

# CHAPTER 8

8



PHYSICAL  
ACTIVITY FOR  
THE ELDERLY

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# Physical Activity for the Elderly

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*Disclaimer: The subject of physical activity for the elderly is complex, and the elderly vary greatly in their individual activity needs and capabilities. The following general recommendations are not intended to replace advice from an individual's healthcare provider.*

## Activity: Rx for Aging

Good news: sickness is not a necessary part of aging. Research on aging now finds that some simple changes can help many people avoid disability, weakness, and disease.<sup>1-6</sup> Adults with a healthy lifestyle, who eat well (and a little less), who don't smoke or drink to excess, who keep emotionally involved with others, and who keep mentally and physically fit may be able to delay the physical process of aging. The era of anti-aging medicine has arrived. As in other areas of medicine, new discoveries will continue to give us insight into living well, and longer. Be cautious; anti-aging is a relatively new medical specialty, but there is already much non-scientific misinformation in the papers and on television. Follow logical suggestions for healthy living, and always discuss health matters with a qualified healthcare professional.

## Who's "Elderly?"

Physical activity for the elderly; let's start by defining our terms. The meanings of "elderly" (or *geriatric*) and "physical activity" have changed a lot over the years. People now live longer, healthier lives and benefit from modern medicine and modern living. "Elderly" used to mean over age 60, but today the definition is more complex. A person's age in years (*chronological age*) is only one part of the picture. Most experts now also consider a person's *physiological age*, which reflects an interplay between genetics and environment, to determine who is "elderly." Environmental factors that influence physiological age include disease, nutrition, physical activity, lifestyle, stress, and education. Because we can change these factors, we now have some control over whether or not we are "elderly." In this chapter we will simply define "elderly" as a chronological age greater than 70, while understanding that our physiological age may be much more or much less, depending on who we are and how we live.

### **What's "Physical Activity?"**

The meaning of "physical activity" has also changed quite a bit over the years. Society has come a long way since the industrial revolution. Life is now much easier, and people do a lot less physical work. Thanks to cars, computers, supermarkets, and fast food, we spend less and less energy in our daily lives. Video games have even made our recreation easier. While it's nice to be comfortable, here's the price of progress: technology has made us a sedentary society that is now battling the epidemics of type 2 diabetes and obesity. Physical activity used to be a normal, non-negotiable part of everyday life, and recreational physical activity used to be considered fun. Today, many people feel that physical activity is a chore, a strenuous task that takes a lot of time and has to be scheduled into our busy lives like an aerobics class or a workout in the gym. Really, though, "physical activity" is any activity that uses muscles, increases the heart rate, and spends more energy than it takes the body to maintain itself (the basal metabolic rate). Some examples of physical activity for inactive elderly people are listed in Example 1. As you can see, they're not hard work, don't have to take a lot of time, and can be fun.

### **Ask Your Doctor**

Many elderly people have diseases or conditions that limit their ability to take part in physical activity. Most elderly people take medicines; some medicines alter the body's normal response to physical activity. Also, elderly people are more susceptible to the usual risks of physical activity, such as falls, dehydration, and heat exhaustion.<sup>6-10</sup> Therefore, all elderly individuals *must* have a thorough medical exam before beginning a program of regular physical activity. Just as with medicines, physical activity has risks and benefits. However, if you stick to the rule, "Start low and go slow" and follow the suggestions in Example 2, the benefits should outweigh any risk.

### ***Physical Activity & the Elderly Body***

This section will discuss some changes that occur in the body as we age, and how a regular routine of physical activity can affect these changes. This is just a few paragraphs on what is really a complex subject, so please discuss your individual situation with a healthcare professional.

#### *The heart*

The heart and the cardiovascular system change with age, in predictable ways that reduce our capacity for

physical activity. As we age, the heart pumps less blood with each beat, reducing the body's ability to use oxygen. In medical terms, the stroke volume and cardiac output decrease, leading to a reduction in maximum oxygen consumption (VO<sub>2</sub>max).<sup>11</sup> VO<sub>2</sub>max declines by about 9% per decade after age 30 in people who do not have heart disease.<sup>12</sup> Thus, as we age, less oxygen and nutrient-rich blood reaches tissues such as muscle. Regular aerobic activity can delay or even reverse this age-related decline in capacity.<sup>7,9,11</sup>

Also, as we age, atherosclerosis (hardening of the arteries) narrows our blood vessels, increasing the resistance to blood flow. This raises our systolic blood pressure by 10 to 50 mm Hg. (The systolic pressure is the pressure when your heart pumps out blood. This is shown in the top number of your blood pressure reading, such as the 120 in 120/80. The bottom number is the diastolic pressure. This is the pressure when your heart relaxes between beats to fill with blood again.) High blood pressure and other conditions often seen in the elderly such as orthostatic hypotension, autonomic dysfunction, and abnormal heartbeats such as paroxysmal atrial fibrillation (heart flutter), sick sinus syndrome,

premature atrial contractions (PACs), and premature ventricular contractions (PVCs) all increase the chance of a fatal arrhythmia, heart attack, or stroke.<sup>11</sup> Therefore, it is very important for inactive elderly people to get a cardiac exercise stress test before beginning a physical activity program. Finally, people usually monitor their heart rate to gauge how hard they're exercising. This measurement is often inaccurate in elderly individuals because the heart naturally slows with aging. In addition, many elderly people take prescription drugs that alter the heart's response to physical activity. More useful ways to monitor the intensity of physical activity include the *perceived exertion scale* or the "talk test," both described in detail in Chapter 7. In general, an activity is too strenuous for an elderly person if they can't carry on a normal conversation while taking part in the activity.<sup>11,12</sup>

### *The lungs*

As we age, our respiratory system also changes in ways that reduce our capacity for physical activity. Over the years the number of tiny air sacs in the lungs (alveoli) declines, and skeletal changes, such as kyphosis (spinal curving) and vertebral fractures decrease the functioning area of the lungs. Respiratory muscles also may

weaken. Technically, these result in reduced vital capacity and residual volume.<sup>12</sup> These changes can cause acid-base abnormalities and electrolyte disturbances if an individual suddenly increases the intensity and duration of their physical activity. If a person starts at a low level of activity, monitors the intensity of their activity, and increases it gradually, there is very little risk. On the plus side, as respiratory muscles strengthen and inhalations/exhalations become fuller with regular physical activity, a person is likely to have fewer respiratory illnesses (such as pneumonia).

### *The muscles*

Many inactive elderly people notice a decline in muscle mass and strength. This is a frequent complaint. In fact, the number and size of muscle fibers diminishes as we age.<sup>12</sup> When this occurs in small muscle groups, it produces a loss of coordination of fine movement. The loss of muscle also slows our metabolism. If we don't reduce our caloric intake to compensate for this, we will gain weight and increase our risk of insulin resistance and type 2 diabetes. Many elderly people consult an endocrinologist to find out if the muscle loss is due to a hormonal problem, such as a testosterone deficiency. While it is reasonable to check for a hormonal

problem, muscle loss is usually due to deconditioning. Studies in which people who did not have a hormonal deficiency received hormone injections found few gains but many side effects. To date, the best (and safest) treatment for age-related muscle loss is a physical activity program that includes endurance training, resistance training, flexibility training, and balance training, as described in Example 2 (Rx: Physical Activity for the Elderly).<sup>1-6</sup>

A program of regular physical activity increases the number of capillaries in our muscles, which improves the delivery of oxygen and nutrients.<sup>12</sup> Heart muscle also benefits. Increasing the number of capillaries also improves the removal of lactic acid from working muscle, and makes heat dissipation more efficient.<sup>12</sup> Resistance training increases the size and number of muscle fibers, increases the strength of muscles and tendons, and improves joint stability.<sup>10</sup> Endurance training increases the ability of the muscles to store glycogen. All forms of physical activity increase the number of mitochondria in muscle cells, which improve the body's metabolism and use of glucose.<sup>3,12</sup>

### *The nervous system*

Scientists once believed that the brain and nervous system could not restore

themselves, and thus any damage or decline was permanent. We now know that this is not entirely true. It is true that the speed of nerve impulses declines with age, slowing our reflexes and impairing balance and coordination.<sup>11</sup> However, regular physical activity can counteract these changes. Strength training and balance training are particularly effective.<sup>10</sup> Moderately-intense physical activity increases oxygen flow to the brain and increases metabolic activity in some areas of the brain. Studies are now in progress to determine if these effects can prevent cognitive decline.

In general, physical activity benefits all organ systems. The common ailments of constipation, chronic fatigue, depression, and rheumatoid arthritis all improve with physical activity.<sup>4</sup> Physically fit individuals have fewer sick days and more energy than inactive individuals, and accomplish more. The most impressive benefit of increased physical activity is a great improvement in the ability to perform activities of daily living.<sup>3</sup> This allows more elderly people to maintain their independence and delays the need for assisted living. Prolonging the period of independent living allows an individual to maintain their quality of life.

## Conclusion

Physical activity can benefit nearly every person, and at every age. We will never be too old to become more fit and improve our lives with physical activity. As you have seen in this chapter, almost any physical activity will improve the life of an inactive elderly person. So, what are you waiting for? “Start low and go slow,” follow the suggestions in Example 1, and you will be well on your way to total well being!

### Example 1



## Examples of Physical Activity for an Inactive Elderly Person

Walking, dancing, playing with grandchildren. Housekeeping, yardwork, gardening. Water aerobics, swimming, jogging in pool. Yoga (the stretching or breathing kind). Tai Chi, stretching exercises, breathing exercises. Bicycling, rowing machine, elliptical machine. Golf, tennis, bowling, hiking, weight lifting.

### Example 2

## Rx: Physical Activity for the Elderly

A therapeutic physical activity program for any elderly person must consider age-related physical changes, maintain safety as a primary concern, and be tailored to that individual's strengths and likes. The

program must make adaptations for diminished hearing, vision, and balance, as well as the decreases in cardiac output, muscle mass, joint flexibility, and bone mass seen with advancing age. The following elements are part of any good prescription for physical activity:

1. All components of a physical activity program for an elderly person must start slowly and progress slowly.
2. STOP physical activity and seek medical treatment if chest tightness, chest pain, shortness of breath, dizziness, or other illness occurs during the activity. Do not engage in physical activity during an acute illness, if dehydrated, or if fever, chills, or other symptoms are present.
3. Begin every workout session with a 10-minute warm-up that includes a gradual increase in heart rate, an increase in blood flow and glucose utilization in skeletal muscle, and gentle stretching to prevent injury.
4. The intensity of the activity should be between 40% to 70% of your maximal heart rate (220 minus age).
5. Start the program with 15-minute sessions (or as tolerated) and gradually increase to 60-minute sessions with a maximum of 90-minute sessions (which you can divide throughout the day). About three to six sessions per week is a reasonable goal.

6. All types of aerobic activity are appropriate, depending on your health. (See Example 1 for examples of physical activity.)

7. People with arthritis should avoid continuous, repetitive weight-bearing physical activity as this may cause orthopedic injury. Instead, these people can try alternative physical activities including swimming, water aerobics, Pilates, yoga, Tai Chi, and possibly rowing or cycling.

8. Add resistance training to the aerobic activity recommendations given above. Resistance training will help to maintain muscle mass and tone, bone strength, proper posture, and possibly help to prevent falls.

9. Focus resistance training sessions on the use of light weights (40 to 50% of one maximum lift) with multiple repetitions (12 to 15 repetitions per set). Train large muscle groups first, then proceed to smaller muscle groups. Initially perform only one set with approximately 30 seconds of rest between exercises. Sets can gradually be increased to a maximum of three sets per training session.

10. Resistance training sessions should initially (and periodically) be supervised by a professional trainer who can teach proper body alignment and slow, controlled movements with a full range of motion to prevent injury. Elderly

individuals MUST avoid lifting heavy weights to prevent injury!

11. End each aerobic and resistance training session with a 5–10 minute cool-down to return an individual to baseline heart rate and to facilitate the body's removal of lactic acid.

12. Engage in flexibility training only after “warming up” your muscles, such as with an aerobic training session or a resistance training session. Hold stretches in position for at least 15 seconds, and avoid extreme pain.

13. Be patient. Gains in aerobic endurance, strength training, and flexibility must be gradual to prevent injury.

14. REMAIN HYDRATED during all physical activity sessions. To replenish water, drink at least three to six ounces of water every 10 to 15 minutes during physical activity. If you “feel” thirsty, you are already deficient in water.

15. Elderly individuals should avoid physical activity in extreme temperatures and at extreme altitudes as they are less able to adapt to these changes.

Physical activity is fun, and may be as simple as a walk with a family member or friend, or may involve dancing, bowling, or throwing a ball with a grandchild. Just “get moving!” The benefits you reap will extend well beyond your physical health!

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