


High Intensity Interval Training

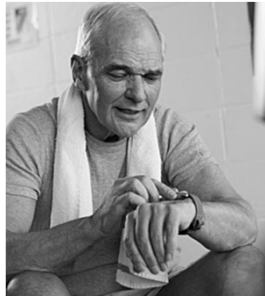



The Psychology of HIIT




“No Time” to Work Out?

- One of the biggest barriers to participate in exercise is no time.
- Many assume that if you can't exercise for 60 minutes it's not worth it
- But -- Something is better than nothing & less may well be more!




Why Use Shorter Workouts?

- Improve mobility and range of motion
- Increasing frequency
- Travel workouts
- Perfecting movements
- Add intensity




Minimum Effective Dosage




- If “exercise is medicine” is it possible to over- or under-dose?
- What is the least amount of effort that will yield results?

The Physiology of HIIT




Why High Intensity Intervals?

- Build & retain lean muscle & bone
- Increase strength & endurance
- Optimize function and performance
- Enhance growth hormone production



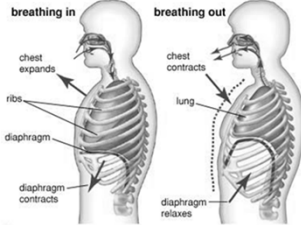
Defining “High Intensity”



- Two elements must exist for an activity to be called “high-intensity:”
 - VO2 must be at or above 75% VO2 (breathless)
 - This intensity must be sustained for \pm 30 minutes
 - If your client can talk on their cell phone during these activities they are NOT high-intensity.


Breathing & HIIT

- “Inspiratory Muscle Training”
- A means to increase strength of respiratory muscles to enhance power & performance
- Accomplished by providing muscles with overload




Resisted IMT Training

- Train twice a day
- Breathe in & out as far as possible using the diaphragm
- Start with no resistance & gradually add resistance (straw)
- Perform 25 – 35 breaths per session
- Respiratory fatigue = “failure to achieve a satisfying breath”



“Cadence Breathing”

- A breathing pattern engaged during running to optimize oxygen usage
- A way to improve stamina by regulating lung function
- A 3 inhale / 2 exhale cadence is most popular
- Some research indicates it may prevent overuse/repetitive stress injury



Exertion & Breathlessness

RPE	% VO2	Exertion	Talk Test
9	50%	Very light	Speaks normally
11	60%	Fairly light	Speaks normally
13	70%	Somewhat hard	Slightly short of breath
15	75%	Hard	Speaks haltingly
17	85%	Hard to very hard	Can gasp out 1 or 2 words
19	95%	Very, very hard	Cannot speak

According to the Old Wife's Club...



- One of the most common old-wife's tales in fitness:
- "You burn more fat at lower levels of exertion"

Understanding Fuel Sources

132 lb (60 kg) person, 30 min of cardio

Intensity (% of VO2)	Total cals burned	Fat cals burned & % fat cals	Main substrate	EPOC 24 hrs	Fat cals & Tot cals
50% Walk, 3.5mph	126	~106 (84%)	Fat	0	106 / 126
70% Jog, 5 mph	228	~152 (66%)	Fat	0	152 / 228
80% Run, 6 mph	273	~89 (32%)	Glycogen	160	249 / 443
90% (20 sec) / 70% (40 sec) 9 mph / 5mph	298	~105	ATP / Glycogen & fat	200 ±	305 / 498

Intensity & Lactate Threshold:

The Great Lactate Debate

- What we used to think:

- Lactic acid is a waste byproduct of anaerobic metabolism, responsible for muscle fatigue & exhaustion.



- What we know now:

- Lactic acid is a form of fuel that is a direct precursor to several performance enhancing hormones.

The Work/Rest Cycle

- **HIGH INTENSITY WORK**

- Utilizes ATP / CP in muscles
- Then uses glycogen in muscles
- Next uses glucose in bloodstream
- Lactic acid levels increase

- **REST**

- Lactic acid returns to liver & converts back to glycogen
- ATP /CP replenishes
- Hormonal boost

Designing HIIT Programs



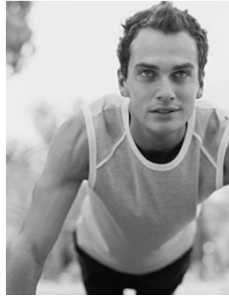
Manipulating the Variables

- Beginners may need to start with 1:3 work to rest ratio
- Beginners need to start with low to moderate intensities
- Beginners to intermediate should rest 48 hours between sessions

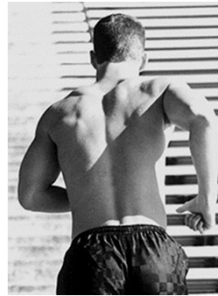


Properly Progressing Extreme Interval Workouts

	Work	Rest
Level 1 1:3	20 secs	60 secs
Level 2 1:2	20 secs	40 secs
Level 3 1:1	20 secs	20 secs
Level 4 2:1	20 secs	10 secs

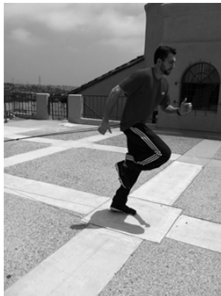


Program Considerations



- With increased intensity comes increased risk of injury; proper screening and assessment is vital
- Client must have a baseline of fitness PLUS high level or motivation
- Proper progression is vital; progression is not always a linear ascent
- If outdoors, factor in environmental factors

Three Vital Program Design Tips



- Allow for an appropriate warm up; insufficient warm-ups limit intensity
- Allow for sufficient rest between work intervals; incomplete or inadequate rest limits the peak intensity of the subsequent intervals
- Encourage proper nutrition & hydration before, during and after the workout.

Implementing HIIT Programs



1) Pyramids

- Ascending Pyramid
 - Increase Repetitions, Duration, or Load with each Consecutive Set
- Descending Pyramid
 - Decrease Repetitions, Duration or Load with each Consecutive Set
- Reciprocating Pyramid
 - One exercise increases intensity, the other decreases intensity



Body Weight Exercises for HIIT

- Push-ups
- Squat thrusts
- Burpees
- Plank Jacks
 - Plank jacks with gliders
- Mountain climbers
 - Gliding mountain climbers
- Tubing speed squats
- Squat jumps
- Medicine Ball Series:
 - Front slams
 - Side Slams
 - Squat & toss
 - Med ball push-ups
 - Toe taps
 - 1-leg "around the world."

2) Partner Intervals

- Partner A Completes an Exercise for Reps

- Shuttle Runs, Stairs, Squats, Thrusters, Lunges, Games?



- Partner B Holds Static Position Until Partner A Completes His/Her Set

- Plank, Push-Ups, Bar Hang



Partner Intervals: Sample

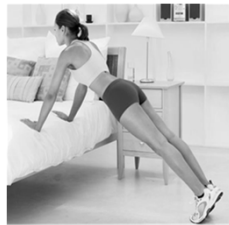
Do each exercise for 10 – 30 seconds, with minimal rest.

Partner #1	Partner #2
Squat jumps	Wall sit
Wall sit	Squat jumps
Push ups	Low push-up hold
Low push-up hold	Push ups
Sit-ups	Plank
Plank	Sit-ups

3) “Microburst Workouts”

High intensity, short duration & very effective

- More effective time management
 - For busy executives
 - While traveling
 - Any time when time is limited
- Burn fat more effectively
- Increase muscle development & bone health
- Improve athletic performance
- To situationally add intensity



Microburst Workout #1:

The 4-minute (Tabata) Workout

- Choose 1 exercise
 - May utilize body weight
 - May utilize light weight: 25 – 40% 1 RM
- Technique
 - Perform as many perfect, full ROM reps as possible in 20 secs
 - Rest for 10 secs
 - Perform 8 sets, for a total of 4 minutes per drill

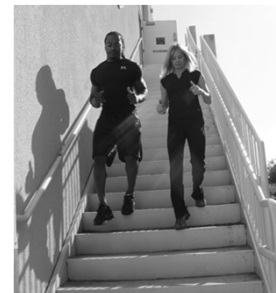
Suggested 4-minute Drill: Push-ups

- Do either straight leg or bent knee, but keep form consistent during drill
- Localized tricep fatigue is the limiting factor
- Watch form; client may rest in the “up” position



Also Try:

- Stair climbing
- Sprints
- Shuffles
- Mountain climbers
- Squats (light resistance)
- Med ball slams
- Inverted Pull-ups



Microburst Workout #2:

Scientific 7-Minute Workout
ACSM Health & Fitness Journal, May/June, 2013


**Do each exercise for 30 seconds;
rest for 10 seconds between each.**

1. Jumping jacks
2. Wall sit
3. Push-ups
4. Crunches
5. Step-ups on chair
6. Squats
7. Tricep dip on chair
8. Plank
9. High Knee run in place
10. Alternating lunges
11. Push-up with rotation
12. Side Plank

Microburst Workout #3

The 9-minute Workout


- **One Minute Each:**
- Total Body Extensions
- Push Ups
- Prisoner Walking Lunges
- Burpees
- Rest and repeat



Microburst Workout #3

The 10-minute Challenge

- Perform a different exercise each minute for 10 minutes.
- Try Walking lunges, Squats, Deadlifts, Mountain climbers, Push Ups, KB Swings, Burpees, Turkish get-ups, squat jumps & "manmakers*."



"A "manmaker" is a burpee with a weighted renegade row in the middle and a weighted overhead press at the end. Yes, we know the term is politically incorrect and sexist; we did not make it up -- that is what it is called. We prefer the gender-neutral, non-patriarchal term "Person Maker."

4) Building Block Intervals

- Select up to 4 exercises
- Choose a duration
 - Repetitions or Time
- Add an exercise to each block
- Rest 10-20 sec b/w exercises
- Rest 1 to 2 minutes between blocks

Example

- Exercise #1, Rest 30 sec
- Exercise #1 & 2, Rest 45 sec
- Exercise #1, 2, & 3, Rest 60 sec
- Exercise #1, 2, 3, & 4, Rest 90 sec

Sample: 9 Minute Cardio Building Block Intervals

Set	Burpees	Mountain Climbers	Squat Jumps	Jogging
1	50 sec	•Rest 10 seconds between sets		
2	40 sec	50 sec	•Rest 1 - 3 minute between blocks	
3	30 sec	40 sec	50 sec	
4	20 sec	30 sec	40 sec	50 sec
5	10 sec	20 sec	30 sec	40 sec

5) Team Intervals

Last One Standing:

- Teams of 4 – 6
- Leader sets limits for max number of reps or seconds
- Each player calls out a drill and the whole team does it
- When done the next person calls out a different drill
- This drill is repeated around (and around!) with little or no rest
- As people fatigue they drop out & have active or passive rest (walk or run around the field, hold bridge or plank, med ball hot potato, etc.)
- The person still standing after everyone else drops out wins!