

### Multiple Sclerosis

Multiple sclerosis (MS) is a chronic degenerative disease of the central nervous system that causes inflammation, muscular weakness and a loss of motor coordination. Over time, MS patients typically become permanently disabled and, in some cases, the disease can be fatal. According to the US National Multiple Sclerosis Society, about 200 people are diagnosed every week with the disease -- often striking those 20 to 40 years of age.

Clinical and anecdotal reports of cannabinoids' ability to reduce MS-related symptoms such as pain, spasticity, depression, fatigue, and incontinence are plentiful in the scientific literature.[1-12] Specifically, investigators at the University of California at San Diego reported in 2008 that inhaled cannabis significantly reduced objective measures of pain intensity and spasticity in patients with MS in a placebo-controlled, randomized clinical trial. They concluded that "smoked cannabis was superior to placebo in reducing spasticity and pain in patients with multiple sclerosis and provided some benefit beyond currently prescribed treatment." [13] Inhaled cannabis yielded similar results in a 2012 randomized, placebo-controlled trial involving MS subjects who were unresponsive to conventional therapy. That study, published in the *Journal of the Canadian Medical Association*, concluded, "Smoked cannabis was superior to placebo in symptom and pain reduction in patients with treatment-resistant spasticity." [14] Not surprisingly, patients with multiple sclerosis typically report engaging in cannabis therapy, [15] with one survey indicating that nearly one in two MS patients use the drug therapeutically. [16]

Other studies suggest that cannabinoids may also inhibit MS progression in addition to providing symptom management. Writing in the July 2003 issue of the journal *Brain*, investigators at the University College of London's Institute of Neurology reported that administration of the synthetic cannabinoid agonist WIN 55,212-2 provided "significant neuroprotection" in an animal model of multiple sclerosis. "The results of this study are important because they suggest that in addition to symptom management, ... cannabis may also slow the neurodegenerative processes that ultimately lead to chronic disability in multiple sclerosis and probably other disease," researchers concluded. [17] Spanish researchers in 2012 reported similar findings, documenting that "the treatment of EAE mice with the cannabinoid agonist WIN55,512-2 reduced their neurological disability and the progression of the disease." [18]

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Investigators have also reported that the administration of oral THC can boost immune function in patients with MS. "These results suggest pro-inflammatory disease-modifying potential of cannabinoids [for] MS," they concluded.[19]

Clinical data reported in 2006 from an extended open-label study of 167 multiple sclerosis patients found that use of whole plant cannabinoid extracts relieved symptoms of pain, spasticity and bladder incontinence for an extended period of treatment (mean duration of study participants was 434 days) without requiring subjects to increase their dose.[20] Results from a separate two-year open label extension trial in 2007 also reported that the administration of cannabis extracts was associated with long-term reductions in neuropathic pain in select MS patients. On average, patients in the study required fewer daily doses of the drug and reported lower median pain scores the longer they took it.[21] These results would be unlikely in patients suffering from a progressive disease like MS unless the cannabinoid therapy was halting its progression, investigators have suggested.

In recent years, health regulators in Canada, Denmark, Germany, Spain and the United Kingdom have approved the prescription use of plant cannabis extracts to treat symptoms of multiple sclerosis. As of this writing, regulatory approval in the European Union and in the United States still remains pending.

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