

Remodeling Coaching In The NHL With Evidence Based Data

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Pivot Sports

Background:

Firstbeat in the National Hockey League

- Success in the NHL. 7 NHL Teams use Firstbeat SPORTS:
 - Chicago Blackhawks
 - New York Rangers
 - San Jose Sharks
 - Pittsburgh Penguins
 - Toronto Maple Leafs
 - Buffalo Sabres
 - Columbus Blue Jackets
- Examples of what GOOD Strength & Conditioning coaches CAN DO with Firstbeat SPORTS to impact training programs.
- In the 2011 – 2012 season the Sharks, Rangers and Sabres monitored every practice and every game. They were looking for trends.

http://www.youtube.com/watch?v=Y1g3-OtwH_A

More Background

- NHL is using TRIMP (Training Impulse) to monitor Training LOAD
- We incorporated TRIMP into Firstbeat SPORTS software specifically for the NHL
 - Defined: The exponential formula used to calculate TRIMP is based on the accumulation of the blood lactate as a function of exercise intensity.
- We worked with Buffalo Sabres team data to established the KEY TRIMP levels
 - HARD > 140
 - EASY < 40
- WHY TRIMP: EPOC goes down with rest. TRIMP does not
 - Professional Ice Hockey was seeing LOW EPOC based TE scores for HARD workouts
- For training that has many significant breaks (longer than 3 minutes) TRIMP is an effective method for estimating training load

Comparative Analysis of TRIMP and EPOC based TE, Various SPORTS

SPORT	Duration (minutes)	EPOC based TE	TRIMP	UNDER 3.0 TE and OVER 140 TRIMP
Mountain Running	285	3.1	331	
Professional Ice Hockey game (NHL)	180	2.5	269	x
Professional Ice Hockey game (NHL)	180	2.9	265	x
Professional Ice Hockey game (NHL)	180	2.5	250	x
College Football practice	144	2.7	212	x
Professional Soccer (Football) practice	100	3.8	191	
Professional Soccer (Football) practice	100	3.7	176	
Professional Soccer (Football) practice	100	3.4	165	
Professional Basketball (NBA), game	126	2.9	165	x
Professional Basketball (NBA) practice	80	4.2	165	
Professional Rowing	81	4.0	165	
Professional Ice Hockey (NHL) practice	118	2.6	149	x
Professional Ice Hockey (NHL) practice	80	2.9	142	x
American Football (NFL) practice	55	4.8	136	
Collegiate Cross Country	68	4.0	127	
Professional Track and Field practice	60	2.5	120	
Weight Training	90	2.3	117	
Professional Ice Hockey (NHL) practice	80	2.2	112	
Soft Sand Beach Run	40	3.0	100	
Crossfit	68	3.2	89	
Indoor Rowing	30	3.7	88	
American Football (NFL) practice	44	3.3	86	
Stair Running	30	2.3	85	
Professional Baseball (MLB)	24	3.2	46	

Still More Background: Coaches in the NHL have an Old School Mentality

Conventional coaching wisdom “work hard” to instill work ethic

Great character building strategy

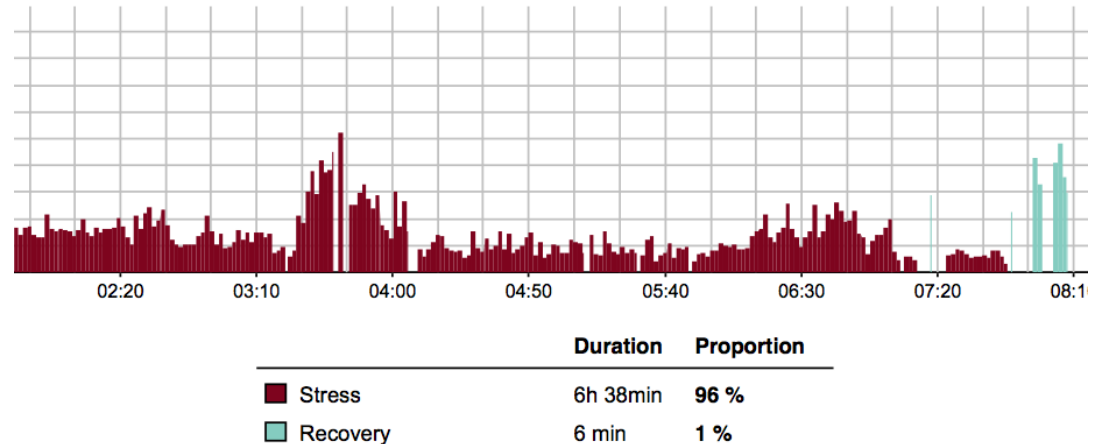
But...

“With no regard for energy expenditure and repetitive intense training sessions=> athletes fight overtraining and fatigue more than their scheduled opponent...”

Mike Potenza, Strength & Conditioning, NHL

NHL Defensemen, Practice Day
12/22/11 – In Between Two Games

covery chart



ss

ased level of physiological activation that may be caused by intensive physical training or other life stressors.

covery

reased level of physiological activation that may be caused by the absence of intensive physical training and absence of stressors.

ex and Follow Up



Posing The Question: “How do you find the balance?”

Reg Grant, NHL Strength Coach laughed heartily

“There is no balance in the NHL...”

“I work in TRIAGE...”

Mike Potenza, NHL Strength Coach.

TRIAGE: is the process of determining the priority of patients' treatments based on the severity of their condition

So...HOW does Firstbeat SPORTS help?

“...We may NOT be able to find the balance but we may be able to ***influence the intensity of practices to be better prepared for games***”

Here’s how they did it...



Methods: Monitor Everything

- To establishing TRENDS and see patterns the Sharks, Rangers and Sabres monitored every game and every practice in the 2011 – 2012 season
- Real-time data teaches coaches the intensity of various drills

GOALS:

- **Find out TRIMP demands of an NHL GAME**
 - Are we translating game intensities to practices?
- **Find out the TRIMP demands of HARD Practice**
- **Find out the TRIMP demands Easy Practices**
- **Find out the TRIMP demands of individual drills**
- **With hopes of making inferences from the data**



Cataloging Drills

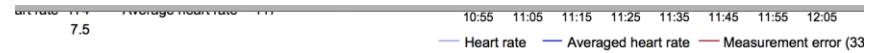
Key Findings: Battle Drills successfully translate game intensity to practice

* EASY Practice = Max of 4. HARD = 7+ battle drills

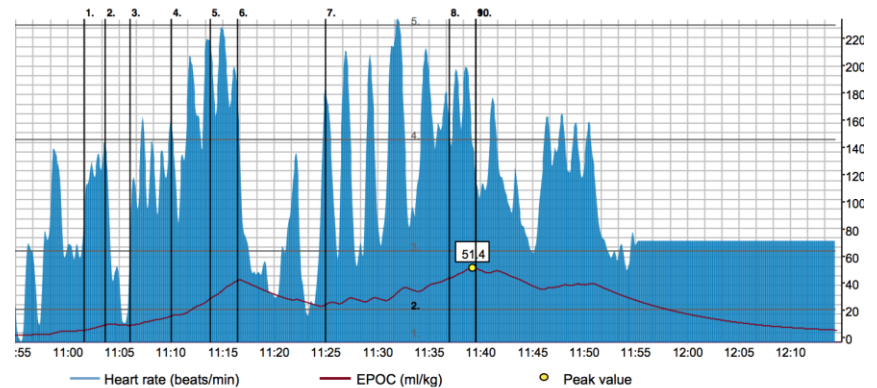
Real Time Monitoring



Lap Markers, Battle Drills



Chart



Information.

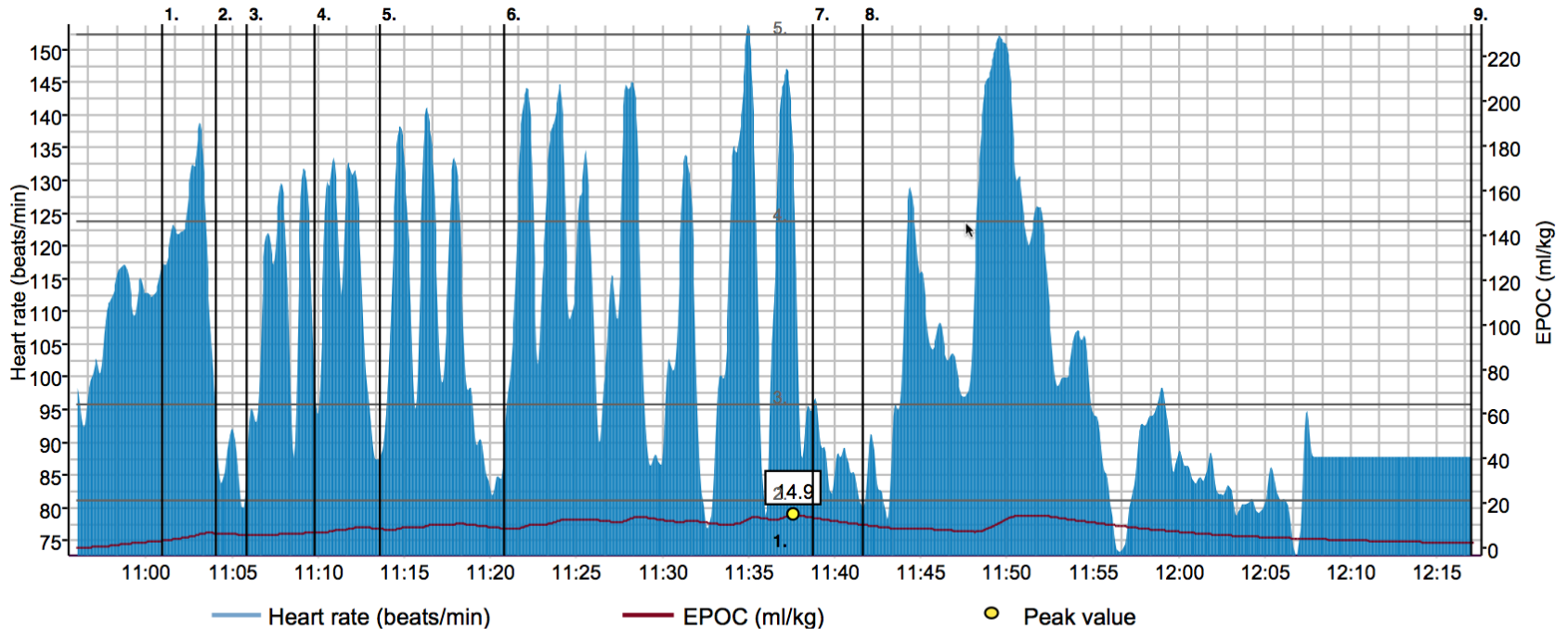
Lap time (hh:mm:ss)	Duration	Heart rate (beats/min)	EPOC (ml/kg)
00:09:20	00:09:20	103	3
00:11:23	00:02:03	124	7
00:13:49	00:02:26	101	9
00:17:49	00:04:00	125	12
00:21:32	00:03:43	138	21
00:24:11	00:02:39	152	35
00:32:44	00:08:33	105	31
00:44:41	00:11:57	132	32
00:47:15	00:02:34	142	48
00:47:18	00:00:03	126	51

Effect



Maintaining training effect

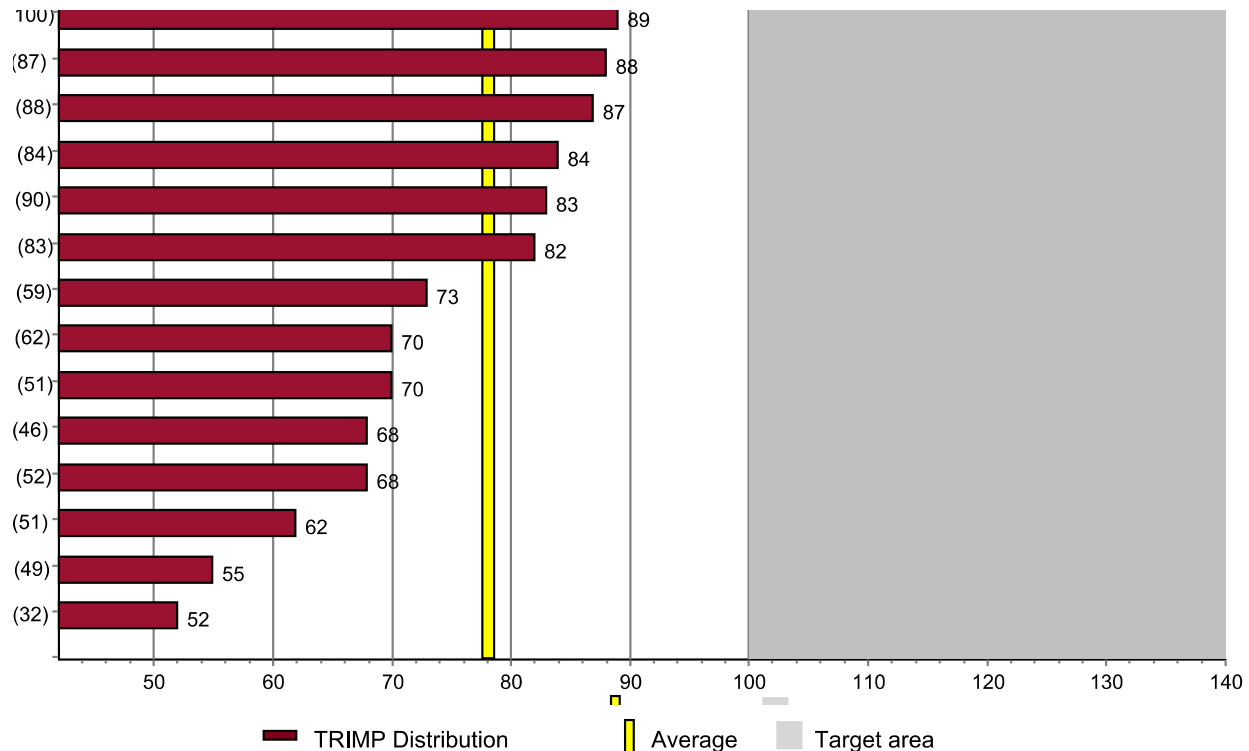
KEY FINDING: Easy Practice 12/22/11: 1.6 TE, 65 TRIMP Started Marking Drills (4 battle drills)



Lap time information.

#	Lap time (hh:mm:ss)	Duration	Heart rate (beats/min)	EPOC (ml/kg)
Lap 1	00:05:00	00:05:00	108	1
Lap 2	00:08:06	00:03:06	123	5
Lap 3	00:09:55	00:01:49	87	6

Take Away for Coaches: EASY Practice Must Be UNDER 100, Team AVE TRIMP



Distribution and average of TRIMP. Darkened area displays the set exercise target area. The figure after the person's name indicates the achieved EPOC-level.



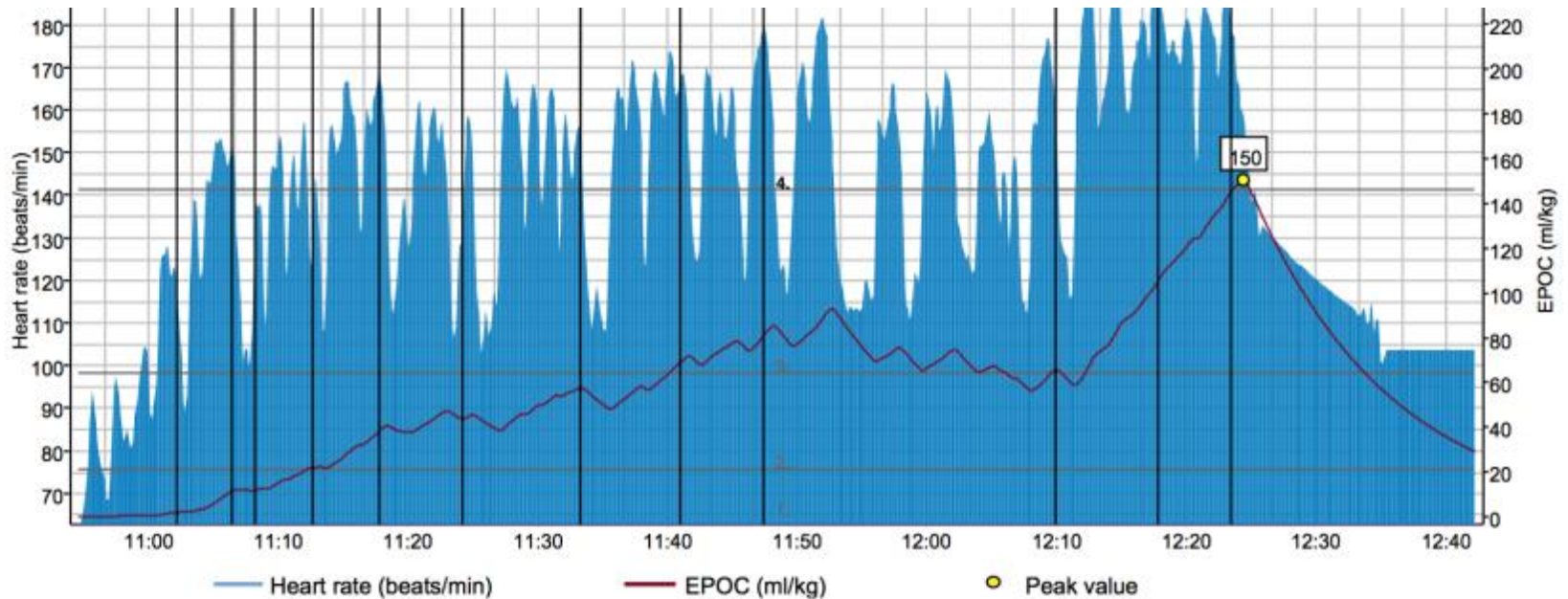
EPOC

EPOC (Excess Post-exercise Oxygen Consumption) is a physiological measure of training load. EPOC peak is the general disturbance to homeostasis brought on by exercise.

TRIMP

TRIMP (Training Impulse) is a measure of quantifying the training load.

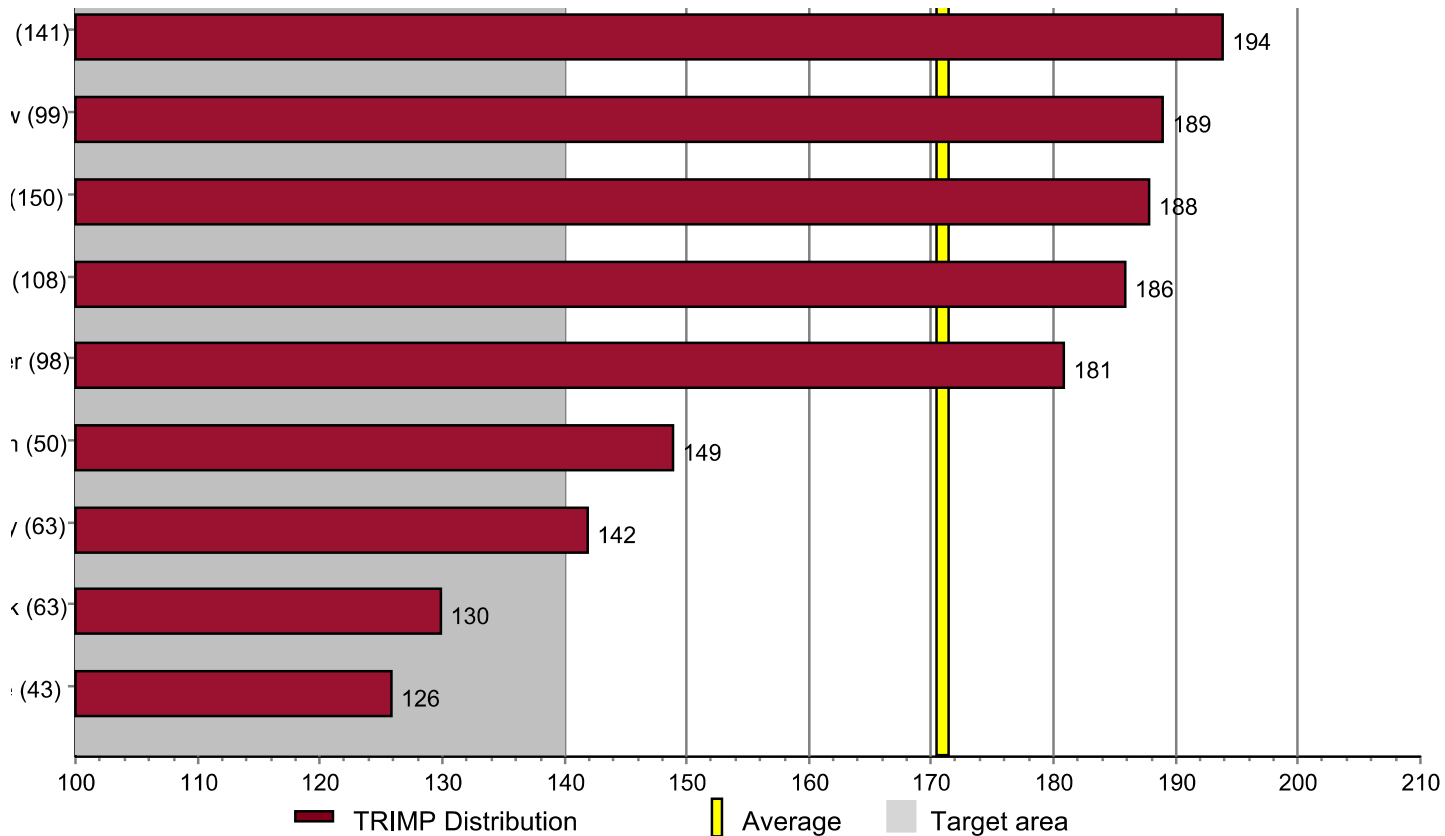
KEY FINDING: Example of Hard Practice 12/22/11: 4.0 TE, 188 TRIMP (7 battle drills)



Lap time information.

#	Lap time (hh:mm:ss)	Duration	Heart rate (beats/min)	EPOC (ml/kg)	#	Lap time (hh:mm:ss)	Duration	Heart rate (beats/min)	EPOC (ml/kg)
Lap 1	00:07:38	00:07:38	91	1	Lap 11	01:23:14	00:07:54	166	78
Lap 2	00:11:53	00:04:15	132	5	Lap 12	01:28:52	00:05:38	177	124
Lap 3	00:13:40	00:01:47	118	12					
Lap 4	00:18:07	00:04:27	139	16					
Lap 5	00:23:11	00:05:04	149	28					
Lap 6	00:29:40	00:06:29	141	42					
Lap 7	00:38:45	00:09:05	144	47					

Take Away For Coaches: HARD Practice Should Be OVER 130, Team AVE TRIMP



KEY FINDINGS: Game TRIMP, NHL = 300, three 3s (Training Effect)

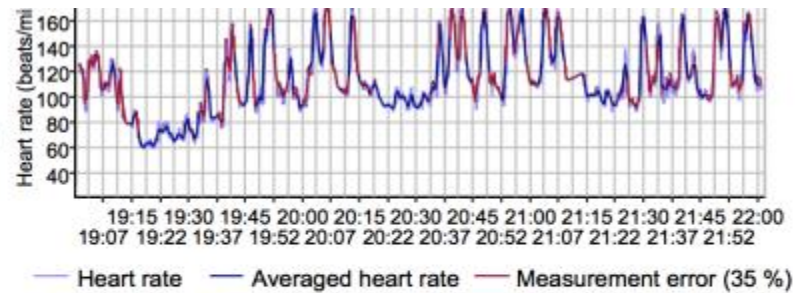
Date: 12/6/2011

Background information

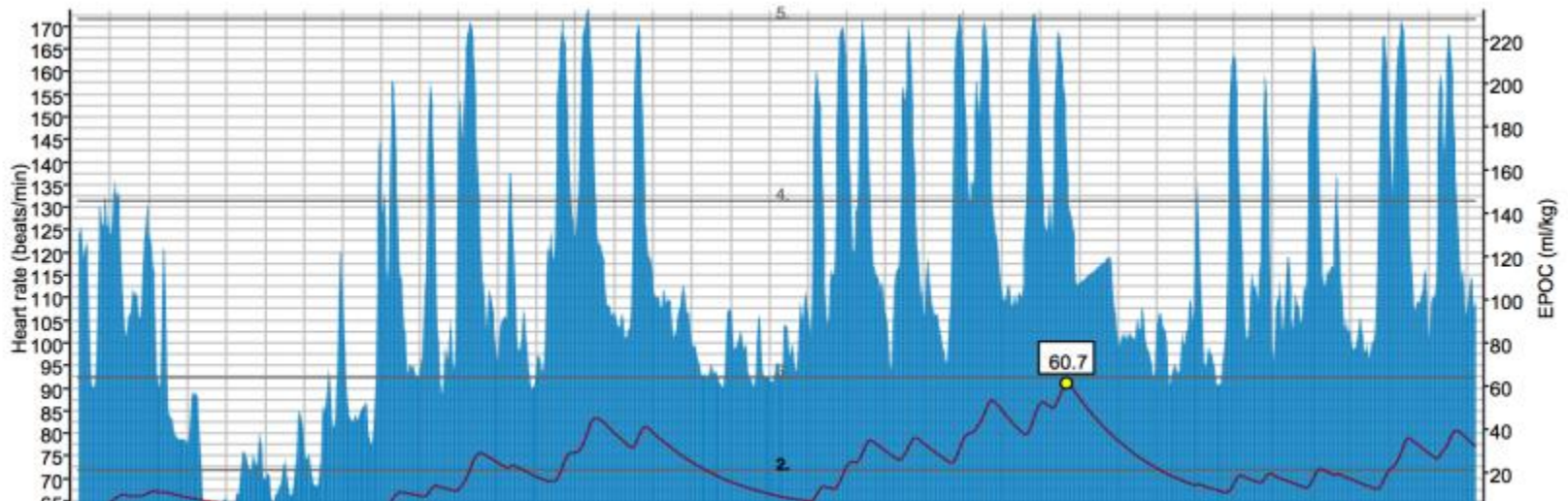
Age 32
Height (ft,in) 6' 2"
Weight (lb) 218
Resting heart rate 43
Maximum heart rate 174
Activity class 7.5

Measurement information

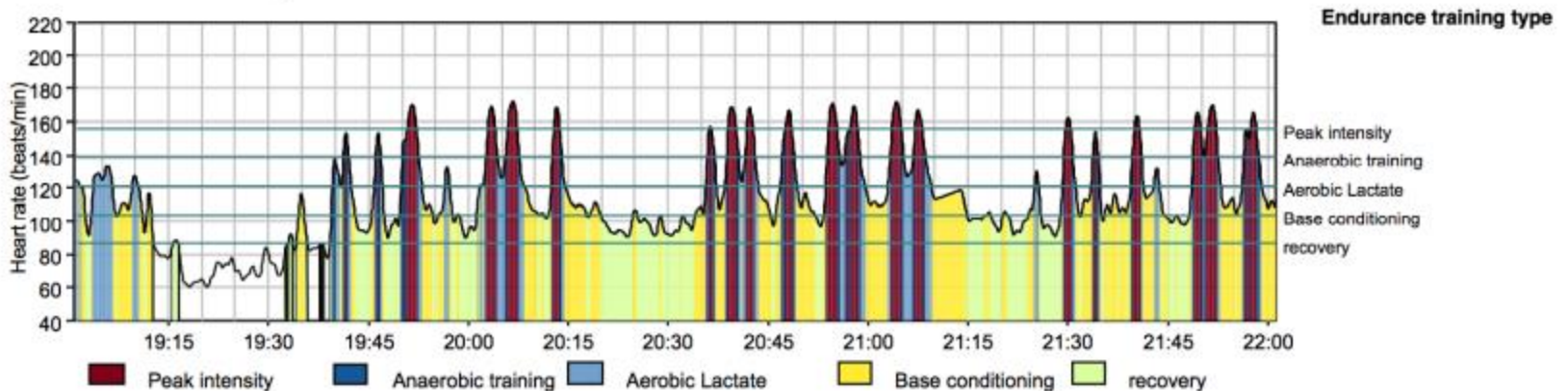
Measurement length 03:00:19
Measurement time 7:00:48 PM - 10:01:07 PM
Lowest heart rate 61
Highest heart rate 174
Average heart rate 113



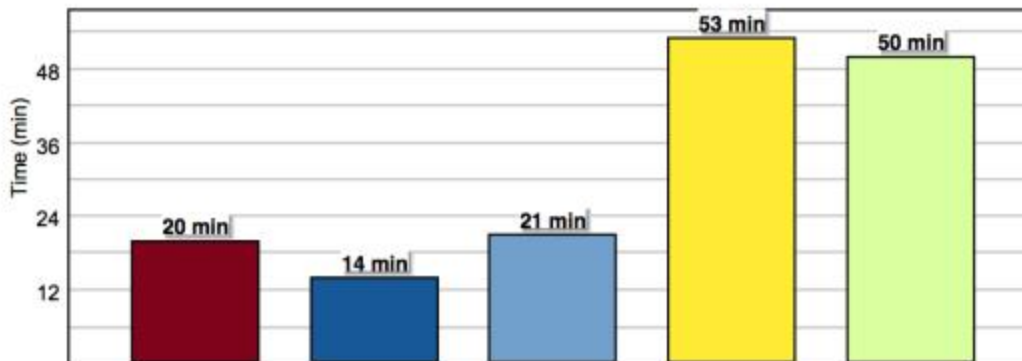
Training Chart



KEY FINDING: 12/06/2011 Game Data – 20 Peaks, 20 Minutes in RED (Red is %HR Max > 90%)



Classification of the measurement to different endurance training types.



The total duration of exercise during the measurement was 2h 37min. Time of different types of endurance training during the measurement is

Making Change: From Trends to Adjustments

KEY OBSERVATIONS

- When Team AVE TRIMP in practice the day before a game was 130+ the team started slowly
- And the opposite was also true, when Team Average TRIMP was low (under 100) on practice days before a game the team started better, more energy
- HR recovery, especially late in games and hard practice was good
- CATALOGING DRILLS allows team to control overall intensity of practice

Adjustments to Training Program

- *Adjustments = Change Team AVE to > 100 TEAM Ave TRIMP Day before Games*
 - *When they implemented this change in December 2011 they went on a 10-game win streak*
- The work ethic is there and the fitness is high
- There can be Max of 4 Battle Drills in EASY Practice and 7+ in HARD practice.
- **THERE ARE ONLY 3 DAYS A MONTH WHEN TEAM CAN PRACTICE HARD**

Conclusions, How Firstbeat Helps Our Team Get Better

Position Coaches Buy In



Quotations from coaches

- Planning a practice with conditioning elements.
- Cataloging Drills: Observation of individual drills and there effects on metabolic conditioning.
- Making sure new players developing OUR HABITS. And our team Vets continue to improve.
- Clear and Concise evidence of this groups “Hockey Conditioning” will eliminate speculation!!!