Session RPE as a Device for Monitoring Training

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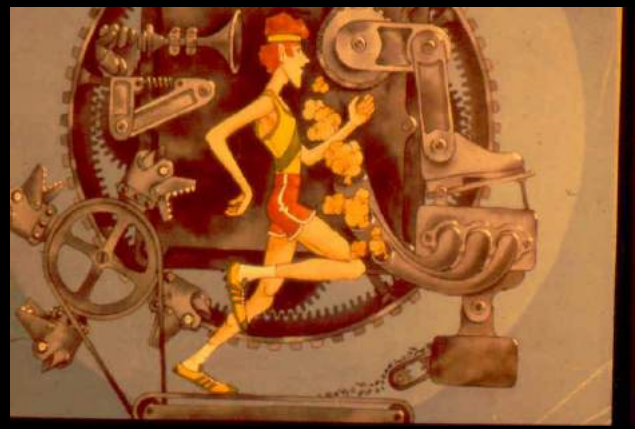
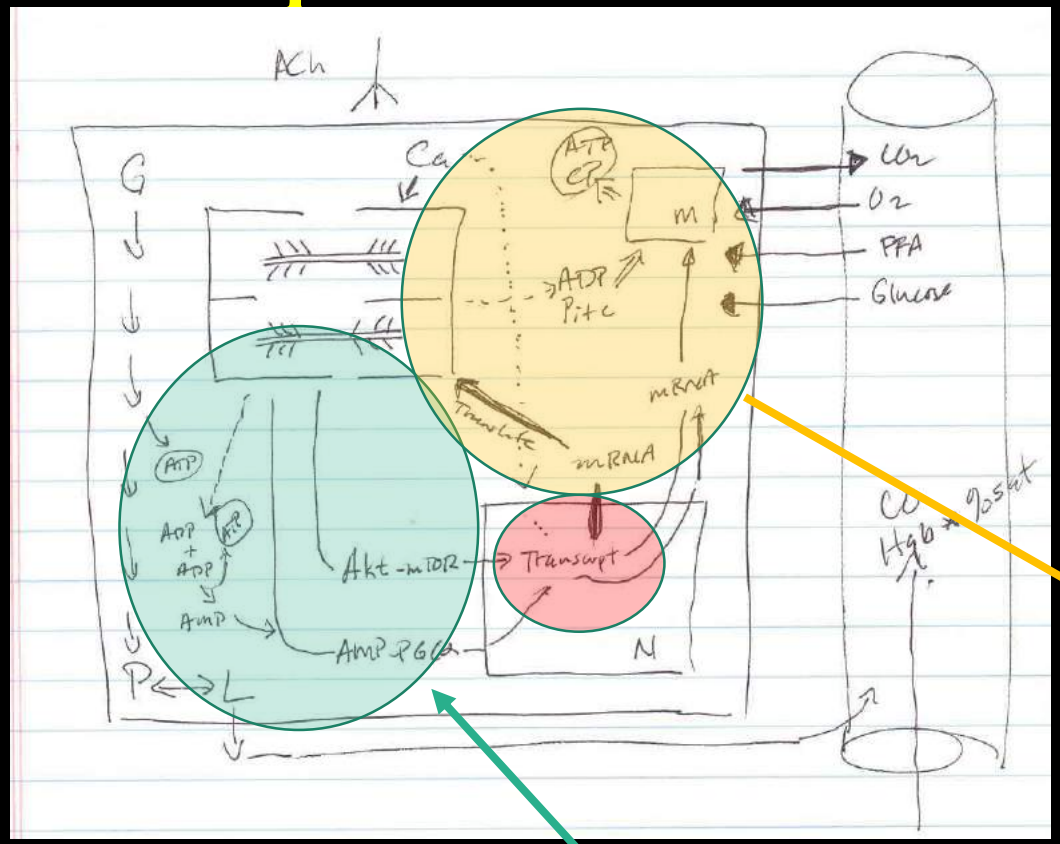


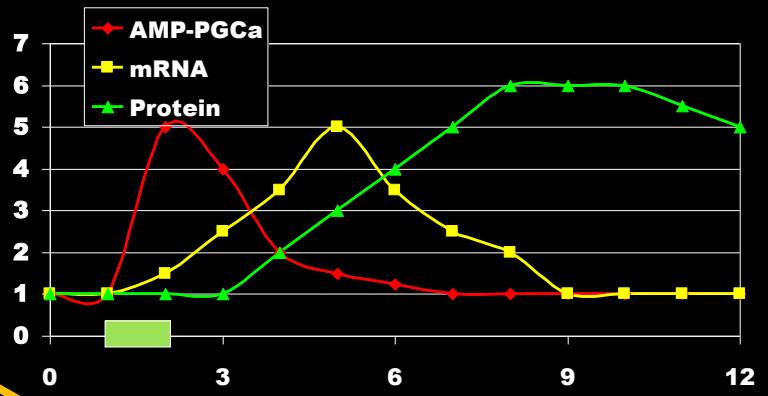
Athletes Are Supposed to Get Better With Training

Adaptation: The Essence of Training



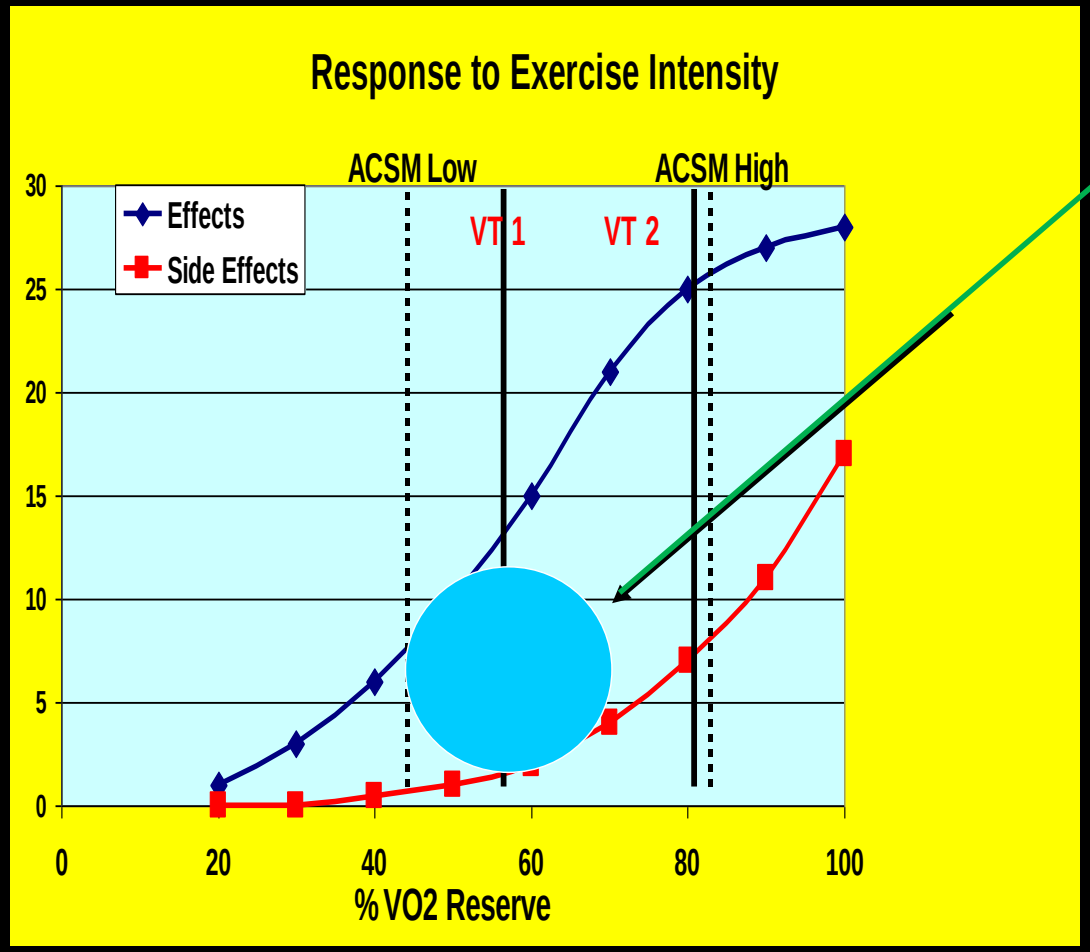
Training Schematic

Temporally Dependent Response



We Believe that There is a Proportional Input-Output Relationship

Improvement



Therapeutic Range

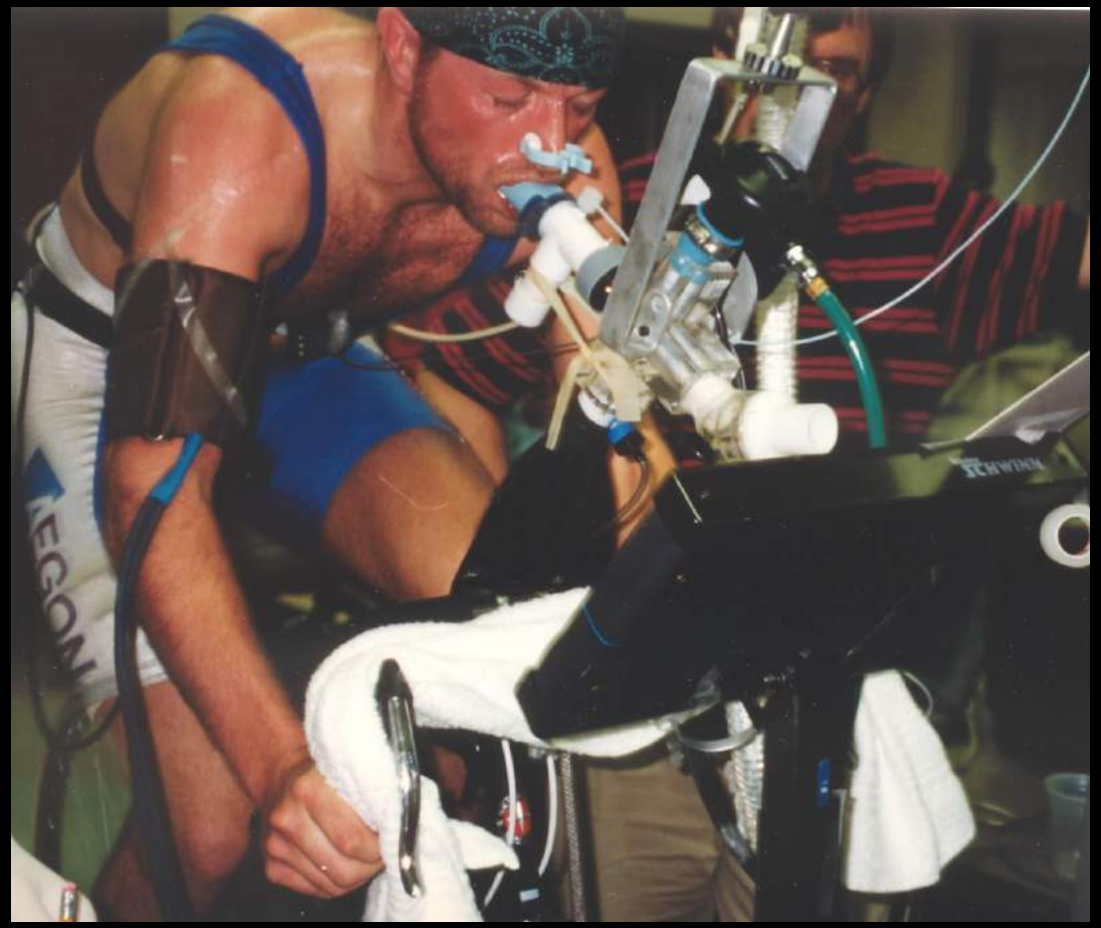
Load

Who Cares About Monitoring?

Physicians
Physios/Rehabilitation Specialists
Personal Trainers
Sports Coaches

What is the problem? (Diagnosis)
How do we fix the problem? (Prescription)
Is the fix being implemented? (Monitoring)
Is the fix working? (Evaluation)

The Coach Has to Have a Device for Monitoring Training



Laboratory

Training Track

International Journal of Sports Physiology and Performance, 2019, 14, 270-273
https://doi.org/10.1123/ijspp.2018-0935

Human Kinetics
INVITED COMMENTARY

Internal and External Training Load: 15 Years On

Franco M. Impellizzeri, Samuele M. Marcora, and Aaron J. Coutts

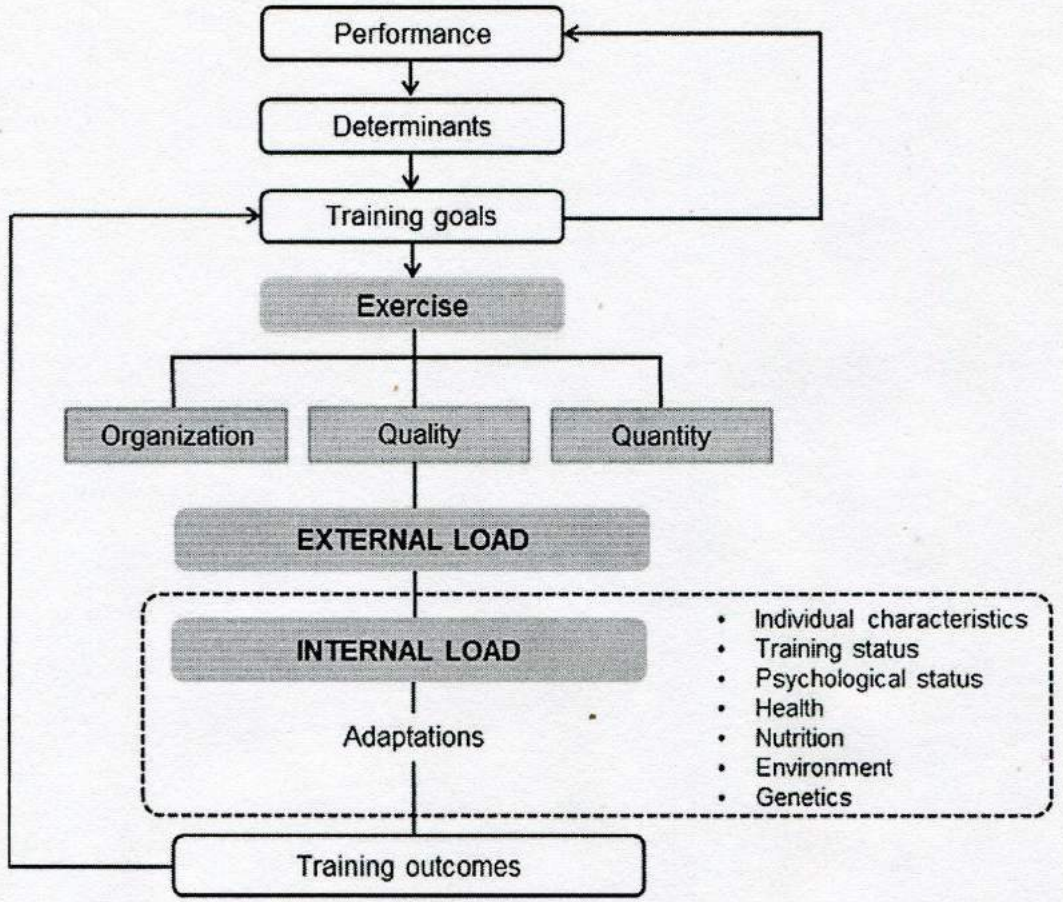
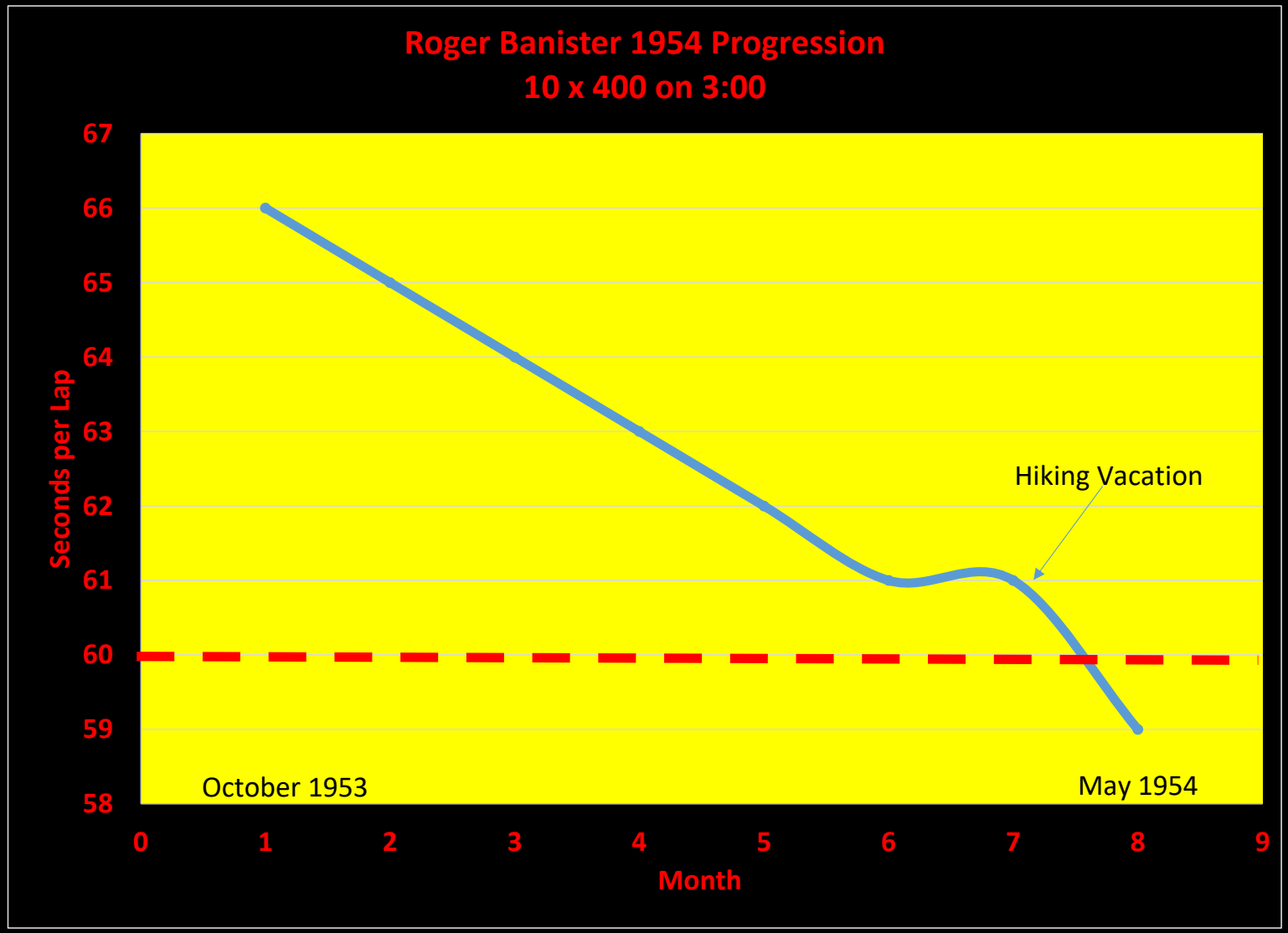


Figure 1 — Theoretical framework of the training process.

External Training Load: Index Workouts

Frantz Stampfl, Bill Bowerman



Cold Wind Track

Regulation of Energy Expenditure during Prolonged Athletic Competition

CARL FOSTER[1], JESUS HOYOS[2], CONRAD EARNEST[3], and ALEJANDRO LUCIA[4]

MSSE 37: 670-675, 2005

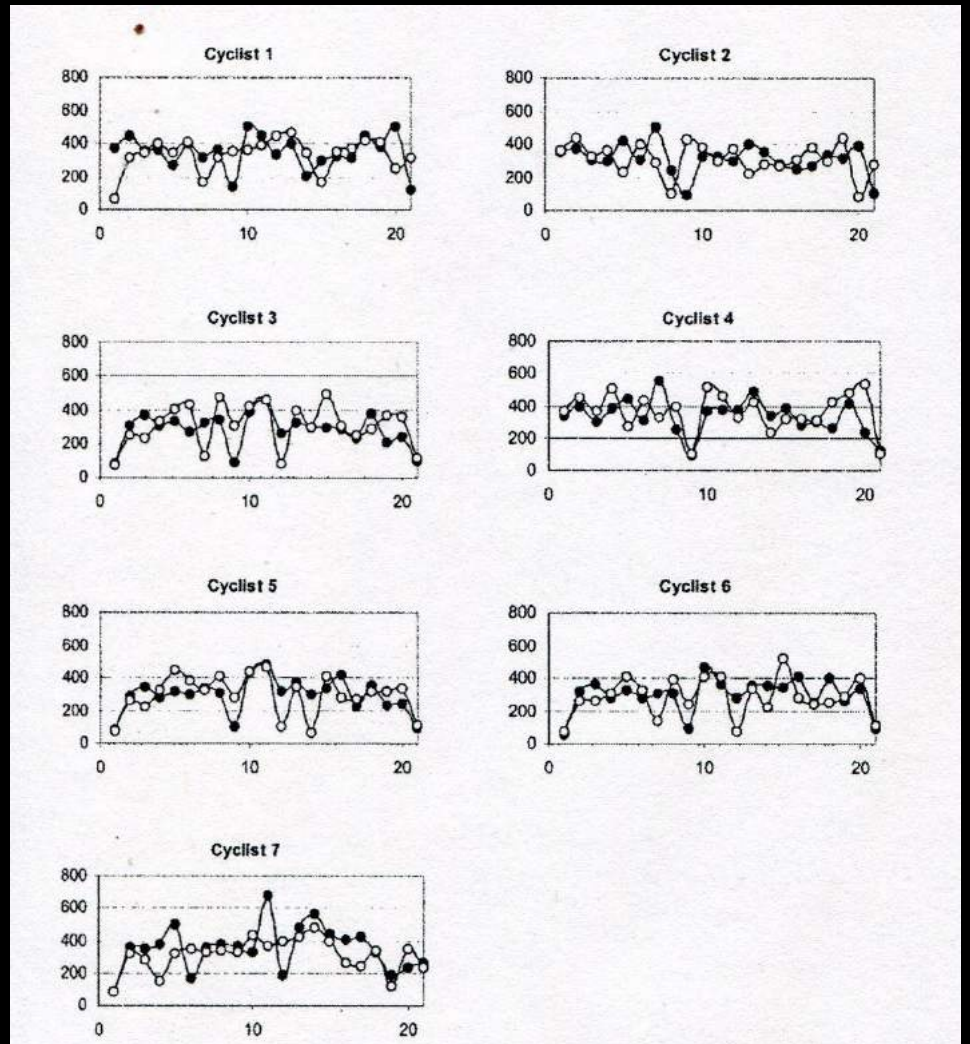


FIGURE 4—Day-to-day variation in training impulse score.

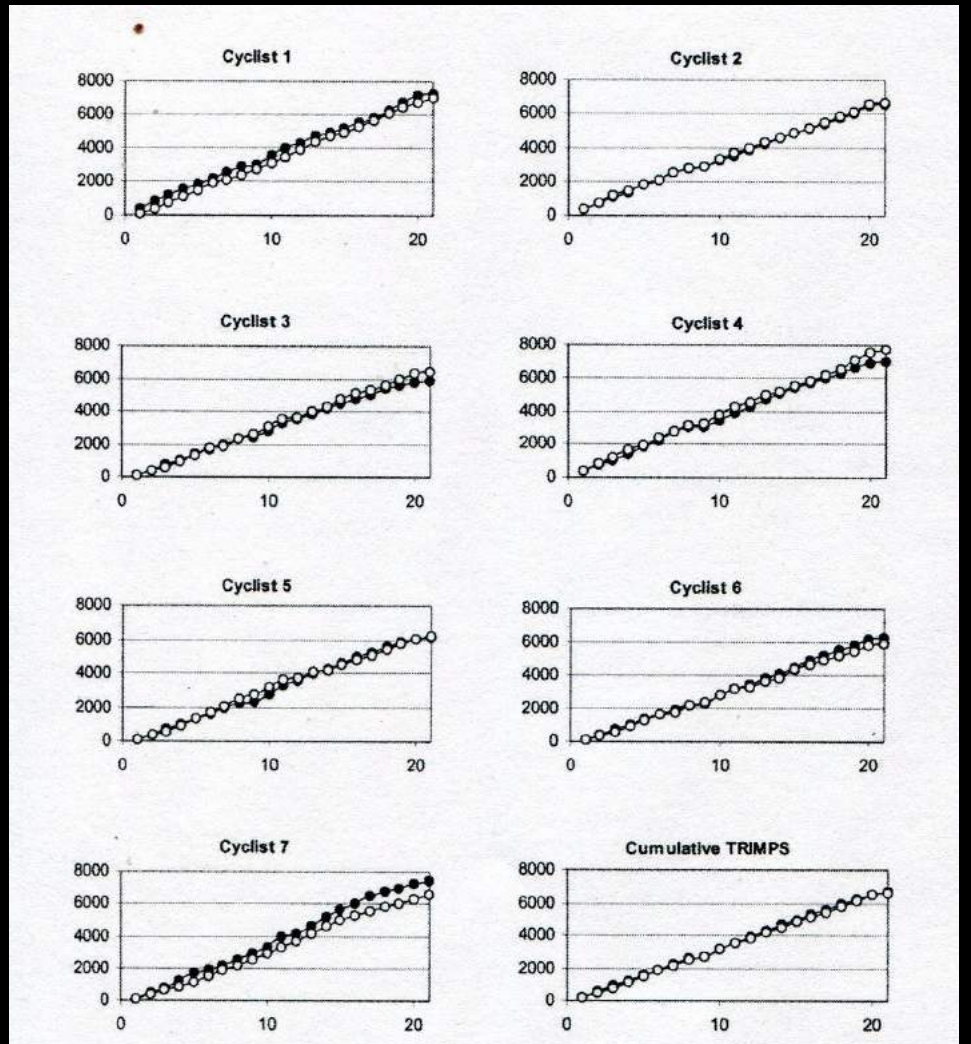
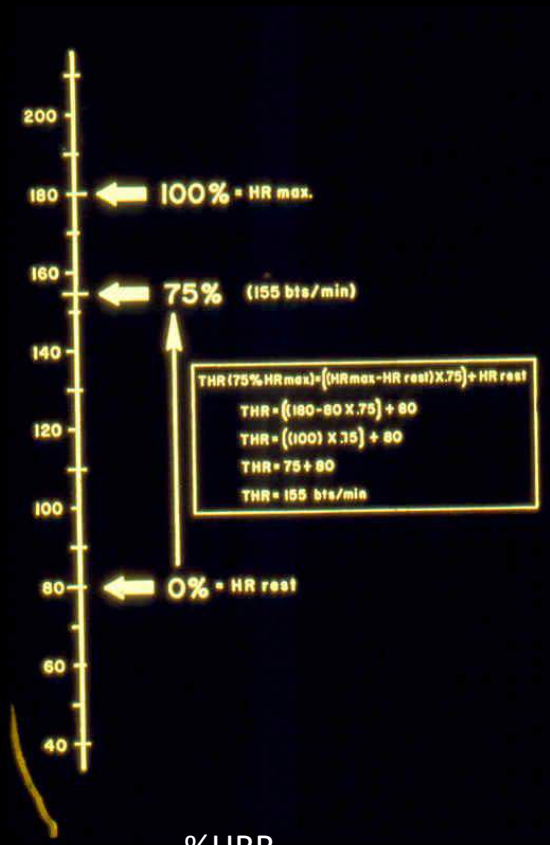


FIGURE 8—Cumulative training impulse score (TRIMPS).

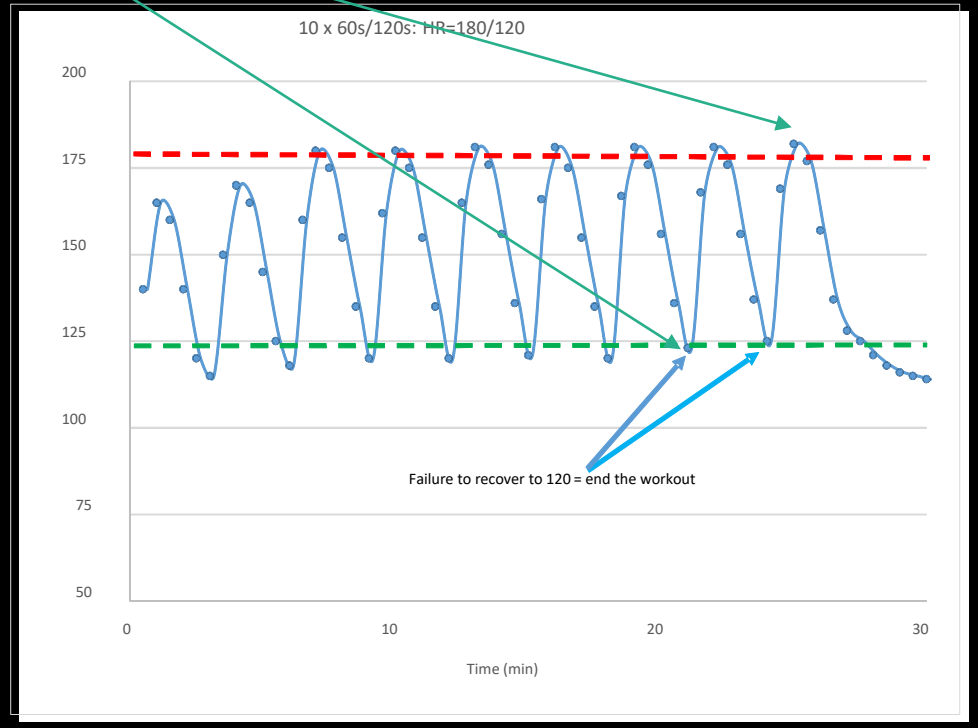
Time to stop workout

Monitoring = Acute Responses to Exercise



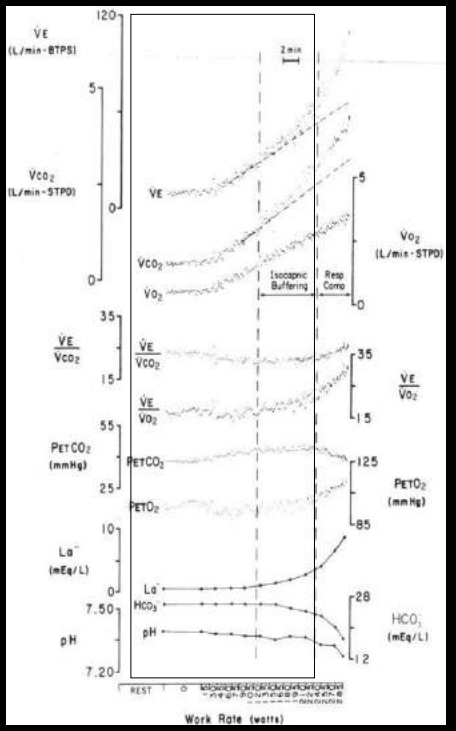
%HRR

Karvonen



Where did 180 and 120 come from?

Gerschler & Reindell



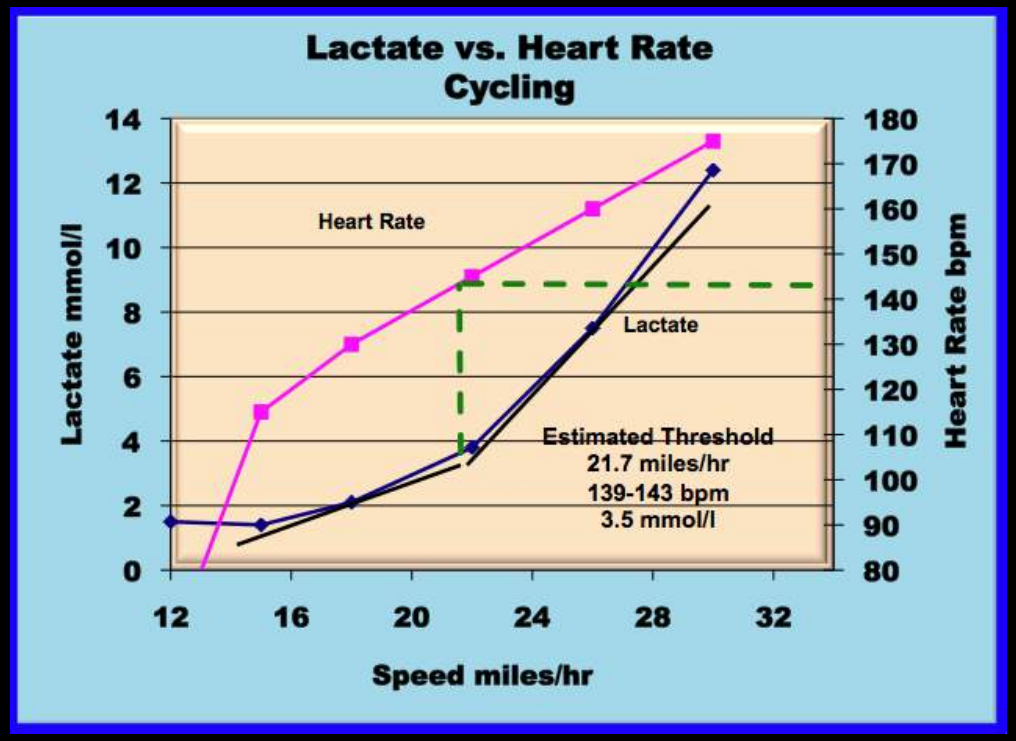
Threshold concepts

Hollmann

Wasserman

Sjodin

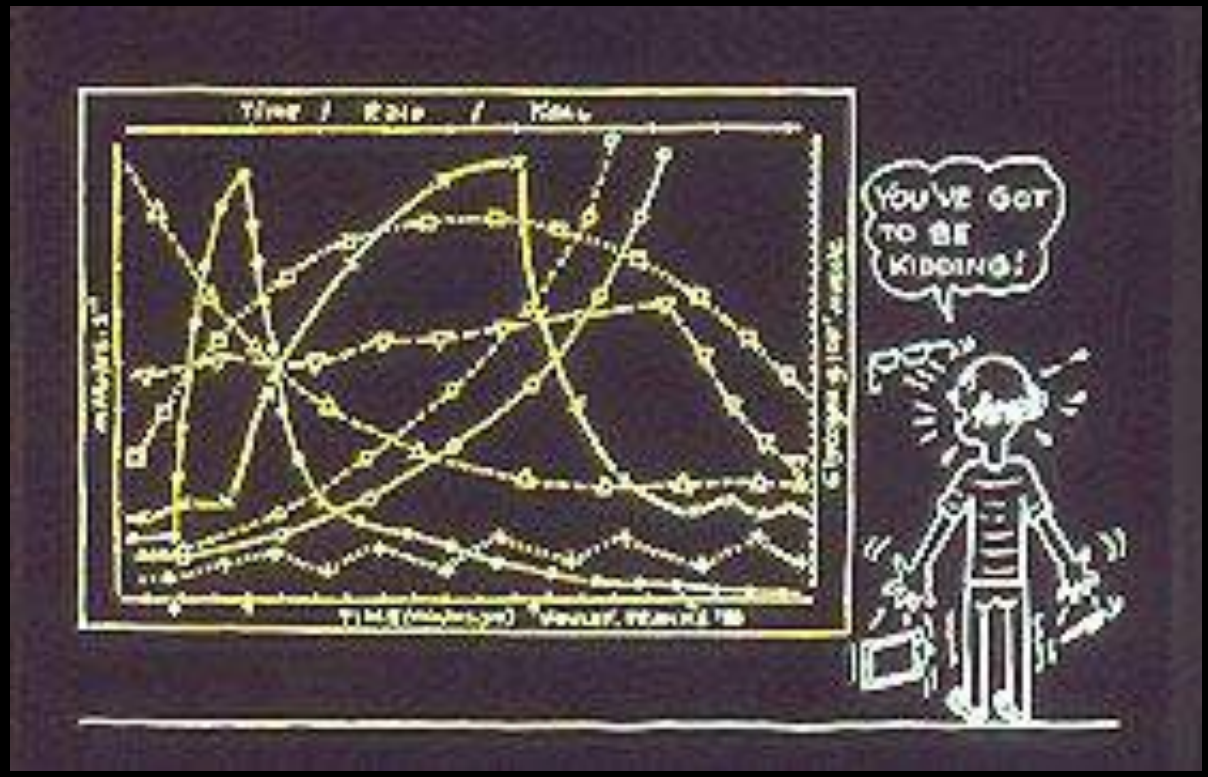
The Lactate Profile



FTP

Talk Test

It's Easy to Get Too Much Information



What is the Coach/Physician/Therapist/Trainer going to use for decision making?

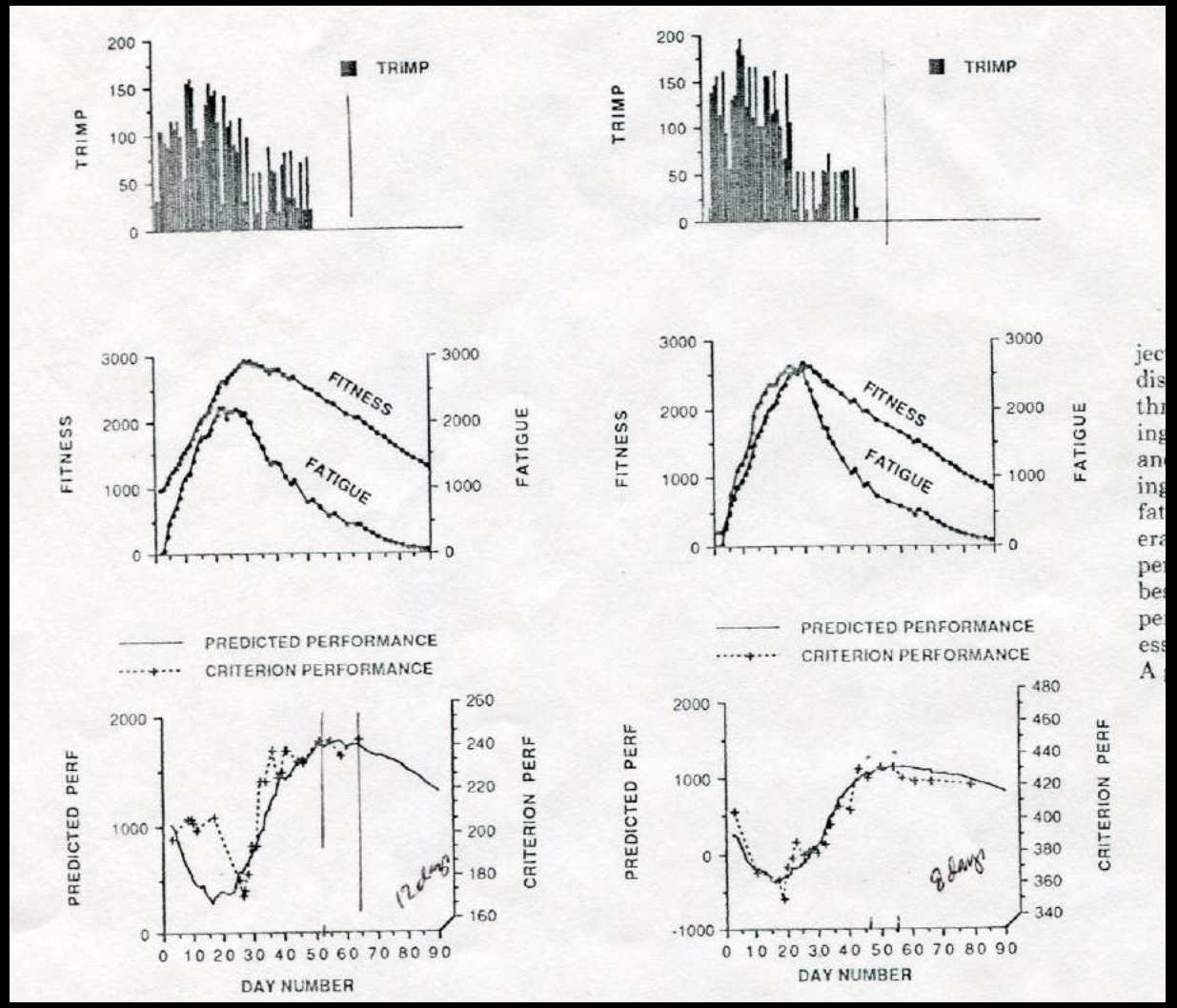
Research tools vs coaching aids

Decision making time?

Linking Physiological Response to Performance Change: TRIMPS

(Brilliant but Complex)

Eric W. Banister, Ph.D.



TW Calvert et al. A systems model of the effects of training on physical performance *Institute of Electrical and Electronics Engineers Transactions on Systems, Man and Cybernetics, 6*: 94–102, 1976.

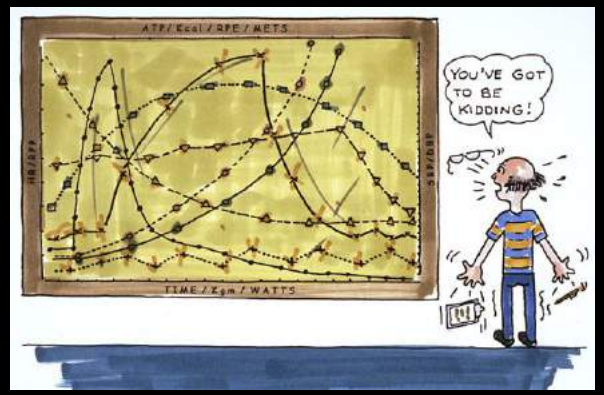
EW Banister et al. Modeling the training responses. *1984 Olympic Scientific Congress: Sport & Elite Performers*, Champaign, Human Kinetics, 1986.

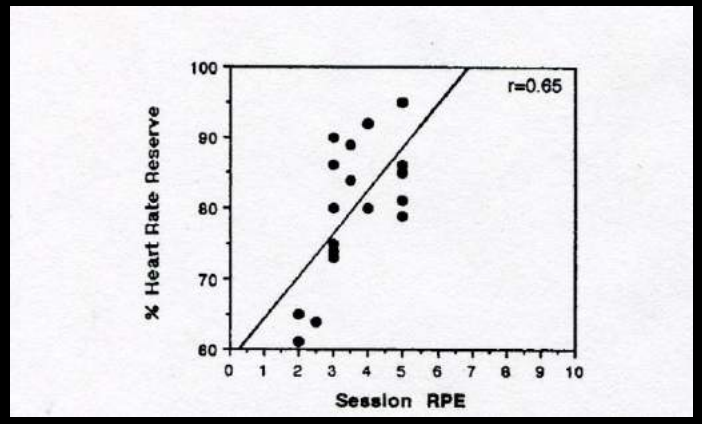
RH Morton et al. Modeling human performance in running *J Appl Physiol* 69: 1171-1177, 1990

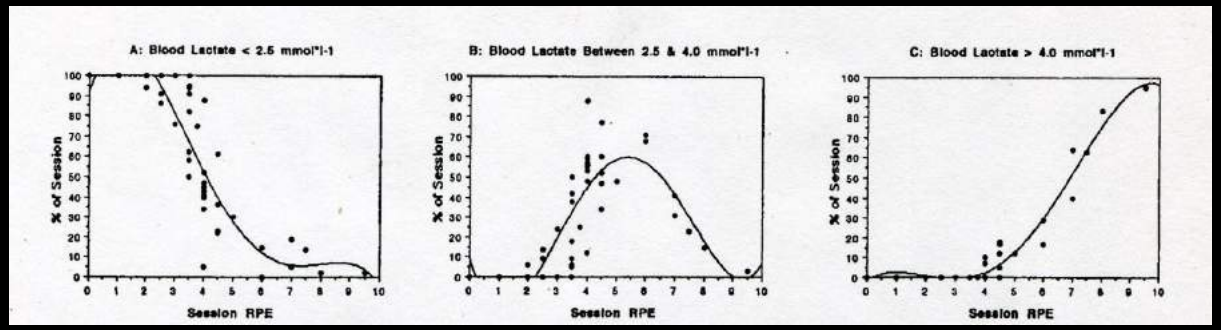
JR Fitz-Clarke et al. Optimizing athletic performance by influence curves. *J Appl Physiol* 71: 1151-1158, 1991.

Making Eric Banister Understandable & Practical

The Emergence of the Session RPE Method



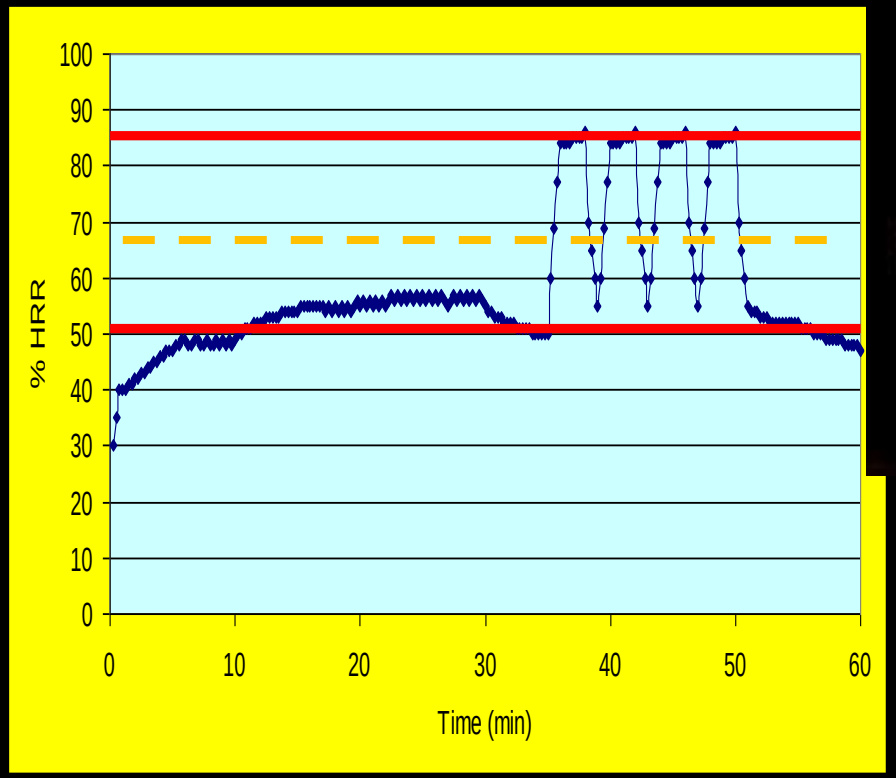


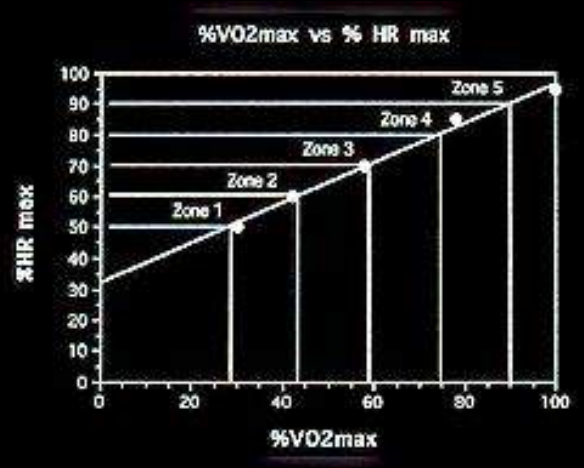


C Foster et al. Effects of specific versus cross training on running performance *Eur J Appl Physiol* 70: 367-372, 1995

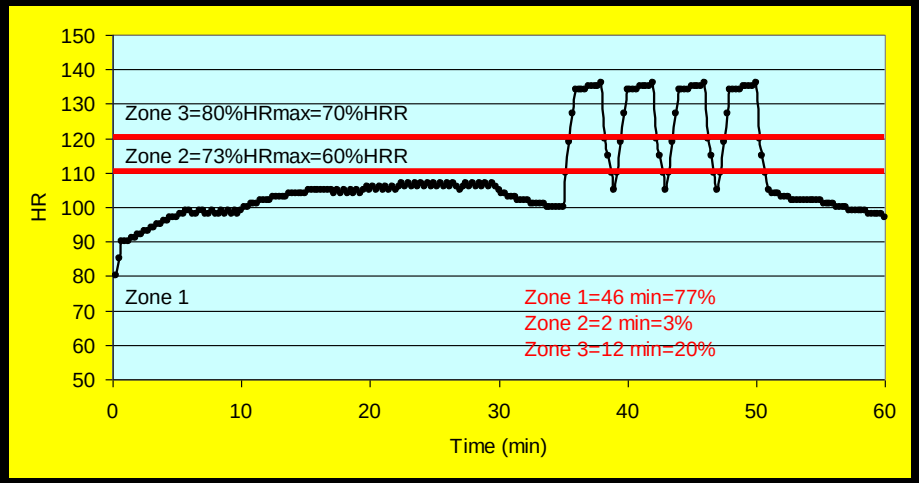
Modifications of TRIMPS

Solving the weaknesses of %HRR and Steady State Exercise





Sally Edwards, M.S.
Summated HR Zone Points



TRIMPs=46*1 + 2*2 + 12*3=46 + 4 + 36 = 86

sRPE= 60 * 4.5 =270

Banister "lite"

C Foster et al. ***J Strength Cond Res*** **15: 109-115, 2001**

So……

1. HR Monitors are a good tool for some types of training (internal training load)

2. Power Meters are a very good tool for some types of training (external—power, or internal—TSS)

3. The TRIMPS concept is too complicated for everyday use as designed

4. More high tech tools are complicated, good for answering research questions

5. We need something simple and practical

    sRPE may be more practical

What Does sRPE Training Monitoring Look Like?

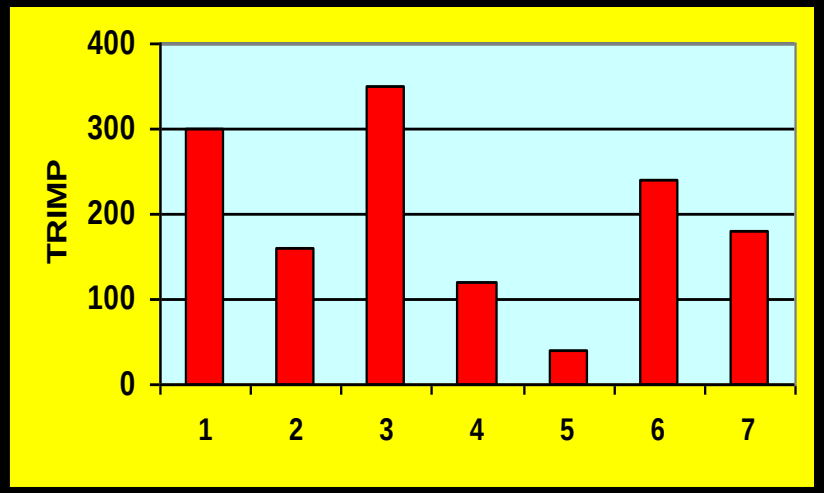
Date	Day	Time	sRPE	Load	Week	Cycle	Monotony	Strain	Complaint
5.27.19	1	40	3	120					3.6
	2	90	3	270					3.6
	3	100	3	300					3.7
	4	70	3	210					3.8
	5	100	3	300					3.8
	6	100	3	300					3.7
	7	45	3	135	1635	748	2.19	3414	3.6

Total time is the simplest measure of volume to use…..saddle to saddle
Summate within a day
Beware of “accountants” (10%)

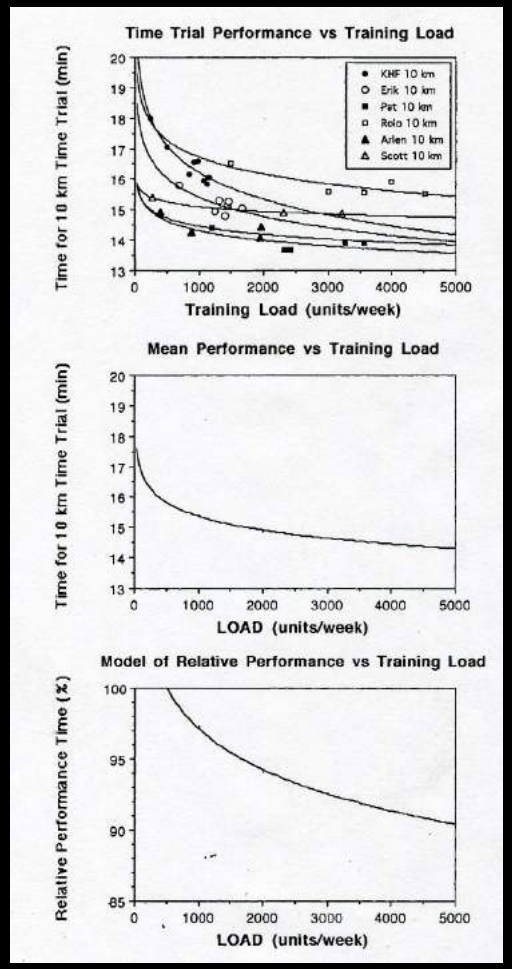
Session RPE TRIMP Calculation

Sunday	60	5	300
Monday	40	4	160
Tuesday	70	5	350
Wednesday	40	3	120
Thursday	20	2	40
Friday	60	4	240
Saturday	60	3	180

- WEEK $_{sRPE}$TRIMP=1390
- MONOTONY (X/sd=1.86)
- STRAIN=1420 * 1.94 = 2591

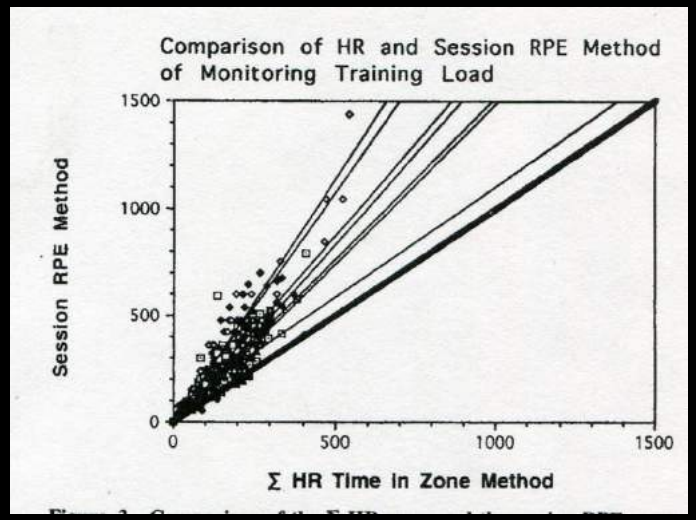


Session RPE & Training Monotony Lead to Explanations

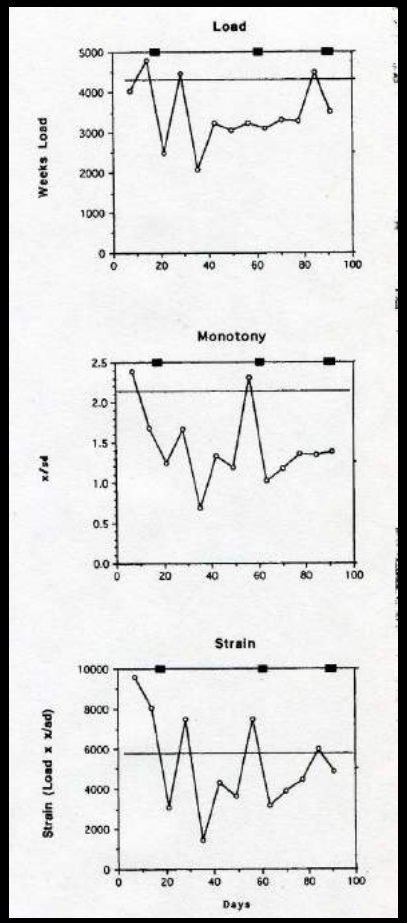


C Foster et al.
Wisc Med J 95: 370-374, 1996

The Good



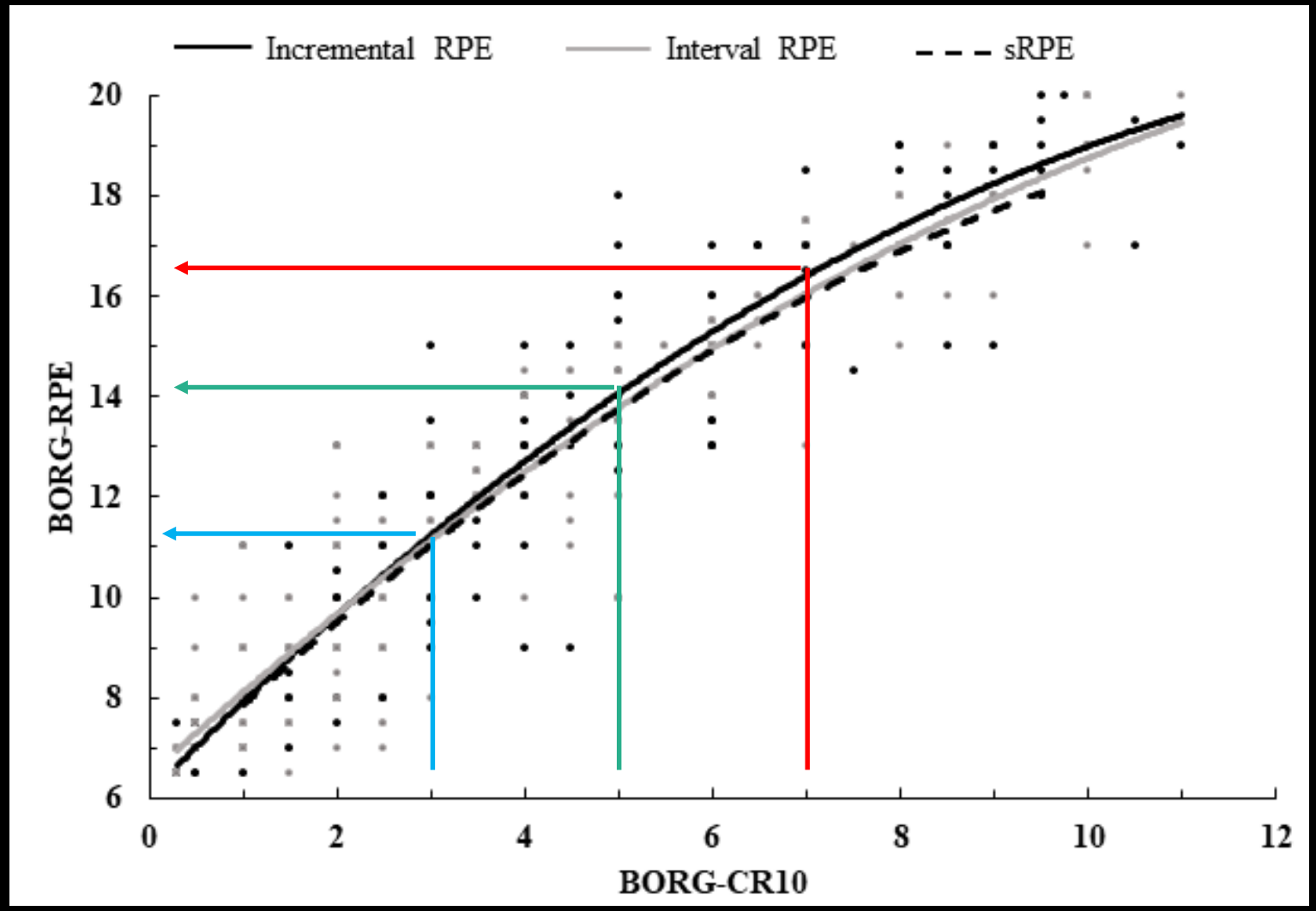
C Foster
MSSE 30: 1164-1168, 1998



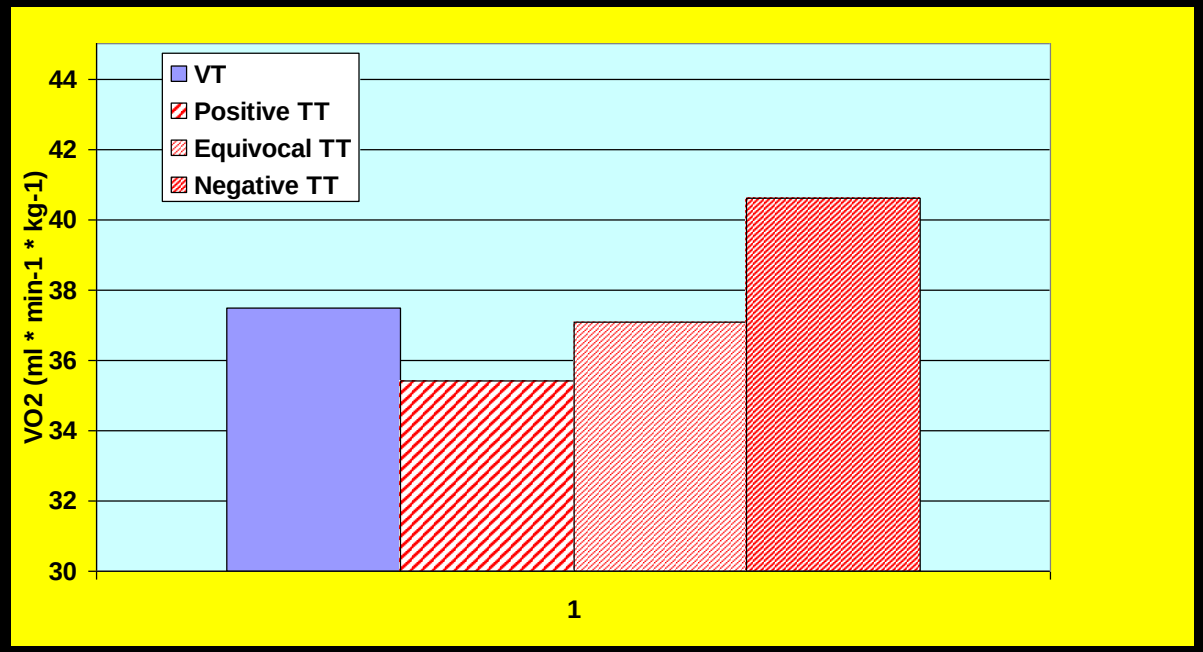
The Bad

Which Borg Scale to Use?

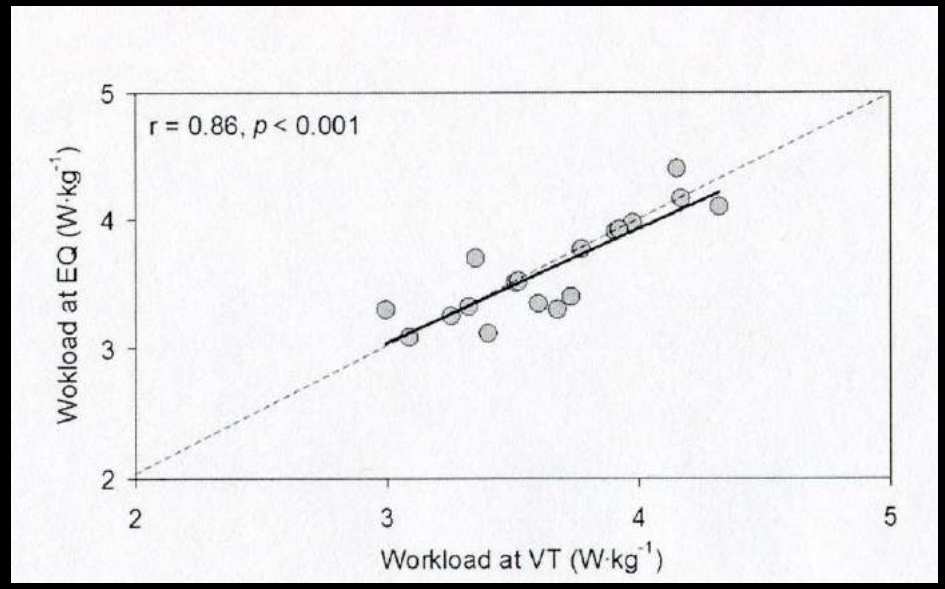
B Arney *IJSPP* (In Press 2019)

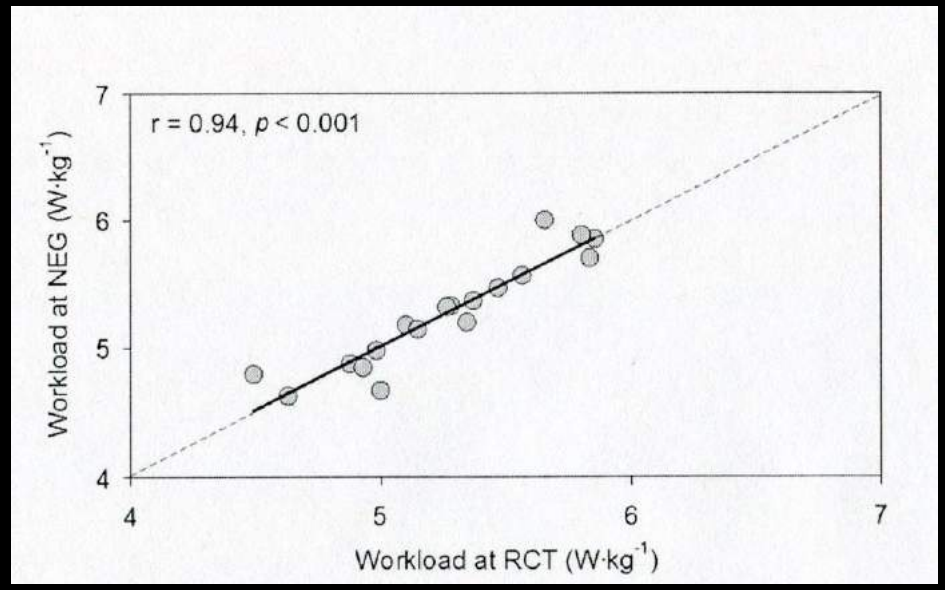


The Talk Test
The Lactate Profile Made Simple
Training Zones for Idiots



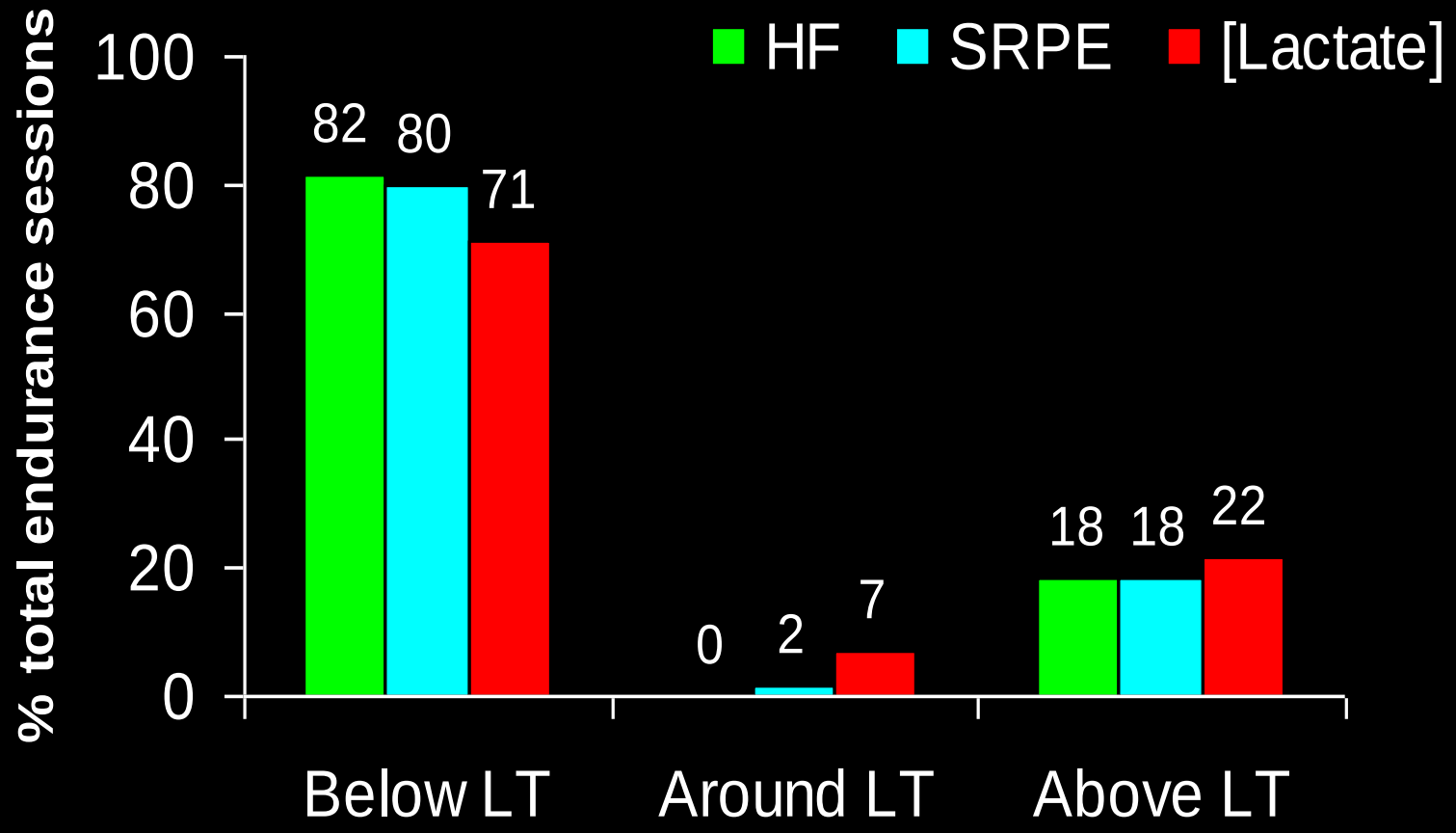
M Dehart-Beverley Clin Exerc Physiol 2: 34-38, 2000





J Rodriguez-Morryo *JSCR* 27: 1942-1949, 2013

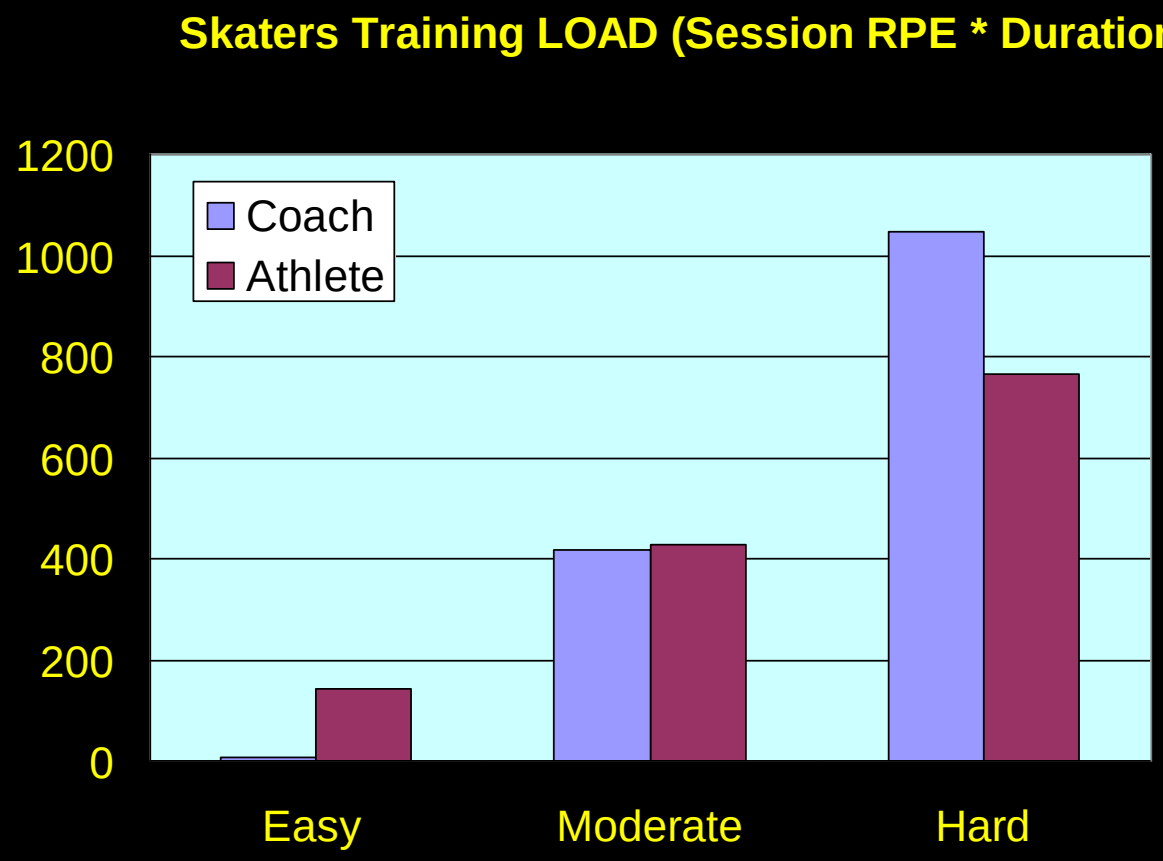
Seiler KS, Kjerland GO: The Polarized Training Model: An Optimal Distribution of Training Intensity ***Scand J Med Sci Sports 16:49-56, 2006***



Polarized training 75/10/15

How Well Was the Plan Executed?

C Foster: *S Afri J Sports Med* 8:3-7, 2001



Runners
Speed Skaters
Swimmers
Basketball Players
Volleyball Players

Use of sRPE in Cycling

How was your ride?

Effect of cycling competition type on effort based on heart rate and session rating of perceived exertion

J. A. RODRIGUEZ-MARROYO [1], J. G. VILLA [1], G. FERNANDEZ [1], C. FOSTER [2]

J Sports Med Phys Fit 53: 154-161, 2013

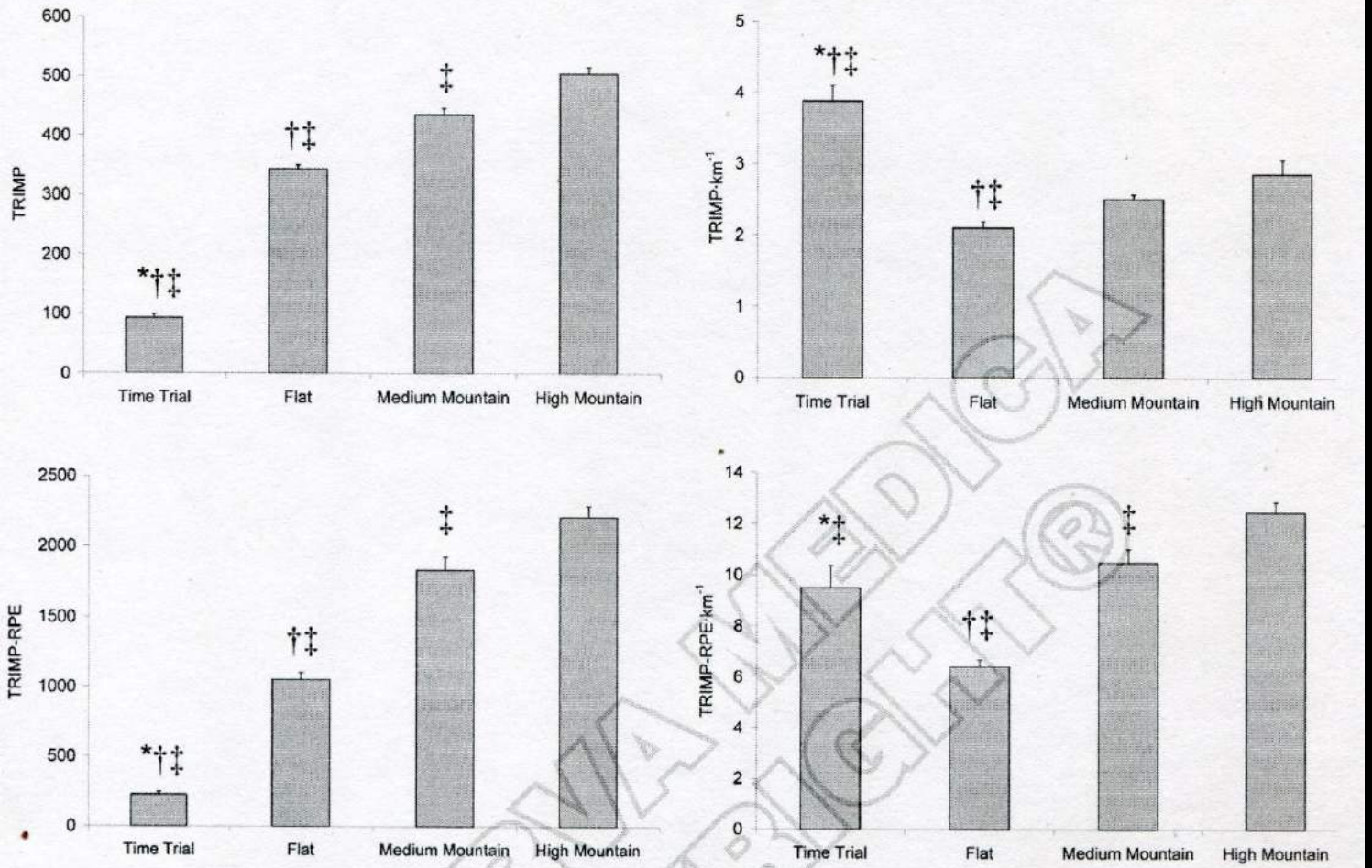


Figure 1.—Competition load calculated using HR ($TRIMP_{HR}$) and session RPE ($TRIMP_{RPE}$) and expressed as TRIMP·km^{-1} in the different type of stages analyzed. *significant difference with flat stages (P<0.05); †significant difference with Medium Mountain stages (P<0.05); ‡significant difference with high mountain stages (P<0.05).

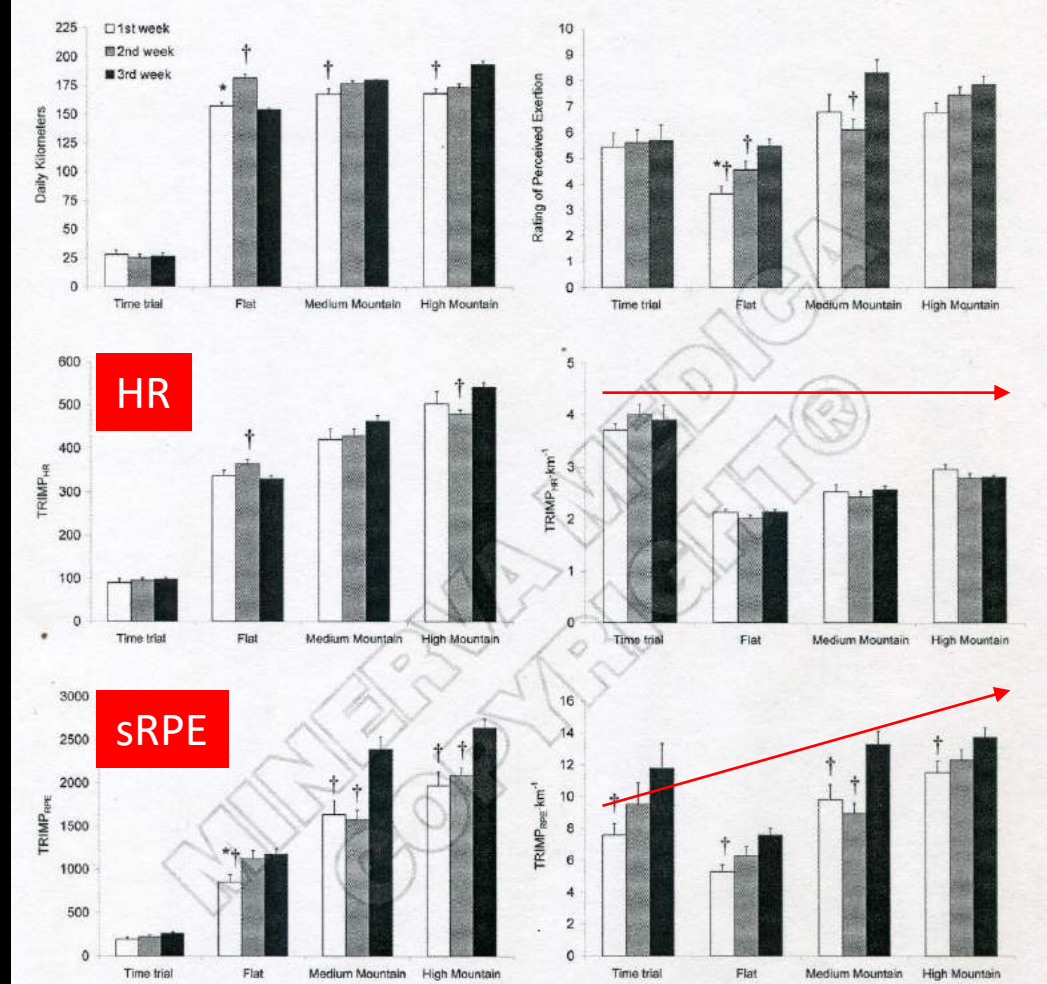


Figure 2.—Evolution of the daily kilometres, session RPE and competition load calculated using the HR ($TRIMP_{HR}$) and session RPE ($TRIMP_{RPE}$) and expressed as TRIMP·km^{-1} in the different type of stages over the course of the *Vuelta a España*. *significant difference with 2nd week (P<0.05); †significant difference with 3rd week (P<0.05).

International Journal of Sports Physiology and Performance, 2017, 12, 1356-1362
https://doi.org/10.1123/ijspp.2016-0435

Human Kinetics
ORIGINAL INVESTIGATION

IJSPP 12: 1356-1362, 2017

Reliability and Seasonal Changes of Submaximal Variables to Evaluate Professional Cyclists

Jose A. Rodríguez-Marroyo, Raúl Pernía, José G. Villa, and Carl Foster

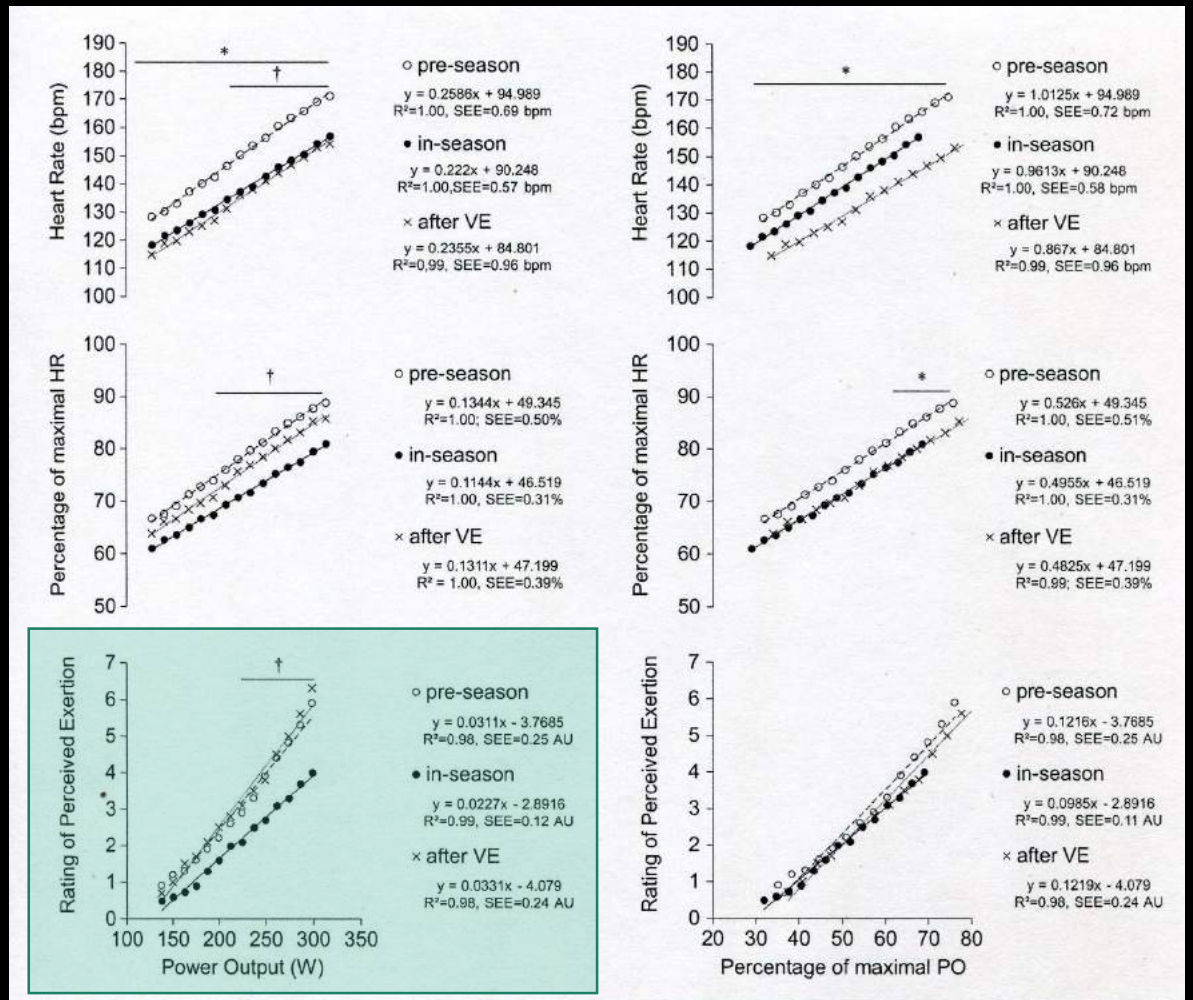


Figure 1 — Heart rate (HR), percentage of maximal HR, and rating of perceived exertion (RPE) as a function of absolute and relative power output (PO) between 125 W and 300 W during the progressive incremental test. SEE, standard error of estimate. *Significant differences with after-VE ($P < .05$). †Significant differences with in-season ($P < .05$).

Comparison of Heart Rate and Session Rating of Perceived Exertion Methods of Defining Exercise Load in Cyclists

Jose A. Rodríguez-Marroyo,[1] Gerardo Villa,[1] Juan García-López,[1] and Carl Foster[2]

J Strength Cond Res 26: 2249-57, 2012

Table 3. Session RPE, HR, and daily time spent in the 3 intensity zones analyzed in the different weeks of 21-day races.*†

	First week	Second week	Third week
RPE	5.1 ± 0.2‡	5.7 ± 0.2	6.5 ± 0.2
Maximal HR ($b \cdot min^{-1}$)	188 ± 1‡§	181 ± 1	180 ± 1
Mean HR ($b \cdot min^{-1}$)	143 ± 2§	140 ± 1	138 ± 1
Zone 1 (min)	98.9 ± 6.1	100.6 ± 6.2	118.3 ± 4.8
Zone 2 (min)	87.7 ± 5.5‡§	117.7 ± 5.1	132.1 ± 5.9
Zone 3 (min)	22.3 ± 2.8‡	10.9 ± 1.5	7.2 ± 1.0

*Zone 1 = exercise intensity below VT; zone 2 = exercise intensity between VT and RCT); zone 3 = exercise intensity above RCT; RPE = rating of perceived exertion; HR = heart rate; RCT = respiratory compensation threshold; VT = ventilatory threshold.

†Values are mean ± *SEM*.

‡Significantly different from the third week ($p < 0.05$).

§Significantly different from the second week ($p < 0.05$).

Wk 1=209 min /1064 au/ 10.7%
Wk 2=229 min/1306 au/ 4.6%
Wk 3=258 min /1674 au/ 2.8%

Comparison of Heart Rate and Session Rating of Perceived Exertion Methods of Defining Exercise Load in Cyclists

Jose A. Rodríguez-Marroyo,[1] Gerardo Villa,[1] Juan García-López,[1] and Carl Foster[2]

J Strength Cond Res 26: 2249-57, 2012

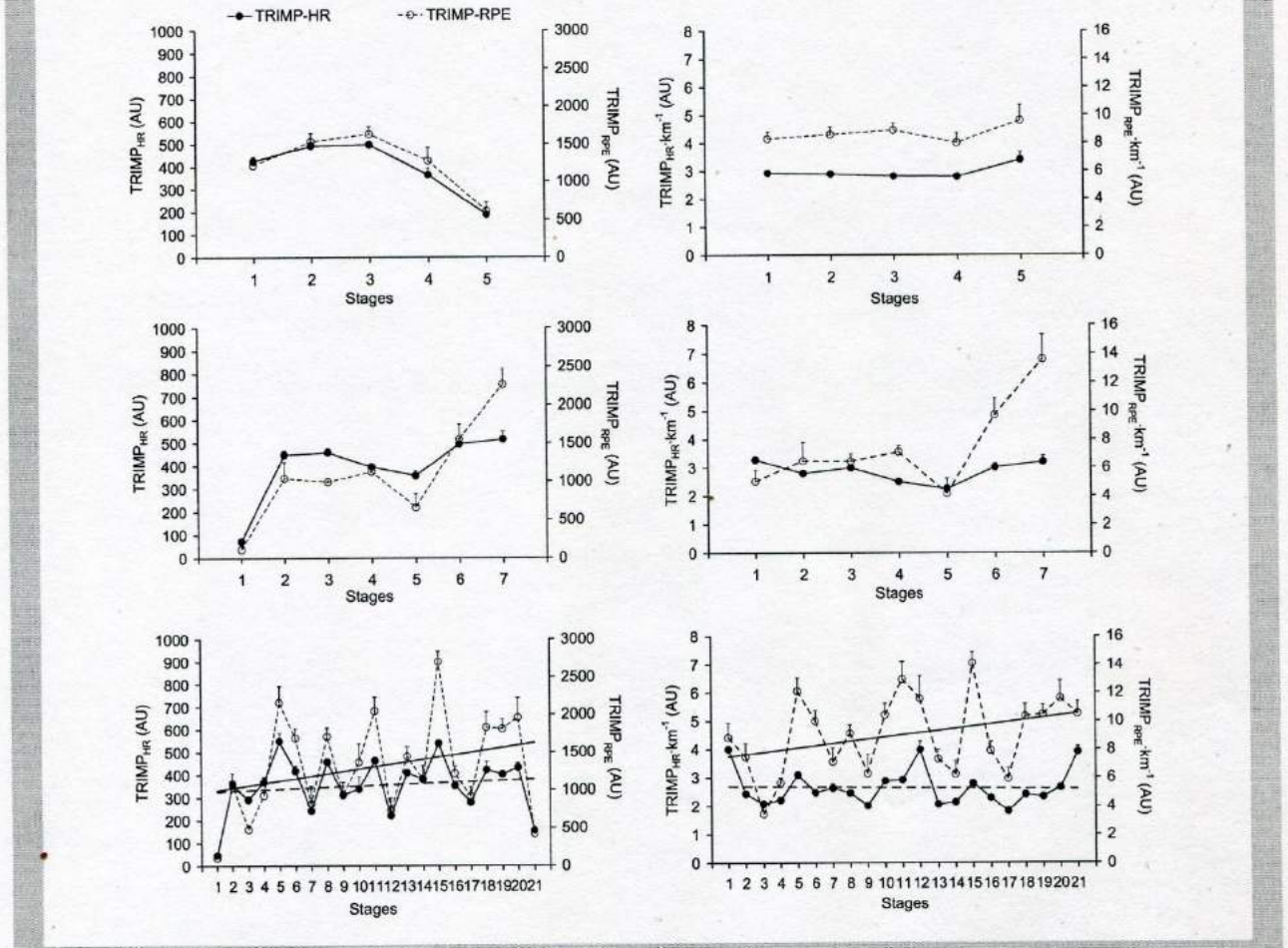
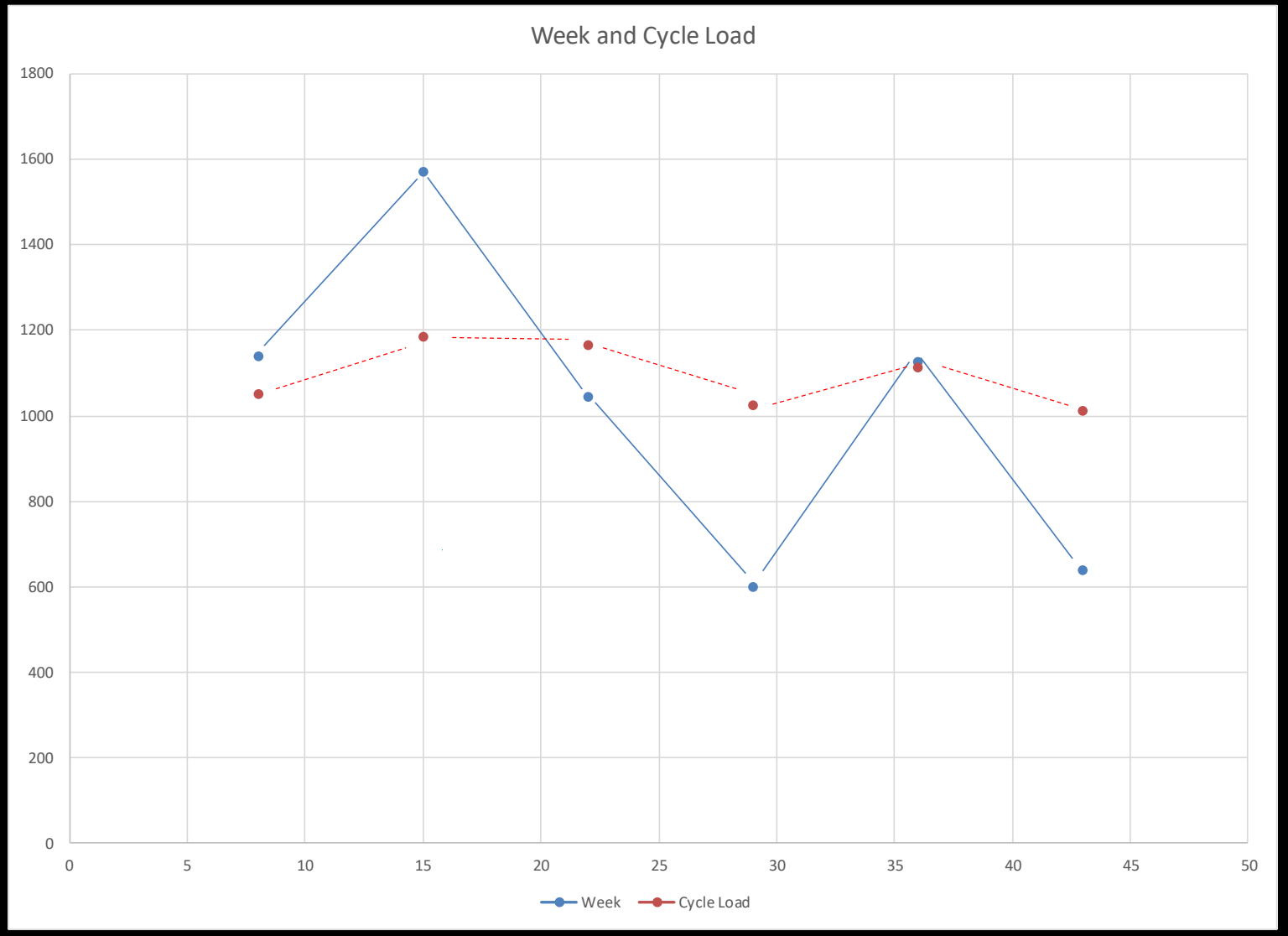


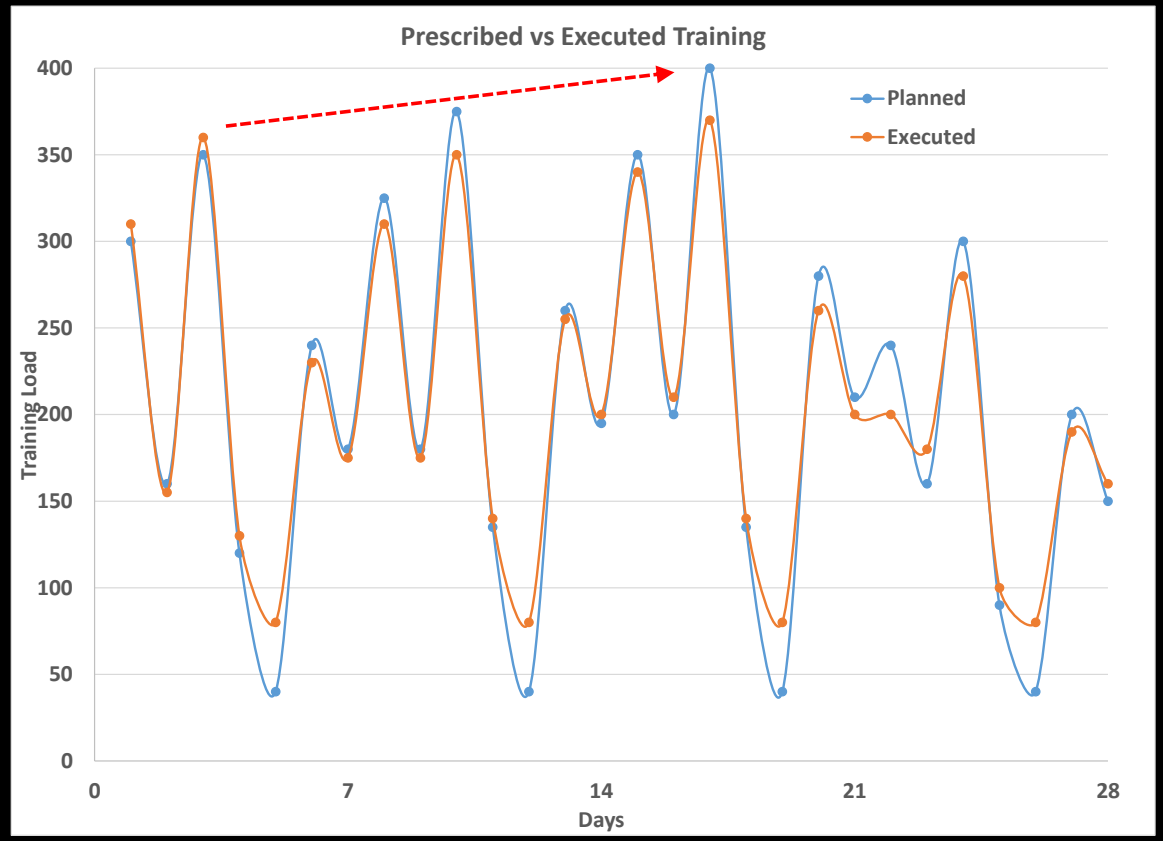
Figure 5. Trend of the competition load distribution during the course of the cycling races. Tracings from top to bottom represent 5-, 7-, and 21-day cycling races, respectively. AU = arbitrary units.

What Does Training Monitoring Look Like?



Do Your Patients/Athletes Do What You Want them to Do?

- How do you communicate to patients and physicians/coaches how well they are matching your designed training program?
- Have them collect it, plot it, and bring to you for discussion



Summary

- Coach/athlete (therapist/patient_ relationship
- Monitor with a purpose!
  - Coaching aid
  - So you know what you're doing
  - So you know matching of plan vs execution
  - Progress outside competition
  - Make changes as needed!!!!
- Graphics to visualize data
  - Make patient/client/athlete record/graph
  - Discuss graph together
- Method of integrating training
  - Index Workouts
  - Warm-up
  - Training Load
    - Monotony
    - Training distribution
- Technology
  - Session RPE
  - Talk Test
  - HR Zone Sums
  - Volume/Step Counter/ Accelerometer
  - Speed/VO_2/Lactate
- KISS

sRPE vs HR

sRPE Accounts for accumulated Fatigue!

Thank You

A Cat Named Chicken Production