

A banner for the ICI/PRO Indoor Cycling 2.0 Conference. The background shows a group of people on stationary bikes in a gym. The text is overlaid on this image. On the left is the ICI/PRO logo with the text 'INDOOR CYCLING 2.0' and 'www.indoorcyclinginstructor.com'. In the center, the word 'Conference' is written in large blue letters, followed by 'Boston | MA | USA | 9.30-10.2'. Below that, it says 'Sponsored by' and lists three sponsors: KEISER mz, stages indoor cycling, and CYCLING FUSION. At the bottom, it says 'Click here for more information'. On the right side, there is a red text graphic that says 'The Power of Indoor Cycling 2.0'.

ICI/PRO
INDOOR CYCLING 2.0
www.indoorcyclinginstructor.com

Conference

Boston | MA | USA | 9.30-10.2

Sponsored by

KEISER mz

stages
indoor cycling

CYCLING
FUSION
For the love of the ride inside and out

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The Power of Indoor Cycling 2.0

Benefits of Metabolic Testing: Spin Your Wheels Effectively

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Course Objectives

- Understanding metabolic physiology
- Identifying effective training intensities
- Program design based on metabolic markers



Would if.....

- Would if we could train your body to utilize fat more efficiently?
- Would if we can ride at a higher intensity for a longer duration with greater ease?
- Would if we can burn more calories and have a higher percentage come from fat?

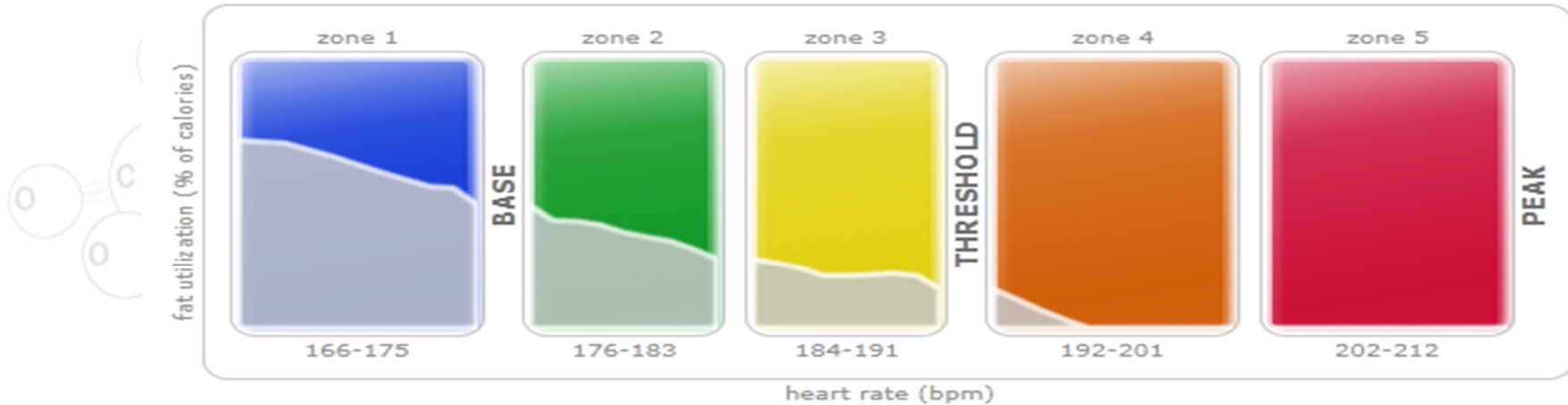
We can.....

Metabolic Profiling

- Exercise becomes individualized opposed to generalized
- Metabolism is unique as our finger print
- Assess don't estimate

Metabolic Profiling

fuel source: **FAT** • CARBOHYDRATE



	zone 1	zone 2	zone 3	zone 4	zone 5
heart rate (beats/min.)	166-175	176-183	184-191	192-201	202-212
VO ₂ (ml/kg/min.)	39-45	45-49	49-55	55	-
calories (min.)	11.9-13.8	13.8-15.1	15.1-17.3	17.3	-
fat utilized (%)	70-51	51-28	28-18	18-0	0
carbs utilized (%)	30-49	49-72	72-82	82-100	100
workload	7 mph 4incline %	7 mph 4-6incline %	7 mph 6-10incline %	7 mph 0-10incline %	- mph -incline %

Metabolic Profiling

	zone 1	zone 2	zone 3	zone 4	zone 5
					
heart rate (beats/min.)	166-175	176-183	184-191	192-201	202-212
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calories (min.)	11.9-13.8	13.8-15.1	15.1-17.3	17.3	-
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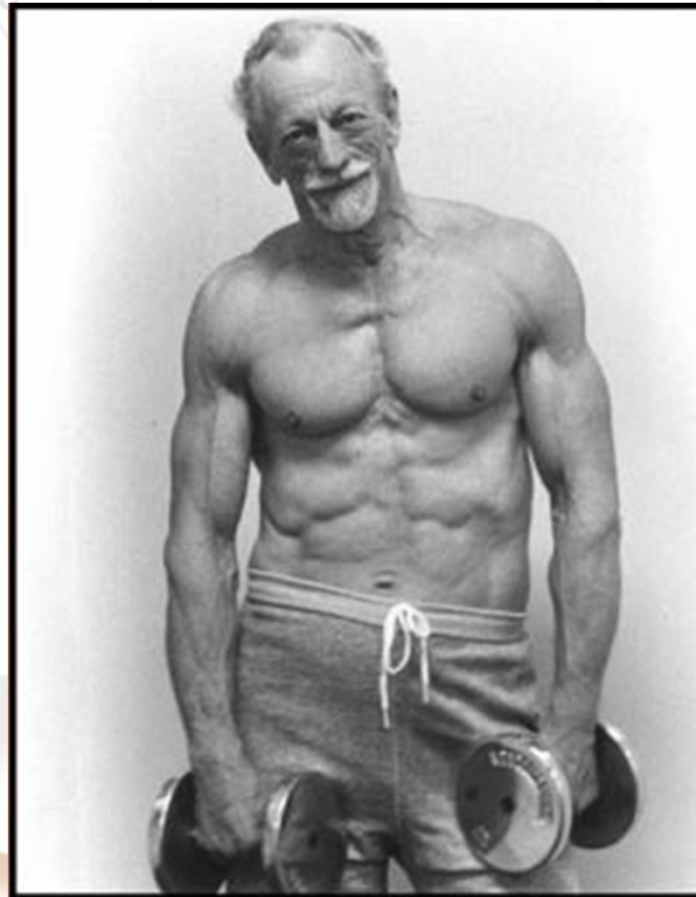
Past models – Estimations

- % of HR Max
 - $220 - \text{AGE}$
- Heart Rate Reserve (HRR)
 - $\text{Max HR} - \text{Resting HR} = \text{HRR}$

“Currently there is NO acceptable method to estimate Heart Rate Max....”

Robergs and Landwehr Journal of Exercise Physiology, Volume 5, #2, May 2002

Are all 70 year olds the same?
Train on current fitness, not on age

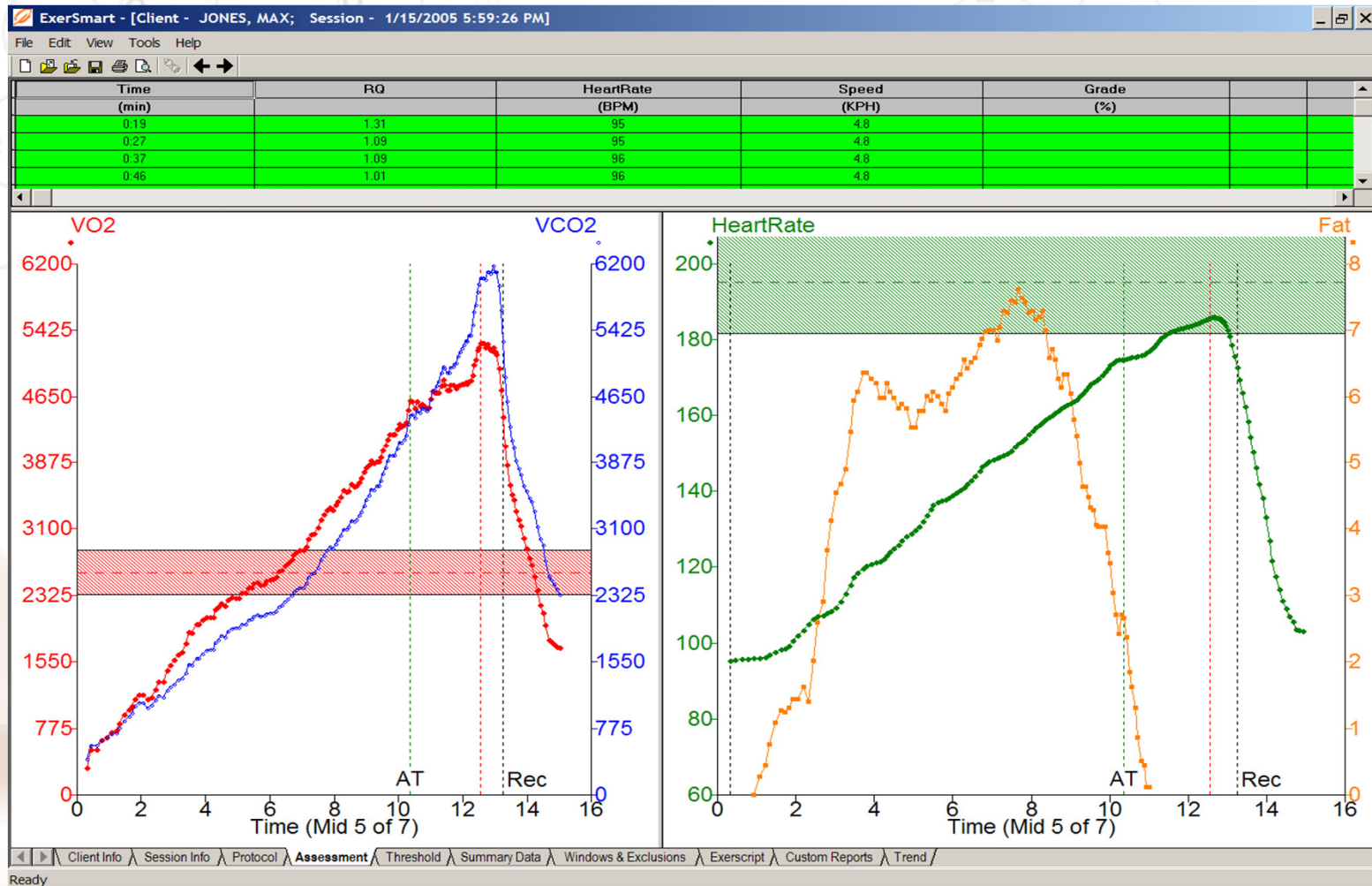


Is Metabolism Dynamic or Static?

- Metabolism is a trainable mechanism
 - I am how I train
- What is the goal?
- Bottom line.....take the fiction away so you deal with fact



Metabolic Profiling



Respiratory Quotient

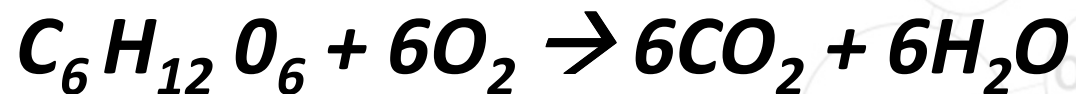
- The respiratory quotient (RQ) is equal to the amount of carbon dioxide produced over the amount of oxygen consumed.

$$RQ = \frac{CO_2 \text{ produced}}{O_2 \text{ consumed}}$$



Carbohydrate

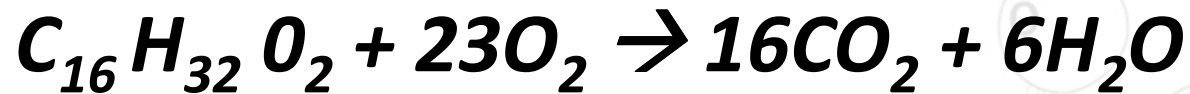
- Different amounts of oxygen are required to completely metabolize carbohydrates and fats to carbon dioxide and water. In addition, different amounts of carbon dioxide will be produced. For example, the breakdown of glucose can be described by the above equation.



In this example, the ratio of carbon dioxide produced to oxygen consumed is 6/6 or 1.00. Therefore, the coefficients for carbon dioxide and oxygen will always be the same and RQ will always be 1.00 when a pure carbohydrate source is metabolized.

Lipids

- For lipid metabolism, the RQ value is different. When palmitic acid, a typical fatty acid, is metabolized it behaves according to the following equation.



In this example, the RQ = 16/23 or 0.696. For lipids in general, the RQ value is given to be 0.70. Therefore, when fats are determined to be the only fuel source, an RQ value of 0.70 will be expected.

What determines Fuel utilization during exercise?

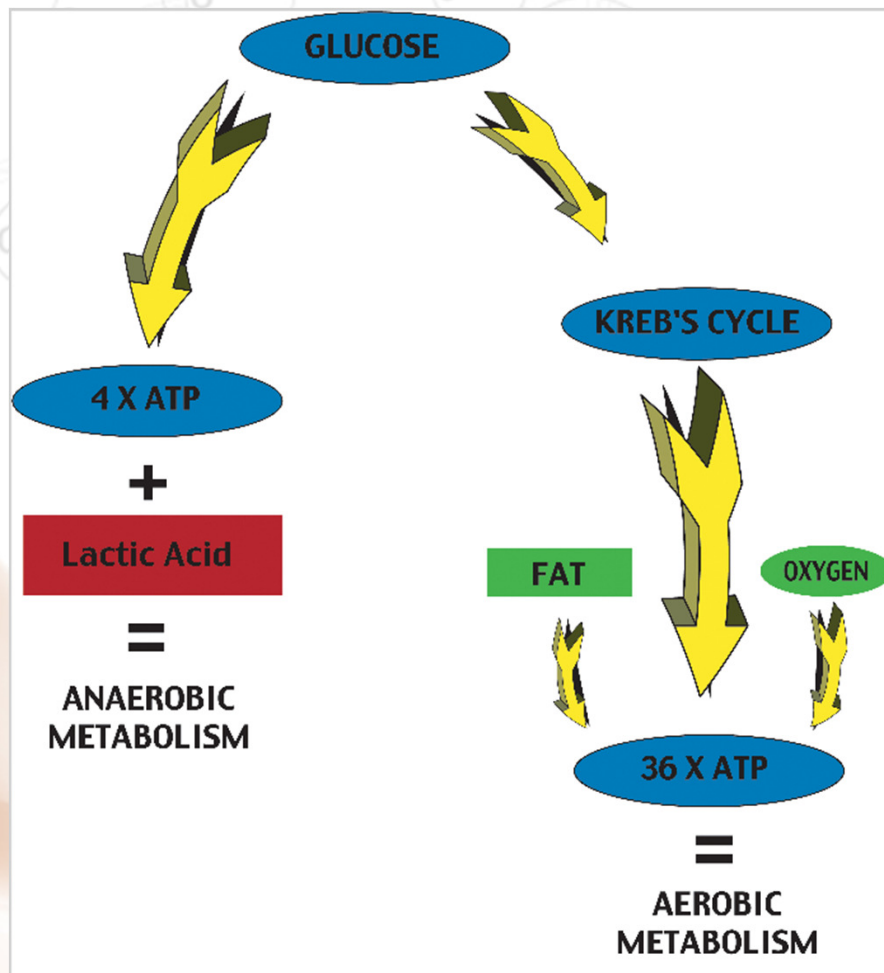
- Genetics – muscle physiology
 - Type I Fibers
 - Type II Fibers
- Training
- Nutrition



Metabolic Markers

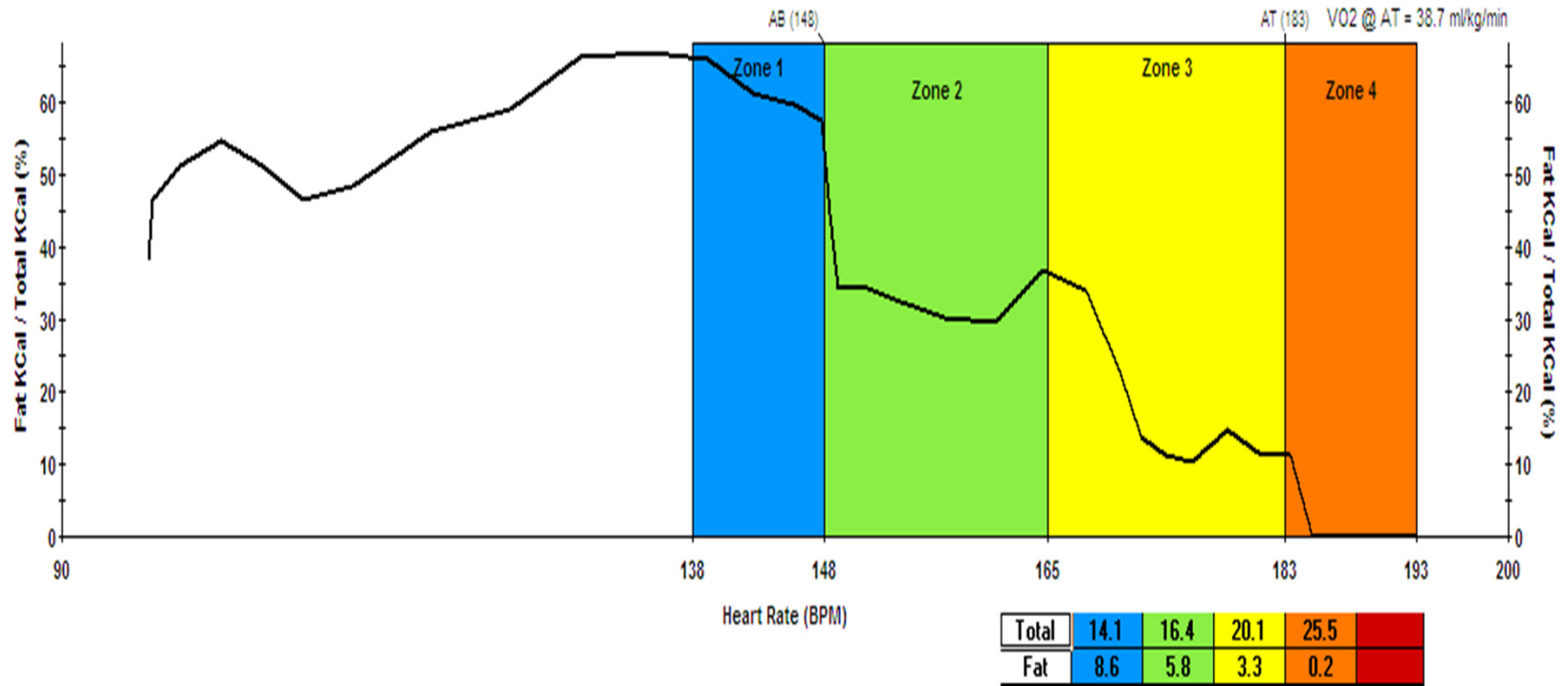
- Base/Crossover
 - Point at which body begins using higher % of CHO vs. Fat (50% FAT to 50% CHO)
 - Could sit here all day
- Threshold
 - Last stop for fat
 - Body is VERY inefficient at creating energy (ATP) via aerobic pathways

Metabolic Training – Energy and Fuel

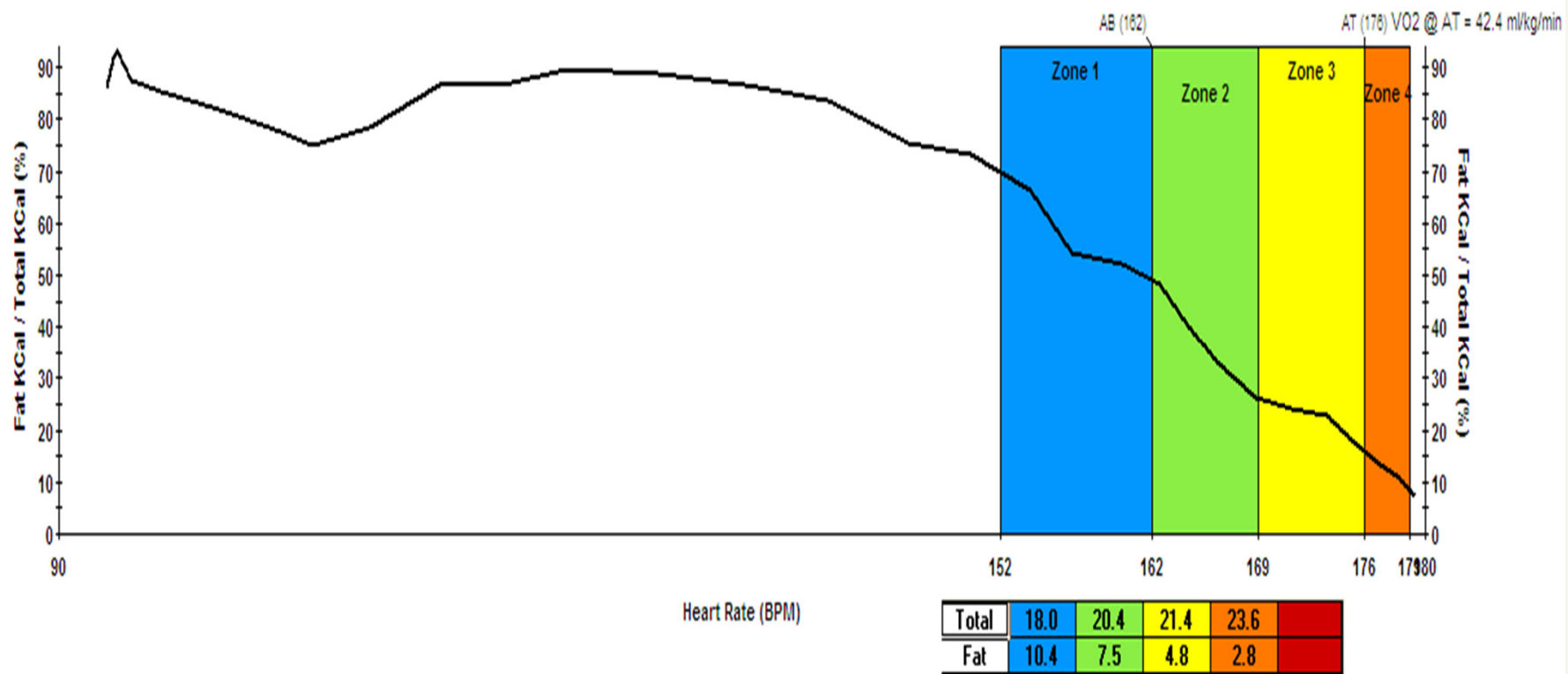


ATP = the major source of energy for cellular reactions

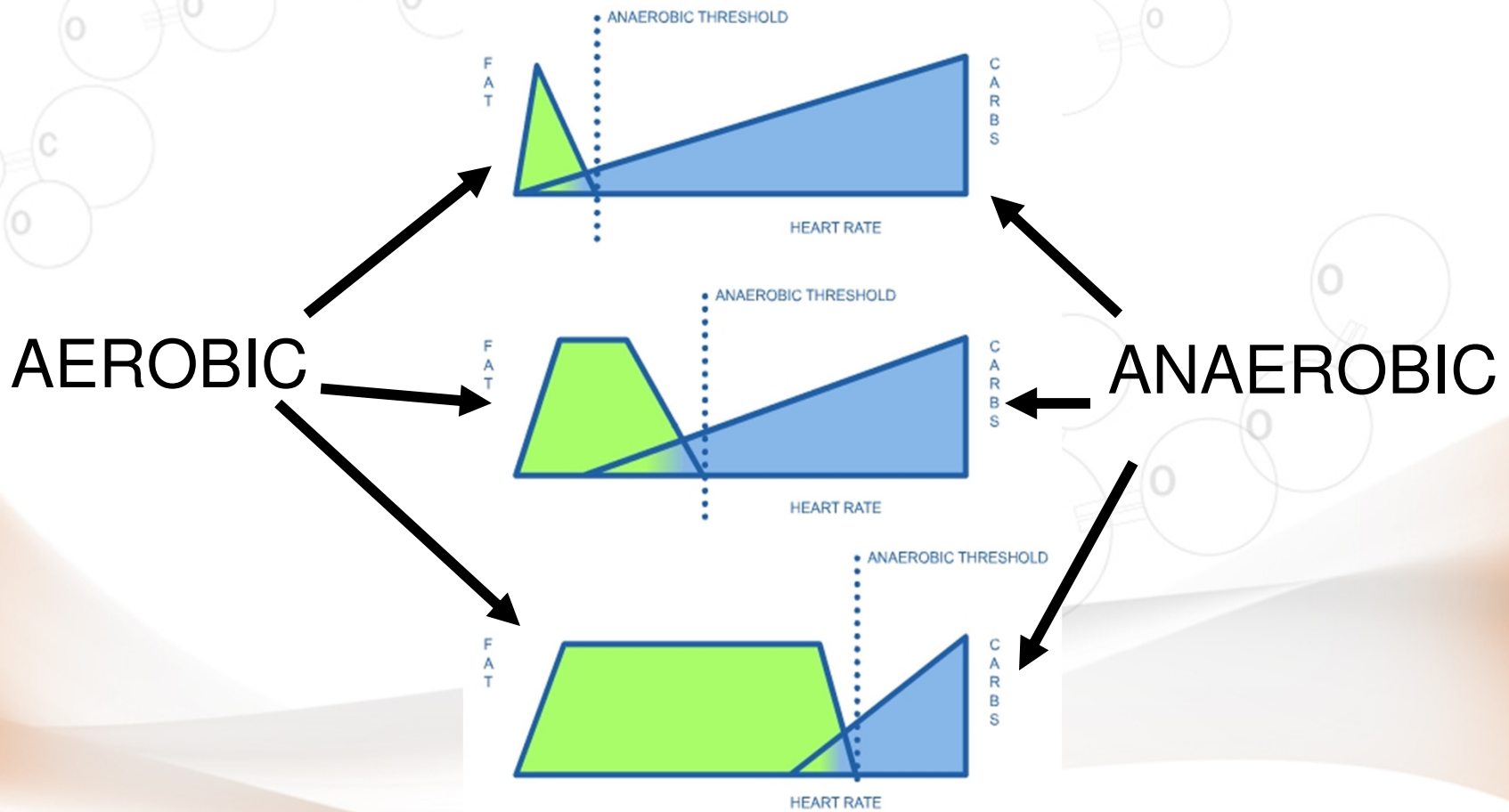
Pre Assessment



Post Assessment

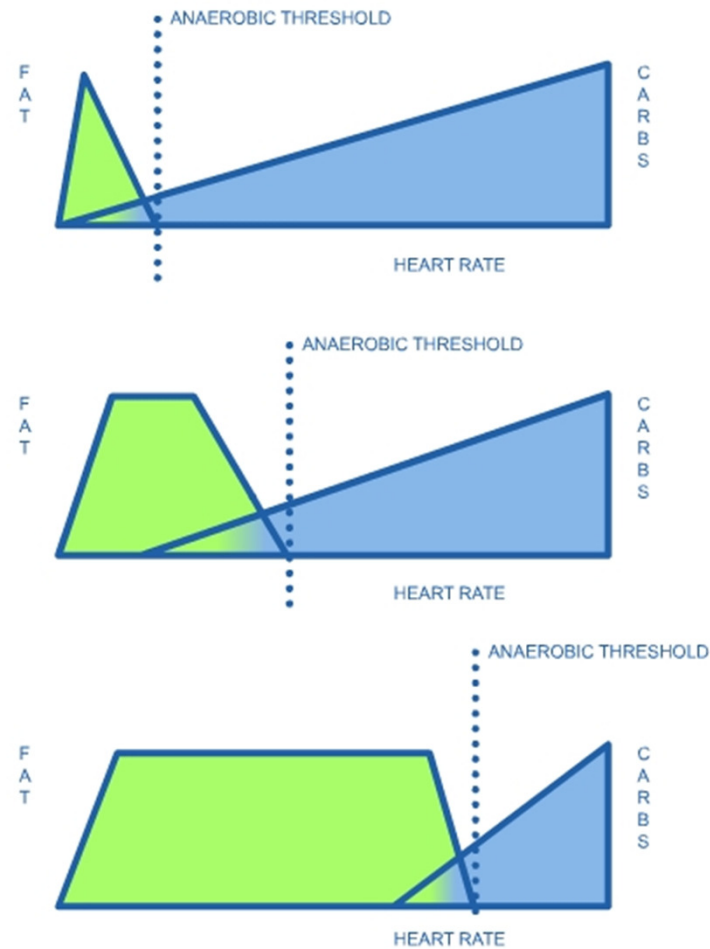


Aerobic vs. Anaerobic



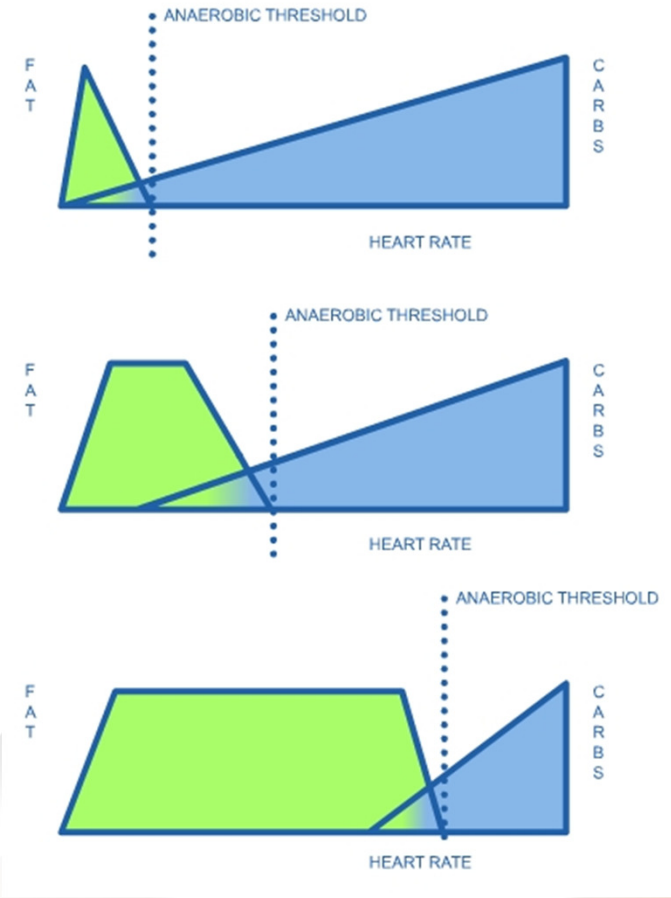
Aerobic Metabolism

Train your body
to metabolize
fat efficiently



Aerobic Base Development

By challenging the point at which the body become inefficient at burning fat, AB will continue to improve



Program Design

- Frequency
 - Days per week
- Duration
 - Time, Miles, Calories
- Modality
 - Bike, Run, Walk, Row, Other
- Intensity
 - Determine metabolic markers (AT, AB)

Intake Questions

Client Intake Questions Necessary for Programming

1. How many days per week can you train?
2. What specific days are you planning on doing cardio?
3. What days are you planning on doing strength?
4. Who is your trainer?
 - a. Coordinate lower extremity training with their trainer to plan active recovery days.
5. How much time on each cardio training day will you train?
6. What activities do you participate in outside of your normal exercise routine (i.e. sports or other physical labor)?

How hard should I work out?

- Go hard or go home mentality
- What are we training our systems to do?
- What should the goal be?



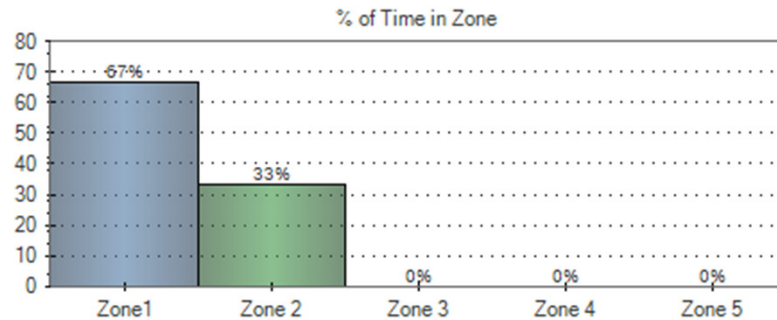
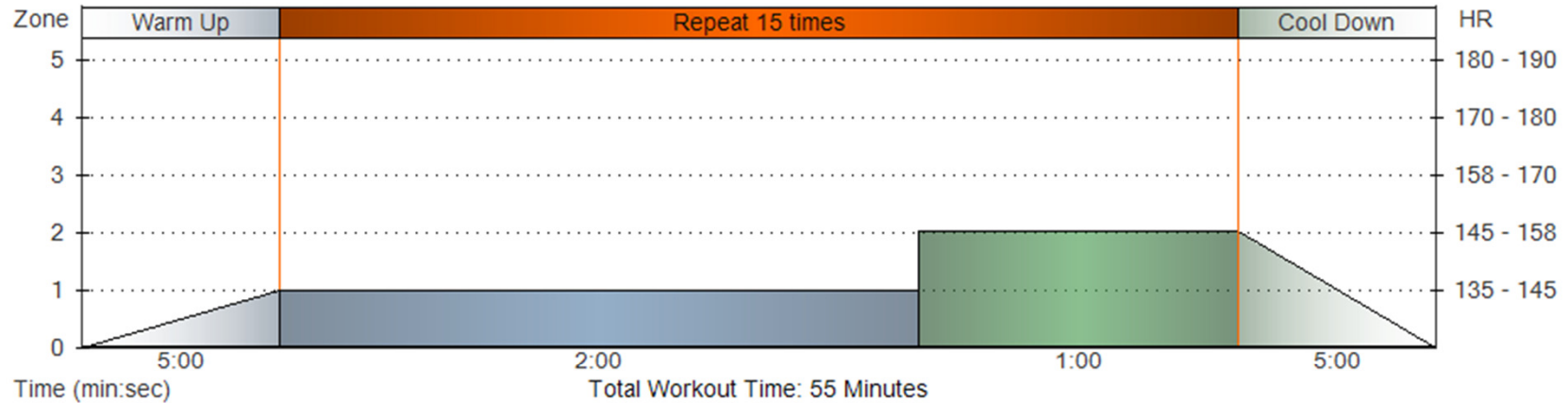
Aerobic Interval

Intensity: Medium

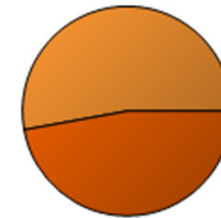
Purpose: Increase your aerobic base by increasing your anaerobic threshold

Description: A Base Development high-intensity day is designed to push your aerobic envelope! These workouts focus on increasing your aerobic base (highest efficient fat calorie burn) by increasing your anaerobic threshold (highest aerobic total calorie burn). Base Development high-intensity days are always followed by either a rest day or an active recovery day.

Zone 1, Zone 2 Interval

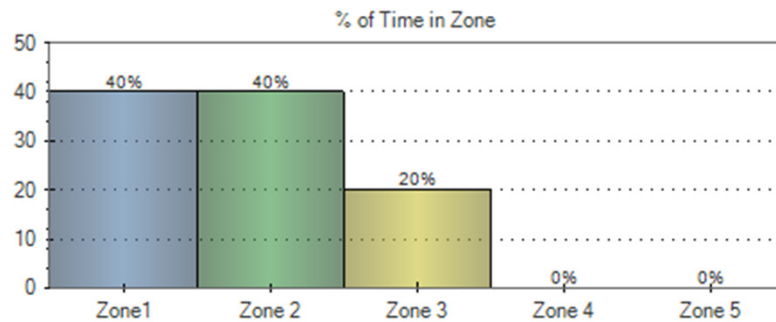
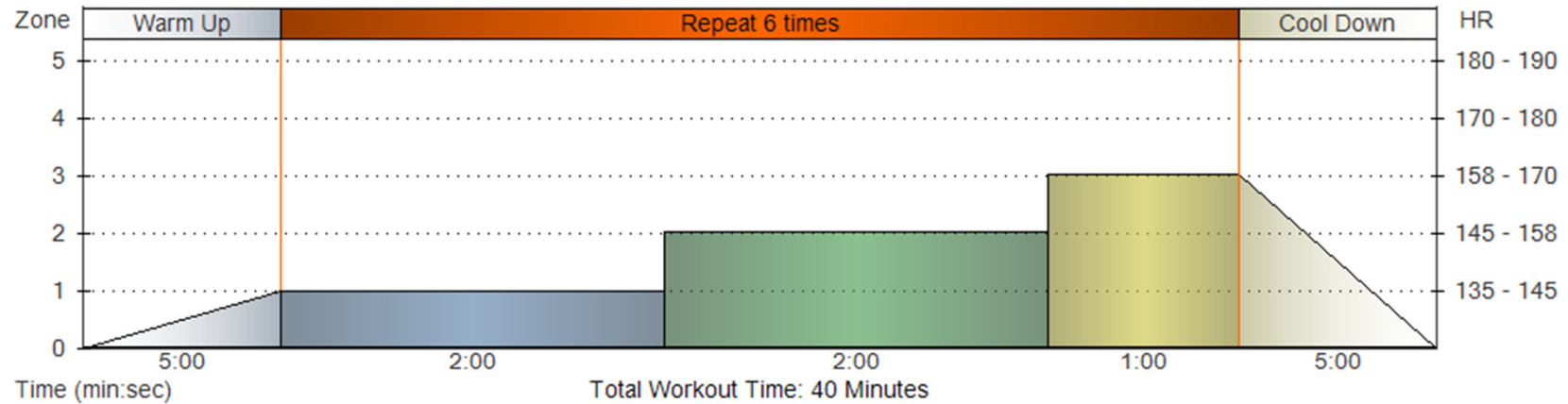


Estimated Total Calories Burned: 526

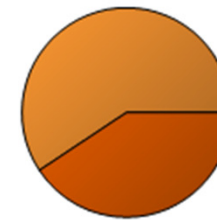


Fat Calories: 248 (47%) Carb Calories: 278 (53%)

Zone 1, Zone 2, Zone 3 Interval

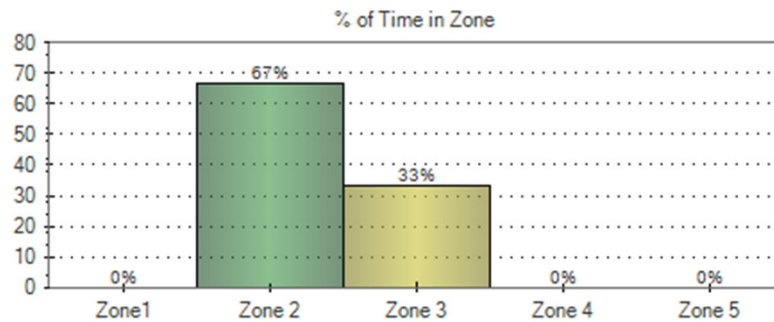
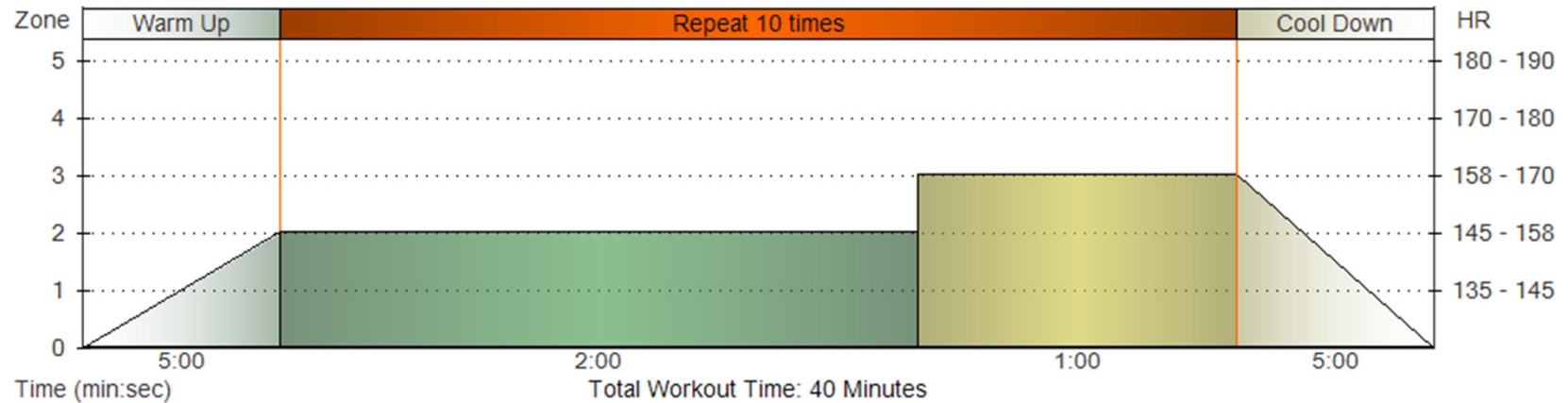


Estimated Total Calories Burned: 376

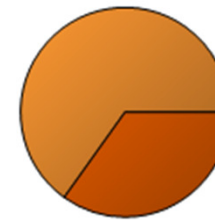


Fat Calories: 153 (41%) Carb Calories: 223 (59%)

Zone 2, Zone 3 Interval



Estimated Total Calories Burned: 407



Fat Calories: 142 (35%) Carb Calories: 265 (65%)

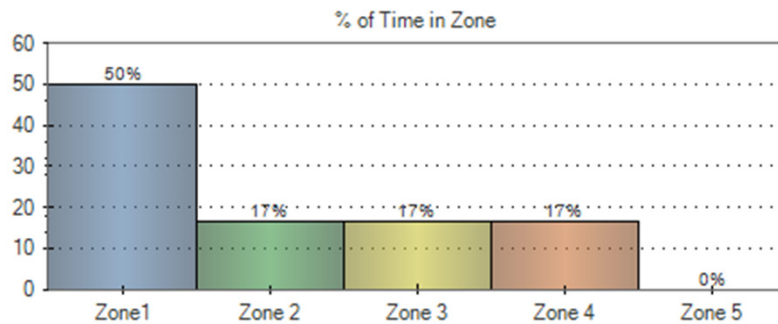
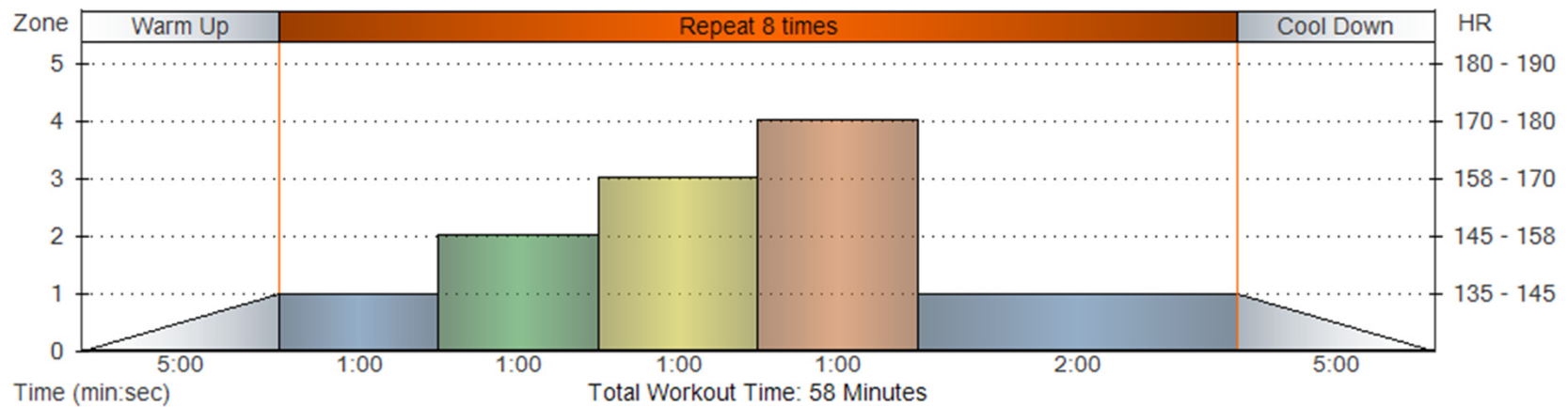
Anaerobic Interval

Intensity: High

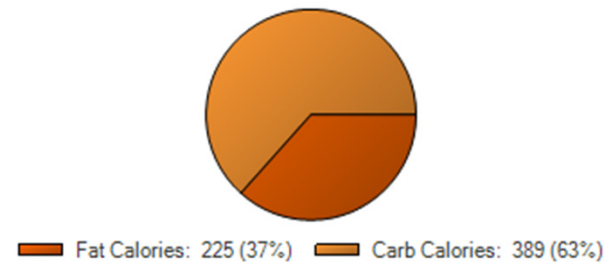
Description: Increase your anaerobic threshold and your body's tolerance to lactic acid

Purpose: An Anaerobic Interval day is designed to push your aerobic envelope and increase your body's tolerance to lactic acid. You have been given an Anaerobic Interval workout because your aerobic base and anaerobic threshold have progressed to the point that you are ready for high intensity work. Anaerobic Interval workouts are always followed by either a rest day or an active recovery day.

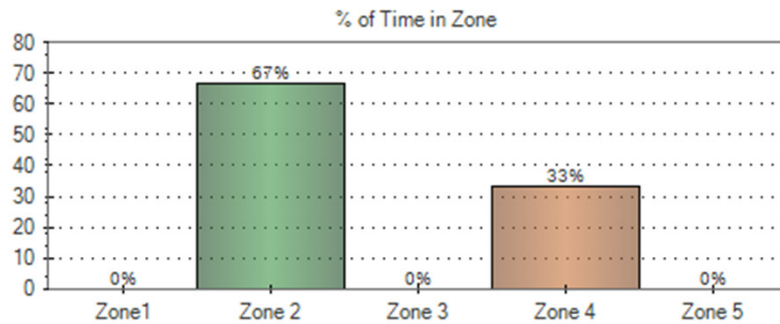
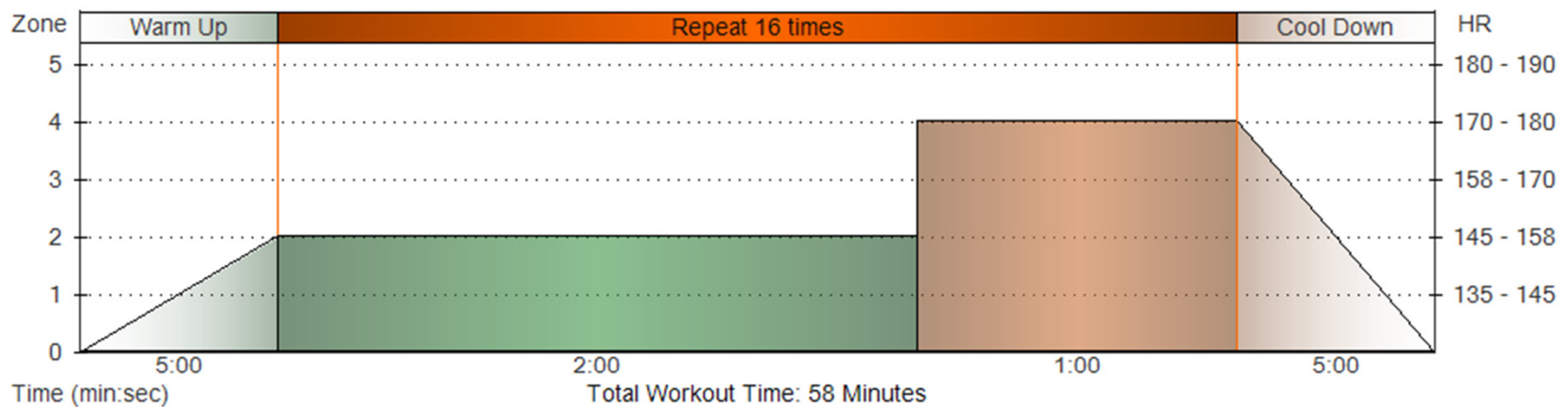
Anaerobic Interval



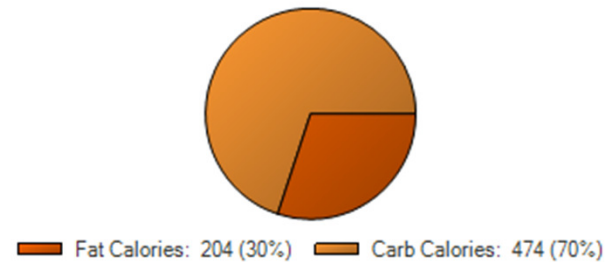
Estimated Total Calories Burned: 614



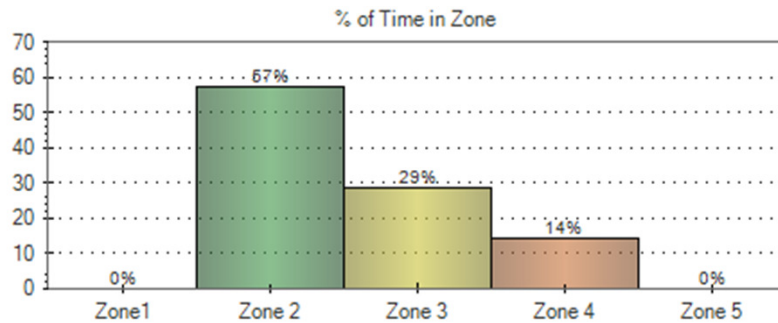
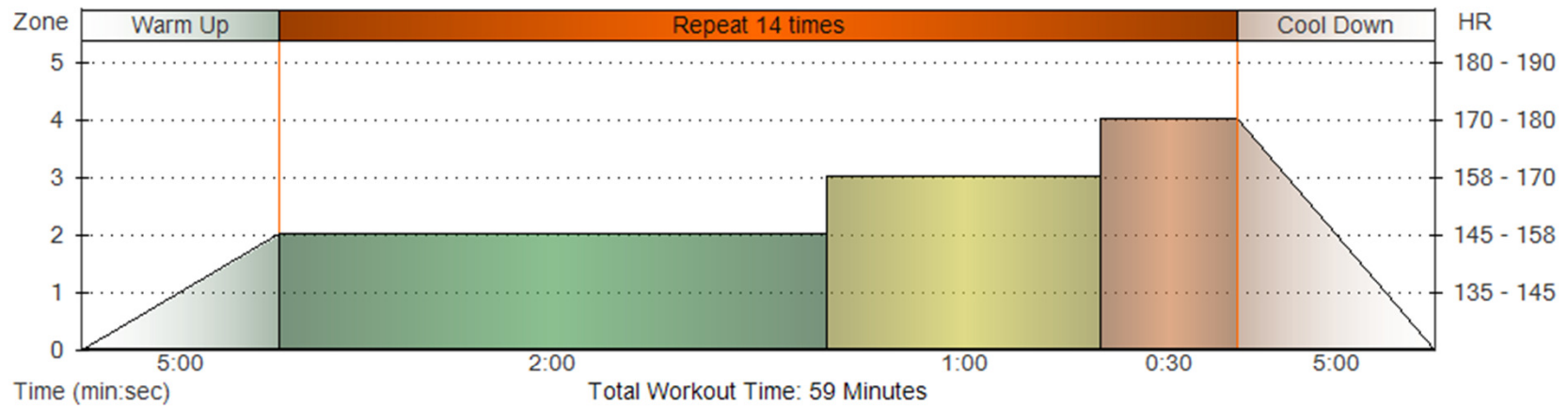
Anaerobic Interval



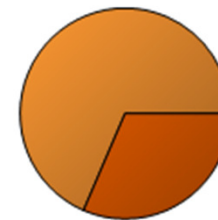
Estimated Total Calories Burned: 677



Anaerobic Interval



Estimated Total Calories Burned: 683



Fat Calories: 215 (31%) Carb Calories: 468 (69%)

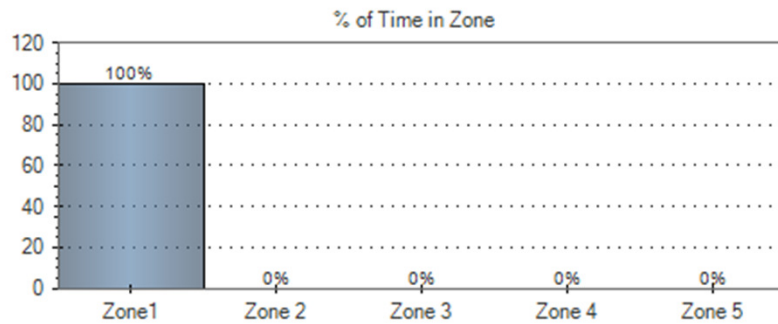
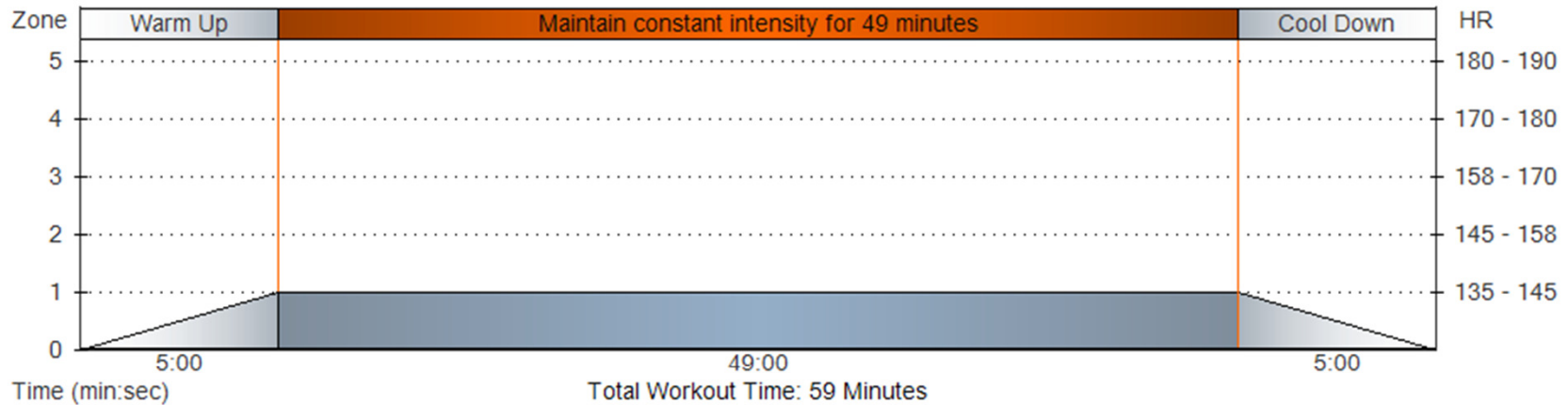
Active Recovery

Intensity: Low Active Recovery

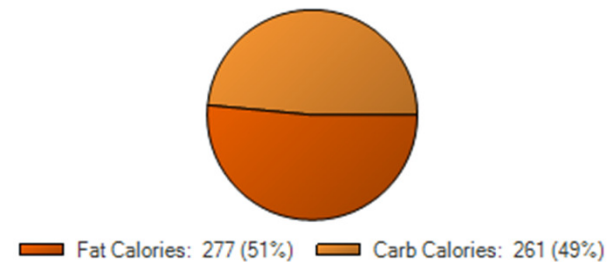
Purpose: Prevent over-training

Description: An active recovery day is one that utilizes only Zone 1. Active recovery days are scheduled after intense aerobic and anaerobic workout days to avoid over-training effects while allowing the body to continue base development.

Active Recovery



Estimated Total Calories Burned: 538



FAQ's

- **Why does my friend train at higher heart rate than I do when I'm in better shape?**
- **Don't I always want to burn more calories?**
- **Is this the "fat burning zone"?**
- **Do I apply my zones on strength training day?**

Refuel



MYTH'S

MYTH: Metabolism slows down with age!

REALITY: 2% loss every DECADE

MYTH: Metabolism can't be changed – it's genetic!

REALITY: Exercise, healthy diet and good lifestyle habits can maximize your metabolism

MYTH: I can figure out my metabolic rate by calculating my age, height, and weight!

REALITY: Equations estimating your metabolic rate can have a 1,000 CALORIE margin or error*

**Gary Foster, University of Pennsylvania, 1988.*

The Power of Knowledge

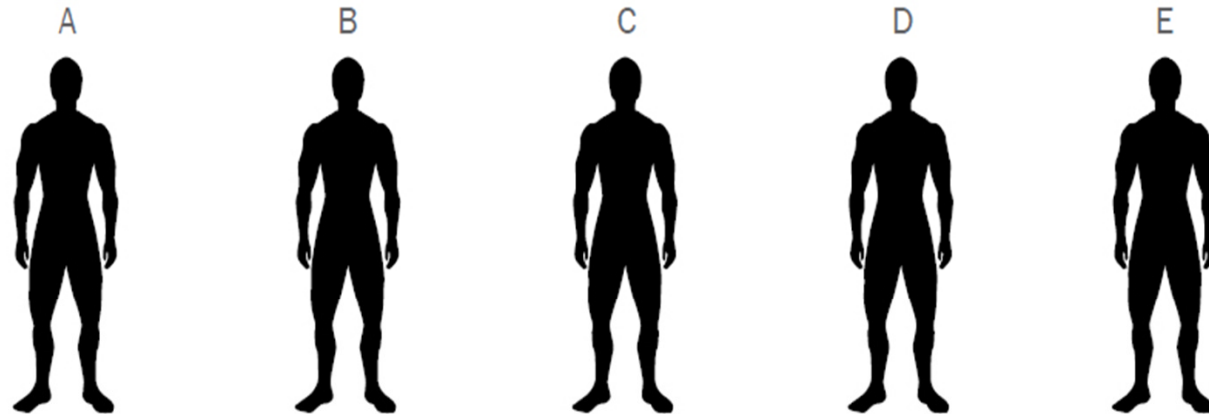
- height: **5'7"**
- weight: **150 lbs.**
- gender: **female**
- K/cal/day (predicted): **1750**
- K/cal/day (New Leaf): **1250**
- weekly weight gain: **1 lbs.**

- height: **5'7"**
- weight: **150 lbs.**
- gender: **female**
- K/cal/day (predicted): **1750**
- K/cal/day (New Leaf): **1500**
- weekly weight gain: **0.5 lbs.**



The Power of Knowledge

Subjects of same
height and weight
(n=80)



PREDICTED	1714	1740	1743	1744	1743
ACTUAL	1263	1523	1778	1979	2152

ACTUAL	1263	1523	1778	1979	2152
PREDICTED	1714	1740	1743	1744	1743

How?

Indirect Calorimetry

The method of ascribing caloric values to the net gas exchange of oxygen and carbon dioxide

Oxygen

Carbon Dioxide

Total Volume



Resting Metabolic Rate

- Calories Equation determines total daily caloric need
RMR + Lifestyle – Lose/Gain per Week + Workout

How much should I be eating?

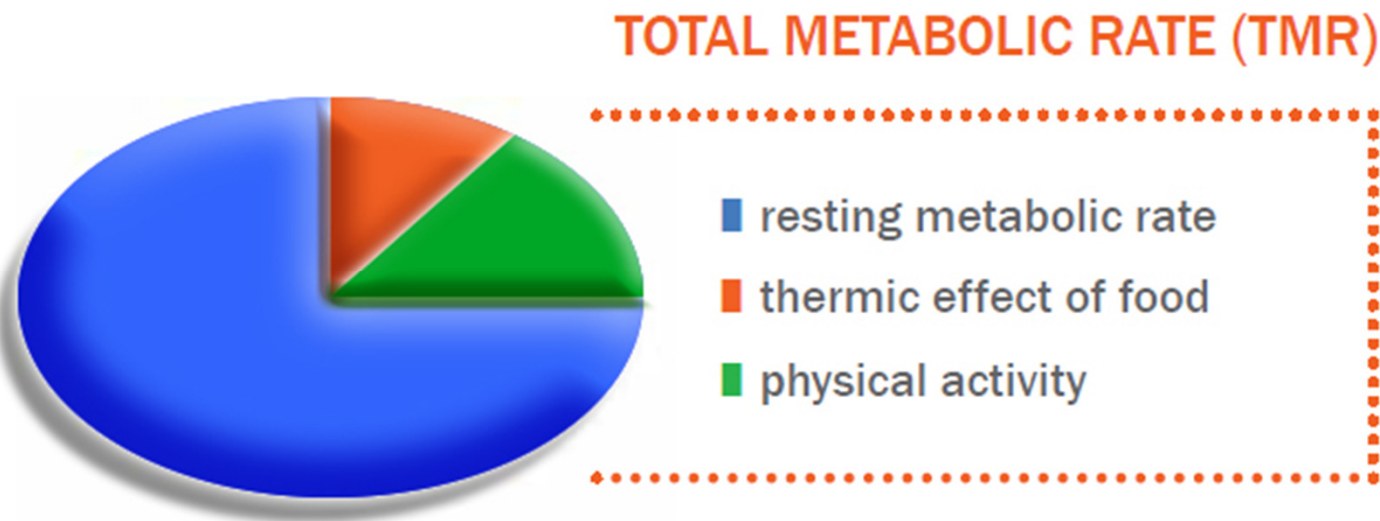
2301 calories per day

Calories Equation - what happens when I work out?

RMR		my lifestyle		lose/gain per week		workout		calories per day
1715	+	686	-	500	+	400	=	2301
		light		-1.00 lbs./wk		■■■■■		

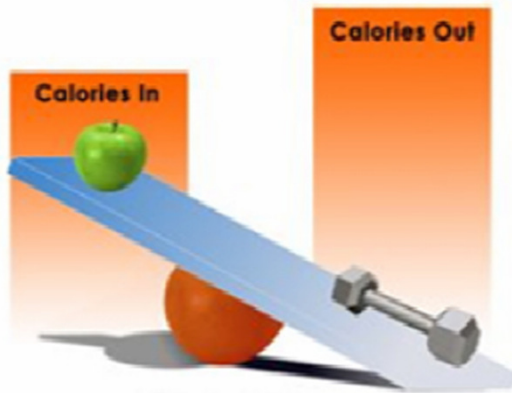
Breaking Down TMR

- RMR is 75% of an individuals total daily energy expenditure



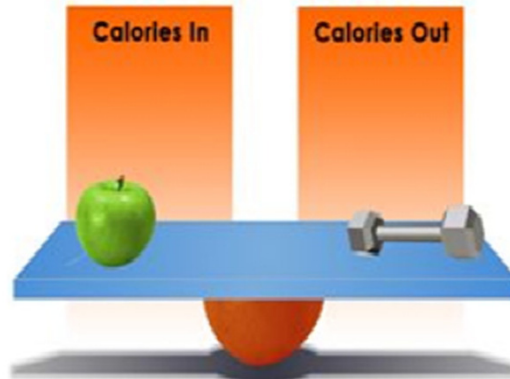
Putting the Numbers to Work

Negative Energy Balance



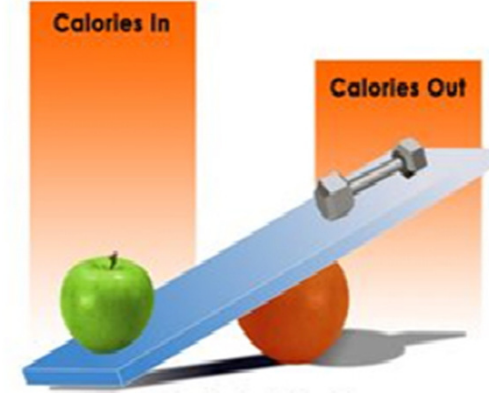
weight loss

Neutral Energy Balance



weight maintained

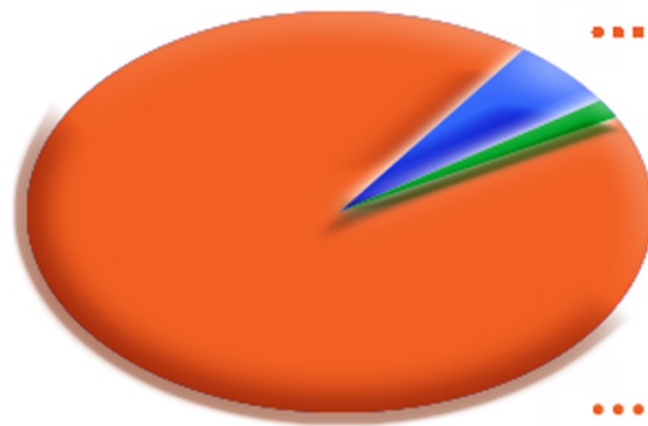
Positive Energy Balance



weight gain

Exercise or Diet

SUCCESSFUL LOSERS



- 89.4% diet and exercise
- 10% diet only
- 0.6% exercise only

* Based on a study of more than 5,000 individuals by the National Weight Control Registry



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*The
Power of
Indoor
Cycling
2.0*

*Thank you for being part of ICI/PRO
Conference 2011*