



# Masters Athletes

Learn about the health benefits of high-level physical activity in this population.

In many ways, age is just a number. Just look at Diana Nyad, aged 64, who in 2013 swam from Cuba to Key West, Florida, a 110-mile swim in the open ocean, after four failed attempts and whose historic swim was recently retold in the 2023 Netflix film *Nyad*.<sup>1</sup> Or, consider Julia “Hurricane” Hawkins, who in 2017 set a world record at 101 in her age group in the 100-meter USA Track & Field Masters Championship. She also held world records in the 60-meter dash and shot put. Believe it or not, Hawkins only started running at age 100.<sup>2</sup> These masters athletes didn’t let their age stop them from showing the world that individuals can accomplish anything—no matter the decade in which they were born.

In this article, *Today’s Dietitian* defines what a masters athlete is and discusses the increased health benefits of vigorous physical activity and decreased disease risk in this population and nonathletic older adults.

## Who’s a Masters Athlete?

The age at which one becomes a masters athlete depends on the sport’s governing body, but in general masters athletes

are aged 35 and older. Masters athletics got its start with World Master Athletics, a global organization that promotes and supports masters athletics events and athletes. Athletes over the age of 35 compete in running and track and field events. Competition is graded in five-year age groups (eg, 35 to 39, 40 to 44, 45 to 49, and above, up to the most recent age category of 100+).<sup>4</sup> While 35 generally is considered the age one can be labeled as a masters athlete, swimmers aged 18 and older can compete in masters swimming events.<sup>5</sup> On the other hand, professional golfers can compete in the Professional Golf Association Tour Champions at age 50.<sup>6</sup>

In addition to these events, many older adults compete in the National Senior Games, also known as the Senior Olympics.<sup>7</sup> The games are multisport events for adults above the age of 50 and are the largest multisport events in the world for seniors. Regional events are held yearly for those who want to qualify for the national event held every summer.

## Health Benefits

Masters athletes can be considered “exemplars of successful aging,” possessing high cognitive and physical function

and engagement in life as they age.<sup>8</sup> The high physical activity levels masters athletes undertake in their chosen sport preserve physical functioning during aging.<sup>9</sup>

It’s important to note that research often is conducted on endurance athletes with small numbers of participants in short-term vs longitudinal studies, and women often are underrepresented in these studies. This article is a global review of the benefits of masters athletic participation. These athletes aren’t a heterogeneous group, yet they all maintain a high level of physical activity. Despite the research limitations, the benefits of high-level physical activity in older athletes are undeniable.

## Oxygen Uptake and Aerobic Capacity

Maintaining a high level of aerobic capacity translates to a high level of cardiorespiratory fitness. High levels of cardiorespiratory fitness are strongly associated with longevity.<sup>10</sup> Assessing aerobic fitness is done by measuring maximal aerobic power or  $\text{VO}_2\text{max}$ . In healthy sedentary adults,  $\text{VO}_2\text{max}$  declines about 10% per decade after the age of 25 or 30. In masters endurance athletes training at a high level, the decline is still evident, but it occurs at a slower rate—about 5% per decade.<sup>11</sup> When masters athletes reduce their training volume or stop training, they experience a more rapid decline in  $\text{VO}_2\text{max}$  when compared with the gradual age-related decline in  $\text{VO}_2\text{max}$  observed in sedentary adults.

It’s difficult to determine that changes in  $\text{VO}_2\text{max}$  are due to only physical activity, because masters athletes also tend to have more lean body tissue, which influences  $\text{VO}_2\text{max}$ .<sup>12</sup>

## Body Composition

Sedentary older adults have increased levels of body fat, decreased lean muscle mass, increased visceral fat, and a redistribution of body fat (more “belly” fat or fat deposited around the trunk).<sup>13</sup>

Aging and lifelong aerobic exercise influence muscle size, function, and adipose tissue infiltration. Higher training intensity throughout the lifespan provides greater protection against adipose tissue infiltration into muscle.<sup>14</sup>

Masters athletes tend to preserve lean muscle mass while preventing fat infiltration into other tissues. However, even



masters athletes have a slight increase in total body fat, but it appears that exercise training can help prevent some of the deleterious changes in body composition associated with aging.<sup>15</sup>

### Musculoskeletal System

Muscle strength, muscle mass, and function decline with age. Dynapenia is defined as loss of muscle strength and power, and some researchers think this is a better predictor of loss of functional abilities than decreased muscle mass, known as sarcopenia.<sup>9</sup> While it's impossible to determine exactly when these changes begin, as it depends on many factors such as physical activity and general health, it's likely to begin in the fifth decade.<sup>16</sup>

In a meta-analysis of more than 50 studies on masters athletes, with an average age of 59 years, who'd been training for sport for over 20 years, continued exercise training preserved physical function, muscular strength, and body fat levels similar to that of young, healthy individuals.<sup>17</sup>

### Cardiovascular Health and Disease Risk

Lifelong aerobic exercise is strongly linked to improved cardiovascular health.<sup>3</sup> However, even masters athletes aren't immune to CVD. The two risk factors most prevalent in masters athletes are family history of premature heart disease and previous history of cigarette smoking, although current smoking is rare.<sup>18</sup> Masters athletes have less arterial stiffness, considered by some cardiologists to be a biomarker for CVD risk.<sup>19</sup>

### Cognitive Function

A positive association exists between physical fitness and cognitive function in community-dwelling older adults, yet the mechanism is unclear.<sup>20</sup> Ongoing exercise training, as in the case of masters athletes, may attenuate age-related decreases in fluid intelligence in middle-aged and older adults.<sup>9</sup> Fluid intelligence involves attention, organizing, planning and prioritizing, working memory, and speed of processing information, and physical activity helps retain these skills.<sup>21</sup>

While few studies compare cognitive function in masters athletes with sedentary controls, a handful of studies show there's some cognitive improvement in older adults who exercise vigorously.<sup>21,22</sup>

Older endurance-trained masters athletes exhibit better performance in fluid intelligence and executive function.<sup>22</sup>

### Counseling Masters Athletes

Sports dietitians who counsel masters athletes should apply the following general recommendations with some special considerations<sup>23</sup>:

- **Be cognizant of chronic conditions.**

Ninety-five percent of adults aged 60 and older have at least one chronic condition, while nearly 80% have two or more. The most common conditions include hypertension, high cholesterol, arthritis, coronary heart disease, and diabetes.<sup>24</sup> Older athletes aren't immune to chronic diseases, so knowledge of MNT for various disease states is important. A thorough assessment using the nutrition care process is the right place to start.

- **Encourage sufficient energy and protein intake to support training.**

Masters athletes may follow the latest diet trends (low carb, ketogenic, intermittent fasting) that may negatively impact training. Older athletes most likely will need a greater intake of dietary protein so ensure they get sufficient intake throughout the day.<sup>25</sup> Researchers suggest protein intakes higher than the Recommended Dietary Allowance with about 1.6 g/kg/day, spread across meals. Aim for 0.4 g/kg/meal, particularly at breakfast and lunchtime meals.<sup>25</sup>

- **Beware of banned drugs.** Masters athletes who compete in sanctioned events, such as World Masters Athletics, are subject to drug testing using World Anti-Doping Agency rules. Several drugs that older adults may take for medical conditions, including beta-blockers (used to manage heart conditions) and aromatase inhibitors (used to treat breast cancer) are banned drugs. Athletes who are prescribed these medications can apply for a Therapeutic Use Exemption; however, many athletes may not be aware that the medications are banned and that there's a procedure to notify the governing body about medication use.<sup>26</sup>

### Benefits of Physical Activity for Older Adults

While masters athletes seem to be in a league all their own, older adults can reap several health benefits of physical activity,

which is considered essential for healthy aging.<sup>3</sup> The Physical Activity Guidelines for Americans list the following benefits for older adults:

- lower risk of all-cause mortality;
- lower risk of CVD mortality;
- lower risk of CVD (including heart disease and stroke);
- lower risk of hypertension;
- lower risk of type 2 diabetes;
- lower risk of an adverse blood lipid profile;
- lower risk of cancers of the bladder, breast, colon, endometrium, esophagus, kidney, lung, and stomach;
- improved cognition;
- reduced risk of dementia (including Alzheimer's disease), and more.

To gain these benefits, the guidelines recommend older adults engage in at least 2.5 hours to five hours per week of moderate-intensity aerobic physical activity, or one hour and 15 minutes to 2.5 hours per week of vigorous-intensity aerobic physical activity, or a combination of moderate- and vigorous-intensity aerobic activity. These recommendations are just the minimum, but additional health benefits are gained by engaging in physical activity beyond these guidelines.<sup>3</sup> What's more, the guidelines suggest older adults engage in muscle-strengthening activities of moderate or greater intensity that involve all major muscle groups two or more days per week. So it's important to remind them that the aerobic exercise and strength training recommendations aren't "either/or" but "and/also."

Masters athletes are unique in their ability to sustain and maintain high levels of physical activity. For adults who wish to get started in competition, encourage them to start slowly with lower impact exercise to prevent injury and check with a health care provider to determine their health status before pursuing increasing levels of physical activity that often require greater intensity and endurance training. ■

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