

New Horizon Fitness

Make Your Workout a HIIT!



Let's pretend you have only two choices at the gym today:

Workout "A"

Takes 2-3 times as long
Modest increase in aerobic fitness (VO₂max)
Modest affect on fat loss

Workout "B"

Takes about 20 minutes
Increases aerobic capacity more than "A"
Decreases fat dramatically more than "A"

Sadly, most people always choose workout "A", steady state a.k.a. High Volume or Endurance Training (ET) such as running, biking, or stepping, at a steady pace for 30 minutes or more. High Intensity Interval Training (HIIT) sessions are a valuable addition to ET that will help you reach new levels of aerobic fitness. Unlike steady state ET, a HIIT session is exercising at a near all-out pace for 6-10 short work intervals separated by rest intervals. These work intervals can be as short as 20 seconds. Other HIIT protocols can be as long as 4m work and 4 m (minutes) rest.

HIIT sessions produce similar results as ET with dramatically less training volume (caloric expenditure). Higher intensity exercise is an independent factor to reduce coronary heart disease (Tanasescu 2002). Your age, physical condition, goals and other factors will determine the best HIIT for you, more on that later.

Increase Your Aerobic Capacity = Increase Your Life

From the mid thirties onward, individuals begin to lose muscle mass (sarcopenia) at a rate of 5-10% per decade. A similar downward spiral begins with lung capacity. It is reduced by about 50% at age 70 for sedentary individuals. With the loss of lung capacity and decreasing metabolic efficiency, total oxygen uptake capacity (VO₂ max) is reduced 5-9% per decade. If you want to accurately predict remaining lifespan, all you need to do is measure VO₂ max. Just as the best way to slow sarcopenia is higher intensity weight training, the best defense against declining VO₂ max is high intensity interval training.

A HIIT protocol first developed for Japanese speed skaters was tested against ET with two groups of student athletes using a stationary cycle (Tabata 1996). Following a 10 minute warm-up, the HIIT sessions of eight intervals lasted just 4 minutes, 20s on/10s off. The ET group exercised at moderate intensity for 60 minutes. Both groups followed their protocol for 12 weeks. Despite the fact the HIIT grouped exercised ¼ as long on average; their increase in aerobic capacity was 14% versus 10% for the ET group. In addition, the HIIT group increased their anaerobic exercise capacity a whopping 28% versus 0% for the MIT.



Another group of cyclists was divided into HIIT and ET groups and trained for 14 days. Even though the HIIT group trained only 1/5 as long, their aerobic gains equaled the ET group. Taking into account they only pedaled hard during the work interval, the HIIT groups' training volume (caloric expenditure) was only 10% of the ET group (Talanian 2006). Male cyclists using HIIT achieved similar results again with just 10% of the training volume of the ET group (Gibala 2006)

Studies utilizing various HIIT variations have shown similar gains in aerobic capacity and fat loss involving young women, elderly women (Broaman 2006) , athletes, recovering heart disease patients (Rognmo 2004, Warburton 2005) , the clinically obese (Hunter 1998) and men of all ages (Tanasescu 2002) . T?

You should follow ACSM screening guidelines for vigorous exercise and may need a physician's clearance before beginning a HIIT program. Understand you may be exercising beyond vigorous for short periods, **talk to your physician if you have any doubts.** But the use of moderate intensity interval sessions with the elderly and recovering heart patients shows that there are degrees of interval training suitable for almost everyone.

Fat Loss and the Beer Belly Blues

But what if your goal of aerobic exercise is to reduce fat? Don't longer, moderate intensity exercise sessions burn more fat than HIIT? Yes and no. A long session will burn more calories and fat DURING THE TIME of exercise. But what is more important when it comes to total fat loss is cranking up your Resting Energy Expenditure (REE) for the other 23 hours of a day. A higher REE causes your body to burn more fat overall. .



HIIT sessions at 70% or more of VO₂ max raise REE while lower intensity ET training has little effect (Hunter). It is estimated the increase in REE can burn another 100-200 kCal a day for up to two days following the HIIT. Although there is a long standing myth that low to moderate intensity exercise is the best fat burner, HIIT sessions are the real winner. A group of women was put through sessions of ten cycles of 4m on/ 2m off for two weeks. Researchers documented profound increases in fat burning enzymes and fatty acid transport proteins. Instead of burning limited glycogen stores, these women's bodies became more effective at using stored fat (Talanian 2006).

In one of the most cited tests (Tremblay 1994), the HIIT group had 3 times the subcutaneous fat loss versus the ET group. Taking into account the HIIT sessions used only about 1/3 the calories during exercise, Tremblay concluded that calorie for calorie, effort spent on HIITs has a nine fold advantage over ET. Although I think his conclusion seems a little optimistic given the inaccuracies of fat measurement, many other studies have documented that HIITs do a better job metabolizing fat (Yoshika 2001).

Weight carried around the waist is not just unsightly – it's deadly. The Interheart study encompassing seven countries and 27,000 people identified a high waist hip ratio (WHR) as more predictive of heart disease than high blood pressure, inactivity and even smoking (Yusuf 2005). It has been observed for some time that weight around the hips (pear shaped body) seemed to have less impact than abdominal fat (apple shape body).

HIIT Considerations

I'll show you how to design a HIIT session on the next few pages. But first, here are some important considerations. High intensity training of any type is not for the beginner. You should have a solid base of aerobic capacity before doing a HIIT. Short intervals of 70-80% of heart rate reserve HRR should be easy before going higher. If you are in ACSM moderate or high risk categories, a medical clearance and pre-exercise testing is recommended.

HIITs are not an everyday activity, unless you are an elite athlete allow at least 48 hours between sessions. Twice a week is plenty; you still need ET sessions to maintain an overall high volume of aerobic exercise. As in almost all exercise, variety is good.

Get a heart rate monitor. You need to consistently push your body into the anaerobic zone and a heart rate monitor is your 'speedometer'. Calculate your heart rate reserve (HRR). $HRR = \text{Max HR} - \text{Resting Heart Rate (RHR)}$. For example, if Max HR is 160 and RHR is 60, your HRR is 100. If your goal is to exercise at 70% of HRR, you take 70% of 100 and add it to the RHR = 130. Unless you are highly trained, low risk category, you will want to gradually increase the intensity of the work intervals and get your physician's clearance for vigorous exercise. Pay attention to your rating of perceived exertion as well, you want to get above vigorous – but not day one.



And finally, aerobic exercise is only half of a complete fitness program. Resistance (weight) training is also required to maintain total functional capacity into your 70s and beyond. Single mode ET aerobic activities such as long distance running can lead to repetitive stress injuries. Sarcopenia continues with the exception of the leg muscles. I have seen too many long distance runners completely drop out of any fitness activities because they have shredded their knee cartilage. Running eight 150 yard intervals is less than a mile in distance. I like the grass next to a track for even more cushioning

Exercise:

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How to do a HIIT Workout

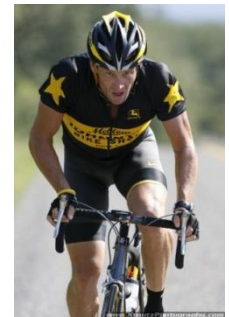


Just about any aerobic activity, running, brisk up-hill walking, treadmill, elliptical trainer, and even weight lifting can be used for HIIT. It simply has to be an activity that you can repeatedly raise intensity to a level where you rapidly reach exhaustion from crossing into the anaerobic zone. It appears a variety of HIIT protocols are equally effective (Lesmes 1978). My favorites are high angle elliptical trainers, brisk walking up a steep hill and 100-150 yard wind sprints. Here are the basic design considerations:

1. Begin the session with an adequate warm-up 3-5 minutes, get your HR close to your aerobic threshold.
2. Plan on completing a minimum of 8 high intensity intervals. Vigorous exercise is classified as up to 85% of HRR, high intensity can exceed that and reach the “very hard” perceived exertion rating. Very hard is just below “maximal”. Maximal can be described as the all out running effort you would exert if your life depended on it – think charging bear! So gear your high intensity effort to below maximal but above vigorous. Keep an eye on your heart monitor as well, +85% of your HRR reserve will roughly equate to the high intensity, very hard level. Of course, depending upon your age and condition, you can reach a perceived high intensity level at less than 85% of your HRR. In this case, go with your perceived intensity and back off at that point.
3. Intervals last from 20s to 4 minutes, with intervals in the 30 second to one minute range most common and my preference. If you have a lower fitness level, longer slightly less intense intervals work best. In all cases a HIIT involves pushing briefly into the anaerobic zone as measured by your heart rate or perceived exertion. During the recovery period you should be “catching your breath”, that is the point.
4. By the end of each interval, you should be experiencing an acute oxygen debt – panting in laymen’s terms. Watch your BPM; if it continues to rise for a few seconds after the interval is complete, this is good evidence of an oxygen debt. You have to reach an unsustainable state by the end of the interval or it isn’t high intensity.
5. Complete an active recovery interval after each high intensity interval. Walk, peddle, swim whatever you were doing but at a dramatically slower pace, sub aerobic threshold, so that your body can recover – but don’t stop moving completely. You want your body to catch up so you can reach that high intensity on the next work interval. These recovery intervals can be as short as 10 seconds or several minutes, depending on your level of fitness and mode of exercise. On the elliptical, I like 75 second recovery periods, with 45 second work intervals. Two minutes from start to finish for each cycle - easy to track!
6. Experiment and find the right pacing for you. Few people can initially do 8 very hard level, high intensity intervals. If the effort you can exert for the last intervals is far less than earlier intervals, next time slightly adjust downward your exertion for the earlier intervals. Alternately, you can increase the rest interval. The objective is to expend about the same effort for each interval and not fail later from overdoing it early on.
7. As with any exercise, discontinue and seek medical attention if you experience dizziness, fainting, continuing shortness of breath, irregular heartbeat, or pain in the chest or arms.

Train Like Lance Armstrong

All professional athletes incorporate HIIT sessions into a training protocol commonly called Lactate Threshold (LT) training. LT training combines HIIT and ET sessions with a third modality called maximal steady state training. You don’t have to be a professional athlete to benefit; LT training is a superior fat burner and will maximize aerobic capacity even more than ET and HIIT combined.



LT training is used by the running crowd to shave seconds of their per mile rate. Runners note, LT training is not the same as tempo runs. The intensity is slightly higher and the interval shorter. Too much to cover in this paper, adding HIIT to any type of ET is the 90% solution. I develop client and goal specific LT protocols on request, see [SERVICES](#) at my website.

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In Closing

Of all the exercise variables, intensity is the most critical to effect positive physiological changes. The same is true for weight training. Higher intensity exercise is more invigorating and stimulates the release of Human Growth Hormone, the ultimate elixir. HIITS can be done in a variety of modes. You can even mix modes during one session, hi-rep power squats, elliptical, biking, pushups, plyometrics – just line them up. Even elderly women have made great gains using deep water running and lower intensity intervals (Broman 2006). Make it fun and vary your routines over time

Of course, too vigorous exercise can have negative affects as well. Begin cautiously, progress slowly, monitor intensity, HRR and perceived exertion. No four page guide can cover all the possible counter-indications for HIIT exercise. Get a medical clearance if age or health conditions warrant. Call me for a free consultation and information on the American College Of Sports Medicine exercise screening guidelines or visit their website.



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