BASIC HEART RATE TRAINING

TRAINING SMART AND SAFE

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ABOUT ME

- Cert. Triathlon Coach, 500 RYT Yoga Instructor Certified Health Coach, Mechanical Engineer
- Specialize in yoga as therapy
- Ironman Triathlete
- Focus on the functional body
- Soccer player
- Mom of 3 boys
- Adventure Addict

BASIC HEART RATE TRAINING
4 CLASS SERIES

Class 1: Nuts and Bolts

Class 2: Heart Rate Zones / Energy Systems

Class 3: How it all comes together

Class 4: Adaptations over time

BASIC HEART RATE TRAINING
CLASS 1

- Why you want to training smart
- Energy production - Aerobic & Anaerobic
- 5 Heart rate zones
- Run and bike heart rate zones are different
- Calculations based on age generally do not work well
- Everyone is individual
- Fundamental approach to training

BASIC HEART RATE TRAINING
SMART TRAINING

- Be patient, it's a process, benefits over time
- Consistency is key
- Workouts change due to goal race, which builds on your foundation
- Volume and intensity work together
- Rest and recovery or paramount

BASIC HEART RATE TRAINING
SMART TRAINING

- Heart Rate training is a system that understands and utilizes/improves how it produces energy
- Heart Rate training is about becoming more EFFICIENT
- Staying in zone 2 might force you to take a look at your run form (work smarter, not harder)
- LT Threshold and zones aren't meant to be compared to others
- Injury prevention through smart training
- Takes into account the individual
- Takes into account factors that will affect training
- Can prevent overtraining by teaching you to use your heart rate as an indicator of recovery

BASIC HEART RATE TRAINING
LACTATE THRESHOLD TRAINING

- Lactate threshold heart rate training is a way of raising your lactate threshold by improving the ability of your heart and cells to produce aerobic energy at higher intensities.
- You can increase your lactate threshold by working at intensities as close as possible to your maximum heart rate for intermittent bouts of four to five minutes, interspersed with easy low intensity bouts of three to five minutes, repeating the cycle four to five times.
- Over time, you will increase your endurance at higher levels of exercise intensity, meaning you can go farther at a faster pace without fatiguing.

BASIC HEART RATE TRAINING
5 ZONES

- Zone 1: Easy
- Zone 2: Light Aerobic
- Zone 3: Moderate Aerobic
- Zone 4: Threshold
- Zone 5: Above Threshold

- More detail on the heart rate zones in Class 2
- These zones are calculated based on your individual Lactate Threshold Heart Rate. The LT heart rate can be found doing a field test. Bike and run.

BASIC HEART RATE TRAINING
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BASIC HEART RATE TRAINING
GETTING STARTED

- RESTING HEART RATE: Record your rest heart rate for 3 days in the am, before sitting up in bed
- RUN LT Field Test: Treadmill is a good place to do this. Warm up for 20 minutes. Then run as fast as you can for 20 - 30 minutes without stopping, keeping good form. This is a hard effort, similar to racing a 5K. Recover the average heart rate for the last mile or for the last 20 minutes. Then cool down for 15 minutes.

- Calculate your zones.
  - Zone 1 <85% THR
  - Zone 2 85-89% THR
  - Zone 3 90-94% THR
  - Zone 4 95-99% THR
  - Zone 5 >100% THR

- After calculating your zones, then the skill comes in how mixing up the zone work and what not. More on that later!

BASIC HEART RATE TRAINING
THE ZONES IN DETAIL

- Assumption: athlete training for an event longer than 2 hours
- Benefiting from heart rate training is a dance, based on the steps that the body goes through in relation to energy production and the heart rate zones.
- Aerobic: mitochondiral respiration: oxygen, fat and carbs (protein after 3 hours)
- Non-aerobic: glycolytic: producing energy primarily using carbs
- Slow-twitch fibers: muscles that provide mobility for efforts lasting longer than 2 minutes
- Fast-twitch fibers: used for speed, explosive power
- Takes more oxygen to burn fat than sugar
- Remember, lactate threshold is the highest intensity at which your body can recycle lactic acid as quick as its produced.

BASIC HEART RATE TRAINING
REAL QUICK ON ENERGY

- Food to ATP to ADP and P
- As you burn ATP, your body replaces it by these three energy systems: aerobic, glycolytic, phosphagen
- Mitochondria are the power plants of cells. Their primary role is to convert the nutrients we eat into energy – specifically through the production of adenosine triphosphate (ATP). ATP is then used by our cells to facilitate a whole host of body functions from breathing to exercising.

BASIC HEART RATE TRAINING
ZONE 1

- Goal: Recovery
- Energy System: Oxidative
- <85% THR
- Easy aerobic training stimulates blood circulation, which can help remove inflammation and promote tissue-recovery.
- This zone is high enough in intensity to increase blood circulation and trigger a growth hormones response without causing further muscle damage or energy/fluid depletion. Meaning — RECOVERY
- So when the plan says Zone 1, the intent is to recovery, which is mandatory in order to benefit from the prior workout and progress
- EASY yoga, light swim, walk the dog, easy bike

BASIC HEART RATE TRAINING
ZONE 2

- Goal: Endurance
- Energy System: Oxidative
- 85-89% THR
- Primarily uses slow-twitch fibers
- The slow-twitch fibers are the primarily source of movements for efforts lasting longer than 2 minutes. Staying in this zone for an extended length of time (not increasing the intensity) will overload these fiber so they become more efficient at using fat and oxygen to produce energy while conserving carbohydrate stores.

BASIC HEART RATE TRAINING
ENERGY & EFFICIENCY

- If mitochondria are integral in the metabolism of fatty acids, wouldn't it stand to reason that the more of them you had, the better? Increasing mitchondria (mitochondrial biogenesis) takes the demand off of 10 mitochondria and disperses the workload amongst 100 – enabling them to more efficiently do their job of converting energy (fat) into ATP so it can be used by the body.
- Both endurance and strength training cause an increased capacity for fatty acid oxidation that correlates with an increase in mitochondrial density. The higher demand for energy by muscles created a higher demand for mitochondria to provide it.
- As athletes, we all know about **oxygen** and **carbohydrates** (sugar). The mitochondria take both of these ingredients, also called **substrates**, and use them to produce the energy (product) that makes your heartbeat and your muscles perform. Glucose (the form of sugar found in our blood stream) is repackaged inside the complex internal structure of the mitochondria into two key components: pyruvate and Nicotinic Adenine Dinucleotide (NADH). These two chemicals are now transported into the central part of the organelle where, in the presence of oxygen (this is of primary importance), they are used to produce ATP (adenosine triphosphate). ATP is a nifty little chemical that is essentially the energy currency (think money, not electricity) of the cell. This all happens via the **Krebs Cycle**. (more in class 3)

BASIC HEART RATE TRAINING
ENERGY & EFFICIENCY

- Also, it can't be said enough, forcing yourself to train in zone 2 will bring out factors that cause inefficiency that you'll be forced to face. Instead of reinforcing the sometimes not so great habit of "work harder" which leads to injury and burnout, instead of "work smarter" which leads to greater improvements and less injury.
  - Run form issues
  - Nutrition issues
  - Fueling issues

BASIC HEART RATE TRAINING
NOT STAYING IN ZONE 2

- Performing zone 2 workouts at a higher intensity level doesn't benefit the athlete in the overall picture and can be counterproductive
- Will reduce effectiveness of higher intensity workouts on subsequent days by fatiguing muscles and depleting carbohydrate stores in fast-twitch muscles
- Can lead to overtraining and injury

BASIC HEART RATE TRAINING
ZONE 3

- Goal: Muscular Endurance
- Energy System: Oxidative, Glycolytic
- 90-94% THR
- Still aerobic, but "working"
- Intensity is too high for max stimulation of the slow-twitch muscle fibers/ fat burning. Oxygen debt does becomes greater, burn less fat and more sugar
- Good to learn this zone for racing, as you can go faster without depleting your carbohydrate stores (next class we will talk about why this matters)

BASIC HEART RATE TRAINING
ZONE 4 - GOOD STUFF HAPPENS HERE

- Goal: Muscular Endurance, lactic acid tolerance, low-end speed
- Energy System: Oxidative, Glycolytic
- 95-99% THR
- Working very hard, but still maintain pace and form
- Lactic acid levels in the blood and muscles are steady, not increasing
- Interval-training sessions can teach your body to decrease the amount of lactic acid being produced and increase lactate removed (at any intensity, thus improving zone 2 workouts for instance)
- Fast-twitch muscle fibers can be taught to produce less lactate acid, slow-twitch fibers can be taught to burn more lactic acid, increasing efficiency, meaning you can work harder at the same intensity.

BASIC HEART RATE TRAINING
ZONE 5

- Goal: Sustained speed, form
- Energy System: Glycolytic, Phosphagen
- >100% THR
- Body is stressed and intensity exceeds lactate threshold
- Lactic acid levels build up quickly, which makes these efforts short in duration
- Accumulation of lactic acid causes muscle fatigue, interferes with neuromuscular firing
- phosphagen: a high-energy phosphoric ester that serves as a reservoir of phosphate-bond energy

BASIC HEART RATE TRAINING
ZONE 5 AND UP

- Goal: Explosive speed, power
- Energy System: Phosphagen
- >100% THR to max
- Develops glycolytic and phosphagen energy systems
- Develops fast-twitch muscles, strength (explosive power)
- Improve cycling/running mechanics
- VERY SHORT

BASIC HEART RATE TRAINING

Consistency and Balance

Next class:

- More on energy production
- Glycogen depletion / lactate build up
- Fueling

QUESTIONS?

More resources and education at
www.BonnieKissinger.com/heartratetraining