

Age, Fitness, and Diving

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After about 30 years of age, life gives each of us an important choice: use it or lose it. Those of us who choose to “use it” can maintain or even increase our fitness levels for decades. The rest of us fail to provide our bodies with enough activity to stave off the debilitating influence of Father Time. For example:

- Our fitness potential peaks in our mid-30s, then gradually declines until death.
- The average person gains about 3 pounds per decade starting at age 20.
- The average 60 year-old American male has a blood pressure of 140/90, where 120/70 is considered normal.

Does this mean that diving becomes automatically riskier as we age? Hardly. However, while there are no upper age limits on diving, it remains prudent to consider the effects of aging on our dive safety and counter them with the appropriate amount of activity. The incidence of death in divers 50 to 70 years old is higher than average, though the primary cause is heart failure, a largely preventable disease. Cardiovascular and strength training thus serve double duty in improving the quality and extent of our lives while preparing us for the diving we enjoy.

Slowing Down

When it comes to our fitness, we really live three “ages” simultaneously. Our *chronological age* is an indication of how long we’ve been alive. Our *biological age* is an indication of how our fitness and health compares to others of different chronological ages. Our *training age* is the length of time spent on a regular exercise program and has the greatest influence on our ability to achieve results for our efforts.

We commonly assume that the older we get chronologically, the less we will benefit from exercise. Contrarily, researchers are finding that age is no barrier to muscle adaptation, whether it be strength or endurance. Thus, the cause of age-related differences in fitness appears to be the cumulative effects of lifestyle choices. We choose to do less, and our bodies adapt. Reverse the downward trend at any age, and we will see our biological ages decrease. Maintain your activity level, and fitness becomes easier to keep over time.

Physiological Function

For most of us, the importance of fitness is not really about how fast we can run or how much we can bench press. Most immediately apparent is how our fitness levels affect our abilities to perform the basic functions of life- climbing hills or stairs, carrying the groceries, mowing the lawn, or walking the dog. The more strenuous our lifestyles, the more important our fitness becomes.

Diving is a unique activity in that we actually strive to *limit* our exertion, while the secondary benefits of our fitness remain critical to our health during and after our dives. Safe diving requires a strong heart, healthy lungs, and good perfusion of our peripheral tissues.

Though we have become conditioned to expect these things to decline as the natural course of life, we now realize that inactivity alone can account for major losses in functional level. It is common to find active people in their 50s with the measured functional level of an average 20 year old.

One of the most interesting explanations of our age-related decrease in activity comes from psychology. Some suggest that the older we get, the less we feel the need to pursue various activities that result in maintaining our fitness. We think, “been there, done that.” We look for easier ways of getting through our days, and through our wisdom, we find them.

So, declining fitness is not a natural course of life. It’s a socially accepted choice that we need to avoid, and it’s never too late to change our minds.

Most of us are familiar with the impact that exercise has on body composition, blood pressure, etc, but exercise also has some less well-known benefits. Exercise has been shown to:

- reverse hearing loss
- improve eyesight
- improve short and long term memory
- reduce arthritic pain
- improve glucose tolerance
- improve virility

Muscle and Bone

Absolute muscle remodeling rates slow down with age. However, even 90 year olds experience the same *relative* increases in strength and endurance as younger adults. One study showed that men in their 70s who strength trained starting in their 50s had muscle size and strength equivalent to the 28 year-old researchers.

Training to achieve maximum peak bone mass when younger may reduce the effects of age and inactivity later. This is known as the “bone battery” concept. In other words, the higher the maximum bone density you achieve, the longer it will take for aging to lower that density below a safe threshold. This is regardless of genetic predisposition to degenerative diseases like osteoporosis.

Flexibility often decreases with age but can be improved with stretching. Again, the percentage gains achieved from a consistent stretching program remain the same across age groups.

Gas Exchange

Most significantly for diving, we see a reduction in the rate of pulmonary and peripheral gas exchange with age, but this reduction is both preventable and reversible with cardiovascular training.

VO₂max is the most relied upon benchmark of both cardiovascular fitness and effective decompression. While the average person experiences a 10% decline in VO₂max per decade, recent studies suggest that maintaining high activity levels can halt this decline entirely.

Heart stroke volume decreases with age, along with a decrease in the capillary-to-muscle fiber ratio and arterial cross-sectional area. This means that less blood is flowing to the peripheral tissues (fewer capillaries), and the speed with which gasses cross into the bloodstream is reduced (which is a function of vessel cross-sectional area). Thus, tissue off-gassing is slowed, and oxygen is less effective at accelerating the decompression process.

That said, an active 65 year old has a higher level of cardiovascular function than a sedentary 30 year old. This difference can come from pursuing 30 minutes of focused exercise every day- hardly the schedule of an elite athlete.

Never Too Late, Never Too Early

In analyzing the best data we have to date, we see an overriding dictum. For those of us who do not participate in a consistent exercise program, neither youth nor maturity can act as an excuse for inactivity.

There is no age at which exercise is bad for you, whether you're just getting started or have been doing it your whole life. There are no exercises that are unsafe based purely on age, either. A 70 year old can follow the same program as a 30 year old when adjusted for baseline fitness.

Everyone should inform their physicians about their exercise programs, though even with significant health issues like diabetes, high blood pressure, coronary artery disease, etc., almost anyone can safely increase their activity with proper guidance. The earlier we start, though, the more benefits we achieve and the longer we can enjoy them.

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