Evaluation of the final stage preparation to the Athens Olympic Games in the World Leading Swimming National Teams

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Plan

• Introduction
• Evidence of the Athens OG
• Factors affecting the peaking
• Why they didn’t succeed
Peaking - obtaining the best athletic conditions at a particular moment
Two approaches to investigate the peaking

Evaluation of performance gains during the taper

Evaluation of performance gains during the final stage preparation (FSP)
Taper’s background:

Taper duration – 7-30 days;
Sampling: swimmers, cyclists, runners, weightlifters, triathletes;
Outcomes: performance improvement of about 1-8%

Kubukeli et al., 2002; Mujika et al., 2004
Final Stage Preparation

Entry results

Target performance

FSP prior the Sidney OG – average performance improvement: US swimming team – 0.2%; Australia swimming team – 0.6%

Pyne et al., 2004
Factors affecting peaking

FSP duration

USA 29 days
Germany 65 days
Australia 132 days
Italy 151 days
Factors affecting peaking

Selection’s mode

1) Tough selection

2) Liberal selection

1. Tough selection
2. Liberal selection

Olympic Trials

Olympic criteria

FSP

OG
Factors affecting peaking

Age
Youngsters – till 20 yrs;
Middle age – 20-24 yrs;
Veterans – 25 yrs and more

Is it certain age category more favorable?

Gender
Female sex hormones can reinforce the influence of other hormones (Viru, 1995)

Does the athletes’ gender affects the peaking?
Factors affecting peaking

Distance length

50, 100, 200, 400, 800 and 1500 m

Perhaps certain work duration is more favorable for peaking?

Swimming strokes

Crawl
Breaststroke
Backstroke
Butterfly
Medley

Is the peaking stroke dependent?
Factors affecting peaking

Personal athletic ranking

<table>
<thead>
<tr>
<th>Category</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medalists</td>
<td>1 - 3</td>
</tr>
<tr>
<td>Finalists</td>
<td>4 – 8</td>
</tr>
<tr>
<td>Semi-finalists</td>
<td>9 – 16</td>
</tr>
<tr>
<td>Other</td>
<td>17 +</td>
</tr>
</tbody>
</table>

How the personal athletic rank affects the peaking?
Purpose:

*to examine* the achievement of peak-performance by world-class swimmers and

*to evaluate* effects of several factors determining peaking in the Athens Olympic Games.
Method

Sampling –
301 swimmers;
424 events (212 male and 212 female)
Method

9 world–leading teams; 187 swimmers -
tough selection

15 National teams; 114 swimmers -
liberal selection
Method

Relative Performance Gain

\[ RPG\% = \frac{\text{entry time} - \text{final time}}{\text{entry time}} \times 100 \]
Method

Descriptive statistics
Analysis of variance (ANOVA)
Linear regression
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## Swim-leading teams:

<table>
<thead>
<tr>
<th>Country</th>
<th>Events’ number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>38</td>
</tr>
<tr>
<td>Canada</td>
<td>31</td>
</tr>
<tr>
<td>GB</td>
<td>31</td>
</tr>
<tr>
<td>Germany</td>
<td>36</td>
</tr>
<tr>
<td>Japan</td>
<td>30</td>
</tr>
<tr>
<td>Russia</td>
<td>27</td>
</tr>
<tr>
<td>USA</td>
<td>52</td>
</tr>
<tr>
<td>Italy</td>
<td>24</td>
</tr>
<tr>
<td>New Zeeland</td>
<td>22</td>
</tr>
</tbody>
</table>
The FSP length

<table>
<thead>
<tr>
<th>Country</th>
<th>FSP, days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>130</td>
</tr>
<tr>
<td>Canada</td>
<td>33</td>
</tr>
<tr>
<td>GB</td>
<td>123</td>
</tr>
<tr>
<td>Germany</td>
<td>65</td>
</tr>
<tr>
<td>Japan</td>
<td>109</td>
</tr>
<tr>
<td>Russia</td>
<td>87-81</td>
</tr>
<tr>
<td>USA</td>
<td>29</td>
</tr>
<tr>
<td>Italy</td>
<td>151</td>
</tr>
<tr>
<td>New Zeeland</td>
<td>131</td>
</tr>
</tbody>
</table>
Average improvement (%) in different teams

- Other Countries: 20.3%
- USA: 42.3%
- Russia: 37%
- New Zealand: 36.4%
- Japan: 36.7%
- Italy: 50%
- Germany: 36.1%
- GB: 22.6%
- Canada: 22.6%
- Australia: 36.8%
Results

Mean RPG% 0.58%

Performance impairment

68.2% of all Olympians declined their performances
RPG% by nation

USA: 0.27
JPN: 0.29
NZ: 0.4
ITA: 0.29
GER: 0.53
AUS: 0.55
RUS: 0.59
GBR: 0.68
CAN: 0.69
PLN: 0.19
HUN: 0.82
SWE: 1.21
ESP: 1.67
ISR: 1.11
TOT: 0.58
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Results

Tough vs. liberal selection

- Tough selection, 287 events: RPG, 0.46
- Liberal selection, 114 events: RPG, 0.84

$p = 0.04$
$RPG\%$ by personal athletic rank

![Graph showing RPG% by personal athletic rank]

- Medalists
- Finalists
- Semi-Finalists
- Other

$p = 0.01$
Impact of the FSP duration

- RPG, %

Days

- 29-33
- 34-90
- 91-130
- 131-152

$P = 0.1$
Impact of the age

RPG, \%

\[ P = 0.4 \]

Age category

15-19 20-24 25 and more
Impact of gender

No difference
No differences were found with regards to swimming strokes and distance length
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Impact of immediate pre-Olympic preparation

3 weeks taper prior Sydney OG, 99 Olympians (Mujika a.o., 2002)

FSP of 24 countries prior Athens OG, 424 events, 29 - 152 days

FSP of 15 countries prior Athens OG, 114 Events, 52 - 148 days

RPG, %

-2.2

0.84

0.58

0.5

0

2

1
Impact of immediate pre-Olympic preparation

- FSP of US prior the Sydney OG (Pyne a.o., 2004) - 0.2
- FSP of Australia prior the Sydney OG - 0.5
- FSP of US prior the Athens OG - 0.2
- FSP of Australia prior the Athens OG - 0.4
- RPG, %

The graph shows the impact of immediate pre-Olympic preparation on the RPG percentage for the US and Australia prior to the Sydney and Athens Olympic Games. The values indicate the percentage change in performance following immediate pre-Olympic preparation activities.
Factors affecting performance impairment:

(a) emotional strain and anxiety
(b) hormonal and metabolic changes induced by emotional and physical stress
(c) training insufficiency during the FSP
Facts:

Each athlete performs better when his/her level of anxiety falls within the "individual zone of optimal functioning“ (Hanin, 1997)

Only 30 - 45% of competitors obtain their best results under high level of pre-competitive anxiety (Raglin & Hanin, 1999)
World tendency:

Emotional strain and anxiety at the last Olympic events are more pronounced than previously

(Weinberg & Gould, 2003; Blumenshtein a.o., 2004)
The rational model of hormonal changes suggests the decline of **Testosterone** level in the mid-season with subsequent increase prior the competition, and opposite dynamics for **Cortisol** (M. & A. Viru, 2000).

The increased trait anxiety suppressed excretion of **Testosterone** during post-exercise recovery (Diamard, 89), similarly the **Cortisol** level is also subjected by psychological stressors (Mujika a.o., 2004).
Testosterone
Pre-Season 60%
Mid-Season 80%
End-Season 100%

Cortisol

Annual hormonal trend
by Viru, 2000

Emotional stress

Pre-Season  
Mid-Season  
End-Season  

60%  
80%  
100%
Terminology

Residual training effect:
- retention of changes in the body state and motor abilities after the cessation of training beyond certain time period
Training insufficiency during the FSP:

- hormonal perturbations shift metabolic reactions into a direction of anaerobic prevalence and shortening of the aerobic and anabolic training residuals;

- this can follow to reduction of aerobic ability, muscle mass and power, which elicit of performance decline
Rational superposition of residual training effects

- Development of aerobic abilities and muscle strength
- Development of anaerobic (event-specific) abilities
- Perfection of maximal speed and tactics

Blocks-mesocycles
Competition
Residuals

Issurin, Shkliar, 2001
Fact:

Emotional strain and competitive activity shorten the training residuals

(Issurin & Lustig, 2004)
Residuals’ superposition transformed by emotional stress

- Blocks-mesocycles
- Development of aerobic abilities and muscle strength
- Development of anaerobic (event-specific) abilities
- Perfection of maximal speed and tactics

Emotional stress
Conclusions:

The majority of Olympians don’t reach their personal best.

The FSP, as a crucial stage for the peaking, should be studied, analyzed, and improved.

The tough selection increases effectiveness of performances.
Thank you