



National
Multiple Sclerosis
Society

Physical Activity for People with Multiple Sclerosis

An Introduction to MS
for Health and Wellness
Professionals

3rd Edition

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Through their work an online professional education program has been developed for fitness, wellness and other professionals providing exercise classes for people with MS.

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Overview and Objectives

There is strong interest among many people with multiple sclerosis (MS) in physical activity programs. Those involved in exercise programs often experience an increased sense of well-being in addition to other benefits such as increased muscle strength and endurance, maintained and improved joint range of motion and flexibility, improved coordination, improved balance, increased cardio-respiratory endurance, as well as the social interaction that the experience provides.

Most people with MS learn to cope with the disease and continue to lead satisfying, productive lives.

Working with people MS can be a mutually-rewarding experience—for the participant and the instructor. This manual is meant to be a resource for fitness and wellness professionals, including aquatics instructors, yoga teachers, personal trainers, and others who want to learn more about MS: it provides an overview of the disease and offers specific strategies for working with a diverse MS population.

After completion of *Physical Activity for People with Multiple Sclerosis: An Introduction to MS for Fitness and Wellness Professionals*, readers will be able to:

- describe basic facts about multiple sclerosis
- identify MS symptoms that affect movement and activity level
- consider ways to modify exercise and movement to accommodate the functional issues presented by a person with MS.
- interact more comfortably with people with disabilities
- describe safety and accessibility issues important to people with MS

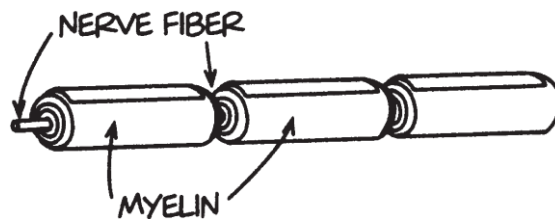
Notes:

Understanding Multiple Sclerosis

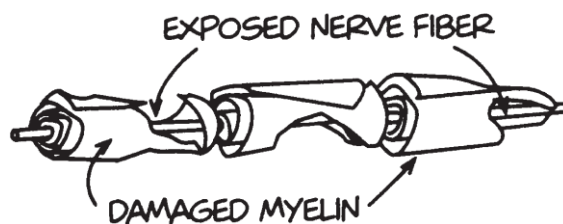
What is MS?

MS is a chronic, often disabling disease that affects the central nervous system (CNS). The CNS consists of the brain, spinal cord and the optic nerves.

The nerve fibers of the CNS are surrounded and protected by a fatty substance called myelin, which helps the nerve fibers to conduct electrical impulses.



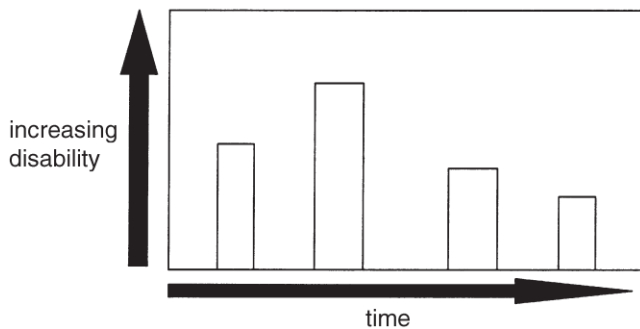
In MS, myelin is lost in **multiple** areas, leaving scarred or **sclerotic** tissue—which gives the disease its name. These damaged areas are also known as plaques or lesions. The nerve fibers themselves may also be damaged or broken.



When myelin is damaged or destroyed, the ability of nerves to conduct electrical impulses to and from the brain is disrupted, producing the various symptoms of MS. Destruction of the nerve fibers themselves is believed to cause the permanent disability that many people with MS experience.

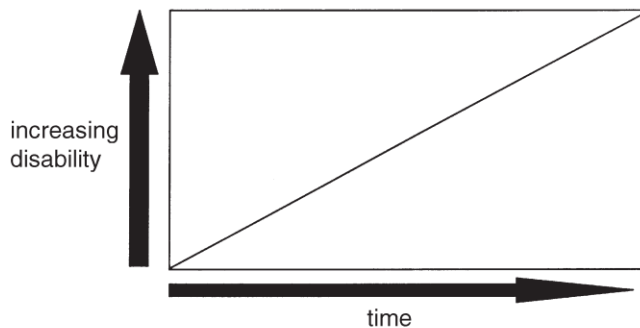
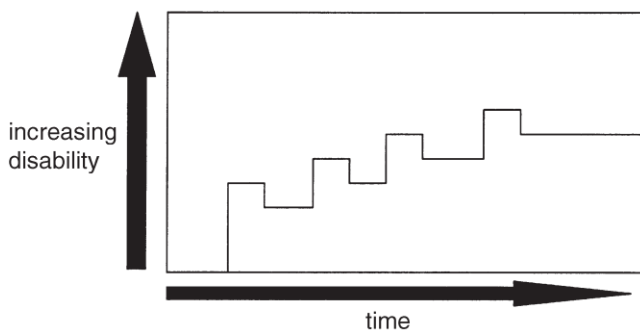
Courses of the Disease

People with MS will most likely experience one of four disease courses, each of which might be mild, moderate, or severe.



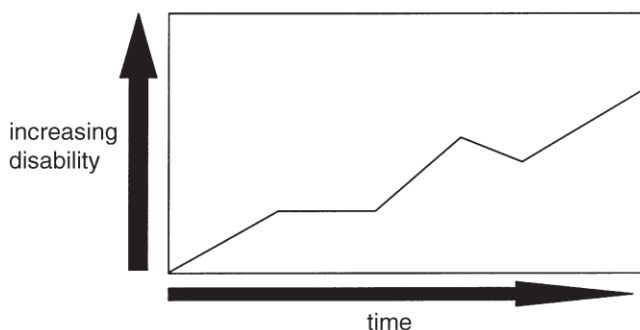
Relapsing-Remitting MS

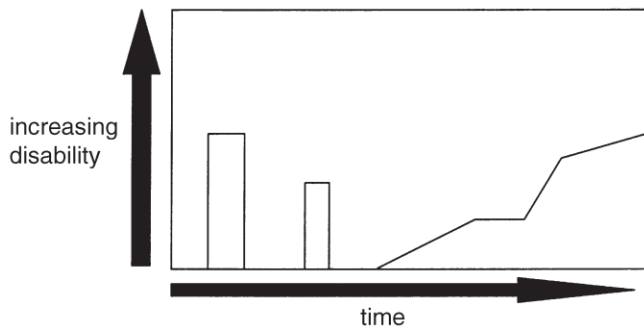
People with this type of MS experience clearly defined attacks of worsening neurologic function. These attacks—which are called relapses, flare-ups, or exacerbations—are followed by partial or complete recovery periods (remissions), during which no disease progression occurs. Approximately 85% of people are initially diagnosed with relapsing-remitting MS.



Primary-Progressive MS

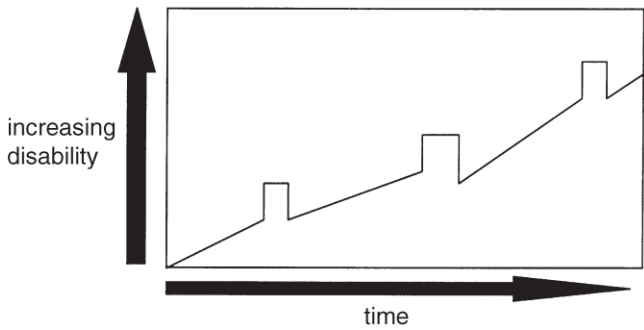
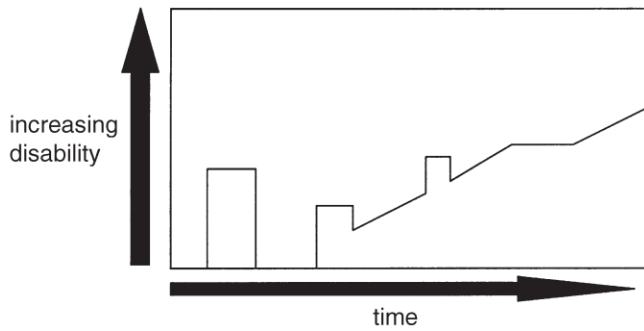
This disease course is characterized by slowly worsening neurologic function from the beginning—with no distinct relapses or remissions. The rate of progression may vary over time, with occasional plateaus and temporary minor improvements. Approximately 10% of people are diagnosed with primary-progressive MS.



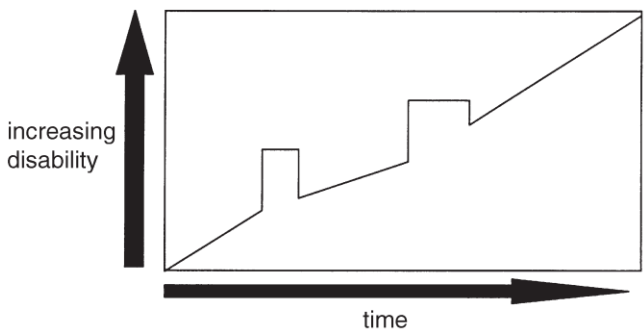


Secondary-Progressive MS

Following an initial period of relapsing-remitting MS, many people develop a secondary-progressive disease course in which the disease worsens more steadily, with or without occasional flare-ups, minor recoveries (remissions), or plateaus. Before disease-modifying medications became available, approximately 50% of people with relapsing-remitting MS developed this form of the disease within 10 years. Long-term data are not yet available to determine if treatment significantly delays this transition.



Progressive-Relapsing MS (PRMS) In this relatively rare course of MS (5%), people experience steadily worsening disease from the beginning, but with clear attacks of worsening neurologic function along the way. They may or may not experience some recovery following these relapses, but the disease continues to progress without remissions.



(These figures are adapted from Fred D. Lubin, MD, and Stephen C. Reingold, PhD, *Neurology*, April 1996; 46: 907–911.)

Since no two people have exactly the same experience of MS, the disease course may look very different from one person to another. And, it may not always be clear to the physician—at least right away—which course a person is experiencing.

What Causes MS?

The exact cause of MS is unknown. Most researchers believe that the damage to myelin results from an abnormal response by the body's immune system. This abnormal response is called an autoimmune response.

Normally, the immune system defends the body by attacking foreign invaders such as viruses or bacteria. But in an autoimmune response, the body attacks its own tissue. In MS, which is an autoimmune disease, the body attacks myelin.

Scientists do not yet know what triggers the immune system to do this. Most agree that several factors are involved, including genetics, gender, and environmental factors (e.g., a virus or toxic environmental substance).

Note that MS is not contagious and is not usually fatal. MS is not directly inherited, although a genetic predisposition is thought to be involved.

Who Gets MS?

Anyone may develop MS, but there are some patterns.

- Most people with MS are diagnosed between the ages of 20 and 50.
- Two to three times as many women as men have MS.
- Studies indicate that genetic factors make certain individuals more susceptible than others, but there is no evidence that MS is directly inherited.
- MS occurs more commonly among people with northern European ancestry, but it is also found among African-Americans, Hispanics and Asians.

Approximately 400,000 Americans have MS and 2.5 million people have MS worldwide. Every week about 200 people receive a diagnosis of MS. The prevalence of MS in a given community may vary depending upon where some lives within the United States.

Worldwide, MS occurs with much greater frequency above 40° latitude than closer to the equator. However, prevalence rates may differ significantly even within a geographic area, where latitude and climate are fairly consistent. These differences demonstrate that geographical factors are not the only ones involved.

How is MS Diagnosed?

At this time, no single test is available to identify or rule out MS. Several tests and procedures are needed. These are likely to include:

- **Complete Medical History** The physician takes a very careful medical history, looking for past and current symptoms or changes indicative of damage in the central nervous system.
- **Nervous System Functioning** The neurologic exam consists of tests of reflexes, balance, coordination, sensation (including tingling or numbness), and vision.
- **Diagnostic Tests** such as
 - MRI scan, which is the best imaging technology for detecting the presence of MS plaques or scarring (also called lesions) in different parts of the central nervous system (CNS). It can also differentiate old lesions from those that are new or active.
 - Evoked potential tests, which measure how quickly and accurately a person's nervous system responds to stimulation
 - Spinal tap, which checks spinal fluid for signs of immune system dysfunction

In order to make a diagnosis of MS, the physician must

- Find evidence of damage in at least two separate areas of the CNS, which includes the brain, spinal cord and optic nerves AND
- Find evidence that the damage occurred at least one month apart AND
- Rule out all other possible diagnoses.

How is MS Treated?

Although there is still no cure for MS, effective strategies are available to

- **Modify the disease course**, reduce number of relapses, rate of progressions and development of new lesions through the use of FDA-approved, disease-modifying drugs.
- **Treat acute attacks**, also known as relapses or exacerbations, to shorten the duration and reduce the severity
- **Manage symptoms** successfully with strategies that include medication, self-care techniques, rehabilitation (with a physical or occupation therapist, speech/language pathologist, cognitive remediation specialist, among others), and the use of assistive devices
- **Improve function and safety** through fitness, rehabilitation, energy management and rehabilitation (physical and occupational therapy, vocational and cognitive rehabilitation.)
- **Provide emotional support**—Mental health professionals (psychiatrists, psychologists, social workers and counselors) are members of the health care team that can help people living with MS and their friends and family meet the emotional, social, and vocational challenges of this unpredictable, chronic disease.

In combination, these strategies enhance the quality of life for people living with MS.

Notes:

Understanding MS-Related Symptoms

In multiple sclerosis, damage to the myelin in the CNS—and to the nerve fibers themselves—interferes with the transmission of nerve signals between the brain and spinal cord and other parts of the body. This disruption of nerve signals produces the primary symptoms of MS, which vary depending on where the damage has occurred.

Over the course of the disease, some symptoms will come and go, while others may be more lasting. The severity of the symptoms that individuals experience varies from person to person.

Fatigue One of the most common symptoms of MS, occurring in more than 80% of people. Fatigue can significantly interfere with a person's ability to function at home and at work, and may be the most prominent symptom in a person who otherwise has minimal activity limitations. MS fatigue is commonly described as a feeling of "exhaustion" or being "wiped out," with reported worsening in mid-to-late afternoon that is unrelated to level of exertion.

Heat Intolerance An increase in core body temperature caused by conditions such as hot weather, high humidity, hot baths, heated swimming pools, physical exertion, or fever can slow nerve conduction and temporarily worsen MS symptoms. When overheating causes worsening of symptoms that can last for a day or more, it may be referred to as a pseudoexacerbation. The symptoms return to baseline when the person's body temperature returns to normal. Usually that takes an hour or two, but sometimes the symptoms may last for more than a day and may be confused with an MS exacerbation.

While many people with MS experience heat intolerance, not all do. Discuss heat issues with clients or students to determine whether or not they tend to experience heat intolerance.

Walking (Gait), Balance & Coordination Problems Problems with gait (difficulty in walking) are among the most common mobility limitations in MS. Gait problems are related to several factors:

- **Weakness:** Muscle weakness is a common cause of gait difficulty. Weakness can cause problems such as toe drag, foot drop, “vaulting” (a compensatory technique that involves raising the heel on the stronger leg to make it easier to swing the weaker leg through), compensatory hip hike, trunk lean, or circumduction (swinging leg out to the side). If there is weakness in one extremity, for instance within the quadriceps muscles, that could lead to knee instability and can cause a fall. Weakness can often be compensated for with the use of appropriate exercises and assistive devices, including braces, canes or walkers.
- **Spasticity:** Muscle tightness or spasticity can also interfere with gait. Spasticity refers to feelings of stiffness and a wide range of involuntary muscle spasms (sustained muscle contractions or sudden movements). It is one of the more common symptoms of MS. Spasticity may be as mild as the feeling of tightness of muscles or may be so severe as to produce painful, uncontrollable spasms of extremities. Spasticity may also produce feelings of pain or tightness in and around joints, and can cause low back pain. Although spasticity can occur in any limb, it is much more common in the legs. In addition, spasticity can also be experienced in the mid-section or chest area limiting the range of a twisting motion. Stretching exercises and antispasticity medications are generally effective in treating this symptom.
- **Loss of Balance:** Balance problems typically result in a swaying and “drunken” type of gait known as ataxia. People with severe ataxia generally benefit from the use of an assistive device such as a cane or walker.
- **Sensory Deficit:** Some people with MS have such severe numbness in their feet that they cannot feel the floor or know where their feet are. This is referred to as a sensory ataxia.

Numbness Numbness of the face, body, or extremities (arms and legs) is one of the most common symptoms of MS, and is often the first symptom experienced by those eventually diagnosed as having MS.

Vision Problems A vision problem is the first symptom of MS for many people. The sudden onset of double vision, blurring, poor contrast or eye pain can be terrifying—and the knowledge that vision may be compromised can make people with MS anxious about the future.

Dizziness and Vertigo Dizziness can also occur in MS. People may feel off balance or lightheaded. Much less often, they have the sensation that they or their surroundings are spinning, a condition known as vertigo.

Pain Pain syndromes are common in MS. In one study, 55% of people with MS had “clinically significant pain” at some time. Almost half were troubled by chronic pain. Pain in

MS can result from damage to nerves in the CNS (neurogenic pain), or result from altered gait patterns or inappropriate use of assistive devices (orthopedic pain). This type of pain may be felt as tingling or burning.

Other things to know about pain:

L’Hermitte’s Sign Some people with MS experience an uncomfortable abnormal neurological sensation called L’Hermitte’s sign. This electrical sensation travels down their spine and into their legs when they bend their head forward. One should be aware of L’Hermitte’s sign especially when planning physical activities for people with MS. This may be seen when students perform certain movements.

Emotional Changes Emotional changes are more common in MS than in other chronic illnesses—because of neurologic and immune changes caused by the disease, and as a reaction to the stresses of living with a chronic, unpredictable illness. Bouts of severe depression (which is different from the healthy grieving that needs to occur in the face of losses and changes caused by MS), mood swings, irritability, and episodes of uncontrollable laughing and crying (called pseudobulbar affect) pose significant challenges for people with MS and their family members.

Cognitive Function Cognition refers to a range of high-level brain functions, including the ability to learn and remember information: organize, plan, and problem-solve; focus, maintain, and shift attention as necessary; understand and use language; accurately perceive the environment, and perform calculations. Cognitive changes are common in people with MS— approximately 50% of people with MS will develop problems with cognition.

Bladder Dysfunction Bladder dysfunction, which occurs in at least 80% of people with MS, can usually be managed quite successfully. Symptoms of bladder dysfunction can include frequency and/or urgency of urination, hesitance in starting urination, frequent nighttime urination and incontinence. These symptoms can be caused by a “spastic” bladder that is unable to hold the normal amount of urine, or by a bladder that does not empty properly and retains some urine in it. Retaining urine can lead to complications such as repeated infections or kidney damage.

Bowel Dysfunction Bowel dysfunction can cause a great deal of discomfort and humiliation, and could aggravate other MS symptoms such as spasticity or bladder dysfunction. Constipation is a particular concern among people living with MS, as is loss of control of the bowels. Diarrhea and other problems of the stomach and bowels can also occur but are much less common.

Sexual Dysfunction Sexual problems are often experienced by people with MS, but they are very common in the general population as well. Sexual arousal begins in the central nervous system, as the brain sends messages to the sexual organs along nerves running through the spinal cord. If MS damages these nerve pathways, sexual response—including arousal and orgasm—can be directly affected. Sexual problems also stem from MS symptoms such as fatigue or spasticity, as well as from psychological factors relating to self-esteem and mood changes.

Less Common Symptoms

In addition to the list of symptoms that are commonly experienced by those living with MS, as noted in the above section, there are some symptoms that occur less frequently. These symptoms include speech disorders, tremors, hearing loss, and headache. In rare instances itching, respiration/breathing problems and swallowing problems can be experienced.

Benefits of an Exercise Program for People with MS

A sedentary lifestyle, for anyone, leads to deconditioning. Inactivity can result in loss of muscle tone and disuse weakness (not related to demyelination), poor postural alignment and trunk control, decreased bone density (and resulting increased risk of fracture), and shallow, inefficient breathing. Exercise decreases the risk of heart disease, decreases resting blood pressure, aids sleep, strengthens bones, and increases flexibility, endurance, energy and can elevate one's sense of well-being.

While exercise has not been shown to slow the progression of MS, it can help decrease complications that arise from muscular fatigue, weakness, contractures, and spasticity. Additionally, exercise can serve as an outlet for stress reduction and help maximize independence, regardless of one's ability.

In a pivotal study, researchers at the University of Utah demonstrated the benefits of exercise for people with MS. Those people with MS who participated in an aerobic exercise program had better cardiovascular fitness, better bladder and bowel function, less fatigue and depression, a more positive attitude, and increased participation in social activities.

Other benefits of exercise for people with MS include:

- Better circulation, bringing oxygen throughout the body
- Increased flexibility and joint range of motion can improve
- Stronger muscles and joints
- Improved ambulation endurance
- Improved skeletal structural alignment
- Balance issues can be addressed
- Decreased secondary complications of spasticity, muscular tension and muscle atrophy and risk of osteoporosis
- Decreased swelling/edema
- Weight maintenance/reduction is facilitated
- Increased tolerance for exercise
- Increased level of independence
- Enhance and support cognitive function
- Increased sense of emotional well-being

Subsequent studies have confirmed these exercise benefits using a variety of exercise regimens, including physical therapy, supervised exercise programs, treadmill training, aquatics, yoga, strength training, balance training, dance and movement, and group aerobic therapies.

Numerous studies have shown that any benefits resulting from a short 1-3 month exercise program are lost within a few months after the program finishes. Thus, it is essential that exercise programs be sustained long-term. Students are encouraged to commit to ongoing, regular exercise over the life span. The first key is to get off to a good start by choosing a good exercise program. Professional advice from a doctor or rehabilitation therapist may help establish the right program. 'Bulking up' should NOT be the initial goal. Development of an ongoing, consistent fitness program with a gradual increase in difficulty is preferable.

Roles and Expectations of the Fitness Professional

An Integrated Approach to Fitness

Functional fitness maximizes the efficiency of the body's physiological system to help manage and take care of activities of daily life. By using exercises that focus on building a body capable of doing real-life activities in real-life situations participants will make the most effective use of their time and effort. The key to a functional approach is integration. It's about training all muscles to work together for a specific purpose rather than isolating them to work independently.



When successfully combined into the following five components of fitness, functional exercise can help maximize strength and minimize overuse of muscles that compensate for weaker counterparts and/or changes due to MS.

Strength & Endurance Strength training uses resistance to challenge muscles, which helps improve muscle strength, bone density, muscle mass, flexibility and balance, and prevent injury. Weakness is a common problem in MS and has numerous and varied causes. A properly designed and executed physical activity program can help address areas of weakness and imbalance in the body and increase endurance during activity over time.

Flexibility & Range of Motion Physical activity can help improve flexibility, which improves range of motion and muscle tone. For individuals living with MS, lack of movement can sometimes translate to loss of flexibility, limiting range of motion. Flexibility exercises can improve joint integrity, prevent injury and release stress.

Cardiovascular Exercise Cardiovascular exercise, or cardio, is activity that involves the large muscles, increases the heart and respiratory rate and keeps the heart rate elevated for a period of time. Cardio is good for the heart and includes walking, bicycling, swimming, and tennis or any exercises that use large muscles. For individuals with MS, cardiovascular activity can help fight fatigue and increase endurance.

Relaxation & Body Awareness Through purposeful breath and movement an individual can relax the body and decrease muscle tension, slow heart and respiratory rates, and shift mental attention in order to increase concentration that aids body awareness. Body awareness is a heightened consciousness of how the body moves. Such awareness can help identify and address any changes, needs or poor movement patterns in the body. By utilization of mind body techniques like those used in yoga and Tai chi and visualization techniques like those used in Feldenkrais the body's ability to make adjustments to movement execution processes are enhanced, possibly enabling the body to enhance its ability to adapt to its sometimes-changing ability levels as effected by MS.

Living with MS can mean change and stress. Stress depletes an individual both emotionally and physically and can add to fatigue. Physical activity acts as a form of stress management. Yoga, Tai Chi, aquatics, Pilates and Feldenkrais can be a great mind body tool for stress reduction by assisting in lowering levels of "harmful" stress, which attacks the immune system. The purpose of relaxation is to consciously dampen physical processes through manipulation of cortical influences. This is based on the belief that the mind influences the body and the body influences the mind. What happens is that physiologically as one relaxes, muscle tension decreases (which can help reduce spasticity) the heart and respiratory rates slow, and mental attention shifts, helping to increase concentration.

Balance & Coordination Coordination and balance involve a sequence of muscle actions to control movement. Problems with coordination and balance are quite common among people with multiple sclerosis, and result in poor posture and alignment. Exercises that promote proper posture are essential to effective body mechanics and extremely important in maintaining proper body alignment. This sequence of muscle actions rely on core muscle groups (also known as "the core") to aid individuals to support their body weight and move with control, quality and speed. The gains in balance, control and stabilization ultimately aid walking and weight transfer movements. Poor balance and posture can create a forward flexion at the hips and add to the development of chronic back pain.

Roles of the Fitness Professional

As fitness professionals you provide students the opportunity to learn about activities that focus on movement that can positively impact activities of daily living. Rehabilitation professionals focus on therapeutic services with goals that differ from those of general fitness instruction. As an instructor, remember to stay within your realm of practice, and be sure to recognize when to refer on to the appropriate health professional. Do not offer medical advice, even if you are a health professional by trade. You may share information and experience, but refrain from giving personal interpretations, giving advice, or offering specific treatment recommendations.

The following will help you better understand your role and expectations as a fitness instructor when working with a group or students/clients individually:

Do's	Don'ts
<ul style="list-style-type: none"> • Use general screening techniques that may consist of a health history and non-invasive fitness testing (e.g., strength, flexibility), etc. 	<ul style="list-style-type: none"> • Assess neurological manifestations and evaluate quality of movement.
<ul style="list-style-type: none"> • Design and implement fitness/wellness programs that address the body as a whole. 	<ul style="list-style-type: none"> • Make a diagnosis and prescribe a treatment-based program. This includes the collection of data for functional, financial and other outcomes for independence restoration.
<ul style="list-style-type: none"> • “Hands Off” policy is practiced by helping participants perform exercises independently. Touching participant is limited to spotting and guiding/cueing—example: “Lengthen the spine” as the instructor lightly runs fingertips up spine. After several verbal cues without response or modification from the student then a hands-on approach may be necessary to avoid injury. 	<ul style="list-style-type: none"> • “Hands On” approaches when client may need assistance to perform movement, such as facilitating or assisting with movement of limbs.
<ul style="list-style-type: none"> • Encourage student to self-transfer when able to do so. Should they need assistance, request that they bring a personal assistant to help. 	<ul style="list-style-type: none"> • Unless certified and/or experienced in transferring skills do not attempt to transfer a student or allow other students in a class setting to assist.
<ul style="list-style-type: none"> • Provide an overall objective of physical well-being and achieving overall fitness goals. 	<ul style="list-style-type: none"> • Provide an overall objective that is on improving specific function(s) until a plateau or stable condition is reached.
<ul style="list-style-type: none"> • Provide group and one-on-one services. “Customers” are called students/participants (group setting) or clients (one-on-one setting). 	<ul style="list-style-type: none"> • Provide one-on-one treatment service where “customers” are called patients.
<ul style="list-style-type: none"> • Stay within your realm of practice and expertise. While students may ask for advice around other lifestyle practices, referral to the appropriate professional for accurate advice should be made. 	<ul style="list-style-type: none"> • Provide general information or perspective plan about topics outside of the scope of expertise.

Notes:

Working with the Student with MS

Understanding the Special Needs of Your Students

Many individuals with MS can experience some hesitation and ambivalence attending an exercise class or facility for the first time or when symptoms might be impacting their ability to move freely, especially when the class is not designed *only* for individuals living with MS. When working with individuals with MS it is important to help them feel comfortable and welcome no matter their limitations.

Important reminders for participants at the beginning of each class:

- Encourage participants to advise instructor about medications being taken that could impact attention, balance, concentration, etc.
- Each participant needs to know his/her own limitations and to exercise at his/her own pace. Classes are not competitive in nature and each participant has his or her own situation, which may change from week to week. Short breaks during the class are appropriate and recommended if needed.
- Any time a person experiences new difficulty with the exercises in class or symptoms increase, recommend that they contact their physician.

The following are a sample questions you can ask your students regarding how they are doing, symptoms they are experiencing and anything with which they may need help:

1. How do you feel today?
2. Could you please describe the typical amount and types of exercise per day or week you have engaged in during the past year?
3. What type of symptoms are you experiencing today? What do you see as the limitations MS imposes on you (e.g. fatigue, heat sensitivity, numbness and visual disturbances) for doing exercise?
4. What do you think you many need extra help with or attention to today?

5. What concerns do you have?
6. Are there any exercises that your physician has cautioned you against doing?
7. What are your short-range and long-range goals in designing your own personal exercise program?
8. What is your favorite exercise format (group classes, individual classes, walking or treadmill, self-motivated individual gym regimen, swimming, yoga, etc.)?

Functional Levels: Options for Movement Modifications

The following levels are intended to assist health, fitness, and wellness professional in designing exercise programs and class formats that address the needs of a group with mixed functional levels. When designing a class or one-on-one training session, keep the following three levels in mind.

Level 1 These individuals may have no symptoms or mild symptoms. They will generally walk independently or use a cane. However, they may be experiencing symptoms that are not outwardly visible to the instructor.

Level 2 These individuals have more motor-physical limitations. Symptoms may also be affecting postural alignment. They may be more dependent on assistive devices such as walkers and wheelchairs for mobility. They have good transfer skills, but may need additional help getting into a chair, onto the floor, or into the pool. They may require assistance with balance while participating in a class.

Level 3 These individuals have greater functional impairment and may experience paralysis and spend most of their time in a wheelchair. These participants may need personal attention and may require an assistant.

As a general guide most of your students would probably fit into the first two levels, however, it is important to understand and feel comfortable making modifications across a range of ability levels. It is important to remember that symptoms of MS are different for each individual and may change daily or weekly. Many common symptoms, including fatigue, heat sensitivity, numbness and visual disturbances can be “invisible.” Be sure to discuss any specific limitations with each student if possible so that they can modify the movement to best meet their needs. Should you see changes in an individual’s functional level, consider a discussion with your student to connect them with the appropriate rehabilitation professional.

MS Symptoms: Considerations for Movement Modifications

As discussed earlier, individuals with MS can experience an array of symptoms due to the disruption of nerve signals, and vary depending on where the damage has occurred. Over the course of the disease, some symptoms will come and go, while others may be more lasting.

In general, exercise at low or moderate levels of intensity are best tolerated by people with MS. This means that the time spent performing an exercise may be gradually increased while holding the intensity at a stable level. This may help reduce early fatiguing, overheating and possibly reduce the risk of fall and injury. When people with MS begin to feel fatigued, it is generally better to heed their body's signals of exhaustion and shift to a cool-down phase of exercise, or non-fatiguing exercise rather than trying to push past their limit of endurance. Gradually increasing an exercise program over several months will allow more physical activity without more fatigue.

The following table discusses how symptoms may impact exercise and considerations for modification and movement.

SYMPTOM/ CONDITION	IMPACT ON MOVEMENT	SUGGESTED EXERCISES	SPECIAL CONSIDERATIONS
Fatigue	<ul style="list-style-type: none"> • Decline in energy levels • Peaked level of fatigue commonly reached by mid afternoon 	<ul style="list-style-type: none"> • Cardio exercises which stay at lower end of target heart range of 45%-60% (i.e. swimming, walking, stationary bike, etc) • Mild interval training • Muscle conditioning • Slow stretches, yoga postures 	<ul style="list-style-type: none"> • Advisable to encourage clients to eat small portion of food before exercise session to increase energy • Allow for resting periods • Monitor duration & intensity of exercise • Utilize Perceived Exertion Scale of 1-20 with clients (12-14) being an appropriate range
Heat Sensitivity	<ul style="list-style-type: none"> • Heat & humidity can lead to fatigue • Decreased energy levels • Loss of balance • Visual changes • May lead to pseudoexacerbation 	<ul style="list-style-type: none"> • Indoor activities • Aquatics/water aerobics • Add cooling device for land activities • Mild interval training 	<ul style="list-style-type: none"> • Provide cool environment • Awareness of early signs of heat-related problems • Allow for rest periods • Increase fluid intake to avoid dehydration • Drink cold water • Wear free-breathing fabrics and dress in layers that can be easily removed
Balance	<ul style="list-style-type: none"> • Foot drop or dragging; may be related to muscle weakness • Foot may turn in while walking: spasticity may be contributing factor • Shuffling of foot while walking • Wobbling gait • Loss of balance leading 	<ul style="list-style-type: none"> • Choose activities that provide support (i.e. aquatics, stationary bike, walking with adaptive device, wall or bar work, or using a supportive prop like a chair) • Dynamic balance exercises • Weight-shifting exercises • Balancing on unstable surface (eyes open and closed) 	<ul style="list-style-type: none"> • Provide surrounding support to prevent falls • Stand close to the client • Develop strength before working on balance exercises • Avoid sharp turning of the head and neck or closing of the eyes in order to prevent loss of balance • Work against a wall or corner

SYMPTOM/ CONDITION	IMPACT ON MOVEMENT	SUGGESTED EXERCISES	SPECIAL CONSIDERATIONS
	to risk of falling	<ul style="list-style-type: none"> • Sitting on balance ball • Tandem walking 	
Ataxia (Coordination)	<ul style="list-style-type: none"> • Staggered gait • Appearance of client to be drugged or drunken • Drop foot • Circumducted hip during swing phase (one must swing the leg around to clear the ground) 	<ul style="list-style-type: none"> • Choose activities that provide support (i.e. aquatics, stationary bike, walking with adaptive device, wall or bar work, or using a supportive prop like a chair) • Strength & conditioning exercises • Balance exercises • Walking in a straight line • Fine motor exercises 	<ul style="list-style-type: none"> • Provide surrounding support to prevent falls • Monitor for fatigue • Provide extra assistance as client performs movement • Avoid sharp turning of the head and neck or closing of the eyes in order to prevent loss of balance
Spasticity	<ul style="list-style-type: none"> • Most common in legs & postural muscles • Causes muscles to lose their ability to interact with each other as in the case of muscle contraction & relaxation • Causes muscle tightness & stiffness • Contributes to mobility & gait imbalances: might be noted by foot turning in 	<ul style="list-style-type: none"> • Any type of rotational stretch of the affected area • Choose supportive exercise such as stationary bike • Perform gentle rhythmic flexibility exercises • Focus on mobility and lengthening of tight areas. 	<ul style="list-style-type: none"> • Avoid quick forceful movement or stretching and move slowly through range of motion • Allow for rest periods • Perform gentle rhythmic flexibility exercises before static stretching • Avoid excessive plantar flexion for increased duration. • Utilize toe clips and heel straps for foot stability
Contracture	<ul style="list-style-type: none"> • Static muscle shortening due to spasm • Can cause loss of mobility, balance and muscle paralysis 	<ul style="list-style-type: none"> • Rotational movement around the contracture • Gentle, slow flexibility exercises before static stretching • Supported balancing exercises 	<ul style="list-style-type: none"> • No over-stretching • Avoid quick forceful movements • Assisted stretching—helping clients to move through full range of motion

SYMPTOM/ CONDITION	IMPACT ON MOVEMENT	SUGGESTED EXERCISES	SPECIAL CONSIDERATIONS
			<ul style="list-style-type: none"> Intensity should be increased very slowly
Paresthesias <i>(w/L'Hermitte's)</i>	<ul style="list-style-type: none"> Numbness & tingling Creeping sensation of the skin 	<ul style="list-style-type: none"> Refer to health professional for evaluation and treatment In many cases, does not cause real distress, but is more of a nuisance. Can typically engage in all modalities of exercise Monitor duration & take breaks 	<ul style="list-style-type: none"> Modify intensity to avoid increase in tingling sensation Stop exercise if experienced Monitor duration & take breaks
L'Hermitte's Sign	<ul style="list-style-type: none"> Uncomfortable electrical sensation/shock traveling down the spinal cord when head is bent forward (chin to chest) Pins & needles sensation in limbs 	<ul style="list-style-type: none"> Refer to MD for pain management therapy Choose activities that maintain neck in neutral position 	<ul style="list-style-type: none"> Avoid neck flexion exercises Avoid extreme forward or backward movement of the neck.
Vision Problems <i>(Optic Neuritis)</i>	<ul style="list-style-type: none"> Typically, blurred vision, that is temporary Double vision Sensitivity to bright light and florescent lighting Heightens tension and fatigue 	<ul style="list-style-type: none"> Refer to health professional Relaxation exercises Choose activities that provide support (i.e. aquatics, stationary bike, walking with adaptive device, wall or bar work, or using a supportive prop like a chair) 	<ul style="list-style-type: none"> Mindful of environment Keep exercise area well lit but not extremely bright Keep working area clear of obstruction
Incontinence	<ul style="list-style-type: none"> Students should empty bladder before exercise May impact the intensity and duration of the exercise 	<ul style="list-style-type: none"> Add Kegel exercise pelvic tilt, wall slide and bridge (easier to contract when gluts are activated) Abductor exercise (i.e. squeeze small medicine ball between 	<ul style="list-style-type: none"> Avoid dehydration if client is intentionally reducing water consumption Allow for restroom breaks May not be appropriate for aquatic activities

SYMPTOM/ CONDITION	IMPACT ON MOVEMENT	SUGGESTED EXERCISES	SPECIAL CONSIDERATIONS
		thighs) <ul style="list-style-type: none"> Refer to medical professional 	<ul style="list-style-type: none"> Encourage clients to continue different types of exercise training aside from aquatics.
Tremor	<ul style="list-style-type: none"> Tremors may be random Can occur in various parts of the body 	<ul style="list-style-type: none"> Refer to PT for individual therapy Adding weights to a limb during exercise may decrease a tremor, but must consult a PT for utilizing this modification 	<ul style="list-style-type: none"> Make sure to provide a safe environment Modify balance exercises
Cardiovascular Dysautonomia	<ul style="list-style-type: none"> Dysfunction of the autonomic nervous system causing possible problem with cardio-accleration and reduction in blood pressure response. 	<ul style="list-style-type: none"> Cardio exercises which stay at lower end of target heart range of 45%-60% Work at lower intensity and duration 	<ul style="list-style-type: none"> Monitor for lightheaded and dizziness Discontinue exercise if symptoms progress

Adapted from **Exercise and Multiple Sclerosis, Karl Knopf, EdD**

Equipment Usage and Analysis

Equipment can enable an individual to complete a movement action or position, when range of motion, flexibility or individual symptoms would otherwise prohibit it. In this way, full benefits of the exercise or position are achieved without stress, strain or injury. Equipment can also be used to increase or decrease intensity and add challenge or variety to activities.

An important first step in selecting the appropriate exercise equipment is to determine the needs of the student. Next, evaluate specific pieces of equipment to determine which type will best address these needs.

Once you have made a selection, knowing how to use it correctly is essential. Equipment that is effective as an exercise tool can also be ineffective and damaging when used inappropriately. When used correctly exercise equipment can be an excellent tool for modification/adaptation or intensification of movements.

When considering the use of equipment, do the following:

- Establish intended use/application
- Assess for correct body mechanics during use
- Identify contraindications/risks
- Determine benefits
- Determine the ability of the client
- Identify tool limitations (cost, availability, intended ability level, etc.)
- Determine desired action or benefit you wish to impart.

Ensuring a Safe & Effective Workout

Considerations for Fitness Professionals

- An exercise class or personal training is not intended to replace rehabilitation therapy.
- Frequency, intensity and time (FIT) considerations are important—adjustments to these parameters will help individuals achieve their goals.
- Plan flexible rest breaks to avoid excessive fatigue or overheating.
- Provide a cool, well-ventilated environment.
- Be prepared to repeat instructions for those who may be experiencing cognitive problems.
- Remember that the student's symptoms of MS may change from one session to the next; adjust exercise programs accordingly.
- Should a student fall, notify appropriate staff before attempting to assist. If in a group setting, make sure other participants maintain a safe space and do not attempt to assist.

Keeping Your Student Motivated

Consider how determination, motivation and self-discipline can help individuals stay on track. Often, people become frustrated by a lack of results from fitness programs and may lose desire to continue and give up. Many people begin fitness programs with unrealistic goals and expect quick results. Explain to your students how the body works and the time needed for changes to be noticed as a way to prevent frustration

Encourage your students to seek out new ways to maintain interest in fitness, so that fitness becomes a way of life, and to set realistic goals and add rewards they are achieved. It can be difficult to stay motivated and committed to exercising, despite good intentions. The following is a list of tips for a successful fitness program that may help you work with your students to overcome these barriers.

Ten Tips to Keep Your Student Motivated

1. Make it fun. Taking part in enjoyable activities that are appropriate to the student and relevant to their goals will ensure commitment to an exercise program and will maintain motivation.

Students might feel uncomfortable and intimidated in a new fitness setting due to accessibility and social factors. Explore ways to build in support from others. Provide opportunities in class for students to interact with one another and encourage a workout buddy. In addition, vary the routine in order to prevent boredom and plateaus.

2. Stay cool and keep hydrated. Ensure students drink water before, during and after a workout to avoid dehydration. To avoid overheating, workouts in a cool environment, wearing cool breathable clothing, and using cooling devices can help.

3. Provide a challenge. Over time the body conditions itself for a particular activity. Students should gradually increase the intensity of a workout to continue to improve strength and endurance when it is no longer challenging. A student can increase the duration of your cardio workout, in small increments (add 2 minutes to your walk), or increase the intensity to a strength training program by adding repetitions or sets (three sets of 10 repetitions to 3 sets of 12 repetitions).

4. Make it complete. Fitness is more than just a cardiovascular workout. Make sure all aspects of fitness are incorporated to make a well-rounded exercise program. Aerobic activity should be done at least two to three times a week, strength training at least twice a week, and flexibility and relaxation should be included throughout the week.

5. Start slowly. Doing too much too soon only leads to sore muscles and unwillingness to do the same routine again. If a workout causes soreness, then too much is being done. Tell your students to workout for a shorter time, use less weight or decrease the intensity, and over time gradually add more.

6. Listen to the body. Encourage students to avoid comparing themselves to others or to do exactly what others might be doing. This could lead to injury, feeling discouraged and unmotivated. They should pay attention to their body and adjust a workout accordingly. Remind them to challenge themselves or make modifications when appropriate.

Each workout may be different each day due to symptoms, how one might be feeling, any injuries, or the time of day they are working out. Lower intensity of exercise or duration during periods of exacerbations and overheating.

7. Pacing. During any strenuous exercise it is important to work at a level at which one can still breathe and talk. Students should assess their body throughout an exercise session to avoid overexertion, which can result in extreme fatigue lasting for up to a few days.

8. Make fitness a habit. Working-out must be thought of as a “life-long” habit and a behavioral change, something done without thinking or talking yourself in or out of. You would not consider brushing your teeth as an option, so encourage your students to treat exercise as another part of daily routine.

9. Set realistic goals. Work with your students to begin with a basic program, including all components of fitness. Be sure that their goals are realistic and achievable for now. Setting unrealistic goals or only long-term goals [those that take months to achieve], is a formula for failure, lack of self-confidence and self-efficacy. Students should set short-term goals that are attainable, and once they are reached new ones can be set. Recognizing when students are improving and maintaining progress on their fitness goals will help build confidence and promote motivation over time.

10. Exercise throughout the day. An hour block of time for exercise can seem overwhelming or even impossible. Students can break it up into smaller chunks throughout the day. Research has shown that you can see benefits when exercising three times a day in 20-minute increments. All activity adds up by the end of the day, so individuals can take advantage of free moments. Adding exercise to daily activities, like taking the stairs instead of the elevator, doing calf raises while standing in line, and tightening your glutes and thighs while sitting at a red light, commuting to work or errands on foot or by bike (including adaptive cycles) is an easy way to incorporate activity throughout the day. These small increments can add up and count toward a total fitness program.

If an individual is having difficulty initiating or maintaining an exercise/physical activity program, recommend that they consult with a healthcare or fitness professional with expertise in MS who can provide specific exercises that will increase success and adherence with an activity program. Always remember, of course, to recommend that people consult with their physician if they have any questions about whether a new exercise program is right for them or if their symptoms change.

Interacting with People with Disabilities

Sensitivity towards people with disabilities is important for personal relationships and also makes good business sense. It can help you expand your practice, better serve your customers, and develop your audience. When service providers—including fitness and wellness professionals—observe disability etiquette and use appropriate language, clients feel more comfortable and are likely to benefit more fully from programs in which they participate.

Language

What we say and how we say it can either enhance the dignity of those we serve, or inadvertently reflect and perpetuate stereotypes and negative attitudes. How we think affects how we talk and behave.

- Disability language and etiquette are about respect, common sense, and common courtesy.
- Some common words and phrases reinforce prejudices and assumptions.
- The right language challenges discrimination and stereotypes.
- Language is continually evolving: not everyone agrees on what is appropriate and what is not.
- Sincerity and honesty go a long way.

Stereotypes to Avoid

- People living with disabilities are “courageous.”
- People’s lives are ruined by disease or disability.
- Disability (MS) dominates a person’s life.
- Disease or disability was caused by something the person did or did not do.
- People with disabilities aren’t as smart as other people.
- People with disabilities are sick.

General Language

Phrases to Avoid . . .	Use Instead . . .
<ul style="list-style-type: none"> • Sufferer, afflicted, victim, invalid, crippled, stricken 	<ul style="list-style-type: none"> • Person/people with a disability
<ul style="list-style-type: none"> • Wheelchair-bound, confined to a wheelchair 	<ul style="list-style-type: none"> • Uses a wheelchair
<ul style="list-style-type: none"> • Handicapped/disabled parking 	<ul style="list-style-type: none"> • Accessible parking
<ul style="list-style-type: none"> • Normal person, healthy person 	<ul style="list-style-type: none"> • Person/people without disability, able-bodied person

MS-Specific Language

Phrases to Avoid . . .	Use Instead . . .
<ul style="list-style-type: none"> • MS patient/client/person 	<ul style="list-style-type: none"> • Person with MS/who has MS
<ul style="list-style-type: none"> • “MS-ers” 	<ul style="list-style-type: none"> • People with MS
<ul style="list-style-type: none"> • Person suffering from/afflicted with MS; MS sufferer 	<ul style="list-style-type: none"> • Person living with/affected by MS
<ul style="list-style-type: none"> • When she was stricken with MS 	<ul style="list-style-type: none"> • When she was diagnosed with MS

Conversation Etiquette

- First and foremost: relax and enjoy the uniqueness of the individual.
- Treat the person as you would any other.
- Speak directly to the person, not an attendant or companion.
- Don't make assumptions about what a person can or cannot do based on what you see and what you [think you] know.
- Offer to help if it seems appropriate—and then wait for a response.
- A wheelchair is part of a person's personal space. Do not lean on it.
- When speaking to a person who uses a wheelchair, try to place yourself at eye level to that person. Step back, squat, or sit in a chair if you are going to have a long conversation. Do not lean over in a condescending manner.

- When approaching a person with a visual impairment, always identify yourself immediately. Identify yourself before you speak especially if there are many voices in the room as it is difficult to know who is speaking.
- Don't pat or talk to a service animal unless invited to do so.
- When conversing with a person with speech problems, be patient, and let him/her speak at a comfortable pace. Never pretend you understand if you are having difficulty. It is okay to ask a person to repeat. It is also appropriate to repeat what you think you heard, and ask for confirmation or correction.
- Don't worry about using customary expressions, e.g., take a walk . . . , run an errand. . . , see you later
- Remember that disability—and ability—are not always visible.

Notes:

The Environment: Safety & Accessibility

Participant Safety

Important reminders to participants at the beginning of each class:

- Encourage participants to advise instructor about medications being taken that could impact attention, balance, concentration, etc.
- Each participant needs to know his/her own limitations and to exercise at his/her own pace. Classes are not competitive in nature and each participant has his or her own situation, which may change from week to week. Short breaks during the class are appropriate and recommended if needed.
- Any time a person experiences new difficulty with the exercises in class or symptoms increase, recommend that they contact their physician.

Facility Accessibility

The Americans with Disabilities Act of 1990 established basic civil rights for people with disabilities, especially in the areas of employment and public accommodation. If you are serving people with MS, every effort should be made to assure that access and safety are assessed. Ramps, wider doorways, accessible bathrooms and other accommodations mean that those with disabilities using mobility equipment such as walkers, scooters or wheelchairs can take advantage of your services.

The Accessibility Checklist (Appendix A) provides a quick way of assessing whether or not a facility is accessible to people with mobility equipment.

Notes:

About the National Multiple Sclerosis Society

The National MS Society funds a wide range of research initiatives, drives change through advocacy, facilitates professional education, collaborates with MS organizations around the world, and helps address the challenges of everyone affected by MS.

The National MS Society is the largest nonprofit organization in the United States supporting research for the treatment, prevention and cure of multiple sclerosis. Through its 50-state network of chapters and the combined efforts of volunteers, donors, researchers and health care professionals, the Society provides significant outreach, education and support to individuals and families who are impacted by the disease.

The National MS Society . . . the expert resource for professionals

The National MS Society's *Professional Resource Center* (PRC) supports the work of health professionals involved in the care of people with MS and their families. The PRC provides a range of library and literature search services, as well as information and consultation about the disease and its management, insurance, long-term care, and the Society's professional education opportunities.

Further information is available via the following:

E-mail: HealthProf_info@nmss.org

Online: nationalMSSociety.org/PRC

To receive periodic research and clinical updates via e-mail, please contact us via e-mail at the address listed above.

The National Multiple Sclerosis Society is proud to be a source of information about multiple sclerosis. Our comments are based on professional advice, published experience and expert opinion, but do not represent individual therapeutic intervention or prescription.

*Professional **R_X** Resource Center*

Notes:

Appendix A: Accessibility Checklist For Exercise Facilities

This resource is intended to provide a quick guide for assessing accessibility and usability for people with MS. For further information, consult the Americans with Disabilities Act website at www.ada.gov or an experienced architect.

Entrances and Doors

- Is there an approach path without stairs? (Y/N)
- Is the path stable, firm and slip-resistant? (Y/N)
- Is the path at least 36 inches wide? (Y/N)
- Is the main entrance free of barriers/steps, etc.? (Y/N)
- If there are barriers, is there another accommodation such as a ramp, lift, or alternative accessible entrance? (Y/N)
- Are there accessible entrance doors? (Y/N)
 - Clear opening of at least 32 inches wide
 - Door handles are no higher than 48 inches
 - Can be operated with a closed fist
 - Interior doors do not require more than 5 pounds of force to operate
(local fire regulations may pre-empt this)
 - Doors with closers take at least 3 seconds to close
 - Doors have a level threshold (less than 1/4 inch high) or beveled (no more than 1/2 inch high)
 - Doormats are no higher than 1/2 inch and are secured to the floor at all edges

Ramps

- Do ramps have slopes no greater than 1:12 (which means that for every 1 inch of height or rise, there are 12 inches (1 foot) of ramp “length” or “run”)? (Y/N)
- Do ramps longer than 6 feet have railings on both sides? (Y/N)
- Do ramps have a non-slip surface? (Y/N)

Lockers and Showers

- Do entrances and doors to locker rooms have a clear opening of at least 32 inches? (Y/N)
- Do entrances, and doors to locker rooms provide necessary clearances for guests with restricted mobility? (Y/N)
- Do locker rooms include accessible lavatories, urinals, water closets, showers, dressing booth, and lockers as well as provide an accessible route from the entrance to these fixtures? (Y/N)

Swimming Pool

- Is at least one pool entry/exit available for people with restricted mobility? (Y/N)
- Do steps into swimming pools have slip-resistant treads or finish? (Y/N)
- Are there handrails at steps to provide support to the user on both the right and left side? (Y/N)
- Is the pool temperature between 82–85 degrees Fahrenheit? (Y/N)
- Is there a lift available? (Y/N)

Miscellaneous

- Are staff members trained and available to assist with mobility needs, if necessary? (Y/N)
- Are there accessible fire exits/emergency procedures for people with limited mobility? (Y/N) If so, where are they located?

Continuing Education Test

Physical Activity for People with Multiple Sclerosis: An Introduction to MS for Fitness and Wellness Professionals

This course has been approved for .4 CECs by the American Council on Exercise.

1) MS is:

- a. A condition of malignant, abnormal tissues that grow rapidly and spread into surrounding tissues.
- b. A chronic, autoimmune disease that can damage any part of the body (skin, joints, and/or organs inside the body).
- c. An often disabling disease that affects the peripheral nervous system (PNS) resulting in the loss of muscle control.
- d. An infectious disease that causes symptoms including fatigue, headache, depression and numbness.
- e. A chronic, often disabling disease that affects the central nervous system (CNS).

2) Which course of MS is characterized by clearly defined attacks of worsening neurologic function followed by partial or complete recovery periods?

- a. Progressive-Relapsing
- b. Primary-Progressive
- c. Secondary-Progressive
- d. Relapsing-Remitting
- e. Primary-Relapsing

3) Which of the following statements are false?

- a. Most people with MS are diagnosed between the ages of 20 and 50
- b. Two to three times as many men as women have MS
- c. MS is not contagious and is not usually fatal. MS is not directly inherited, although a genetic predisposition is thought to be involved.
- d. The exact cause of MS is unknown, but it is believed that damage to myelin results from an abnormal response by the body's immune system.
- e. There are effective strategies available to modify the disease, treat attacks, manage symptoms, improve function and provide emotional support.

4) True or False: The most common symptom of MS, occurring in more than 80% of people is headaches.

5) Problems with balance impacts movement by all of the following ways, except:

- a. Increased risk of falling
- b. Pins and needles sensations in the limbs
- c. Shuffling of foot while walking
- d. Foot drop or dragging
- e. Wobbling gait

- 6) **When working with a student experiencing contracture, ensure they do all of the following except:**
- Minimize over-stretching in the area of the contracture
 - Move through full range of motion with guided stretching
 - Quickly move through the movement they might be stuck in
 - Increase intensity very slowly
 - Perform gentle, slow flexibility exercises before static stretching
- 7) _____ **is most common in legs & postural muscles, causes muscles to lose their ability to interact with each other, causes tightness and stiffness, and contributes to mobility and gait imbalances.**
- Ataxia
 - Tremor
 - Parasesthesias
 - Contracture
 - Spasticity
- 8) _____ **may help reduce early fatiguing, overheating and possibly reduce the risk of fall and injury.**
- Low or moderate levels of intensity
 - Avoiding exercise
 - Short intense bursts of intensity
 - Medications
 - Comfortable environments
- 9) **True or False: When working with individuals with MS it is important to help them feel comfortable and welcome no matter their limitations.**
- 10) **If your student experiences spasticity, it is important to consider which of the following?**
- Avoid excessive plantar flexion for increased duration
 - Increase awareness of early signs of heat-related problems
 - Monitor for lightheadedness and dizziness
 - Perform quick forceful movement and/or deep, full-range stretching
 - Avoid sharp turning of the head and neck
- 11) **True or False: Individuals with MS who are at varying functional levels (levels 1, 2 and 3) can actively participate in exercise with appropriate modifications and intensity levels.**
-

12) Which of the following statements are true?

- a. It is important to evaluate a person's medical status when he/she experiences new difficulties with exercises in class or symptoms increase.
- b. It is up to you, as the fitness instructor, to know your students' limitations based on the way they appear.
- c. It is important to remember that symptoms of MS are the same for each individual and do not change daily or weekly
- d. There is never the need to ask about the medications a student may be taking. This is private and confidential information.
- e. It is important to understand and feel comfortable making modifications across a range of ability levels.

13) Which of the following statements are false?

- a. Should a student fall in a group setting, make sure other participants maintain a safe space and do not attempt to assist.
- b. Student's symptoms of MS may change from one session to the next and it is important to adjust exercise programs/routines accordingly.
- c. Adjusting frequency, intensity and time considerations will help individuals achieve their goals.
- d. Be prepared to repeat instructions for those who may be experiencing cognitive problems.
- e. An exercise class or personal training is intended to replace rehabilitation therapy.

14) _____ can either enhance the dignity of those we serve, or inadvertently reflect and perpetuate stereotypes and negative attitudes.

- a. Language
- b. Clothing
- c. Appropriate equipment
- d. Exercise modifications
- e. A cool environment

15) The role and expectations as a fitness instructor include all of the following, except:

- a. Use general screening techniques that may consist of a health history and non-invasive fitness testing
- b. Make a diagnosis and prescribe a treatment-based program.
- c. Design and implement fitness/wellness programs that address the body as a whole.
- d. While students may ask for advice around other lifestyle practices, referral to the appropriate professional for accurate advice should be made.
- e. Should a student need assistance transferring, request that they bring a personal assistant to help.

16) When assessing for accessibility at your facility, which of the following should be considered?

- a. Availability of trained staff to assist with mobility needs
- b. Proximity to the parking lot
- c. Emergency procedures for individuals with mobility devices
- d. All of the above
- e. None of the above