CHAPTER

24

Wellness for the Aging Adult

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The World Health Organization defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity."[1] Wellness is often described in terms of these three interconnected domains of physical, psychological (mental), and social well-being. Wellness is viewed by some as a process,[2,3] and by others as an outcome achieved through health promotion and disease prevention processes.[4] Regardless of whether wellness is viewed as a process or an outcome, wellness programs give participants tools to approach life and activities in ways that promote optimal health and maximize personal potential.

Health promotion and disease prevention programs typically focus on enhancing wellness within one or more of these three health domains.[5] Wellness becomes a philosophy of life that utilizes health promotion and disease prevention strategies to achieve the goal of optimal aging. Optimal aging implies maximizing one's ability to function across physical, psychological, and social domains to one's satisfaction and despite one's medical conditions. The three overarching domains of physical, psychological, and social health are often further divided into dimensions (Table 24-1). Hettler, the founder of the Wellness Institute, is frequently quoted for his view of wellness as a process with six interconnected wellness dimensions: physical, emotional, spiritual, social, occupational/vocational, and intellectual (Figure 24-1).[3] Although these dimensions are frequently described in the wellness literature, there is little scientific evidence to confirm or reject these dimensions as the primary underlying factors making up the broad construct "wellness." Despite the lack of a clear understanding of the various components of the construct of wellness, wellness is generally accepted as a multidimensional entity, with inclusion of factors associated with physical, psychological, and social health making intuitive sense.

PHYSICAL HEALTH DOMAIN

The physical dimension of wellness is primarily influenced by such factors as exercise, nutrition, sleep, avoidance of disease-causing agents, early detection and treatment of diseases and medical conditions, and avoidance of iatrogenic complications.[2,4,6] Exercise and nutrition are discussed later in this chapter.

Sleeping well is important for physical health and emotional well-being, especially if there is a history of prior depression.[7] A good night's sleep is especially important with age because it improves concentration and memory formation, allows the body to repair any cell damage that occurred during the day, and refreshes the immune system, which helps to prevent disease.[8] Conversely, a lack of sleep is linked with the risk of depression.[9] Older adults' sleep habits change with aging, with having increased periods of wakefulness and less REM sleep.[10] Chronic diseases are associated with poor sleep habits, complaints of poor sleep quality, and interruptions in sleep patterns.[11] Specific sleep habits such as engagement in physical exercise, one nap in the middle of the day, avoidance of caffeine and snacks in the evening, relaxation techniques, and a consistent sleep schedule can promote healthful sleep.

Cigarette smoking is a major public health concern. Conservative estimates are that 30% of deaths from lung cancer, and 80% of deaths from chronic obstructive pulmonary disease are linked to cigarette smoking.[12] Smoking is also a factor in cardiovascular disease. It is never too late to quit smoking, with benefits occurring in as little as 1 year in those with cardiovascular disease.[13]

Few studies have been conducted regarding the value of participating in preventive medicine services after the age of 75 years. However, common sense might dictate that getting regular checkups to identify problems before they impact wellness, maintaining a healthy weight, engaging in physical activity, and getting enough physical exercise promotes physical wellness. These habits may make it less likely for hospitalization and medications that often have associated iatrogenic complications.[6]

Physical therapists can promote the goal of optimal aging through the accommodation of the primary, secondary, or tertiary prevention needs for those whose health conditions span the range of minor physical impairments and sedentary lifestyle to major disability. Similarly, physical therapists possess the requisite knowledge of the

TABLE 24-1 Wellness Domains

Health Domain	Wellness Dimension	Description
Physical	Physical	Physical functioning to the degree that allows one to perform roles in family and society
Mental	Emotional	Sense of well-being and the ability to cope effectively with life's "ups and downs"
	Spiritual	Aspect of life that provides meaning and direction that connects to something greater than one's self
	Intellectual	Ability to learn and use information effectively; to reason and use self-efficacy in wellness endeavors
Social	Social	Meaningful relationships and presence of a social support structure
	Occupational/ Vocational	Purpose in life, a reason to get up in the morning

FIGURE 24-1 Six dimensions of wellness. *(Courtesy of Lifetime Wellness, Ltd., Longview, Tex.)*

consequences of poor health behaviors and strategies to promote more positive behaviors through patient education.[14] Wellness is a way of life that often requires behavioral and lifestyle changes to accomplish, changes only accomplished when individuals are educated in behaviors and conditions that limit or enhance wellness.[5]

Nutrition

Poor nutrition and excessive weight loss in older adults,[15] as well as excessive weight gain (obesity),[16] are associated with excess mortality, frailty, and lower quality of life. Maintaining a healthy body weight promotes optimal aging. Effect size for the relationship between optimal aging and having a normal body weight ranges from 1.58 to 3.05.[16] Weight loss in obese individuals is associated with improved functional status and amelioration of frailty in older adults.[17] Dietary interventions may decrease the risk or progression of macular degeneration, stroke, heart attacks, and lipid abnormalities, osteoarthritis and osteoporosis, and a number of cancers.[18-20] There is growing evidence that older adults can benefit from regular use of a daily multivitamin containing age-appropriate recommended amounts of folic acid and vitamins B_6, B_{12}, D, and E, as older adults are often deficient through dietary intake.[21-23] Subopitmal vitamin D levels have been associated with poor balance, weakness, and increased risk of hip fracture.[24-26] Table 24-2 provides a summary of the key nutritional considerations outlined in the USDA-approved modified nutritional guidelines for older adults, advocated by many gerontologists.[6] Physical therapists should be ready to advise older adults on basic nutrition principles to manage weight or accommodate high levels of physical activity.[27] The physical therapist will also work with nutrition specialists who can provide individualized assessment of nutritional needs and recommendations for nutritional modifications in managing special diets (e.g., control of diabetes or morbid obesity).

Exercise

Exercise is the single most important health-promoting activity for older adults.[28] Current recommendations for physical activity to achieve health benefits are a minimum of 150 minutes per week of *moderate to intense* aerobic activity and strengthening of the major muscle groups 2 or more days per week (Table 24-3). However, the Centers for Disease Control and Prevention reports

TABLE 24-2 Recommendations from the Modified USDA Food Pyramid for Older Adults

1. Whole, enriched, and fortified grains and cereals such as brown rice and 100% whole wheat bread
2. Bright-colored vegetables such as carrots and broccoli
3. Deep-colored fruit such as berries and melon
4. Low- and nonfat dairy products such as yogurt and low-lactose milk
5. Dry beans and nuts, fish, poultry, lean meat, and eggs
6. Liquid vegetable oils and soft spreads low in saturated and trans fat
7. Fluid intake (water is best)
8. Physical activity such as walking, housework and yard work

(Adapted from Lichtenstein AH, Rasmussen H, Yu WW, et al: Modified MyPyramid for older adults. J Nutr 138(1):5-11, 2008.)

TABLE 24-3 2008 Physical Activity Guidelines for Older Adults

	2 h and 30 min (150 min) of moderate–intense aerobic activity (i.e., brisk walking) every week AND muscle strengthening exercise on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms)
OR	1 h and 15 min (75 min) of vigorous–intense aerobic activity (i.e., jogging or running) every week AND muscle strengthening exercise on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms)
OR	An equivalent mix of moderate- and vigorous-intensity aerobic activity AND muscle strengthening exercise on 2 or more days a week that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms)

For generally fit older adults the guidelines listed in Table 24-3 apply. Otherwise, obtaining a health clearance from the individual's physical therapist or physician is advisable to set appropriate physical activity goals. (*Data from Centers for Disease Control, Division of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion. Physical activity for everyone: guidelines: older adults. http://www.cdc.gov/physicalactivity/everyone/guidelines/olderadults.html. Accessed April 4, 2010.*)

that only 34% of individuals between ages 65 and 74 years, and 17% of individuals aged 75 years and older, exercise regularly.[29] This is consistent with Fiatarone Singh's findings that only 30% of older adults are physically active.[30] Physical therapists are uniquely qualified to guide older adults to improve physical wellness through individualized fitness and physical activity programs. Physical therapists, as movement specialists, can provide information, guidance, and help that is particularly relevant to older adults striving to optimize their aging—by maintaining and enhancing function and adapting physical activity and exercise programs to accommodate pain or other disability that challenges movement ability. Communicating and marketing the value of physical therapist–designed and –led wellness programs are key to promoting the functional abilities and wellness of aging adults.

PSYCHOLOGICAL WELLNESS

Psychological wellness includes the emotional, cognitive, and spiritual dimensions of wellness. Emotional wellness emphasizes control of stress and effective coping with life situations. High stress levels with poor coping can lead to negative physiological (e.g., cardiovascular, musculoskeletal), emotional (e.g., depression, anxiety, anger), and behavioral (e.g., inability to work, inefficiency) responses. Cognitive wellness emphasizes the skills, self-efficacy (a person's confidence in his or her ability to accomplish a task or achieve a goal), and interest in engaging intellectually in the world. Strategies to promote cognitive health are contained in Chapter 8 on cognition.

Spiritual health includes the values, morals, and ethics that guide an individual's search for a state of harmony and inner balance. Spirituality is about a person's existence and relationships with self, others, and the universe. Spirituality does not necessarily connote religiosity.[31] The spirituality dimension may increase with age, perhaps because of increased time to reflect about their role in the universe and the meaning of life.[32]

Ryff and Keyes[33] in a confirmatory factor analysis of a large group of adults across a wide age range compiled six distinct dimensions associated with psychological wellness that integrate elements from several theorists such as Erikson, Maslow, and Rogers. Taken together, these six dimensions encompass a breadth of wellness that includes positive evaluations of one's self and one's life, a sense of continued growth and development as a person, the belief that life is purposeful and meaningful, the possession of good relationships with other people, the capacity to manage one's life and the surrounding world effectively, and a sense of self-determination. A healthy psychological outlook can reduce the intensity and duration of illnesses, creating the so-called mind–body interaction. Although the absence of mental distress or illness does not equate to psychological well-being, attention to these six domains can promote a sense of well-being and hope that encompasses psychological health.[34]

SOCIAL WELLNESS

Social wellness includes the social and occupational dimensions of wellness. In general, social well-being involves the ability to develop and maintain healthy relationships with others, to feel connected to a community or group, to interact well with other people, and to have a support structure to call on during difficult times. Social supports significantly influence the ability to cope with life's stressors. Social networks also help to protect older people against harm and promote emotional and physical well-being. For older adults, social connectedness is often a priority need and helps people find a balance between quality of life and compromised health. People considered socially well are usually involved with others, rather than isolated, and they report satisfactory levels of perceived social support.

Five major factors make up the construct of social wellness.[35] These five factors are:

1. Social integration ("I feel close to other people in my community")
2. Social contribution ("My daily activities are worthwhile to my community")
3. Social coherence ("I can make sense of what's going on in the world")
4. Social actualization ("Society is improving for people like me")
5. Social acceptance ("People care about the social issues that are important to me")

In a large-scale set of two studies that included adult subjects between 18 and 74 years of age, Keyes found that social well-being increased with age (although more slowly with increasing age) in all categories except for social coherence, which decreased with increasing age.

Social supports and caregiving can be both formal and informal. Formal caregiving involves paid services, usually from agencies and organizations that address basic needs of individuals such as personal care, meals, and transportation. Informal (unpaid) caregiving, typically provided by family, friends, and significant others, often is the main source of emotional and psychosocial support for the older adult. A healthy social network provides a safety net for older adults. Older adults who lack adequate social supports are more vulnerable to safety risks such as older person abuse and substance misuse and are at risk for depression, impaired decision making, isolation, loneliness, poor health, and decreased life expectancy.[36]

Occupational/vocational wellness is closely linked to social wellness. A basic tenet of occupational/vocational wellness is a balance between work, home, and leisure activities, with the opportunity to engage in meaningful activity.[37] Occupational wellness refers to one's attitude about one's work and to having an occupational or vocational interest in life. An occupationally well person is one who is involved in paid and nonpaid activities that are personally rewarding and make a contribution to the well-being of the community at large. As older individuals leave paid work, purposeful employment (occupation) can be replaced with purposeful and meaningful activity such as volunteer activities (vocation). Vocational wellness occurs through matching core values with interests, hobbies, employment, and volunteer work. Retirement can bring opportunities for vocational wellness. Employment or vocational endeavors can provide a sense of purpose, enrichment enhanced mental health indices, and overall wellness in older adults.[38]

The dimensions of wellness described earlier demonstrate the capacity of aging adults to live optimally throughout their days. Wellness is a concept to strive for regardless of health conditions. Although physical therapists deal primarily with the domain of physical wellness, familiarity with the other domains of wellness will enhance the physical therapist's ability to promote optimal aging.

PHYSICAL ACTIVITY AND EXERCISE–FOCUSED WELLNESS PROGRAMS

In the past decade, there has been an explosion in the literature to support the efficacy of purposeful activity for the older adult, whether community, clinic, or home based. The essence of this work demonstrates that fundamental and meaningful change in strength, balance, flexibility, function, and community participation is possible with exercise regardless of age.[30,39,40] Therefore, the inclusion of activity promotion, purposeful physical engagement, and/or exercise should be a goal of any wellness program for individuals between the ages of 50 and 100+ years.

PHYSICAL THERAPISTS' SCOPE OF PRACTICE

Providing health promotion and wellness services in the area of physical fitness and patient education in healthy lifestyle principles is identified in both the *Guide to Physical Therapist Professional Practice* and in the *Normative Model of Physical Therapist Professional Education*[41,42] as practice expectations of physical therapists. However, wellness is not generally viewed as a health care service within the traditional medical model oriented around illness. Most insurance companies do not reimburse health care providers for delivery of wellness interventions. As such, there are few regulations on who can deliver wellness services. Thus, many wellness practitioners are not licensed within any health profession. In seeking wellness services, older adults should carefully scrutinize the background of the provider to determine their comfort level with the practitioners educational background.

However, when licensed health professionals such as physical therapists deliver wellness services they must function within the scope of practice allowed by their state licensing laws. Each state has its own laws regarding the practice of physical therapists. Some states allow full and direct access to patients; other states require a physician referral for any access to a patient. Most states allow physical therapists to evaluate and screen individuals without physician referral but then have varying provisions regulating the implementation of an intervention. For several states, the language of the state physical therapy practice act makes a clear statement allowing physical therapists to provide wellness and fitness programs without physician referral when the purpose is for prevention of illness or improved functional ability (in the absence of an acute illness or injury). However, other state practice acts do not provide this option. Thus, physical therapists must be familiar with the licensing

regulations in their state and organize wellness services to comply with these regulations.

The ability to legally evaluate and provide wellness services to older adults is a separate consideration from the ability to be reimbursed by health care insurers. Frequently, patients' rehabilitative needs far exceed their Medicare benefits. For example, older individuals with fractured hips or stroke frequently show the greatest trajectory of improvement between 2 and 6 months; after that time, most patients have completed their reimbursable rehabilitation.[43,44] Other clients with chronic conditions may be ineligible for traditional physical therapy because they require "maintenance," an area Medicare benefits do not currently cover. General deconditioning (e.g., following treatment for cancer or even severe flu), neurologic disease such as Parkinson's disease and dizziness are examples of chronic conditions that fall into the cracks of our health care system. These patient groups are given as examples of older adult clients who may benefit substantively from follow-up care or wellness for which the expertise of a physical therapist could be particularly useful.

Screening for Physical Activity and Wellness Programs

Screening is an essential part of a physical activity/exercise-focused wellness program to determine the appropriateness of individuals to participate and may help to stratify individuals to the appropriate program or level within a program. Screening is a precursor to baseline and outcomes assessment, which will be discussed in the next section.

Although validated screening tools for adults older than age 70 years do not exist, several tools are widely used in the general population. The Physical Activity Readiness Questionnaire (Par-Q) is a popular screening form to identify contraindications to exercise. However, the Par-Q has several limitations, such as unnecessary elimination of individuals.[45] The Par-Q is accompanied by a MED PAR-X form that can be used to communicate with the client's medical team. The Par-Q consists of seven questions that address possible contraindications to exercise and is freely available.[46] A positive answer on any of these seven items indicates a need to further investigate the individual's readiness for more intense physical activity. For example, the Par-Q question "Is your doctor currently prescribing drugs (for example, water pills) for your blood pressure or heart condition?" can help identify medications such as β-blockers that can blunt the physiological exercise response. The Par-Q question of "Do you have a bone or joint problem (for example, back, knee or hip) that could be made worse by a change in your physical activity?" is often answered yes because clients have experienced increased pain and/or discomfort with physical activity as a result of a total joint replacement or arthritis. Asking a few questions about their pain can often determine if a physical activity modification is needed, thus promoting confidence that exercise may improve the clients' symptoms.

In response to the limitations of the Par-Q, the Exercise Assessment and Screening for You (EASY) tool was developed.[47] This six-question online screening tool[48] (Table 24-4) identifies potential health problems that require health care provider clearance before exercising, provides education about each problem and the value of exercise, and helps older adults choose appropriate exercises that may not first require a physician's approval. The EASY tool emphasizes the benefits of exercise and physical activity for all individuals while educating the older adult about how to exercise within the individuals' limitations. The EASY tool provides instant recommendations regarding the safety of exercise or the need for the client to see a physician before exercising.

Regardless of which screening tool is used, additional questions about the presence of osteoporosis and falls history are helpful in an older clientele. Certain movements such as excessive thoracic flexion, common in the presence of osteoporosis, have been linked to thoracic fractures,[49] and fractures result more easily with falls.[50] In addition, fear of falling may be more acute in individuals who know they have a heightened risk of fracture.[51] The physical therapist can provide valuable information and exercise cueing to avoid potential problems if awareness of osteoporosis is present. Table 24-5 describes screening questions for osteoporosis. Although no tool exists as a criterion standard of fall risk,[52] the American Geriatrics Society recommends asking about a history of falls in the previous 12 months and conducting the Timed Up and Go (TUG) test when screening for fall risk.[53] Others would suggest a positive history of falls is sufficient to determine fall risk.[53]

TABLE 24-4 Exercise and Screening for You (EASY)

1. Do you have pains, tightness, or pressure in your chest during physical activity (walking, climbing stairs, household chores, similar activities)?
2. Do you currently experience dizziness or lightheadedness?
3. Have you ever been told you have high blood pressure?
4. Do you have pain, stiffness, or swelling that limits or prevents you from doing what you want or need to do?
5. Do you fall, feel unsteady, or use assistive device while standing or walking?
6. Is there a health reason not mentioned why you would be concerned about starting an exercise program?

(Adapted from Exercise and Screening for You. http://www.easyforyou.info/index.asp. Accessed July 3, 2010.)

TABLE 24-5 Screening for Osteoporosis

The physical therapist can ask for:
The results of previous dual-energy x-ray (DEXA), heel scan indicating (T-Score of −2.5 or more)
Family history of osteoporosis (mother, sisters, grandmother)
Low body mass index
History of vertebral or wrist fractures[135]
Observe presence of kyphosis[135]
Loss of height of >4 cm[135]

Baseline and Outcomes Assessment

Baseline measures for physical activity/exercise-focused wellness programs can help establish program goals and identify specific areas to target, such as flexibility, strength, and aerobic fitness. Baseline measures can also be used to stratify clients to an appropriate exertional and skill level. Ideally, baseline information should be gathered that determines health issues, prior exercise history, functional deficits, impairments such as poor cardiovascular endurance, strength deficits, and balance issues. In addition, clients' adherence and self-efficacy can improve when regular feedback is given about their progress.[54-56]

Many objective and responsive tools are available to measure different aspects of physical ability, and many of these tools have age-based normative data. The specific measurements or assessments used depend on the amount of time available, the condition of the client, and the focus of the program. For example, if a walking program is the focus of the wellness activity, then the assessment may be heart rate response to walking in a 6-minute walk test, gait speed, 1-mile walk, or a 24-hour pedometer reading. If the intended outcome is improved balance, then baseline measures of balance capacity should be used. Several tests that range from well-validated and reliable tests with normative data to timed tests such as stair climb,[57] time to put on a jacket,[58,59] and floor rise[60] are listed in Table 24-6.

Knowledge of the clients' physical activity history can provide valuable baseline information if a goal is to improve physical activity. Knowledge of clients' physical activity history can help determine a starting point for the physical activity/exercise class. A detailed history of prior training is likely important if preparing older adults for an intense exercise activity such as a competitive senior Olympic sport. If working with a group of frail seniors in an assisted living facility, the only question that may be needed is, "Have you ever been active?" Then follow up with an inquiry about frequency and intensity of the activity. Several valid, self-report physical activity tools exist.[61] Several of the more reliable and valid measures of routine activity are listed in Table 24-7.

Outcome measures for program evaluation can be used to provide individual feedback on progress, to evaluate and determine whether the class has met its purpose, and to provide data on the program's effectiveness. Individual client feedback focused on the clients' wellness goals can be provided at the end of the program. Consideration should be made for the time it takes to realize a change in the desired outcome. For example, 12 months or more may be needed to achieve weight loss goals, to increase physical activity to recommended wellness levels, or realize quality-of-life changes.[62-64] However, specific strength and endurance gains may occur in as little as 12 to 15 weeks.[65-67] Recognizing that several months may be required to achieve functionally important physical changes, it is important to provide feedback that highlights the short-term successes the patient is achieving along the longer-term path to more functionally visible outcomes, for example, sticking with a commitment for regular attendance and participation in physical activity, lower perceived exertion with the same workload, and additional repetitions of exercises or distance walked without a rest. Early success in physical activity endeavors positively reinforces commitment to pursuit of long-term physical activity goals. Individual results can be provided in terms of age-based norms for additional value to the client.

Program evaluation can also be determined by factors such as class attendance, clients' adherence, and satisfaction with the various components of the program, such as self-perception of health and lifestyle changes. Summary scores of performance-based outcome tools can provide an indication of general strength gains, weight loss, and balance improvement in the group. Program evaluation outcomes should relate to the purpose and focus of the program.

Types of Physical Activity and Exercise Programs

There are literally hundreds of opportunities for physical therapists to promote wellness for the older adult client. Fortunately, there are resources available, some in book or monograph form, many on the Internet, and numerous video-based protocols that may be used to assist in the design of an activity program. Several types of programs are presented here. Utilizing preexisting resources is encouraged when a specialty wellness activity program is chosen. Physical activity/exercise–focused wellness programs can be developed in any venue such as health clubs, outpatient offices, older adult residences, senior centers, health-related clinics, nursing homes, rehab hospital gyms, religious facilities, or individually. Wellness programs can also take the form of consultant-type services.

Balance and Fall Prevention Programs. Many older adults are justifiably afraid of falling as their balance is beginning to fail and reaction times are slower than they

TABLE 24-6 Baseline Measures for Physical Activity/Exercise–Focused Wellness Programs

Measure	Description	Normative Values
Short Physical Performance Battery (SPPB)	Quick, easy to perform test consisting of timed 5× chair stands, usual gait speed, and balance tests. Scored on an ordinal scale with a total possible score of 12. Test is free and instructions are available at www.grc.nia.nih.gov/branches/ledb/sppb/download_sppb.doc	Individuals scoring 9 or less reflects mobility disability.[136]
Gait speed[137]	Can use any distance of 4 m or more. Usual (customary) and fast gait speeds can be recorded.	1.2 m/s is approximate time it takes to cross the street. Norms for community-based older adults[138]: 60-69 y: males 1.59 m/s (usual); 2.05 m/s (fast) 60-69 y: females 1.44 m/s (usual); 1.87 m/s (fast) 70-79 y: males 1.39 m/s (usual); 1.83 m/s (fast) 70-79 y: females 1.33 m/s (usual); 1.71 m/s (fast) 80-89 y: males 1.21 m/s (usual), 1.65 m/s (fast) 80-89 y: females 1.15 m/s (usual); 1.59 m/s (fast)
Single limb stance test.[35] This test is self-explanatory although a few rules do apply such as not being able to put the free limb against the stance limb or wiggling in place. It is up to the therapist (dictated by safety) whether or not to assist the client into the test position and then let go when they are ready or have them do the entire activity unassisted. Make note of the choice.	Ability to stand on one leg is associated with balance and normal gait and is known to decrease with age.[139] Time of stance should be measured with arms folded across chest and one leg lifted from floor, not touching the other leg.	10 s eyes open is the recommended minimal standard for adults older than age 60 y[139] Age-based means[140]: 60-69 y: mean 26.9 s (eyes open); 2.8 s (eyes closed) 70-79 y: mean 15.0 s (eyes open); 2.0 s (eyes closed) 80-99 y: mean 6.2 s (eyes open); 1.3 s (eyes closed)
Tandem and semitandem stance	Can be used in addition to single leg stance and is included in the SPPB.	
Timed Up and Go test	Demonstrates ability to get up from a chair, walk, and turn and sit down again. May be too low level for higher-functioning older adults.	TUG times can be considered worse than average if they exceed[141]: 60-69 y: 9.0 s 70-79 y: 10.2 s 80-99 y: 12.7 s
Activities-Specific Balance Confidence Scale, or ABC[142]	Measures balance confidence during common community-based tasks and is known to be responsive to improved balance.[142] Is a self-report, paper-based test.	None available
Chair stand test	30-s chair stand test or timed 5-repetition chair stand test have been used as proxies for leg strength and power. Arms cannot be used.	8 or fewer repetitions indicate risk for mobility disability.[143] Norms for 30-s chair rise[143]: 60-69 y: women 11-17; men 12-19 70-79 y: women 10-15; men 11-17 80-89 y: women 8-14; men 8-15 ≥90 y: women 4-11; men 7-12
Distance walk test	Time taken to walk 400 m (approximately ¼ mile) or distance walked in 6 min can be used as proxies for endurance tests. The rate of perceived exertion can be used as a measure of effort.[88]	Taking more than 5 min 30 s to complete 400-m test is indicative of risk of developing functional limitations.[144] Mean time of 5 min 11 s was recorded in healthy older adults.[145] 6-min walk test norms[138]: 60-69 y: men 572 m; women 538 m 70-79 y: men 527 m; women 471 m 80-89 y: men 417 m; women 392 m

Continued

TABLE 24-6 Baseline Measures for Physical Activity/Exercise–Focused Wellness Programs—cont'd

Measure	Description	Normative Values
Flexibility: Back Scratch	Back Scratch (Apley's) tests shoulder mobility while the Modified Sit and Reach tests hamstring and lumbar mobility.	Norms for Back Scratch test[146]: 60-69 y: women −3.5 to +1.5 in.; men −7.5 to 0.0 in. 70-79 y: women −5.0 to +1.0 in.; men −9.0 to 1.0 in. 80-89 y: women −7.0 to −1.0 in.; men −9.5 to −3.0 in. ≥90+ y: women −8.0 to −1.0 in.; men −10.5 to −4.0 in.
Modified Sit and Reach		Modified Sit and Reach norms[146,147]: 60-69 y: women −0.5 to +5 in.; men −3 to +4 in. 70-79 y: women −1.5 to +4 in.; men −4 to +2.5 in. 80-89 y: women −2.5 to +3.0 in.; men −5.5 to +1.5 in. ≥90+ y: women −4.5 to +1.0 in.; men −6.5 to −0.5 in.

TABLE 24-7 Measurements of Physical Activity

Physical Activity Scale	Description	Comments
Physical Activity Scale for the Elderly (PASE)[148]	PASE comprises self-reported occupational, household, and leisure activities during a 1-wk period providing prompts with examples of specific activities. Can be administered by phone, mail, or personal interview. Focus on activities commonly performed by older adults by giving more weight to these activities instead of sports.	Correlates with 6-min walk and other physical performance measures.[61] May not be responsive to change following physical activity/exercise interventions.[149] Requires a license and purchase[150]
Pedometer	Simple, inexpensive tool to record steps and/or minutes of activity. Generally, 10,000 steps per day is considered to afford a health benefit.[133]	In people walking slower than 0.8 m/s, may not be accurate or register steps.[151] Individuals who used a pedometer were more likely to achieve the recommended amount of activity as compared with those without a pedometer.[132]
Accelerometer	Computerized measures of step count and movement that may be more applicable for research.[152]	Can be attached at the ankle. Requires a computer to interpret number of steps.

were in younger years. Balance programs are quite valued, particularly if they capitalize on popular programs such as Tai Chi. Tai Chi is known to be effective in improving balance and reducing fall risk, and its movements and principles can be incorporated into any balance activity.[68-70] Tai Chi was also shown to reduce symptoms of knee osteoarthritis[71] and reduce blood pressure.[72]

Tai Chi is not the only approach to enhancing balance in older adults. Literature has demonstrated that balance will improve if multimodal programs are used.[73,74] The programs should include challenge to static and dynamic balance provided two to three times a week for at least 8 weeks, environmental assessment and remediation, visual assessment and remediation (if needed), vestibular assessment, and promotion of strength, particularly of the muscles controlling the ankle.[73,75,76]

Missouri has the dubious distinction as the state with the highest falls-related death rate in the country. It also ranks in the top three states for recorded falls in the older adult population. Consequently, the state government has grown alarmed and a coalition of practitioners was formed to create Falls Free Missouri, which is an excellent Web-based resource.[77] The Falls Free Missouri Web site provides information such as risk factors and statistics on falling but more importantly, includes action steps that may be taken to reduce falls. Falls prevention programs are relatively easy to provide with minimal allocation of financial and human resources. In addition, this approach is an excellent way to enhance public awareness and foster community loyalty to the facility.

Strength Training. The efficacy of strength training for older adults has been demonstrated by numerous investigators. From the seminal article by Fiatarone et al.[78] in 1990 to more contemporary issues of power versus velocity versus traditional weights, a multitude of evidence overwhelmingly supports the inclusion of strength training for all older adults, including those who are frail, have multiple comorbidities, and have never done any type of resistance activity.[75,79-87] Indeed, resistance training is endorsed, even encouraged by the American Association for Retired Persons (AARP) and the American College of Sports Medicine.[88,89]

Strength training can be done in a myriad of ways, including traditional free weights, isotonic-type machines, elastic bands, functional activities (e.g., weighted

chair stands, stair climbing), incorporating high-velocity training and emphasizing power-based training into class-type activity or individual exercises. Because resistance training is so strongly recommended for older adults, it should be incorporated into most activity programs.[28,40,90] Strength training in dose-specific recommendations known to increase strength should be followed as described in Chapter 5 on exercise.[40,91]

Exercise for Frail Older Adults. Eighty-plus-year-old individuals are the fastest growing group in the United States and are at greatest risk for loss of independence.[92] A large proportion of this population is highly deconditioned, with poor muscular and cardiovascular endurance as well as muscle weakness, associated with sedentary lifestyle and periodic bouts of bed rest from illnesses and hospitalizations. More than 50% of individuals older than age 80 years are physically inactive; at least 60% have difficulty with functional activities such as stooping, crouching, kneeling, lifting or carrying 10 pounds, and standing from an armless chair; and 30% have difficulty with very basic activities of daily living such as dressing and bathing.[93] Individuals who have low physical activity levels, need help with daily activities, fatigue easily, are weak, have slow motor performance and balance abnormalities are likely to be classified as frail.[94] Many frail older women test poorly on measures of function and balance.[95]

Wellness classes are greatly needed for frail and near-frail older adults. However, this is the most challenging group to tackle given preexisting medical conditions, the lack of endurance, low physical activity levels, and generalized weakness.[96] Nonetheless, developing and implementing programs for the frail is interesting, gratifying, and wonderfully challenging. Exercise focused on remediating frailty and improving function in frail older adults can be task specific, as research has shown that task-specific exercise is equivalent to resistance training.[97-103] Task-specific exercise has the advantage of being relevant to the frail older adult, which may promote participation.

General conditioning exercises are extremely effective for prefrail older adults and can be done in groups.[72,104-107] These classes should focus on strengthening activities, particularly the lower extremities, dynamic balance (in standing position), and functional activities such as getting up and down from the floor, stair climbing, and walking distances of 0.25 to 1 mile. An advantage of group classes is the socialization they provide that may promote exercise adherence.[108,109]

Exercise to Enhance Bone Quality/Quantity. One of every two women older than age 50 years is on a trajectory to develop osteoporosis if she does not have it already.[110] Consequently, wellness programs that emphasize bone loading are important and highly pertinent. Key components to all of the approaches to enhance bone health are core strengthening exercises for abdominals and back extensors, possible use of a weighted vest (if there is no kyphosis), strengthening exercises for the scapular retractors and upward rotators, and lower-extremity loading.[111,112] A summary of activity- and exercise-based strategies to improve the quantity and quality of bone include the following:

1. Exercises must include weight-bearing activity; weight-bearing that is over and above what is done in a typical day.[113-115]
2. Resistance exercise will increase bone mineral density if exercise adherence is maintained for 6 months or longer.[115,116]
3. Weighted vests do work, but evidence suggests a minimum of a 2-year commitment to wearing the vest.[113] For gains to be maintained, vest use must be continued.[114]
4. Back extensor and core strengthening to reduce the risk for vertebral fractures.[112,117]

Aerobic Training. The vast majority of older adults have cardiovascular deconditioning, most of which is the consequence of sedentary lifestyle.[118,119] The presence of cardiovascular disease does not preclude aerobic training; to the contrary, the presence of disease makes aerobic training even more important.[120-122] There is no evidence indicating a worsening of cardiovascular disease with exercise[123,124]; in fact, exercise actually improves the disease state (e.g., congestive heart failure, post–myocardial infarction) and raises the level of conditioning.[125] The only time exercise is contraindicated for heart disease is if a client is in the midst of an acute crisis.[88] One thing that should be borne in mind is that because so many older adults are so very deconditioned, nearly all exercise constitutes an aerobic challenge. It is not necessary to consider aerobic exercise within the narrow framework of running, cycling, Nordic track, elliptical trainer, or stair stepper. Musical chairs, dance, Tai Chi, brisk walking, and resistive strengthening functional activities are often of sufficient intensity to achieve an aerobic training effect.

Enhancing Physical Activity and Mobility. Mobility challenged older adults are everywhere but most visibly within assisted care facilities. These men and women are often one fall or illness away from admission to the nursing home. Many of the so-called mobility programs for sedentary older adults and frail individuals are chair-based, which is counterintuitive to mobility. Wellness activities for this population should heavily emphasize functional activities, including handling pots and pans, carrying items, sweeping and vacuuming, putting clothes away, and stooping to pick up items from the floor. Gait activities are also important and should include changing direction suddenly, walking slowly and very quickly in response to a command, walking the equivalent width of a street in time to cross with the light, and stepping up and down from a curb. Obstacle courses and circuit training kinds of activities can be

fun, meaningful, and effective for individuals struggling to stay independent.[126-129]

Walking Programs. Walking programs are very easy to set up, require little supervision, and can provide numerous benefits such as socialization, sense of well-being, self-efficacy, and health benefits such as decreased pain (in the presence of knee osteoarthritis)[130] and improved glycemic control.[131] Pedometers are effective in tracking steps and can promote physical activity more so than encouragement alone to be more physically active.[132] Pedometers with the sponsor's name on them can also be an effective marketing strategy. Recommendations of 10,000 steps/day (5 miles) are associated with health benefits.[133,134]

One of the most successful walking programs in this country came out of Waukesha, Wisconsin, over a decade ago. The basic idea was to start a program with a nucleus of interested people and "grow" that program over the first and second summers by having each member recruit another walker. There are walking trails throughout Waukesha that are clearly labeled to provide distances, information about where to go from that particular way-point, and suggestions for an exercise that can be done at each station. Participants have t-shirts and there is a strong sense of belonging. Hundreds of older adults have joined the walking club over the years with their "train the trainer" concept.

CONCLUSION

Given the burgeoning older adult population, an increasing life span, and the fact that nearly 50% of all those older than age 80 years have already lost their independence, it has become critical to stave off frailty and extend productive and capable years for older adults. Because increased physical activity and exercise is most important for health and physical and cognitive well-being, every physical therapist should be involved in promoting physical activity and exercise programs. Physical therapists have the skills required to prevent the spiraling decline in independence among the aging and aged population. The efficacy of physical activity and exercise programs has been demonstrated. Elements of endurance as in walking, strengthening, and balance should be incorporated. All that is required is willingness to begin and an appropriate assessment of resources.

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To enhance this text and add value for the reader, all references are included on the companion Evolve site that accompanies this text book. The reader can view the reference source and access it online whenever possible. There are a total of 152 cited references and other general references for this chapter.

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