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The Elderly Need Anaerobic Exercise

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Most of the research and information regarding exercise in general has stressed aerobic energy production rather than anaerobic energy production. It was easier to measure the aerobic system by measuring the maximal oxygen uptake (Vo2max) of a subject during exercise. At present, there is no anaerobic assessment test that has reached this level of acceptance.[1]

A review of the two systems is in order. The anaerobic energy system (AES) is considered a power system, while the aerobic energy system (ArES) is a work or endurance system. The ArES system uses Type I (slow-twitch) muscle fibers, which have a lower strength of contraction than the AES Type IIb (fast-twitch) higher fatigability fibers. Type II fibers use high-energy phosphagens, ATP, creatine phosphate stored in the muscle and glycolysis for energy production, while Type I fibers use ATP by oxidative pathways using glycogen and glucose. Type IIa fibers have characteristics of the other two fibers and are used primarily by the AES system.

The AES uses an energy system that is either based on lactacid (lactate accumulation) or alactic, while the ArES uses an oxidative system. Most physical activity uses a combination of these three systems. Anaerobic exercise usually involves a local area, such as the legs in cycling, which does not include the arms, while aerobic exercise is more of a systemic phenomenon.

According to McArdle et al.,[1,2] anaerobic exercise must be performed to the point of near-muscular exhaustion, recovery between bouts of exercise in a training session must be incomplete, and the exercise must be progressive to increase the degree of strength. Stoneet al.[1,3] state that combining aerobic and anaerobic training generally produces mixed results, with neither energy system optimally improving. Anaerobic exercise requires high intensity, within 1-12 repetitions, for a duration of 0 to 120 seconds, while aerobic exercise requires low intensity many repetitions, and over two minutes duration.[1]

According to Cahill et al.,[1] all biologic activity is initiated with anaerobic energy, which means that the initiation of all movement is an anaerobic process. Anaerobic energy is thus used for all emergency-response reactions, such as a pedestrian running and jumping to avoid a vehicle, or the elderly attempting to avoid a fall. As people age, there is a decrease in the size and number of the Type II muscle fibers and a loss of ability to activate high-threshold (Type II) motor units. It is an accepted fact that the elderly respond to anaerobic training with large gains in strength, mobility and physical fitness. Activity such as rising from a chair or the floor depend entirely on the AES. "Unless there is an ongoing strength maintenance program, there will be a steady loss of strength and muscle mass (sarcopenia) with aging."[1]

References

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