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## Importance of Exercise and Physical Activity in Older Adults Reviewed CME/CE

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July 8, 2009 — The American College of Sports Medicine has issued a position stand providing an overview of issues critical to understanding the importance of exercise and physical activity in older adult populations. The review and guidelines are published in the July issue of *Medicine & Science in Sports & Exercise*.

"The 2008 Physical Activity Guidelines for Americans affirms that regular physical activity reduces the risk of many adverse health outcomes," write Wojtek J. Chodzko-Zajko, PhD, and colleagues from the American College of Sports Medicine. "The guidelines state that all adults should avoid inactivity, that some physical activity is better than none, and that adults who participate in any amount of physical activity gain some health benefits. However, the guidelines emphasize that for most health outcomes, additional benefits occur as the amount of physical activity increases through higher intensity, greater frequency, and/or longer duration."

The 3 sections of the position stand review the structural and functional changes accompanying normal human aging, the degree to which exercise and physical activity can affect the aging process, and the benefits of both long-term exercise and physical activity and shorter-duration exercise programs on health and functional capacity.

The reviewers conclude that no amount of physical activity can stop biological aging but that evidence to date affirms that by limiting the development and progression of chronic disease and disabling conditions, regular exercise can reduce the physiologic harms of an otherwise sedentary lifestyle and improve active life expectancy. Older adults who engage in regular exercise may also experience significant psychological and cognitive benefits.

The position stand recommends that all older adults participate in regular physical activity and avoid an inactive lifestyle and that exercise prescription for older adults include aerobic, muscle-strengthening, and flexibility exercises. Overall, the recommendations and underlying evidence are consistent with the 2008 Physical Activity Guidelines for Americans and with earlier American College of Sports Medicine statements regarding types and amounts of physical exercise suggested for older adults.

### Benefits of Physical Activity and Exercise

The following are some specific evidence statements regarding the benefits of physical activity and exercise, and their accompanying level of evidence rating (see "Note" at end of article for explanation of the ratings):

- Vigorous, long-term participation in aerobic exercise training (AET) improves cardiovascular reserve and skeletal muscle adaptations, allowing trained older persons to sustain a submaximal exercise load with less cardiovascular stress and muscular fatigue than their untrained peers. Prolonged AET may also reduce age-related accumulation of central body fat, thereby protecting the heart (level of evidence, B).
- Prolonged participation in resistance exercise training (RET) increases muscle and bone mass and strength to a greater extent vs AET (level of evidence, B).
- In healthy middle-aged and older adults, AET programs of sufficiently intense ( $\geq 60\%$  of pretraining  $VO_{2max}$ ), frequency, and length ( $\geq 3$  days/week for  $\geq 16$  weeks) may significantly improve  $VO_{2max}$  (level of evidence, A).
- In healthy middle-aged and older adults, 3 months or more of moderate-intensity AET are associated with cardiovascular adaptations which are apparent both at rest and in response to acute dynamic exercise (level of evidence, A/B).
- Moderate-intensity AET has been shown to reduce total body fat, but not fat-free mass, in overweight middle-aged and older adults (level of evidence, A/B).
- Beneficial metabolic changes associated with AET include improved glycemic control and clearance of postprandial lipids, as well as preferential utilization of fat during submaximal exercise (level of evidence, B).
- In postmenopausal women, AET may counteract age-related decreases in bone mineral density (level of evidence, B).
- RET may markedly increase strength and muscular power in older adults (level of evidence, A).
- Older and younger adults have similar age-related increases in muscle quality, and these increases do not appear to be sex specific (level of evidence, B).

- Improvements in muscular endurance have been reported after RET using moderate- to higher-intensity protocols, but not lower-intensity RET, and may improve muscular endurance (level of evidence, C).
- Although the effect of exercise on physical function is poorly understood and may not be linear, RET may improve walking, chair stand, and balance activities (level of evidence, C/D).
- Older adults who regularly take part in moderate- or high-intensity RET may have increased fat-free mass, decreased total body fat mass, and other beneficial changes in body composition (level of evidence, B/C).
- Compared with sedentary control subjects, adults who participate in high-intensity RET have maintained or improved bone mineral density, with a direct relationship between muscle and bone adaptations (level of evidence, B).
- Evidence is mixed regarding the effect of RET on metabolic variables (level of evidence, B/C).
- In populations at increased risk of falling, multimodal exercise, including strength and balance exercises, and tai chi may decrease the risk for noninjurious and sometimes injurious falls (level of evidence, C).
- Few controlled studies have evaluated the effect of flexibility exercise on range of motion in older adults (level of evidence, D).
- Regular exercise and physical activity are linked to significant improvements in overall psychological well-being, possibly via effects on self-concept and self-esteem. Physical fitness and AET are linked to a lower risk for clinical depression or anxiety (level of evidence, A/B).
- Cardiovascular fitness and higher levels of physical activity lower the risk for cognitive decline and dementia, based on epidemiologic studies. In experimental studies, AET and RET, alone or especially combined, improve some measures of cognitive functioning, especially those requiring executive control, in previously sedentary older adults (level of evidence, A/B).
- Physical activity appears to be linked to some aspects of quality of life, but the precise nature of the relationship is unclear (level of evidence, D).
- High-intensity RET is effective for treating clinical depression. Additional research should address the optimal intensity and frequency of RET needed to elicit specific improvements in other measures of psychological health and well-being (level of evidence, A/B).

"A combination of AET and RET activities seems to be more effective than either form of training alone in counteracting the detrimental effects of a sedentary lifestyle on the health and functioning of the cardiovascular system and skeletal muscles," the authors of the position stand conclude. "Although there are clear fitness, metabolic, and performance benefits associated with higher-intensity exercise training programs in healthy older adults, it is now evident that such programs do not need to be of high intensity to reduce the risks of developing chronic cardiovascular and metabolic disease. However, the outcome of treatment of some established diseases and geriatric syndromes is more effective with higher-intensity exercise (e.g., type 2 diabetes, clinical depression, osteopenia, sarcopenia, muscle weakness)."

*Med Sci Sports Exerc.* 2009;41:1510-1530.

(*Note:* Level A evidence — Overwhelming substantial evidence from randomized controlled trials (RCTs) and observational studies; Level B evidence — Strong, somewhat inconsistent evidence from RCTs and observational studies; Level C evidence — Generally positive evidence from observational and uncontrolled or nonrandomized trials; and Level D — Insufficient evidence).

## Clinical Context

The American College of Sports Medicine and the American Heart Association published physical activity and public health recommendations for older adults in 2007. The College now has best practice guidelines that recommend at least 150 minutes of moderate-intensity aerobic activity per week for older adults.

This is a position stand to provide an overview of the structural and physiologic bases of the recommendations, the extent to which exercise influences aging, and the benefits of long-term and short-duration exercise.

## Study Highlights

- Studies of long-term physical activity in athletes suggest the following benefits: more favorable body composition with less abdominal and total body fat, greater lean muscle mass and higher bone mineral density, higher oxygen-carrying capacity, and less cardiometabolic stress with reduced coronary risk profile.
- In older people, these benefits translate into lower waist circumference, better lipid profile, better endothelial function, and slower development of disability.
- Sedentary people in the United States typically gain 8 to 9 kg of body weight, mainly fat, between the ages of 18 and 55 years

followed by 1 to 2 kg in the next decade.

- Prolonged aerobic exercise slows the age-related accumulation of central body fat and is cardioprotective.
- In previously sedentary individuals, 3 or more months of moderate-intensity AET in middle-aged and older adults produces a lower heart rate; smaller increases in systolic, diastolic, and mean blood pressure; improvements in oxygen uptake capacity; and numerous cardioprotective effects.
- Moderate-intensity AET can reduce the fat gain in overweight adults independent of dietary changes.
- Bone health in postmenopausal women and men has been shown to improve with low-intensity weight-bearing activities such as walking, with a lower rate of bone loss and reduced hip fracture risk.
- AET can also enhance glycemic control at rest, promote clearing of atherogenic lipids, and increase preference for fat as fuel.
- RET with isometric, isokinetic repetitions in older adults is associated with an increase in muscle strength, muscle power, and muscle quality in older adults.
- Moderate- to high-intensity regimens are associated with marked improvements in muscle endurance.
- Muscle quality improvements may be greater in younger vs older women.
- Significant improvements in bone mineral density at most sites have been noted in both premenopausal and postmenopausal women.
- Multimodal exercise, including strength and balance exercises and tai chi, have been shown to reduce the risk for falls in those prone to falls.
- Both AET and RET have been shown to reduce clinical depression and anxiety and improve cognitive function including tasks requiring complex executive control.
- The American College of Sports Medicine and the American Heart Association recommend that older adults engage in endurance exercise with moderate intensity of 30 to 60 minutes per day in at least 10-minute bouts to at least 150 to 300 minutes per week.
- Vigorous-intensity activities are recommended at 20 to 30 minutes per day for a total of 75 to 150 minutes per week.
- RET is recommended at least 2 days per week at moderate to vigorous intensity.
- Balance exercises are recommended for those at risk for falls or for those with mobility problems.
- There is no specific recommendation for frequency and duration of balance exercises because of insufficient evidence.
- The following guidelines are recommended: progressively difficult postures that gradually reduce the base of support, dynamic activities that perturb the center of gravity (eg, tandem walks, circle turns), stressing postural muscle groups, and reducing sensory input (eg, shutting the eyes while standing).
- For older adults who are highly deconditioned, have chronic diseases, or who are functionally limited, intensity and duration should be low and graded gradually.
- Older adults should perform physical activity as tolerated to avoid being sedentary.

## Clinical Implications

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- The benefits of AET and RET in older adults include cardiovascular and metabolic protection, reduced body fat, improved bone health, reduced depression and anxiety, and improved cognition.
- AET at moderate intensity is recommended at 150 to 300 minutes per week, RET at 2 days a week, and balance exercises for those at risk for falls.

## CME/CE Test

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Which of the following *best* describes the benefits of RET in older adults?

- Improves muscle strength but not muscle quality
- Reduces clinical depression
- Improves muscle quality in women but not in men
- Only high-intensity regimens improve muscle endurance

Which of the following *best* describes the American College of Sports Medicine and American Heart Association recommendations for balance exercises in older adults at risk of falling?

- At least 75 minutes per week
- Should be at moderate to high intensity
- At least 20 minutes per session
- No specific recommendation

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This article is intended for primary care clinicians, geriatricians, cardiologists, and other specialists who care for older adults.

## Goal

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The goal of this activity is to provide medical news to primary care clinicians and other healthcare professionals in order to enhance patient care.

## Learning Objectives

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Upon completion of this activity, participants will be able to:

- Describe benefits of exercise in older adults.
- Describe recommendations for aerobic, muscle-strengthening, and flexibility exercises in older adults.

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