

Multiple Sclerosis Spastic Pain Relief Secondary to Medicinal Marijuana

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Abstract A 57-year-old male presented to an outpatient Multiple Sclerosis (MS) clinic for excruciating spastic pain secondary to MS. After a trial of multiple pain management drugs with no success, he began a trial of marijuana. In this paper, we report the extent of improvement in quality of life secondary to cannabinoid use after failing multimodal pain management regimens.

Keywords: multiple sclerosis, pain management, medicinal marijuana, cannabinoids

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1. Introduction

Multiple Sclerosis is a chronic autoimmune demyelinating disease defined by focal lesions in the grey and white matter of the Central Nervous System (CNS) with accompanying diffuse neurodegeneration and glial scarring. A study analyzing the 2010 annual prevalence of MS in the United States found it to be 727,344 cases in that year with 309.2 cases per 100,000 people [1]. Common manifestations include optic neuritis, sexual and urinary dysfunction, fatigue, heat intolerance, pain, and spastic paresis. The only approved FDA-approved disease-modifying therapy in the setting of primary progressive MS is ocrelizumab. In the setting of relapsing-remitting MS, beta interferons, glatiramer acetate, fingolimod, and others are commonly used to reduce the rate of relapse. To alleviate the muscle spasticity of MS, muscle relaxants such as tizanidine and baclofen are often used in conjunction with pain relievers. The use of cannabinoids for patients with MS has shown promising results regarding the palliation of chronic pain, neuropathic pain, and spasticity [2]. We discuss the case report of a patient with MS who was treated with cannabis and experienced significant improvement in his quality of life.

2. Case Presentation

A 57-year-old male presents to the outpatient MS clinic with a past medical history remarkable for progressively worsening involuntary leg movements, problems ambulating, spastic hemiplegia, sleep difficulty, restless leg syndrome, bilateral leg weakness, pain, and fatigue. The patient endorsed extreme difficulty sleeping

secondary to worsened leg spasticity—specifically flailing motions every night with persistent asterixis-like motions throughout the night. His history is also significant for Graves disease and mitral valve prolapse. Current medications include gabapentin 3200mg for pain, levetiracetam and divalproex sodium for leg spasticity. Upon interview, the patient admitted that the anticonvulsants exacerbated his leg weakness and seemingly only worked for less than a week.

A survey was given to the patient asking him to rate sleep quality, stress, ability to complete tasks of daily living, involuntary leg movement and fatigue on a subjective scale of 1-10 as presented in Table 1. The patient was then referred a medicinal marijuana license for treatment of leg spasticity and pain.

Table 1. Quality of Life Survey

MS-related Patient Complaints	Pre-Marijuana Administration	Post-Marijuana Administration
Pain/Discomfort	Fluctuating	General relief
Sleep ¹	2	8
Stress ²	6	1
Ability to complete daily activities	Everything except sleep	Walking/coordination difficulties, unable to drive
Involuntary leg movement ³	10	1
Fatigue ⁴	8	On high THC: 4 On combination: N/A, used for sleep.

¹ A scale from 1 to 10 was implemented; 1 defined as no sleep and 10 defined as full sleep without interruptions.

² A scale from 1 to 10 was implemented; 1 defined as no stress and 10 defined as unbearable stress

³ A scale from 1 to 10 was implemented; 1 defined as no perceived leg movement at all and 10 defined as unbearable leg movement.

⁴ A scale from 1 to 10 was implemented; 1 defined as no fatigue and 10 defined as unbearable fatigue.

3. Case Report

Upon reinterview at the MS clinic 12 months later, the patient had tried THC through various routes including edibles, suppository, and inhalation—both smoke and vapor. The patient stated that only smoking/inhalation and suppository administration had benefited him in terms of sleep and decreased involuntary leg movement. The patient began a steady regimen consisting of 3 daily doses of smoke inhaled marijuana at 17:00pm, 21:30pm, and 2:30am, in addition to a suppository oil administration approximately two times a week. The patient's symptoms improved so significantly that he was able to discontinue all other muscle relaxants and pain medications. The patient was then surveyed and asked to rate the same metrics of sleep quality, stress, ability to complete tasks of daily living, involuntary leg movement and fatigue on a subjective scale of 1-10. Results shown in [Table 1](#) demonstrated significant improvements in all measures.

In addition to scaled measurements, the patient verbalized that marijuana administration was the only therapy that alleviated symptoms. The patient reported a general decreased frequency of leg flails as well as a general reduction in the asterixis-like movement of the feet immediately after administration.

The only difficulties for this patient regarding the use of a cannabinoid as a palliative measure were route of administration and dosage. Optimization of both occurred through a few weeks of trial and error with serial adjustments.

4. Discussion

MS is an immunogenic disease categorized by demyelination and inflammation of neuronal white matter in the CNS. Females are more likely to acquire MS than males with a reported female to male prevalence ratio of 2.8:1 [1]. The disease also typically manifests in a young population with the incidence peaking at ages 21-30. In addition to age and gender, latitude seems to play a significant role; a 2019 study found a correlation with the prevalence of MS and the degree of geographic latitude; for example, in the United States, the rate of MS below the 37th parallel is 57-78 cases per 100,000 while above the 37th parallel was shown to be approximately 110-140 cases per 100,000 [3].

A common symptom of MS is spasticity with a noted prevalence of 50–60% [4]. Spasticity and severity of muscle spasticity, as displayed by this patient, are significant influencers of quality of life in symptomatic MS patients. In a quality of life survey of spasticity and MS, one fifth of participants graded their quality of life as worse than death due to spasticity [5]. In addition, muscle spasticity and pain are the two driving factors of MS-induced economic loss. In a global study over 39% of MS patients reported being unemployed [6]. A study found that physical symptoms were the most commonly reported reason accounting for 77.8% of employment status change [7].

Typical therapies for MS-induced muscle spasticity are tizanidine and baclofen but recent research has begun to

focus on the therapeutic use of THC and CBD. A University of British Columbia study surveyed 55 MS patients who admitted marijuana usage [8]. Of these 55 marijuana users 43 used marijuana orally and 42 used marijuana in a smoked vaporized fashion. The most common reason for marijuana usage was sleep difficulties (71%), a symptom typically secondary to muscle spasticity, and pain (71%). Fifty two out of the fifty five participants showed symptomatic improvement [8]. Two high-quality systematic reviews, provides even further evidence of relief of spasticity and pain in MS patients -- specifically, the studies concluded that nabiximols, oral cannabis extract (OCE), and synthetic tetrahydrocannabinol (THC) are likely effective at reducing both pain and patient-reported symptoms of spasticity in patients with MS. It should be noted that OCE and synthetic THC were not found to be effective for reducing physician-administered measures of spasticity [9].

Limitations of cannabinoid-derivative use for management of MS-induced pain and muscle spasticity includes difficulties optimizing route of administration and lack of standardization of dosages. This is particularly difficult with regards to marijuana "buds" as there is no standardized dose largely due to the non-homogenous nature of the material. With more research, these issues can be addressed and minimize the duration of the trial and error period.

Due to the prevalence of motor dysfunction, its ability to affect quality of life, and its societal economic cost, it is essential that adequate therapeutic options for muscle spasticity and pain be available. Cannabinoid derivatives have shown to be efficacious in this regard and should be considered as a potential option for palliative relief of refractory muscle spasticity or pain secondary to MS. Despite this noted efficacy, more research is needed to ensure high quality of care. Additionally, we believe the apparent palliative efficacy of cannabinoid-derivatives warrants further research into determining the optimal routes of administration and standardization of effective dosages.

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