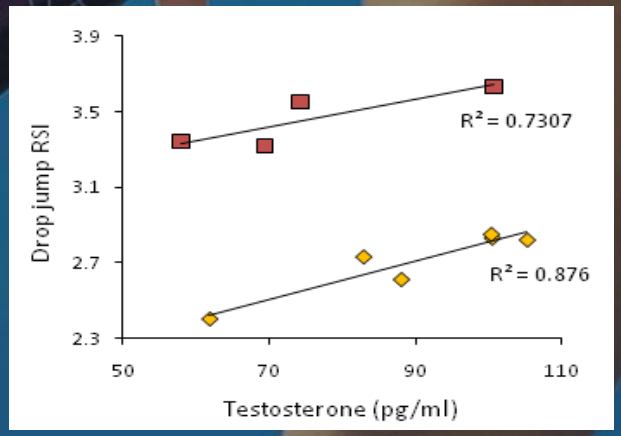
Measured: Testosterone & Cortisol

<u>4 key Outcomes</u>

1. High T and Good Responders
2. Load Tolerant
3. T good relationship with DJ-RSI
4. Difference OC and Naturals

Impact Areas – Competition, Physical Development, Recovery



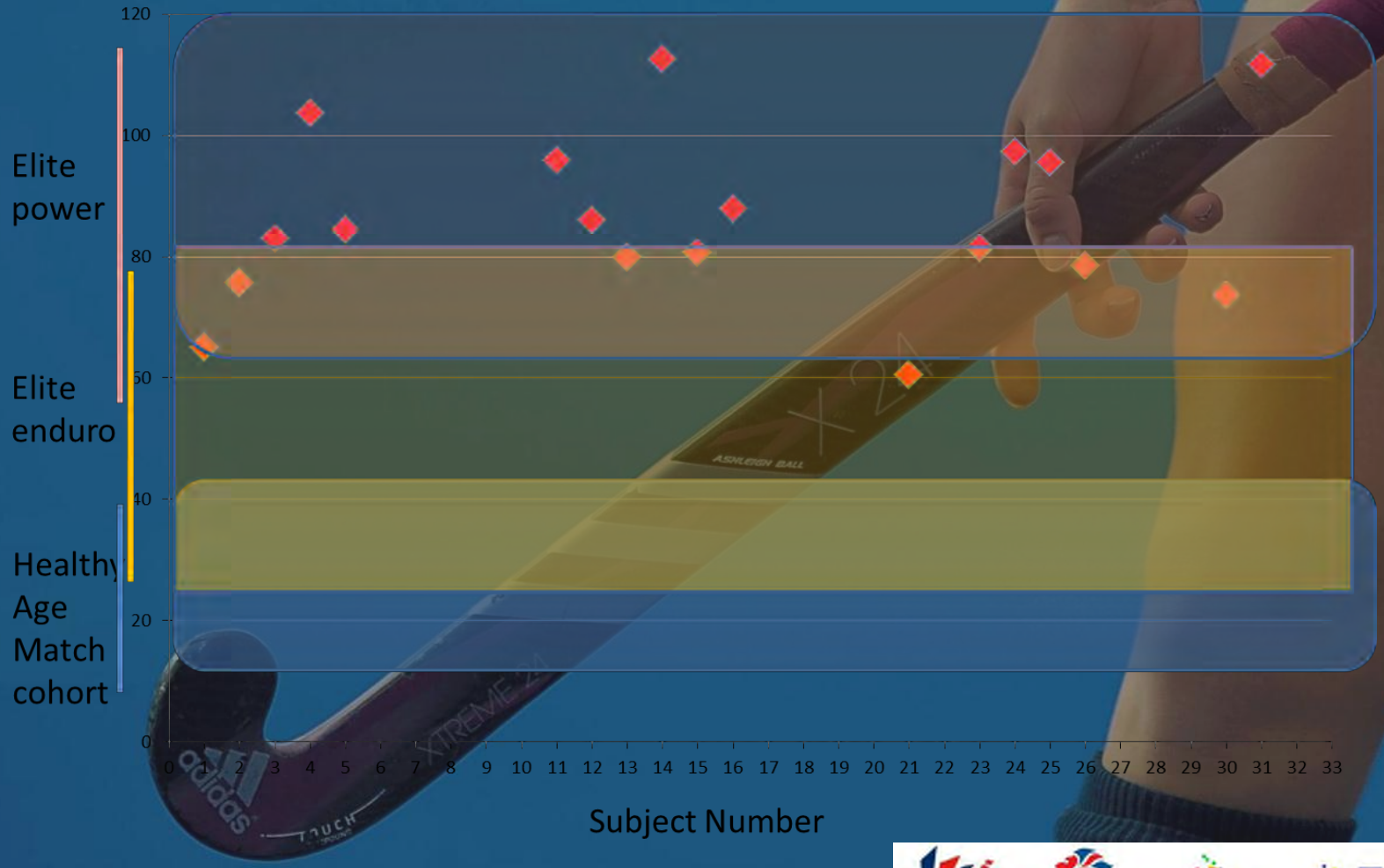




GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT

# Hormonal Profiling (T): Naturals




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Hormonal Profiling (T): OC

Am J Hum Biol. 2012 Aug 22. doi: 10.1002/ajhb.22302. [Epub ahead of print]

## Comparison of baseline free testosterone and cortisol concentrations between elite and non-elite female athletes.

Cook CJ, Crewther BT, Smith AA.

United Kingdom Sports Council, London, United Kingdom; Sport, Health and Exercise Science, Department for Health, University of Bath, Bath, United Kingdom; Hamlyn Centre, Imperial College, London, United Kingdom; Health and Sport Portfolio, College of Engineering, Swansea University, Swansea, United Kingdom.

**Abstract**

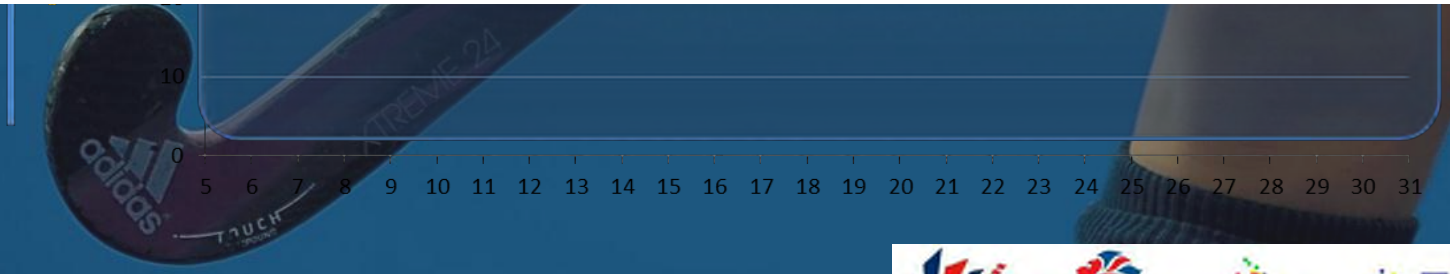
**OBJECTIVES:** To compare the baseline free testosterone (T) and cortisol (C) concentrations of elite and non-elite female athletes.

**METHODS:** Eighteen females from different sports (track and field, netball, cycling, swimming, bob skeleton) were monitored over a 12-week period. Baseline measures of salivary free T and C concentrations were taken weekly prior to any training. The elites (n = 9) and non-elites (n = 9) were classified as international and national level competitors, respectively, with both groups matched by sport.

**RESULTS:** The pooled free T concentrations of the elites (87 pg/ml) were significantly higher than the non-elites (41 pg/ml) and consistently so across all weekly time points ($P < 0.001$). Pooled free C concentrations were also greater in the elite group (2.90 ng/ml) than the non-elites (2.32 ng/ml) ($P < 0.01$).

**CONCLUSIONS:** The pooled baseline T and C measures were higher in elite female athletes than non-elites. Higher free T and C concentrations could indicate a greater capacity for physical performance at higher work rates, which is commensurate with the demands of elite sport. Speculatively, the T differences observed could influence female behavior and thereby help to regulate sporting potential. Am. J. Hum. Biol., 2012. © 2012 Wiley Periodicals, Inc.

Match cohort




GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT

# Menstrual Data

| | | | | | S&C Periodisation Thoughts | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Menstrual | Phase | Hormone Level | Physiological and Psychological Changes | Effect on Training | Weeks | Focus | Intensity | Priority Session | Simple Terms |
| 1 | Early Follicular (Mensus) | Oestrogen, Progesterone & Testosterone Low | Changes in mood resulting in increased stress, accidents, poor reaction times and perception of excertion. Immune depression | Eliminate skill and precision training, reduce stress and training volume | 1 | Regen | Light | Mixed Early Light Conditiong & Start loading gym | |
| 2 | | | | | | | | | |
| 3 | | | | Include anaerobic and power based activity, lactic acid based work and strength training | | Metabolic | | | |
| 4 | | | | | | | Medium | | |
| 5 | | | | | | | | | |
| 6 | Mid Follicular | Oestrogen Rising, Progesterone Low | | Include high intensity, low volume, complex tasks, anaerobic and power based activity, lactic acid based work and strength training | | Metabolic & Strength | | Speed | |
| 7 | | | | | | | | | |
| 8 | | | | | 2 | | | | |
| 9 | Late Follicular | Oestrogen Peak | Increased glycogen storage, fat and protein and water and electrolyte stores | Include low intensity and high volume aerobic work. Emphasize nonweight bearing activities and prolonged exercise | | Aerobic & Injury Prevention | Medium Heavy | Conditioning | |
| 10 | | | | | | | | | |
| 11 | | | | | | | | | |
| 12 | | | | | | | | Gym & Speed | |
| 13 | | | | | | | | | |
| 14 | Ovulation | Testosterone Peak | | Strength & Power Training | | Maximal Strength * Power | Very Heavy | | |
| 15 | Early Luteal | Progesterone Rising | Increased glycogen stores in liver and muscle tissue. Decreased glycogen stores in blood glucose. Increase in total energy and fat intake. Depression of blood lactate concentration. Greatest retention of water, sodium, chloride and potassium | Include High intensity, low volume, complex task. Anaerobic and power based activity, lactic acid based work and strength training | 3 | | | | |
| 16 | | | | | | | | | |
| 17 | | | | | | | | | |
| 18 | | | | | | | | | |
| 19 | | | | | | | | | |
| 20 | | | | | | | | | |
| 21 | Mid Luteal | Oestrogen and Porgesterone Peak | Greater protein breakdwon. Muscular enduarnce low. Increased glycogen storage, increased fat and protein. Increased water and electrolyte stores | Include low intensity and high volume aerobic work. Emphasize nonweight bearing activities and prolonged exercise. Ability to cope with heat stress | | Aerobic & Injury Prevention | Medium | Conditioning Heavy | |
| 22 | | | | | | | | | |
| 23 | | | | | | | | | |
| 24 | | | | | 4 | | | | |
| 25 | Late Luteal | Oestrogen, Progesterone & Testosterone Low | Changes in moood resulting in increased stress, accidents, poor reaction times and perception of excertion. Immune depression | Recovery week. Eliminate skill and precision training. Include Simple tasks and low stress. Reduce stress and training volume and include strength training | | Recovery | Light | Light Mixed | |
| 26 | | | | | | | | | |
| 27 | | | | | | | | | |
| 28 | | | | | | | | | |
| 29 | | | | | | | | | |
| 30 | | | | | 5.00 | | | | |
| 31 | | | | | | | | | |

Days

GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT

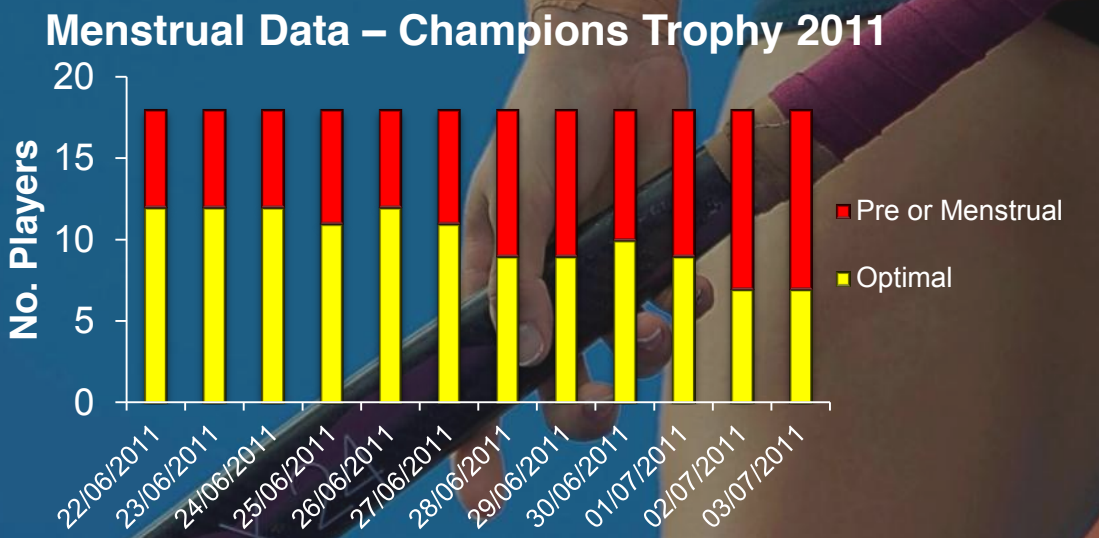
# Menstrual: Physical Development

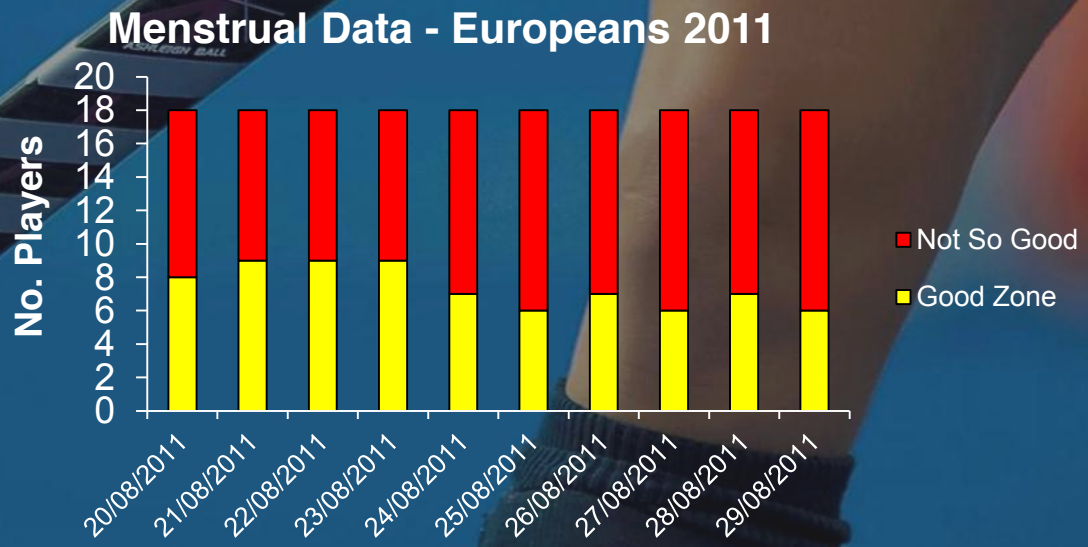
How did it work?

1. Collect data (Oct 2010)
2. Prescriptive changes (S&C)
3. Competition
4. Then What?

Interventions?

Management?



# Restwise

What is it?

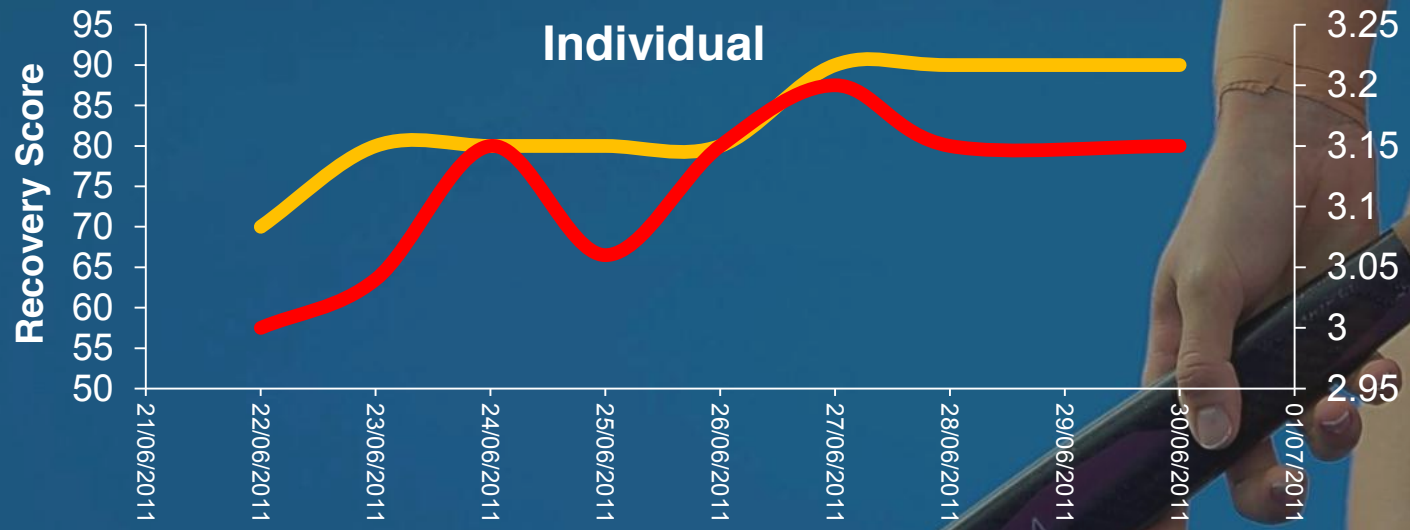
- Online – Monitoring Tool
- Simple & Easy
- Recovery score
- Nice add-on: Player Understanding

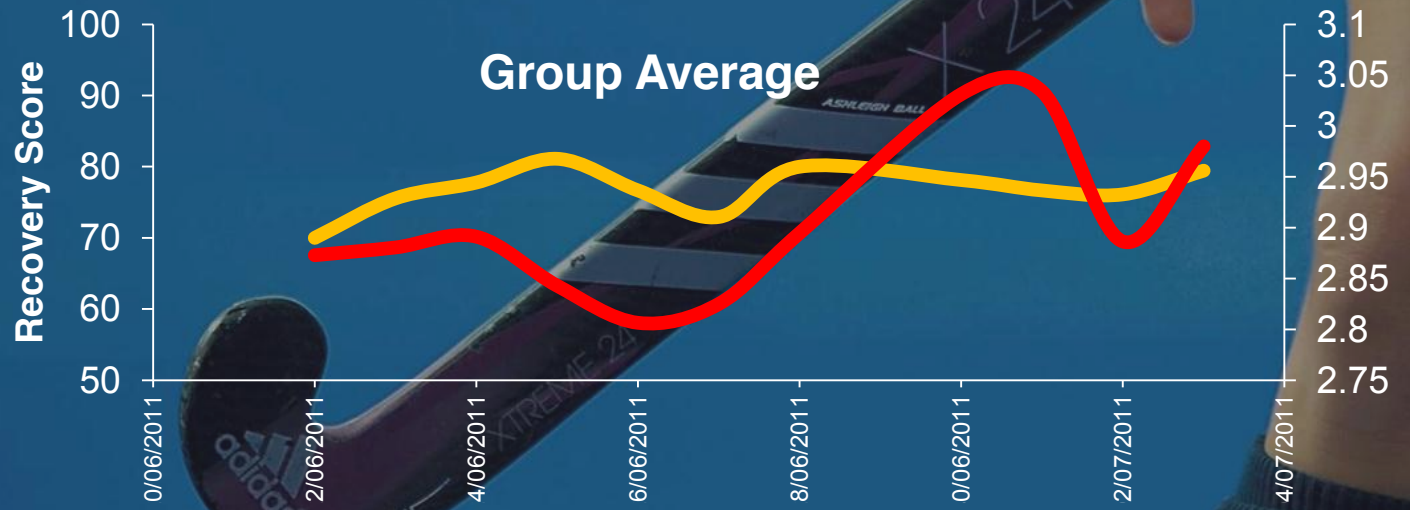
- Apps



GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Findings – DJ-RSI & Restwise

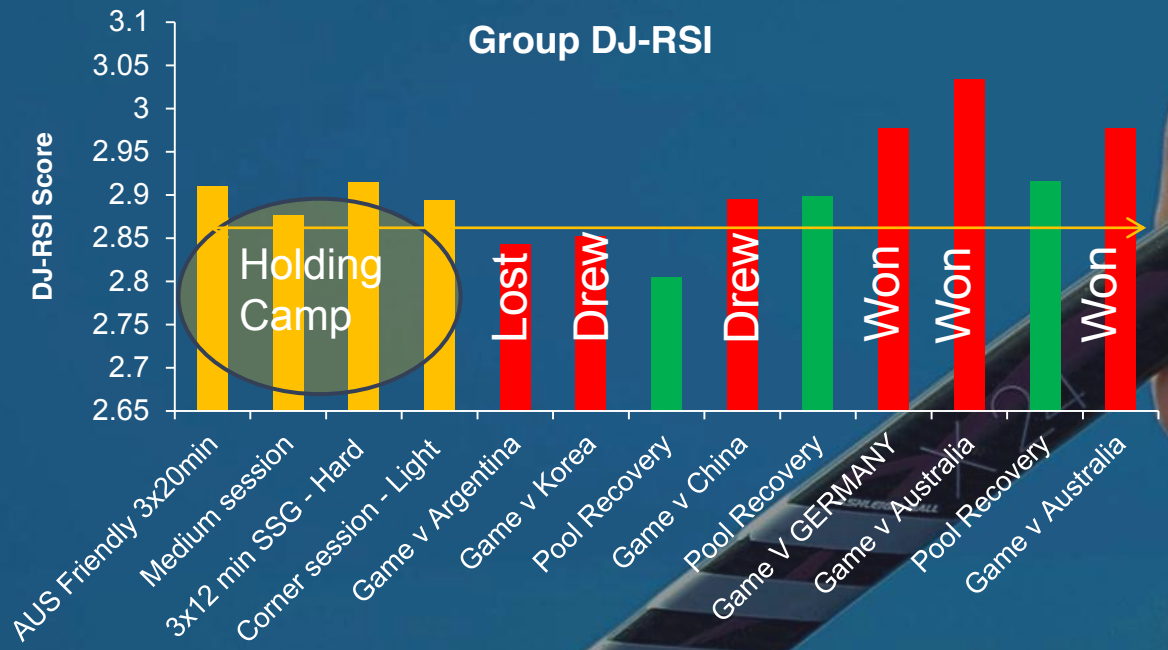


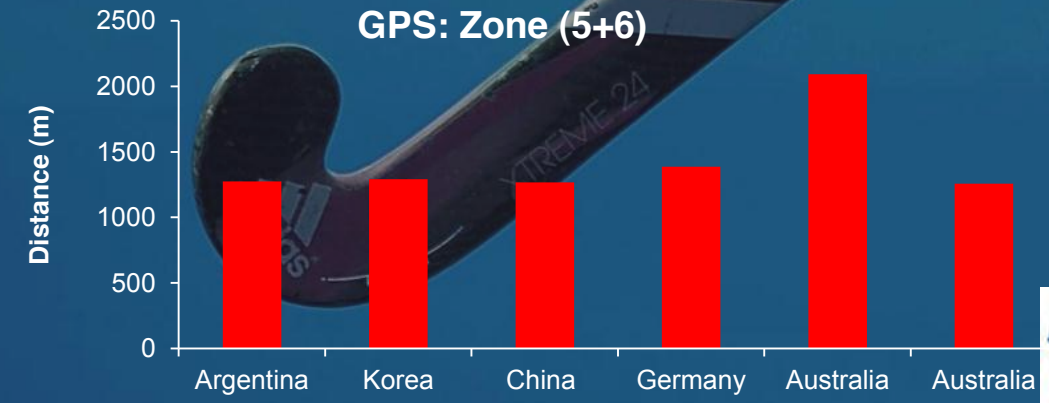




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# DJ Competition: Case Study 1 - Holding Camp

1. Champion Trophy: June 2011 (Bad Example)




- DJ-RSI poor – Game 1: Why?
- Q? Taper Strategy

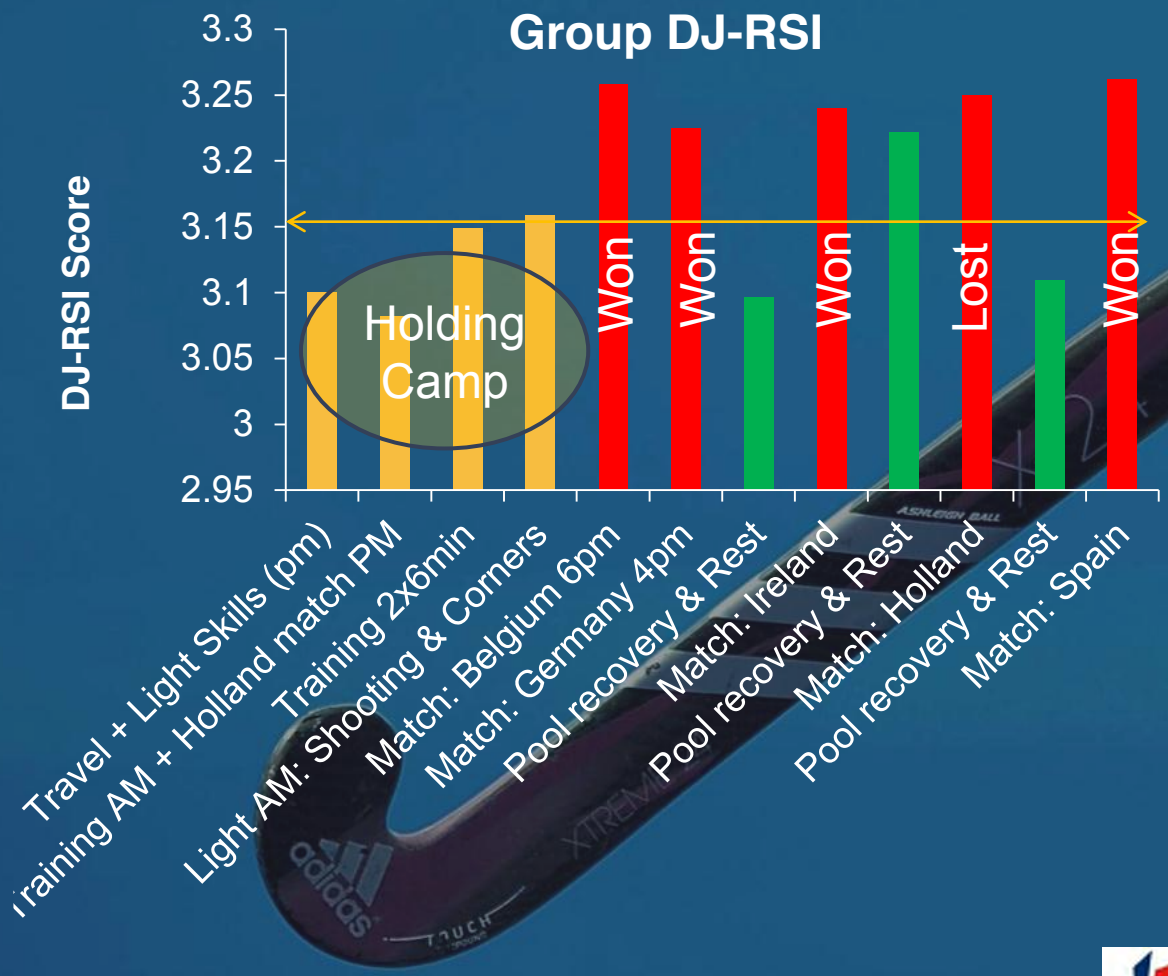
Thoughts

- 6 hour travel + evening game
- 48 hours – training to hard

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Case Study 1 – Holding Camp

1. European Championship 2011 – August




- DJ good – Game 1: Why?
- New Strategy (loading)

GREAT BRITAIN HOCKEY · TEAM GB · ENGLISH INSTITUTE OF SPORT

# Ideal Holding Camp Strategy

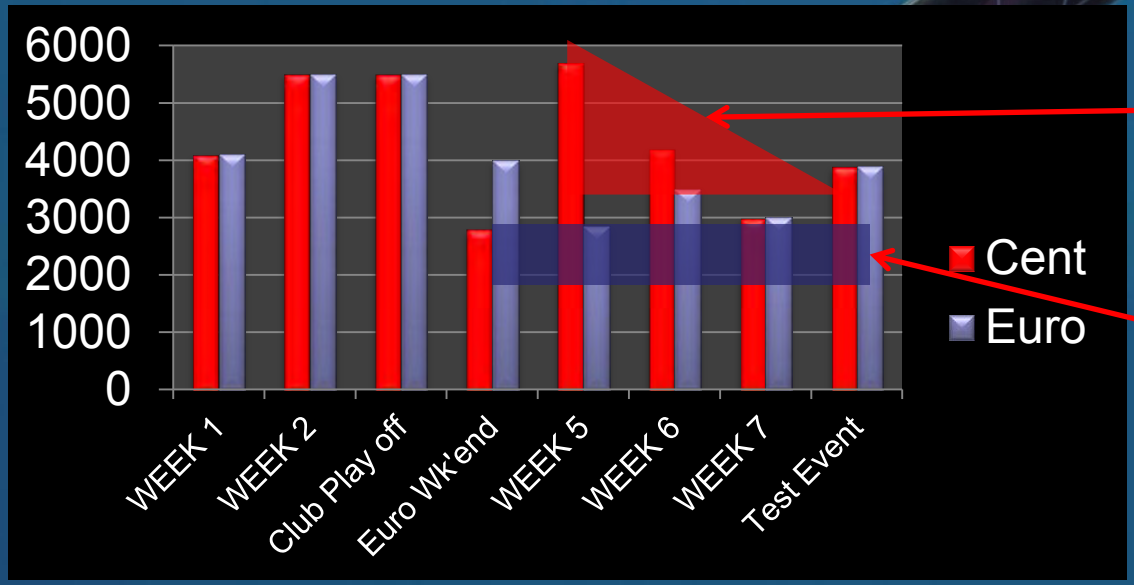
| Monday: Bisham | Tuesday: Arrived | Wednesday | Thursday | Friday | Saturday |
|---|---|---|---|---|---|
| Hockey (M) | Flight (M) | Rest | Hockey 7v7 (2x6mins) (M) | Hockey: Shooting & Corners (L) | Rest |
| Gym Primer (L) | Hockey PM: Aerials & Corners | Game Vs Holland 3x20 (H) | Rest (L) | Rest | Game 1 Vs Belgium |
| Moderate | Moderate | Heavy | Moderate | Light | Heavy |

# Case Study 2: Player Management

Champions Trophy 2011

- Two Player Groups (European Cup Finals & England Centralised)
- Two - Training regimes
- Two - Performance outcomes
- 'Management Vs Development'

| Date | Week | Centralised | Euro-players |
|---|---|---|---|
| 11/03/2012 | 1 | Testing - MH | Testing |
| 18/03/2012 | 2 | Heavy - H | H |
| 25/03/2012 | 3 | Club Play off - VH | Club Play off - VH |
| 01/04/2012 | 4 | ML - Decentralised | Euro Play offs - H |
| 08/04/2012 | 5 | Overreach 1 - H | Recovery - L |
| 15/04/2012 | 6 | Taper 2 - MH | Rebuild - M |
| 22/04/2012 | 7 | Taper 1 - ML | Taper 1 |
| 29/04/2012 | 8 | Test Event | Test Event |




Player Development & Taper

Player Management

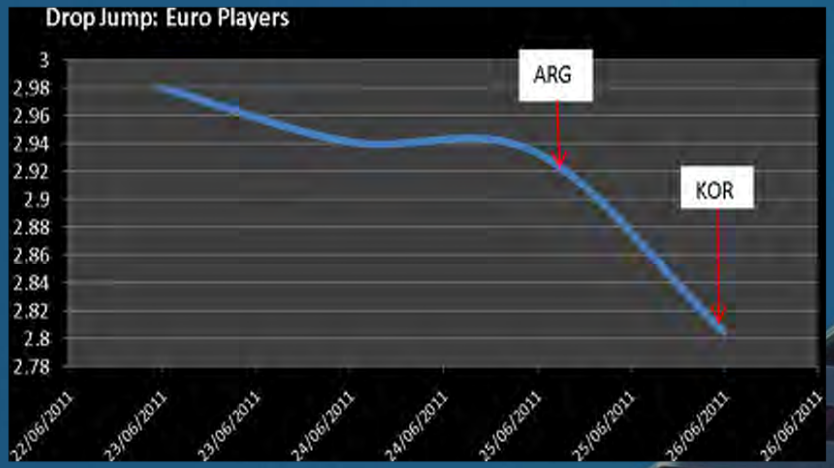
*Based on actual RPE data collected 2010

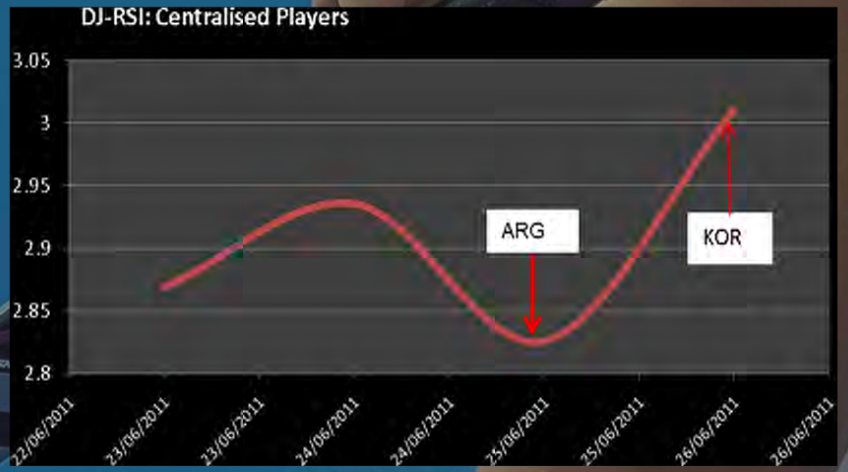
GREAT BRITAIN HOCKEY TEAM GB ENGLISH INSTITUTE OF SPORT

# Case Study 2: Player Management

Performance Markers – CT2011

1. Drop Jump




- Suppressed NMS
- Lack of variance

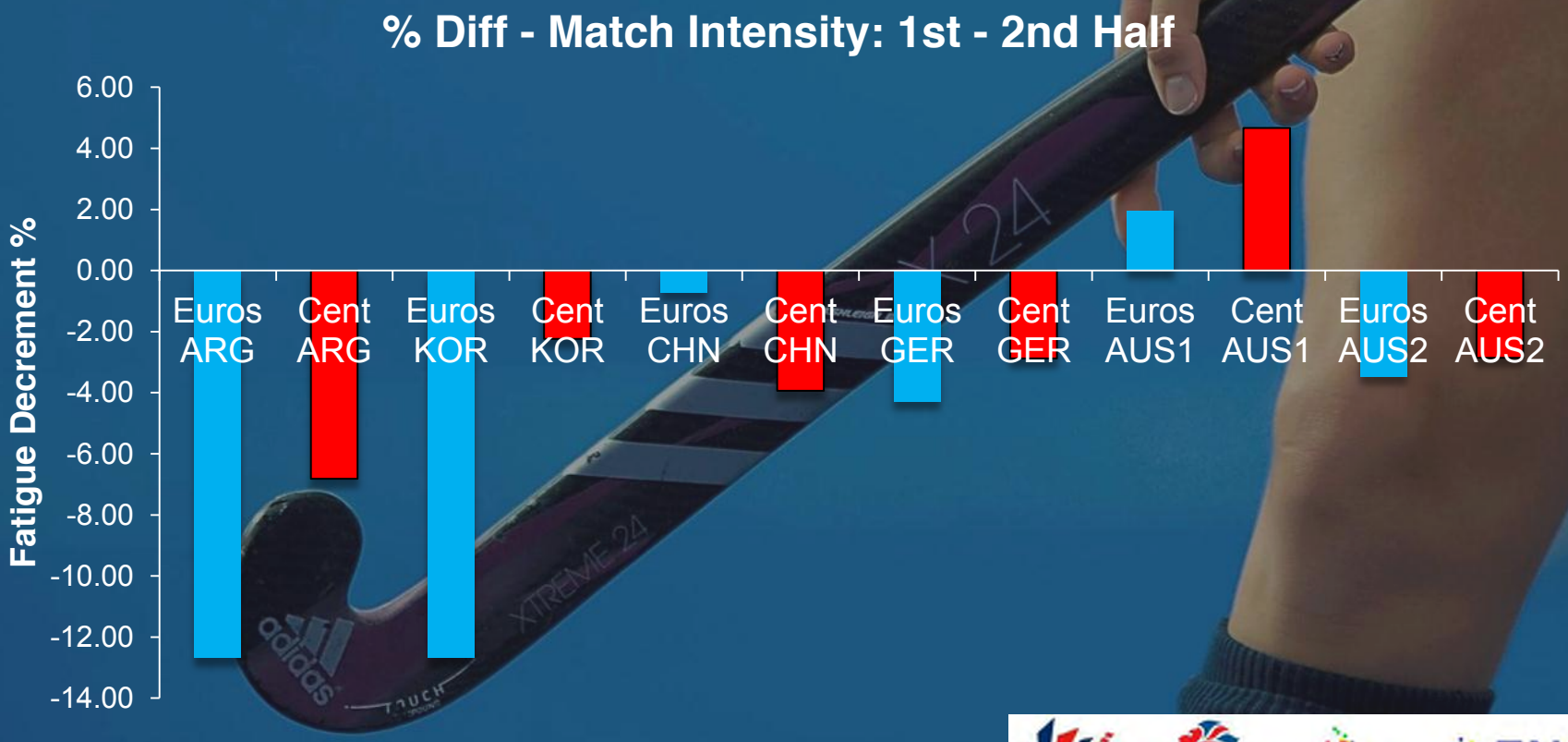
- NMS Active
- High Variance

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Case Study 2: Player Management

Performance Markers

- GPS - Match Intensity ($m.min^{-1}$)




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Year 2: Summary

1. Menstrual Cycle – Can we optimise cycle & performance?
2. DJ – Powerful
3. Restwise
4. Holding Camp Strategy – Very close to perfect?
5. Management Vs. Development ‘issues’ – What have we learnt?


GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT


# Year 3

*Actualisation Phase*

# Year 3: Actualisation Phase

- Happy with Monitoring Model?
- Where else are the margins for change?

1. Post Match Recovery – How effective is it
2. Hormone Priming –What, Where, When.
3. Taper, DJ-RSI & Performance
4. Olympic Outcome?


GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Post Match Recovery

Recovery Package

Q. How can we ma

Answer: Mind-bod

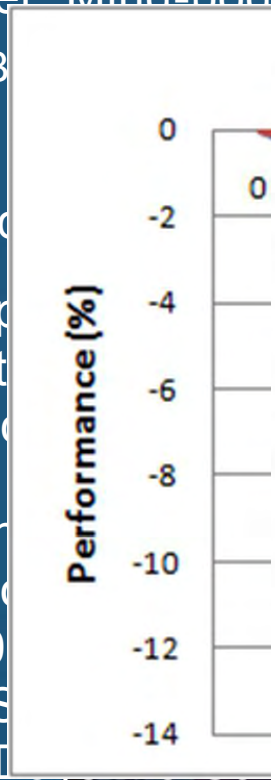
a. B

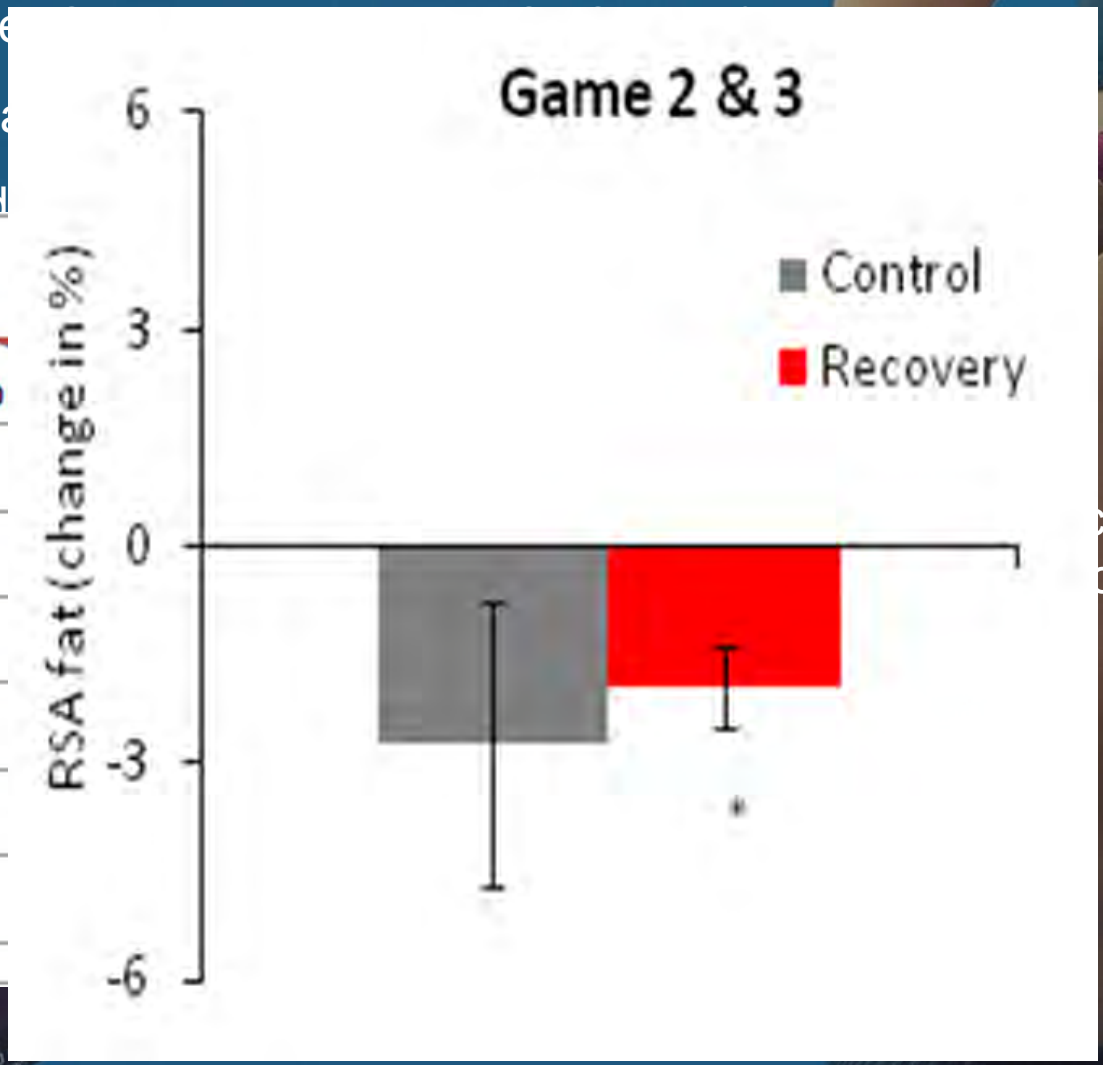
Immed

- Sup
  Bat
  sto

Testi

- X-
- 30
- RS
- 4 D




ce
on

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

Physiol Behav. 2012 Jul 16;106(5):683-8. Epub 2012 May 16.

## The effects of different pre-game motivational interventions on athlete free hormonal state and subsequent performance in professional rugby union matches.

Cook CJ, Crewther BT.

United Kingdom Sport Council, London, UK.

**Abstract**

We examined the effect of different pre-match motivational interventions on athlete free testosterone (T) and cortisol (C) concentrations and subsequent match performance in professional rugby union. Male participants (n=12) playing at a senior or academy level in rugby union were recruited and each completed three interventions (15 min each) before a competitive game; 1) watching a video clip of successful skill execution by the player with positive coach feedback [VPCF1]; 2) watching a video clip of successful skill execution by an opposing player with cautionary coach feedback [VCCF], 3) the player left alone to self-motivate [SM1]. The first and last interventions were retested [VPCF2 and SM2]. Salivary free T and C measures were taken pre-intervention and pre-game. Within each game, players were rated by coaching staff on a key performance indicator (KPI) from identified skills and an overall performance indicator (OPI), where 1 = best performance to 5 = worst performance. The VPCF1 and VPCF2 interventions both promoted significant T responses (11.8% to 12.5%) before each game and more so than SM1, SM2 and VCCF. The VCCF approach produced the largest C response (17.6%) and this differed from all other treatments. The VPCF interventions were also associated with better game KPI (1.5 to 1.8) and OPI ratings (1.7 to 1.8) than SM1, SM2 and/or VCCF. Across all treatments, greater individual T responses and lower C responses were associated with better KPI and OPI outcomes. In conclusion, the pre-game presentation of motivational strategies to athletes involving specific video footage and coach feedback produced different outcomes on two indicators of match performance, which were also associated with changes in free hormonal state.

Copyright © 2012 Elsevier Inc. All rights reserved.

Physiol Behav. 2012 Jun 25;106(4):471-5. Epub 2012 Mar 21.

## Effects of different post-match recovery interventions on subsequent athlete hormonal state and game performance.

Crewther BT, Cook CJ.

Hamlyn Centre, Imperial College, London, UK. bcrewther@imperial.ac.uk

**Abstract**

We tested the effects of different post-match recovery interventions on the subsequent hormonal responses to a physical stress-test and game performance in professional rugby union players. On four occasions, participants (n=12) completed a video session (1 h each) with accompanying coach feedback the day after a rugby union match. The interventions showed either video footage of player mistakes with negative coach feedback (NCF1) or player successes with positive feedback (PCF1). Both approaches were repeated (NCF2 and PCF2). In the following week, participants were assessed for their free testosterone (T) and cortisol (C) responses to a physical stress-test, pre-game T and game-ranked performance. The PFC1 and PCF2 approaches were both associated with significantly ($p<0.01$) greater free T (36% to 42%) responses to the stress-test when compared to NCF1 and NCF2 (16% to -3%), respectively. The PCF interventions were also associated with higher (28% to 51%) pre-game T concentrations and superior game-ranked performances than the NCF approaches ($p<0.01$). In conclusion, the post-game presentation of specific video footage combined with different coach feedbacks appeared to influence the free hormonal state of rugby players and game performance several days later. Therefore, within the sporting context, future behaviour and performance might be modified through the use of simple psychological strategies. These data are applicable to generalised human stress responses and their modifiability by prior exposure to a stressor.

Copyright © 2012 Elsevier Inc. All rights reserved.

GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT

# Post Match Recovery – DJ-RSI

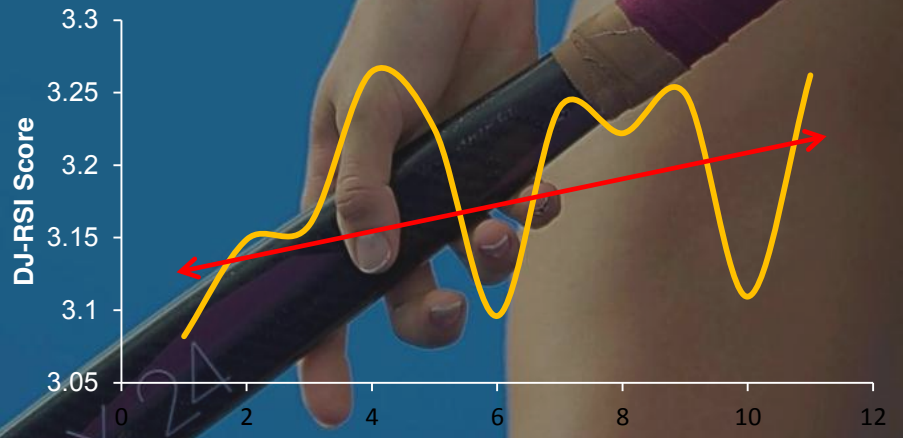
## Training: USA (5 in 6)

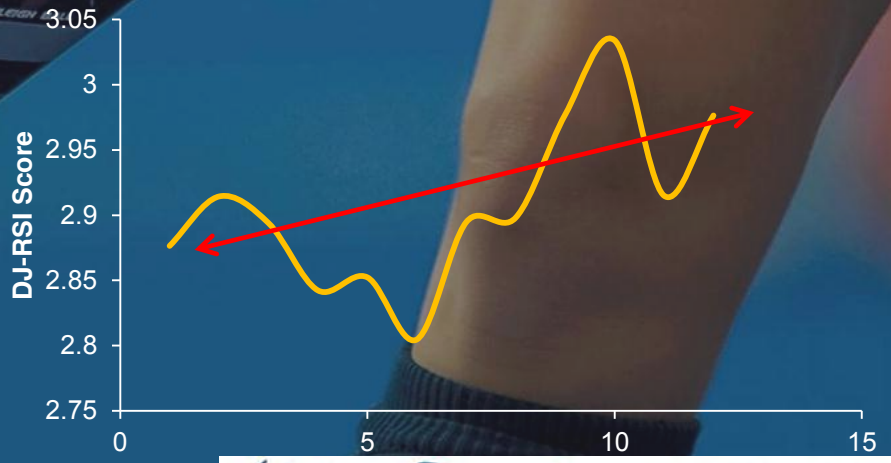
- No Recovery intervention

| Date | Session | DJ-RSI |
|---|---|---|
| 07/12/2011 | Gym & Training | 3.256 |
| 08/12/2011 | Gym & Training | 3.257 |
| 09/12/2011 | Gym & Training | 3.359 |
| 11/12/2011 | Game v USA | 3.188 |
| 12/12/2011 | Pitch & Upper Body | 3.320 |
| 13/12/2011 | Speed Session (light) | 3.201 |
| 15/12/2011 | Game v USA | 3.281 |
| 15/12/2011 | Game v USA | 3.281 |
| 17/12/2011 | Game v USA | 3.176 |
| 18/12/2011 | Game v USA | 3.220 |


## Competitions (Euro 2011, CT 2011)

- Full Recovery package

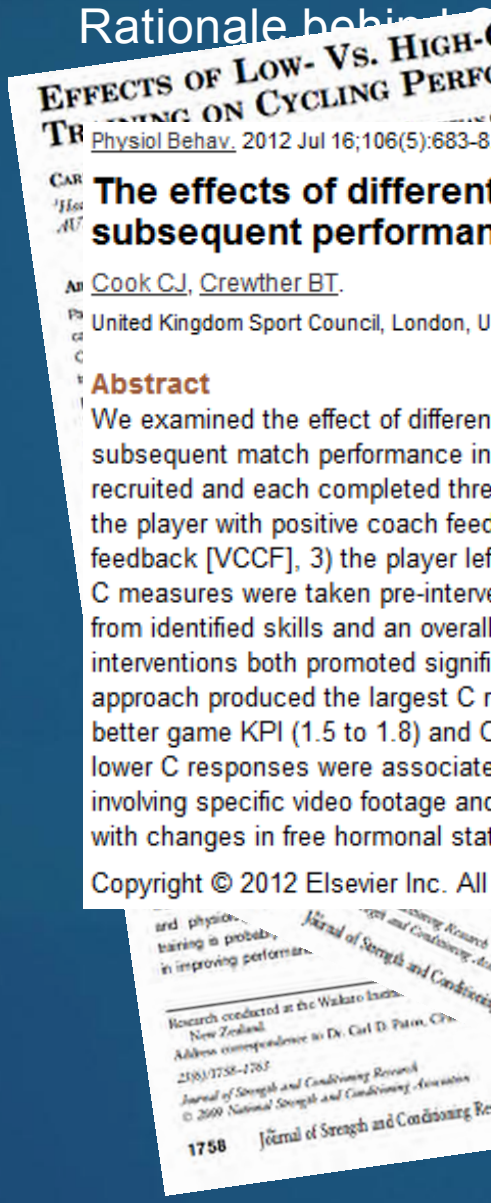



GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Priming

Rationale behi



EFFECTS OF LOW- VS. HIGH-
TR ING ON CYCLING PERF

Physiol Behav. 2012 Jul 16;106(5):683-8

**The effects of different**
**subsequent performan**

Cook CJ, Crewther BT.

United Kingdom Sport Council, London, U

**Abstract**

We examined the effect of differen
subsequent match performance in
recruited and each completed thre
the player with positive coach feec
feedback [VCCF], 3) the player lef
C measures were taken pre-interve
from identified skills and an overall
interventions both promoted signifi
approach produced the largest C r
better game KPI (1.5 to 1.8) and C
lower C responses were associate
involving specific video footage anc
with changes in free hormonal stat

Copyright © 2012 Elsevier Inc. All

and physio
training is probab
in improving performa

Research conducted at the Waikato Insti
New Zealand.
Address correspondence to Dr. Carl D. Paton, Ch
2588/1758-1765
Journal of Strength and Conditioning Research
© 2009 National Strength and Conditioning Association

1758 Journal of Strength and Conditioning Re

REVIEW ARTICLE

Sports Med 2011; 41 (2): 103-123
0112-1642/11/0002-0103/$49.95/0

© 2011 Adis Data Information BV. All rights reserved.

## Two Emerging Concepts for Elite Athletes

### The Short-Term Effects of Testosterone and Cortisol on the Neuromuscular System and the Dose-Response Training Role of these Endogenous Hormones

*Blair T. Crewther*,[1,2,3] *Christian Cook*,[3,4,5] *Marco Cardinale*,[6,7] *Robert P. Weatherby*[2] and *Tim Lowe*[8]

1 The New Zealand Institute for Plant & Food Research Limited, Hamilton, New Zealand
2 Department of Exercise Science and Sport Management, Southern Cross University, Lismore, New South Wales, Australia
3 Hamlyn Centre, Institute of Global Health Innovation, Imperial College, London, UK
4 United Kingdom Sport Council, London, UK
5 Sport, Health and Exercise Science, Bath University, Bath, UK
6 British Olympic Medical Institute, London, UK
7 University College London, Division of Surgical and Interventional Science, London, UK
8 School of Applied Sciences, Bay of Plenty Polytechnic, Tauranga, New Zealand

**Contents**

Abstract . . . 104
1. Introduction . . . 104
2. Literature Search Methods . . . 105
3. Hormonal Effects on the Neuromuscular System . . . 105
3.1 Long-Term Effects of Exogenous Hormones . . . 106
3.1.1 Muscle Development . . . 106
3.1.2 Neural Development . . . 106
3.2 Short-Term Effects of Exogenous Hormones . . . 106
3.2.1 Steroid Receptors . . . 106
3.2.2 Second Messengers and Lipid/Protein Pathways . . . 107
3.2.3 Behaviour and Cognition . . . 107
3.2.4 Motor System . . . 107
3.2.5 Muscle Properties . . . 107
3.2.6 Energy Metabolism . . . 108
3.3 Summary . . . 108
4. Hormonal Contribution to Resistance Training . . . 109
4.1 Acute Modifications in Endogenous Hormones . . . 109
4.1.1 Workout Design . . . 109
4.1.2 Nutrition . . . 110
4.1.3 Training Status and Type . . . 110
4.1.4 Genetic Variation . . . 111
4.2 Chronic Modifications in Endogenous Hormones . . . 111
4.2.1 Training Status . . . 111
4.2.2 Training Type . . . 112
4.3 Acute and Chronic Modifications in Steroid Receptors . . . 113
4.3.1 Androgen Receptors . . . 113

**e hormonal state and**

sol (C) concentrations and
emy level in rugby union were
lip of successful skill execution by
posing player with cautionary coach
PCF2 and SM2]. Salivary free T and
on a key performance indicator (KPI)
ance. The VPCF1 and VPCF2
SM2 and VCCF. The VCCF
itions were also associated with
eater individual T responses and
of motivational strategies to athletes
rmance, which were also associated

GREAT BRITAIN HOCKEY

ENGLISH INSTITUTE OF SPORT

# Priming

What is it?

Training stimulus used to promote a positive change in Testosterone

How?

1. Individual (hormone profile) – identify key Exercise/intensity

   = ↑ NM function & testosterone

2. Mind-Body Link

3. Reinforce with feedback

When?

- Rest days – decline in NM Function
- Late Games – Potentiation/activation of NM System

Performance Marker – DJ-RSI

GREAT BRITAIN HOCKEY

TEAM GB

ENGLISH INSTITUTE OF SPORT

# Priming Format

## Great Britain Women's Hockey Primer Session

**Name**

| | |
|---|---|
| **10 minute Warm Up** | **This should involve activities which best suit your session content and is player led. You may chose classic dynamic exercises, mobility work, foam roller or activation activities** |
| **Examples** | Foam Roller Work (gluts, ITB) – Hip mobility Circuit – Body Weight Squats |

**Profile Type: Elite Power (Force)**

| | Option 1 | Option 2 | Option 3 | Option 4 | Option 5 |
|---|---|---|---|---|---|
| **Exercise** | (2 x WU sets) 2x2 @ 85% Back Squat or Leg Press | Squat Jumps 3x3 @ 20% 1RM | (2 WU sets) Power Cleans @ 75% 2x2 | Max Load Cycle (high load) 4x7s - 1min rest easy | Cycle: 5x7s sprint 30s between (moderate resistance) |
| **Rest (s)** | 120 | 120 | 120 | 1 set | 1 set |

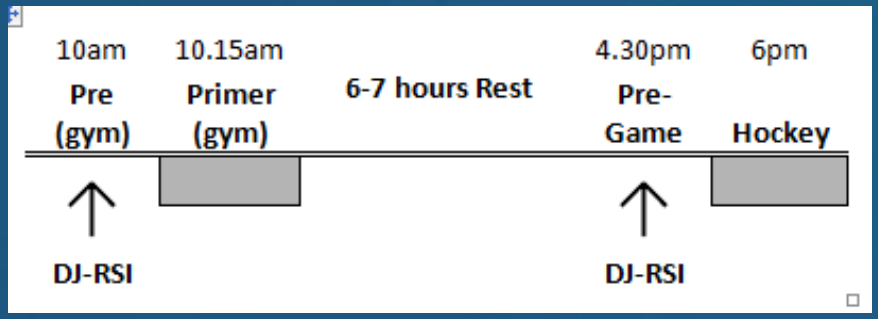
| | |
|---|---|
| **Supplementary:** | **This is secondary to the primer activities and is optional. You may choose to do some upper body exercises, activation work or core. I will be available should you need guidance with your exercise selection here.** |
| **Examples** | DB Curl & Press – Supine Pulls 3x12 – Bench Press – Glut Shuffles – BOSU Stability |

***Your primer session** should **last no longer than 30 minutes and this should include warm up and any extra** supplementary **work you should choose to do.***

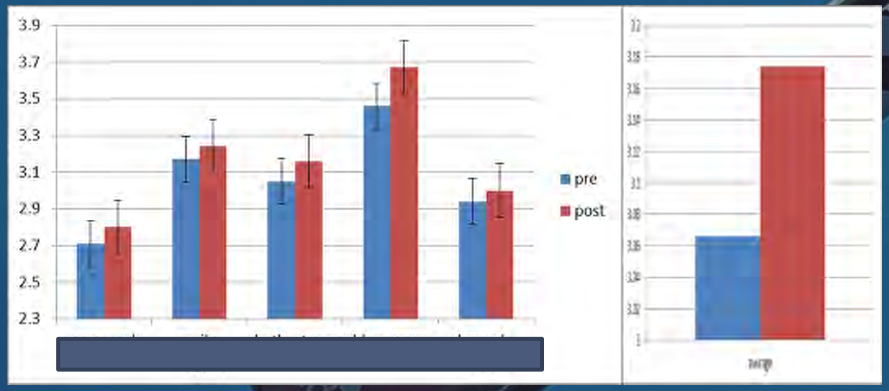
# Priming Study

Investec Cup 2012

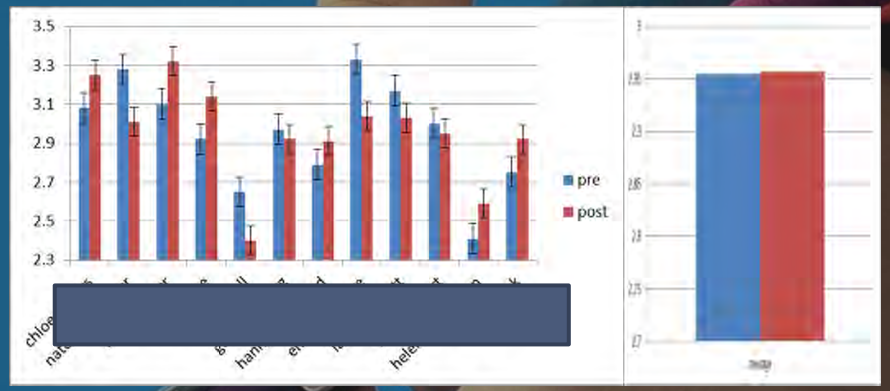
- 3 opportunities (2 primer, 1 control) – Evening Games



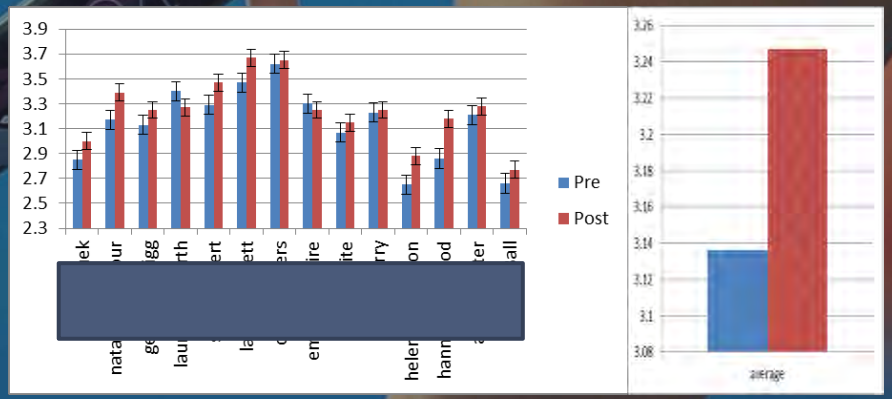

Primed: Game 1 v SA (5 players)




Normal: Game 2 v GER (15 Players)




Primed: Game 3 v IRE

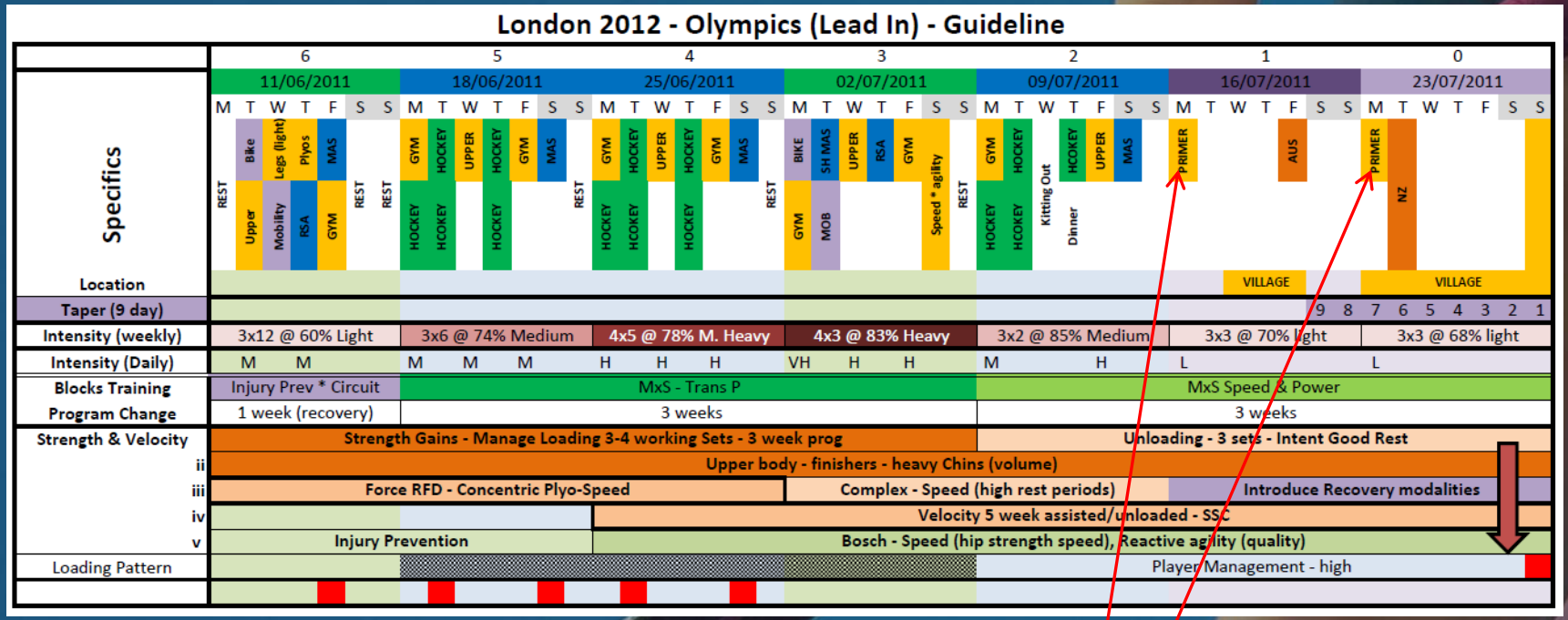



Conclusion:

- There is something there

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Olympic: Lead-In, Taper, DJ & Performance




- Traditional Periodisation (Block)
- Taper (14 day)
- DJ-RSI Score: Mean = Ok +/- SD = Good or Bad

# DJ-RSI

- DJ-RSI: Taper (Primer 1&2)
  - Continue
  - Remove Plyometric/Reduce Volume

Decision: DJ-RSI Score
Mean = Ok
+/- SD = Good or Bad

| Name | DJ-RSI |
|---|---|
| A[redacted]ll | 2.76 |
| La[redacted]tt | 3.05 |
| Ge[redacted]gg | 3.20 |
| A[redacted]n | 3.80 |
| C[redacted]rs | 3.48 |
| Har[redacted]eod | 2.94 |
| Er[redacted]re | 3.36 |
| A[redacted]er | 3.50 |
| Hel[redacted]lson | 2.82 |
| Nat[redacted]our | 3.46 |
| [redacted]y | 3.37 |
| Lau[redacted]rth | 3.30 |
| [redacted]h | 3.06 |
| S[redacted]n | 2.54 |
| [redacted] | 3.10 |

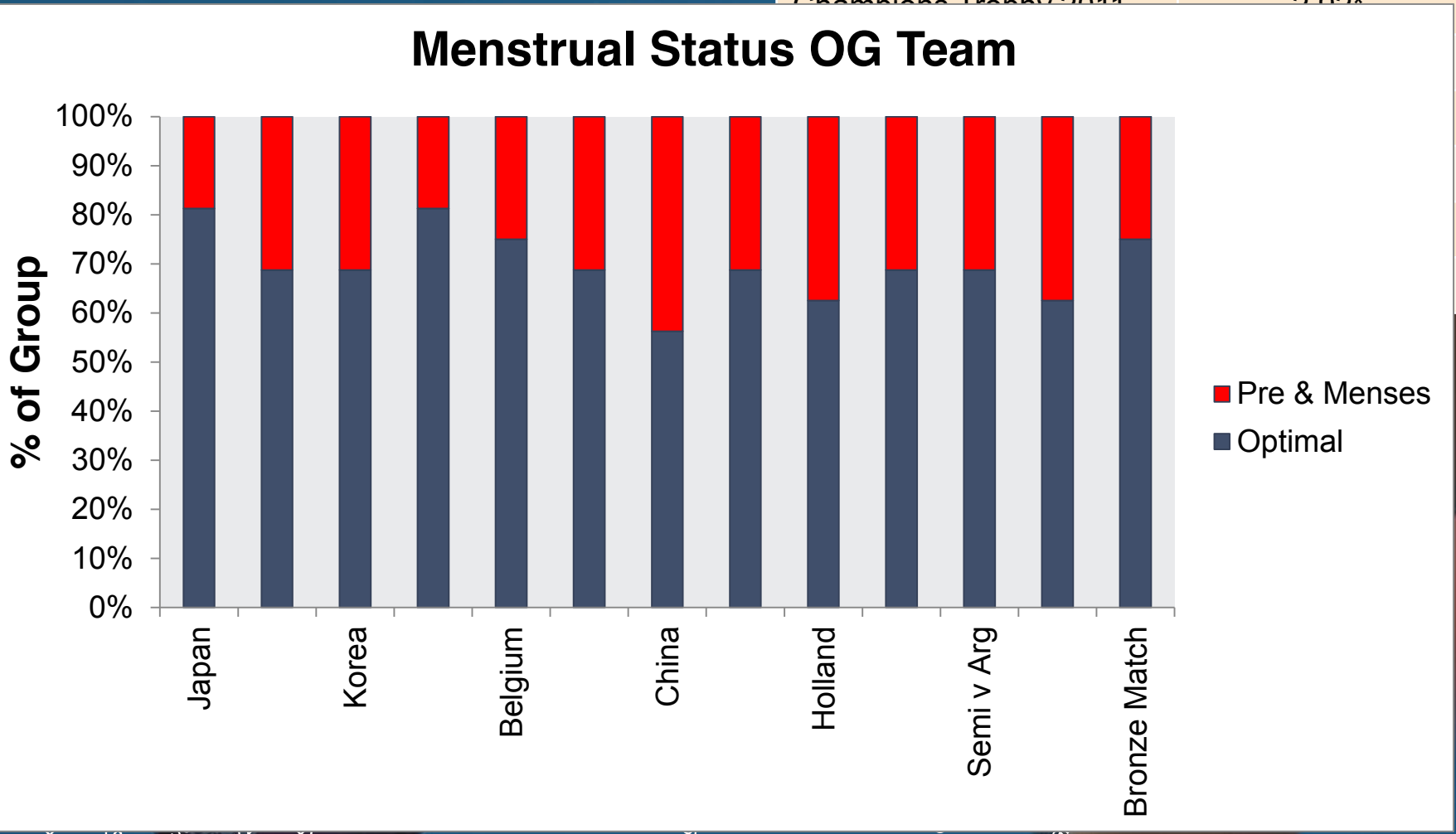
If you do not achieve your drop jump score, please leave the 15m accelerations and replace with 20m build ups 90%

| Name | Average | Date 23/07/2012 | STD | Status |
|---|---|---|---|---|
| A[redacted]Ball | 2.783811 | 2.65 | 0.15719 | ok |
| La[redacted]lett | 3.086794 | 3.23 | 0.22753 | ok |
| Ge[redacted]vigg | 3.195481 | 3.13 | 0.183519 | ok |
| A[redacted]on | 3.816422 | 4.06 | 0.182577 | good |
| C[redacted]ers | 3.477521 | 3.46 | 0.237073 | ok |
| Er[redacted]uire | 3.34689 | 3.17 | 0.16252 | bad |
| A[redacted]ter | 3.491836 | 3.68 | 0.154414 | good |
| Hel[redacted]dson | 2.821716 | 3.06 | 0.187415 | good |
| Nat[redacted]hour | 3.4526 | 3.32 | 0.123743 | bad |
| [redacted]ry | 3.39677 | 3.5 | 0.166464 | ok |
| Lau[redacted]orth | 3.316409 | 3.59 | 0.234276 | good |
| [redacted]e | 3.092069 | 3.21 | 0.149025 | ok |
| [redacted] | 3.221002 | 3.32307692 | 0.094911 | good |

GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Olympic Games:

| Competition | Mean DJ-RSI *Games |
|---|---|
| Champions Trophy 2011 | 2.92* |




GREAT BRITAIN HOCKEY
TEAM GB
ENGLISH INSTITUTE OF SPORT

# Summary: Learning's


1. Get to know the individuals within Team
2. Choose simple monitoring tools
3. Be Patient

# Acknowledgements


- Team GB Hockey S&C: Matt Bramhall, Shaun Joffe
- UKSPORT R&I: Dr. Christian Cook, Dr. Scott Drawer, Pete Atkinson