



2020

Understanding Health & Fitness

Education Series 2d

Current Aerobic Recommendations Overview

Adults should move more and sit less throughout the day. Some physical activity is better than none. Adults who sit less and do any amount of moderate-to-vigorous physical activity gain some health benefits.

For substantial health benefits,

adults should do at least 150 minutes (2 hours and 30 minutes) to 300 minutes (5 hours) a week of moderate-intensity exercise.

Another way to look at it is 30 to 60 minutes of moderate-intensity exercise five days per week.

Moderate-intensity exercise RPE of 3 Easy, talking is easy, breathing is comfortable and you are probably working at 55 % maximum of heart rate.

Or

75 minutes (1 hour and 15 minutes) to 150 minutes (2 hours and 30 minutes) a week of vigorous-intensity aerobic physical activity.

Another way to look at it is

20 to 60 minutes of vigorous-intensity exercise three to 3-5 days per week.

Vigorous-intensity exercise RPE of 4/5 Somewhat Hard to Hard, talking is somewhat difficult to difficult, breathing is deepened and you are probably working at 70 % maximum of heart rate.

Or

an equivalent combination of moderate- and vigorous-intensity aerobic activity.

Preferably, aerobic activity should be spread throughout the week.

One of the reasons why you should know and try to improve your aerobic fitness is this recent Landmark Aerobic Fitness Study

Cardiovascular Fitness Impacts Your Life Span - Improving Your Ability to do Cardiovascular Level to a better than Average Level is a great goal.

Better Cardio Fitness Predicts a Longer Life, Study Finds - from Cleveland Clinic

There's no such thing as too much of a good thing when it comes to cardio fitness, according to a large new study. The study found no upper limit to the benefits of aerobic fitness in terms of reducing risk of death. Higher levels of cardiorespiratory fitness were associated with longer survival. Extreme aerobic fitness showed the greatest benefit to participants' longevity, and that benefit was particularly noticeable in people age 70 and older. It even showed great benefit to people with hypertension. Poor fitness, on the other hand, posed a comparable mortality risk to participants as cardiovascular disease, diabetes and smoking. The study's findings emphasize the long-term benefits of exercise and fitness, even to extreme levels, regardless of age, the researchers say. It is important to note that the study analyzed findings over a large population, and individual patients should always check with their healthcare provider before starting an exercise program. "In consultation with their physician, individuals should aim to maintain the highest exercise performance they can regardless of age, sex or prior history of heart disease," the researchers say.

What does this mean for people that are young to middle age? It would be great for to achieve an extreme level of fitness but that is not doable for most considering both time and genetics but healthy people should consider trying to reach an above average level of aerobic fitness.

One of the best way to develop aerobic fitness is through incorporating vigorous exercise 2-3 times per week after developing a base of moderate aerobic exercise.

What is the difference between Moderate and Vigorous Activities?

Moderate and Vigorous Activities are all relative.

Example: A fit person may find walking 2.8 mph very light while someone who is unfit might find it vigorous. Therefore try to meet the suggested requirements and progress at your pace

These charts works for many, but not for all.

RPE	Talking	Breathing
1	Normal	Normal
2	Normal	Normal
3 Moderate	Easy	Comfortable
4 VT-1 Somewhat Hard	Somewhat Difficult	Noticeable
5-VT2 Hard	Difficult	Deep but Steady
6-VT2	Difficult- Very Difficult- Lactic Acid Burn	Deep and Somewhat Rapid
7-VT3	Very Difficult	Deep and Rapid
8-VT3	Extremely Difficult	Very Deep and Very Rapid
9	No	Very Deep and Very Rapid
10	Impossible	Breathlessness

	HOW YOU'LL FEEL	EXAMPLES
Moderate physical activity	heart beating faster sweating can still talk can't sing	walking fast, cycling, hiking, pushing a lawnmower, doubles tennis, basketball, water aerobics
Vigorous physical activity	heart beating faster sweating a lot breathing hard can't talk	jogging, swimming fast, riding a bike on hills, football, rugby, singles tennis, aerobics, martial arts

Moderate-intensity Physical Activity (Approximately 3-6 METs)	Vigorous-Intensity Physical Activity (Approximately >6 METs)
Requires a moderate amount of effort and noticeably accelerates the heart rate.	Requires a large amount of effort and causes rapid breathing and a substantial increase in heart rate.
Examples of moderate-intensity exercise include:	Examples of vigorous-intensity exercise include:
• Brisk walking	• Running
• Dancing	• Walking / climbing briskly up a hill
• Gardening	• Fast cycling
• Housework and domestic chores	• Aerobics
• Traditional hunting and gathering	• Fast swimming
• Active involvement in games and sports with children / walking domestic animals	• Competitive sports and games (e.g. Traditional Games, Football, Volleyball, Hockey, Basketball)
• General building tasks (e.g. roofing, thatching, painting)	• Heavy shovelling or digging ditches
• Carrying / moving moderate loads (<20kg)	• Carrying / moving heavy loads (>20kg)

For those Fitness Nerds

Fitness Rating (VO2 Max)	Moderate Workout	Vigorous Workout	Hard Workout
40-45	5.7-6.4 MET	6.9-7.7 MET	8.0-9.0 MET
35-40	5.0-5.7	6.0-6.9	7.0-8.0
30-35	4.3-5.0	5.1-6	6.0-7.0
25-30	3.6-4.2	4.3-5.0	5.0-6.0
20-25	2.9-3.6	3.4-4.3	4.0-5.0
15-20	2.1-2.9	2.6-3.4	3.0-4.0

You can take your VO2 Score from an exercise test you took and see what MET range is appropriate for you or you can take the Max Met you achieved during an exercise test and understand what activities are suited for you. So if you Maxed out at 10 Mets then 50% would be the low range and 75% would be the high range so you would want do do MET activities that are between 5 and 7.5 METs.

MET	EXAMPLE ACTIVITIES
8-9	flag football, basketball, swim front crawl, boot camp
7-7.9	backpacking, tennis, shoveling, racquetball
6-6.9	weightlifting, moving furniture, brisk uphill walk
5-5.9	playing w/ kids (vigorous), push mowing, softball / baseball, walk 4.0 mph
4-4.9	golf, dancing, gardening, playing with dog, wash car
3-3.9	casual volleyball, sweeping carpet, walking 3.0 mph

Estimating Max Heart Rate
Rather than use age predicted max heart rate I test clients to an exercise intensity of RPE 5 (Hard) where talking would be difficult and breathing would be deepened. I then find their heart rate. I then multiply that heart rate by 1.25 if over 45 years old and 1.33 if younger to get a better estimate of maximum heart rate. Example Client's HR is 130 at RPE of 5 and is 50 years old. I then estimate Max HR to be 162. I feel this is safer to work with than an age predicted Max HR of 195.

How Much is Too Much when it comes to aerobic exercise?

Meeting the current aerobic exercise recommendations mentioned is key but is it worth exceeding that amount? Researchers suggest that pinning down just how much exercise qualifies as "too much" will likely vary between individuals and depend on a variety of factors – including their age, health history and lifestyle. I always suggest to meet or surpass the recommendation but not to exceed 1 hour a day of cardiovascular exercise. When it comes to vigorous exercise, which includes high intensity interval training, I suggest performing two to no more than four sessions a week. The research on this centers on injury prevention - there is considerable research of musculoskeletal injuries in those who exercise more than 1 hour a day. One study found that runners who log between .15 and 15 miles per week (a wide range) benefit from an estimated 19 percent reduction in mortality rates, those who consistently surpass 25 weekly miles have a risk of death comparable to those who don't exercise. Further investigation is warranted to determine if an upper cutoff for the health benefits of exercise exists.

Cardiovascular fitness changes as one ages

Cardiovascular fitness is related to age, gender, exercise habits, heredity and cardiovascular clinical status. Maximum values occur between ages 15 and 30 years, decreasing progressively with age. At the age of 60, the mean maximal aerobic power in men is approximately three fourths of that at the age of 20.

With sedentary lifestyle, there is a 10 % reduction in the mean maximal aerobic power per decade after the age of 30, the reduction with an active lifestyle being less than 5 %.

Best form of Vigorous Training is HIIT Programming

Studies have found that high-intensity interval training (HIIT) is a SUPERIOR form of aerobic exercise

High-intensity interval training (HIIT), also called high-intensity intermittent exercise (HIE) or sprint interval training (SIT), are forms of interval training, a cardiovascular exercise strategy alternating short periods of intense anaerobic exercise with less intense recovery periods.

HIIT exercise sessions generally consist of a warm up period, then several repetitions of moderate (beginners) to high (advanced) intensity exercise separated by low (beginners) to moderate (advanced) intensity exercise for recovery, then a cool down period. There is no specific formula to HIIT. One study found the work to rest ratio of 1 minute on and 1 minute off to be superior to the work to rest ratio 30 secs on and 30 secs off over 10 cycles of on-off.

Most of the research on HIIT has been done using a cycling ergometer, but other exercises like a rowing ergometer, running, stair climbing and uphill walking can also be effective. I prefer these type of activities versus muscular conditioning exercise when performing HIIT - 2 reasons greater cardiovascular development and less chance of injury (see below).

More Details on HIIT

Studies have found that HIIT training is time efficient and works as well as conventional training

The study, from scientists at Canada's McMaster University, adds to the growing evidence for the benefits of short term high-intensity interval training (HIT) as a time-efficient but safe alternative to traditional types of moderate long term exercise. Astonishingly, it is possible to get more by doing less! "We have shown that interval training does not have to be 'all out' in order to be effective," says Professor Martin Gibala. "Doing 10 one-minute sprints on a standard stationary bike with about one minute of rest in between, three times a week, below your maximum works as well in improving muscle as many hours of conventional long-term biking less strenuously."

Interval training may shed more pounds than continuous moderate intensity workout

And sprint interval training may be most effective for weight loss, pooled data analysis shows Interval training may shed more pounds than a continuous moderate intensity workout, suggests a pooled analysis of the available evidence.

Intensive exercise with intervals 'more effective'

Short bursts of intensive exercise provide a more "time-efficient" and realistic way of preventing, delaying and managing Type 2 diabetes and also losing weight, a study has found. Obesity and Type 2 diabetes are linked, with over 80 per cent of people with the condition classed as overweight or obese -- diet and physical activity interventions are the cornerstones for management of both conditions.

High-intensity exercise improves memory in seniors

Researchers who examine the impact of exercise on the brain have found that high-intensity workouts improve memory in older adults.

How exercise -- interval training in particular -- helps your mitochondria stave off old age

Researchers have long suspected that the benefits of exercise extend down to the cellular level, but know relatively little about which exercises help cells rebuild key organelles that deteriorate with aging. A new study found that exercise -- and in particular high-intensity interval training in aerobic exercises such as biking and walking -- caused cells to make more proteins for their energy-producing mitochondria and their protein-building ribosomes, effectively stopping aging at the cellular level.

HIIT releases endorphins in the brain

Researchers have revealed that exercise-induced endorphin release in the brain depends on the intensity of the exercise. Endorphin release induced by exercise may be an important mechanism which affects exercise motivation and maintenance of regular physical activity.

Downside - High-intensity interval training increases injuries, research shows - But it is a form of HIIT I do not recommend for many

People who engage in high-intensity interval training are at greater risk for injury, especially in the knees and shoulders, a Rutgers study found. The problem is that there are done in a nontraditional HIIT way by adding weight training and other exercises. These workouts where there were high injury rates, which combine aerobic exercising, weight lifting and calisthenics at maximum capacity, followed by periods of recovery, have been growing in popularity over the past decade, driven by the efficiency of the exercise to deliver fitness goals in less time.

The study, which appears in the *Journal of Sports Medicine and Physical Fitness*, acknowledged that while this type of training is effective in improving cardiorespiratory fitness, boosting energy and promoting lean muscle mass and fat loss, it also increases injury risk. "These workouts are marketed as 'one size fits all.' However, many athletes, especially amateurs, do not have the flexibility, mobility, core strength and muscles to perform these exercises," said Joseph Ippolito, a physician in the department of orthopaedics at Rutgers New Jersey Medical School. To stay injury free perform HIIT on a cardio piece of equipment or by running or speed walking outdoors. Do your muscular training in a non-aerobic manner.

Downside - High-intensity interval training will not work in most people

As high-intensity interval training has grown in popularity, so has the debate over whether it is an effective public health solution. A professor says the workouts are not sustainable for the majority of people trying to lose weight and move more. I say do a combination of them both and when doing high intensity training the high intervals do not need to be maximum just a higher intensity than what you are use to.