Exercise Prescriptions for Active Seniors

In Brief: Exercise is perhaps the best 'medication' healthcare providers can prescribe for their geriatric patients. Increasing fitness by participating in a regular exercise program can reduce the effects of aging that lead to functional declines and poor health. By exercising modestly and regularly, elderly patients can substantially lower their risk of death from coronary artery disease, colon cancer, and complications of diabetes. Even for those who start between the ages of 60 and 75, regular exercise can reduce overall mortality rates. Elderly patients can benefit tremendously from a comprehensive exercise prescription.

A s a vast number of baby boomers enter their 60s, the role of exercise as a "health promoter" will become more evident. Many individuals 65 or older who regularly exercised throughout their lives will reap the benefits from their efforts.1-3 Unfortunately, about 24% of elderly people are sedentary, while roughly another 54% are suboptimally active, according to the Centers for Disease Control and Prevention and the American College of Sports Medicine.4 Estimates suggest that 42% of men and women between the ages of 60 and 69 are overweight (a body mass index [BMI] >25).5
In a busy office practice, what can healthcare providers do about the elderly patient who has never or rarely exercised? Can an exercise prescription this late in life still have potential health benefits? Does the patient need a cardiac stress test before starting the exercise prescription? Are patients going to hurt themselves by exercising? The key to the geriatric exercise prescription is to create a realistic, individualized, holistic program based on the goals of the patient and provider.

Normal Physiologic Changes Accompanying Aging
Even in the absence of disease, changes associated with aging affect all the major organ systems. Changes in the cardiovascular system include decreased elasticity in blood vessel walls, increases in blood pressure, and myocardial hypertrophy resulting in decreased end-diastolic filling and cardiac output.6 After the age of 25, maximum oxygen uptake (Vo2max) by exercising muscles decreases by 5% to 25% per decade.7
Pulmonary effects include loss of tissue elasticity as well as a gradual decline in the number of alveolar sacs. These normal changes will impair an elderly patient's abilities to tolerate an aerobic exercise challenge.

As humans age, they experience neuronal cell loss, decreases in reaction time, decreases in overall balance, and decreases in nerve conduction velocities.8 Aging decreases estrogen, androgen, and growth hormone levels. Rates of depression increase with age, while motivation decreases, leading to a decrement in daily function and increased hospital mortality.

The most noticeable changes observed with aging are those involving the musculoskeletal system. Lean body mass decreases, interstitial fat content increases, joint motion diminishes, and muscle strength and endurance decrease.8 Muscle strength is maintained well up until the fifth decade of life, but in each of the next 2 decades, it is normal to see up to a 15% drop in muscle strength.9 Progressive loss of bone density is also a concern. Women maintain bone density until age 35, while men do so until about age 55. By age 70, most people have lost 10% to 15% of their peak bone density.10 When prescribing exercise, providers must factor in these normal changes to maximize exercise benefit and minimize injury risk.

Physiologic Benefits of Exercise for Older Patients

Regular exercise can improve the physical and mental health of elderly patients, even though it cannot halt the anatomic changes that occur with aging. (See "Retirement From Olympics Means Time to Enjoy Exercise," below.) However, some evidence suggests that Vo2max can be improved in the elderly patient.11 Regular aerobic exercise will also increase levels of high-density lipoprotein (HDL) and decrease levels of low-density lipoprotein (LDL), both of which are advantageous for those who have other cardiovascular risk factors.

The neuromuscular benefits of exercise are perhaps the most substantial because they can reduce the number of falls. Falls can significantly affect the rest of patients' lives, so healthcare providers must help patients reduce the risk by incorporating strength and balance training.12

Type 2 diabetes has been increasing among sedentary elderly patients. In the Physician's Health Study,13 regular exercise increased the ability to regulate glucose, improved overall glucose homeostasis, and decreased the chances of developing diabetes by 36%. Depression in the elderly can rapidly contribute to the "beginning of the end." Although treatment of depression has improved with the advent of newer classes of drugs such as selective serotonin-reuptake inhibitors, adding another medication can create an adverse drug interaction or another side effect (see next section). Studies suggest that regular exercise helps reduce the risk of becoming depressed and decreases the symptoms in elderly patients who are already clinically depressed.14 Promoting exercise may also improve socialization with other elderly people who choose to exercise together.

The effects of aging on the musculoskeletal system are perhaps most noticeable to patients and their healthcare providers. Osteoarthritic pain with loss of strength, motion, and function brings many patients to seek healthcare advice. The Fitness and Arthritis in Seniors Trial (FAST)15 demonstrated a decrease in pain and increased daily functioning among more than 400 patients older than age 60 with significant osteoarthritis. No increase in overall injuries was observed in patients who exercised. In addition, resistance training markedly increases lower-extremity strength, gait speed, and the ability to climb stairs.16 An exercise prescription can help elderly patients improve their functional and psychological well-being.

Medications and Exercise

Many elderly people take medications that can trigger adverse effects while they exercise, so healthcare providers and pharmacists must educate their patients about the accompanying risks. Medications and their side effects include:

- Antihypertensive medications, such as beta-blockers and calcium channel blockers, can cause bradycardia and may mask the symptoms of hypoglycemia;
- Diuretic agents may contribute to dehydration, orthostasis, electrolyte imbalances, and, potentially, cramping;
- Beta-blockers can impair glucose uptake by exercising muscles;
- Psychotropic medications may contribute to hyperthermia and dehydration;
- Antidepressant medications and tranquillizers can cause orthostasis;
- Insulin and sulfonylureas increase the risk of hypoglycemia; and
- Anticoagulants increase the risk of serious bleeding if elderly patients fall or injure themselves during exercise.

Formulating an Exercise Prescription

The goal of the exercise prescription is to improve cardiovascular and muscular health and/or fitness. No single program works for all patients, so the program must be tailored to the individual. Some patients will already be active and just looking for some refinement. Others may never have exercised consistently and have no idea where to start. Keeping in mind the individual's physical and mental limitations, as well as available resources, healthcare providers can then tailor an exercise plan for that patient. Exercise assessment. Providers and patients should work together to identify health and individual goals. Healthcare providers should identify patients who need cardiovascular screening and begin their program with plenty of encouragement. The program should include aerobic activities and strength, flexibility, and balance training.

Risk assessment. It is important that the underlying cardiovascular health, including any history of valvular disease, be known before initiating any program that might provoke an acute coronary syndrome (figure 2). The patient's complete medical history should also be reviewed.

If the patient has known cardiac or moderate-to-severe valvular disease, symptoms suggestive of disease, or two or more cardiac risk factors (advanced age is one), the provider should consider cardiac physiologic testing, electrocardiogram, echocardiogram, and/or cardiology consultation before suggesting a vigorous exercise prescription. Patients with a history of pulmonary disease should be considered for pulmonary function testing and/or consultation with a pulmonologist. In general, most elderly patients who are found to have low-to-moderate risk do not need a current medical examination or a stress test before beginning a low-to-moderate intensity exercise program.7

Exercise prescription. When the goals are set and the patient is willing to start, take 10 to 15 minutes to sit down and plan out a program together.Remember the mnemonic "MDFIT" when writing the prescription:

- Mode of activity: Swimming, walking, stationary cycling, dancing, and water aerobics are all possible choices. The keys are that patients enjoy the activities, activities

are safe for them to do within their physical limitations, resources are readily available, and they are willing to comply with the program.

- Duration of activity: The activity can be continuous or done in short bouts throughout the day. For example, if a patient walks briskly for 15 minutes to a friend's house, stays a few hours, and then walks 15 minutes back home, that patient has exercised for 30 minutes that day. Patients should gradually increase session time by 5 to 10 minutes per week to reach a final goal of 30 to 40 minutes total exercise for that day.1
- Frequency: The current recommendation is for patients to exercise most days of the week.
- Intensity: The level can be low, moderate, or high, depending on the patient's fitness level and ultimate goals (see figure 3). In general, a low-to-moderate-intensity program is best for geriatric patients. The goal is to maintain their interest and avoid overuse injuries.
- Timely follow up: Patients need to be encouraged. See the patient after 4 weeks to monitor progress and health status. A few words of encouragement can often make the difference in whether a patient will continue an exercise program or lapse into a sedentary lifestyle. Patients should be instructed on precisely how to start and advance their training. They should also be educated about what to expect as they exercise and how to contact their provider if any questions or concerns should arise.

Resistance or weight training should be an adjunct to the aerobic exercise prescription. Consider giving patients four to six basic resistance exercises to be done at a comfortable pace. Flexibility exercises should also be incorporated into each exercise session. General guidelines exist for healthy and "low-risk" cardiac patients who wish to increase their overall strength and flexibility (table 1).

TABLE 1. Strength and Flexibility Training Guidelines for Older Patients

1. Start with a gentle warm-up. A 5- to 10-minute walk with active arm swinging can be effective. Stretch your major muscles, like legs and back, for 5 to 10 minutes after the warm-up. Your healthcare provider can give you handouts or a list of resources to guide you.
2. Concentrate on working large muscle groups such as the quadriceps (thighs), gluteus muscles (buttocks), hamstrings, hip muscles, deltoids (shoulders), biceps, triceps, back, and abdominal muscles. Arising from a chair with arm rests using your arms and legs is a good way to work many of these muscles. Repeat this 12 to 15 times. Eventually work up to two to three sets of these most days of the week.
3. An alternative to 2 (above) is to choose weights that can be lifted 12 to 15 times with "fairly light" to "somewhat hard" exertion. Do not strain or hold your breath. Your healthcare provider can give you handouts or suggest where you can get specific exercises to guide you. When that weight becomes too easy, increase the weight slightly, but keep the number of repetitions the same, between 12 to 15. Lift the weight gradually in 2 seconds and gently lower it in 4 seconds, working the muscles through their normal range of motion.
4. Rest for 1 to 2 seconds between repetitions and 1 to 2 minutes between sets of exercises. Eventually work up to two to three sets of each exercise.
5. Allow 1 to 2 days' rest between workouts so that muscles can rebuild and recover.

6. Stop immediately and sit or lie down if you experience chest pain or pressure, dizziness, abnormal heartbeats, or unusual shortness of breath. Call Doctor if you do not feel much better after 1 or 2 minutes of rest. Report these symptoms--even if they get better quickly--to your doctor before resuming exercise.
7. Lift weights--or do other strength training--and stretch with a partner or significant other. You will be more likely to continue exercising. Community yoga programs are also a good way to learn to stretch and relax while exercising.
8. Drink plenty of fluids before, during, and after resistance training.
9. Be creative and try different exercises to avoid boredom.

Considerations for Special Patient Populations

COPD and asthma. Patients with chronic obstructive pulmonary disease (COPD) and moderate-to-severe persistent asthma provide special challenges for the healthcare provider who wishes to write an exercise prescription. Patients with moderate COPD benefit from regular aerobic exercise. Regular aerobic exercise has been shown to decrease lactate production and decrease ventilation rate despite not producing significant changes in pulmonary function testing or arterial oxygenation.17 For patients who have some dyspnea, optimize medical treatment and allow them to use the Borg perceived exertion scale to guide their ability to exercise. Concentrate efforts on conditioning larger muscle groups. The overall goal is to increase daily functional abilities and decrease shortness of breath.

Some general guidelines include:

- Walking, stationary biking, aqua aerobics, and swimming are good exercise options.
- For patients who have 60% to 80% of predicted forced expiratory volume in 1 second (FEV1), exercise intensity should be less than 75% of the patient's maximum predicted ventilatory rate.8 In practical terms, the patient should never exert to the point of symptomatic hyperventilation or breathlessness. The patient should still be able to speak in complete sentences while exercising.
- For patients with FEV1 values less than 60% of predicted, exercise intensity should be regulated by a dyspnea scale. The Borg scale may be used as a guide. The "fairly light" to "somewhat hard" categories represent a good target range.
- Two to 4 L/min of oxygen may be administered, by nasal cannula, to improve performance.
- Multiple short periods of exercise may be better tolerated than one long session.
- Avoid exercising outside during harsh weather conditions.

Another option is to refer patients with COPD, persistent asthma, cardiovascular disease, or diabetes for supervised community exercise programs.

Osteopenia and osteoporosis. The National Osteoporosis Foundation recommends regular weight-bearing activities 45 to 60 minutes four times per week,8 and some tips include:

- Strengthen back extensor muscles and abdominal muscles while avoiding spinal flexion exercises, which may increase the risk of compression fractures.
- Avoid exercises that may increase the risk of falling.
- Aquatic exercises are helpful for muscle conditioning and range of motion but will not help maintain bone mineral density.

- Encourage proper nutrition; diet should include vitamin D, 1,500 mg of calcium per day, and estrogen replacement, for women, to help maintain bone mineral density.
- Strengthen large leg muscles to help prevent falls and subsequent fractures.

Maximizing Exercise Adherence

The most difficult challenge is keeping patients focused and compliant with the prescription. Empathize with them and provide constant praise and encouragement. Let them know that, despite many barriers, they can still find the time to exercise. Encourage them to exercise with a friend, significant other, or even a pet. This advice may be helpful for days when the patient feels tired or unmotivated. Variety is important for preventing boredom. For example, walking in the park or the mall can substitute for walking on a treadmill.

Physical factors also play a role. The exercise location should have adequate lighting and be safe and free of obstacles. Patients should wear their glasses if necessary and be educated about the best time to exercise to avoid any potential medication side effects. Investigate the community and provide a list of support groups, health club facilities, and other resources that may support the patient in this lifelong goal. Finally, provide the patient with aids such as easy-to-read illustrated handouts or videos that illustrate the exercise prescription. Provide patients with time to ask questions about their exercise prescription.

Prescription for Health

The health benefits of regular exercise are well known to healthcare providers. For geriatric patients who are able, there may be no "medication" better than a well-planned and executed exercise prescription. In today's busy medical practices it may seem easier to prescribe a pill rather than exercise; however, an exercise prescription may be the best way for elderly patients to stay healthy, preserve their functional capacity, and maintain an active, independent lifestyle.

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Retirement From Olympics Means Time to Enjoy Exercise

There's an ironic edge to the way former Olympic men's speed skater Chuck Burke, age 71, views aging and exercise: He doesn't want to be the first one across the finish line. "I like to stop and smell the roses," Burke says.

That doesn't mean Burke has ever stepped off the ice. After competing in the 1952 and 1956 Winter Olympics, he went on to coach speed skating for the next 35 years; among his athletes were 18 national champions and 8 Olympians. Currently, he's coaching two of his grandchildren.

Burke, of Northbrook, Illinois, has been cross-training since age 6, before the concept became popular. During his younger years he competed in speed skating, figure skating, barrel jumping, and bike racing. After retiring from competitive skating, Burke took up biking and running, but just for fun. Burke says his goal in gravitating more toward biking is to stay fit in an activity that is less stressful on the joints and is a scenic social outlet.

Burke says older people should listen to their bodies during sports participation, approach activity with moderation, and select enjoyable activities. "Some things are hard to start later in life, such as in-line skating--one fall and you can get clobbered," he says.
Being active won't prevent all age-related health problems, Burke says, noting he had a minor heart blockage a few years ago. The support of his physician, however, encouraged Burke to remain active. "He's an athlete, so he understands," Burke says.

LISA SCHNIRRING

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