

# Training Strategies for Endurance and Maximum Longevity

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✓ Fact Checked

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## STORY AT-A-GLANCE

- › If your goal is to optimize your cardiovascular health and longevity, focus on moderate-intensity exercise. The cardiovascular and mortality benefits of moderate activity continue to accrue in an inverse, dose-dependent manner
- › For vigorous exercise, benefits such as cardiovascular health and longevity plateau at approximately 150 minutes/week. After that, your heart health may suffer, and you reap no additional reduction in mortality
- › Moderate physical activity includes activities like walking, hiking, gardening, housework, dancing, shopping, golf, pickle ball, doubles tennis, volleyball and leisurely bike riding. As a general rule, you're still able to speak and breathe through your nose during the activity
- › Vigorous physical activity includes strenuous bicycling, running or swimming, high-intensity interval training (HIIT), singles tennis, basketball and other activities and sports that cause heart-pounding and breathlessness and make you sweat profusely
- › People with low cardiorespiratory fitness have a greater risk of death than any other traditional risk factor for premature death, including age, diabetes, smoking, chronic kidney disease, hypertension, atrial fibrillation, obesity, history of cardiovascular disease and cancer

In the video above, Siim Land, author of “Metabolic Autophagy: Practice Intermittent Fasting and Resistance Training to Build Muscle and Promote Longevity,”<sup>1</sup> reviews the findings of a new systematic review published in the March-April 2023 issue of *Missouri Medicine*.

The paper, titled “Training Strategies to Optimize Cardiovascular Durability and Life Expectancy,”<sup>2</sup> reviewed studies published between 2011 and 2022 that assessed the effects of duration and intensity of exercise, and specific types of training or sports on long-term cardiovascular health and life expectancy.

Not surprisingly, a sedentary lifestyle was associated with an elevated risk of cardiovascular problems and shorter lifespans, and physical activity was associated with improved health and longer life. What was somewhat surprising was the type of physical activity that garnered the best results.

The authors concluded that high amounts of strenuous exercise were nowhere nearly as beneficial as moderate exercise, strength training and interactive sports or play. These results again refute the idea that if something is good, more must be better. In the case of exercise and physical activity, moderation is the key to optimal health and longevity.

A key finding here is that the benefits of vigorous high-intensity training plateau at a level much less than moderate exercise, and continuing to push past it doesn't give you any additional benefit, and in fact may likely be counterproductive. On the other hand, the benefits of moderate activity continue to accrue, with no real endpoint.

## **Benefits of Vigorous Activity Plateau**

A key piece of evidence for this was a Harvard School of Public Health study<sup>3</sup> described as “a landmark, long-term, prospective, cohort study” that “evaluated the links between leisure-time physical activity duration and intensity with all-cause mortality and cause-specific mortality.”

**“ If your goal is to optimize your cardiovascular health and longevity, more is better for moderate-intensity exercise, but not for vigorous exercise. For high-intensity exercise, optimal benefits plateau at approximately 150 minutes/week. ”**

As explained in “Training Strategies to Optimize Cardiovascular Durability and Life Expectancy”:<sup>4</sup>

*“This Harvard School of Public Health study that included 116,221 individuals assessed 15 times during 30 years of follow up suggests that if one’s goal is optimizing long-term CV [cardiovascular] health and overall longevity, more is better for moderate-intensity exercise.*

*However, the same cannot be said for vigorous exercise, where optimal benefits are achieved at approximately 150 minutes/week ... For an individual whose goal is to decrease the risk of CVD and boost life expectancy, a routine of MPA appears to be adequate.*

*Although chronically performing very high doses of VPA (vigorous physical activity) may attenuate some of the benefits bestowed by less extreme efforts, this is relevant for only about 2.5% of the United States (U.S.) adult population.*

*This is not to say that VPA is harmful; it substantially reduces all-cause mortality and CVD mortality compared to a sedentary lifestyle. Yet, the magnitude of the mortality and CVD risk reductions with high doses of VPA do not appear to be as substantial as for high doses of MPA.*

*In the Lee study,<sup>5</sup> chronically doing very high doses of moderate exercise reduced risks of all-cause mortality and CVD mortality at least two-fold better compared to chronically performing very high doses of vigorous exercise.”*

## **Types of Exercise Evaluated**

So, what counts as moderate physical activity and what’s considered vigorous? Here’s a summary breakdown:

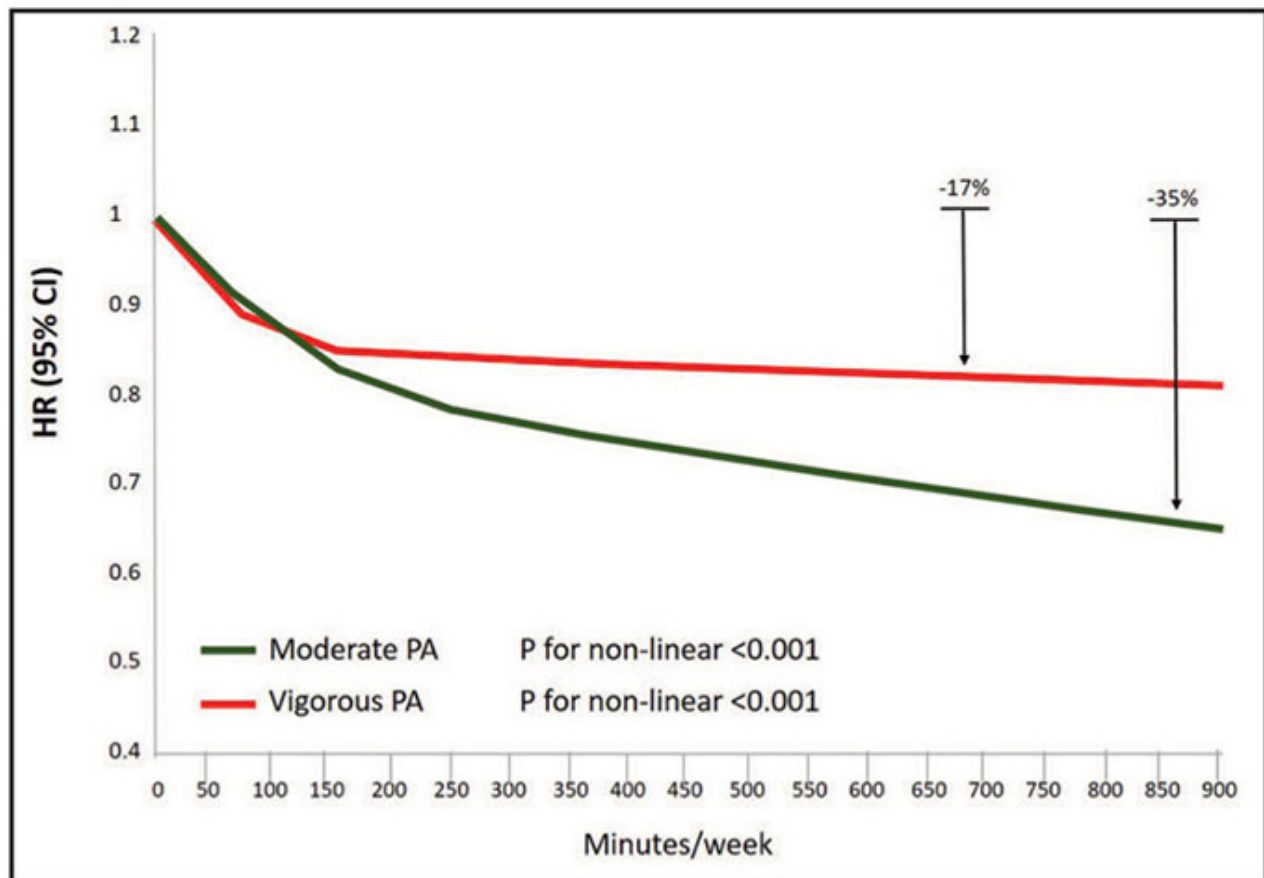
- Moderate physical activity includes activities like walking, hiking, gardening, housework, dancing, shopping, golf, pickle ball, doubles tennis, volleyball and

leisurely bike riding. As a rule, you're still able to speak and breathe through your nose during the activity.

- Vigorous physical activity includes strenuous bicycling, running or swimming, high-intensity interval training (HIIT), singles tennis, basketball and other activities and sports that cause heart-pounding and breathlessness and makes you sweat profusely.

## How to Maximize Your Cardiovascular Health and Longevity

The graph below from “Training Strategies to Optimize Cardiovascular Durability and Life Expectancy” paper<sup>6</sup> illustrates the difference in mortality benefit between the two modes of activity. Around 150 minutes (2.5 hours) or so per week, the maximum benefit that you can achieve from vigorous activity is reached, giving you a 17% reduction in mortality.



The benefits of moderate activity, however, continue to accrue, reaching a 35% reduction at around 850 minutes (14 hours) per week. In other words, the higher the dose of moderate activity, the lower your risk of death. So, in the case of moderate activity, there's an inverse dose-dependent relationship, whereas with vigorous activity, benefits are maximized at 150 minutes.

The same relationships were found for cardiovascular health, but here the difference between moderate and vigorous activity was even more drastic.

For vigorous activity, the maximum benefit was again reached after 150 to 200 minutes, giving you a 15% reduced risk of cardiovascular disease and CVD-related death. Beyond that, the cardiovascular benefit actually started to disappear. As noted by the authors:<sup>7</sup>

*"This fits well with the hypothesis of extreme exercise cardiotoxicity/cardiac overuse injury, which is particularly relevant for middle-aged and older individuals. A large amount of vigorous exercise, though required for attaining peak physical performance, may not be necessary for maximizing life expectancy and cardiac durability.*

*Very strenuous exercise acutely increases the risk of CVD events (myocardial infarction, sudden cardiac arrest) particularly for individuals who are in mid-life and beyond ..."*

Meanwhile, the cardiovascular benefit from moderate activity continues to accrue in an inverse linear progression, giving you a 40% reduced risk of cardiovascular disease and CVD-related death after 850 minutes a week. From the data reviewed in the paper, at no point does moderate activity become counterproductive. However, it is likely that at some point excess of even moderate physical activity becomes counterproductive.

## **Cardiorespiratory Fitness Is Good Gauge of Longevity**

Another very large study included in this review was a Veterans Affairs study that followed 750,302 U.S. veterans for up to 20 years. Here, they found that

cardiorespiratory fitness (CRF) – as measured by performance in treadmill testing – was strongly related to longevity “in a graded continuous manner.”

Those capable of attaining a peak exercise level of 14.3 metabolic equivalents (METs) had the best survival rates, and this was true for both men and women. As noted in “Training Strategies to Optimize Cardiovascular Durability and Life Expectancy”:<sup>8</sup>

*“Compared with the lowest tertile of CRF, those in the highest tertile of CRF had a 45% lower mortality, highlighting the fact that fitness is one of the strongest predictors of survival.”*

Importantly, and rather remarkably, people in the least fit cohort, those with a MET of 4.7, had a greater mortality risk than ANY other traditional risk factor for premature death, including age, diabetes, smoking, chronic kidney disease, hypertension, atrial fibrillation, obesity, history of cardiovascular disease and cancer!

Another meta-analysis cited, which assessed the results of 37 studies with nearly 2.3 million participants, concluded that each MET increase was associated with an 11% reduction in mortality.

## **How Strength Training Impacts Your Longevity**

“Training Strategies to Optimize Cardiovascular Durability and Life Expectancy” also reviewed the literature on strength training. According to one recent comprehensive meta-analysis, 30 to 60 minutes of strength training per week reduced all-cause mortality by 17%, cardiovascular events by 18% and cancer by 9%.

That said, as with vigorous activity, more strength training is not necessarily better either. This suggests hard training should be three and no more than four times per week. The magic occurs in recovery. It is only when you rest that your body is optimally capable of building lean muscle mass. As noted in “Training Strategies”:

*“In this recent comprehensive meta-analysis by Momma et al., the survival curves were J-shaped – benefits were completely lost at strength training*

*durations of ~130 to 140 minutes/week, with possible harm at progressively higher doses.*

*Another meta-analysis showed that doing resistance-training sessions one or two times/week was associated with reduced risk of all-cause mortality, although increasing the frequency to three or more sessions/week was not.”*

When strength training was combined with aerobic activities, even greater risk reductions in all-cause mortality, cardiovascular disease death and cancer mortality were obtained.

This synergy has been demonstrated in previous studies as well, and “strongly suggests that adding muscle-strengthening activities to routine of cardio activities may provide additional benefits for preventing disease and improving life expectancy,” the authors said.

## **Simple Tests to Gauge Your Fitness and Longevity**

“Training Strategies” also reviews other aspects of fitness that can give you an idea of your fitness and premature death risk. For example:

- **One-legged balance test** — People who cannot stand on one leg for 10 seconds without losing their balance or having to put the raised foot on the floor have an 84% higher all-cause mortality risk than those who can successfully complete this test.
- **Autonomous functioning (the sitting-rising test)** — This test evaluates the nonaerobic components of physical fitness, such as flexibility, balance, muscle strength and body composition, all of which are important for optimal function and survival.

The test involves lowering yourself onto the floor and then rising back up. Start with a score of 10. As you lower yourself to the floor, subtract one point for each support used, such as a hand, forearm, knee or side of leg. As you rise back up, again

subtract one point for each support used. The lower your final score, the higher your all-cause mortality risk.

## **Impacts of Socialization and Nature**

Games and sports involving other people also had beneficial impacts on longevity. People who played soccer, badminton or tennis lived significantly longer than those who jogged, swam or cycled alone. So, the social aspects of sports also appear to have potent positive effects on health and life expectancy.

Nature therapy, or simply spending time in nature, also had a very positive impact. In one recent study cited, those who spent 120 minutes per week or more outdoors in parks, woods, countryside, lakes and beaches, were 59% more likely to report good health and 23% more likely to report well-being compared with those who reported spending no time in nature.

Gardening is one way to get closer to nature. Having a dog is another. With regard to dog ownership, there appears to be several factors that play into the benefits reaped. It counteracts loneliness, and it encourages physical activity, especially outdoors. My personal preference is to spend time walking on the ocean and then relaxing or playing in the salt water. As noted in "Training Strategies":

*"Exercise with a dog is virtually always done outside. Individuals who adopt a dog into their home compared to non-dog owners are approximately 14 times more likely to be recreational walkers and four times more likely to meet current exercise guidelines of 150 minutes/week.*

*Furthermore, a prospective register-based nationwide study from Sweden that included 3,432,153 individuals with 12 years of follow-up found that dog ownership for people who were otherwise living alone was associated with significant all-cause mortality reduction of 33%, and CVD mortality reduction of 36%.*



*People living in multiple-person households also benefited from dog ownership with less impressive but still highly significant reductions in risks of all-cause mortality and CVD mortality (11% and 15% reductions, respectively)."*

## **Summary of My Updated Workout Recommendations**

The findings in this meta-analysis have convinced me to tweak my own workout regimen to reduce the amount of vigorous exercise and strength training I do and make sure I am walking nearly every day and seeking to get 12,000 steps in.

Experimentation has also shown me that I really need to rest at least twice a week. Giving myself these rest periods has significantly boosted the quality of my sleep and ability to feel strong when I reengage my resistance training.

Overall, walking appears to be the absolute best form of exercise there is, in terms of making you fitter and increasing your life span. As noted in "Training Strategies":

*"Hunter-gatherer humans' daily subsistence required large amounts MPA [moderate physical activity] with smaller doses of interspersed VPA [vigorous physical activity] – this is the activity pattern for which we remain genetically adapted. This evolutionary template would seem to be a logical guide to structuring an ideal activity pattern for promoting optimum health and longevity."*

So, focus on activities like daily walking, hiking, gardening and leisurely bike rides first. Again, more IS better when it comes to moderate-intensity activities like walking. For most I think that it is better to get your walking down before you start resistance training as it may be more important.

However, if you want to avoid frailty and sarcopenia, you should be doing both. In my view walking is exponentially superior to running, as it is moderate, not vigorous activity, and burns the same calories for the distance traveled.

Next, add in two to four 30- to 60-minute strength training sessions per week. Building **muscle is still a crucial component for longevity**, as it counteracts frailty and increases your chances of survival during illness and hospitalization. To prevent injury, I recommend doing **KAATSU (blood flow restriction training)**, which gives you the same or better results as conventional weight lifting with very light or no weights. If you have the time, also add in:

- A few short bouts of HIIT or some sort of team sport, which will help optimize your CRF. Remember, the benefits of high-intensity exercises either plateau or become counterproductive above 150 minutes a week
- Two hours or more per week outdoors
- Flexibility and balance training sessions like yoga or tai chi

Finally, make sure you rest and recover for a day or two after strenuous exertion. The recovery phase is just as important as the exertion phase in terms of producing a high level of fitness.

## Sources and References

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- <sup>1</sup> [Amazon](#)
- <sup>2, 4, 6, 7, 8</sup> [Missouri Medicine March-April 2023; 120\(2\): 155-162](#)
- <sup>3, 5</sup> [Circulation August 16, 2022;146\(7\):523–534](#)