

# MS Fitness Specialist

## Module 2

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### MS Terms

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#### Learning Objectives

1. Obtain a knowledge of MS terms used

## Chapter Two

### Multiple Sclerosis Terms

To better understand the terminology involved in Muscular Sclerosis, provided below is a glossary of terms.

**Acute Attack:** A sudden or severe exacerbation (also known as a relapse, attack, flare-up, or episode), in which existing symptoms worsen, or new symptoms develop. To be considered a true relapse, symptoms must be present for at least 24 to 48 hours, and not be associated with other factors that might mimic an acute attack, such as a urinary tract infection, depression, hot weather, and extreme exercise. Relapses occur with relapsing-remitting, progressive-relapsing, and sometimes secondary-progressive forms of MS.

### Advance (Medical)

**Directive:** Written instructions that provide specific directions to doctors and family regarding a person’s end-of-life choices in advance, should this person become unable to make these decisions on his or her own when needed. Typically include appointing a healthcare representative or proxy as well as creating a “living will.”

**Ankle-Foot Orthosis:** A brace that holds and angles the foot and ankle in the best position for maximum comfort and mobility. This device can also relieve stress on the knee.

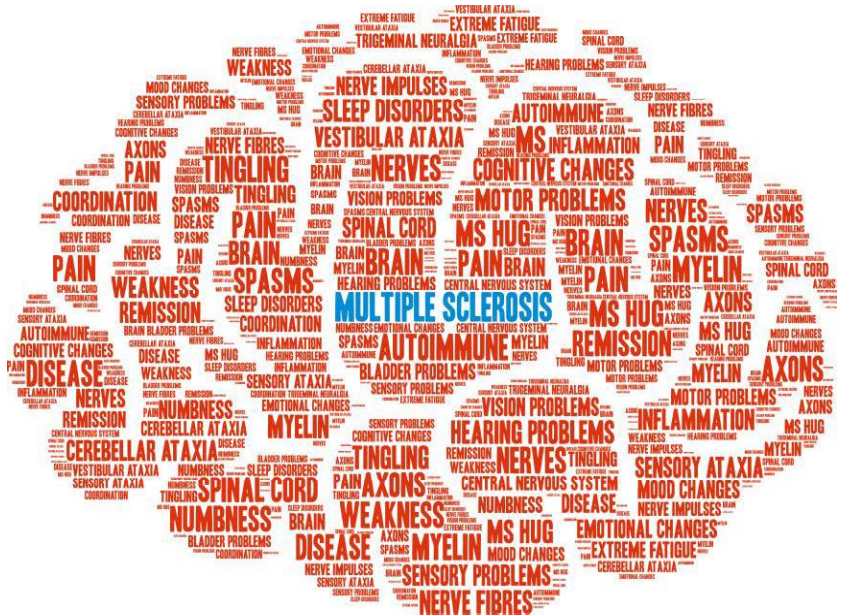
**Antibody:** A protein produced by the body's immune system when it detects foreign substances, called antigens. Examples of antigens include microorganisms (such as bacteria, fungi, parasites, and viruses) and chemicals. Antibodies may be produced when the immune system mistakenly targets healthy tissue, which happens with an autoimmune disorder. Each type of antibody is unique and defends the body against one specific type of antigen.

**Antigen:** A foreign molecule or substance that stimulates the immune system to activate a series of events to eliminate the antigen. In MS, the immune system misdirects the reactivity to antigens to damage the CNS, which is referred to as autoimmunity.

**Assistive Devices:** Tools, products, or types of equipment that help someone perform tasks and activities. They may help individuals to move around, see, communicate, eat, or get dressed. Some are high-tech tools, such as computers (which can be adapted to meet various disabilities such as reduced vision or dexterity/mobility problems). Others are much simpler, like a “reacher” – a tool that helps someone to grasp an object that is difficult to reach.

**Assistive Technology:** Any service or tool that can help a person with a disability perform activities that might otherwise be difficult or not be possible.

**Ataxia:** Inability to coordinate walking movements.



**Atrophy (of the brain or muscles):** The decrease in the volume of brain or muscle tissue often associated with MS.

**Autoimmune Disease:** When the body's own immune system attacks its own tissue, it is known as an autoimmune disease. MS is believed to be an autoimmune disease.

**Autonomic Nervous System (ANS):** The ANS helps control blood flow to and from the extremities; it also controls: heart rate; blood pressure; bowel, bladder, and sexual activity; and other automatic bodily functions.

**Axon:** The wire-like nerve fibers that conduct signals between neurons (nerves of the brain and spinal cord). Axons have a protective myelin covering and are found in the white matter of the brain. They are also located in peripheral nerves.

**Axonal Damage:** Damaged nerves that are unable to efficiently conduct impulse flow.

**B-cells:** Immune-system cells that produce antibodies to fight against “foreign invaders” (such as bacteria or viruses) within the body and help to regulate other immune cells. These cells have been shown to be an element of the autoimmune destruction seen in MS.

**Babinski Reflex:** The Babinski reflex occurs after the sole of the foot has been firmly stroked. The big toe then moves upward or toward the top surface of the foot. The other toes fan out. This reflex is normal in children up to 2-years old. It disappears as the child gets older. When the Babinski reflex is present in a child older than 2 years or in an adult, it is often a sign of a brain or nervous-system disorder. Multiple sclerosis is among the disorders that could be indicated by this reflex in people older than 2 years.

**Bell's Palsy:** Bell's palsy is the most common cause of facial paralysis. It usually affects just one side of the face. Symptoms appear suddenly and are at their worst about 48 hours after they start. They can range from mild to severe and include twitching, weakness, paralysis, drooping eyelid or corner of mouth, drooling, dry eye or mouth, excessive tearing in the eye, and impaired ability to taste.

Scientists think that a viral infection makes the facial nerve swell or become inflamed. Individuals are most likely to get Bell's palsy if pregnant, diabetic, or sick with a cold or flu. It can also occur with multiple sclerosis. Three out of four patients improve without treatment. With or without treatment, most people begin to get better within two weeks and recover completely within three to six months.

**Blood-Brain Barrier (BBB):** A protective barrier that lines the blood vessels, this layer of cells is designed to prevent damaging cells and other substances in the blood (including those that could cause disease) from entering the brain, optic nerves, and spinal cord of the CNS.

**Brainstem:** The back part of the brain above the base of the skull. Many nerves to the face come from this area.

**Central Nervous System (CNS):** Consists of the brain, optic nerves, and spinal cord and functions to send and receive nerve impulses throughout the body.

**Cerebrospinal Fluid (CSF):** The liquid that surrounds the brain and spinal cord.

**Clinically Isolated Syndrome (CIS):** Prior to a diagnosis of MS, CIS is a single attack (or the appearance of one or more symptoms characteristic of MS), with a very high risk of developing MS, when no other diseases or causes for symptoms are apparent.

**Cognition:** A group of mental processes that include functions such as memory, decision making, and concentration, which is the ability to focus on specific tasks and planning.

**Cognitive Impairment:** Some of the cognitive functions typically affected in people with MS include: information processing; perceiving; attending/responding to incoming information; information-processing speed; cognitive flexibility, such as attending to multiple stimuli at the same time (“multi-tasking”); problems with storage, manipulation, and retrieval of information; and executive function, which includes planning, working memory, attention, and problem-solving.

**Corticosteroid:** A steroid hormone produced in the adrenal gland. Cortisol reduces inflammation and is often used to treat unwanted inflammation in the brain that is connected to MS.

**Cortisone:** The name of the corticosteroid first used to treat MS relapses in 1951.

**Cytokines:** Small proteins that may stimulate or inhibit the function of other cells. They connect to specific receptors found on the surface of cells and send messages from one cell to another. They can stimulate or inhibit the inflammation process.

**Demyelination:** Damage to the protective (insulating) covering of the nerves (myelin) of the CNS, causing interruptions in the flow of nerve impulses in the CNS. This can ultimately affect a wide range of function. (Demyelination can occur outside the CNS as well, but myelin in the peripheral nervous system is chemically different than in the CNS which is why MS only affects the CNS.)

**Diplopia:** Double vision which can result from lesions in the brain stem, a part of the nervous system between the brain and cervical spinal cord.

**Double-Blind Clinical Study:** Neither the participants nor the medical staff administering or evaluating the new treatment are told who is receiving the drug and who is receiving the placebo or other drug being compared to the test drug.

**Dysarthria:** Speech that is abnormal as a result from problems in the brain interfering with the production of speech. There is loss of coordination and control of the speaking muscles. Speech becomes slurred or poorly articulated; it can involve a loss of volume control, unnatural emphasis on words or sentences, and a slower rate of speaking.

**Dysesthesia:** Type of pain that is experienced as a burning, aching, or “pins and needles” type of sensation under the skin. For some, this can be painful; for others, it is more bothersome.

**Dysfunction:** A medical term that describes abnormal function in a tissue or organ, usually based on disease.

**Dysphagia:** Swallowing dysfunction.

**Dysphasia:** Language disorder marked by deficiency in the generation of speech, and sometimes also in its comprehension, due to brain disease or damage.

**Dysphonia:** A type of Dysarthria that causes changes in the quality of speech, such as a breathless quality to the voice, or speech that sounds harsh.

**Electromyography:** An electrical test used to evaluate nerve and muscle problems.

**Evoked Potentials:** Evoked potentials measure the speed of the brain’s response to visual, auditory (sound), or sensory (feeling) stimuli to the central nervous system, using electrodes (taped to the patient’s head) and a computer. This system measures the time for an impulse to travel from the eye, ear, arm, or leg to the brain.

**Exacerbation:** An episode usually lasting days to weeks, not caused by fever or illness, where there are new or worsened neurological symptoms in patients with MS. Note that exacerbation=attack=relapse=flare; they are all terms for the same thing.

**Expanded Disability Status Scale:** This 10-point scale (from 1 to 10 with half points) measures degrees of disability, largely in terms of mobility. Points 1 to 3 on the scale are primarily used to measure function; points 4 to 9 measure mobility. Half points are used for higher clarity.

**Experimental Allergic Encephalomyelitis:** An MS-like disease in animals, induced through the injection of myelin plus adjuvant (a substance that enhances the body's response), to enable investigators to see how experimental treatments affect this MS-like disorder (often in mice).

**Gadolinium:** A type of dye given via injection prior to magnetic resonance imaging (MRI). It serves to enhance areas of active inflammation and blood-brain barrier (BBB) breakdown.

**Inflammation:** A process where white blood cells as well as chemical messengers go to an area of the body to stimulate healing or to attack viruses or foreign material in the body.

**Intermittent Self-Catheterization:** A procedure to help bring urinary symptoms under control by inserting a catheter (a specially designed thin tube) into the urinary opening to drain urine from the bladder, for people who cannot empty their bladder normally (see neurogenic bladder).

**Lesion:** A localized area of abnormality. In MS, it is usually an area in the brain or spinal cord. This is not a specific term but is just a description of a finding usually seen on MRI or sometimes CT scanning.

**Lhermitte's Sign:** An electric shock-like sensation down the spine and legs when the neck is flexed forward; approximately 40 percent of individuals with MS experience this type of pain, although it usually does not require any treatment. It is often an indication of myelin damage in the spinal-cord area.

**Lumbar puncture (LP):** Also known as a spinal tap, LP is a procedure where a very thin needle is inserted at the lower back and a small amount of cerebrospinal fluid (CSF) is collected to look for induced changes or other problems.

**Lymphocyte:** A type of white blood cell that plays a strong role in the body's immune system, which works to defend the body against foreign bodies and disease. In MS, the lymphocytes may be misdirected to cause damage to the central nervous system. Some lymphocytes help to control the MS damage (T-regulatory cells).

**Macrophage:** Type of white blood cell that works to ingest and destroy foreign substances.

**Magnetic Resonance Imaging:** Scan of the brain and/or spine. The MRI uses a computer, radiofrequency stimulator, and a large electromagnet to provide a picture of the brain.

**Monoclonal Antibody:** Monoclonal antibodies are produced to defend the body and are derived from cells that are identical (cloned from a single cell and then replicated). They are produced from animal tissue, most commonly laboratory mice. Humanized monoclonal antibodies are antibodies from non-human species whose protein sequences have been modified to increase their similarity to antibodies produced naturally in humans. Monoclonal antibodies are an important type of medication, as they can be specifically targeted to perform a particular action, which is desirable when trying to impact a complex structure like the immune system. The name of all monoclonal antibodies ends with "mab." These antibodies attack and destroy specific inflammatory lymphocytes that may be damaging the CNS in MS.

**Multiple Sclerosis Functional Composite:** A scale that measures lower-limb function (walking), upper-limb function (arm movements), and cognition.

**Myelin:** Myelin is a fatty protein that serves as a protective covering and insulation to the nerves (called axons) that work like wires to carry messages to and from the CNS.

**Neurogenic Bladder:** Bladder problems resulting from demyelination in the nervous system pathways that control the muscles of the bladder and the sphincters of the urinary tract. The three categories of bladder problems are usually referred to as “failure to store” (small, spastic bladder), “failure to empty” (large, flaccid bladder), and “dyssynergia,” which is a disconnect between the muscles of the bladder wall and the urinary sphincter.

**Nocturia:** The need to urinate during the night.

**Nystagmus:** Involuntary movements of the eyes that result from lesions in the brain stem, a part of the nervous system between the brain and cervical spinal cord. It typically is an uncontrolled side-to-side (horizontal) or up-and-down (vertical) movements of the eye. It can be asymptomatic (causing no visual problems) or severe enough to disturb vision. Objects may appear to jump or move unpredictably as the two eyes no longer coordinate well with each other. Nystagmus can be more of a nuisance than a major problem and is usually temporary. It may sometimes distort vision.

**Oligoclonal Bands:** Abnormal immune proteins called immunoglobulins. These are present in the CSF of roughly 90 percent of individuals with MS, however, they can occur with several other neurological disorders. Since the introduction of the MRI, CSF analysis is used less often, but it can be helpful in supporting an MS diagnosis if the MRI results are normal or inconclusive.

**Oligodendrocyte:** Cells that produce and maintain myelin. Over time, oligodendrocytes may be damaged or lost and fail to repair the damaged myelin.

**Optic Neuritis:** A condition that causes decreased or blurred vision. This is an inflammation of the optic nerve, which – unlike the nerves that innervate most of the body that are part of the peripheral nervous system – is actually part of the central nervous system and is myelinated in the same way as axons in the brain and spinal cord.

**Osteoporosis:** The loss of bone density.

**Paresthesia:** Tingling, burning, or numbing sensation.

**Paroxysmal Symptom:** Sudden recurrence of a symptom, spasm, or seizure.

**Periventricular Region:** This is the area around or near the ventricles, the spaces in the brain containing the cerebrospinal fluid.

**Plaque:** Areas of inflammation and damage in the brain or spinal cord in MS.

**Primary-Progressive MS (PPMS):** This form of MS presents a gradual but steady accumulation of neurological problems from the onset, without the presence of relapses and remissions.

**Progressive-Relapsing MS (PRMS):** A progressive course of MS from the onset with acute relapses occurring later in the disease course.

**Pseudobulbar Affect (PBA):** Characterized by uncontrolled, inappropriate, and/or exaggerated episodes of crying, laughing, or other emotional display. PBA occurs involuntarily with little or no stimulation to invoke such a response.

**Pseudoexacerbation:** A temporary worsening of symptoms without actual myelin inflammation or damage, brought on by other influences. These can include other illnesses or infection, over-exercise, a warm environment, depression, exhaustion, and stress. When symptoms flare, checking for a fever is important, since even a minor infection and slight increase in temperature can cause symptoms to appear.

**Relapse (or exacerbation):** A temporary worsening or recurrence of existing symptoms and/or the appearance of new symptoms (also called an “acute attack;” definition shown above), caused by inflammation occurring along the nerves and the myelin. This can range from a few days in duration to a few months, followed by a complete or partial recovery (remission). Acute physical symptoms and neurological signs must be present for at least 24 to 48 hours, without any signs of infection or fever, before the treating physician may consider this type of flare-up to be a true relapse. Treatments may improve recovery time.

**Relapsing-Relmitting MS (RRMS):** A course of MS that includes temporary symptom flare-ups (also referred to as relapses, attacks, exacerbations, or bouts), which typically last for one to three months. These are followed by a complete or partial recovery.

**Remission:** Reduction and stability in severity of one’s MS, or the disappearance of symptoms.

**Remyelination:** The restoration or repair of myelin (protective covering to the nerves).

**Scanning Speech:** Characterized by long pauses between syllables and words with loss of melody in speech production; it is a type of dysarthria.

**Scotoma:** Blind spot in the center of the visual field.

**Secondary-Progressive MS (SPMS):** This phase of MS follows relapsing-relmitting MS (RRMS) and is reached when the patient experiences a progressive worsening of symptoms. SPMS may occur with or without superimposed relapses. Disease-modifying therapies for MS help to delay the conversion from RRMS to SPMS.

**Spasticity:** Uncontrolled involuntary continuous muscle contraction that occurs when the parts of the brain or spinal cord that controls that muscle is damaged. A tightness or stiffness of any muscle in the body but will typically occur in the legs (calf or thigh), groin, buttocks, arms, or hands.

**Spinal cord:** The major part of the nervous system that carries information up and down the spine from the brain to the nerves and from the nerves to the brain. It is affected in many people with MS.

**T-lymphocytes or T-cells:** Immune-system cells that have the ability to increase an immune response within the body, causing inflammation and damage in MS.

**Trigeminal Neuralgia:** A spontaneous, sharp or shooting facial pain, often brought on by a light touch or movement.

**Ventricles:** Are normal fluid-filled spaces in the brain. They contain the cerebrospinal fluid. Many MS lesions touch the surface of the brain where it contacts the ventricles. (A periventricular location is an 'around the ventricle' location.)

**Vertigo:** The sensation of “spinning or rotation,” which may occur as the result of lesions in the brainstem areas that coordinate balance.

**White matter lesions:** Refers to localized changes in the white matter; in MS, these are plaques or lesions. There are other white matter lesions in patients with other disorders.