Tapering and peaking for team sports

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PHYSIOLOGY & TRAINING

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- Elite team sports figures on tapering and peaking

Individual sports, team sports, and the taper

- Individual sport athletes usually achieve a fitness and performance peak through months of hard training followed by a segment of tapered training, culminating with the targeted race or championship

- This approach may not always be the most suitable for team sport athletes, who usually need to perform at a high level week after week to be in contention for the championship when it really counts

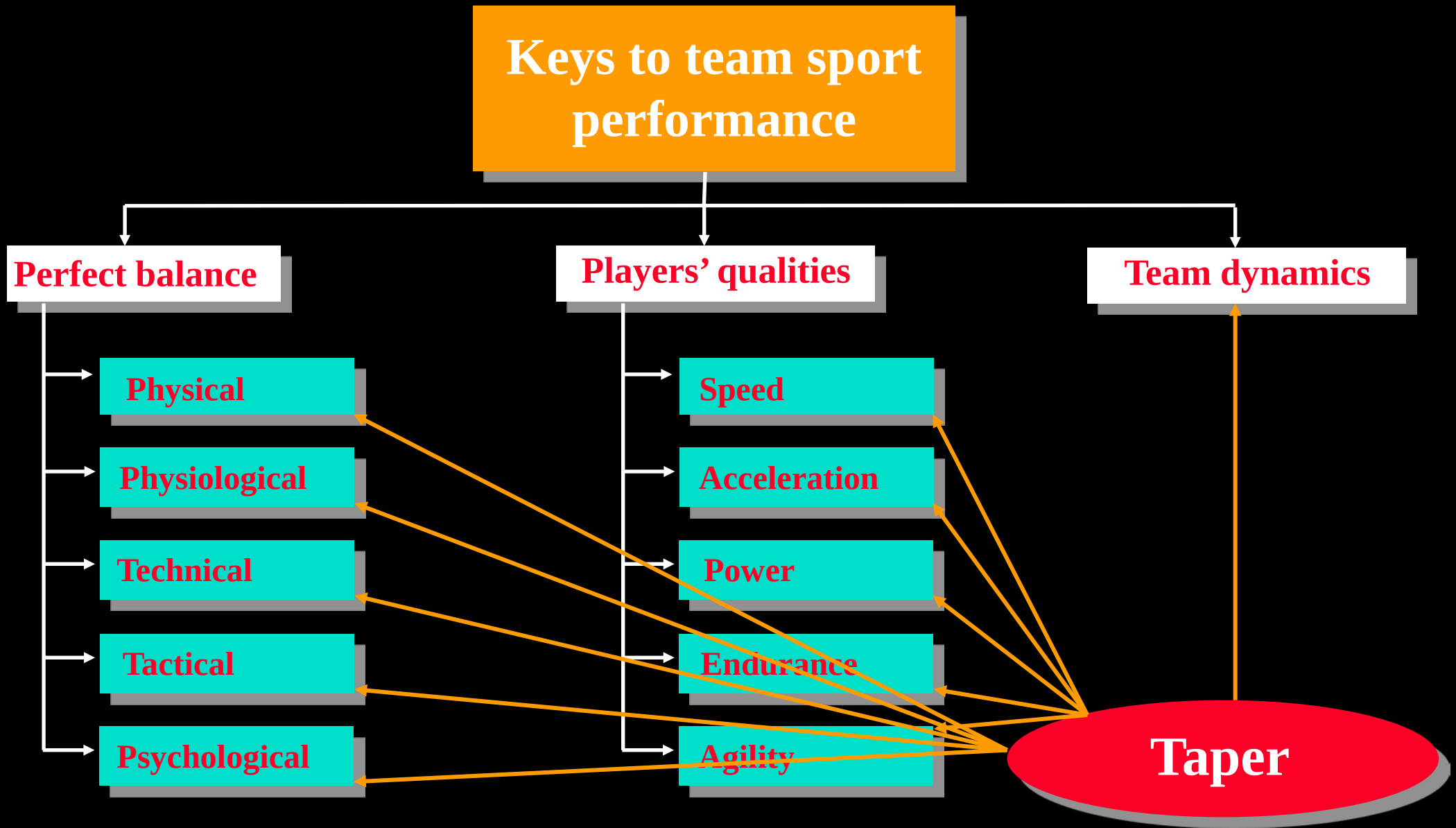
- Most of the experimental and observational research on tapering in the scientific literature has been conducted primarily in individual sports and events

- No study has directly examined the taper in the context of multiple peaking, so it is not known how often an athlete or team can obtain the performance benefits of an efficient taper

Mujika, *Olympic Coach* 18: 9-11, 2007
Pyne et al. *J. Sports Sci.* 27: 195-202, 2009

Unique aspects of team sport tapering

Requirements of team sport performance



Mujika, *Olympic Coach* 18: 9-11, 2007

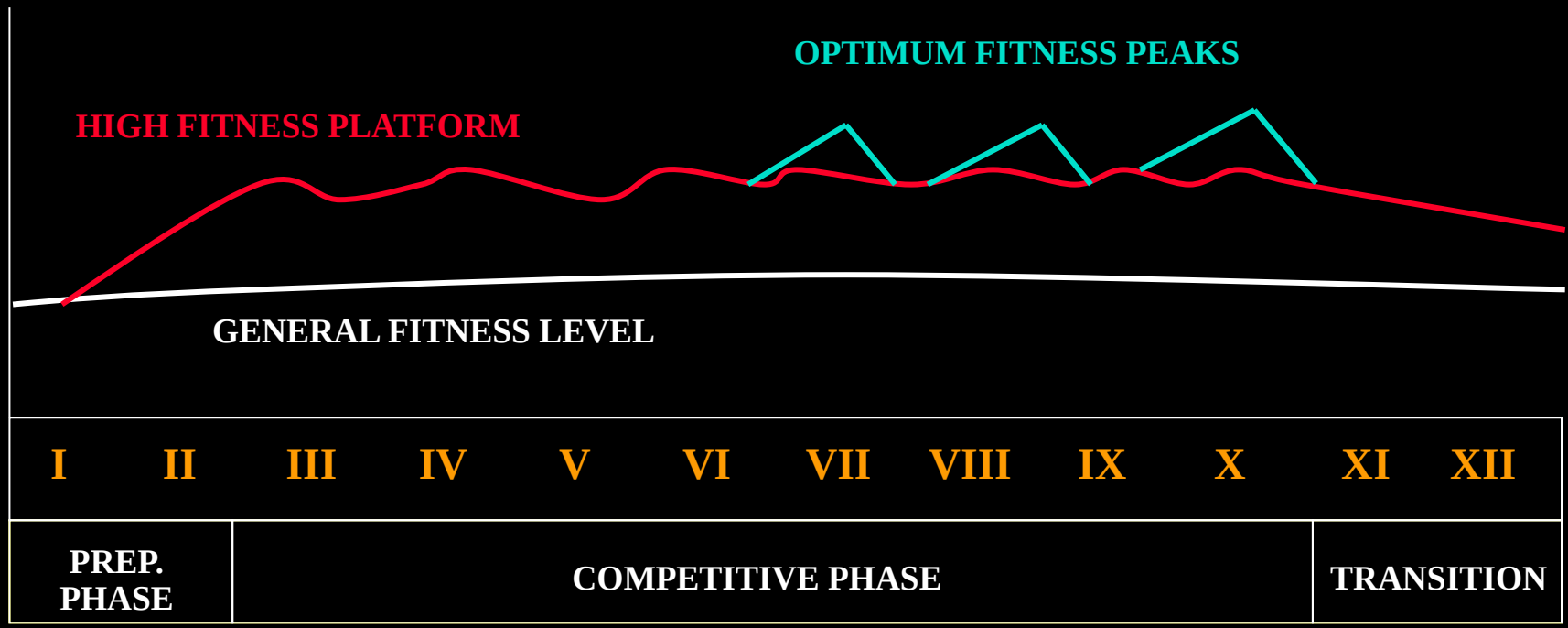
Why so little research on tapering and peaking for team sports?

- **The physiological determinants of team sport performance are not clearly understood in comparison to most individual sports. Identifying physiologial qualities is not the only requirement to be competitive in team sports**
- **Performance is a difficult concept to define in team sports: more goals or points? A higher playing tempo for the duration of the match? Demonstrating skills and qualities under pressure? Performance is a relatively abstract concept!**
- **Diverse range of training activities and interindividual variability in responses and adaptations complicate integration of training variables into quantifiable units, making it more difficult to relate training with adaptations and performance**
- **Long competitive seasons and busy fixture schedule makes it difficult to carry out research placing additional physical demands on already overloaded players**
- **The relatively high risk of injury makes it difficult to carry out longitudinal investigations during the competitive season**

Mujika, *Int. J. Sports Physiol. Perf.* 2: 221-222, 2007

Tapering and peaking for a league format competition

Periodization for sports with a long competitive period



Overreaching and tapering in rugby league players

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Changes in Selected Biochemical, Muscular Strength, Power, and Endurance Measures during Deliberate Overreaching and Tapering in Rugby League Players

Abstract

The purpose of this study was to examine the influence of overreaching on muscle strength, power, endurance and selected biochemical responses in rugby league players. Seven semi-professional rugby league players ($\dot{V}O_{2max}$ = 56.1 ± 1.7 mL · kg^{-1} · min^{-1}; age= 25.7 ± 2.6 yr; BMI = 27.6 ± 2.0) completed 6 weeks of progressive overload training with limited recovery periods. A short 7-day stepwise reduction taper immediately followed the overload period. Measures of muscular strength, power and endurance and selected biochemical parameters were taken before and after overload training and taper. Multistage fitness test running performance was significantly reduced (12.3 %) following the overload period. Although most other performance measures tended to decrease following the overload period, only peak hamstring torque at 1.05 rad · s^{-1} was significantly reduced ($p < 0.05$). Following the taper, a significant increase in peak hamstring torque and isokinetic work at both slow (1.05 rad · s^{-1}) and fast (5.25 rad · s^{-1}) movement velocities were observed. Minimum clinically important performance decreases were measured in a multistage fitness test, vertical jump, 3-RM squat and 3-RM bench press and chin-up$_{max}$ following the overload period. Following the taper, minimum clinically important increases in the multistage fitness test, vertical jump, 3-RM squat and 3-RM bench press and chin-up$_{max}$ and 10-m sprint performance were observed. Compared to resting measures, the plasma testosterone to cortisol ratio, plasma glutamate, plasma glutamine to glutamate ratio and plasma creatine kinase activity demonstrated significant changes at the end of the overload training period ($p < 0.05$). These results suggest that muscular strength, power and endurance were reduced following the overload training, indicating a state of overreaching. The most likely explanation for the decreased performance is increased muscle damage via a decrease in the anabolic-catabolic balance.

Key words
Athlete monitoring · fatigue · recovery · hormones · team sport · overtraining

Introduction

A competitive game of professional rugby league is a high-impact collision sport played over approximately 90 min. Like other football codes, rugby league has been characterized as a high-intensity sport that combines intermittent bouts of very intense anaerobic exercise interspersed with longer lower-intensity periods of aerobic exercise. Due to these activity demands, rugby league players require both a high level of muscular strength and power combined with a well-developed aerobic capacity. Additionally, other physiological factors such as increased speed, speed-endurance, agility and quickness are considered important for success in rugby league [22].

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- **6 weeks of progressive overload training with limited recovery**
  - **Reduced muscular strength, power and endurance**
  - **Increased muscle damage via a decrease in the anabolic-catabolic balance**
- **7-day progressive taper**
  - **Supercompensation of muscular strength, power and endurance**
  - **Increased anabolism and decreased muscle damage**

Coutts et al. *Int. J. Sports Med.* 28: 116-124, 2007

Tapering and RSA in team sport female athletes

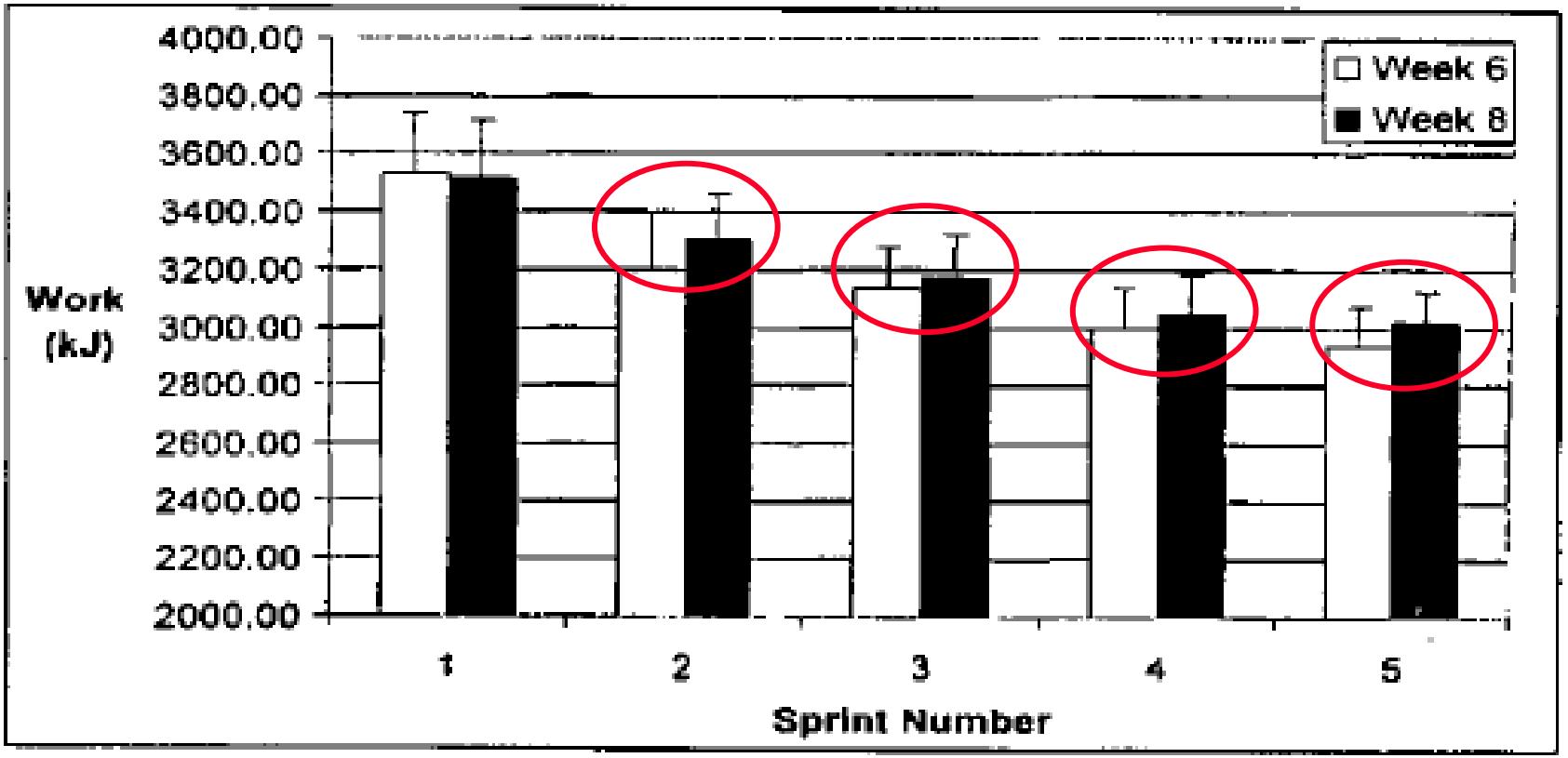
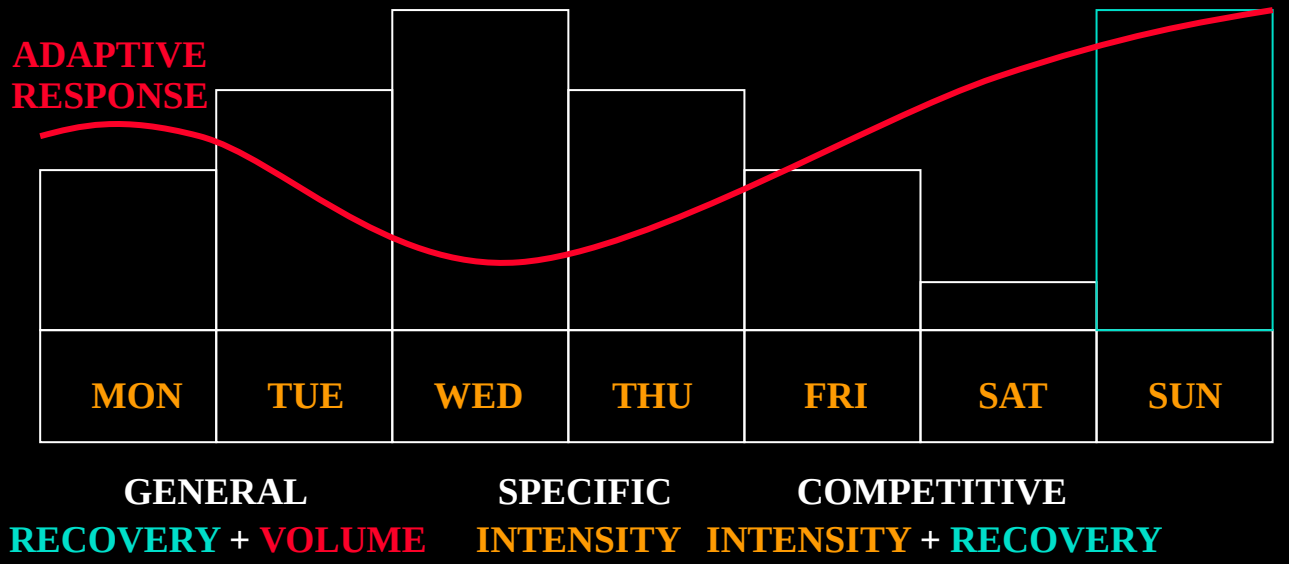
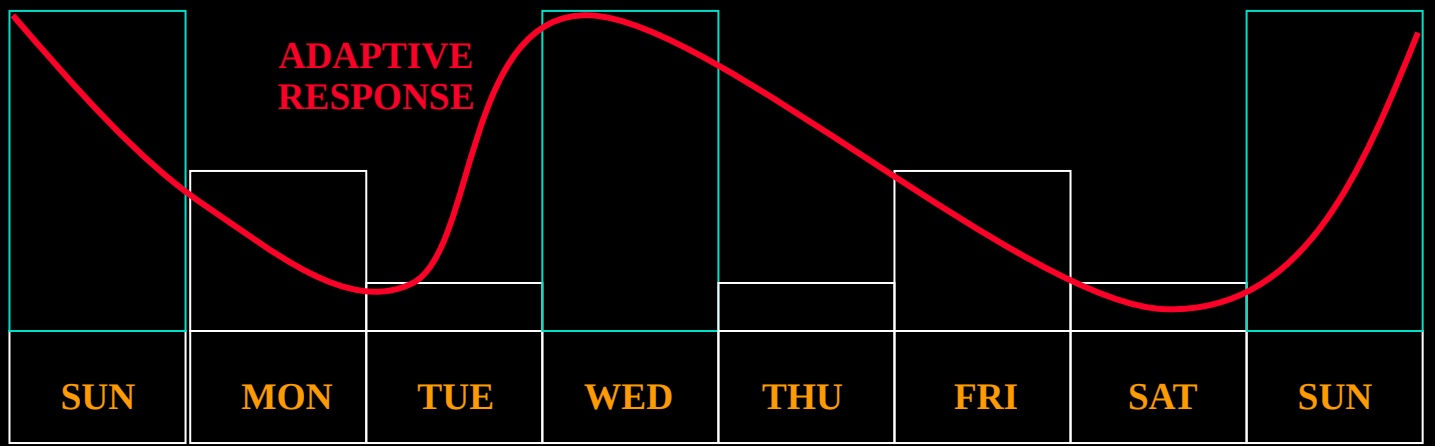


Figure 5: Total work (kJ) recorded for each sprint of the 5 x 6-s sprint test before (week 6) and after the 10-day taper procedure (week 8). Data are mean±SE_M.

Bishop & Edge. *J. Sci. Med. Sport* 8: 200-209, 2005

Training load fluctuation during the week





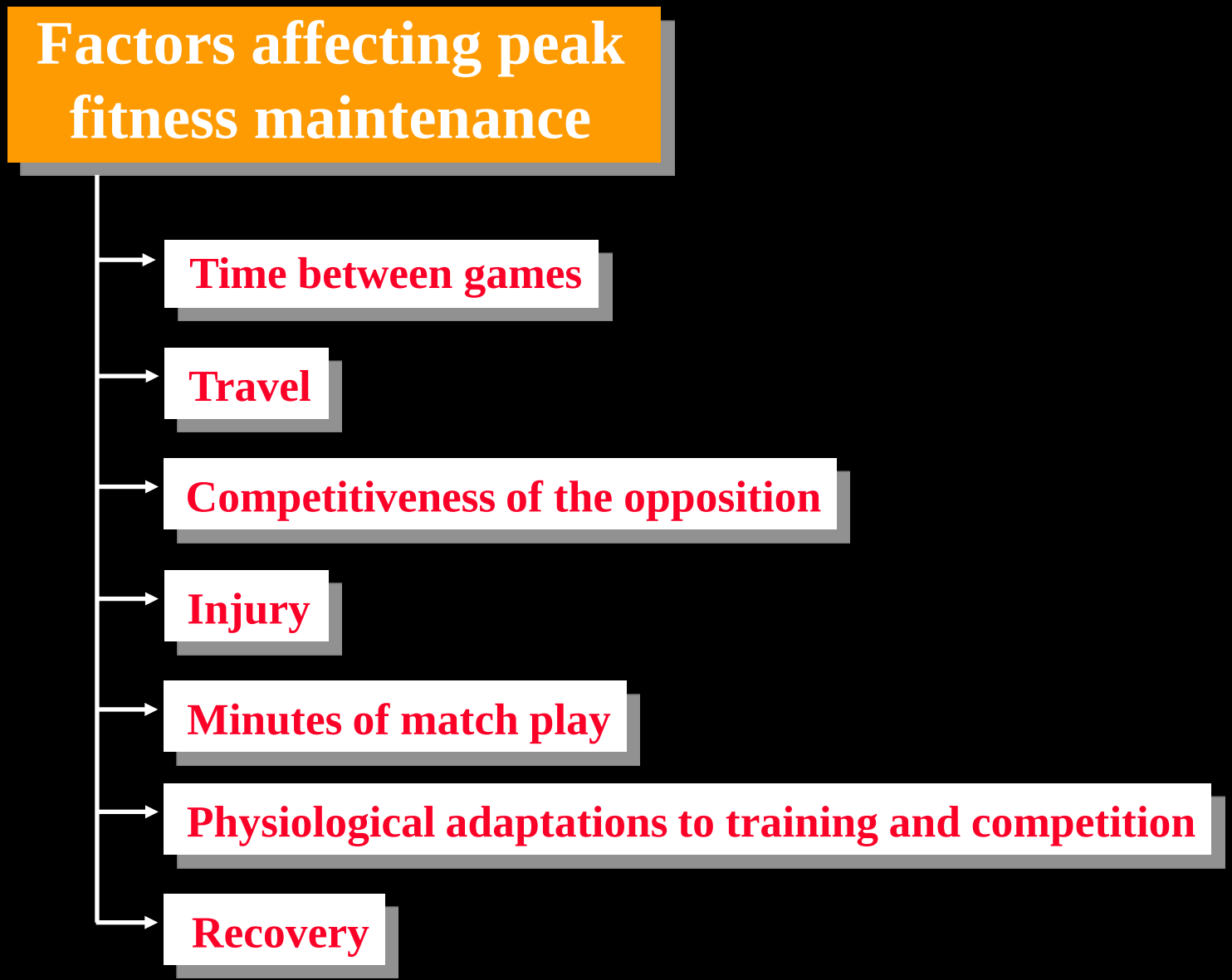
Weekly program in professional football with 1 or 2 games

Table I. An in-season weekly programme for a professional soccer team when playing one or two matches a week.

Day	One match a week	Two matches a week
Sunday	Match	Match
Monday	Free	Low-/moderate-intensity aerobic training, 30 min Strength training, 30 min
Tuesday	Warm-up, 15 min Technical/tactical, 30 min High-intensity aerobic training, 23 min Play, 15 min	Warm-up, 15 min Technical/tactical, 30 min High-intensity aerobic training, 10 min Play, 15 min
Wednesday	*Morning* Strength training, 60 min *Afternoon* Warm-up, 15 min Technical/tactical, 30 min Speed endurance training, 20 min	Match
Thursday	Warm-up, 15 min Technical/tactical, 30 min Play, 30 min	Low-/moderate-intensity aerobic training, 40 min Strength training, 30 min
Friday	Warm-up/technical, 25 min Speed training (long), 20 min High-intensity aerobic training, 18 min	Warm-up/technical, 25 min Speed training (long), 10 min High-intensity aerobic training, 20 min
Saturday	Warm-up/technical, 25 min Speed training (short), 20 min Play, 30 min	Warm-up/technical, 25 min Speed training (short), 20 min Play, 30 min
Sunday	Match	Match

Bangsbo et al., *J. Sports Sci.* 24: 665-674, 2006

Maintenance of peak fitness throughout the season



Mujika, *Olympic Coach* 18: 9-11, 2007

Tapering and peaking for a major tournament

High intensity training during the taper in elite football

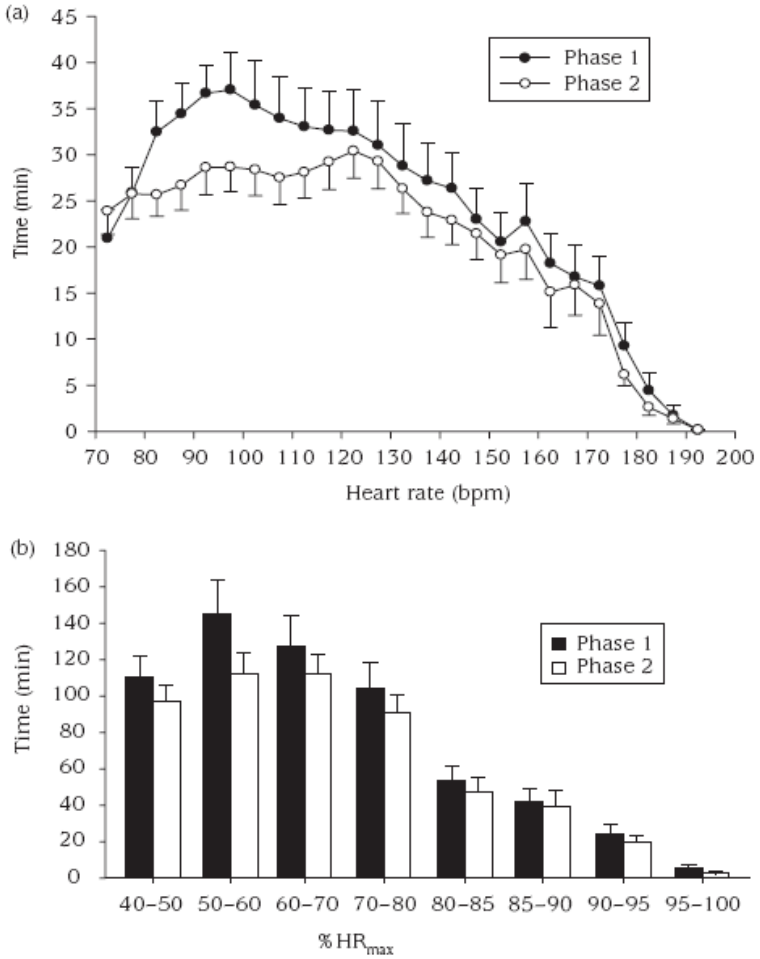
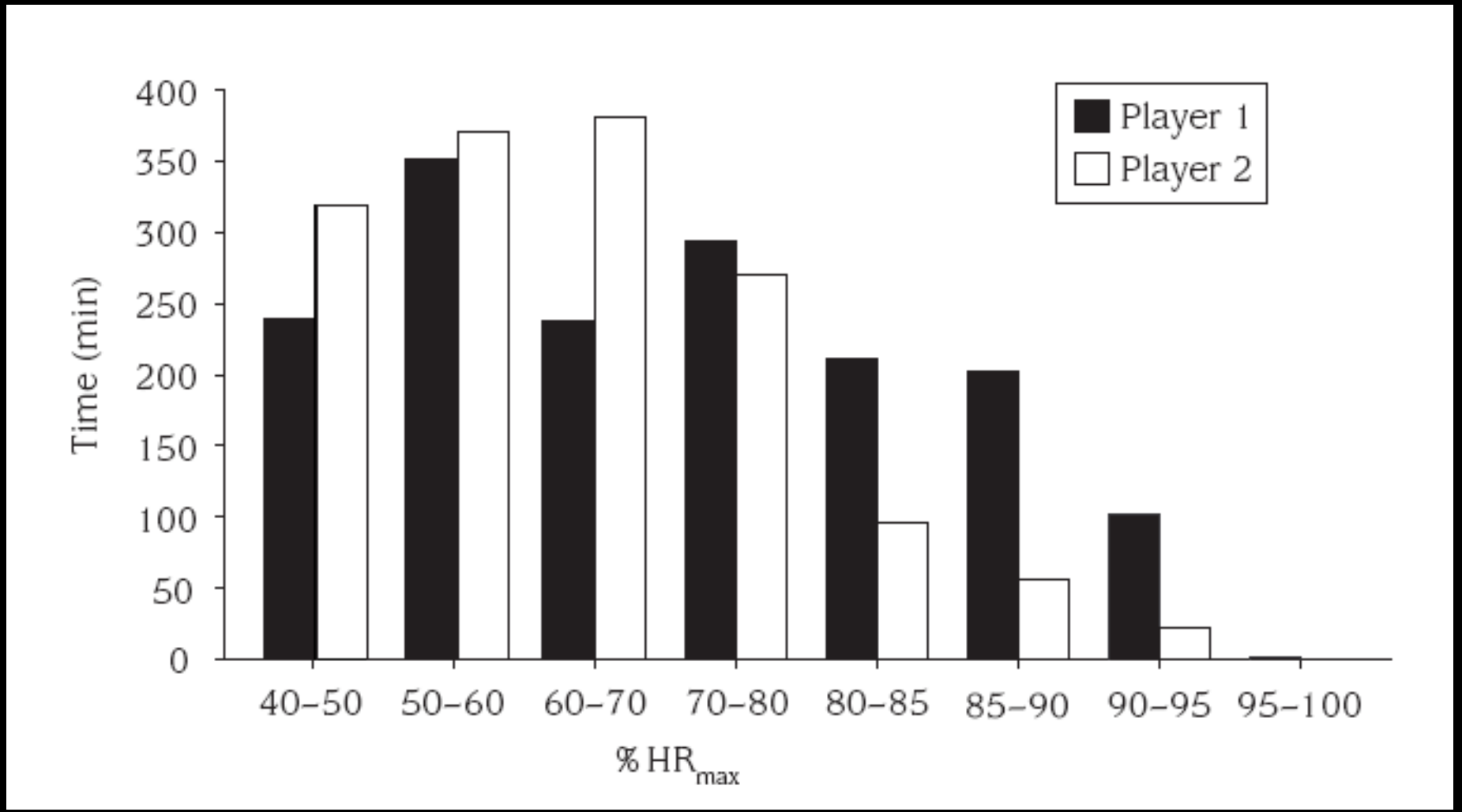


Fig. 8 Heart-rate distribution during two 9-day preparation periods (phases 1 and 2) for the Danish National team soccer squad before the European Championship 2004. The values are expressed as mean ± SEM in: (a) beats min^{-1}; and (b) $\%HR_{max}$.

Bangsbo et al. *J. Exerc. Sci. Fit.* 4: 1-14, 2006

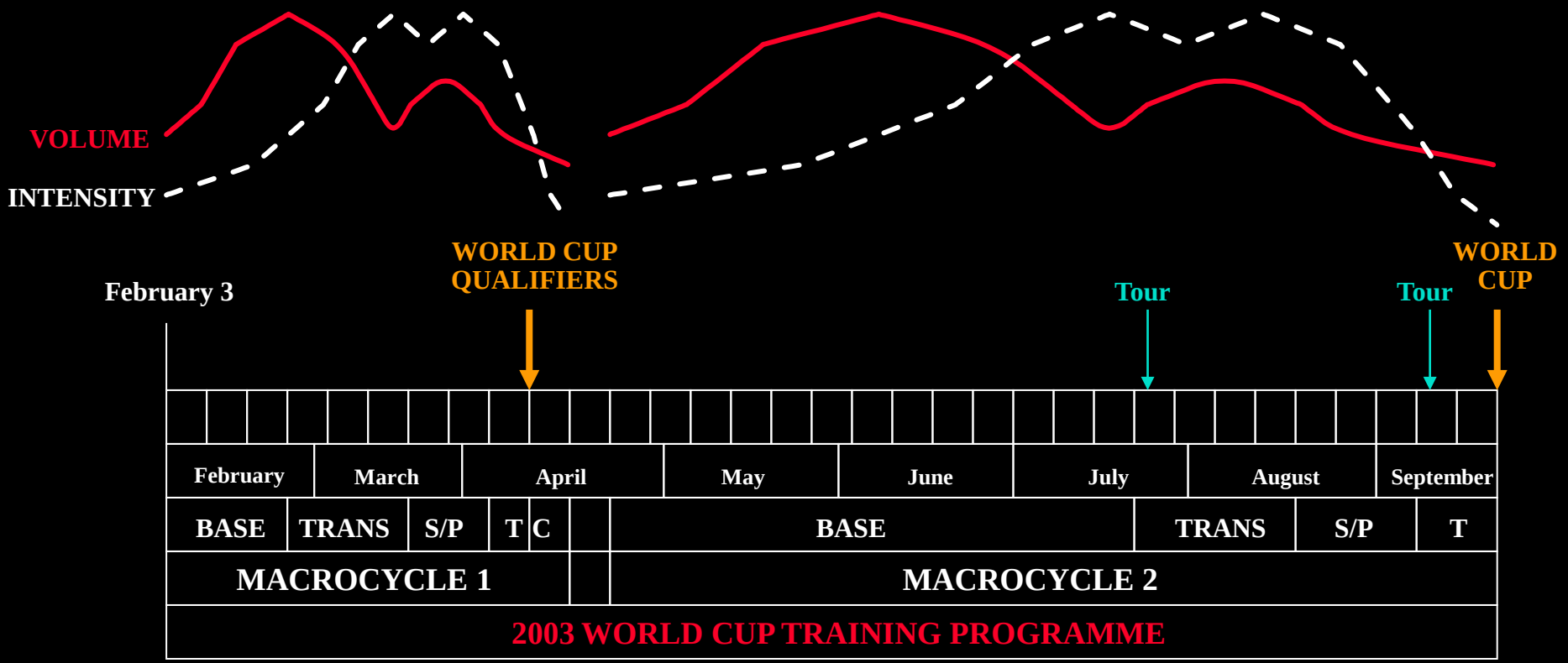
Variability in high intensity exercise during tactical training



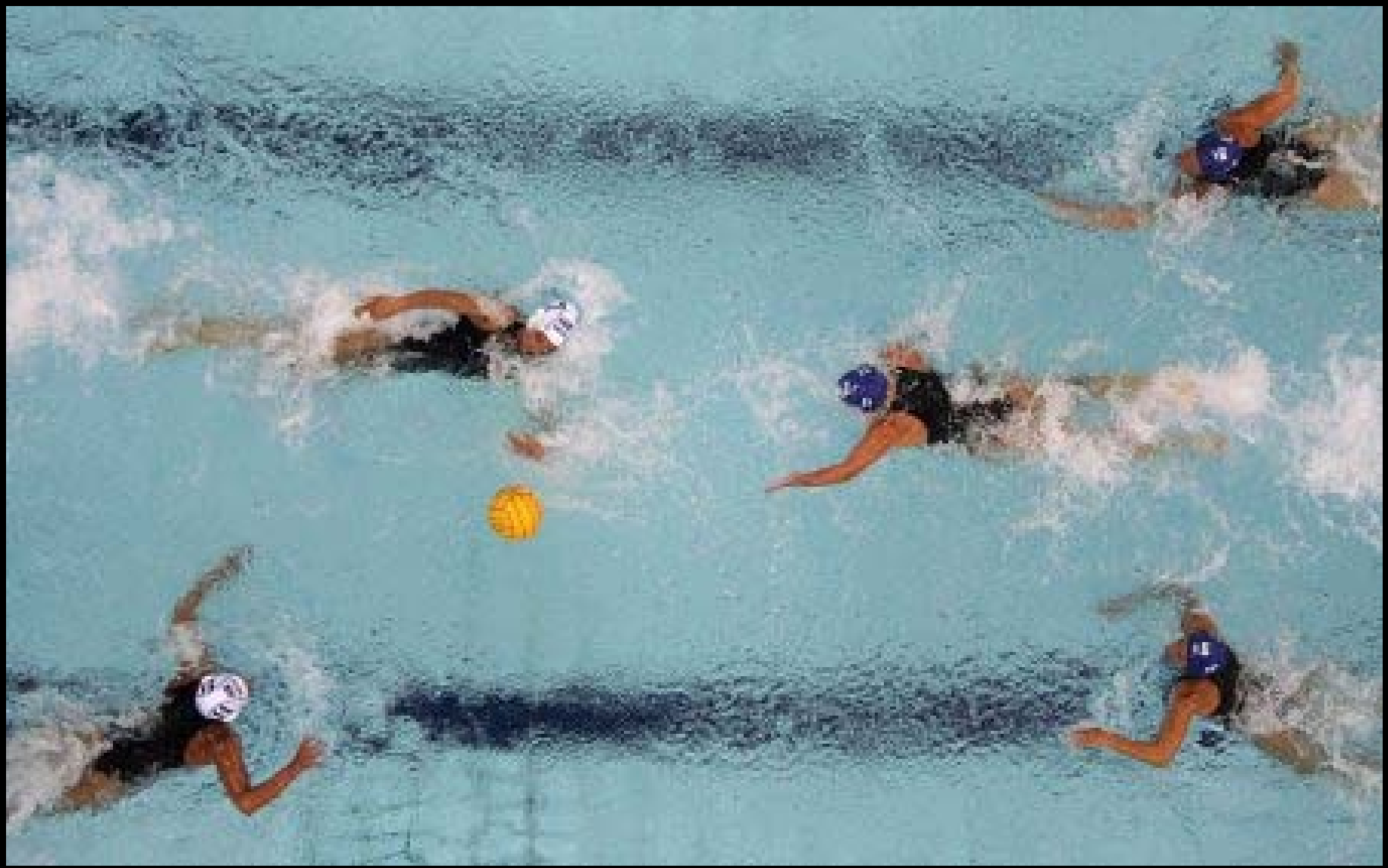
Bangsbo et al. *J. Exerc. Sci. Fit.* 4: 1-14, 2006

National Training Programme for Women's Soccer

Training Programme for the 2003 World Cup



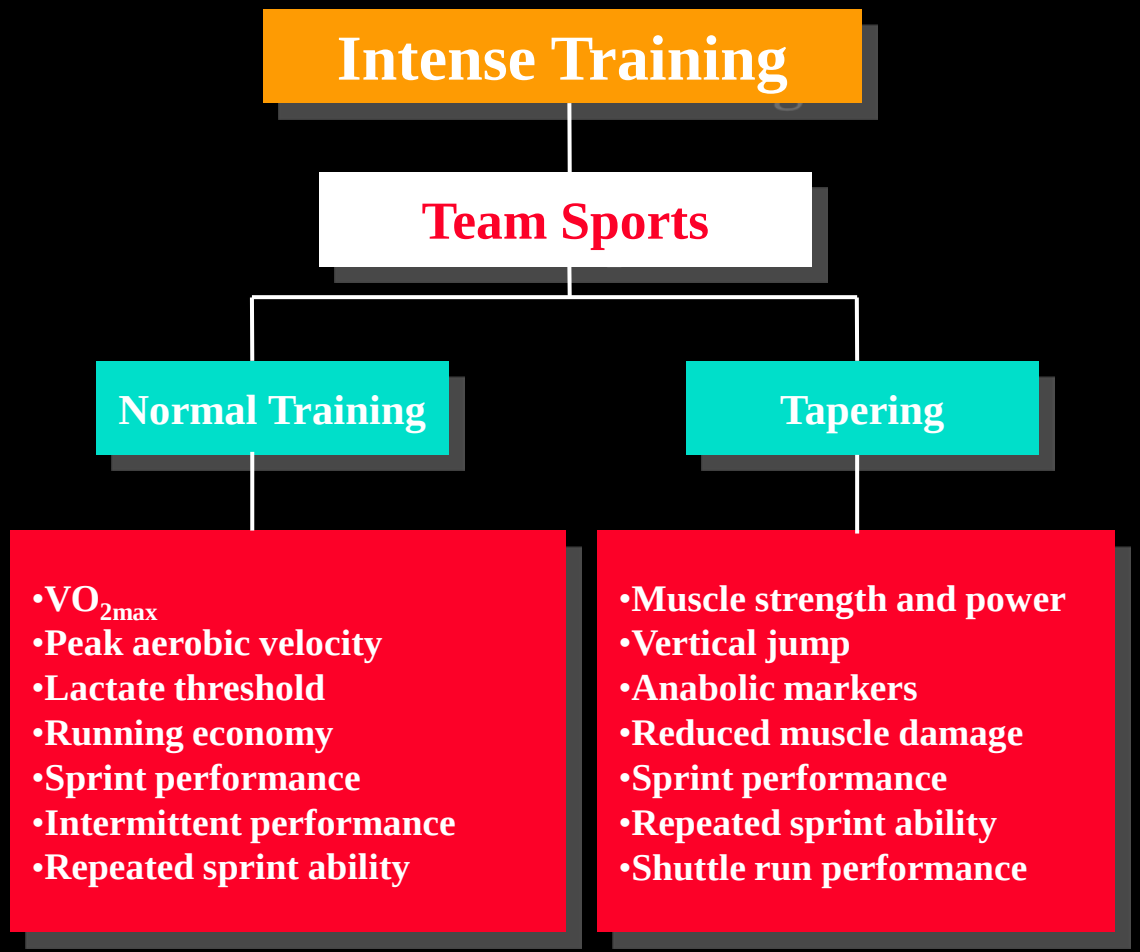
Athens 2004 Olympic preparation for Women's Water Polo



Final macrocycle for the Athens 2004 Olympic Games

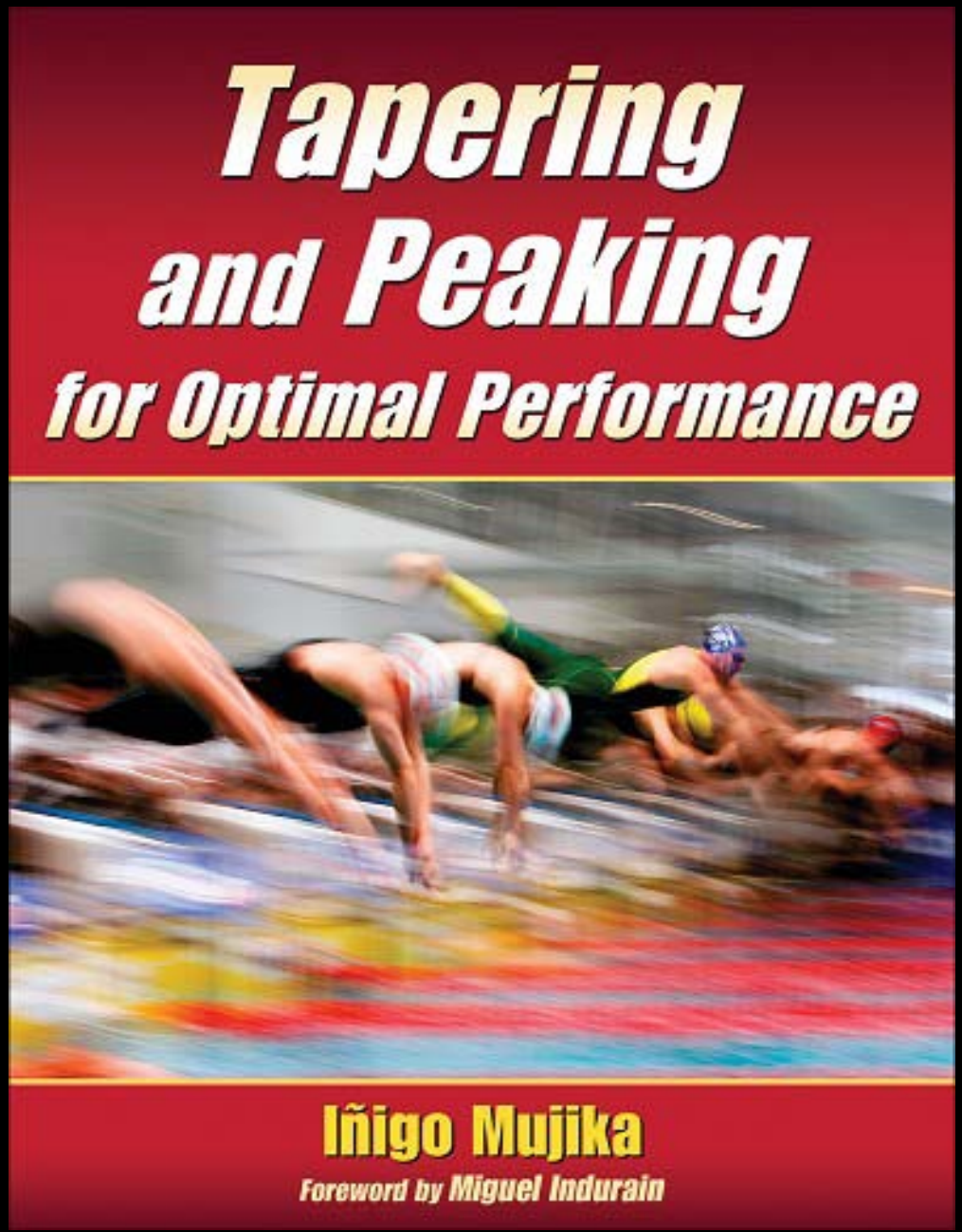
French Cup	World League					Italian Cup			OLYMPIC GAMES	
MC1 JUNE 14-20	**MC2** JUNE 21-27	**MC3** JUNE 28-JULY 4	**MC4** JULY 5-11	**MC5** JULY 12-18	**MC6** JULY 19-25	**MC7** JULY 26-AUGUST 1	**MC8** AUGUST 2-8	**MC9** AUGUST 9-14	**MC10** AUGUST 15-22	**MC11** AUGUST 23-26
MS 1 *Competition/Base*		**MS 2** *Recovery/Base*	**MS 3** *Ae-An Transition*		**MS 4** *Recovery/Base*	**MS 5** *Sprint/Power* **MS 6** *Sprint/Power*		**MS 6** *Taper*	**MESOCYCLE 7** *Competition*	
OLYMPIC MACROCYCLE										

Physiological and performance gains elicited by intense exercise



Mujika, *Scand. J. Med. Sci. Sports* 20 (suppl. 2): 24-31, 2010

Elite team sports figures on tapering and peaking



Chapter 12 – Tapering for Team Sports

Ric Charlesworth

Achieving Gold in Women's Field Hockey

Derik Coetzee, Yusuf Hassan, Clint Readhead

Winning the World Cup in Rugby

Greg McFadden

Peaking for World Championships Silver in Women's Water Polo

Dragan Matutinovic

Securing Silver in Olympic Men's Water Polo

Chapter 12 – Tapering for Team Sports

Ric Charlesworth

Achieving Gold in Women's Field Hockey

- Match or exceed the physical output requirements of competition during training
- Take the first week of competition as part of the loading phase to actually peak for the final games of the tournament
- Train throughout the competition to maintain players' technique proficiency, achieve specific training aims, and also fill time
- Perform a taper that had been tested and proven to be successful in prior events
- Be flexible to anticipate and react to eventualities

Chapter 12 – Tapering for Team Sports

Derik Coetzee, Yusuf Hassan & Clint Readhead

Winning the World Cup in Rugby

- **Apply some of the rest and recovery principles of tapering to the year-round training**
- **Quantify training loads and players' subjective perceptions of fatigue**
- **Find the optimal balance between training and recovery**
- **Minimize the incidence of injury throughout the competitive season, in a coordinated effort between players' club staff and national team staff**

Chapter 12 – Tapering for Team Sports

Greg McFadden
Peaking for World Championships
Silver in Women's Water Polo

- **Maintain a high intensity, increase the specificity, decrease the duration of the sessions and adequately quantify the individual training load in the lead-up tounaments preceding the major event**
- **Make sure that players who are in the water longer during the lead-up tournaments receive enough recovery, whereas those receiving less match time receive extra training to maintain their fitness**
- **Use posttraining recovery techniques and optimal nutrition strategies**
- **Emphasize players' body size, strength and power, because this is considered to have a major impact on game quality**
- **Periodize the training plan to achieve peak performance at the desired time**

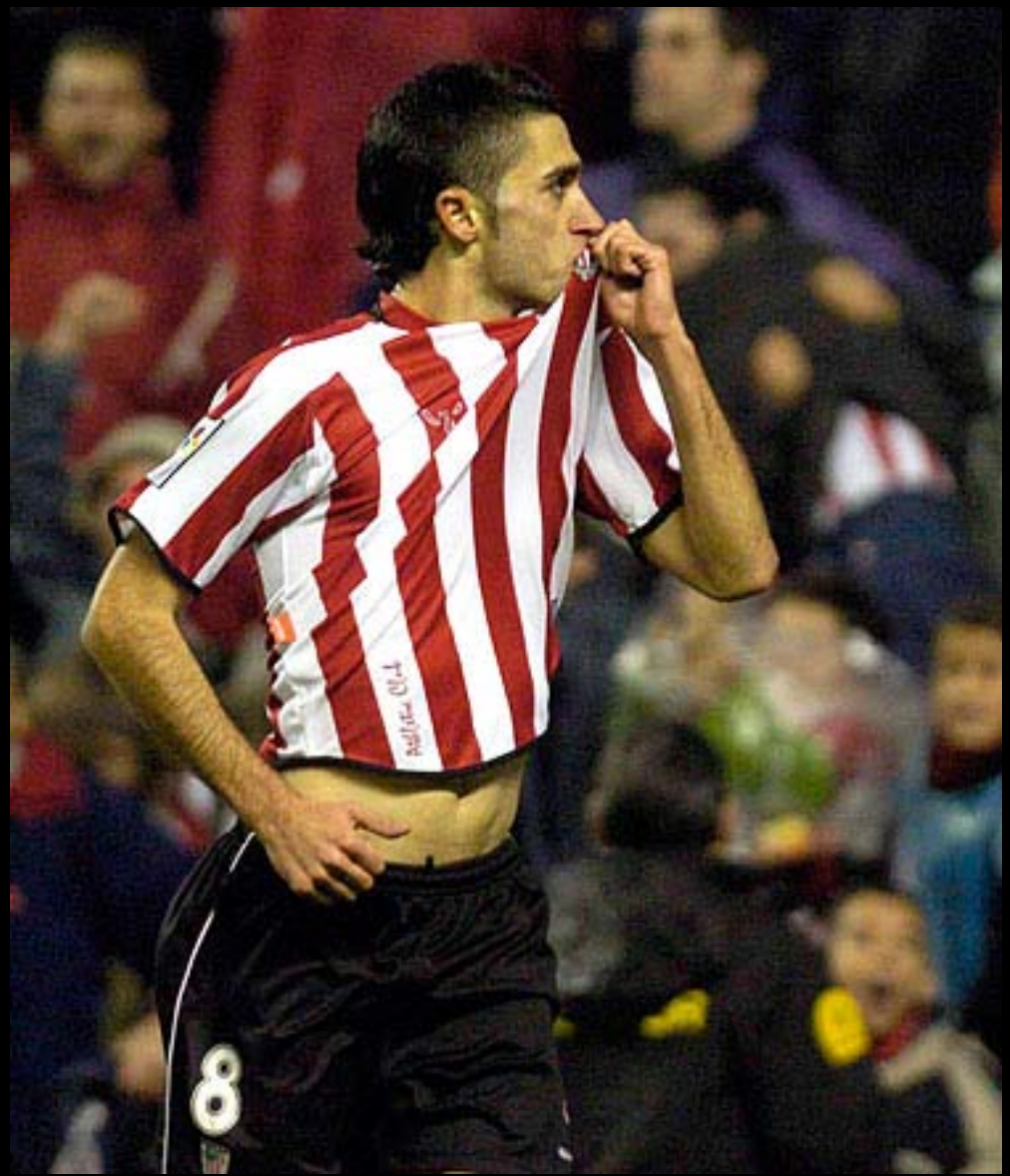
Chapter 12 – Tapering for Team Sports

Dragan Matutinovic

Securing Silver in Olympic Men's Water Polo

- Set specific, difficult targets for the players to increase their physical and mental strength and determination
- Create a playing style early in the preparation process and compete against teams that play very different types of games
- Help the players to stay motivated, focused, relaxed and free of external and internal pressure in the days before and during the event

ESKERRIK ASKO!
(“Thank you very much!” in Basque Language)



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