

Preliminary research focused upon Masters Swimmers is opening up new information on the question “what is aging?” Recently, it has been suggested that much of what we assume to be physical and mental deterioration due to aging might really be due to a prolonged sedentary lifestyle. We have focused our attention on Masters Swimmers to help resolve this question because, quite simply, there are few comparable populations who engage in routine intensive daily exercise for decades. Some findings are remarkable in that a number of these parameters were previously thought to necessarily decline with age. We are beginning to challenge that assumption.

Nerve conduction velocity.

Coordination and muscular activity requires optimal rapid communication between the central nervous system and periphery. Nerve conduction velocity (NCV) is a measure of the speed at which this information is transferred through the body’s nerve fibers. Our preliminary data show that Master Swimmers peripheral NCV declines very little with age (as compared to the general population [GP]). The younger swimmers and the younger members of the GP are fairly similar. However, with increasing age the general population shows substantial declines in NVC while the swimmers show very minimal declines. It is demonstrated that average NCV values of Masters Swimmers in 40, 50, 60, and 70 year-olds were significantly greater (faster) than averages in the age match GP

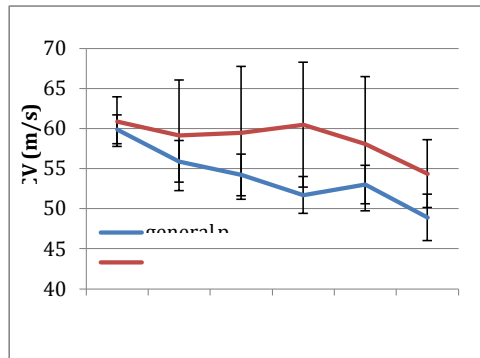


Figure 1. nerve conduction velocity in general population and masters swimmers. Error bars represent standard deviation.

groups. These differences show up relatively early, perhaps as early as in the late thirty and early forty year-old population. Furthermore, the onset rate of decline in NCV appears to occur much later slower for Masters Swimmers than the GP. For example, NCV appears to moderately decline from 30’s throughout the rest of the age groups. Masters Swimmer’s NCV, however, appears to be consistent until 60’s. Specifically, similar to the 80 yr old group showed the similar NCV value as the 50 yr olds in the general population. It is an impressive difference that we

believe is due to the physical activity

in which Masters Swimmers routinely engage.

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Cognitive parameters:

Working memory construct.

The preliminary study also suggests that master swimmers also show smaller age-related declines in working memory capacity, which is associated with the executive ability of attention control and general memory capacity. Masters Swimmers have superior working memory capacity compared with the general population at all ages with the age differences largest at ages 55 years and older. Research shows that superior working memory capacity is associated with better self-regulation, self-control, and decision-making. In addition, our data reflect that the superior working memory capacity of Master Swimmers is associated with faster reaction times on choice-reaction time tasks, which is generally interpreted to reflect superior overall information processing speed and ability. Finally, the Masters Swimmers demonstrated faster choice reaction times compared to the general population.

Cardiovascular parameters:

Arterial Elasticity –

Reduced arterial elasticity can indicate early cardiovascular disease. Masters swimmers' large and small arterial elasticity indices were compared to values reported in the literature for healthy subjects from the general population. First, all of the swimmers, regardless of age, showed mean arterial elasticity indices that were in the normal-to-borderline clinical range of the arterial elasticity guidelines. The mean large arterial elasticity index of swimmers between the ages of 45-54 years was significantly greater than that of subjects from the general population with a mean age in the 30s. This is indicative of superior arterial health compared to similarly aged people in the GP. In addition, the mean small arterial elasticity index of the older Masters swimmers in our sample did not differ significantly from much younger individuals in the general population. Thus, our study demonstrates that a highly active lifestyle can delay age-associated reductions in central and peripheral arterial elasticity, a reflection of good vascular health.

Muscle mass

Muscle mass is a key component of being able to sustain free-living lifestyle as we age. The measurement of muscle mass is by no means simple. While there are several methods available for muscle mass estimation, quantification requires chemical assays or complex imaging equipment. Preliminary data from Masters Swimmers present the following picture: Our muscle mass measurements indicate that our older Masters Swimmers have an offset of roughly 15 yrs when compared to the people of the same age within the general population. In other words, the older Masters Swimmers have a muscle mass that is equivalent to persons 15 years younger. The younger Masters Swimmers appear to be more similar to the general population in terms of muscle mass or, to turn this around, at a young age the general population presents a relatively active profile. However, importantly, older

masters swimmers have more muscle mass than the general population. The older the Masters Swimmers get, the more different they become. Our data show that Masters Swimmers lose muscle mass at fairly similar rates to general population. However, their increased sustained physical activity appears to attenuate the age-associated decline.

In conclusion, recent data collected from Masters Swimmers attending the Nat'l meet in Indianapolis in August present new and exciting data on the physiological consequences of aging... and physical activity. The data challenge the assumption that substantial age related declines in cardiovascular, neuro-motor and cognitive function are a necessary part of the aging process. While we cannot suggest that aging can be halted by physical activity, our data suggest that in the highly active, there may be age offsets in the magnitude of decades. Something to think about on the days you find an excuse to skip your daily swim!