Chapter 1
Multiple Sclerosis: A Summary

In the mid-nineteenth century, physicians in France, England, and Germany began describing what is now known as multiple sclerosis. Although the famous French neurologist Charcot first documented multiple sclerosis in the 1860s, MS was not recognized in the United States until after 1900. Moreover, the disease was not known by most physicians in this country until the 1950s. After a slow start, great strides have been made towards understanding the chain of events that leads to multiple sclerosis.

Multiple sclerosis is one of a category of diseases called autoimmune diseases. In an autoimmune disease, the individual's immune system mistakenly targets and destroys parts of the person's body. MS targets areas in the brain and spinal cord. Specific immune system cells called lymphocytes appear to zero in on the nerve fibers (axons) and their insulating cover (myelin). When the myelin and axons are attacked, small, oval scars, known as plaques form in the white matter of the brain and spinal cord. Those scars cause messages from the central nervous system to be short-circuited on their way out to the body, thus creating neurologic symptoms. Each person with MS has a unique pattern of plaque formation and thus may experience a variety of symptoms. The symptoms of MS can include:

- pain, numbness, or tingling
- fatigue
- decreased or double vision
- problems with coordination and balance
- bladder and/or bowel problems
- muscle stiffness (spasticity)
- dizziness and vertigo
- weakness
- difficulty walking (ataxia)
- problems with thinking, memory, and attention
- sexual dysfunction
As the name "multiple sclerosis" implies, multiple areas of damage (scars or scleroses) may be present in the brain and spinal cord. The name also reflects the episodic, ongoing nature of the disease. In fact, in order to make a confirmed diagnosis of multiple sclerosis, a physician must be able to document at least two neurologic areas affected in the person's body and at least two episodes where a person experiences symptoms.

MS symptoms may occur rather suddenly. After an attack, or exacerbation, more than 75% of MS patients will improve without treatment (a remission). Even those who are considered to be in remission often experience some symptoms with their MS, such as fatigue, spasticity, numbness, or tingling. However, some MS patients do not have attacks and remissions, but instead have a continuous progression of symptoms that do not recede. About two-thirds of MS patients live normal lives, sometimes aided with the help of adaptive equipment. The remaining one-third become physically disabled and may require wheelchairs.

While MS is different for every person, five types are most common. Relapsing-remitting MS means the person has attacks and recovers some or most of their function. Secondary-progressive MS occurs when some people with relapsing-remitting disease start to experience constant problems between attacks or after they stop having attacks. Primary-progressive MS begins as a progressive disease without attacks and is usually diagnosed between the ages of 40 and 60. Progressive-relapsing shows progression from the beginning, but with attacks occurring on occasion. Benign MS is a mild form of relapsing-remitting MS with occasional attacks followed by complete or nearly complete recovery, resulting in little or no functional losses after several years.

Multiple sclerosis is not usually a fatal disease. The life expectancy of a person with MS is close to that of the general population. A person with MS can experience significant functional losses, however, and become increasingly disabled as the disease progresses.
The cause of multiple sclerosis remains a mystery. Multiple sclerosis is like a giant puzzle with scientists searching for the many pieces. It is only a matter of time until enough pieces of the puzzle will be found to identify the cause.

Some clues to the cause of multiple sclerosis include:

**Climate**--Persons growing up in temperate climates (with seasons) have a greater risk of multiple sclerosis than those persons who grow up nearer to the equator. For example, MS is ten times more common in Denver than in New Orleans and fifty times more common than in Mexico City. Scientists suspect that a virus that is more prevalent in temperate climates may account for this increased risk.

**Age**--Studies of people who have lived in high risk areas for MS between the ages of 10 and 15 suggest that exposure to some factors (possibly viruses) in the environment during adolescence makes one more susceptible to MS many years later.

**Genetics**--Although most people (80% of cases) diagnosed with MS do not have a family history of the disease, we know that some families do have several affected members, sometimes spanning several generations. MS is much more commonly diagnosed among people of Northern European descent than people of other races, even when other racial groups traditionally live in temperate climates. The heightened incidence (20% of cases) of MS in some families may be related to genetic predisposition. However, MS is not strictly a hereditary disease caused by one genetic defect. Many genes, each exerting a very small impact, are likely to play a role. Research to identify the genetic roots of MS is underway. Genetic research may also identify why there is such variability in disease progression and whether an individual's genetic identity may influence the types of disease modifying therapies that are most likely to be helpful.

**Immunology**--The immune system is composed of white blood cells, which normally protect the body from viruses, bacteria, cancers, and other "foreign agents". However, this system may react abnormally in MS patients, and, in fact, may play a major
role in the cause of multiple sclerosis. Lymphocytes are triggered or activated, then travel through the blood-brain barrier to enter the brain and set off a series of chemical and cellular events, which lead to myelin damage. A heavy focus of current research aims to identify the initiating activities in this presumed cascade of events.

**Virus**—One or more viruses may play a role in the cause of multiple sclerosis. Viruses may be the predisposing "environmental factor" in MS. It is very important to emphasize that MS is not contagious. People with MS should be conscious about their health as viral infections such as "colds" may increase the risk of an exacerbation (attack).

One theory postulates that exposure to a virus predisposes the body's immune system to malfunction and attack myelin. In this theory, many factors must act together. They include an environmental factor (virus?) attacking a susceptible person (possibly genetically determined), at a specific age (possibly between the ages of 10 and 15). Other factors may also be necessary to set the stage for multiple sclerosis.

It is estimated that there are approximately 350,000 persons in the United States with MS. Multiple sclerosis is the most common neurologic disease diagnosed in young adults (ages 20 to 50). For every person in Denver with muscular dystrophy or amyotrophic lateral sclerosis (Lou Gehrig's Disease), there are more than ten people with multiple sclerosis. MS is more common among Caucasians than in other racial populations. Approximately two-thirds of those diagnosed with MS are women.

The diagnosis of MS is usually made by a neurologist from the patient's medical history, neurologic examination, and laboratory tests. The laboratory tests may include a spinal tap (lumbar puncture), evoked potentials (EP), blood tests, and brain or spinal MRI (magnetic resonance imaging). Spinal fluid is analyzed for immunologic changes, such as unique antibodies called oligoclonal bands. The evoked potential response is a test done by a computer measurement of the pattern of responses to auditory, sensory, and visual stimuli. In people with MS, the response pattern is usually slowed. MRI studies
are able to show MS plaques and have emerged as a leading indicator to help differentiate MS from other conditions. Images of the brain and spinal cord are made by means of a large magnet, radio frequency pulses, and a computer. In some cases, patients undergoing an MRI will have a dye (gadolinium) injected into their veins at the time of the test. This dye is used to make areas of current MS activity more brightly illuminated on the MRI scan than lesions that are inactive or quiet. Many current clinical research trials are now using serial MRI scans to help prove the benefit of new therapies and people with MS are often encouraged to have updated MRIs done every two to three years to track the course of the disease.

In the not so distant past, many claims were made for treatments thought to "cure" MS. These included mercury, arsenic, high fever therapy (induced by active malaria virus), aspirin, organ extracts, frequent spinal taps, Coumadin®, alcohol, X-rays, and surgery on the spine. All of the above, plus additional treatments such as transfer factor, vertebral artery surgery, snake and honeybee venom, highly specialized diets, removal of dental fillings, and calcium orotate have no proven benefit and some may be dangerous. Caution should be taken when entertaining any treatment for MS without data demonstrating its effectiveness and safety. More details on evaluating the benefits and risks of some alternative therapies are discussed in Chapter 7.

At the present time no cure exists for multiple sclerosis. However, some new immune system modulating treatments have been FDA-approved to reduce attacks and reduce disability in some forms of MS. Also, treatments for MS symptoms are numerous. This handbook will detail many of the symptomatic and immunologic treatments now available for people with MS. The practice of good health habits can also improve a patient's quality of life. They include:

- a sensible blend of activity and rest
- a nutritious diet
- a good mental attitude
- a willingness to change priorities
- a strong support system
(Chapters 6 and 7 will provide more detail regarding these recommendations.)

We are making progress in the symptomatic treatment of MS and can relieve many of the symptoms of MS.

Physical therapy helps keep good muscles strong and helps treat balance and walking problems. A physical therapist can also help tailor an individualized exercise program.

Occupational therapy provides strategies to help patients accomplish their daily activities more easily. These strategies can vary from simple room rearrangement ideas to complex solutions involving computer systems and electronic devices.

Speech/Language therapy can help with speech, swallowing, and memory problems.

Psychotherapy helps many patients and families adjust to the psychological and coping challenges presented by MS. Psychotherapy is geared toward promoting self-confidence and self-esteem.

Support groups can be helpful for patients and family members. They provide an atmosphere of understanding and acceptance for people struggling with the changes MS has created.

Drug therapy can provide relief for many symptoms, including muscle spasms, spasticity (stiffness), pain, bladder problems, fatigue, and depression. New treatments are constantly being discovered. An MS specialist can provide updates on the newest medications for symptomatic relief.

Steroid therapy is used to shorten exacerbations, decrease the intensity of symptoms, and improve recovery from an exacerbation.

Immunologic treatments may help reduce attacks, and thus, potentially decrease the subsequent progression that leads to disability.
One of the most valuable sources of information is an MS health care provider. Be skeptical of reports of sensational cures or treatments from well-meaning friends and relatives who relate stories they have heard. Many people don't understand the unpredictable nature of MS and the way symptoms can come and go. Remember, every patient's experience is different. Patients should report any changes in symptoms or new symptoms to their doctor. Many problems can be treated and should be addressed promptly.