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Why Resistance Training Preserves Your Cardiovascular Health

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STORY AT-A-GLANCE

- As you age, it's more important to maintain your muscle mass and strength, which is directly related to blood flow resistance and heart health. Data show aerobic activity does not improve blood flow and vascular conductance, but resistance training does
- Strength is a strong predictor of survival, even after accounting for confounding factors, and it is a reliable predictor of functional independence, cognitive decline and all-cause mortality. One measure of strength is walking speed, which also correlates with brain health and survival
- After 43 years of aerobic exercise, which for me was long distance running, I began learning how to improve my fitness by ditching running and starting resistance training. One of the factors I credit for the vast changes to my fitness is using blood flow restriction training
- Food choices and fasting are two other pillars that have made a big difference in my fitness. The "magic" happens when you combine time-restricted eating, a cyclical ketogenic diet and exercising while fasting

The older you get, the more important it becomes to maintain your muscle mass and strength. Strong muscles are required for mobility and balance, which supports your ability to live independently. One study[1] also demonstrated that strong muscles could promote heart health independent of cardiovascular aerobic training.

As you age, muscle is lost far more easily than it is built, so finding ways to promote and maintain muscle mass is crucial, especially as you get older. The medical terminology for age-related muscle loss is sarcopenia.[2] Although it affects the elderly population more frequently than younger individuals, it can occur in anyone.

Sarcopenia[3] can increase the risk of falls and fractures, which ultimately may lead to hospitalizations and surgeries. It also increases the risk of complications. Sarcopenia is not related to your body mass. In other words, people with obesity can also lose muscle mass and have a greater risk for complications than they do independently from obesity or sarcopenia.

According to one meta-analysis[4] of 35 studies and 58,404 people, the overall global prevalence of sarcopenia is 10% in both men and women. Scientists have recognized the importance of sarcopenia as it relates to longevity and health, which led the Centers for Disease Control and Prevention[5] to recognize it as an independently reportable medical condition.

Your skeletal muscle doesn't only manage your ability to do physical activity but also plays a major role in metabolism, circulation and cognition. Your resilience to external negative forces is directly related to the strength, mobility and endurance of your musculoskeletal system since it increases your adaptive capacity to withstand multiple disease states.

While there are several ways to address your musculoskeletal system, resistance training has proven over the years to be one of the best methods of growing and strengthening your muscle mass. Research[6] also demonstrates that even without aerobic activity, strength training promotes heart health by preventing reduction in blood flow as you age.

Resistance Training Preserves Basal Leg Blood Flow

Your body begins to lose muscle mass and strength as early as age 30. Researchers from the National Institute of Health and Nutrition in Tokyo, Japan,[7] sought to test the

hypothesis that a reduction in leg blood flow would either be absent or minimal in people who regularly perform strength training exercises.

The team split a group of 104 men with normal blood pressure into two age groups. The younger group was aged 20 to 34 and the middle age group was aged 35 to 65. They then separated those two groups into two groups; one with members that were sedentary, and one with participants who had been resistance training for two or more years.

The men were recruited from fitness clubs and any who also incorporated regular aerobic exercise were excluded. Also excluded were participants with any overt chronic diseases and anyone who smoked within the past four years, had ever used performance enhancing drugs, was taking other medications, or had significant characteristics of atherosclerosis.

The researchers measured and compared whole leg blood flow and vascular conductance. Between the younger group and the middle age group, there were no notable differences in those who used resistance training. However, there was a significant difference in the sedentary middle age group, from which the team concluded:

> *"... the age-related reduction in basal whole leg blood flow is absent in resistance-trained men. These results suggest that resistance training may favorably influence leg perfusion in aging humans, independent of its impact on leg muscle mass."*

This supported past research[8] that also found a reduction in basal whole limb blood flow with age in healthy men that led to a reduction in fat free mass and oxygen consumption. Additionally, it appeared that aerobic exercise did not modulate these changes.

Lower levels of basal leg blood flow have been associated with the development of metabolic syndrome, functional impairment,[9] and are associated with a rise in sympathetic vasoconstrictor nerve activity and lower oxygen demand.[10]

Strength Is a Strong Predictor of Survival

One study[11] from the University of Michigan School of Public health found people who had lower muscle strength did not live as long as their peers who had stronger muscles. The researchers adjusted the data for confounding factors, including chronic health conditions and smoking history and still found those with low muscle strength had a 50% greater risk of dying early.

Lead researcher of the study, Kate Duchowny, said in a press release[12] that the data adds to a growing body of evidence showing "muscle strength may be an even more important predictor of overall health and longevity than muscle mass." Hand grip strength was specifically found to be related to disability and limited mobility.

The data was pulled from a study of 8,326 men and women aged 65 and older. The group measured grip strength and believed that grip strength should be part of routine physicals in midlife and older adults. Another functional sign of measuring longevity is walking speed.[13]

Scientists have used it as a reliable measure of overall health and have developed cutoff values that have shown to be predictive of functional independence, cognitive decline, institutionalization and all-cause mortality.

Data suggest that if you can comfortably walk at 1.4 meters per second, you are less likely to be hospitalized, are fit and have increased independence and self-care.[14] When walking speed was measured in midlife, it was also associated with lifelong brain health.[15] A pooled cohort of nine studies and 34,485 community-dwelling older adults found that gait speed was also associated with survival.[16]

Muscle Loss Is a Major Factor in Recovery

Muscle loss in older adults may be a primary driver of insulin resistance,[17] and declining strength likely impacts a reduction in daily physical activity, which also contributes to metabolic dysfunction.[18] Older adults with low muscle mass have delayed recovery[19] and

higher rates of complications and infections[20,21] after surgery. They also have higher disease-specific and all-cause mortality.[22]

Sarcopenia is a predictor of risk for community-acquired pneumonia[23] and 90-day mortality in patients with aspiration pneumonia.[24] Scientists are increasingly recognizing that muscle has immune regulatory properties and as such modulates immune function.[25]

Researchers speculate that sarcopenia may contribute to immunosenescence, or the gradual deterioration of the immune system[26] and is linked to a higher death rate in older adults.[27] Further reviews have found strong evidence that frailty secondary to sarcopenia[28] is a risk factor for longer hospital stays and higher mortality rates.[29]

How I Lowered My Risk of Heart Disease

I've been exercising for over 54 years. In the first 43 years, I exclusively used aerobic exercise. In my case, it was long distance running. Unfortunately, I didn't realize that while it can lower your risk of heart disease, it is a highly catabolic activity and eventually lowers your ability to build muscle. At the height of my running career, my upper arm circumference was 10.5 inches.

By contrast, December 8, 2020, my arm circumference measured 15 inches and I could deadlift 400 pounds. My fitness didn't change until I ditched cardio and started resistance training. It is important to note that these changes did not happen overnight, so you can't expect immediate results. I was well over 50 when I first started using resistance training and at the time of the video, I was 67.

Overall, I use a balanced program of lifting weights for about five hours a week and an equal amount of time in stretching and general body movement exercises. The key is to allow a significant recovery period so the connective tissue and muscles can rebuild.

I work with a trainer, but if you can't afford a trainer, there are many great free videos on YouTube. When you do resistance training, avoid doing the same exercise every day as this allows the body to recover and repair so you get the benefits and avoid the injuries.

Pay Attention to Eating and Fasting

Your food choices are vital to your body's ability to build muscle and protect your health. In this one-hour video, Dr. Jason Fung and I discuss his book "The Longevity Solution," which addresses your body's protein needs.

In the beginning of my journey, I believed if I didn't eat consistently, it would wreck my health and I would lose muscle mass. However, after researching this, I realized eating consistently is highly counterproductive. Your body requires regular intervals when you don't eat and failing to do so is a prescription for metabolic disaster.

One of the most important health principles I've discovered is time-restricted eating (TRE), which is a form of intermittent fasting. When you never skip a meal, your body adapts to burning sugar as a primary fuel, which downregulates enzymes utilized in burning stored fat.[30,31] As a result, you progressively become more insulin resistant and start gaining weight.

There are a few different intermittent fasting regimes, but all are based on the premise of fasting. TRE is one of the easiest to follow since you simply don't eat for 16 to 18 hours every day and eat all your meals within a four- to six-hour window. Over time, this teaches your body to burn fat for fuel rather than relying on burning carbohydrates.

While it helps shift into fat burning, it's most effective when you're also eating a cyclical ketogenic diet. The "magic" happens when you combine TRE, a cyclical ketogenic diet and exercise while you're fasting. The reason this works is that it affects the mammalian target of rapamycin (mTOR) pathway, which is a primary regulator of growth and which plays a central role in disease, the aging process and metabolism.[32]

When you fast, it suppresses the mTOR anabolic pathway, which is suppressed even further with exercise. Think of the pathway as a coiled spring. You can compress it with fasting and exercise and then when you eat food it explodes into action. This signals your body to build muscle mass. However, you want to do this only once a day because if you constantly activate mTOR it increases your risk of cancer.

Other factors that activate mTOR are branched chain amino acids, of which leucine appears to be the most potent. So immediately after resistance exercise, you'll want to consume at least three grams of leucine or hydroxymethyl butyrate (HMB), a leucine metabolite. This gives your body the optimal stimulus to increase muscle protein synthesis and boost muscle mass.

Below is a list of foods to consider. Other foods contain leucine, such as chicken, soy protein and almonds. However, I don't recommend them as they have higher amounts of omega-6 fat linoleic acid. Also note that you want at least 3 grams after your workout, but more is not better, and it will not stimulate more muscle growth.

Food	Leucine grams per 100 grams of protein
Whey protein[33]	13 - 15 grams
3 Eggs[34]	1.5 grams
Beef[35]	1.9 grams
Salmon[36]	1.6 grams

Blood Flow Restriction: Best Way to Increase Muscle Size

There are several ways of increasing your muscle mass and most involve either pushing or pulling heavy weights or resistance bands. The challenge with this traditional strategy is that if you're not in good shape, and especially if you're elderly, there is a higher likelihood you get injured. Too often, the question is not if you will get injured, but when.

The answer that I found is a strategy called blood flow restriction training or BFR. As the name implies, it modifies the arterial inflow and venous outflow to a specific muscle group you're using by placing an inflatable band around the extremity.[37] Of all the different strategies that I have tried in the past 10 years to build muscle mass, I believe

that combining TRE with mTOR activation and BFR has been largely responsible for producing my results.

BFR works by slowing the venous blood flow out of the muscle group and creating a relatively hypoxic environment. Using very light exercise, you get an exhaustive workout in about 15 to 20 minutes. This signals the brain to send out a hormonal response that causes the muscles and blood vessels to grow.

Studies show that using this method a 36.2% to 40.1% increase in muscle strength can be achieved after only 12 weeks depending on the load used and your health.[38] The difference between BFR and using exercise bands or weights is that there's far less muscle fiber trauma and damage, which means you can recover more quickly and can exercise different parts of your body to attain the metabolic and physical benefits from the exercise.

BFR also helps to increase microcirculation by triggering the release of hypoxia-inducible factors that increase vascular endothelial growth factor (VEGF).[39] It not only increases the microcirculation in your muscle stem cell, but also affects your brain and heart. In Japan, it is used for stroke and cardiac rehabilitation for this purpose.[40]

Placement of and pressure from the restriction bands needs to be done appropriately since you want to restrict venous flow but do not want to cut off arterial supply to the muscle. Because venous flow is restricted, you must anticipate that your arms swell during the exercise, which in turn tightens the bands even more.

A simple way to determine the base pressure to use is to have the band tight enough that you cannot fit two fingers underneath but loose enough that you can squeeze one finger under the band. If the band is too tight you can damage the muscle, so it's important to monitor capillary refill to confirm you're getting enough blood flow to the exercising limb.

To avoid damaging your muscles, or not getting the benefit from the BFR training, consider consulting with a qualified trainer. You'll find more information about how to

place the bands and choose the right weights the video below. For a limited time, you can get 10% off the KAATSU band by using this link: www.kaatsu.com/go/NVIC

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