National MS Society
Information Sourcebook
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Cognitive Function

Approximately 50% of people with MS will develop some degree of cognitive dysfunction, affecting the ability to think, reason, concentrate or remember. However, only 5-10% of persons with MS develop problems that are severe enough to interfere in a significant way with everyday activities. While cognitive dysfunction is more common among people who have had the disease for a long time, it can be seen early in the disease course—even as the first symptom. There is no relationship between level of physical disability and degree of cognitive impairment; a person with virtually no physical limitations can have significant cognitive impairment, while a person who is quite disabled physically can be unaffected cognitively.

MS may affect cognitive function for several reasons. First and foremost, MS damages both myelin and the nerve cells within the brain, thereby compromising a variety of functions handled by the brain. In fact, MRI studies have indicated that the extent of demyelination in the brain is related to severity of cognitive dysfunction. However, MS can also affect cognition indirectly. MS is often associated with depression, anxiety, stress, and fatigue, all of which may compromise cognitive functioning. Fatigue can be particularly challenging to one's ability to sustain any type of challenging mental task.

Just as the physical symptoms of MS can vary considerably from person to person, cognitive changes can as well. Moreover, it is common for certain functions to be largely intact while others are more severely affected. The cognitive function most likely to be affected appears to be **memory**. Other cognitive functions frequently affected in MS include speed of **information processing, executive functions** (planning and prioritizing), **visuospatial functions** (impairment in visual perception and constructional abilities), **abstract reasoning and problem-solving**, and **attention and concentration**—especially sustained attention and ability to divide attention between separate tasks. One of the most vexing cognitive deficits seen in MS is word-finding difficulty—the experience of having a word on the tip of your tongue but not being able to remember it.

The first signs of cognitive dysfunction may be subtle. The person may have difficulty in finding the right words to say, or trouble remembering what to do on the job or during daily routines at home. Decisions that once were easy now demonstrate poor judgment. Often, the family becomes aware of the problem first, noticing changes in behavior or personal habits.

People with MS and their families should seek medical help if they are concerned about cognitive dysfunction. Even early in the disease, cognitive dysfunction can

have an impact on role performance at home and at work. In fact, research has shown that cognitive symptoms and fatigue are two primary reasons for early departure from the workforce. Since cognitive function can also be affected by aging or medications, a careful evaluation is necessary to determine the cause of these mental changes.

To evaluate a person with MS for cognitive dysfunction, a specially trained health professional (neuropsychologist, speech/ language pathologist, or occupational therapist) administers a battery of tests. Based on these tests, the person's cognitive deficits *and* strengths can be determined. Strategies for coping with areas of deficit can usually be devised. For example, one strategy for dealing with memory problems is using a notebook or personal digital assistant (PDA) to store information. In rare instances, cognitive dysfunction may become so serious that the person can no longer be cared for at home.

Recent Research

During the last few years, there have been numerous studies of ways to stabilize or improve cognitive dysfunction. Some of these studies have looked at whether the MS disease-modifying drugs can slow the progression of cognitive changes. Results thus far have been mixed, with interferon-beta 1a showing the most potential. However, since the disease-modifying drugs have all been shown to reduce the accumulation of new demyelinating lesions, it is likely that over the long term, they should all help to stabilize cognitive changes. Some studies have also examined possible symptomatic treatments that may temporarily improve cognitive functioning without altering its long-term course. Thus far the most successful has been donepezil hydrochloride, which has been shown to modestly improve verbal memory in MS.

Other studies have explored the utility of rehabilitation for cognitive changes. Cognitive rehabilitation involves a variety of strategies ranging from computer-mediated memory exercises to training people in the use of compensatory aids such as notebooks. These rehab studies have had mixed results, and thus far the greatest promise seems to reside in the more straightforward compensatory techniques, i.e., using organization, notebooks, computers, filing systems, etc. to compensate for memory deficits and other changes.

Studies currently underway that are funded by the National MS Society are investigating the natural history of cognitive changes, along with better ways of diagnosing and treating cognitive problems seen in people with MS. It is hoped that in the future, people with MS will have access to a combination of disease-modifying therapies, symptomatic treatments, and cognitive rehabilitation that will significantly modify the course and impact of the cognitive changes seen in MS.

See also…

Sourcebook

- Depression
- Emotional Aspects
- Fatigue
- Rehabilitation

Society Web Resources

- Spotlight: MS and Cognition
  www.nationalmssociety.org/Cognition
- Spotlight: MS and Fatigue
  www.nationalmssociety.org/Fatigue
- Spotlight: Emotional Aspects of MS
  www.nationalmssociety.org/Emotions
- Spotlight: MS and Employment
  www.nationalmssociety.org/Employment
- Spotlight: Rehabilitation in MS
  www.nationalmssociety.org/Rehab

For Healthcare Professionals

- Clinical Bulletin: Cognitive Loss in MS
- Clinical Bulletin: Emotional Issues of the Person with MS
  www.nationalmssociety.org/ClinicalBulletins

- Expert Opinion Paper: Assessment and Management of Cognitive Impairment in Multiple Sclerosis
  www.nationalmssociety.org/ExpertOpinionPapers

- Booklet: Talking about Cognitive Dysfunction
  www.nationalmssociety.org/TalkingAbout

Books

Holland NJ, Halper J (eds.). *Multiple Sclerosis: A Self-Care Guide to Wellness* (2nd ed.). New York: Demos Medical Publishing, 2005.
—Ch. 9 Addressing Cognitive Problems

Kalb R. (ed.) *Multiple Sclerosis: The Questions You Have; The Answers You Need* (3rd ed.). New York: Demos Medical Publishing, 2004.
—Ch. 9 Cognition

Kalb R. (ed.). *Multiple Sclerosis: A Guide for Families* (3rd ed.). New York: Demos Medical Publishing, 2005.
—Ch. 2 Emotional and Cognitive Issues

Schapiro R. *Managing the Symptoms of Multiple Sclerosis* (4th ed.). New York: Demos Medical Publishing, 2003.
—Ch. 18 Cognitive Difficulties

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 recommendations or prescription. For specific information and advice, consult your personal physician.

To contact your chapter, call **1-800-FIGHT-MS** (1-800-344-4867) or visit the National MS Society web site: www.nationalmssociety.org.

Last updated August 2006