

MS Fitness Specialist

Introduction

Learning Objectives

1. What is MS
2. History of MS

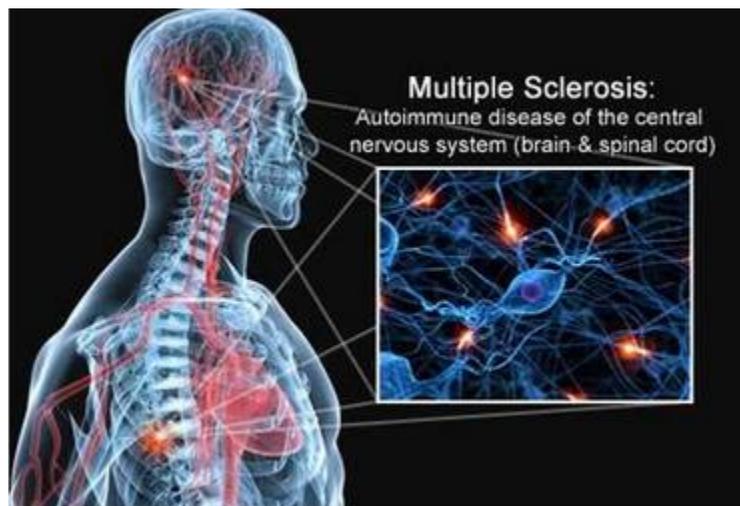
Introduction

More than 2.3 million people are affected by MS worldwide. But because the Centers for Disease Control and Prevention (CDC) does not require U.S. physicians to report new cases, and because symptoms can be completely invisible, the prevalence of MS in the U.S. can only be estimated. People who suffer from MS are often overlooked as candidates for a solid and rewarding fitness program. For many years they have been told not to exercise to avoid exacerbations. This philosophy has led to obesity and other physical ailments in the MS community that, as fitness professionals, we know is in contrast to a lifestyle of health and wellness. Therefore, some of your clients may suffer from MS and you may be an important source for relief. Fitness professionals can effectively work with those who have MS providing them with a better quality of life through movement.

The *Multiple Sclerosis: Fitness Specialist Certification* course provides fundamental information on the anatomy and physiology affected by MS, causes of MS, signs and symptoms of MS, and traditional treatment for MS. In addition, this course provides techniques on management of MS through exercise. You will learn how to design and prescribe a proper exercise program including basic nutrition to improve the quality of life for your clients with MS. With progression tracking, your clients can experience a gradual and pleasant growth in their health and fitness status. You as their health and fitness coach can provide a positive experience to facilitate an effective path to better health and wellness.

What is Multiple Sclerosis?

Multiple sclerosis (MS) involves an immune-mediated process in which an abnormal response of the body's immune system is directed against the central nervous system (CNS). The CNS is made up of the brain, spinal cord and optic nerves. When a person has an autoimmune disease, the immune system attacks healthy tissue, just as it might attack a virus or bacteria. In the case of MS, the immune system attacks the myelin sheath that surrounds and protects the nerve fibers, causing inflammation. Myelin also helps the nerves conduct electrical signals quickly and efficiently. Multiple sclerosis means "scar tissue in multiple areas."



History of Multiple Sclerosis

Up until pre 19th century, physicians relied on superstition and hearsay to care for the sick as opposed to scientifically testing medical ideas. However, physicians of the past were very good observers and evidence from their practices and writings reveal that they were treating those with MS early in history. In fact, historical accounts of illnesses with remarkably similar symptoms can be found as far back as the middle ages. Once medical scientific testing was established, MS was one of the first diseases to be described and identified.



Jean-Martin Charcot was a French neurologist who defined and gave a name to multiple sclerosis in 1868.

The following are some of the significant milestones in the history of Multiple Sclerosis:

Year	Event
1838	Drawings from autopsies done as early as 1838 clearly show what we now recognize as MS.
1868	Jean-Martin Charcot, a professor at the University of Paris who has been called “the father of neurology,”
1873	MS was recognized in England by Dr. Walter Moxon.
1878	MS was recognized in the United States by Dr. Edward Seguin.
Late 1800s	Much of what can be learned about MS from careful observation was known—that the disease is more common in women than men, that it is not directly inherited, and that it can produce many different neurological symptoms.
Late 1800s	Scientists first learned that bacteria cause many diseases.
Early 1900s	Discovered even smaller organisms, viruses, and developed techniques for growing and studying bacteria and viruses in the laboratory. This later led to research on viral causes of MS.
1916	With the new technology of visibility of nerve cells under the microscope now available, Dr. James Dawson at the University of Edinburgh performed detailed microscopic examinations of the brains of patients who had died with MS. Dr. Dawson described the inflammation around blood vessels and the damage to the myelin with a clarity and thoroughness that has never been improved upon.
1919	MS research grew more sophisticated. Abnormalities in spinal fluid were noted for the first time.
1925	The first electrical recording of nerve transmission, by Lord Edgar Douglas Adrian, established techniques needed to study the activity of nerves and launched a series of experiments to determine just how the nervous system works. The resulting knowledge included clarification of the role of myelin in nerve conduction and a realization that demyelinated nerves cannot transmit impulses efficiently.
1928	Myelin, which had been discovered in 1878 by Dr. Louis Ranvier, was studied intensively under the microscope and the cells that make myelin (the oligodendrocytes) were discovered.
1935	Dr. Thomas Rivers at the Rockefeller Institute in New York City, demonstrated that immune cells, not viruses, produced the MS-like illness in an animal model of MS. This animal form of

	MS, called experimental allergic encephalomyelitis, or EAE, would later become an important model for studying the immunology and treatment of MS. In fact, it paved the way to modern theories of “autoimmunity”— the process by which the body generates an immunologic attack against itself.
1943	The actual composition of myelin was determined.
1946	The National Multiple Sclerosis Society was founded by Sylvia Lawry.
1947	The Society for the Advancement of Multiple Sclerosis Research was awarded to study the immunology of MS. This grant went to Dr. Elvin Kabat at Columbia University. He identified abnormal immunologic proteins in the spinal fluid of people with MS. These proteins appeared in patterns known as oligoclonal bands. Oligoclonal bands not only proved to be valuable in diagnosing MS, but also a major demonstration that MS and the immune system are connected.
1940s	The renamed National Multiple Sclerosis Society awarded grants to dozens of scientists in 17 countries in all fields of medicine, pushing forward research that ranged over every aspect of MS from description to diagnosis to causes to cures. Recipients included Dr. Jonas Salk, who studied the immunology of MS, and Dr. Rita Levi-Montalcini, who described proteins that help nerve cells grow and stay healthy.
1950	National Institute for Neurologic Disorders and Stroke (NINDS) was founded.
1951	Cortisone (a steroid) was first used to treat MS relapses (also known as exacerbations, attacks, or symptom flare-ups). Cortisone was found to reduce the severity of the relapse and to shorten its duration, but it had no long-term effects on the disease.
Post WWII	<ol style="list-style-type: none"> 1. A strong geographical gradient was apparent, showing that the incidence and prevalence of MS increased steadily as one moved northward away from the equator. 2. It seemed that B cells produced the oligoclonal bands in MS spinal fluid. 3. Continued EAE studies.
1950s	Additional studies on nerve conduction showed how chemicals generate electricity as they flow through channels in the nerve fiber membranes. Myelin was further broken down into its components, isolating the basic protein suspected to be the target of the MS attack. Scientists studied B-cells, T-cells, genes, and myelin but without uncovering a clear unifying thread to direct MS treatment.
1960	The National MS Society funded a panel of experts, headed by Dr. George Schumacher, to draw up standard guidelines for MS diagnosis. Although they have been refined since, the basic concept of these standards is still in use today. At the same time, a rating scale for determining the level of disability and the parts of the nervous system affected by MS was developed by Dr. John Kurtzke.
1969	First study to prove that a therapy could be developed that would improve the symptoms of MS. For the first time, there was a scientific treatment for MS.
1960s	<p>MS may combine features of both an infectious and an immune-mediated disease. The treatments that were later developed for MS all targeted either an infectious or an immune mechanism.</p> <p>Two Major Ideas Developed:</p> <ol style="list-style-type: none"> 1. MS involves a direct immune-system attack on myelin. 2. Viruses involved in MS were now thought to alter the immune system and trigger it to damage myelin.
1978	The first CAT (Computed Axial Tomography) scans were performed on people with MS.
1970s	<ol style="list-style-type: none"> 1. The introduction of brain wave tests called “evoked potentials” which measure nerve conduction throughout the optic nerves, brain and spinal cord and often detect hidden areas of scarring and damage.

	<ol style="list-style-type: none"> 2. Steroids to suppress immune activity were now widely used to treat MS attacks. 3. Studies involving interferon began. 4. The treatment product known as copolymer1 was developed and is today an approved disease-modifying therapy: glatiramer acetate.
1980s	<ol style="list-style-type: none"> 1. Called the “treatment decade” in MS. There was an explosion of new treatment trials. 2. The white blood cell type that causes the actual damage to myelin in MS was identified. It is the macrophage (or “Big Eater” in Greek). 3. Identical and Fraternal twin studies.
1981-1988	<ol style="list-style-type: none"> 1. The first MRI scans of people with MS were performed in 1981 by Dr. I R Young, in England. 2. 1984: MRI can reveal attacks on the brain by MS. 3. 1988: MRI can detect MS as an ongoing disease.
1990s	<ol style="list-style-type: none"> 1. The Decade of the Brain 2. MRI gets more sophisticated to identify MS. 3. Through studies that involved over 80,000 people, the International MS Genetics Consortium (IMSGC) identified about 160 genetic variations related to MS, and has begun to identify the specific immune cells and proteins involved. 4. Computer technology enabled faster communication and large databases to improve research analysis and treatment. 5. Many medications are developed to treat symptoms of MS.
1993	The first injectable medication was introduced. These are also referred to as <i>disease-modifying therapies (DMTs)</i> . While these medications do not cure MS, they do work to slow disease activity as well as reduce the severity and frequency of flare-ups. Additionally, these DMTs may delay disease progression, delay disability, and increase longevity.
1996	Tizanidine was introduced for management of spasticity.
2010	Oral therapies introduced as treatments for MS relapses.
2013	Studies hint that exercise and rehabilitation can improve many functions and even help rewire the brain.
2018	FDA approved use of Gilenya in children and adolescents aged 10 years and older, making it the first drug approved by the FDA to treat MS in pediatric patients
2019	The Food and Drug Administration (FDA) has approved three applications for the first generics of the oral disease-modifying therapy Gilenya® (fingolimod) for the treatment of relapsing forms of multiple sclerosis (MS) in adults.
2019	Interest continues among both clinicians and patients alike by the prospect of treating multiple sclerosis (MS) with stem cells obtained from a patient’s own bone marrow. Small studies on stem cell therapy in MS yields favorable findings.
2019	Studies suggest that individuals experiencing tremors may be helped by deep brain stimulation, or DBS. DBS has been approved by the FDA to treat conditions including epilepsy, obsessive-compulsive disorder, and Parkinson’s disease. It is being investigated for several other conditions, including MS.
2019	A small, MRI-based study suggests that learning a second language may be an effective way for people with MS to stave off the decline in the brain’s grey matter volume (GMV) that is a frequent hallmark of the condition.
Present	Many more drugs are being tested, and the history of MS is still being written, but more has been accomplished in the last decade than in the preceding century.