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Regular to Ripped: High Intensity Interval Training: The New Fat Burning Zone?

1. Who uses HIIT w/clients and personally?
2. History of HIIT
3. Important Studies for Fat Burning
4. Science to Practical Application of HIIT
5. Is HIIT "Metabolic Training," or is it just Hard Exercise?

Who uses HIIT with their clients?
- Group Ex?
- Personal Training?

Who does HIIT when they work out?

History of HIIT
Hannes Kolehmainen - 1st elite athlete to use HIIT, Olympic Gold Medal 1912 middle distance runner - Intervals at race pace with walking recovery.
Swedish running coach Gusto Holmer - 1937 - Fartlek training for his runners. Fartlek = "speed play." Continuous running with sprints - 5km to 3000m.
Emil Zatopek - Gold Medalist & Olympic records in 5,000m & 10,000m 1952 Helsinki Olympics. Sprints with jog recoveries.

HIIT and Fat Burning
1. Izumi Tabata, National Institute of Fitness and Sports, Japan
2. Angelo Tremblay, Laval University.
3. Mehrdad Heydari, University of New South Wales, Australia.
4. Whyte, Gill & Cathcart, University of Glasgow
5. Trapp, et al., University of New South Wales, Australia.
6. Hazell, et al., University of Lethbridge
7. Zhang, et al., Hebei Normal University, China
8. Gibala, McMaster University

All studies show
1. Fat burning
2. Increased use as energy
3. Reduction of fat
4. Decrease in skinfolds
5. Decrease in circumference

Except... Tabata?


- Compared aerobic exercise & HIIT on fat loss & muscle metabolism.
- 2 Groups:
  1) 20-week endurance training - Cycling 4 or 5 x/week - 30 to 45 min - 60% - 85% of heart rate reserve
  2) 15-week HIIT - 10 – 15/15 – 30 sec intervals or 4 – 5/60 – 90 sec intervals - 60% - 70% of max.
  - Recovery HR down to 120-130 bpm.
Tremblay

- Total energy cost:
  - Exercise: 74.7 kcal
  - REST: 15 kcal

- Increase in total body mass:
  - Men: 2.7 kg
  - Women: 3.2 kg

- Significant increase in enzymes promoting fat being used as energy for muscle contraction.

Lean, compared to overweight women, lost less fat after HIIE.

SSE training

- Nutritional counseling, high
- Reduced 4.4 lbs

Cardiovascular fitness improved.

Insulin sensitivity & resting fat oxidation rate higher (24 times less than endurance program.

Fat free mass 14%

Waist circumference

Subjects started exercising for 10 min.

Decrease in sum of 60 lbs for the trunk.

There was significant fat loss in legs compared to arms in the HIIE group only.

Duration of the exercise was gradually increased to a maximum of 40 min.

Results for HIIE . . . 12 weeks

- Breakdown of fat loss:
  - Trunk fat
  - Abdominal fat
  - Waist circumference decreased by week six

Aerobic power improved 15%

Both groups significant improvements in:

- Fat free mass
- Trunk fat
- Waist and hip circumference decreased

Introduction of 80 lbs can be increased by clients.

Results: for HIIE

- Protocol
- Remarkable benefits considering total work time = 12

Insulin sensitivity & resting fat oxidation rate higher (24 times less than endurance program.
Decreased total fat mass (−0.5 kg) gynoid (hips, buttocks, thighs).

2017 HIIT, MICT, or no training for waist circumference: 3.5%.

Difference of body fat 8.0% (BOD POD).

Metabolism:

9 weeks.

Fat percentage (−2.5%) abdominal subcutaneous.

At end of program, prevalence of metabolic syndrome was reduced by 8.7%.

Peak running speed 4.8%.

Zhang, et al. (2017)

Flux and MICT had no advantage compared with HIIT in the reduction of abdominal visceral fat reduction.

Authors conclude: HIIT appears to be an effective alternate to traditional endurance training in healthy young women, and obese individuals. HIIT shown to improve CV fitness in people with coronary artery disease, congestive heart failure, middle age adults and healthy individuals and diseased populations.

Average Time of Training

- HIIT = 63.75 min
- MICT = 58.65 min
- Difference = 5.10 min

MCT not as strenuous compared with HIIT in the reduction of abdominal visceral fat reduction.

Results

Zhang, et al. (2017)

Flux and MICT had no advantage compared with HIIT in the reduction of abdominal visceral fat reduction.

Authors conclude: HIIT appears to be an effective alternate to traditional endurance training in healthy young women, and obese individuals.
HIIT or No HIIT — Get off the Couch!

**What is HIIT?**
Low training volume, very high training intensity . . . “Good news – bad news!”

**Tremblay** – 60% of max. 2.5 – 7.5 min total training time.

**Heydari & Trapp** – 8 sec work, 12 sec active recovery for 20 mins.

**Whyte, Gill, Cathcart** – 2–week HIIT, 6 sessions, 4 to 6 – 30 sec Wingate sprints, 4.5 min recovery.

**Hazell** – 4 to 6, 30 sec “all-out” sprints . . . 4 min of rest between sprints.

**Zhang** – 4–minute cycling at 90% VO2 max, 3–min passive recovery.

**HIIT Is Short & Sweet**

What is HIIT?
Always incomplete recovery . . . physically, metabolically, & mentally.
1:3 – 1:1 work to rest ratio.
Physically & mentally demanding.

But . . . it’s fun . . . time quick . . . creative . . . applicable in any situation.

**Psychological Adaptations to HIIT**
Tolerating pain . . . how much pain do we want our clients to have?

“Pain and suffering to enhance the human will.”
Juan Carlos Santana, (2010).

**HIIT Can Be Any Kind of Exercise**

Most research is done with bikes for a controlled environment.

But in real life . . .

Front squats
Calisthenics
Stairs
Hard–Easy Running
Sled push
Versaclimber
Cycling/Spinning
Push Presses
Plyo
Kettlebells
Junk Yard Training
Keiser Runner
**Highest Calorie Burner?**

Forestry

- Fast Axe Chopping = 1050 kcals

"Chop it! Chop it! Chop it!" - Chop the fat away!!

**Fat Burning During Exercise**

Approximate Energy Use During Continuous Exercise

<table>
<thead>
<tr>
<th>Time (min)</th>
<th>CHO %</th>
<th>Fat %</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>70</td>
<td>30</td>
</tr>
<tr>
<td>60</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>120</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

(Wilmore & Costill, 1994)

Fat Burn During Exercise

MCT... Takes a long time to get primarily to produce muscle contractions.

No such thing as a "Fat Burning Zone."

But... Is there when using High Intensity Interval Training? (HIIT)

Total calories burned... right?

HIIT studies seem to show a trend.

Enzymes to promote the use of fat to produce muscle contractions.

Free Fatty Acids

<table>
<thead>
<tr>
<th>Exercise &amp; need for energy</th>
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<tbody>
<tr>
<td>Fatty acids that are freed into blood (free fatty acids)</td>
</tr>
<tr>
<td>Binds with albumin</td>
</tr>
<tr>
<td>Carried to muscle cell</td>
</tr>
<tr>
<td>Used as energy (ATP)</td>
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</tbody>
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"Energy for exercise does not simply result from activation of a series of energy systems that "switch on" and "switch off" but rather from a smooth blending, with considerable overlap of one mode of energy transfer to another."


Is HIT "Metabolic Training," or is it Just Hard Exercise?

**What is "Metabolic Training"?**

Metabolism

A complex network of hormones and enzymes that convert food into fuel and affect how efficiently we burn the fuel.

Robert Yanagisawa, MD

Five Metabolisms

1. Sleeping
2. Resting / Sedentary work / Hanging around / Watching TV
4. Exercise
5. Post Exercise
What is "Metabolic Training"?

"Exercises that improve or enhance the body’s energy systems."  
secretstolivingahealthylifestyle.com

"Conditioning muscles to better use what is being delivered to them by improving the efficiency of the different metabolic pathways."  
baye.com

"Exercise that utilizes the science of endocrinology and performance training to tax the body’s major energy systems... maximize use of stored adipose tissue as a fuel source, during and after exercise."  
tnation.com

Some research shows anaerobic exercise may condition your Cardiovascular system to the same extent as aerobic exercise... Aka "Cardio."

Metabolic training is a fancy way of describing anaerobic training... a.k.a. Interval Training

Thanks for coming to this session!

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