

Classification of Training Exercises and Targeting of Training Objectives

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Topics

- **What is targeting ?**
- **Why targeting ?**
- **How to target ?**
- **Concept of classification**
- **Conclusion**

Present Observation

- **Are there bad coaches ?**

Coaches of EC-swimmers are good coaches as it is much easier to break a talented swimmer than to make a champion. EC-coaches are clever

However, some of them are a little bit more clever.
*They know how to **maximise training efficiency.***

What makes them different ?

1. make difference between more and less important
2. their training meets swimmers' needs

= Targeting

Why targeting ?

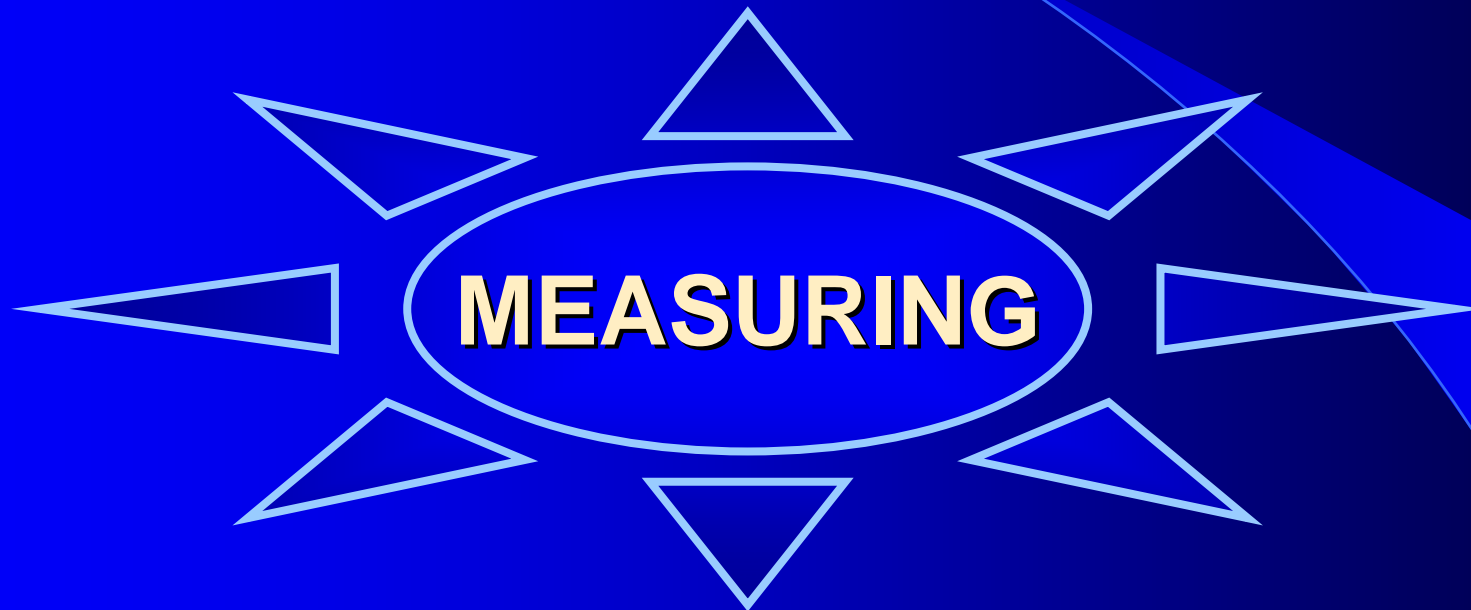


- **maximal exploitation of swimmer's potential**
 - **no waste of time nor effort**
 - **less risk on injuries/overuse**
 - **maximise training efficiency**

How to target ?

- ① - **The right “Training Objectives”**
- ② - **The right Exercise**
”Intensity, Volume, Fraction, Rest”
- ③ - **The right Timing**
”Training Periodisation”
- ④ - **Systematic and reliable control of training adaptations**
”Steering Principle”

How to target ?



- Define needs & individual adaptation capacity
- Control evolution

Key measure for Conditioning

Lactate test

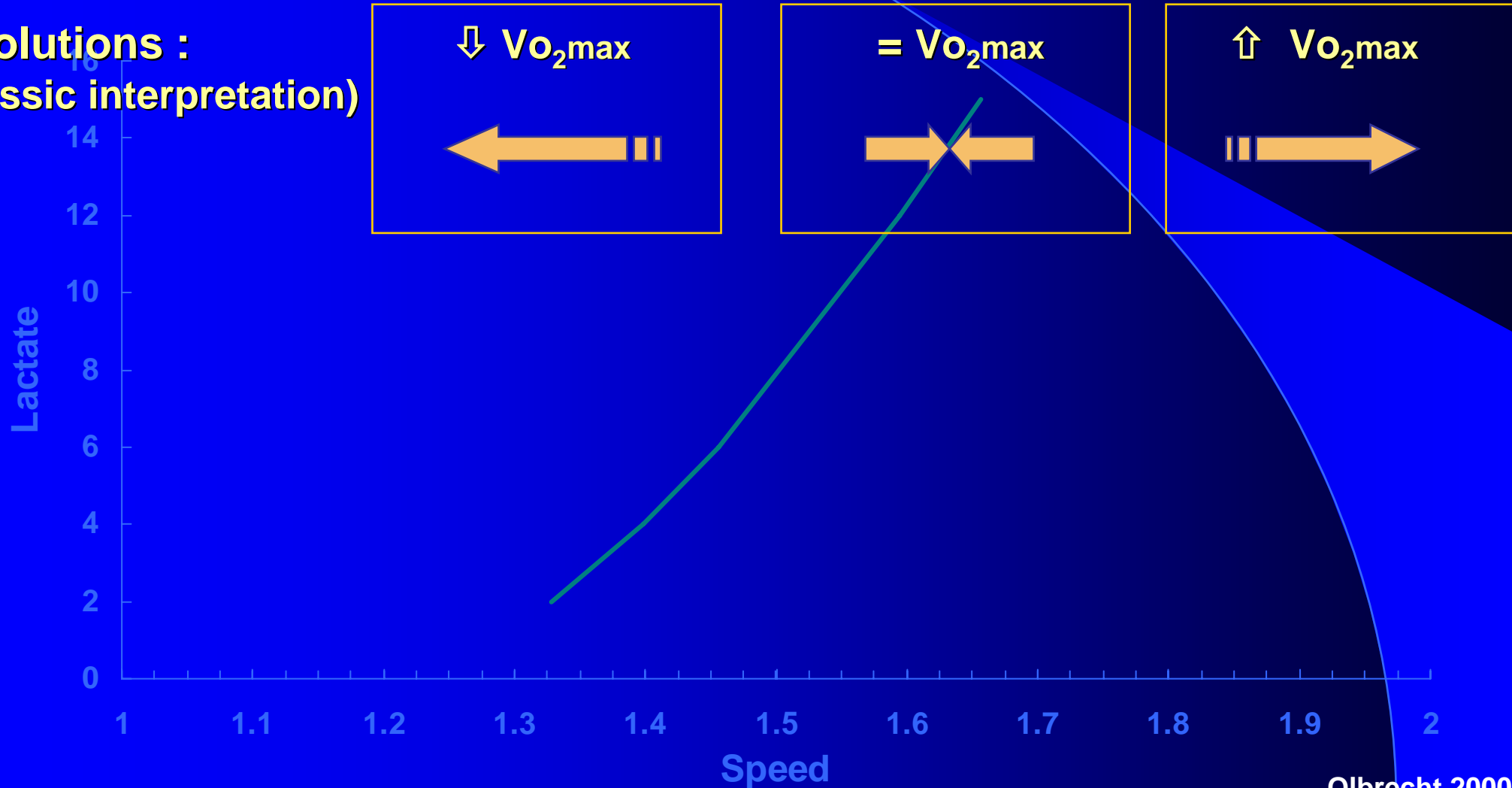
BUT

!!!!!!

Lactate Curve

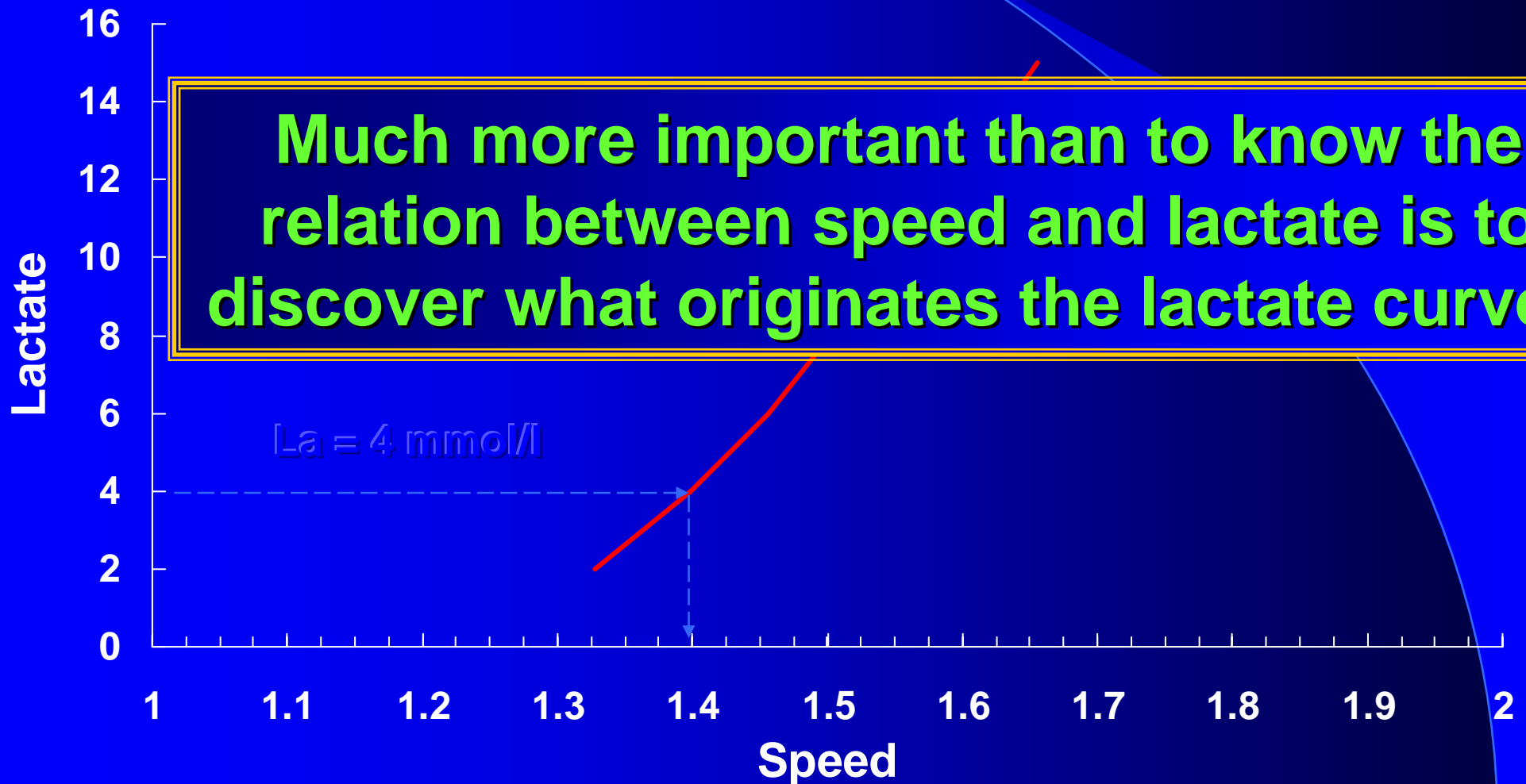
Lactate curve 400m Freestyle

3 solutions :
(classic interpretation)



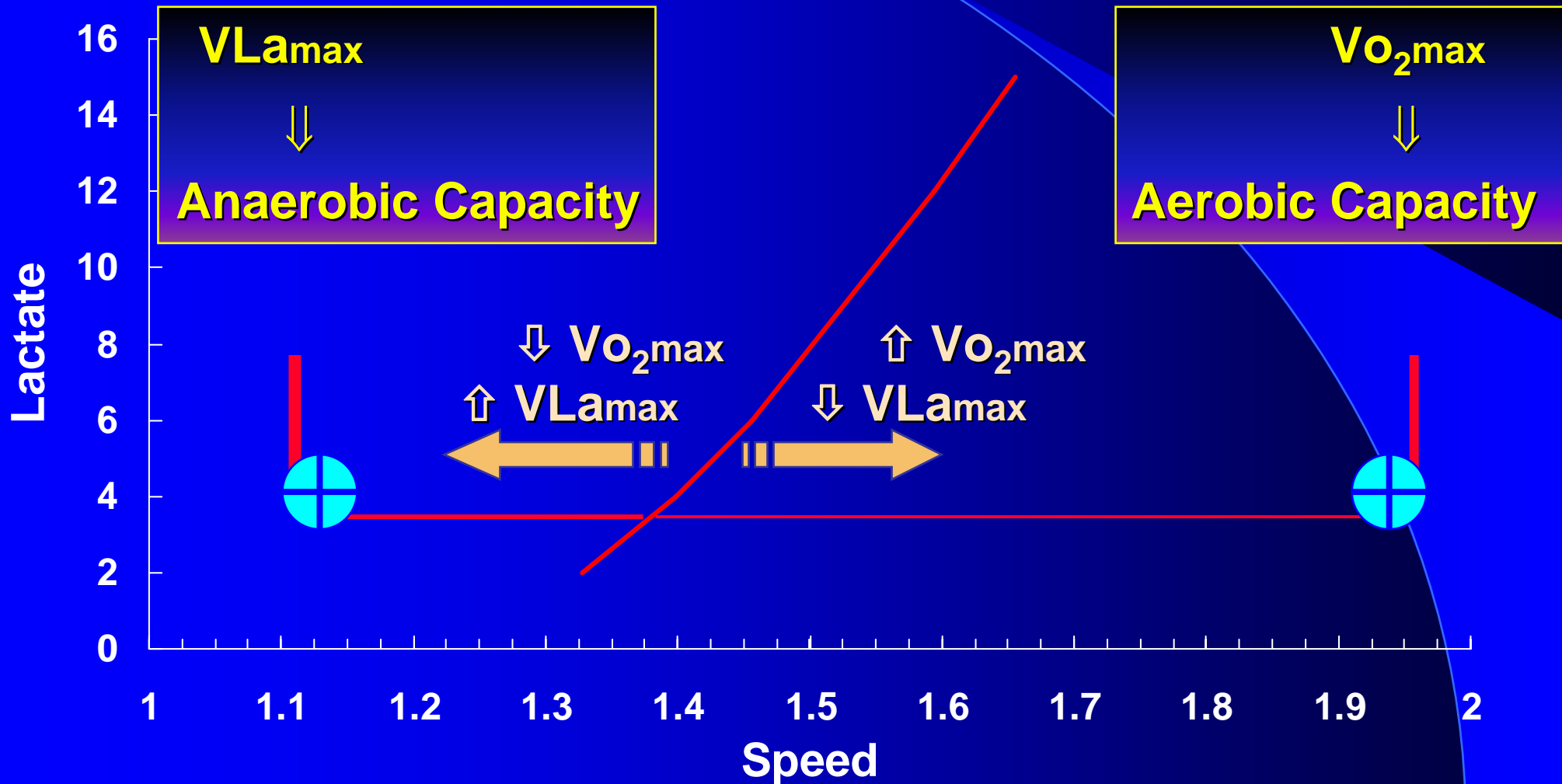
Important Note re Lactate Curve

Lactate curve 400m Freestyle



Most Important Finding

Basic Drivers that move the Lactate Curve

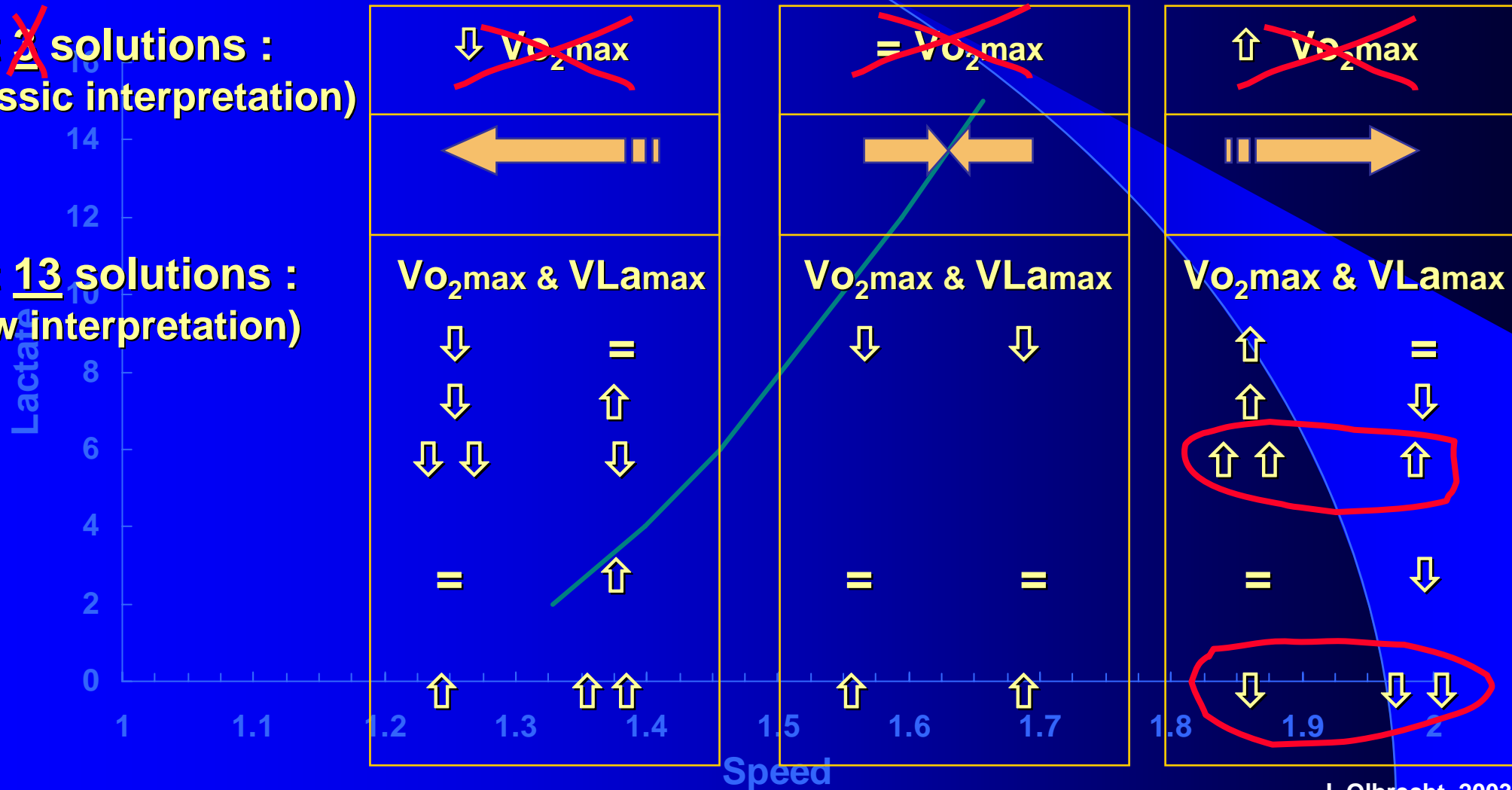


Most Important Finding

How to explain the shift of a Lactate Curve ????

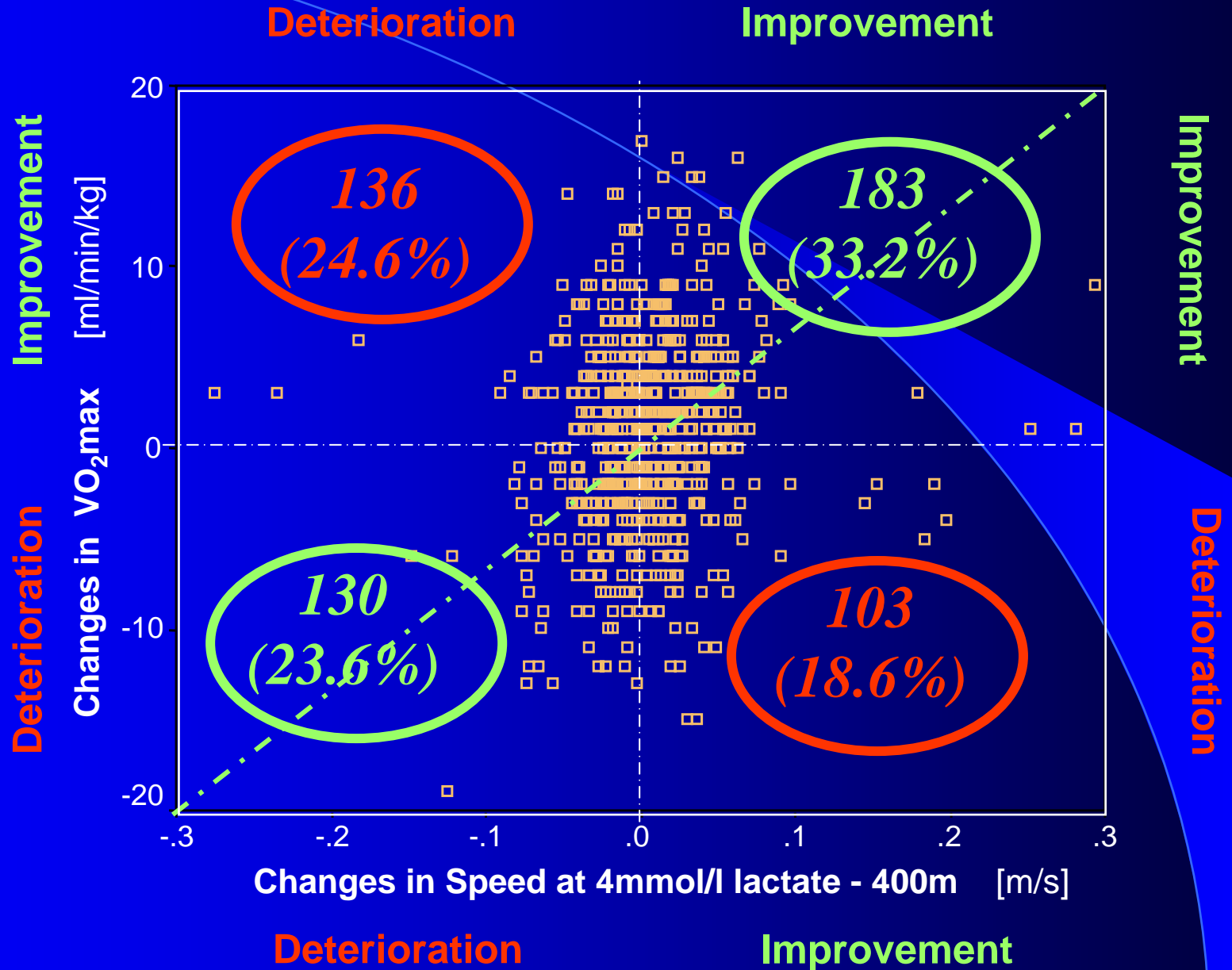
Not ~~2~~ solutions :
(classic interpretation)

But 13 solutions :
(new interpretation)



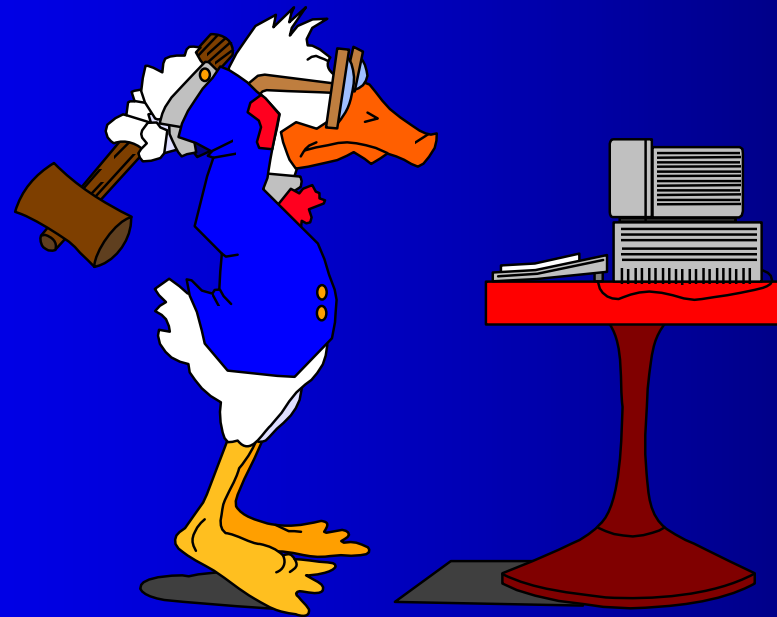
552 Tests : classic vs new interpretation algorithm

**S
h
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k
!!!
!**



Lactate Tests

- $La_{bl} = f(VO_{2max}, VLa_{max})$
 - Bring in PC: Lactate - Distance - Speed - Stroke - Gender



- Outcome: AEROBIC CAPACITY & ANAEROBIC CAPACITY
(VO_{2max}) (VLa_{max})

Capacity and Power

Aerobic

Anaerobic

Capacity

$\dot{V}O_{2max}$

VLa_{max}

- ↪ Assessment conditioning profile
- ↪ Defining training objectives
- ↪ Determining appropriate volume, intensity and periodisation

Power

$\% \dot{V}O_{2max}$

$\% VLa_{max}$

- ↪ Competition performance

VO_{2max} & VL_{amax} : Relevance for Maximal Performances

- MAX is not always the BEST -

- VO_{2max} : can never be too high

Even for sprinters a very high VO_{2max} is very useful

- VL_{amax} : must be balanced

Depending on:

1. Competition distance to prepare

sprint VL_{amax} may be high / Long Distance VL_{amax} may be much lower

2. The higher VO_{2max} , the higher VL_{amax} may be

Framework to classify Training Exercises

Aerobic

Anaerobic

“build up”
Capacity

Aerobic
 $\uparrow \text{VO}_2\text{max}$
capacity training

Anaerobic
 $\uparrow \text{VLamax}$
capacity training

“fine tune”
Power

Aerobic
 $\frac{\% \text{VO}_2\text{max}}{\text{Competition time}}$
power training

Anaerobic
 $\frac{\% \text{VLamax}}{\text{Competition time}}$
power training

Training Adaptations

Classification Approach

Training Effect

- Exercises with different layout / intensities may induce the same training effect

Layout of Exercise

- Form-based: Interval exercise, continuous effort, In & Outs, ...
- Intensity-based: AER1, AER2, ...



Integration approach (compiles Rest, Fraction, Intensity and Volume)

Offers the coach more possibilities to achieve training effect

Concept for Classifying Training Exercises

- Each class groups workouts with the **same main class effect**; i.e. inducing the same major biological and functional adaptation => **4 classes**
- Each class is **defined by criteria** for:
Volume - Intensity - Fraction - Rest
- Enables the **coach** to **create “freely”** new training sets for each of the classes, knowing which main training effect to expect

Classification of Training Exercises - Rowing

Aerobic Capacity
(Endurance Cap.=AEC)

Anaerobic Capacity
(=ANC)

Aerobic Power
(=AEP)

Anaerobic Power
(=ANP)

**ANC-
Strength**

S

W

S

W

S

W

S

W

Volume*

Long (20-40min) Very High (35-70min)

Moderate (10-20min) Short (5-10min)

Long (25min) (35min) Short (6-20min) (4-8min)

Interval

Long (2-10min/cnt) Short (1-5min/cnt)

Short (20-40s) Very Short (15-30s)

Short progresses to Long (1-3min) => (3-9min) Short (45s-120s)

Intensity*

Extensive alternated with short intensive intervals
(QUALY + Regeneration)

Nearly maximal All out

Race Pace or somewhat faster

All-out

Rest

Short (60-30s) (90-60s)

Long: 2x effort (40-90s) (40-90s)

Short => Very Short (90-60s) => (45-20s) Short (10-20s within 3min)

Example

6x5min R=60s
1,3 Hi SF+P
rest very easy

4 x (1, 3, 10min)
R=20s
1 = MAX, 3 = P
and 10 = easy

12x30s
R=80S

2x(3x30s)
R=90s
max

8x250m R=45s
to
3x750m R=15s
SFcomp/+

12x300m R=40s
to
3x1000m R=20s
SFcomp/+

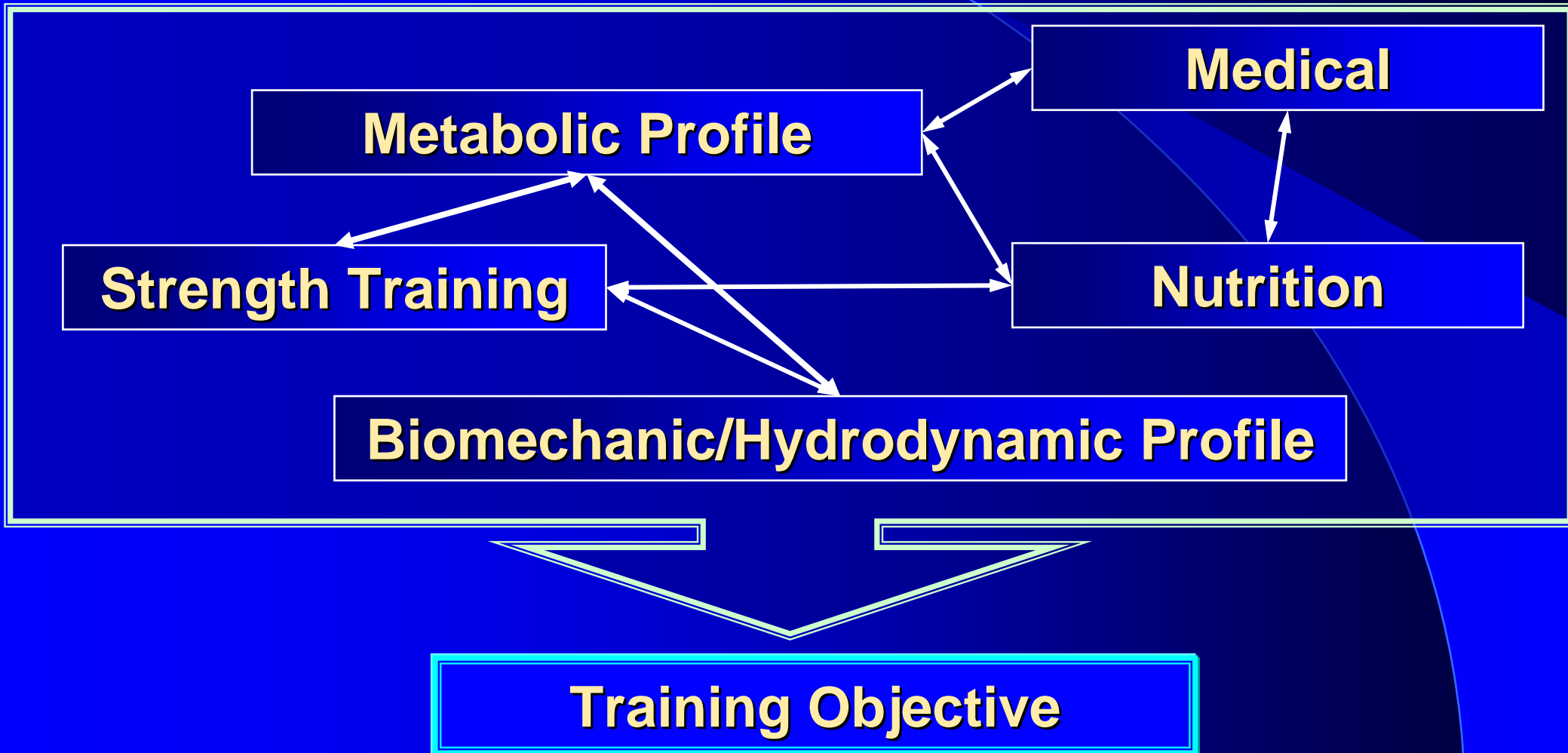
Brokens / Test Comp.
3x(4x15strP) R=10s
R=5-10min

* depends on conditioning level

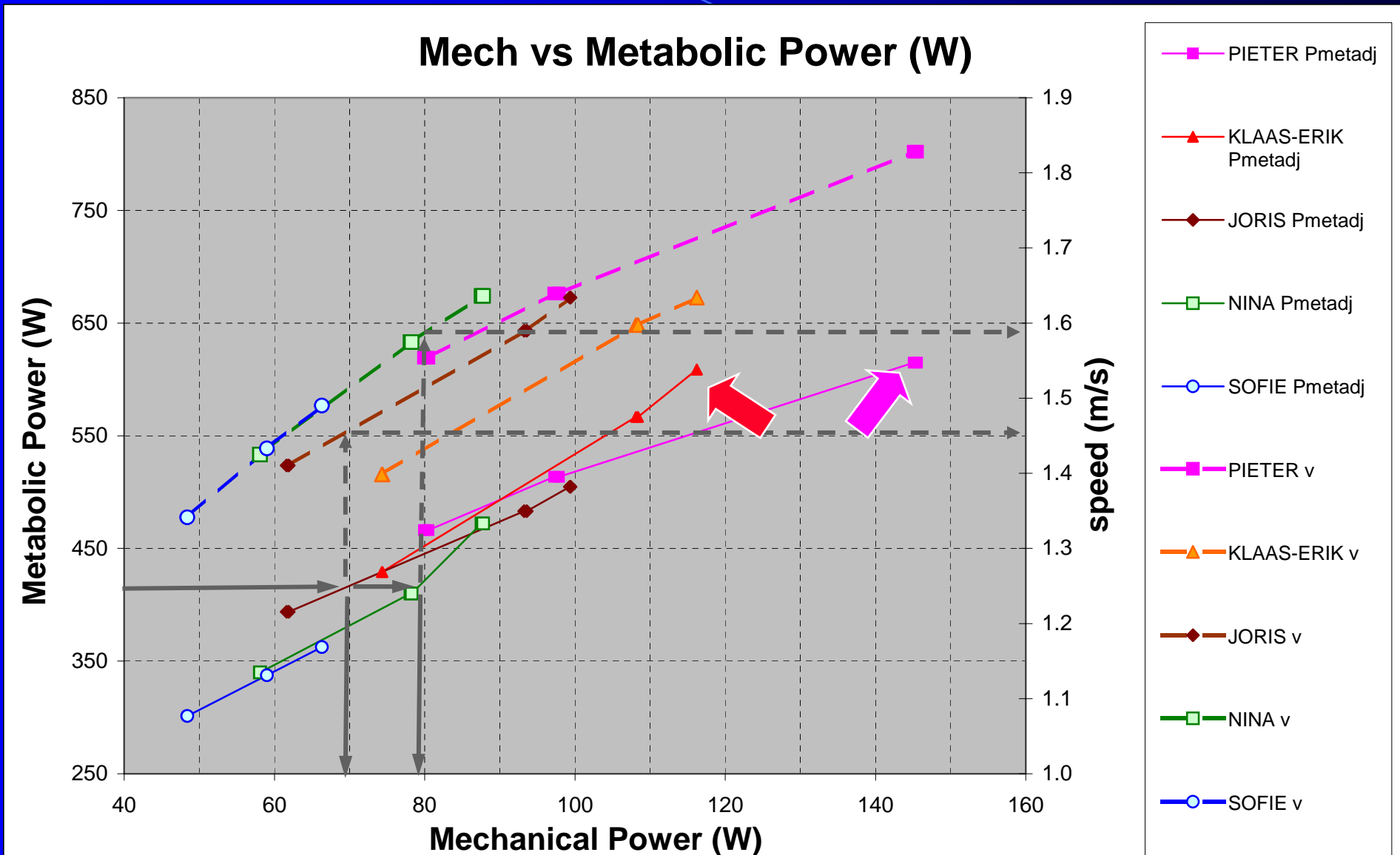
Sprint and technique are not in this classification

Multidisciplinary Approach

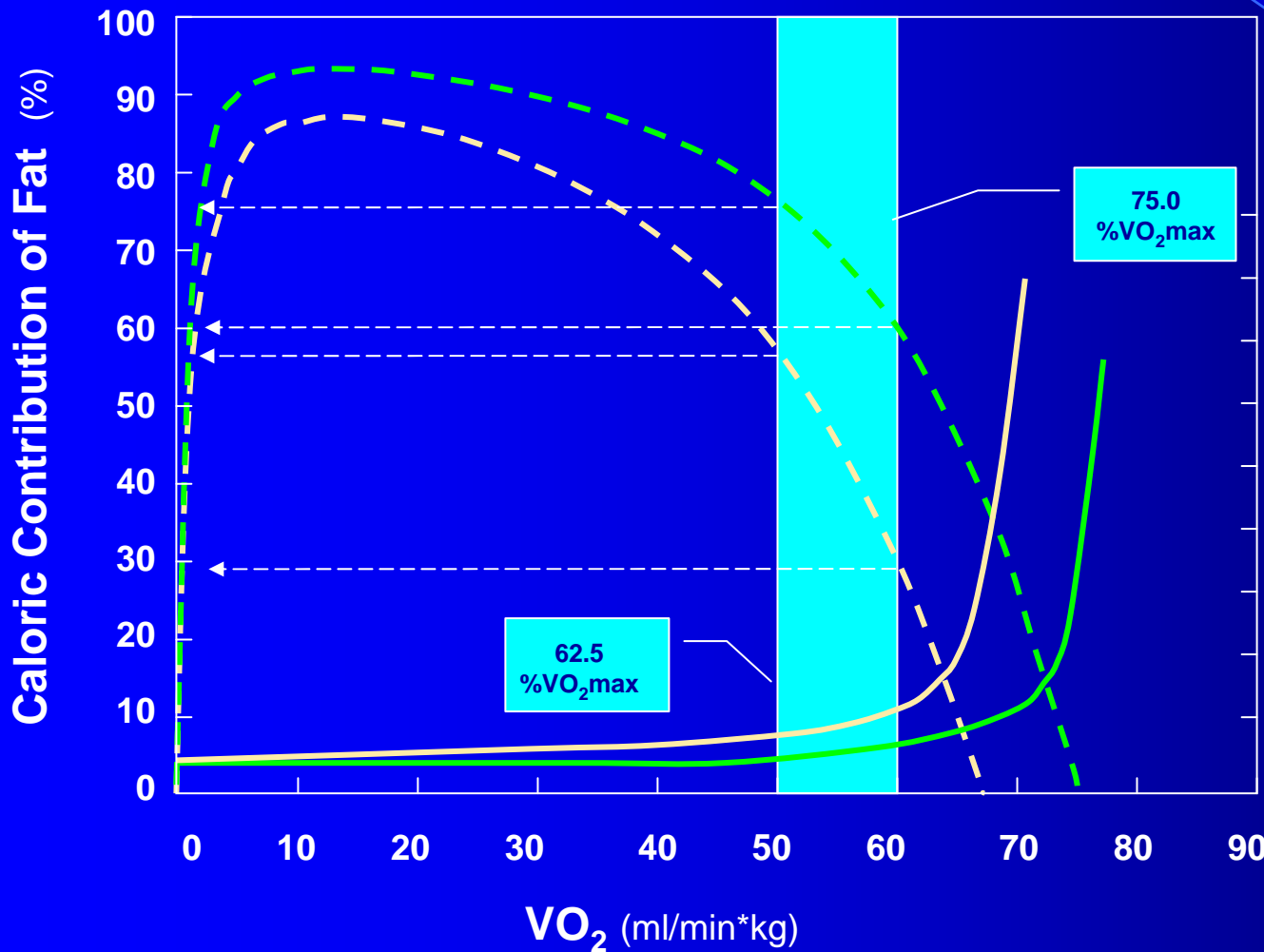
PSV-Model (swimming)



Symbiosis Biomechanics & Physiology



Interaction Metabolic Profile and Nutrition



Lactic Acid (mmol/l)

VO_2max		
= 80 ml/min*kg		
Athlete	A	B
V_{Lamax}	0.2	0.4

Extensive Endurance		
Glucose Contribution		
50 VO_2	25%	40%
60 VO_2	40%	70%

Conclusions (1/2)

1. Maximising training efficiency is very important to make a champion.
2. Targeting = selection of the "needed" training
 - objective
 - exercise
 - timing (supercompensation)
3. Targeting will avoid waste of time and effort, and will reduce risk on injuries/overuse
4. Important: objective measures to define needs and to evaluate training effect

Conclusions (2/2)

5. **Make difference between the athletes' capacity and power (aerobic and anaerobic // ...).**
6. **Training exercises can be classified in 4 classes with each a main as well as secondary training effect**
7. **This classification takes into account the difference between capacity and power training objectives.**
8. **Multidisciplinary approach to set priorities**
 - **everything is important, but some things more than others**

A white speech bubble with a black outline and several yellow spikes radiating from its edges. The background is a solid blue color with a subtle gradient and a faint white arc at the top.

Thanks for your attention,

**You have a tremendous
endurance power !!!!!**

More details, examples and applications for planning, periodizing and optimizing swim training can be found in:

The Science of Winning

For more information contact:

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The Science of Winning

Planning, Periodizing and
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