Physical Exercise and Aging: Appraisal and Reappraisal

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Aging is usually defined as the progressive loss of function accompanied by increasing morbidity with advancing age. The process of aging is multifactorial and depends on intrinsic (genetic) and extrinsic (environmental) factors. Aging concerns both physical and cognitive spheres of an individual. Detriments in functional reserve predominate in such body systems as the cardiovascular, the muscle-skeletal, the osteo-arthritis, the immuno-humoral, and brain systems. Physical exercise, adequate to the metabolic capability of an individual at a given stage of life, has been proposed as remedy to counteract aging. One of the most common exercise techniques is stretch. The unresolved issue with stretch is what kind of it should be applied in the setting of health care practitioners, particularly those engaged in sports training or in rehabilitation of the elderly. There are basically three types of stretch exercise: static stretching, dynamic stretching, and proprioceptive neuromuscular facilitation (PNF). The static paradigm consists of holding muscles in an elongated position for an extended period, the dynamic consists of moving joints through their range of motion, and the PNF combines static stretching with isometric contractions in a cyclic manner. While the static stretching may lead to muscle weakness which hampers subsequent physical performance, the dynamic stretching gives proneness to injuries, although it may be argued that range of motion is important to activities of daily living and declines with age. On the plus side, dynamic stretching increases the speed of neural signals running down from the brain to muscles, quickness of motion, and the velocity of enzymes. Studies demonstrate that both PNF and static stretching appear to substantially reduce the number of physical activity-related injuries. Ultimately, the mix of stretch modes, with static stretch followed by dynamic stretch, may be optimal to mitigate the risk of muscle impairment and to counteract injuries. To this end, meditation techniques containing a mixed physical motion ingredient, such as Tai Chi, deserve attention and imitation as an example exercise, with the additional benefit of improvement in mood, emotional stability, and cognition.

Human functionality has an outstanding plasticity and is capable of compensating for the structural insufficiency due to the age-related hampering of cellular metabolism. That may be exemplified by the maintenance of adaptive hyperventilatory responses to strenuous stimuli, such as exercise, in old age despite severe structural deterioration of the lungs and airways, limiting the alveolar gas exchange area and thus oxygen delivery.

Exercise is an antiaging strategy linked to physical and cognitive rehabilitation, a process aimed at combating the effects of a disease. This process also entails a large psychological component that is closely linked to behavior, personality traits, and other factors. The mind-to-body connection is indispensable for a motative engagement in antiaging behaviors, such as exercise or rehabilitation in case of a physical handicap due to a disease. Exercise has a protective effect on cognitive functions and helps combat the deleterious effects of stress and aging. The practice of exercise improves physiological and functional responses and thus the physical health and quality of life of the elderly.