

# Grip Strength Is a Reliable Biomarker of Biological Age

Analysis by [Dr. Joseph Mercola](#)

March 15, 2024

## STORY AT-A-GLANCE

- › Grip strength appears to be well correlated with epigenetic clocks used to estimate biological age based on DNA methylation patterns. Researchers concluded that age acceleration in men and women is associated with loss of strength over time
- › Chronological age is the number of months or years that you have existed on Earth, while biological age describes the age at which your cells are functioning. As your cells grow older, they're more susceptible to a variety of age-related diseases, many of which are in the top 10 leading causes of death
- › There are similar associations between grip strength and endurance, balance, mobility, immune system function, heart health, cognitive function, an increase in psychiatric conditions and dementia
- › Hand grip strength is measured with a dynamometer, which you can purchase or use at your local gym. Take three measurements following the instructions and average the measurements to find your grip strength
- › While important, grip strength is an indicator of overall strength, so just improving hand strength doesn't improve health or longevity. I highly encourage you to consider KAATSU, which is a specialized form of blood flow restriction training

**Research<sup>1</sup> published in the Journal of Cachexia, Sarcopenia and Muscle demonstrated once again that grip strength is a reliable biomarker of your biological age. In case you were not aware, your biological age can be a different number than your chronological age.**

## **Biological Age, Health Span and Legal Implications**

Chronological age is the number of years you have existed on Earth, while biological age describes the age at which your cells are functioning. For some people, these numbers are the same, and for others, they are vastly different. If you throw another measurement into the mix, your health span is the amount of time in life you are free from age-related disease.

Your health span is intimately related to your biological age. This means as your body's cells decline in function, they're more susceptible to a variety of age-related diseases, many of which are in the top 10 leading causes of death recorded by the Centers for Disease Control and Prevention.<sup>2</sup> These conditions include heart disease, cancer, stroke, Alzheimer's disease, diabetes and chronic liver disease.

Researchers believe that biological age is a combination of genetics, lifestyle choices, nutrition and comorbidities.<sup>3</sup> You have control over two factors – lifestyle and nutrition – which together influence comorbidities. In other words, you have control over a vast majority of the factors that impact your biological age, and therefore your longevity.

When you consider the world around you, a lot has changed in the last five years. Bioethicists at Harvard University<sup>4</sup> question if the distinction between biological and chronological age is significant, should that support a legal age change? While this is a question for another time, you can see how taking control of your health today may hold many benefits later in life, no matter what time in life you begin making changes.

The featured study indicates that grip strength is a reliable biomarker of your biological age, which would indicate that measuring your grip strength can help doctors predict your probability of developing chronic disease or all-cause mortality. One writer ponders<sup>5</sup> about the growing number of individuals in their 20s and 30s who are no longer biologically young.

He writes that over the last eight years, a variety of studies have shown that the number of people with serious chronic diseases is growing, alongside a rising infertility rate,

rising rate of mental illnesses in young women, and a roughly 70% decline in male testosterone since the 1970s.

He concludes that it is "obvious just how much the quality of human life has declined in just 1-2 decades."<sup>6</sup> Yet, information from the featured study and many others demonstrate that simple lifestyle changes can produce significant results.

## **Grip Strength Is a Reliable Biomarker for Biological Age**

The researchers identified a growing body of evidence that has linked muscular weakness to a host of age-related health outcomes.<sup>7</sup> Many researchers have looked at low grip strength as a biomarker of aging. This research team sought to identify the pathways that connect grip strength to negative health consequences by looking at DNA methylation (DNAm) age acceleration.

The researchers used data from the 2006 to 2008 data collection in the Health and Retirement Study in which there were eight to 10 years of follow-up. The researchers looked at longitudinal modeling that examined a potential association between the change in grip strength and DNAm age acceleration.

The data estimated age acceleration using DunedinPoAm, PhenoAge and GrimAge clocks, which are three epigenetic clocks used to estimate biological age based on DNAm patterns.<sup>8</sup>

At the conclusion of the study, the researchers wrote that there was "a robust and independent cross-sectional association between NGS (normalized grip strength) and DNAm age acceleration for men using the DunedinPoAm, PhenoAge and GrimAge clocks and for women using the DunedinPoAm and GrimAge clocks."<sup>9</sup>

Based on the data, the researchers concluded that there is "some initial evidence of age acceleration among men and women with lower NGS and loss of strength over time."<sup>10</sup> They suggest that more research is needed to understand the extent to which DNAm age is associated with grip strength and chronic disease.

This data seeks to explain what other researchers have documented, that grip strength provides evidence of your overall strength and upper limb function, as well as information about bone mineral density, nutrition, cognition, sleep and quality of life.<sup>11</sup>

## **Relationship Between Strength and Overall Health**

Other researchers have also identified a similar relationship with grip strength, overall health and specific health conditions. According to geriatric medicine specialist Ardeshir Hashmi from the Cleveland Clinic, "Grip strength naturally begins to decline around age 50, and maybe even earlier. People who maintain their grip strength age more slowly. They stay healthier longer and are stronger throughout their bodies."<sup>12</sup>

The consensus is that the stronger your grip strength, the better your health and the lower your grip strength the poorer your health. However, there is no consensus on the exact low and high measurements, and they are different based on your chronological age, weight and other factors.<sup>13</sup>

It's estimated that grip strength is an indication of general muscle strength, which is crucial for endurance, balance and mobility. The association between hand grip strength and the strength of your immune system was the focus of a 2022 study<sup>14</sup> that concluded measuring hand strength allows for "preliminary predictions on the current level of immunity and inflammation in the body."

Data has also found that hand grip strength is correlated with heart health and can help predict cardiovascular problems alongside family history, blood pressure and other indicators.<sup>15</sup> Low grip strength increases the risk of osteoporosis in postmenopausal women and a stronger grip is associated with increased functional independence.<sup>16</sup> Grip strength can also affect your stability and increase the risk of accidents when you can't catch yourself from falling.

Several studies have also found an association between a weaker grip, a reduction in cognitive functioning, an increase in the risk of psychiatric conditions and an increase in

dementia.<sup>17</sup> A large study published in 2022 associated poor hand grip strength in midlife with cognitive decline roughly 10 years later.<sup>18</sup>

The study<sup>19</sup> published in JAMA Neurology used data from the U.K. Biobank Cohort Study. The researchers concluded that hand grip strength is associated with neurocognitive brain health. They believe this adds to a growing body of research indicating that increasing muscle strength in middle-aged adults may help maintain neurocognitive brain health as you age.

Another 2022 study<sup>20</sup> published in BMC Medicine analyzed cross-sectional and longitudinal data from over 40,000 participants. The number in the cohort varied depending on the measurement being analyzed.

The researchers looked at the association between grip strength, behavioral outcomes and brain structure, finding an association between grip strength and increased gray matter volume in regional areas of the brain, as well as several measures of cognition and mental health.

## **How to Measure Hand Grip Strength**

I have known of the correlation between grip strength and longevity for some time now, but was surprised that the instrument to measure it is inexpensive, So, I purchased one for \$25 on Amazon and was delighted that my grip strength was off the charts at 129 pounds. I sincerely believe it is largely due to hanging for 90 seconds to two minutes twice a day for the last few years, a practice that I encourage nearly anyone to consider to increase their grip strength.

Researchers in the featured study used a Smedley spring-type hand dynamometer to measure grip strength.<sup>21</sup> Grip strength measures muscle strength exerted in your hand and forearm muscles. A dynamometer is typically the tool that's used to measure grip strength but not what's used to improve your grip strength.

The measurement is typically given in kilograms or pounds. A digital hand dynamometer is the easiest and most reliable way of measuring your hand strength. Owning a hand

dynamometer helps you keep track of your grip strength over time. To use a dynamometer be sure to follow the instructions that come with the device. Generally:<sup>22</sup>

1. The grip handle should be positioned to fit your hand
2. Bend your elbow at a 90-degree angle
3. Apply maximum effort to squeeze the dynamometer
4. Repeat a total of three times and average the three results

A 2018 study<sup>23</sup> used data from 1,232 participants aged 18 to 85 years to extract normative reference values for hand grip strength in that age range. The researchers established ranges based on gender and dominant or non-dominant hands.

The cohort was broken into five-year age ranges and an overall range was established for each group as well as identifying those in the 10th, 25th, 50th, 75th and 90th percentiles. Examples of the measurement ranges in the dominant hand include:

<b>Years</b>	<b>Pounds</b>
<b>Men</b>	
18-24	103.6 +/- 17.9
35-39	103.8 +/- 26.2
50-54	97.0 +/- 22.7
60-64	84.7 +/- 22.7
70-74	76.5 +/- 19.8
<b>Women</b>	
18-24	61.9 +/- 15.7
35-39	64.4 +/- 13.7

Years	Pounds
50-54	62.2 +/- 13.9
60-64	52.0 +/- 14.3
70-74	47.4 +/- 11.2

## Pay Close Attention to Overall Strength

As the lead researcher of the featured study, Mark D. Peterson said, "Grip strength is a proxy indicator of overall muscle strength, meaning that it is highly correlated to other measures of strength. Thus, simply increasing grip strength would not render any changes to health or longevity."<sup>24</sup>

While grip strength is just an indicator of your overall strength, you still may want to spend some time improving your grip strength to make everyday tasks easier. Hashmi recommends<sup>25</sup> using a racquetball or squash ball as a squeeze ball.

He notes that the size and the material of the ball are important so that you have the right resistance. A tennis ball is too large and may cause an injury while exercising. Other options can include resistance bands and grip and squeeze handles that come in different sizes and levels of resistance. He recommends using a low resistance and working your way up to higher strengths.

While you might think that traditional weightlifting is the only way to build muscle, there are several other options. If you've never done any strength training, it may help to begin with resistance bands that come in a variety of different strengths. These allow you to build muscle while you learn the correct form to reduce your risk of injury.

As you get stronger, I highly encourage you to consider my favorite way of strength training – [KAATSU](#), also known as blood flow restriction training. It can help radically

improve muscle growth and strength without risking injury. This makes an ideal for people who have never done strength training and for the elderly.

Strength training is vital to prevent age-related muscle loss that leads to frailty and premature death. KAATSU is not only effective in building muscle, even when you're older, but it also generates some highly beneficial metabolic byproducts, including insulin growth factor 1, growth hormones and brain-derived neurotrophic factor (BDNF).

You can learn more about the benefits of KAATSU in "[How to Optimize Health and Strength – Even if You're Over 60](#)," which features my interview with Dr. Marcos de Andrade, a research physician and CEO of BIOHAXS. We met at Dave Asprey's Biohacking Conference in June 2023, where we ended up arm wrestling. De Andrade was 38 years old and an extreme fitness buff, and I was 69. But I still beat him. So, age doesn't have to be a determining factor or excuse for poor fitness.

## Sources and References

---

- <sup>1</sup> [Journal of Cachexia, Sarcopenia and Muscle, November 9, 2022](#)
- <sup>2</sup> [Centers for Disease Control and Prevention, Leading Causes of Death](#)
- <sup>3</sup> [Translational Oncology, 2022; 15\(1\) Bullet 3](#)
- <sup>4</sup> [Center for Bioethics, April 1, 2021](#)
- <sup>5, 6</sup> [Haidut, February 27, 2024 \(Archived\)](#)
- <sup>7</sup> [Journal of Cachexia, Sarcopenia and Muscle, November 9, 2022, Sentence 1 and background last sentence](#)
- <sup>8</sup> [Haidut, February 27, 2024, last para \(Archived\)](#)
- <sup>9</sup> [Journal of Cachexia, Sarcopenia and Muscle, November 9, 2022, Results; Conclusion for next para](#)
- <sup>10</sup> [Journal of Cachexia, Sarcopenia and Muscle, November 9, 2022, Conclusion](#)
- <sup>11</sup> [Clinical Interventions in Aging, 2019; 14](#)
- <sup>12</sup> [Cleveland Clinic, March 13, 2023, para 5](#)
- <sup>13</sup> [Cleveland Clinic, March 13, 2023, Subhead 1 para 2; Muscle strength para 1](#)
- <sup>14</sup> [International Journal of Environmental Research and Public Health, 2022; 19\(20\) quote is from last sentence abstract](#)
- <sup>15</sup> [British Heart Foundation, March 14, 2018](#)
- <sup>16</sup> [Joan Pagano, November 7, 2023](#)
- <sup>17</sup> [BMC Medicine, 2022;20\(286\) 5% down the page, Background para 1](#)
- <sup>18</sup> [Harvard Health Publishing, September 1, 2022 top of para 1](#)
- <sup>19</sup> [JAMA Neurology, 2022; 5\(6\) Abstract/Concl and Relevance](#)
- <sup>20</sup> [BMC Medicine, 2022;20\(286\) 45% down the page, Discussion, para 1 GMV=grey matter volume – abbreviations at the end of the article](#)



- <sup>21</sup> Journal of Cachexia, Sarcopenia and Muscle, November 9, 2022, Methods/Exposures/Grip Strength para 1 15-30% Down the page
- <sup>22</sup> Cathe, How Strong Is Your Grip? Para 7
- <sup>23</sup> Journal of Orthopaedic & Sports Physical Therapy, 2018;48(9) Pop up appendix A 80% down the page
- <sup>24</sup> Atlanta Journal Constitution, April 17, 2023
- <sup>25</sup> Cleveland Clinic, March 13, 2023, Hand exercises 60% down the page