

Training with a Heart Rate Monitor

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Overview

- Why train with a Heart Rate Monitor (HRM)
- HRM Functionality
- Using the HRM in training
- Post training session analysis
- Monitoring training progress

Why train with a HRM?

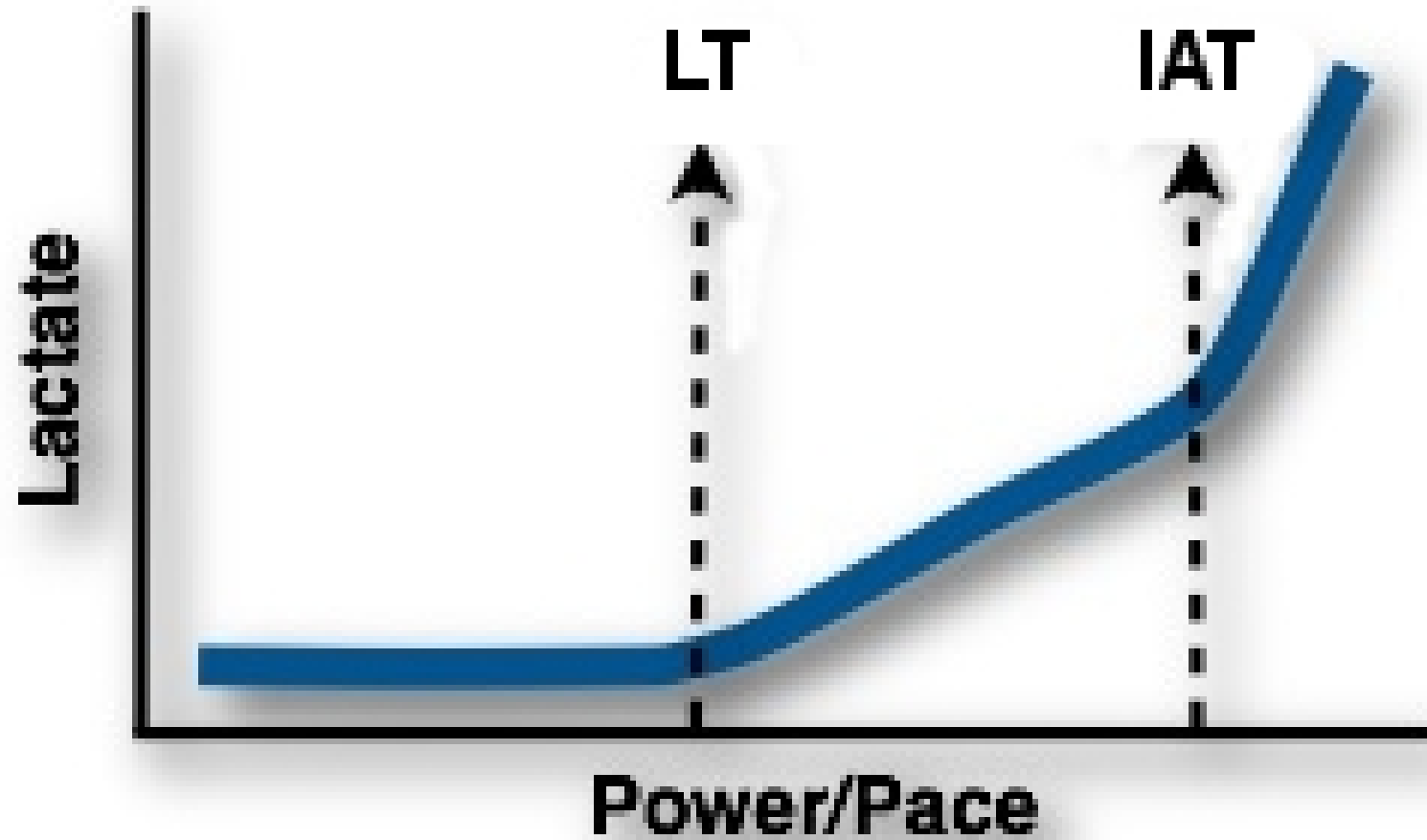
- Help guide your intensity to get the most out of your training sessions.
- Provide feedback on your fitness and level of fatigue
- Provide data to help quantify overall training load.

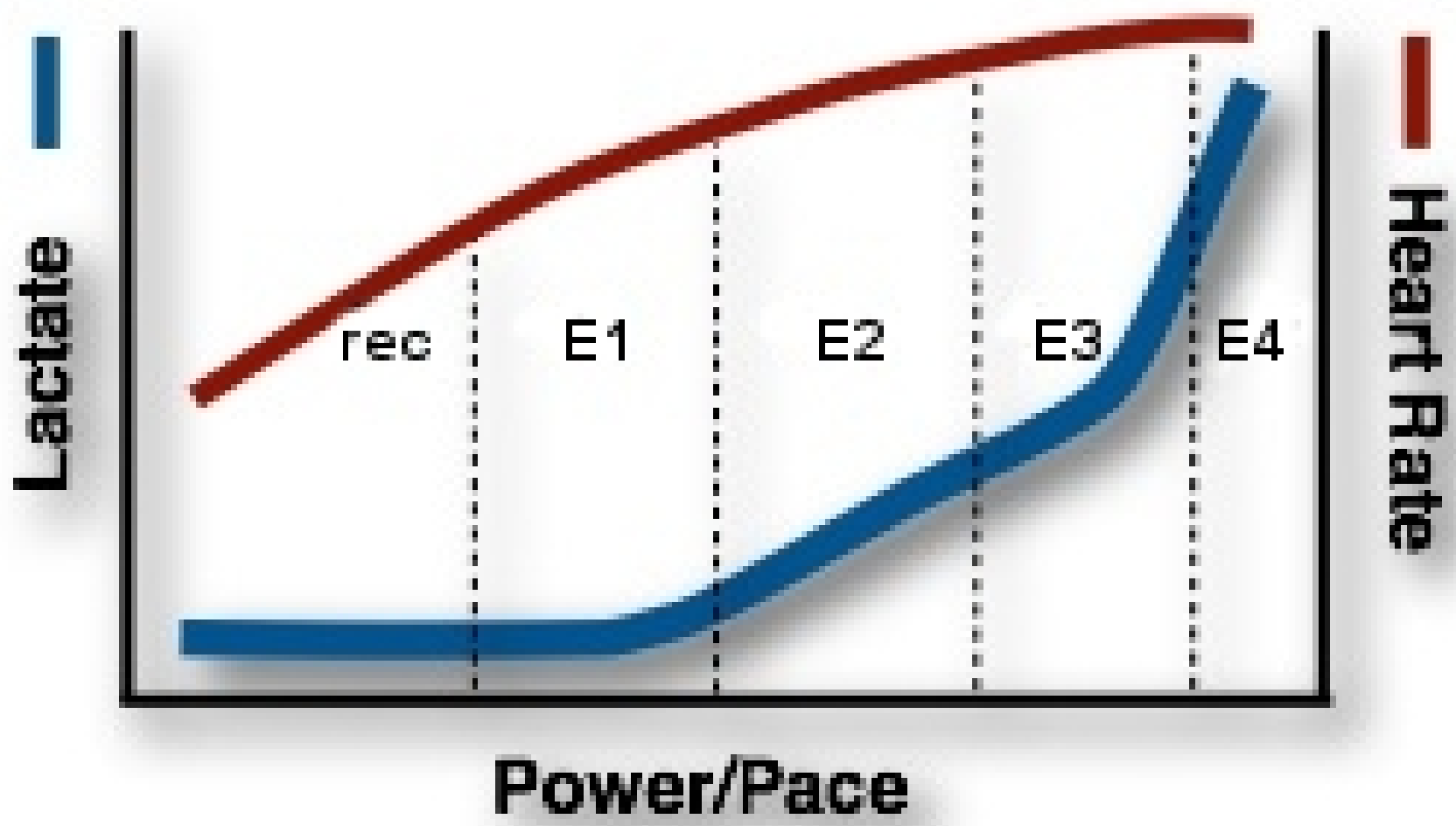
HRM Functionality and Setup

- Heart rate zones and setup (test vs 220-age)
- Integrated cycle computer
- Altitude
- Stop-start (auto vs manual)
- Lap function and auto laps
- Data recording frequency
- HRM display options (HR, speed, duration)
- Post ride review and downloads

Determining Zones

- Maximal Aerobic Heart Rate vs Threshold Heart Rate.
- Zones and terminology can vary from program to program and coach to coach
- Don't “set and forget” zones, review from season to season.
- What is each zone for?





Training Zones

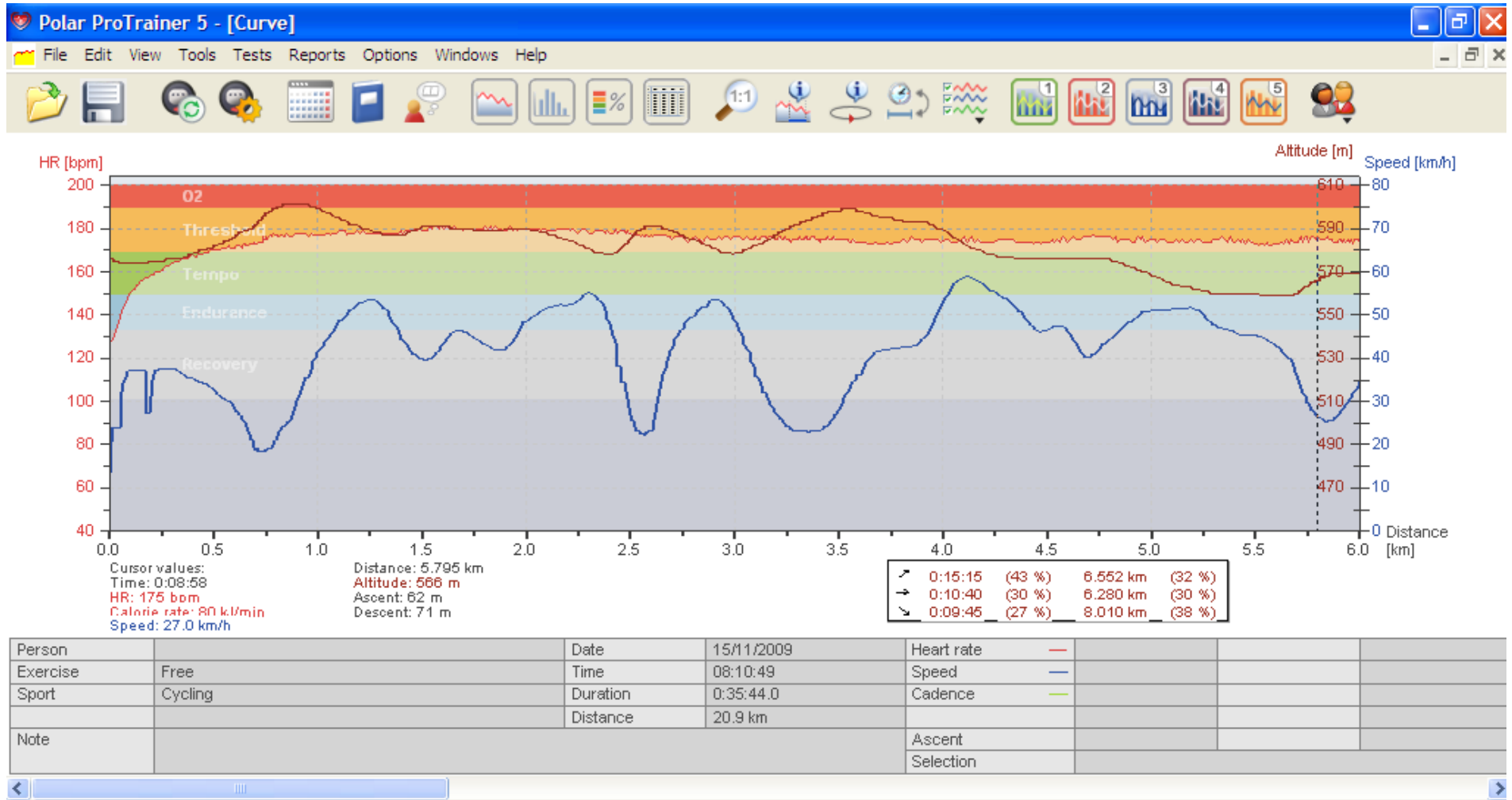
Based off Threshold Heart Rate (approx 88%-92% of Max Aerobic Heart Rate)

Level	Name	HR (% of threshold)
1 (Rec)	Active Recovery	≤68%
2 (E1)	Endurance	69-83%
3 (E2)	Tempo	84-94%
4 (E3)	Threshold	95-105%
5 (E4)	VO ₂	>106%

Using a HRM in Training

- HR vs perceived intensity
- HR in intervals
- Don't get too preoccupied with the HRM
- Zone Alarms – in training but not while racing
- Auto start/stop
- Laps, laps and more laps.....
- Recovery heart rate

Delayed Heart Rate Response



Using a HRM in Training

- HR vs perceived intensity
- HR in intervals
- Don't get too preoccupied with the HRM
- Zone Alarms – in training but not while racing
- Laps, laps and more laps.....
- Recovery heart rate

Post training - ride analysis

- Basic HRM's have nil or limited download capability. Can only be reviewed on the HRM
- Better models can be downloaded for full ride analysis.
- Initially, look at average and maximum HR for overall ride and for each lap (work and recovery).
- Review time in zones based on ride purpose
- Energy expenditure

Post training - ride analysis (cont)

- Use software to review files. Polar, Garmin, Sport Tracks, WKO+, etc
- Key features (desired): Good ride graphs, time in zones, lap data (averages, max's,etc), overall ride summary.
- What to look for: HR at key points, did the session meet its intended purpose, time above threshold, recovery HR between efforts, etc.

Post training - ride analysis (cont)

- Example 1 – Garmin File
- Example 2 – Polar (race file)
- Example 3 – Sport Tracks
- Example 4 – WKO+ (crit file)

Monitoring Training Progress

- Exertion Count, TRIMPS, TSS, ATL, CTL and TSB. What are they?
- Software: Polar, SportTracks, WKO+
- What to look for: Gradual increases in workload vs sharp spikes, excessive fatigue, taper for freshness.

Training Load

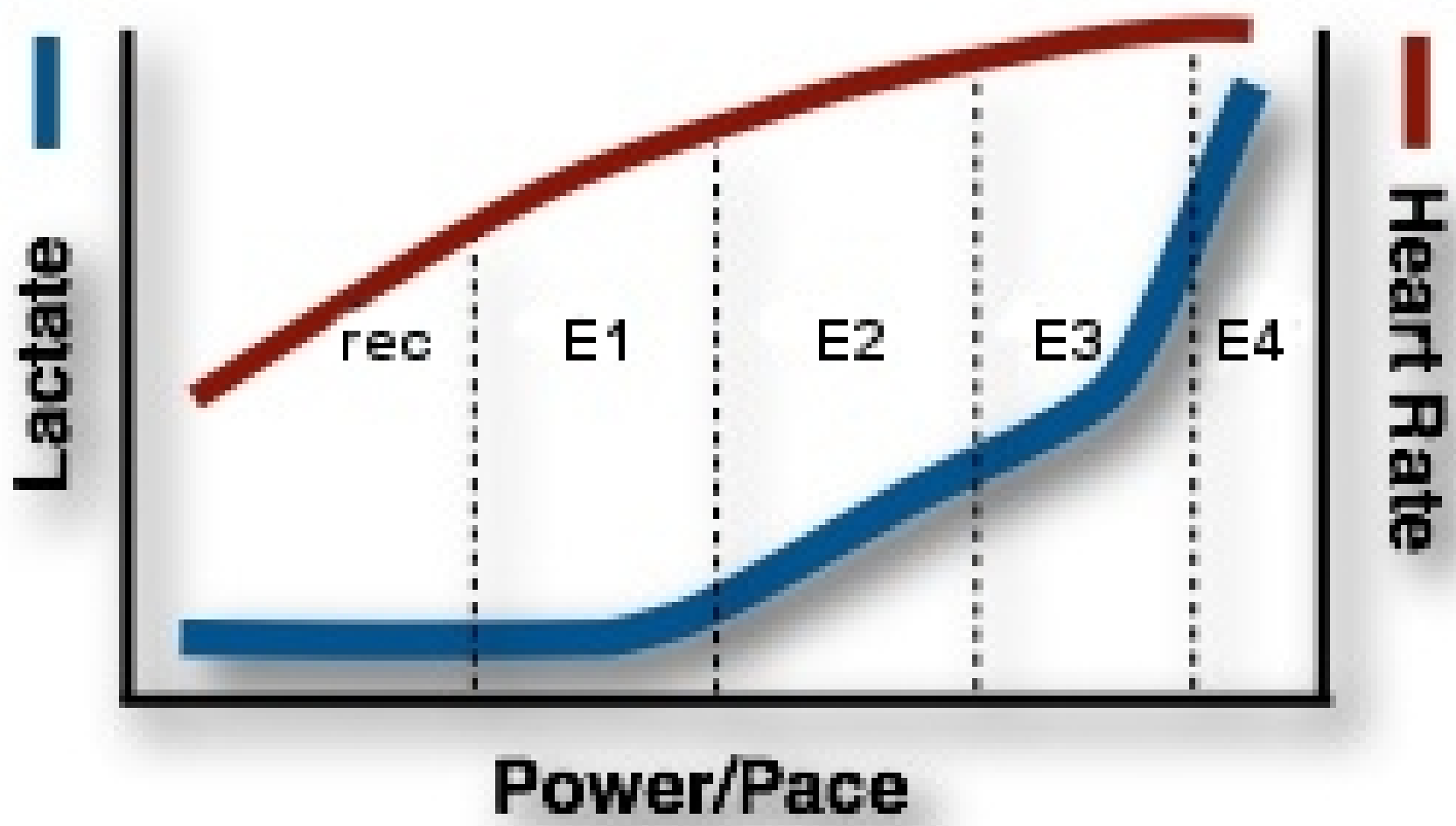
- Training Load is a measure of the work completed in a training session. It can be measured in various ways.
- TRIMPS & Exertion Counts – Use zone based weighting systems to determine training load.
- TSS (Training Stress Score) – Is based of intensity as % of threshold power.

Training Impulse (TRIMP)

Training Zones and Modified TRIMP		
Zone	Weighting	Training Type
1 (Rec)	0.84	Recovery
2 (E1)	1.65	Aerobic
3 (E2)	2.57	Steady State/Tempo
4 (E3)	4.01	Threshold
5 (E4)	5.97	VO2

Or, at a more basic level – multiple average heart rate by duration in minutes.

e.g. 155 bpm x 144 min = 22320



Training Stress Score

- Primarily used for power based training, but a modified version can be used for training with heart rate.

$$\text{TSS}_{\text{hr}} = [(\text{HR}_{\text{avg}} - \text{HR}_{\text{rest}}) / (\text{HR}_{\text{thr}} - \text{HR}_{\text{rest}})]^2 \times 100 \times \text{hrs}$$

**Example: 2hr 24mins @ avg HR of 155bpm
Threshold HR of 172bpm
Resting Heart Rate of 52 bpm**

$$\text{TSS}_{\text{hr}} = [(155 - 52) / (172 - 52)]^2 \times 100 \times 2.4$$

$$\text{TSS}_{\text{hr}} = 176.81$$

(nb: TSS of 100 = 60min TT at threshold)

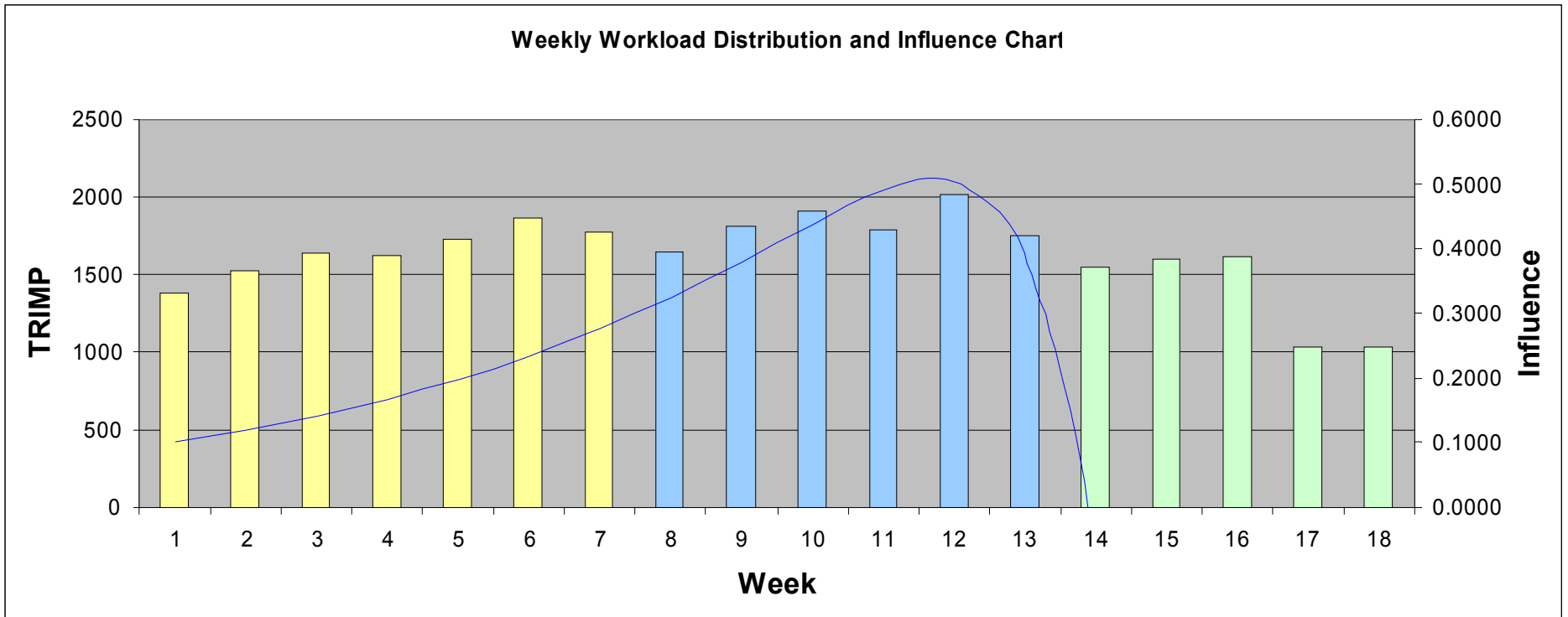
Training Load (cont)

- Once each session has a training load calculated, you can start to monitor overall training loads to assist determine changes in fitness, fatigue, etc.
- Chronic Training Load (CTL) is your longer term training load
- Acute Training Load (ATL) is your short term training load
- Training Stress Balance (TSB) is the difference between ATL and CTL.

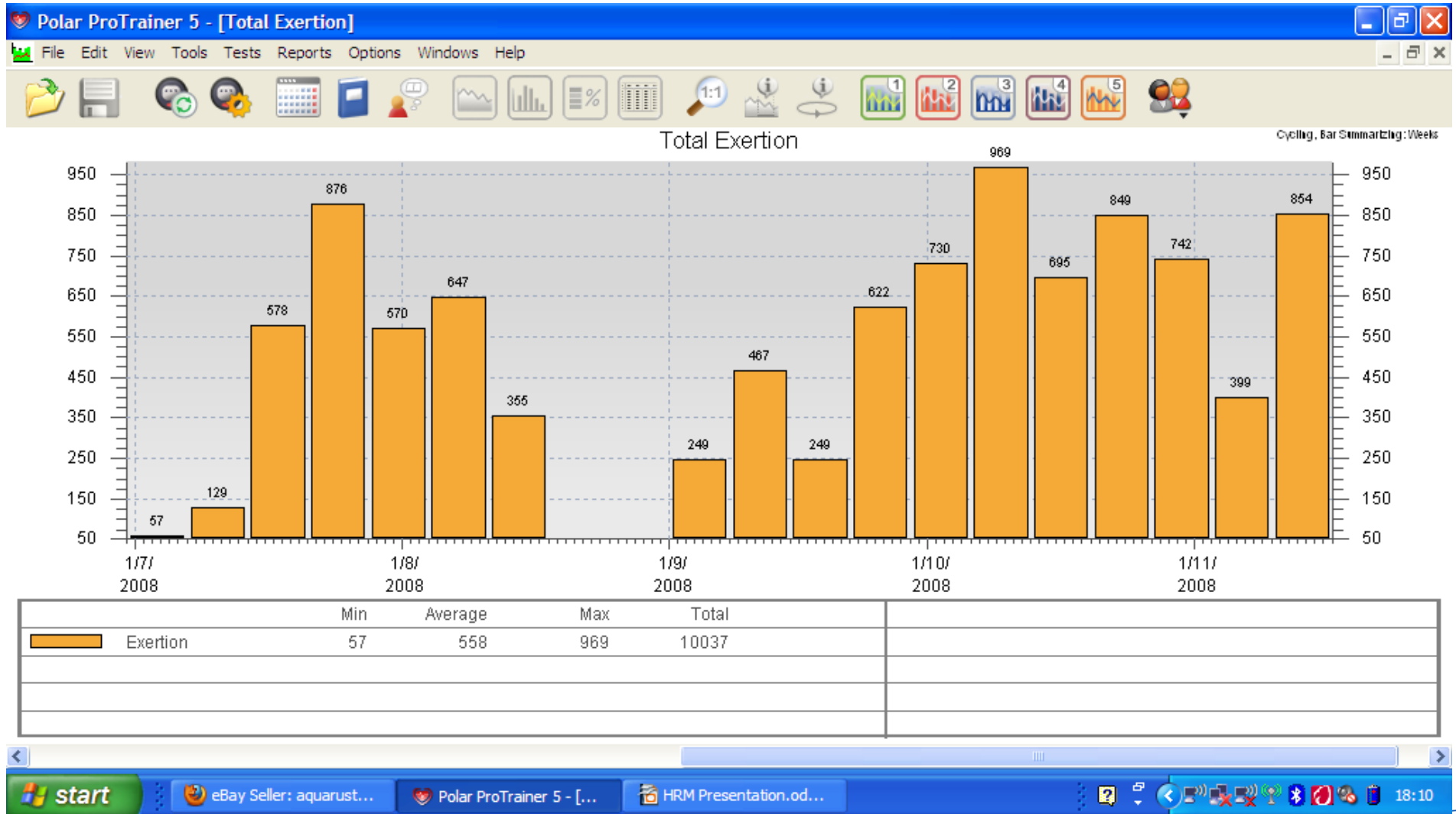
Monitoring Training Progress (cont)

- Example 1 – TRIMPS/TSS_{hr}
- Example 2 – Exertion Count (Polar)
- Example 3 – SportTracks
- Example 4 – WKO+ (power based)

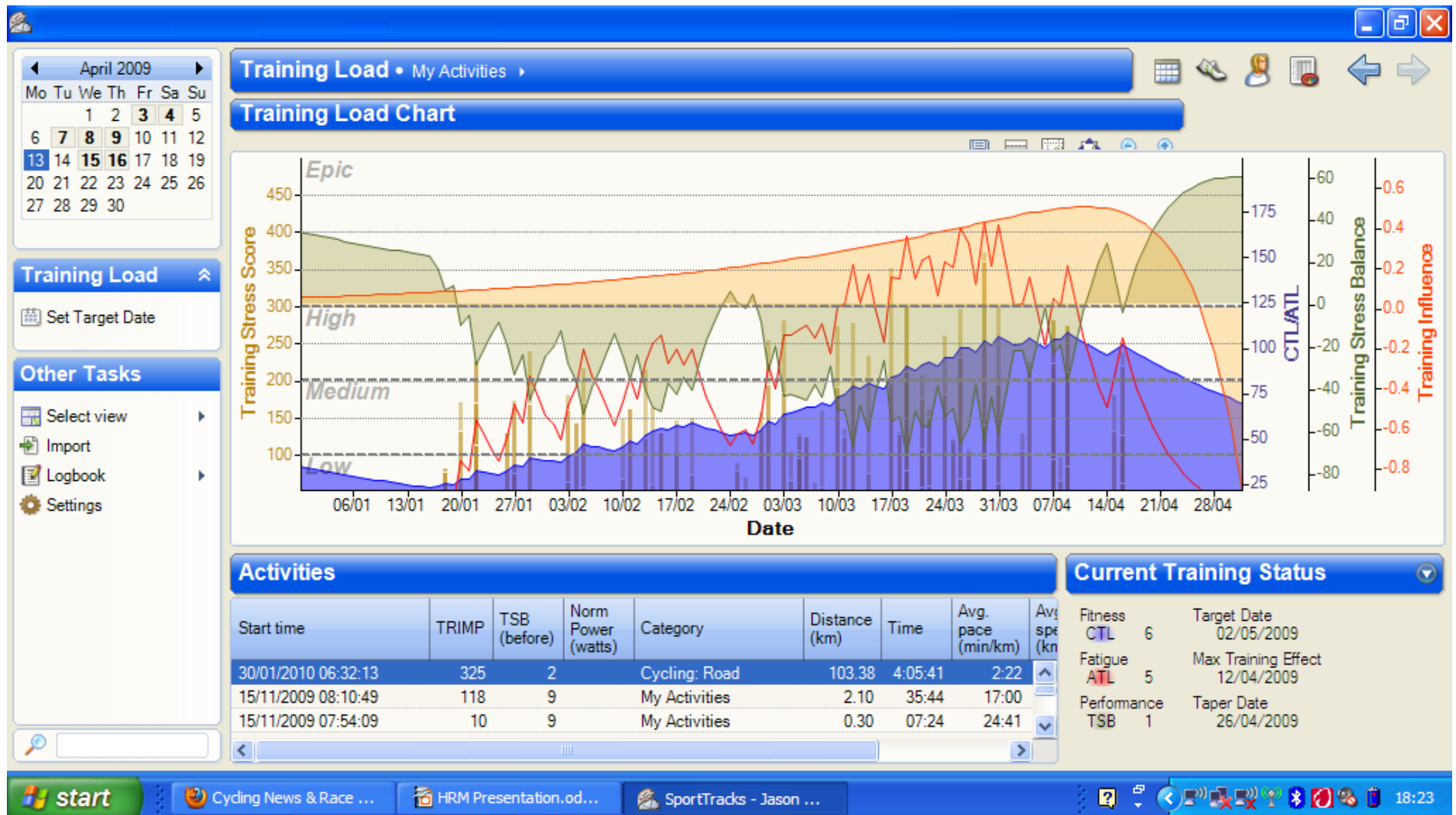
Training Load (cont)



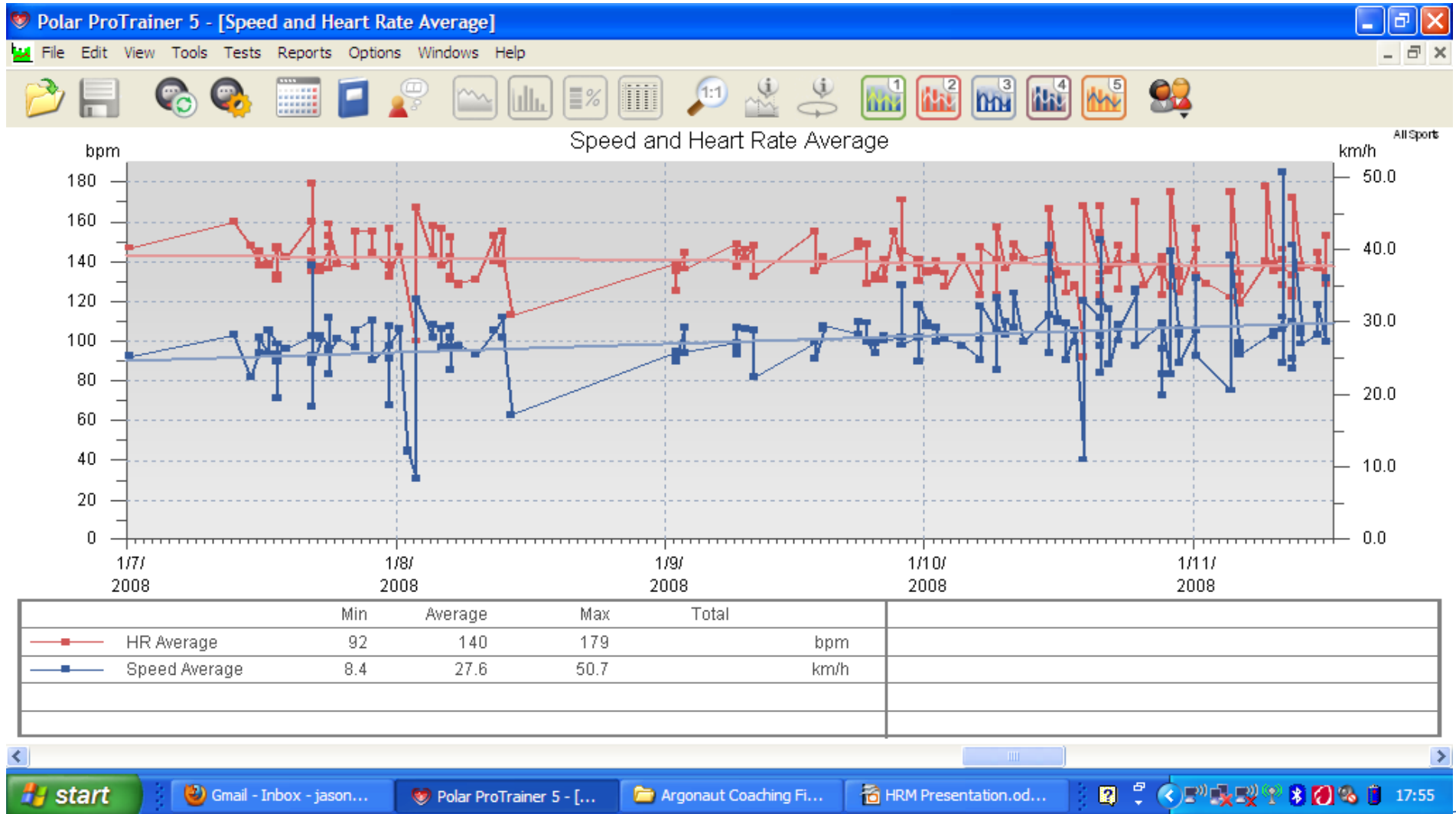
Polar Exertion Count



Sport Tracks – Training Load Plug-in



Performance Improvement



Common mistakes

- Comparing your HR with others.
- Not being aware of the factors that affect HR. (heat, dehydration, fatigue, stress, nutrition...)
- Sticking to HR zones too religiously
- Not analysing HR data
- Incorrect use of HR during races
- Incorrect setting of training zones (usually due to errors in determining max or threshold HR)

Questions?

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