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REVIEW
ΑΝΑΣΚΟΠΗΣΗ

Prescription of exercise for older adults
Recommendations for clinical practice

Regular exercise and general daily activity provide substantial health benefits, improve quality of life and increase functionality in older adults. Elderly people often do not benefit fully from exercise prescription, however, because they receive vague or inappropriate instructions. This paper reviews the components of exercise prescription and the approaches to developing appropriate exercise prescription for older persons, which should be multi-component, including aerobic, muscle strengthening, balance and flexibility training. The elderly should be encouraged to participate in therapeutic exercise programs as primary or adjunctive therapy in the treatment of various chronic diseases associated with aging.

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2021, 38(1):12–17

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Συνταγογράφηση άσκησης σε ηλικιωμένα άτομα: Συστάσεις για την κλινική πρακτική

Περίληψη στο τέλος του άρθρου

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1. INTRODUCTION

In the geriatric population, physical activity (PA) and regular exercise are beneficial. PA promotes health, reduces disease and disability, slows disease progression, decreases mortality and morbidity, and increases the quality of life (QoL) and functional independence of elderly people.[1–4] Strong evidence documents that PA lowers the risk of obesity and enables maintenance of a healthy body weight. It also lowers the risk of heart disease, stroke, type 2 diabetes mellitus (DM), high blood pressure, adverse blood lipid profile, metabolic syndrome, and certain cancers (notably, colon and breast).[4–6]

Exercise is highly effective in producing a myriad of health benefits,[7,8] including the promotion of health and extension of lifespan, but it is a strikingly underused health promotion modality. Although the health benefits of PA for elderly persons are well established, exercise is an underused form of health promotion, especially in the older population.[4] Both clinicians and their elderly patients continue to neglect exercise.[4,9]

There is a clear difference between the terms PA ("any bodily movement") and exercise ("a subset of physical activity that is characterized by a planned and purposeful training"). Many researchers and health care practitioners, however, use these two concepts synonymously.[7] Exercise, a subcategory of PA, consists of structured, planned, repetitive body movement, with the intent of improving physical fitness, performed to improve one or more components of fitness (cardiorespiratory, strength, flexibility, body morphology, and or balance).[10] Health professionals should know the components of exercise prescription and

understand the different types of exercise, and should identify the benefits and the risks in older age groups.[10] Health practitioners, namely, physicians, physiotherapists and exercise scientists, should educate older adults about the benefits of activity, and they should play a more active role in motivating their patients to exercise.[4]

Older adults will derive distinct benefits from aerobic exercise, strength and or resistance training, flexibility or stretching exercises, and balance training.[11] Although any form of exercise is better than none, the appropriate manipulation of the exercise density (i.e., intensity, frequency and duration) is necessary for the optimal effect.[12] Exercise can be considered as a drug[7] and it is important to create a plan that addresses each recommended type of exercise.[2]

The aim of this study is to provide updated, evidence-based recommendations for health care professionals concerning the quantity and quality of exercise prescriptions for elderly people, with the goal of increasing the awareness of the value of exercise prescription among health practitioners.

2. THE BENEFITS OF EXERCISE

There is strong evidence that common changes of aging (e.g., functional decline, loss of muscle strength and balance) can be remedied with an important, but often overlooked prescription: exercise.[13] Exercise constitutes effective therapy for many chronic diseases, reducing the risk of cardiovascular disease, thromboembolic stroke, hypertension, type 2 DM, chronic obstructive pulmonary disease (COPD), osteoporosis, sarcopenia, obesity, colon cancer, breast cancer, dementia, anxiety, and depression.[14,17] Emerging evidence documents significant psychological and cognitive benefits from participation in regular exercise by older adults.[15,16]

Primary adaptations to exercise occur in the cardiorespiratory and musculoskeletal systems from both aerobic (endurance) and resistance (strengthening) types of training. In skeletal muscle, physical exercise consistently attenuates several characteristics of aged muscle, including intramuscular adipose infiltration, physical performance, strength, size, and function; muscle fiber area; and muscle quality.[13] Exercise also reduces morbidity. A reduced risk for elderly persons (≥65 years) is associated with participation in moderate to moderately vigorous PA; this translates to approximately 4 METs, or 60% VO_2max (or heart rate equivalence), and can be accomplished by brisk or fast walking.[17] Age-related decreases in glucose tolerance and insulin sensitivity appear to be preventable with exercise participation. Endurance exercise training increases important cellular functions, such as mitochondrial biogenesis, muscle oxidative capacity, mitochondrial content, oxidative enzyme activities, muscle protein synthesis rates, mitochondrial protein gene transcripts, and mitochondrial DNA copy number.[13]

Resistance training may increase both muscle strength and muscle mass. Older adults respond to strength training, showing large gains in isometric and dynamic strength, power, and force control.[17,18] An association has also been shown between improvements in strength and motor function and reduced mortality in older adults.[19]

3. EXERCISE ASSESSMENT AND PRESCRIPTION

The World Health Organization (WHO)[21] and the European Association of Cardiovascular Prevention and Rehabilitation[22] guidelines state that exercise is generally safe for the elderly population, and older people therefore need not consult a medical practitioner before increasing physical activity levels.[11] In addition, exercise prescription is generally designed for a specific purpose, and it is usually developed by rehabilitation specialists based on the health condition of the individual. It mainly includes the type, frequency, intensity, and duration of exercise.[13] Older adults are heterogeneous with respect to their health status and physical function, and exercise prescription should therefore take into consideration the patient's health status, chronic disease risk factors, behavioral characteristics, personal goals, and exercise preferences.[10,20] Older adults will derive distinct benefits from aerobic exercise, strength or resistance training, flexibility or stretching exercises, and balance training.[21]

Prior to exercise, older adults should visit their physicians to identify health risks or safety concerns and their complete medical history should be thoroughly evaluated.[23] The assessment of older adults is a multidimensional, multidisciplinary assessment, evaluating their physical health, functionality, and mental health, and socioenvironmental circumstances.[24] Exercise professionals should elicit history regarding medical conditions, polypharmacy, previous physical activities and exercise pursuits, and symptoms which may suggest underlying conditions, such as shortness of breath. Walking more, or being more active in everyday activities does not warrant prior medical clearance.[13,24]

Key components of exercise prescription include setting achievable activity goals, identifying barriers and providing potential solutions, and offering specific recommendations on the type, frequency, and intensity of activities.[11]

Verbal or written recommendation for PA should include a specific activity (modality), its frequency and intensity, and short- and long-term goals to help maintain motivation.[22] After the older adult begins an exercise program, the health professional should continue to monitor the progress periodically and provide encouragement.[22,23] Rehabilitation professionals should counsel the elderly about the benefits of exercises, matched to each individual's level of ability, skill, and interest. Long-term benefits of exercise are sustained only with regular adherence, and health professionals should advise also that these benefits begin almost immediately after starting a regular exercise program.[13] They may also help the elderly decrease their fear of injury from exercise.[21,22]

When prescribing exercise for older adults, it is essential, for both safety and adherence, to begin slowly at low intensities and to progress gradually.[13] Each exercise session should include a warm-up and cool-down period. If chest pain, shortness of breath, or dizziness develops during unsupervised training, older individuals are instructed to rest and to see their physician if these symptoms continue with further exercise.[25,26]

Some major challenges are faced by rehabilitation professionals in designing exercise interventions that will increase the involvement of older people in exercise and will also improve their adherence to and compliance with exercise programs. Rehabilitation professionals should regularly inform older adults of the health and functional benefits and the safety associated with regular supervised exercise.[8,27] They should also motivate elderly by establishing reasonable and attainable health goals.[25] Pre-exercise evaluation is vital to ensuring that exercise training can be safely initiated, and may include: body weight and body composition assessment, blood pressure assessment, spirometry, chest X-ray, palpation of the cardiac apical impulse and point of maximal impulse, palpation and inspection of lower extremities for edema and the presence of arterial pulses, tests of neurological function, including reflexes and cognition, auscultation of the lungs with specific attention to uniformity of breath sounds in all areas (absence of râles, wheezes, and other abnormal breathing sounds).[25]

4. COMPONENTS OF EXERCISE PRESCRIPTION

The main components of exercise prescription for older persons include aerobic, muscle-strengthening, balance and flexibility activities.[24,25] These components contribute to healthy aging and maintenance of strength, function and QoL in elderly people.[13] Effective exercise programs may also include warm-up and cool-down periods, although evidence of their benefit is lacking.[2,6]

4.1. Aerobic exercise

Aerobic exercise is any repetitive activity that increases the heart rate for an extended period of time. To improve aerobic fitness, exercise must utilize major muscle groups –such as arms and legs– over prolonged periods in activities that are rhythmic and aerobic in nature. Some aerobic activities are walking, jogging, cycling, swimming, dancing, and hiking.[10,13]

4.1.1. General principles and recommendations. To promote and maintain health, older adults need moderate-intensity aerobic physical activity for a minimum of 30 minutes on five days of each week, or vigorous intensity aerobic activity for a minimum of 20 minutes on three days of each week.[18] For aerobic exercise, the American College of Sports Science (ACSM) recommends a target intensity of 50–85% of oxygen uptake reserve – a range that includes both moderate and vigorous exercise.[20]

4.2. Resistance exercise

Resistance training or progressive resistance training uses body weight, resistance bands, machines, free weights or stability balls to apply resistance against which a muscle or muscle group must generate force to move or resist.[10] Resistance training helps maintain muscle mass, muscle strength and bone density.[13]

4.2.1. General principles and recommendations. To promote and maintain health and physical independence, older adults will benefit from performing activities that maintain or increase muscular strength and endurance for a minimum of two days each week. Resistance training should thus be performed at least twice per week.[18] ACSM recommends performing at least one set of repetitions for 8–10 exercises that train the major muscle groups, and recommends that exercise for each muscle group takes place on two or three nonconsecutive days each week.[20] Some experts recommend 10 to 15 (as opposed to 8–12) repetitions per set for older adults.[20,23]

4.3. Balance exercise

Balance training involves exercises that challenge the individual's ability to stabilize his or her body and maintain posture. This training uses unstable surfaces, narrowing bases of support, weight shifts, or the removal of upper body assistance to improve balance.[13]

4.3.1. General principles and recommendations. Balance exercises consist of positions or movements that challenge the individual to maintain posture and stability over a base of support. The ACSM recommends performing exercises that narrow the base of support, disrupt the center of gravity, stress postural muscles, or reduce sensory input.[13,18] The preferred types, frequency, and duration of balance training are unclear and not specified in the clinical guidelines.[18,28] Balance training should be practiced at least two hours per week, should be ongoing for lasting fall prevention effect, and may be group-based or home-based.[11,29] To minimize the risk of falling during exercise, balance training should be closely supervised at first and begin with less challenging postures.[29,30]

4.4. Flexibility exercises

Flexibility is the range of motion around a joint and is associated with injury prevention through all life stages.[10] Flexibility training can help maintain or improve the range of motion in the joint, which may prevent injury, reduce joint pain, and improve posture. Flexibility training consists of dynamic or static stretches. Dynamic stretches involve actively moving through the joint's range of motion and static stretches are held for a certain length of time. Flexibility training allows older adults to maintain or improve their ability to perform activities of daily living such as combing hair, reaching for objects on a shelf or the floor, getting dressed, or putting on shoes.[13]

4.4.1. General principles and recommendations. At least 10 minutes of flexibility activities is recommended, based on the time required for a general stretching routine involving major muscle and tendon groups with 10–30 seconds for a static stretch and 3–4 repetitions for each stretch. Preferably, flexibility activities are performed on all the days that aerobic or muscle-strengthening activity is performed.[20] ASCM suggests static stretches for all major muscle groups at least two days per week. Flexibility exercises can be performed while seated, standing or lying down.[13]

4.5. Mode of exercises

The ACSM recommends that most adults engage in moderate-intensity cardiorespiratory exercise training for ≥30 minutes on ≥5 days per week for a total of ≥150 minutes per week, vigorous-intensity cardiorespiratory exercise training for ≥20 minutes per day on ≥3 days per week (≥75 minutes/week), or a combination of moderate- and vigorous-intensity exercise, to achieve a total energy expenditure of ≥500–1.000 MET minutes per week. The intensity of exercise should be modified to match the exercise experience and physical capability of each individual.[5,20,30] For most health outcomes, greater benefits occur with exercise intervention performed at higher intensity, greater frequency, or longer duration.[11]

4.6. Additional exercises

Structured exercise programs and classes designed specifically for older adults, such as Tai Chi, gentle or chair yoga, motor control exercises, water aerobics, dancing, Zumba programs, etc., can motivate and encourage older adults to exercise through a fun, supportive, social environment.[13] The Otago Exercise Program is an evidence-based strength, balance and exercise program for high risk older adults, designed to prevent falls in older people living in the community.[31–33]

All these exercises can be performed as structured center-based group exercise or in individual home-based exercise.[33] Group exercise is believed to be beneficial and its mechanisms of action are attributed to a combination of physical, psychological, and social factors.[34,35] The one-to-one exercise model is effective in terms of patient motivation and for securing compliance, but it is more costly and requires more human resources.[34,36] The mode of exercise in all cases should match the individual needs, abilities and goals. There is a need for specific skill training on how to write exercise prescriptions and to motivate older adults to follow these prescriptions.[37]

5. CONCLUSIONS

Health professionals are well aware of the importance of integrating PA and exercise into the daily life of every individual. Exercise prescription includes setting achievable activity goals, identifying barriers and providing potential solutions, and providing specific recommendations on the type, frequency, and intensity of activities.[11] Older adults can safely and effectively participate in exercise programs when exercises are prescribed by exercise certified health professionals. The type and mode of exercise prescription for older adults vary according to their individual characteristics and health status.

ΠΕΡΙΛΗΨΗ

Συνταγογράφηση άσκησης σε ηλικιωμένα άτομα: Συστάσεις για την κλινική πρακτική

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Η τακτική άσκηση και η δραστηριοποίηση στην καθημερινότητα παρέχει ουσιώδη οφέλη στην υγεία, βελτιώνει την ποιότητα ζωής και αυξάνει τη λειτουργικότητα στα ηλικιωμένα άτομα. Όμως, οι ηλικιωμένοι συχνά δεν ωφελούνται πλήρως από τη συνταγογράφηση της άσκησης καθώς λαμβάνουν ακατάλληλες ή ασαφείς οδηγίες. Ο σκοπός της παρούσας εργασίας είναι η ανασκόπηση των διαφορετικών μορφών της άσκησης για συνταγογράφηση και προσέγγιση αναφορικά με τη δημιουργία συστάσεων για τους ηλικιωμένους. Η συνταγογράφηση της άσκησης σε ηλικιωμένα άτομα πρέπει να είναι πολυπαραγοντική, περιλαμβάνοντας αερόβια προπόνηση, ασκήσεις μυϊκής ενδυνάμωσης, ισορροπίας και λειτουργικότητας. Οι ηλικιωμένοι πρέπει να ενθαρρύνονται για τη συμμετοχή τους σε θεραπευτικά προγράμματα άσκησης ως πρωτογενή ή συμπληρωματική θεραπεία διαφόρων χρόνιων παθήσεων που σχετίζονται με τη γήρανση.

Λέξεις ευρετηρίου: Άσκηση, Ηλικιωμένοι, Κλινική πρακτική, Συνταγογράφηση

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