



Enhancing Quality of Life Through Muscle Endurance Training

Amy Ashmore, Ph.D.

Muscle endurance is defined as the muscle's ability to work for a prolonged period of time – the capacity of the muscle to repeatedly contract under a moderate load over time. **Exercises designed to build muscle endurance help to slow aging (reduces biological age), aid in weight management, and contribute to maintaining the performance of Activities of Daily Living (ADLs).**

A great example of endurance is a marathon, which requires participants to sustain work at approximately 65% - 85% maximum heart rate (MHR) for 26 miles or approximately 4 hours. Running a marathon requires a mixture of cardiovascular conditioning and muscular endurance. In contrast, muscle endurance in the real world is the ability to sustain work at the necessary output to complete the desired task. For example, a conditioned person with adequate endurance can push a lawn mower long enough to finish the job, while a deconditioned individual may struggle to do so because he lacks endurance.

The Muscle Endurance training program on the xRide seated elliptical by Octane Fitness is specifically designed to improve muscle endurance. It can be activated anytime to increase resistance, motivate changes in speed or change mechanics – all of which are ways to increase exercise intensity. The interval training program utilizes 30-second active intervals with one-minute recovery periods. The most effective way to increase heart rate, move oxygen to the muscles and reap the anti-aging and overall health benefits associated with exercise is through interval training.

Primary benefits of building muscle endurance

- *Muscle endurance has positive effects on aging*
Biological age (or physiological age) corresponds with the physical state of the body. It is determined by physiology rather than chronology; and factors of biological aging include changes in the physical structure of the body as well as changes in the performance of motor skills and sensory awareness. Research has shown that **regular, high intensity exercise forces the body to make physiological and physical adaptations that ultimately slow aging (or reduce biological age).**
- *Muscle endurance plays a role in weight management*
It is well-documented that intense exercise and interval training are very effective means to reduce

and maintain weight. Any exercise program designed to increase heart rate and maintain it at a Target Heart Rate (THR) greater than 70% of Maximum Heart Rate (MHR) can help control weight. Research shows that high intensity exercise at a THR greater than 70% increases resting energy. Experts recommend interval training as a way to incorporate and tolerate high intensity exercise.

The Muscle Endurance routine on the xRide by Octane Fitness motivates higher exertion by the user and **can play a significant role in weight management.**

- *Muscle endurance training helps to maintain performance of ADLs*

Because biological age includes markers associated with physical and/or structural changes (like bone mineral density, joint function and muscle mass), one must also consider performance of Activities of Daily Living or ADLs. ADLs include things that individuals normally do on a day to day basis-- like bathing, transferring from chair to standing, meal preparation, transferring from bed to standing, walking to the store, etc. The ability to maintain ADLs is one of the most important determinants to maintain independence as individuals age. Physical activity throughout the lifespan is the most influential factor related to maintenance of ADLs, and **training muscular endurance will lead to an improvement in the longevity of function/performance of ADLs for an individual.**

Building muscle endurance with xRide

- *xRide builds muscle endurance through the strategic use of muscle overload and variable resistance*

Overload

To increase muscle strength and endurance (as well as cardiovascular fitness), it is necessary to systematically subject the muscles and cardiovascular system to workloads greater than those to which they are accustomed.

Workload can be modified by changing speed, resistance, upper/lower body workload sharing and biomechanics of movement.

The Muscle Endurance routine on the xRide meets these criteria by allowing users to strategically manipulate speed, resistance and biomechanics.

Variable resistance

The use of variable resistance is an important tool in building muscle endurance. A user's pace and resistance level are ways to manipulate exercise intensity. Octane's Muscle Endurance workout motivates exercisers to overload their muscles and vary intensity throughout the exercise session, thereby building muscle endurance.

- *Muscle endurance training mode and time*
Typically, endurance is associated with total-body conditioning because endurance contains both muscle and cardiovascular components. Alternating sessions of cardiovascular intervals with moderately overloaded muscular endurance intervals taxes both systems and increases an individual's endurance and power when the individual exercises for at least 20 minutes or more (individual performs more muscle building "sets" at a lower load than that which would be used in traditional strength training workouts). The **xRide** is a total-body conditioning machine that **provides an excellent way to train both muscle and cardiovascular endurance** during the same workout while minimizing stress on joints.

Summary

Muscle endurance is the ability of muscles to continue to work or contract under a moderate load. In a real world sense, muscle endurance can be viewed as the difference between enjoying a high quality of life versus being limited by poor physical condition or premature aging. The xRide's Muscle Endurance routine enhances physical condition, and when used regularly, can decrease biological age, reduce and manage weight and maintain performance of ADLs.

REFERENCES

Den Hoed M., Hesselink M.K., van Kranenburg G.P., Westerterp K.R., (2008). Habitual physical activity in daily life correlates positively with markers for mitochondrial capacity, *Journal of Applied Physiology*, May 29 (Epub ahead of print).

Shephard R.J., 2008. Maximal oxygen intake and independence in old age, *British Journal of Sports Medicine*, (Epub ahead of print).

Tanaka H. & Seals D.R., 2008. Endurance exercise performance in Master's athletes: age-associated changes and underlying physiological mechanisms, *Journal of Physiology*, 586, 55-63.

Wright, V.J. & Perricelli B.C., 2008. Age-related rates of decline in performance among elite senior athletes, *American Journal of Sports Medicine*, 36, 443-50.

Carrel, J.F., et al., 1992. Incidence of injury during moderate and high intensity walking training in the elderly, *Journal of Gerontology*, 47(3):M61-6.

Hunter G.R., Weinsier R.L., Bamman M.M., Larson D.E., 1998. A role for high intensity exercise on energy balance and weight control, *International Journal of Obesity Related Metabolic Disorders*, June; 22(6): 489-93.

For more information, contact Octane Fitness at www.octanefitness.com or 888-OCTANE-4.

About Amy Ashmore

Amy Ashmore, Ph.D., holds a doctorate in Kinesiology from the University of Texas at Austin. She is an assistant professor of exercise science and sports management at the University of Tampa in Florida and is published in the areas of stretching, strength training, kinesiology and biomechanics.