TYPE 2 diabetes

Exercise is Medicine®

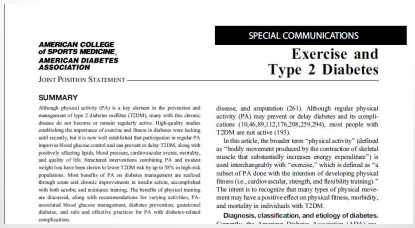
Type 2 Diabetes

QOL & Risk of Mortality

- Diabetes Mellitus is an independent risk factor for developing cardiovascular disease and may lead to chronic kidney failure, peripheral neuropathies, and vascular degeneration
- Blood glucose control is achieved in pre-diabetics and diabetics through pharmaceutical and lifestyle management
- Both aerobic and resistance exercise have significant and very positive effects on blood glucose levels in diabetics, however a combination of both has most dramatic effect (*JAMA* 304(20), Nov. 2010)

Type 2 Diabetes

Supporting Documentation



AMERICAN COLLEGE of SPORTS MEDICINE, AMERICAN DIABETES ASSOCIATION

JOINT POSITION STATEMENT

SPECIAL COMMUNICATIONS

Exercise and Type 2 Diabetes

SUMMARY

Although physical activity (PA) is a key element in the prevention and management of type 2 diabetes mellitus (T2DM), many with this chronic disease do not become or remain regularly active. High-quality studies establishing the importance of exercise and fitness in diabetes were lacking until recently, but it is now well established that participation in regular PA improves blood glucose control and can prevent or delay T2DM, along with positively affecting lipids, blood pressure, cardiovascular events, mortality, and quality of life. Structured interventions combining PA and modest weight loss have been shown to lower T2DM risk by up to 58% in high-risk populations. Most benefits of PA on diabetes management are realized through acute and chronic improvements in insulin action, accomplished with both aerobic and resistance training. The benefits of physical training are discussed, along with recommendations for varying activities. PA-associated blood glucose management, diabetes prevention, gestational diabetes, and safe and effective practices for PA with diabetes-related complications.

disease, and amputation (261). Although regular physical activity (PA) may prevent or delay diabetes and its complications (10,46,89,112,176,208,259,294), most people with T2DM are not active (193).

In this article, the broader term "physical activity" (defined as "bodily movement produced by the contraction of skeletal muscle that substantially increases energy expenditure") is used interchangeably with "exercise," which is defined as "a subset of PA done with the intention of developing physical fitness (i.e., cardiovascular, strength, and flexibility training)." The intent is to recognize that many types of physical movement may have a positive effect on physical fitness, morbidity, and mortality in individuals with T2DM.

Diagnosis, classification, and etiology of diabetes.

http://www.acsm.org/access-public-information/position-stands

Prognostic Effect of Exercise Capacity on Mortality in Older Adults with Diabetes Mellitus

Eric S. Nylen, MD,† Peter Kokkinos, PhD,‡§ Jonathan Myers, PhD,‖¶# and Charles Faselis, MD***

OBJECTIVES: To investigate the prognostic effect of exercise capacity in older individuals with diabetes mellitus.
DESIGN: Retrospective data review in a clinic-based cohort.
SETTING: Veterans Affairs Medical Centers in Washington, District of Columbia, and Palo Alto, California.
PARTICIPANTS: Two thousand eight hundred sixty-seven men aged 50 to 87 with type 2 diabetes mellitus.
MEASUREMENTS: Exercise tolerance testing with fitness categories based on peak metabolic equivalents of task (METs) achieved adjusted for age. All-cause mortality in age groups 50 to 65 (Group 1; n = 1,658) and older than 65 (Group 2; n = 1,209) was analyzed using adjusted Cox proportional hazards models.
RESULTS: After a mean ± standard deviation follow-up [illegible] 65. Thus, physical fitness, as represented by exercise capacity, lowers mortality risk in people with diabetes mellitus irrespective of age. These findings suggest that healthcare providers should be cognizant of the level of exercise capacity in individual patients and encourage a physically active lifestyle regardless of age. J Am Geriatr Soc 58:1850–1854, 2010.

Key words: diabetes; elderly; exercise capacity; mortality

Aging is associated with declines in muscle mass, strength, endurance, and aerobic fitness, with reciprocal increases in adiposity, insulin resistance, metabolic syndrome, and type 2 diabetes mellitus.[1,2] Persons with diabetes mellitus, in addition, show an accelerated decline [illegible] been well studied in older people with diabetes mellitus. The aim of the current study was to assess the relative prognostic association of exercise capacity with mortality in two cohorts of older adults.

"Augmented exercise capacity is associated with lower risk of mortality in people with type 2 diabetes mellitus aged 50 to 65 as well as those older than 65. Thus, physical fitness, as represented by exercise capacity, ***lowers mortality risk in people with diabetes irrespective of age***."

Nylen, et al. *J Am Geriatrics Society*, 2010 Oct;58(10):1850–54.

Type 2 Diabetes

Precautions

- New-onset diabetics, or those new to exercise, should monitor blood glucose levels within 30 min prior to exercise, and again immediately following for 3-5 exercise sessions (or when significant changes are made to an exercise program or medication regimen)
- Be aware of co-morbidities that might effect exercise tolerance and responses (i.e. hypertension, obesity, etc.)
- Medication schedule is key for managing exercise responses in the diabetic client to avoid blood glucose crashes
- Carbohydrate consumption may require modification and monitoring depending on exercise duration and intensity

Type 2 Diabetes

Assessments

- Diabetes stratifies client into high risk category; GXT is highly recommended under medical supervision prior to moderate or high intensity exercise program
- Strength and flexibility assessments are secondary to GXT; complete after risk of complications and cardiac disease are eliminated

Type 2 Diabetes

Exercise Recommendations – Aerobic

FOCUS: aerobic exercise may cause significant changes in blood glucose levels

- 50–80% peak HR; 11–14/20 on subjective RPE scale
- 4–7 sessions/week, 20–60 min/session
- Recumbent exercise may be indicated for those with peripheral neuropathy or advanced diabetes

Type 2 Diabetes

Exercise Recommendations – Resistance

FOCUS: resistance training has independent influences on cellular blood glucose uptake; therefore, additional monitoring may be necessary

- Low – moderate resistance, high repetitions until diabetes is well controlled
- High intensity training only with athletes
- 1–3 sets, 12–15 repetitions, 2–3 days/week
- Exercises for all major muscle groups

Type 2 Diabetes

Safety Considerations

- Monitor for dizziness, lightheadedness, sudden fatigue or fainting during and immediately following exercise
- Exercise with caution if blood glucose is > 300 mg/dl, without ketones present, feeling well, and adequately hydrated
- Exercise is contraindicated if blood glucose is > 250 mg/dl and ketones are present; or if blood glucose is < 70 mg/dl
- Keep a source of glucose (without fat) readily available and adequate hydration is critical

Type 2 Diabetes

Medication Considerations

- Insulin is prescribed based on release time (rapid – long acting); knowledge of time and dosage is important as blood glucose response may be augmented by exercise
- Medications may require titration or modified dosing schedules depending on individual exercise responses
- Clients not using insulin are unlikely to experience hypoglycemia related to exercise; those on insulin should supplement with carbohydrate as necessary to prevent drop in blood glucose < 100 mg/dl during and after exercise

Cardiovascular disease

(Coronary artery disease, hyperlipidemia, hypertension)

» Exercise is Medicine®

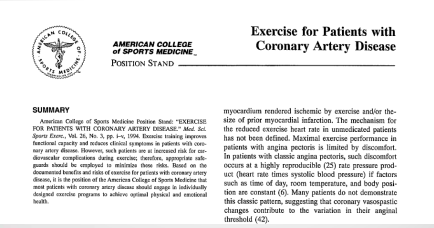
Coronary Artery Disease

QOL & Risk of Mortality

- Exercise has positive benefits for preventing coronary lesion development and during ongoing rehabilitation following a cardiac event and/or intervention
- Improved MET capacity is inversely proportional to mortality due to all-cause mortality, including coronary disease as a result of improved metabolic capacity and risk factor reduction
- Regular exercise has significant and positive benefits in many areas affecting QOL and functional performance

Coronary Artery Disease

Supporting Documentation



AMERICAN COLLEGE of SPORTS MEDICINE
POSITION STAND

Exercise for Patients with Coronary Artery Disease

SUMMARY

American College of Sports Medicine Position Stand: "EXERCISE FOR PATIENTS WITH CORONARY ARTERY DISEASE." *Med. Sci. Sports Exerc.*, Vol. 26, No. 5, pp. i–v, 1994. Exercise training improves functional capacity and reduces clinical symptoms in patients with coronary artery disease. However, such patients are at increased risk for cardiovascular complications during exercise; therefore, appropriate safeguards should be employed to minimize these risks. Based on the documented benefits and risks of exercise for patients with coronary artery disease, it is the position of the American College of Sports Medicine that most patients with coronary artery disease should engage in individually designed exercise programs to achieve optimal physical and emotional health.

myocardium rendered ischemic by exercise and/or the-size of prior myocardial infarction. The mechanism for the reduced exercise heart rate in unmedicated patients has not been defined. Maximal exercise performance in patients with angina pectoris is limited by discomfort. In patients with classic angina pectoris, such discomfort occurs at a highly reproducible (25) rate pressure product (heart rate times systolic blood pressure) if factors such as time of day, room temperature, and body position are constant (6). Many patients do not demonstrate this classic pattern, suggesting that coronary vasospastic changes contribute to the variation in their anginal threshold (42).

http://www.acsm.org/access-public-information/position-stands

INVITED COMMENTARY

Survival of the Fittest: Evidence for High-risk and Cardioprotective Fitness Levels

Barry A. Franklin, PhD

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Current Sports Medicine Reports 2002, 1:257–259
Current Science Inc. ISSN 1537-890x

Apparently Healthy Individuals
In a landmark prospective study, Blair *et al.* [6] examined 10,224 men and 3120 women who were given a preventive medical examination and a maximal treadmill test to estimate their aerobic fitness. Over an average follow-up of slightly more than 8 years, there were 240 and 43 deaths

An exercise capacity of < 5 METs generally indicates a higher mortality group, whereas an exercise capacity of ≥ 10 METs identifies a group with an excellent long-term prognosis, regardless of the underlying extent of coronary disease.

Franklin BA. *Current Sports Med Rep* 2002;1:257

Coronary Artery Disease

Precautions

- Must be aware of client's co-morbidities along with cardiac issues
- Define clear exercise parameters based on assessments, physician restrictions, state of coronary disease
- Monitor hemodynamic responses to exercise as this can be indicative of cardiovascular stability and screening for acute events

Coronary Artery Disease

Assessments

- Medically supervised GXT is highly recommended prior to any moderate intensity exercise
- Gas analysis (VO_2 uptake) may offer additional information, useful for exercise prescription
- 1-10 RM strength testing
- Sit & reach flexibility testing
- 6 minute walk test & other field tests may provided additional useful information

Coronary Artery Disease

Exercise Recommendations – Aerobic

- Early exercise may employ resting HR + 30 beats/min for coronary bypass (CABG) and percutaneous coronary intervention (PCI) clients
  - Avoid exercises involving arms for CABG patients 6-8 weeks post surgery to avoid injury to sternotomy
- Early exercise may require resting HR + 20 beats/min for myocardial infarction clients
- Aerobic exercise 3-5 days/week
- 20-45 min/session as tolerated

Coronary Artery Disease

Exercise Recommendations – Aerobic

- *Myocardial infarction*: 40-80% HR reserve
- *Bypass graft surgery*: 40-80% HR reserve
- *PCI with stent*: 40-80% HR reserve
- 11-15/20 on subjective RPE scale

FOCUS: review Karvonen HR reserve method

- ~ 50-70% HR reserve for entry cardiac rehabilitation
- Exercise intensity should be titrated based on fitness and risk stratification

Coronary Artery Disease

Exercise Recommendations – Aerobic

- All modalities are appropriate as tolerated
- Treadmill, recumbent/stationary/airdyne bike, upper body ergometer, rowing, elliptical, etc.
- Swimming and water exercise programs may be appropriate for select, stable patients
- Include prolonged warm-up and cool down
- Training for competitive participation is possible in stable patients with adequate MET capacities for desired activity

TABLE 3. Guidelines and Statements Regarding Resistance and Flexibility Training

	Resistance Training		Flexibility Training	
Population	Sets; Reps	Stations/Devices*	Frequency	Goal
Healthy/sedentary adults				
2007 AHA Scientific Statement	1 set; 8–12 reps for persons <50–60 y of age; 10–15 reps at reduced levels of resistance for persons 50–60 y of age	8–10 exercises	2–3 d/wk	Stretching the major muscle or tendon groups, 2–3 d/wk
2006 ACSM Guidelines[113]	1 set; 8–12 reps (range, 3–20 reps) performed at a moderate rep duration (~3 s concentric, ~3 s eccentric)	8–10 exercises	2-3 nonconsecutive d/wk	Static stretching, major muscle tendon units a minimum of 2–3 d/wk; stretch to the ROM at a point of tightness, 15–30 s/stretch, 2–4 reps/stretch
Elderly persons				
2001 American Geriatrics Society[121]	Low: 40% 1-RM; 10–15 reps Moderate: 40%–60% 1-RM; 8–10 reps High: >60% 1-RM; 6–8 reps	Not specified	2–3 d/wk	3–5 stretches/key muscle group; hold for 20–30 s; 3–5 d/wk
Cardiac patients				
2007 AHA Scientific Statement	1 set; 10–15 reps	8–10 exercises	2–3 d/wk	Stretching the major muscle or tendon groups, 2–3 d/wk
2004 AACVPR guidelines[111]	1 set; 12–15 reps	6–8 exercises	2–3 d/wk	
2006 ACSM guidelines[116]	1 set; 10–15 reps	8–10 exercises	2–3 d/wk	

Reps indicates repetitions; ROM, range of motion; ACSM, American College of Sports Medicine; and AACVPR, American Association of Cardiovascular and Pulmonary Rehabilitation.

*Minimum 1 exercise per major muscle group, for example, chest press, shoulder press, triceps extension, biceps curl, pull-down (upper back), lower-back extension, abdominal crunch/curl-up, quadriceps extension or leg press, leg curls (hamstrings), and calf raise.

Williams MA, et al. *Circulation*. 2007 July;116:572-584.

Coronary Artery Disease

Exercise Recommendations – Aerobic

FOCUS: Low-fit clients may train at 40-50% HR reserve, >70% is appropriate for moderate-higher fit clients

- Monitor for abnormal signs and symptoms
- Intensities approaching 90% HR reserve may precipitate cardiovascular complications
- Select exercises/equipment that may be increased in intensity by 1 MET increments

Coronary Artery Disease

Exercise Recommendations – Resistance

- 12 weeks post bypass grafting for resistance > 1-2lbs.
- 4 weeks post myocardial infarction
- 2 weeks post PCI or stent placement

FOCUS: Begin with modest resistance (50-70% 1RM), functional training, and flexibility training

- Progress to higher levels of resistance training based on tolerance (70-90% 1RM)
- Advanced resistance training may be employed safely and effectively for select, stable cardiac clients

Coronary Artery Disease

Safety Considerations

- Common symptoms associated with angina:
  - chest pain, pressure, burning, discomfort
  - left jaw pain
  - arm numbness/discomfort (often only left arm)
  - upper back pain or pressure
  - unusual difficulty breathing with minimal exertion
  - dizziness and unnecessary fatigue
- Exercise should be terminated if any of the above are noted or change during an exercise session

Suspected Cardiac Emergencies: Dial 911 and initiate appropriate emergency response

Coronary Artery Disease

Medication Considerations

- Many common medications prescribed for coronary disease have effects on exercise response, tolerance, and symptomology
- Daily reminders about medications and follow up are necessary as medication timing, dosage, and frequency changes may significantly change hemodynamic response to exercise on a day to day basis
- Oral nitroglycerine (fast-acting) may be used to relieve exercise-induced chest discomfort (as prescribed); however, if no relief is realized after 1st dosage, terminate exercise and contact cardiologist or primary care physician

Hyperlipidemia

QOL & Risk of Mortality

- Elevated cholesterol or reduced high-density lipoprotein are classified as an independent risk factor for developing cardiovascular disease
- Exercise has been shown to indirectly reduce total cholesterol by improving HDL profile of patients undergoing treatment for hyperlipidemia
- No direct influence on exercise response or tolerance

Hyperlipidemia

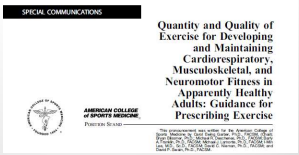
Assessments

- GXT may be indicated depending on additional risk factors and patient status
- All field tests and assessments may be performed without restriction based solely on lipid profile

Hyperlipidemia

Exercise Recommendations

- Based on general guidelines for exercise prescription
- Modifications made based on co-morbidities as necessary


SPECIAL COMMUNICATIONS

AMERICAN COLLEGE of SPORTS MEDICINE

POSITION STAND

Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise

http://www.acsm.org/access-public-information/position-stands

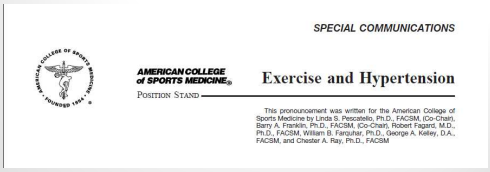
Hypertension

QOL & Risk of Mortality

- Elevated systolic and/or diastolic blood pressure is classified as an independent risk factor for developing cardiovascular disease
- Exercise training has been shown to reduce resting blood pressure and acute response to exercise and physical activity, thus lowering chronic stress on arterial walls and reducing risk of damage
- No direct influence on exercise response or tolerance

Hypertension

Supporting Documentation



SPECIAL COMMUNICATIONS

AMERICAN COLLEGE of SPORTS MEDICINE®

POSITION STAND

Exercise and Hypertension

This pronouncement was written for the American College of Sports Medicine by Linda S. Pescatello, Ph.D., FACSM, (Co-Chair), Barry A. Franklin, Ph.D., FACSM, (Co-Chair), Robert Fagard, M.D., Ph.D., FACSM, William B. Farquhar, Ph.D., George A. Kelley, D.A., FACSM, and Chester A. Ray, Ph.D., FACSM

http://www.acsm.org/access-public-information/position-stands

Hypertension

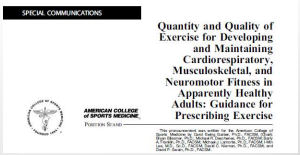
Assessments

- GXT may be indicated depending on additional risk factors and patient status
- All field tests and assessments may be performed without restriction based solely on blood pressure
- Resting blood pressure measures should be validated on 2 or more occasions

Hypertension

Exercise Recommendations

- Based on general guidelines for exercise prescription
- Modifications made based on co-morbidities as necessary


SPECIAL COMMUNICATIONS

AMERICAN COLLEGE of SPORTS MEDICINE

POSITION STAND

Quantity and Quality of Exercise for Developing and Maintaining Cardiorespiratory, Musculoskeletal, and Neuromotor Fitness in Apparently Healthy Adults: Guidance for Prescribing Exercise

http://www.acsm.org/access-public-information/position-stands

Hypertension

Safety Considerations

- Resting blood pressure above 200/110mmHg is a contraindication for exercise participation
- Resistance exercise should not increase blood pressure or myocardial oxygen demands beyond acceptable levels
  (SBP x HR = Rate Pressure Product)
- Exercise training and/or testing should be stopped with drop in SBP > 20mmHg or rise above 250/110mmHg

Common Cardiovascular Medications

- Beta Blockers*
- Diuretics
- Ace Inhibitors**
- Calcium Channel Blockers*
- Anticoagulants
- Digitalis
- Nitrates (angina, HTN)
- Aspirin
- Statins (hyperlipidemia)
- Combination Drugs

*Medication classes often prescribed to suppress HR & BP at rest and exercise response; cardio-selective beta blockers may have more dramatic HR suppression than non-selective beta blockers and Ca^{++} channel blockers
**Ace inhibitor lower BP at rest and suppress exercise response; have no effect on HR response to exercise

Beta Blockers

- Decrease heart rate at rest and during exercise
- Decrease blood pressure at rest and with exertion
- Decrease ischemic response during exercise (strain on heart muscle due to lack of oxygen)
- May inc ance in clients w

ATENOLOL – TENORMIN
BISOPROLOL
METOPROLOL – LOPRESSOR/TOPROL XL
NADOLOL – CORGARD
SOTALOL
PROPRANOLOL – INDERAL
CARVEDILOL – COREG

Diuretics

- No effect on heart rate
- May decrease blood pressure or have little effect
- May show a false positive "ischemic strain" if fluid loss is excessive

HYDROCHLOROTHIAZIDE
FUROSEMIDE – LASIX
TORSEMIDE – DEMADEX
TRIAMTERENE – DYRENIUM
SPIRONOLACTONE – ALDACTONE

Ace Inhibitors

- No effect on heart rate at rest or during exercise
- Decreases blood pressure at rest and during exertion
- No ECG effects
- No effect on exercise tolerance, except potentially in sympton patients

BENAZEPRIL – LOTENSIN
CAPTOPRIL – CAPOTEN
ENALAPRIL – VASOTEC
LISINOPRIL – ZESTRIL/PRINIVIL
QUINAPRIL – ACCUPRIL
RAMIPRIL – ALTACE

Calcium Channel Blockers

- Decreases resting and exercise heart rate
- May slightly decrease resting and exercise blood pressure
- Decreases ischemic response shown on ECG
- May increase exercise tolerance in patients with exertional angina

DILATAZEM – CARDIZEM/DILACOR/TIAZAC
VERAPAMIL – CALAN/ISOTOPIN

Anti-coagulants

- Coumdin/Warfarin is commonly prescribed for patients with clotting risk; atrial fibrillation presents significant risk
- No effect on heart rate and blood pressure

Statins

- No effect on heart rate, blood pressure, or exercise tolerance
- Intended to lower total cholesterol or specific sub-particles of cholesterol (LDL, etc.)
- Most widely prescribed pharmaceutical in the country

LIPITOR – ATORVASTATIN
CRESTOR
TRICOR
ZOCOR – SIMVASTATIN

Nitrates

- Increase resting heart rate and may also increase exercise heart rate
- Decreases resting and exercise blood pressure
- Decreases ischemic ECG response
- Increased exercise capacity in patients with exercise-induced angina

ISOSORBIDE MONONITRATE – IMDUR

NITROGLYCERINE – NITROSTAT/ NITROQUICK/ NITROLINGUAL/NITORGARD/ NITRO-BID

Aging, fall prevention

Exercise is Medicine®

Aging & Fall Prevention

QOL & Risk of Mortality

- Exercise has demonstrated significant improvements in cardiovascular disease risk, functional mobility, metabolic fitness, psychological health, and general health measures in seniors engaged in a regular exercise program
- As previously described improvements in MET capacity confer reduced mortality, including for seniors; exercise improved metabolic capacity
- Exercise delays disability by improving muscular strength and endurance
- Falls account for a significant risk of acute health issues in seniors leading to mortality and should be prevented however possible

Aging & Fall Prevention

Supporting Documentation

AMERICAN COLLEGE of SPORTS MEDICINE

POSITION STAND

Exercise and Physical Activity for Older Adults

This pronouncement was written for the American College of Sports Medicine by Wojtek J. Chodzko-Zajko, Ph.D., FACSM, (Co-Chair); David N. Proctor, Ph.D., FACSM, (Co-Chair); Maria A. Fiatarone Singh, M.D.; Christopher T. Minson, Ph.D., FACSM; Claudio R. Nigg, Ph.D.; George J. Salem, Ph.D., FACSM; and James S. Skinner, Ph.D., FACSM.

http://www.acsm.org/access-public-information/position-stands

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Exercise Physiology

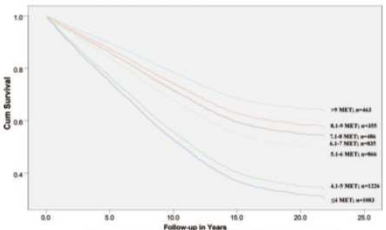
Exercise Capacity and Mortality in Older Men

A 2

Peter Kokkinos, P
Demosthenes B. Panagiotakos
Athanasios Manolis, MD; John F
Vasilios I

Background—Epidemiological findings, b
association between exercise capacity a
Methods and Results—Between 1986 and
mortality in 5314 male veterans aged 65
Veterans Affairs Medical Centers in Wa
peak metabolic equivalents (METs) ach
2137 deaths. Baseline exercise capacity
(P<0.001) and emerged as a strong pred
hazard for death was 12% lower (hazar
individuals (≤4 METs), the mortality ris
confidence interval, 0.54 to 0.71) and p
0.49) for those who achieved >9 METs.
testing had a 35% lower mortality risk (
remained unfit.
Conclusions—Exercise capacity is an indep
and graded, with most survival benefit
significantly when unfit individuals bec

Key Words:



Fitness Categories	Number of Cumulative Events/Number of Cases at Risk			
	5 years	10 years	15 years	20 years
≥4 METs	337/724	535/379	608/186	615/61
4.1-5.0 METs	302/853	525/400	605/176	622/48
5.1-6 METs	113/656	215/330	289/122	298/56
6.1-7 METs	93/644	179/343	241/168	260/49
7.1-8.0 METs	51/386	108/180	149/77	146/22
8.1-9.0 METs	43/275	70/111	87/39	95/18
>9 METs	27/343	64/210	100/55	101/25

Kokkinos, et al. *Circulation*. 2010;122:790

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Activities and Mortality in the Elderly: The Leisure World Cohort Study

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[4]Department of Neurobiology and Behavior, University of California, Irvine.

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Background. Although physical activity has substantial health benefits and reduces mortality, few studies have examined its impact on survival beyond age 75.

Methods. *Using the population-based Leisure World Cohort Study, we examined the association of activities on all-*

Results. Time spent in active activities, even ½ hour/day, resulted in significantly lower (15–35%) mortality risks compared with no time in active activities. ***Conclusions.*** Participation in leisure-time activities is an important health promoter in aging populations.

testings.

Conclusions. Participation in leisure-time activities is an important health promoter in aging populations. The association of less physically demanding activities as well as traditional physical activities involving moderate exertion with reduced mortality suggests that the protective effect of engagement in activities is a robust one.

Key Words: Mortality—Physical activity—Elderly—Exercise—Longitudinal.

Received July 9, 2010; Accepted December 17, 2010

Decision Editor: Darryl Wieland, PhD, MPH

Paganini-Hill, et al. *J Gerontol A Bio Sci Med Sci*. Feb. 2011.

Aging & Fall Prevention

Assessments

- GXT may be indicated depending on risk factor profile prior to beginning a moderate exercise program
- 6 minute walk test
- Timed up and go
- Sit to stand
- 10 RM strength assessment
- Standardized fall risk assessment

Aging & Fall Prevention

Mode	Intensity	Frequency	Duration
Aerobic exercise	Moderately intense*	≥ 5 days a week	30 min or more†
Aerobic exercise	Vigorously intense±	≥ 3 days a week	20 min or more
Resistance training	10-15 reps/set	2-3 times per week	
Flexibility stretch	3-4 times each	Each workout	10-30 sec/stretch
Balance exercises		No specific recommendation	
Physical activity plan	Combo of all		
	*40-60% max O2 uptake ±>60% max O2 uptake		†short bouts (≥10 min)

Aging & Fall Prevention

Exercise Recommendations – Resistance

- To increase strength:
  - Squeeze sponges or ball newspaper
- To improve balance:
  - Stand on one leg, sit on large ball, walking on heels, sideways or crossover walking, stand on balance disc/board

  FOCUS: encourage core stability exercise using callisthenic and isometric exercises to improve balance. Use of unstable surface training techniques should be adequately supported to prevent falls
- To improve reaction time, agility & kinesthetic awareness:
  - Toss balls of various sizes, shapes & surfaces
  - Challenge visual acuity and hand-eye coordination

Aging & Fall Prevention

Exercise Recommendations

- Adjust for decreased vision, hearing, balance, stamina, strength & flexibility
- Keep exercises simple, safe & enjoyable
- Avoid high impact exercises
- Increase repetitions before resistance
- Encourage pain-free ROM and train for ADLs
- Consider benefits and risks of all weight training modalities

Aging & Fall Prevention

Safety Considerations

- Avoid sudden postural changes, uneven surfaces, and excessive weight/intensity to prevent falls
- Monitor for acute cardiac symptoms, hemodynamic abnormalities, and pain tolerance during exercise progressions and intensity changes
- Incorporate chair/seated exercises, balance bars, and other support for deconditioned and frail individuals

Cancer

Exercise is Medicine®

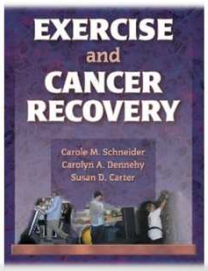
Cancer

QOL & Risk of Mortality

- Regular exercise during cancer therapy may result in reduced fatigue, greater body satisfaction, body weight maintenance, improved mood, decreased side effect severity (from treatment), and better overall QOL
- Aerobic and resistance exercise programs have the potential to improve bone remodeling and reduce muscle atrophy effects of glucocorticoids that are common in treatment regimens
- Significant improvements in functional tests have been shown in clients who participated in a regular exercise program during treatment

Cancer

Supporting Documentation



Cancer

Precautions

- Easy and premature fatigue is common in cancer patients, especially during exercise and must be considered during exercise program development
- Exercise testing has similar endpoints and considerations as typical parameters
- Clients may be limited by muscle weakness and/or pain from tumor, surgery, or other therapy
- An acute change in general health status is a relative contraindication to exercise testing/training

Cancer

Assessments

- GXT may provide useful insight, however not required for exercise participation
- Functional fitness assessments
- 6 min walk test
- Sit & reach
- 10 RM strength assessment
- Sit to stand
- Stair climbing
- Gait analysis

Cancer

Special Considerations

- Assess client's medical condition prior to each session
- Exercise program should accommodate special needs related to cancer treatment regimen
- Sessions may need to be adjusted on a daily basis based on client's ability at each session
- Adapt training to client's treatment schedule
- Modify exercise program based on current status, medical condition, and treatment regimen

Cancer

Exercise Recommendations – Aerobic

- Symptom limited at moderate intensity
- 40 – 60% of HR reserve

FOCUS: exercise for improved mood, fatigue level, weight management; daily exercise should be individualized based on acute symptoms and fatigue

- 3-5 days/week; 20-60 min/session
- All cardiovascular modalities are appropriate and increase duration & intensity as tolerated

Cancer

Exercise Recommendations – Resistance

FOCUS: Maintenance of arm, leg, and core strength with consideration for fatigue and any treatment-related areas of weakness

- 40-60% of RM, increase slowly as tolerated
- 1-3 sets, 3-5 reps increasing to 8-15 reps
- 2-3 days/week as tolerated
- All major muscle groups may be targeted

FOCUS: lymph edema related to breast cancer treatment may be augmented using ROM exercise and lymph drainage techniques

Cancer

Safety Considerations

- Consider risks of cardiovascular co-morbidities, especially anemia
- Exercise should be postponed if:
  - uncontrolled vomiting/diarrhea
  - neutropenic fever (infection-related)
  - bleeding risk is high or unknown
  - acute anemia is suspected
  - abnormal blood counts and levels are present

Cancer

Medication Considerations

- Treatments may effect exercise performance, but unlikely to alter exercise responses
  - Surgery: pain, loss of flexibility, nerve damage
  - Radiation: pain, fatigue, scar tissue & loss of flexibility, premature osteoporosis leading to fracture
  - Chemotherapy: fatigue, nausea, anemia, bone loss, general pain, neuropathy
  - Immunotherapy: fatigue, nerve damage, myopathy

Pregnancy

Exercise is Medicine®

Pregnancy

QOL & Risk of Mortality

- Exercise may have very positive results during pregnancy to minimize weight gain, musculoskeletal discomforts, and post partum weight management and psychological health
- Exercise should be cleared by OBY-GYN prior to participating and avoided during higher risk pregnancies
- Exercise improves overall function and may impact delivery and recovery if done safely and effectively

Pregnancy

Supporting Documentation

- Exercise significantly decreases incidence of gestational diabetes and pre-eclampsia
- Supports general health of both the mother and fetus during pregnancy and post-partum
- See ACOG FAQ August 2011 (http://www.acog.org/~/media/For%20Patients/faq119.pdf?dmc=1&ts=20120314T0959177512)

Pregnancy

Precautions

- Avoid exercises for abdominal muscles and supine positions
- Prevent falls and avoid any contact and high impact exercises
- Terminate exercise immediately if any bleeding, unusual nausea, dizziness, or other unexpected symptoms occur
- Avoid vigorous exercise in hot, humid weather conditions and wear comfortable, clothing to remain cool
- Recommend wearing a bra that fits well and provides ample support – sports bra may not be sufficient during pregnancy

Pregnancy

Exercise Recommendations – Aerobic

- Exercise is encouraged during first 2 trimesters of pregnancy
- Do not start, stop, and restart exercise during pregnancy
- Consult physician prior to participation
- Avoid high-impact exercises and activities where balance may be compromised

FOCUS: progressively increase duration rather than intensity of aerobic training

Pregnancy

Exercise Recommendations – Resistance

- Exercise during third trimester should be closely monitored and approved by physician
- Emphasize flexibility, range of motion, and lower body exercise
- Avoid abdominal resistance training
- Avoid exercises with increased risk of falls
- Water exercise may be very beneficial

Pregnancy

Safety Considerations

- Terminate exercise if client becomes dizzy, disoriented, or unusually fatigued
- Discontinue exercise if there are signs of bleeding/spotting, cramping, unusual shortness of breath or other unusual symptoms; consult physician immediately
- Do not start an exercise program with a formerly sedentary client during a pregnancy unless cleared by physician

- You have earned 4 ACSM CEC's for participating today

Conclusions & wrap-up