

From 1998 to 2011: ACSM Publishes Updated Exercise Guidelines

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Article Reviewed

Garber, C.E., Blissmer, B., Deschenes, M.R., Franklin, B.A., et al. (2011). Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: Guidance for prescribing exercise. *Medicine & Science in Sports & Exercise*, 43 (7), 1334-1349.

Introduction

The new ACSM quantity and quality Position Stand paper is an update from the previous 1998 document. It cites over 400 publications from scientific reviews, epidemiological studies, clinical studies, meta-analyses, consensus statements and evidence-based guidelines. The purpose of this ACSM Position Stand paper is to present evidence-based direction to health and fitness professionals for the development of individualized exercise training programs for apparently healthy adults of all ages (Garber et al., 2011). Competent exercise and health professionals can also use these guidelines for persons with certain chronic health problems or disabilities, incorporating modifications accordingly to their physical function and health status. Helpfully, Garber and colleagues have clarified some misunderstandings with the use of frequently used fitness terminology (see Side Bar 1). One of the most compelling sections of this principal paper is the fact-based review of the numerous health benefits (see Figure 1) that a comprehensive exercise program of resistance, cardiorespiratory, flexibility and neuromotor exercise confers to men and women participants. Equally impressive is the ACSM statement that “engaging in regular exercise and reducing sedentary behavior is vital for the health of adults.”

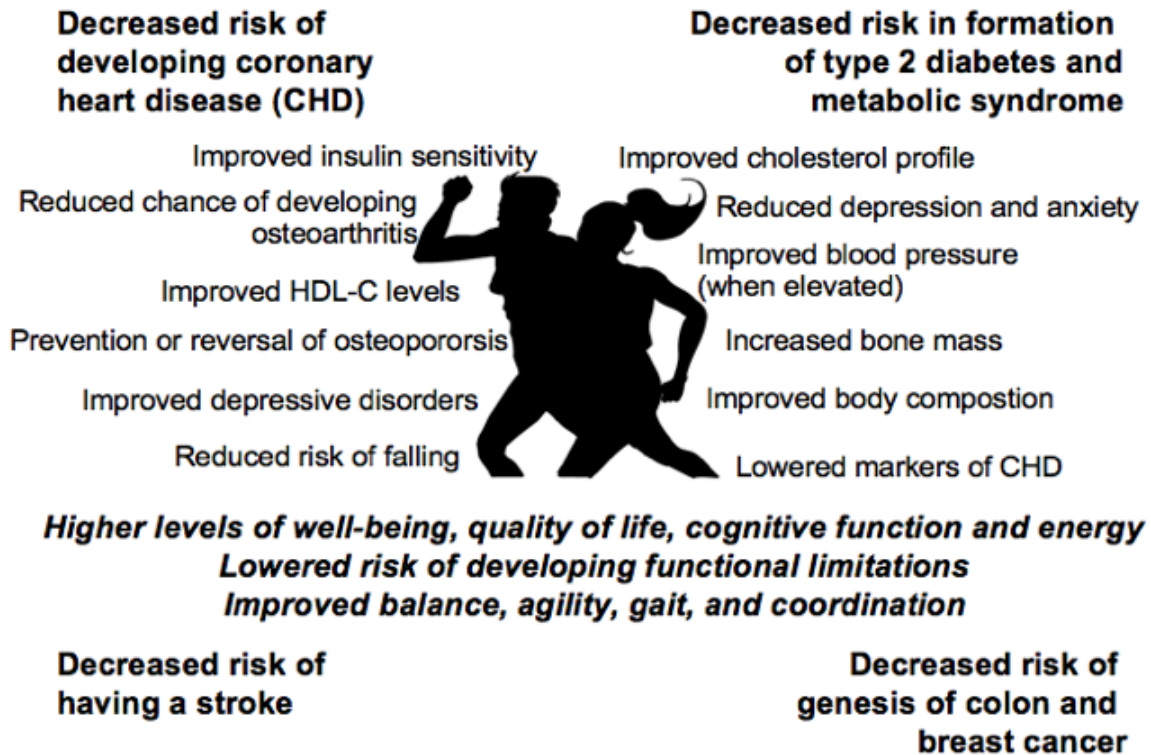


Figure 1. Health Benefits of Cardiorespiratory, Resistance, Flexibility and Neuromotor Exercise

resistance, cardiorespiratory, flexibility and neuromotor exercise

Cardiorespiratory Exercise Design Guidelines

It is important to note that Garber et al. (2011) state that the minimum level of cardiorespiratory fitness required for health benefits may be different for men and women and for older and younger adults. As well, Garber and colleagues note that sedentary behavior (i.e., sitting at a desktop workstation, watching TV, surfing the internet, etc.) is associated with depression, higher coronary heart disease, increased waist circumference, elevated blood pressure, depressed lipoprotein lipase activity (leading to higher levels of circulating blood triglycerides), and elevated blood glucose, insulin and cholesterol. The authors state that daily physical activity, exercise and standing movement during the day can help to diminish these unfavorable biological effects. The guidelines recommend

progressive increases in step counts by ≥ 2000 when using a pedometer to attain a daily step count of at least 7,000 steps. The new cardiorespiratory fitness recommendations are shown in Table 1.

Table 1. Cardiorespiratory Fitness Recommendations

Variable	Evidence-Based Recommendation
Frequency	≥ 5 day/wk moderate* intensity or ≥ 3 days/wk vigorous** or a combination of both on ≥ 3 -5 days/wk
Intensity	Moderate and/or vigorous is recommended for apparently healthy adults
Time	30-60 minutes at a moderate intensity or 20-60 minutes at a vigorous intensity or a combination of both
Type	Purposeful, continuous, rhythmic exercise involving the major muscle groups of the body
Pattern	Exercise may be performed in one continuous session per day or in multiple sessions of ≥ 10 min to accumulate the desired duration
Progression	Progress intensity, duration and frequency gradually until desired goal is attained

*Moderate intensity includes exercise that is fairly light to somewhat hard, or a rating of perceive exertion (RPE) of 12-13.

**Vigorous exercise includes exercise that is somewhat hard to very hard, or a RPE of 14-17.

Resistance Training Exercise Design Guidelines

Higher levels of muscular fitness are associated with lowered risk of all causes of disease, improved cardiometabolic (a construct that includes a group of risk factors that are indicators of a person's overall risk for type 2 diabetes, stroke and cardiovascular disease) health and lowered risk of developing functional limitations (Garber et al., 2011). In fact, Garber and colleagues state in the new ACSM position stand that resistance exercise may be an effective intervention in the treatment of metabolic syndrome. And, very importantly, the bone loading stress of resistance exercise may prevent, slow and even reverse the loss of bone mineral and mass that is seen with osteoporosis. Program designs should target opposing muscle groups of the chest, shoulders, back, hips, legs, trunk and arms. Have clients perform all exercises with a

purposeful, controlled full range of motion. See Table 2 for new resistance exercise guidelines.

Table 2. Resistance Exercise Recommendations

Variable	Evidence-Based Recommendation
Frequency	Major muscle groups should be trained 2-3 days/week with a 48-hour rest between sessions for muscle groups
Intensity (Strength)	40-50% of 1RM or very light to light load for beginning older persons and for beginning sedentary persons 60-70% of 1RM or moderate to hard load for novice to intermediate adult exercisers ≥80% of 1RM or hard to very hard load for experienced weight lifters
Intensity (Endurance)	<50% of 1RM or light to moderate load
Intensity (Power)	20-50% of 1RM or very (very) light to light load in older adults
Repetitions	10-15 repetitions to improve strength in beginning, middle aged and older persons 8-12 repetitions to improve strength and power in most adults 15-20 repetitions to improve muscular endurance in most adults
Sets	Single set training for novice and older adults 2-4 sets are recommended for strength and power of most adults ≤2 sets for muscular endurance
Rest	2-3 minutes of rest between multiple set training

Flexibility Training Exercise Design Guidelines

In the new ACSM position stand, Garber et al. 2011 recommend that flexibility programs (including static, dynamic, and PNF methods) should be designed specifically to meet the needs and demands of each individual's lifestyle. For most adults, flexibility training will help to improve balance and postural stability. As well, the relationship between flexibility and a reduction of musculoskeletal injury has not been substantiated in the literature. Flexibility training guidelines are shown in Table 3.

Table 3. Flexibility Exercise Recommendations

Variable	Evidence-Based Recommendation
Frequency	≥2-3 days/week of stretching the major muscles groups; greater gains will be attained if done daily
Intensity	Stretch to the point of slight discomfort or feeling of tightness in muscle

Time	30-60 seconds of static stretching holds for older persons 10-30 seconds of static stretching holds for most adults
PNF Stretches	3-6 seconds of a muscle contraction at 20-75% of maximum intensity followed by 10-30 seconds of an assisted stretch
Pattern	2-4 repetitions of each stretch is advocated
Volume	Provide a total of 60 seconds of stretching time per target muscle group for any stretching method utilized

Neuromotor Training Exercise Design Guidelines

Neuromotor exercise (i.e., functional exercise) training is advantageous as part of an all-inclusive exercise program for adults, especially older persons. This type of training can improve balance, agility, muscle strength, gait, coordination, and reduce the risk of falls (Garber et al., 2010). Garber and colleagues summarize that more research is needed to make clear the specific health-related changes resulting from functional fitness training and to determine the effectiveness of different exercise types and amounts. See Table 4 for recommendations.

Table 4. Neuromotor Exercise Recommendations

Variable	Evidence-Based Recommendation
Frequency	≥2-3 days/week
Intensity	Not determined at this time
Time	≥20-30 min/day may be needed
Type	Exercises that improve balance, agility, coordination and gait, particularly for older adults to improve/maintain physical function and to prevent falls
Volume	The optimal volume of repetitions and sets is currently unknown

Final Thoughts

One of the most impressive evidence-based statements in the new ACSM Position Stand paper is that leadership from well-trained fitness professionals will meaningfully enhance the exercise experience with adults, especially the novice exercisers. The fact that a position statement with over 400 cited references highlights the importance of

skilled exercise professions is a true measure of how much we as a profession have grown in the last decade.

Side Bar 1. Exercise Terminology Clarified

The terms physical activity, exercise, physical fitness and physical function are closely related terms that are interchanged frequently, but have discrete meanings. The new ACSM Position Stand (2011) clarifies these terms with the following definitions.

Physical Fitness: “The ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy [leisure] pursuits and to meet unforeseen emergencies. Physical fitness is operationalized as [a set of] measurable health and skill-related attributes that include cardiorespiratory fitness, muscular strength and endurance, body composition and flexibility, balance, agility, reaction time and power.”

Exercise: “Physical activity that is planned, structured, and repetitive and [that] has a final or intermediate objective the improvement or maintenance of physical fitness.”

Physical Activity: “A bodily movement produced by skeletal muscles that results in energy expenditure above resting (basal) levels. Physical activity broadly encompasses exercise, sports, and physical activities done as part of daily living, occupation, leisure, and active transportation.”

Physical Function: “The capacity of an individual to carry out the physical activities of daily living. Physical function reflects motor function and control, physical fitness, and habitual physical activity and is an independent predictor of functional independence, disability, morbidity, and mortality.”

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