



Symptoms

English Version



1 Typical Signs and Symptoms

1.1 Introduction

Intro

Multiple sclerosis (MS) is a complex condition and can cause a wide range of symptoms. In this section, some of the more common symptoms will be described, along with some of their common features and distinguishing factors. MS can cause a wide variety of symptoms (*summarised in Figure 1*). At the onset of MS, symptoms can often include visual disturbance. Later, as the disease progresses, weakness, partial loss of movement and spasticity may appear (amongst others). These symptoms can add considerably to the degree of disability and impairment of quality of life (QOL) that patients with MS experience.



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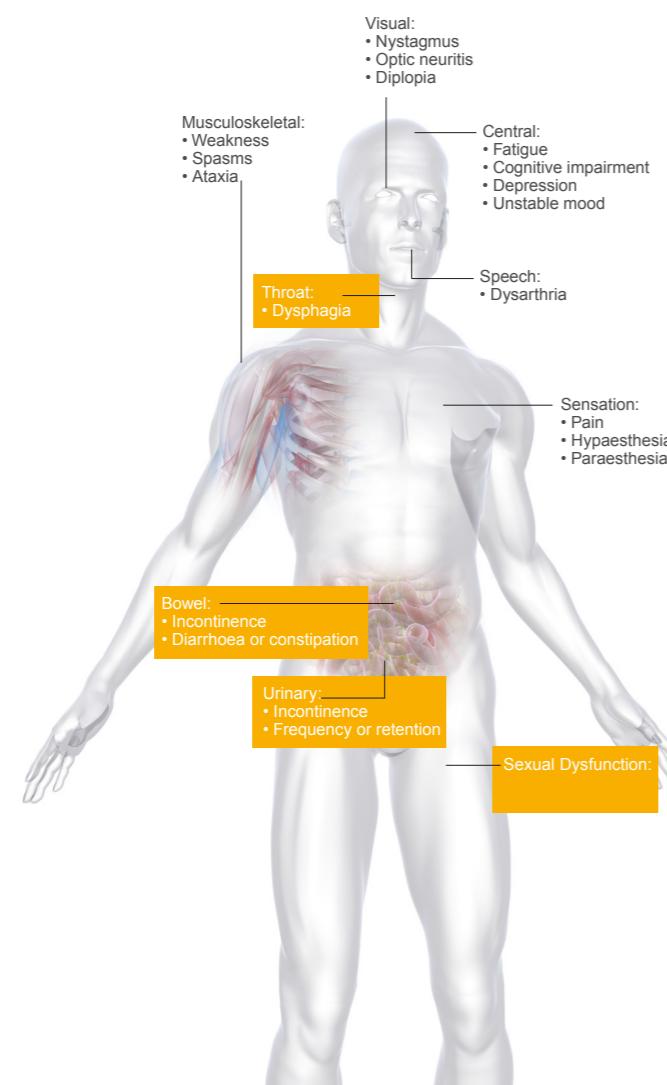


Figure 1. A summary of symptoms of MS

The symptoms of MS are unpredictable and may be mild, moderate or severe. Each person with MS differs in the types and intensity of symptoms they experience, depending on the areas of the CNS that are affected (see *Table 1*). Symptoms can be present in many different combinations and with variable severity. People with MS do not follow a linear trajectory and no two people with MS have exactly the same symptoms. Post-mortem studies have shown that some people have had MS all their lives and symptoms have been so mild they have not been recognised, while other people with MS develop severe disability very quickly following disease onset. However, for most people disability in MS lies somewhere between these two extremes¹.

Initial Signs and Symptoms	Manifestation
Weakness of the limbs	Loss of strength
Spasticity	Movement-induced, painful muscle spasms
Sexual dysfunction	Decreased libido, impotence in men, diminished vaginal lubrication
Sensory	Paraesthesia (tingling and prickling sensations), hypoesthesia (reduced sensations, numbness), pain (anywhere in the body and can change locations)
Cognitive impairment	Memory loss, impaired attention, difficulty taking in information and with problem solving
Mood disorder	Depression, emotional lability, more rarely euphoria
Visual deficit	Diminished visual acuity, double vision, decreased colour perception; may progress to severe visual loss
Bladder dysfunction	Urinary frequency and urgency, nocturia, uncontrolled bladder emptying, retention, hesitancy
Bowel dysfunction	Constipation, faecal incontinence

Table 1. Indicators of common symptoms in MS

A survey of 2,265 individuals with MS recorded the prevalence rates of common symptoms in MS². Results are displayed in Figure 2.

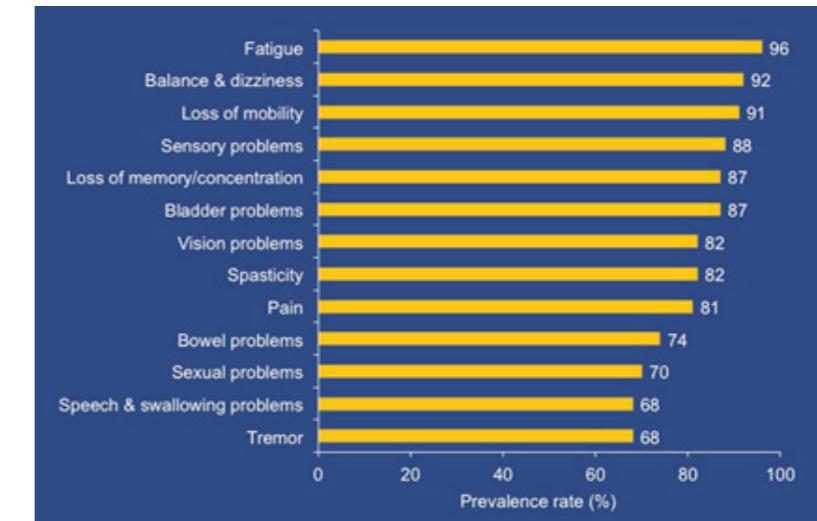


Figure 2. Prevalence of common symptoms in MS²

For the MS Nurse, identifying and discussing a person's symptoms can be challenging at times, for several important reasons:

- While some changes are readily apparent — such as walking problems, speech impairments, or tremor — others, including fatigue, bladder and bowel changes, and cognitive and emotional changes, are less visible to the observer.
- While some symptoms are relatively easy for people to discuss — for example, fatigue, double vision, stiffness or pain — others are more embarrassing, such as cognitive symptoms, bladder and bowel dysfunction, sexual dysfunction and even depression.
- While some symptoms are easy for people to associate with a disease that affects the nervous system — including sensory problems, weakness, loss of balance, or visual symptoms — they may neglect to mention other problems that they assume are unrelated to MS (e.g., fatigue, bladder or bowel changes, sexual dysfunction, cognitive changes, or pain).

For all these reasons, it is important that the MS Nurse carries out a complete assessment at every visit, asking about symptoms or changes, even if a person has not mentioned any difficulties. It is equally important to make sure that people living with MS have access to accurate and comprehensive information so that they become experts who can self-manage their condition.



Nursing tip

Where would you start when assessing for any problems or symptoms that a person with MS may be experiencing – the approach you take, questions you ask etc?

People with MS can present in many different ways. Early in the disease it is not helpful to ask "Do you have any MS symptoms?" because they may not recognise what an MS symptom is. The nurse should start with a review of systems asking specific questions about things such as thinking, memory, vision, strength, walking, bowel and bladder function. Targeted questions such as "Do you have bladder problems such as going too frequently, urgency to void or not feeling like you have fully emptied your bladder?" are the most helpful.



It is important that the MS Nurse carries out a complete assessment at every visit, asking about symptoms or changes, even if a person has not mentioned any difficulties.

1.2 Common Symptoms

Some of the more common symptoms of MS will now be defined and described in more detail.

1.2.1 Fatigue

Fatigue is more than tiredness and has been referred to as "pathological exhaustion"³. The Centres for Disease Control and Prevention (CDC) defines "pathological fatigue" as fatigue that "is not improved by bed rest and that may be worsened by physical or mental activity".

Fatigue is the most common symptom of MS, occurring in approximately 75–95% of patients in all age groups and with all types of MS⁴⁻⁵. Between 50% and 60% of patients with MS report fatigue as their worst problem, regardless of severity of disease or disability, and up to 69% of patients consider it one of the most disabling features of MS^{7,8}. Fatigue has been cited as one of the two major reasons for unemployment in MS individuals⁹.



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Fatigue is a primary determinant of poor QOL in MS¹⁰, affecting both physical and mental components independent of disability level. Fatigue also has a negative effect on cognitive function¹¹. It is often described as an invisible symptom as there is no external evidence or internal damage. This can lead to a lack of understanding and frustration from others, as they may believe that the person is just lazy, often causing social isolation⁶ and broken relationships. These views can sometimes be shared by the person with MS as they struggle to deny to themselves how fatigue affects them. It can therefore have a high impact on psychological wellbeing of the person with MS.

Fatigue results from a combination of factors, caused partly by MS itself (known as primary fatigue) and partly by other factors (secondary fatigue) that affect the person with MS more significantly than those without the condition. MS-related fatigue can come on suddenly,

Disabling features

In a survey of 2,265 people with MS, 94% experienced fatigue, with 87% reporting an impact they rated between moderate and high on their activities of daily living.

even in the morning after a full night's sleep. MS-related fatigue is generally more severe and more likely to interfere with daily responsibilities than normal fatigue. Patient complaints may include tiredness, poor endurance, weakness, difficulty concentrating or mental dullness¹².

Various other factors can contribute to fatigue in MS, including disturbed or reduced sleep, medication effects, increased muscular effort to accomplish daily tasks, depression, comorbid conditions, infections and relapses¹¹.

Fatigue must be distinguished from limb weakness and from depression, though there may be an inter-dependent relationship between depression and fatigue. Fatigue can have a frightening effect, particularly in relation to cognitive difficulties that can be more noticeable when fatigue is being experienced. Similarly, it can be a worrying problem for carers who may fear that psychological problems are developing, or that inactivity is due to laziness^{13,14}.

Heat-sensitive fatigue is well recognised in MS and it has long been considered a unique dimension of MS fatigue differentiating it from fatigue in other conditions. Changes in temperature can cause some patients with MS to become fatigued. This can be triggered by the weather, hot baths or showers, hot drinks or meals, or feeling feverish as a result of infections. These effects are usually quickly reversed when steps are taken to cool down or when the temperature falls¹⁵.

1.2.2 Sleep Disorders

Sleep disturbances are common in people with MS, with approximately 50% of individuals reporting sleep problems¹⁷. Treatment of sleep disorders in people with MS is important because poor sleep quality and quantity can affect daily life, causing daytime sleepiness, decreased concentration and memory, worsening depression and the inability to work effectively¹⁸. Sleep dysfunction can potentially exacerbate other MS symptoms (e.g., mental health problems, fatigue)¹⁹, and has recently been shown to be an independent predictor of QOL in people with MS^{20,21}.

Heat-sensitive fatigue

Many people with MS experience a temporary worsening of their symptoms when the weather is very hot or humid, when they run a fever, sunbathe, get overheated from activity, or take hot showers or baths. A definitive symptom of MS 'heat fatigue' is when vision becomes blurred when the person with MS is overheated; this is a phenomenon known as Uhthoff's sign. These temporary changes can result from even a very slight elevation in core body temperature, as little as 0.5°C. An elevated temperature further impairs the ability of a demyelinated nerve to conduct electrical impulses. For many years, the "Hot Bath" test was used to diagnose MS. A person suspected of having MS was immersed in a tub of hot water, and the appearance of neurologic symptoms or their worsening was taken as evidence that the person had MS.

It is important to remember that heat generally produces only temporary worsening of symptoms and does not cause actual tissue damage (demyelination or damage to the axons themselves), however the use of the "Hot Bath" test has been erroneously associated with permanent tissue damage. Heat-related symptoms are generally rapidly reversed when the source of increased temperature is removed¹⁶. As with so many other MS symptoms, fatigue can be exacerbated by, or conversely cause exaggeration to cognitive/emotional symptoms, spasticity, exercise tolerance and weakness poor nutrition, speech and swallowing problems.



Sleep disturbances are common in people with MS, with approximately 50% of individuals reporting sleep problems.

The most common sleep disorders seen in patients with MS include insomnia, nocturnal movement disorders, sleep-disordered breathing, narcolepsy, restless leg syndrome and rapid eye movement sleep behaviour disorder²². Sleep questionnaires were sent to a group of 473 people with MS²³. Over 46% had moderate-to-severe sleep problems, but most did not use over-the-counter or prescription sleep aids. Factors found to contribute to sleep problems included anxiety, night-time leg cramps, fatigue and nocturia.

Getting a good night's sleep helps to alleviate many common symptoms of MS, including chronic fatigue, mood and memory problems. Sleep quality can be improved by establishing regular habits or good 'sleep hygiene'. Some sleep hygiene recommendations that might be communicated to the person with MS include:

- Stay as physically active as possible during the day, but allow plenty of time to wind down before bedtime.
- Avoid getting overtired by doing too much, as being too tired can make it difficult to get to sleep.
- Ensure some daily exposure to sunlight and avoid bright lights in the evening.
- Avoid unnecessary stress or stimulants (e.g., caffeine, chocolate, alcohol) in the late afternoon and evening.
- Establish a bedtime routine that can include, for example, relaxation, a warm 'milky' drink, taking a warm bath.
- Keep the same nightly ritual every evening throughout the week.
- Only use the bed as a place for sleeping, not for other activities such as watching TV.
- Instead of lying in bed awake, after 15 minutes of not sleeping get out of bed and do something calming or boring, and return to bed after a short period of time.
- Avoid getting too hot; keep the bedroom at a comfortable temperature.

The MS Nurse should ask patients about sleep quality and refer patients for further help with sleep-related issues when indicated. By addressing the causes of poor sleep quality and establishing good daily sleep habits and sleep hygiene, people with MS can greatly improve overall energy levels and QOL.

1.2.3 Vision Impairment

Visual disturbance is one of the most commonly reported symptoms in MS, with figures up to 80%²⁴, and it is the presenting symptom in 25–50% of cases²⁵. Abnormalities of vision are usually due to plaque formation along the optic nerve. There can be loss of visual acuity, double vision or tunnel vision (monocular or binocular, depending upon which nerves have been affected), and photophobia²⁶.



Visual disturbance is one of the most commonly reported symptoms in MS, and it is the presenting symptom in 25–50% of cases.

Optic neuritis is the most common ocular disorder in MS. The effects of optic neuritis are visual disturbance and ocular pain. 70% of people with MS will experience optic neuritis during the course of their disease. Like MS itself, it normally affects people aged between 20 and 40 years, affects women more than men, and usually occurs in one eye rather than bilaterally²⁷. Not everyone who experiences optic neuritis goes on to develop further symptoms of MS, but a significant proportion do²⁸.

Optic neuritis is characterised by dimmed vision with acute pain on eye movement, a consequence of which is blurred, incomplete or jumping vision. It may be accompanied by nystagmus (rapid eye movements). This is usually horizontal but may also be rotary, upbeat and downbeating.

Optic neuritis is usually transient and associated with good recovery. It occurs suddenly, is progressive and usually reaches its peak after about two weeks. Visual recovery takes from 4 to 6 weeks, but colour vision can be severely impaired with other minor defects often persisting. Above all, loss of colour vision is a typical indication of MS; it develops if the optic nerve is inflamed in the region around the central retina section, which is the area responsible for seeing in colour.

1.2.4 Tremor

Approximately one third of people with MS have tremor. It is one of the most disabling symptoms of MS, causing the person to become dependent as many daily activities become difficult to perform, e.g., writing, eating, dressing and personal hygiene. People with severe tremor have a high level of disability and a loss of independence in activities of daily living. A survey undertaken as part of the European TREMOR study, found that people with MS who had moderate-to-severe tremor were unable to continue in their employment and had to either give up or greatly modify their leisure activities. Commonly, a person tries to cope with tremor either by **[avoidance of movements](#)**, by **[compensation strategies](#)** or by adaptation of their external environment.

[Avoidance of movements](#)

Avoidance of movements: Tremor can be socially isolating. The person with tremor will often avoid movements that make their difficulties obvious. For example, many will refrain from eating or drinking in public.

[Compensation strategies](#)

Compensation strategies: By using strategies such as pressing the elbow firmly to the side of the trunk, a person may find that their distal tremor is diminished and they are better able to perform movements of the hand even although they will have a shorter arm reach as a result. Those with head tremor (titubation) may attempt to stabilise the head against the shoulder in an attempt to reduce the tremor. Retracting the shoulder girdle and pressing it against the back of the chair, or fixing the elbow in a locked straight position, may give improved distal control.



Approximately one third of people with MS have tremor. People with severe tremor have a high level of disability and a loss of independence in activities of daily living.

Tremor in MS can affect the limbs, trunk, vision and speech. It has been described as the most frustrating MS symptom to treat²⁹. Stress and anxiety can exacerbate tremor.

In MS, the two most prevalent tremor forms are postural tremor and intention tremor.

- Postural tremor is present while a position is voluntarily maintained against gravity. This type of tremor is common in people with MS and may include titubation of the head and neck.
- Intention tremor is obvious when a movement is target-directed with an increased amplitude during visually guided movements towards the target. This can be observed during the finger-to-nose test when the person is asked to lift their arm out to the side, then to bend their elbow and touch their nose with their index finger³⁰: As the finger approaches the nose the tremor amplitude increases. Intention tremor is related to lesions in the cerebellum and/or connected pathways in the brain stem and the term is often synonymously used with ‘cerebellar tremor’³¹.

Resting tremor, which is observed when a body part is not voluntarily activated and supported against gravity, is unusual in MS³².

1.2.5 Bladder Dysfunction

Approximately 75% of people with MS experience some type of bladder dysfunction during the course of their disease. The effect of this can be difficult for the person, since bladder control may deteriorate at the same time as mobility worsens, making it increasingly difficult to respond to bladder urgency by hurrying to the toilet.



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There are three types of bladder dysfunction most commonly associated with MS³³. They are summarised in Table 2.

Nature of Dysfunction	Cause	Common Symptoms
Storage dysfunction	Detrusor hyperreflexia	Urgency, frequency, nocturia, incontinence
Emptying dysfunction	Diminished detrusor contractility Sphincter hypertonia	Urgency, dribbling, frequency, hesitancy, incontinence, infection
Combined storage and emptying dysfunction	Detrusor-sphincter dyssynergy	Urgency, hesitancy, frequency, dribbling, incontinence, infection

Table 2. Types of bladder dysfunction

1.2.5.1 Failure to Store (bladder overactivity)

Bladder overactivity is the problem that the person with MS is usually most aware of. It is the most common type of bladder dysfunction in MS, with reported incidences ranging from 26–50%. Symptoms of this dysfunction include urgency, frequency, urge incontinence and nocturia³⁴.

It results in a tendency for the bladder to contract unpredictably and sometimes uncontrollably. At its worst, the bladder may seem to have ‘a life of its own’.

After only partial filling the person senses urinary urgency. Incontinence may occur if the contraction pressures are too high and the problem is made worse if mobility is affected and it is difficult to reach the toilet in time.

Another feature of the impaired nerve supply to the bladder muscle is that the normal capacity is diminished, causing urinary frequency. This increases the frequency of emptying from every 3–5 hours (depending on how much is drunk) to hourly or worse.

1.2.5.2 Failure to Empty

This type of bladder dysfunction is less common (incidence 19–40%) but it can result in more serious complications than failure to store. Symptoms of failure to empty include frequency, nocturia, retention, overflow incontinence and urinary tract infections.

Although some people with MS are aware that their bladders do not empty properly, others with the same problem are not. For many, needing to void again soon after doing so is an indicator that bladder emptying is poor. Research has shown that if people with MS thought they were not emptying their bladder properly, they were usually correct. However, of those who thought they were **emptying completely**, about half were wrong and were surprised to find how much urine they had been leaving behind³⁵.

1.2.5.3 Combination Failure to Store and Failure to Empty

This occurs in 24–46% of people with bladder dysfunction in MS. It is often associated with detrusor-sphincter dyssynergia. Symptoms of this type of bladder dysfunction include those associated with both failure to store and failure to empty³⁷. If not treated appropriately, this condition can lead to recurrent urinary tract infections, urinary reflux, hydronephrosis and, in extreme cases, renal failure.

Emptying completely

Incomplete bladder emptying is the result of two things going wrong, both of which are due to spinal cord malfunction³⁶:

- **detrusor-sphincter dyssynergia:** the muscle that surrounds the bladder outlet tube (urethral sphincter) does not relax when the bladder muscle contracts, but instead goes into contraction, thus causing an interrupted flow.
- **detrusor hyperreflexia with poorly sustained contractions:** the neural impulses which in health keep the bladder muscle contracting until it is completely empty do not get down the spinal cord. When the bladder does contract, the contractions, although frequent, are poorly sustained.

1.2.6 Bowel Dysfunction

Bowel problems are common among people with MS, although they are generally under reported and neglected. Wiesel and colleagues³⁸ reported that the prevalence of bowel dysfunction in patients with MS is higher than in the general population (up to 70%)³⁸.

Bowel dysfunction does not appear to be associated with the degree of disability; however, it is associated with duration of MS³⁹. It is a source of considerable ongoing distress in many people with MS³⁸.

In order to control bowel actions, it is necessary to be aware of the need, or '**call to stool**'.

However in MS the messages are often either lost or incomplete, leaving a situation in which it may be difficult to differentiate between the calls.

The two main types of bowel dysfunction in MS are constipation and faecal incontinence, which may coexist:

1.2.6.1 Constipation

Constipation is defined as two or fewer bowel movements per week and/or the use of suppositories, laxatives or enemas more than once per week to promote bowel movements. It is estimated that in the general population of Europe the mean value of the reported constipation rates is 17.1%⁴⁰. Constipation occurs in approximately 36–53% of people with MS.

1.2.6.2 Faecal Incontinence

Faecal incontinence is defined as the involuntary passage of stool. In people with MS it occurs in 25% once a week and in 51% less than once a month. Factors contributing to faecal incontinence include constipation that causes rectal distension and overflow, diminished rectal sensation, sphincter dysfunction, certain medications and diet³⁹.

'Call to stool'

'Call to stool' awareness occurs when the faeces move into the rectum causing the rectum to expand and send messages via the sensory pathways of the need to evacuate. At this point, the finely tuned nerve endings of the rectum are able to differentiate between whether the stool is solid, liquid or wind.

Constipation

Factors that contribute to constipation include⁶⁴:

- neurologic changes
- lack of sensation in the rectal area
- weakened abdominal muscles
- lack of mobility and exercise
- insufficient fluid intake
- medications, particularly those used to treat urinary symptoms
- inadequate bowel routines, particularly the lack of a regular and relaxed time for elimination.

1.2.7 Sexual Problems

The private and intimate nature of issues relating to sexuality presents a challenge to both people with MS and the healthcare professionals caring for them. Patients who are experiencing sexual problems may be unaware of the extent to which these can be attributed to MS; whilst others may be concerned about the potential impact of MS on their sexuality. It is important, therefore, for nurses working with people diagnosed with MS to be alert to the varying needs of patients for assessment, information and reassurance about sexuality and sexual matters.

The incidence of sexual dysfunction in people with MS varies considerably between different reports. A 2009 review reported that between 50% and 90% of men and 40% and 80% of women are affected⁴¹. The most frequently reported symptoms in women are anorgasmia or hyporgasmia, decreased vaginal lubrication and reduced libido, and men most frequently experience impotence or erectile dysfunction (ED), ejaculatory and/or orgasmic dysfunction and reduced libido^{42,43}.

The prevalence of sexual dysfunction is higher in MS than in other chronic diseases, and almost five times higher than in the general population^{44,45}. Such studies tend to focus on physical problems and the total impact of a change in an individual's sexuality is often overlooked.



Prevalence studies indicate that approximately 70% of people with MS experience changes in sexual function.

Sexual dysfunction is correlated with the presence of other disabilities, in particular bladder and bowel symptoms, sensory disturbance of the genitalia, weakness of the pelvic floor and spasticity⁴². The associated factors may be recognised as 'risk factors' and alert the nurse to the possibility of sexual dysfunction. In common with other symptoms of MS, those of sexual dysfunction can relapse and remit.

Sexual problems can be described as primary, secondary or tertiary⁴⁶. People with MS may experience dysfunctions at any of these phases.

1.2.7.1 Primary Sexual Dysfunction

Primary sexual dysfunction occurs as a result of demyelinating lesions in the spinal cord and brain that directly impair sexual feelings and/or response. Examples include:

- decreased or absent libido.
- altered genital sensations or paresthesias.
- decreased or absent genital sensations.
- decreased frequency or intensity of orgasms.
- erectile dysfunction.
- decreased vaginal lubrication or clitoral engorgement.
- decreased vaginal muscle tone.

1.2.7.2 Secondary Sexual Dysfunction

Secondary sexual dysfunction refers to changes in sexual function that result indirectly from other MS symptoms or medical/pharmacological interventions.

The following MS symptoms can interfere with sexual expression:

- fatigue – interferes with interest, activity level and spontaneity.
- spasticity – affects comfort and positioning.
- non-genital sensory paresthesias – reduce comfort and pleasure.
- weakness – interferes with sexual activity.
- pain – reduces sexual activity and pleasure.
- bladder/bowel dysfunction – causes anxiety and discomfort.
- tremor – interferes with sexual activity.
- cognitive impairment – affects attention and psychogenic stimulation.

The following medications can interfere with the sexual response:

- tricyclic antidepressants and selective serotonin reuptake inhibitors (SSRIs) for depression – can inhibit libido and orgasm.
- anticholinergic and antimuscarinic medications – reduce vaginal lubrication.
- antispasticity medications – produce significant fatigue.
- anti-seizure medications used to control pain or tremor – produce significant fatigue.

1.2.7.3 Tertiary Sexual Dysfunction

Tertiary sexual dysfunction refers to the psychological, social and cultural issues that interfere with sexual feelings and/or response. Examples include:

- “Disabled people aren’t sexually attractive.”
- “I can’t be both a caregiver and a lover.”
- “If I don’t like myself any more, how can I expect someone else to find me attractive?”
- “This isn’t the same person I married.”
- “He/she doesn’t find me attractive now that I’m a burden.”
- “With everything else that’s going on, sex is the last thing I care about right now.”

It is important to establish in which of these areas a sexual problem is presenting. The range of potential interventions includes (but is not limited to) those which directly enhance sexual activity, the pharmacological management of MS symptoms and counselling directed at self-image or improved communication skills.

It is also important to remember that MS is a condition of young people who may wish to be/remain sexually very active. It is important to consider that the level of physical function or relationship is not relevant to desire for sexual fulfilment.



Nursing tip

What might be the right way to start talking about difficult/personal problems, such as bladder/sexual problems, with the person with MS?

Letting the person with MS know that problems with bowel, bladder and sexual function can be a part of MS is often a reassuring way to start a conversation. It is helpful to discuss the role the nervous system plays in each of the functions discussed and, if possible, provide diagrams for illustration. Letting them know that they are not alone and that, in most cases there are many ways to approach those problems, often relieves anxiety from the start. The nurse as a partner with the patient and family can explore many options to manage MS symptoms. The nurse should also explore other issues related to the symptoms. The female patient with sexual dysfunction may feel it is not worth discussing, yet simple changes such as emptying the bladder before intercourse and alternative positions are often helpful. The patient who has a solid relationship with the MS nurse is in the best position to partner with the nurse to approach the sometimes complex problem of symptom management.

1.2.8 Speech Difficulties

At a physical level, MS can affect the production of speech, usually by delays in messages passing through affected nerve pathways to the muscles involved in speech production.

Symptoms are variable and often relate to fatigue and stress levels. Some people with MS experience a mild reduction in volume when tired or a slight slurring of speech at the end of the day. Others find their thoughts run ahead of their words¹⁸.

Speech disturbances have been shown to correlate with severity of demyelination and progressive disease, but not with duration of illness, age or onset of MS⁴⁷. Speech disturbance is uncommon in the initial stage of MS and tends to occur as a later manifestation. Initially the speech disorder is mild and the severity increases progressively with greater degree of neurological involvement; it is more pronounced in individuals in whom the disease process involves a greater number of neurological systems.

It is difficult to determine the number of people who will experience speech and communication difficulties with their MS. Various studies have reported incidences ranging from 44% to 77%⁴⁸. In a large group study of patients with MS, Hartelius and colleagues⁴⁹ found that 62% of the group reported speech and voice impairments. The variation in the incidence depends on the severity, duration and stage of disease progression.

Symptoms

The main symptoms of speech disturbances in MS are:

Imprecise articulation (dysarthria)

Speech can be slow and slurred, with imprecise vowels and consonants, sudden breakdowns or excessive length of sounds. These difficulties are caused by slowness and weakness of tongue movements, and to a lesser extent, by difficulties related with movement of lips and jaw.

Voice abnormalities (dysphonia)

There are different types of voice disturbances: harshness, breathiness, hoarseness and a strained-strangled voice. The voice intensity may be low and decrease with fatigue. In some cases, the person can produce only short utterances. These disturbances are caused by abnormalities of breathing and of the laryngeal system. Deficits in breathing may consist of poor breath support and lack of breath control for speech. Deficits in the laryngeal system may be caused by hyper- or hypofunction. Sometimes the voice has an excessive nasal resonance.

Abnormal speech melody (dysprosody)

The person with MS may show prosodic disturbances, such as slowness or excessive velocity; poor or excessive pitch variation; and excessive variation of loudness. These disturbances are caused by reduced breathing control, by laryngeal and articulatory dysfunction, or by poor coordination between these components.

Dysarthrias are commonly associated with other symptoms caused by brain-stem lesions, such as head tremor and incoordination of fine motor control. The following speech symptoms have been reported in order of frequency of occurrence:

- impaired loudness control.
- voice harshness.
- defective articulation.
- impaired emphasis.
- impaired pitch control.

Research into the effects of speech therapy on people with MS indicates that therapy can be beneficial. General advice may include reducing background noise before speaking, saying half words on each breath, speaking slowly and facing listeners when speaking. Traditional speech exercises may be beneficial if the problem is very mild (e.g., exercises to assist breathe control for volume).

1.2.9 Swallowing Difficulties

Since speech and **swallowing** share the same anatomical structures and some physiological mechanisms, speech disorders can be associated with swallowing disorders.

Swallowing disorders (dysphagia) has been reported in 34% of MS patients, with a significant correlation with pronounced **severity of illness**^{50,51}. The disturbances usually involve oral and pharyngeal phases of swallowing, although upper oesophageal sphincter dysfunction has also been detected. This can include difficulty chewing, pocketing food in the cheek, drink dribbling from the mouth, and episodes of coughing/choking when eating or drinking. It is not unusual for people with MS to deny swallowing difficulties, even when family members report concerns.

Swallowing

Swallowing has been recognised as one of the most basic biological functions, but the real process is by no means basic. The act of swallowing consists of 3 phases:

- Oral
- Pharyngeal
- Oesophageal

The oro-pharyngeal phases last no longer than 1.5 seconds but involve the coordination of no less than 31 paired muscle groups. Impairment to the neurological control of swallowing results in dysphagia, and may lead to potentially serious effects on respiratory function, nutrition and QOL.

Severity of illness

A recent study⁵² found that people with MS with dysphagia had a significantly longer disease duration ($p=0.031$) and more neurological impairment in cerebellar functional system ($p=0.04$) when compared with non-dysphagic patients. Dysphagia was significantly more prevalent in people with more neurological disability as measured by EDSS scores ($p=0.04$). These results emphasise the importance of assessment and management of swallowing function in people with MS, particularly in those with a high EDSS score, more severe cerebellar dysfunction and long disease duration.

Self-reports of chewing and swallowing problems generally increase as MS progresses; the incidence of these problems is 65% in the most severely disabled patients⁵³. Depending on the location and extent of demyelination, swallowing disorders can relapse and remit along with MS exacerbations.

A speech and language therapist will be able to assess adequacy of swallowing through manual assessment and videofluoroscopy. Following assessment, the therapist will advise on posture, amounts and consistencies of food, and eating environment. If swallowing is considered unsafe and recurrent chest infections or marked weight loss develop, then alternative ways of feeding will be recommended, e.g., nasogastric feeding or percutaneous endoscopic gastrostomy (PEG) feeding.

1.2.10 Cognition

Cognitive problems can arise early in the course of MS, although the greater the disease duration and severity, the more likely cognitive problems are to occur. As with physical symptoms, MS may affect some cognitive functions while others are left intact. Cognitive symptoms can worsen during relapse and improve during remission, but more commonly cognitive symptoms develop slowly and gradually.

Approximately 50% of people with MS develop measurable cognitive deficits⁵⁴⁻⁵⁶. In 5–10%, cognitive impairment interferes significantly with everyday activities, but it is rarely severe enough to require institutionalised care. Cognitive impairment can occur in patients with little physical disability, and is an independent predictor of subsequent impairment in work and social settings⁵⁷. It can cause difficulties in maintaining employment, performing activities of daily living, and adhering to medication; cognitive impairment interferes with social interactions, strains family relationships and causes significant emotional distress⁵⁸.



Approximately 50% of people with MS develop measurable cognitive deficits.

Cognitive impairment remains relatively mild for most people with MS⁵⁹, but in a small proportion (around 10%) it progresses further to resemble a form of subcortical dementia⁶⁰. Cognitive impairment tends to get slightly worse very gradually, and at an unpredictable pace, over many years. The rate of change depends largely upon the degree of disease activity in the brain.

Some cognitive functions are more likely to be affected than others in people with MS. These include **recent memory**, **attention and concentration**, **information processing**, **executive functions** (such as planning and problem-solving), **visuospatial functions** and verbal fluency^{61,62}. General intellect, long-term memory, conversational skill and reading comprehension are most likely to remain intact. General language functions, routine social skills and orientation to person, place and time are rarely significantly affected in MS (even when cognitive impairment becomes severe overall), although some degree of mild word-finding difficulty is common⁵⁷.

There is a wide range of individual variation in the experience of cognitive impairments. Many people with MS experience none. Others may experience impairment in one area only; whilst others may experience a combination of the more common areas of impairment. Even mild cognitive impairment can have a significant impact on a patient's capacity to **function in their daily lives**.

Therefore, evaluation of cognitive functioning should be part of the ongoing neurological and nursing assessment of people with MS⁶³.

Motor, sensory and fatigue symptoms may also affect a person's cognitive functioning. Therefore, these symptoms need to be taken into account when evaluating cognitive impairment. Emotional state can also affect a person's cognitive functioning⁶⁴.

Memory loss is probably the commonest cognitive problem experienced by patients with MS. Apart from the obvious difficulties presented by forgetfulness, memory loss also has implications in terms of learning new skills.

Attention and concentration lapses can also cause problems, especially when attention needs to be divided between tasks.

Reasoning and judgment, including new learning, problem solving and behavioural regulation, may also be impaired but, because of the subtle nature of reasoning, this problem is often much less obvious.

Speed of information processing can be affected. This is particularly noticeable when people have to deal with information coming to them from different directions.

Visuo-spatial perception is also sometimes impaired. Cognitive functions which are less likely to be affected by MS include language, remote knowledge, 'old knowing', previously learned motor skills (e.g., riding a bicycle) and long-term automatic social skills.

Function in their daily lives

A significantly slowed speed of information processing has been linked with an increased risk for car accidents, and also with a greater risk of misunderstanding what is been said, which in turn can lead to an increase in interpersonal conflict.

Even mildly reduced problem-solving and organising skills can have a great impact on a patient's ability to successfully juggle the multiple competing demands on their time and energy each day, such as maintaining a job, keeping up with after-school activities of their children, and managing their own personal MS symptom care plans which might require scheduled fatigue- or toilet-breaks.

1.2.11 Spasticity

Spasticity affects approximately three quarters of people with MS⁶⁵. In a survey a third of people with MS reported spasticity as either a moderate or the worst symptom they experience on a daily basis⁶⁶. Severity of spasticity was related to duration of MS, severity of disability, number of relapses and worsening symptoms in recent months⁶⁵. Spasticity negatively affects daily activities in up to 44% of those who are affected by it⁷. It can worsen gait problems, physical components of QOL, and bowel or bladder dysfunction^{7,67}.



Spasticity affects approximately three quarters of people with MS.

Spasticity is one component of the upper motor neurone syndrome that occurs as a result of acquired damage to any part of the CNS, including the spinal cord. It has a range of effects, which can be categorised into positive and negative features; most people will present with a combination of the two⁶⁸.

Spasticity includes active muscle spasms, muscular tightness, stiffness, inelasticity and weakness. Muscle weakness is a frequent first presenting symptom of MS, and spasticity often compounds the weakness. Dizziness, vertigo and numbness can also occur in MS and interfere with mobility⁷. It can decrease range of motion, hinder the initiation or cessation of movement, cause pain, increase fatigue and provoke falls. It is a major source of disability in the lower limbs⁶⁵. People with MS may notice that certain movements are accompanied by increasing rigidity. This often occurs in the morning or after being seated for a length of time; the cramping improves after several minutes. In addition, spontaneous jerks or contractions of the extremities can occur.

1.2.11.1 Consequences of Spasticity

Spasticity does not always cause discomfort or inconvenience for people with MS. The muscle stiffness can compensate for weakness in some cases, and can assist activity that would not otherwise have been possible, as well as assisting with some components of physiotherapy⁷⁰. However, in most cases spasticity does cause problems. The increased stiffness in the muscles consumes a great deal of energy, can hinder coordination and exacerbate other MS symptoms such as fatigue.

Spasticity can affect physical activities such as walking, transferring, picking up objects, washing, dressing and sexual activity. It can also have an emotional impact, on for example, mood, self-image and motivation⁷¹⁻⁷³. Safety in sitting and lying can also be compromised due to spasms or persistent poor positioning which can lead to the development of contractures. This can potentially lead to restricted community mobility and social isolation. Therefore, the treatment of spasticity needs to be carefully selected and reviewed over time in order to meet the individual's aims, and to promote and maintain function.

1.2.12 Pain

Pain is a common symptom in people with MS. Studies report prevalence ranging from 30% to 90%⁷⁴⁻⁷⁶, and it is often one of the presenting symptoms². Pain in MS shows correlations with both anxiety and depression, and can affect all aspects of function and physical and mental QOL domains⁷. Almost one-half of patients with MS and pain report that pain interferes with social activities, work or sleep.



Pain is a common symptom in people with MS. Studies report prevalence ranging from 30% to 90%.

Pain can be difficult to cope with and those who experience it may also be more prone to poorer mental health. Pain can lead to depression, and depression in turn may contribute to the experience of pain. The pain experienced by people with MS can be either primary, a direct result of nerve damage, or secondary, due to disability, for example low back pain from prolonged wheelchair use or poor posture¹⁸.

A systematic review of pain in MS⁷⁵ differentiates between four distinct pain categories:

- continuous central neuropathic pain (e.g., dysesthetic extremity pain).
- intermittent central neuropathic pain (e.g., trigeminal neuralgia, Lhermitte's sign).
- musculoskeletal pain (e.g., lower back pain, muscle spasms or pain relating to tonic spasms).
- mixed neuropathic and non-neuropathic pain (e.g. headache).

An additional source of pain derives from MS-specific drug therapies which, although not serious, may decrease compliance with treatment⁷⁷.

Spasticity

The control and regulation of normal skeletal muscle activity involves a complex combination of descending motor commands, reflexes and sensory feedback, both from the brain and spinal cord, and from peripheral sensation. During normal movement, influences from the cerebral cortex, basal ganglia, thalamus and cerebellum, travelling via upper motor neurones, adjust, reinforce and regulate the lower motor neurone which connects directly via peripheral nerves to the muscle to form smooth, coordinated muscle activity and maintenance of posture.

In simple terms, spasticity occurs when there is damage to these descending upper motor neuron tracts (e.g., a plaque in MS). This interrupts the regulation of spinal cord and lower motor neurone activity. This can result in enhanced lower motor neurone activity and a consequent increase in muscle activity, in response to peripheral stimuli (e.g., muscle stretch, a urinary tract infection or pressure ulcer)⁶⁹.

1.2.12.1 Neuropathic Pain

Neuropathic pain, or ‘nerve pain’, is usually described as burning, shooting, tingling, stabbing and/or hypersensitivity. People with MS often experience neuropathic pain due to demyelination of the nerves and plaques in the brain and spinal cord. An example of this is trigeminal neuralgia, a severe facial pain, which occurs 300 times more frequently in people with MS than in the general population. In extreme cases, surgery may be performed to alleviate the pain of trigeminal neuralgia, but this may leave the face numb⁷⁸. Lhermitte’s sign is another example of neuropathic pain often triggered by head movement and attributed to demyelination in the cervical area.

1.2.12.2 Nociceptive Pain

Musculoskeletal or nociceptive pain is the type of pain experienced when damage occurs to muscles, tendons, ligaments and soft tissue. Muscle spasm and spasticity, common symptoms of MS, can also be a source of nociceptive pain. Many people with MS experience lower back pain, especially if immobility or fatigue means that they are sitting down for much of the time. Sitting places the lower back under more strain than standing and nerves can easily become compressed or pinched. Equally, an alteration of gait may place unusual stresses on the discs between the vertebrae. Such stress can cause damage to the discs and nerves to be trapped, which results in pain in whichever part of the body is served by those nerves. Ligament damage can also occur in MS because of hyperextension of the knee when walking; the subsequent swelling of the knee can cause significant pain⁷⁶.

1.2.13 Altered Mobility and Balance

Mobility can be defined as the ability to move freely; it includes moving in bed, getting out of bed, moving into and out of chairs, going up and down stairs and slopes, getting to and from shops and using public transport. It may also include endurance – some people with MS may retain the ability to walk but can do so only over a short distance.

Mobility is impaired in up to 90% of people with MS⁷. Impaired mobility affects functional activity, employment, independence, and physical and mental components of QOL⁷. Several studies have suggested the importance of mobility to productivity and employment. Mobility and hand function are the two largest predictors of leaving the workforce. Of factors affecting QOL in a group of patients with MS, 65% gave mobility the highest priority⁷. In another survey, 70% of people with MS and walking impairment reported that it was the biggest challenge associated with MS⁷⁹. Patient fear about **falling** will increase social isolation.

Falling

People with MS who are afraid of falling may decrease physical activity, which can reduce strength, endurance, and range of motion⁸⁰. This can in turn increase the risk of falling, which may lead to additional increase in medical costs.



Mobility is impaired in up to 90% of people with MS.

Gait problems can appear any time in the disease course. Fifteen years after diagnosis the probability of requiring assistance for walking is estimated at 40%, and of requiring a wheelchair, 25%⁷.

1.2.14 Depression

Major, or clinical, depression is a serious psychiatric disorder that is distinguished from minor depression, discouragement and grief by the persistence, severity and number of symptoms⁸¹.

A diagnosis of major depression requires an individual to have a sad or irritable mood most of the day and nearly every day for at least two weeks. In addition, there must be four other **symptoms** present during this time, which may include:

- loss of interest in the things one is usually interested in and capable of doing.
- feelings of worthlessness or excessive/inappropriate guilt.
- significant increase or decrease in appetite with weight gain or loss.
- change in sleep patterns (waking up 2–3 hours earlier than usual, or increase in number of hours of sleep each day, by several hours or more) recurrent thoughts of death or suicidal feelings and thoughts, fatigue.
- attentional impairment.
- sexual dysfunction.

Major depression is more common in MS patients than in the general population, or even among people with other chronic disabling diseases⁸². Half of all people with MS experience depression at some point in the course of their illness⁸³. The prevalence of major depression has been estimated at 26% in those in the 18–45 age range⁸². Depression may be a reaction to effects of MS, a result of lesions in areas of the brain that control emotions, a result of immunologic processes in MS, a side effect of MS medications (e.g., corticosteroids, possibly interferon), or may be a separate comorbidity.

Symptoms

Some of the symptoms associated with major depression are also associated with MS. Consequently, it's important to differentiate between social withdrawal associated with depression (due to loss of interest in usual social activities) and the inability to socialise in one's usual manner due to MS symptoms or impairments. If the persistent and severe mood changes that characterise major depression are not present, such symptoms are most likely due to MS.



Half of all people with MS experience depression at some point in the course of their illness.

Depression, which often goes unrecognised and untreated, does not correlate with level of disability in MS^{84,85}. It has however been shown to correlate with the degree of neurological impairment; people with MS and depression tend to have a higher lesion load in the medial orbital frontal cortex than non-depressed people with MS⁸⁶. Depression has also been found to be the most important predictor of a decreased QOL in MS patients⁸⁷.

The uncertainty of the future, coupled with the perceived loss of a ‘normal’ life, causes most people with MS to feel depressed at least occasionally. Researchers believe that MS-related depression may be due to a combination of the following:

- psychological reactions to the diagnosis of a chronic illness.
- neuropathology of the disease process.
- anxiety related to the uncertainty of future events.
- grieving over the perceived loss of former self.

Few diseases are as affected by emotional status as MS. Research has shown, for example, that function and performance are much better when people are in good emotional health than when they are depressed or anxious⁸⁸.

The presentation of depression in people with MS frequently differs from that of the general population. In MS, symptoms such as sadness, irritability and anxiety may be the first indicators of an underlying depression. In any person with MS who is depressed, a list of possible contributing factors (such as chronic pain and social isolation) should be drawn up. Interventions should be undertaken to help resolve those contributing factors where possible. Specific antidepressant medication or psychological treatments such as cognitive behavioural therapy should be considered, but only as part of an overall programme of depression management.

1.3 Summary



- MS is associated with a number of symptoms, including vision difficulties, speaking and swallowing difficulties, weakness, pain, tremors, bladder, bowel and sexual dysfunction, thinking and memory problems, depression, fatigue and episodic symptoms.
- These symptoms may affect a patient’s functioning and wellbeing.
- Treatment of symptoms may improve quality of life and day-to-day functional ability.
- However, symptomatic treatments do not slow progression of the disease.



Reflective learning point

Taking into account all of the symptoms discussed, what do you think are the most significant signs to look out for when you meet with your patients?

How will you go about assessing your patients for any changes they might be experiencing in their symptoms?

What is the significance of understanding the different symptoms a person with MS might encounter in your role as MS Nurse?

2 Pharmacologic Management of Symptoms

2.1 Introduction

Intro

People with MS experience a spectrum of symptoms which may be the result of past neurodegeneration or as a feature of disease progression (Figure 3)⁸⁹.

Importantly, these symptoms may not improve with DMT treatment alone and to achieve a more immediate benefit in terms of symptom management and quality of life, individualised therapy to manage symptoms is required⁹⁰. Improving symptoms can maintain quality of life and patients' ability to undertake activities of daily living and ability to maintain employment^{90,91}.

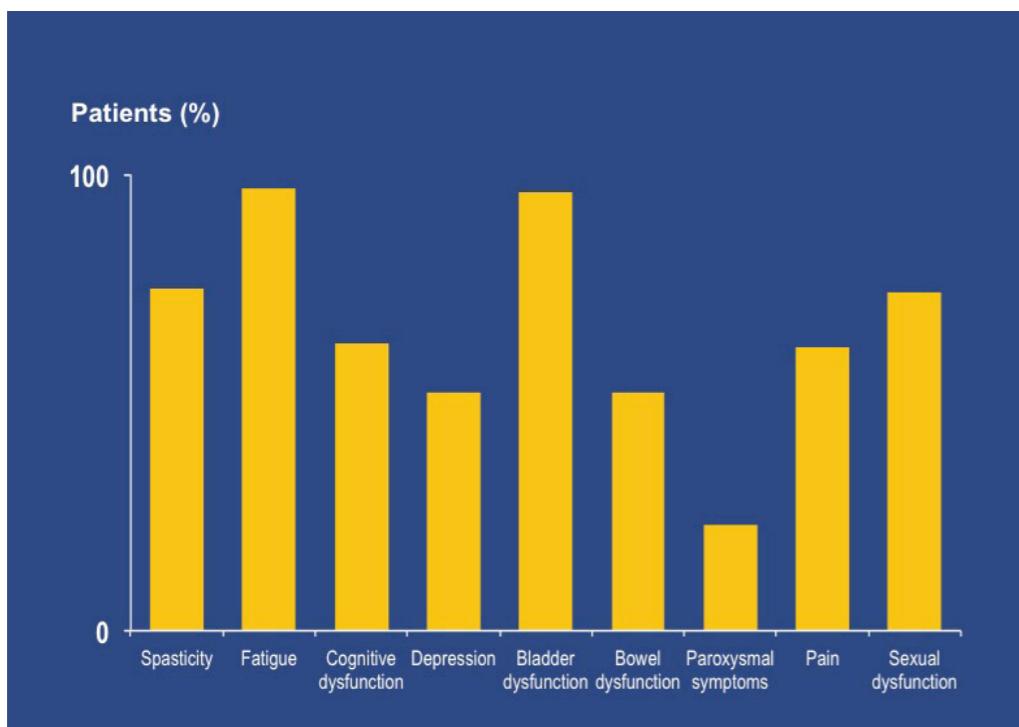


Figure 3 – Symptoms of MS⁸⁹

Symptom management is a critical part of care of those with MS; left untreated symptoms can significantly impair patients' quality of life and their ability to fully engage in daily life and continue in their work^{89,91}. In addition, symptoms can also lead to the development of additional symptoms; for example, fatigue will likely lead to decreased exercise, which in turn can lead to spasticity and constipation and also depression⁸⁹. Bladder dysfunction, another common symptom in people with MS, can affect sleep patterns which in turn can affect cognition and aggravate depression.

Breaking the so called 'cycle of symptoms' requires an individualised approach which focuses on the needs of the patient and may include drug and/or non-pharmacological therapy and effective patient communication⁹². Therefore, the MS Nurse is an important member of the multidisciplinary team (MDT) and can help ensure an individual patient's needs are effectively addressed⁸⁹.



The MS Nurse is an important member of the MDT and can help ensure an individual patient's needs are effectively addressed.

In order to provide optimal support and advice as appropriate to people with MS-related symptoms, the MS Nurse must be aware of the likely treatment options, and for pharmacologic therapy, an understanding of the likely benefits from therapy, knowledge of the common dose regimens and possible adverse events the patient may experience.

The following sections summarise some of the common therapies for the more frequently reported symptoms experienced by people with MS. Supportive care strategies are also important and are reviewed in detail in the next section.

2.2 Walking

2.2.1 Background

Impaired ability to walk is one of the major signs associated with MS⁹³ and may affect more than three-quarters of people with MS^{93,94}. Loss of walking ability leads to patients needing walking assistance or a wheelchair leading to problems with undertaking tasks of daily living and to loss of patient quality of life⁹⁴⁻⁹⁶. Moreover the effect on a patient's family/caregiver is significant⁹⁷.



Impaired ability to walk is one of the major signs associated with MS.

2.2.2 Management

The usual approach to management is physical rehabilitation and retraining, with management of any associated spasticity⁹⁴. Treatment of spasticity can help walking by improving muscle tone but this has no impact on the underlying gait disorder⁹⁴. In advanced stages of MS, wheelchairs or power scooters may be unavoidable⁹⁸.

2.2.3 Fampridine

A new treatment approved by the EMEA to **improve walking** in people with RRMS and SPMS is **fampridine**. In clinical trials 35% and 43% of patients in two trials were 'responders'^{99,100}. In these patients, walking speed increased by approximately 25% (approximately 15.5 cm/second) over 25 feet (7.62 meters). This sustained release tablet is taken twice daily, 12 hours apart¹⁰¹.

Fampridine works by improving the ability of neurons to transmit a signal and therefore acts to improve the neurological deficits associated with demyelination^{100,102,103}.

Fampridine is excreted unchanged by the kidneys. Therefore, while there is no documented risk of interactions with drugs metabolised by the liver, there is a risk of increased levels in patients with renal impairment and fampridine should not be used in patients with creatinine clearances <80 ml/min. It is suggested that renal function should be assessed in elderly patients prior to starting therapy¹⁰¹.

Although fampridine is usually well tolerated, the mechanism of action of fampridine means that it may cause convulsions (seizures). Indeed, there have been reports of convulsions during use of fampridine, particularly in early studies of higher doses (e.g. 20 mg) and the clinical trials could not confirm the magnitude of risk with the 10 mg twice daily dose⁹⁹⁻¹⁰². Patients with a history of convulsions should not receive fampridine¹⁰².

The most common adverse events with fampridine are mild and resolve without specific management. Common events reported include dizziness/balance disorders, tremors, insomnia, anxiety, fatigue, back pain and gastrointestinal disturbance (nausea, vomiting, diarrhoea, constipation)⁹⁹⁻¹⁰².

There are no reports of pregnancy during use of fampridine, however animal studies have reported adverse effects to the foetus and it is recommended that use of fampridine is avoided in pregnancy¹⁰¹.

Improve walking

The efficacy of fampridine was measured using the 'Timed 25-foot Walk' (T25FW) test. The walking speed of patients was timed over 25 feet and a 'responder' was defined as a patient with a faster walking speed for at least three of the four visits during treatment compared with the maximum off drug^{93,94,96}. The results of two phase III studies were very similar; the proportion of responders was increased with fampridine (34.8% vs 8.3% and 42.9% vs 9.3%, p<0.001 in both studies). Responders increased their walking speed in both studies by approximately 25%, or an increase of approximately 0.51 ft/second (approximately 15.5 cm/second). The MS Walking Scale-12 (MSWS-12) was also used to assess patient response and this measure also improved in fampridine-treated patients which was also correlated with 'response' as defined using the T25FW primary endpoint.

Fampridine

Fampridine is a 'potassium channel blocker'^{102,103} which prolongs the duration of Na⁺ influx and hence the action potential of nerves, reducing the amount of current necessary to transmit a nerve signal. In addition, calcium influx at nerve ends is also increased which can improve the conduction of signals to other nerves or muscle¹⁰².

2.3 Spasticity

2.3.1 Background

Up to three-quarters of people with MS experience spasticity, the muscle affected depending on the location of MS lesions⁸⁹. Spasticity is associated with a number of additional symptoms including pain, bowel and bladder function, and significantly compromises the ability of individuals to continue with activities of daily living^{89,104}. Spasticity can compensate for muscle weakness in people with MS and therefore treatment can 'unmask' weakness⁸⁹.

2.3.2 Management

For individual patients affected by spasticity, physiotherapy and carefully planned exercise can be helpful. Exercise should be carefully planned in collaboration with rehabilitation services and include flexibility exercise, aerobic exercise and relaxation^{89,102,105}.

First-line drug therapy is usually baclofen or tizanidine^{89,90} (*Table 3*).

Agent	Dose	Adverse Events	Comments
Baclofen	Initial dose : 5mg orally 2 - 3 times daily. Titration : no more than every 3 days Usual effective dose :20 mg 3 x daily. Maximum dose :100 mg unless the patient under close medical supervision in hospital ¹⁰⁰ . Up to 200 mg daily may be required ¹ .	Most occur during the start of treatment: Sedation Drowsiness Nausea Less commonly: Dry mouth Dizziness Tiredness Confusion Rarely: Paresthesia Depression. There may also be a lowering of the threshold for convulsions, particularly in epileptic patients Exacerbation of psychiatric disorders possible; patients with pre-existing psychiatric conditions should be treated cautiously and kept under close surveillance ¹⁰⁰	Taking the tablets with milk or food helps alleviate nausea The effects of baclofen on blood pressure may be increased by the concurrent use of antihypertensive therapy; therefore , used with extreme care in patients receiving therapy for hypertension ¹⁰⁰
Tizanidine	3 or 4 times daily ¹ Initial dose : 1mg or 2mg at bedtime (due to risk of sedation); three or four times daily Titration : no more than half weekly according to response. Maximum dose : 12mg (single dose) ^{1,101} , and no more than 32 mg daily ^{1,101}	Sedation Hypotension Dizziness Tiredness Nausea and GI disturbances (constipation). More rarely: hallucinations and weakness ^{1,101}	Patients should be counselled that alcohol can worsen the sedating effects of tizanidine. The effects of tizanidine on blood pressure may be increased in patients taking antihypertensive therapy and caution is recommended. Because of the (rare) risk of liver dysfunction, liver function tests required before and during therapy at doses greater than 12 mg daily ¹⁰¹ . Care is necessary when discontinuing tizanidine as rebound hypertension has been reported ¹⁰¹

Table 3 – First line agents used for spasticity

Oral baclofen and tizanidine have similar effects on spasticity⁸⁹. In a systematic review¹⁰⁸ the data for baclofen were described as limited, however improvements in spasticity were reported in at least some studies¹⁰⁸. There was also evidence that baclofen improves range of motion and frequency of spasms and potentially, gait. However, there is no evidence that baclofen improves functional ability. Although the evidence for tizanidine was described as more complete, the efficacy was described as similar, with improvements demonstrated in the pendulum test and spasticity score, as well as tone, in some studies. Again, like baclofen, no effect on functional ability was detected¹⁰⁸. In an analysis of comparative studies no difference between tizanidine and baclofen could be observed¹⁰⁸.

For non-ambulatory patients not responding to baclofen or tizanidine, dantrolene may have effects on spasticity; however the data are limited^{89,108}. The frequent adverse events (weakness and GI symptoms) limit the role of dantrolene¹⁰⁸, and the risk of liver function abnormalities means patients require frequent monitoring of liver function⁸⁹. Diazepam may also be used for spasticity, which while as effective as baclofen and tizanidine is also more often associated with adverse events including sedation and weakness¹⁰⁸. Patients who are prescribed diazepam should be warned of the sedative effects and advised to take their medication in the evening before bed⁸⁹.

Nabiximol is a cannabis extract which works on the cannabinoid receptors in the brain and spinal cord. It is licensed in MS as an add-on therapy for those people whose spasticity and spasm has not responded to the other available drugs^{109,110}. It is available as an oral spray. Side effects can include dizziness, sleepiness and feelings of light headedness. Occasionally the spray can cause soreness in the mouth so it is important to change the spray site regularly. About half of people with MS will respond to nabiximol; whether someone is a responder can be identified after a four week trial of the drug. The dose can then be controlled by varying the number of sprays taken each day.

Combination therapy may be helpful to minimise the doses of each agent used, and therefore the potential severity of adverse events⁸⁹. Patients may however require help to plan their medication as the drugs used are administered with different schedules.

Patients who lose response to oral medication, or who cannot tolerate therapy may gain relief from intrathecal baclofen. The baclofen pump is a surgically implanted programmable pump and catheter that delivers the baclofen directly into the intrathecal space where fluid flows around the spinal cord. Most people report that the programmable pump is not uncomfortable or restrictive, and does not interfere with their movement. After a test injection a pump can be used to provide ongoing administration⁸⁹. Intrathecal baclofen has been shown to improve rigidity and spasms, particularly bilateral leg spasticity^{89,111}.

Abrupt discontinuation of intrathecal baclofen has resulted in withdrawal symptoms that include high fever, altered mental status, exaggerated rebound spasticity, and muscle rigidity, that in rare cases has advanced to rhabdomyolysis, multiple organ-system failure and death. Patients and caregivers should be advised of the importance of keeping scheduled refill visits and should be educated on the early symptoms of baclofen withdrawal. Special attention should be given to patients at apparent risk (e.g. spinal cord injuries at T-6 or above, communication difficulties, history of withdrawal symptoms from oral or intrathecal baclofen).

Botulinum toxin has been used off-label for the management of spasticity in people with MS for many years, based on the results of studies in patients after stroke which demonstrated efficacy⁹⁰. In some markets certain formulations may be approved for spasticity, or even specifically MS-related spasticity⁹⁰. Treatment with botulinum toxin is generally considered salvage therapy after first-line therapy has failed. Adverse events reported include difficulty in swallowing, speaking or breathing and fatigue and weakness – the latter being a particular concern in people with MS⁹⁰.

2.4 Fatigue

2.4.1 Background

Fatigue is reported by most people with MS^{89,92} and significantly impairs quality of life, and also the ability to continue in employment¹¹¹. Up to one-third of people with MS may identify fatigue as their most disabling symptom, and fatigue may lead to the onset, or worsening of other symptoms including depression, loss of cognitive function, and through an effect on exercise, muscle weakness⁹².



Up to one-third of people with MS may identify fatigue as their most disabling symptom, and fatigue may lead to the onset, or worsening of other symptoms including depression, loss of cognitive function, and through an effect on exercise, muscle weakness.

2.4.2 Management

Non-pharmacologic therapy for fatigue can include a cooling vest, air conditioned environments and cool showers or cold drinks to reduce elevated body temperature. In addition, aerobic exercise and occupational therapy can both help patients with fatigue (Figure 4).



Figure 4 – Fatigue management⁸⁹

Pharmacologic therapy to alleviate fatigue is with CNS stimulants such as methylphenidate, modafinil, amantadine, and although not available in many markets dextroamphetamine⁸⁹ (Table 4).

Agent	Dose	Adverse Events	Comments
Amantadine	100 mg twice daily. If tolerance develops a drug 'holiday' of 2 to 3 weeks can be used to prolong therapeutic benefits ¹ .	In general well tolerated (<10% of patients discontinues therapy in clinical studies) Generally mild: Vivid dreams Nausea Hyperactivity Anxiety Insomnia Constipation Rash Much less commonly: Hallucinations ¹⁰⁶	Usual first-line therapy
Modafinil	100-200 mg daily (usually, the second dose is taken before 2pm to avoid insomnia)	Generally well tolerated. Most commonly: Nausea Constipation Nervousness Restlessness Loss of appetite ¹ . Insomnia is a possible event but was not reported in the MS trials ¹⁰⁶ Rare but serious events include skin reactions, psychiatric adverse effects and hypertension ¹⁰⁶	

Table 4 – Pharmacologic therapy for fatigue

None of these agents are approved for the management of fatigue in people with MS^{89,112}, for example methylphenidate is indicated for the treatment of ADHD, modafinil for excessive somnolence in patients with narcolepsy, and amantadine is used for the prophylaxis and treatment of symptoms of influenza.

Amantadine is most commonly considered the first-line therapy for fatigue^{112,113}. Four short term clinical trials of amantadine have reported the effects of amantadine and reported improvements in fatigue and patient preference for amantadine over placebo^{112,113}. Overall between 20% and 40% of people with MS with mild-moderate fatigue show short-term reduction in fatigue with amantadine^{89,90,114}.

Modafinil has been shown to improve fatigue in three main trials¹¹⁵⁻¹⁷. However, two additional studies could find no benefit compared with placebo^{118,119}. The European regulatory agency (EMEA) has stated that the risk-benefit of modafinil is positive only for narcolepsy¹¹².

2.5 Bladder Dysfunction

2.5.1 Background

Many people with MS have bladder dysfunction^{89,120}. MS lesions lead to detrusor instability and sphincter problems which can produce symptoms of overactive bladder (urinary frequency, incontinence) or urinary retention^{89,121}; overactive bladder/destrusor instability is the more common condition, reported in approximately 60% of people with MS¹²¹.

2.5.2 Assessment: Role of the MS Nurse

Patients may be reluctant to report incontinence and other bladder issues as many people can feel a sense of shame and embarrassment. It is important, therefore, that the MS Nurse is prepared to raise this with their patients and that the nurse considers how he/she might handle these discussions with care and discretion. Simple questions may help patients discuss their symptoms in an open and trusting environment¹²².



Patients may be reluctant to report incontinence and other bladder issues and it is important that the MS Nurse is prepared to raise this with their patients.

2.5.3 Management

Managing bladder and bowel problems requires a comprehensive and holistic approach that sees a step wise escalation of interventions. Although behavioural therapy and bladder training **Kegel exercises** may be helpful in patients with OAB, most will require pharmacologic therapy – the mainstay of therapy being anticholinergic agents such as oxybutinin, tolterodine, solifenacin, trospium, or tricyclic antidepressants^{89,123}. Although there is a lot of evidence for these drugs to treat OAB, there is less information on their use in people with MS¹²³. A systematic review identified only five trials, of which only a study of oxybutinin reported significant effects on frequency¹²³.

Anticholinergic therapy is associated with typical side effects including dry mouth, blurred vision and constipation⁸⁹, with some evidence that the newer agents (e.g. tolterodine, fesoterodine, darifenacin, trospium and solifenacin) are less frequently associated with troublesome anticholinergic symptoms and some permit dose adjustment to achieve an acceptable compromise between efficacy and tolerability^{122,124}. In addition, the older antimuscarinic agents have been associated with cognitive changes; this is less frequently reported with the newer agents; notably trospium.

For those not responding to first line therapy, or developing recurrent UTIs referral to a urologist may be necessary⁸⁹. Treatment strategies that may be considered in patients not responding to anticholinergic therapy may include '**transcutaneous posterior tibial nerve stimulation**' (PTNS/TPTNS), which may be used to provide long term control of OAB without the adverse events of anticholinergic therapy by some urologists¹²⁵. In one study of PTNS in 70 people with MS, daily TPTNS sessions over 3 months produced clinical improvement in over 80% of patients¹²⁶.

Kegel exercises

Kegel exercises can help both men and women who have problems with urine leakage or bowel control. The aim of Kegel exercises is to improve muscle tone by strengthening the pubococcygeus muscles of the pelvic floor. Kegel exercises can be done at any time and any place. Most people prefer to do the exercises while lying down or sitting in a chair. After 4 - 6 weeks, most people notice some improvement but it may take as long as 3 months to see clinical benefit. Instructions for Kegel exercises¹¹⁶:

- Pull in or squeeze your pelvic muscle as if you were trying to stop urine flow
- Hold for several seconds
- Relax and repeat
- Perform at least 3 sets of 10 contractions every day

'Transcutaneous posterior tibial nerve stimulation' (PTNS/TPTNS)

Percutaneous posterior tibial nerve stimulation (PTNS) for overactive bladder involves inserting a fine needle into a nerve just above the ankle. A mild electric current is passed through the needle and carried to the nerves that control bladder function

For patients with refractory OAB, **botulinum toxin** is being increasingly used to provide relief¹²⁷, including those with MS¹²⁸⁻¹³⁰. In a study with people with MS, three-quarters reported clinical improvement, including one-half of patients who reported 'complete success' (total continence). Non-response was more likely in those with advanced MS¹³⁰. In this study no complications from therapy were reported, but potential complications include pain, urinary tract infections, and haematuria^{129,130}.

Nocturnal incontinence and night-time urinary frequency are two of the worst problems associated with urinary impairment. For most people with MS, symptoms are helped significantly by taking an oral antimuscarinic before going to bed. Sometimes difficulties persist and desmopressin at night may be effective as it reduces the volume of urine produced overnight by the kidneys (when they are at their most productive). Its action lasts for 3-6 hours and it is safe when taken precisely as instructed. Desmopressin is usually taken as a spray. It can be used during the daytime but it is essential that the user realises the possible dangers of retaining too much water if it is used more than once in 24 hours. It should not be prescribed to people over 65.

Patients suffering from retention may need to learn self-catheterisation and there is some evidence that α -adrenergic antagonists may provide some benefit^{89,120}.

2.6 Bowel Dysfunction

2.6.1 Background

Bowel symptoms in MS include constipation, bowel urgency, and bowel incontinence. Loose stool that isn't caused by some type of infection or medication is usually the result of impaction or stool blockage, whereby looser stool from higher in the digestive tract leaks out around the impaction. Constipation is the most common bowel symptom, and is defined as infrequent, incomplete, or difficult bowel movements.

2.6.2 Assessment: Role of the MS Nurse

Managing dysfunction begins with assessment by an experienced health professional followed by ongoing collaboration with the individual to develop an approach which meets their particular needs. Factors that could contribute to constipation include poor mobility, voluntary fluid restriction to minimise urinary incontinency, anticholinergic drugs taken for concomitant bladder symptoms and poor dietary habits. Faecal incontinency may arise as a result of diminished perineal and rectal sensation, weak sphincter squeeze pressures, faecaloma leading to rectal overloading and overflow, or any combination of these factors.

Botulinum toxin

For the treatment of OAB, botulinum toxin is diluted in saline and during cystoscopy injected in small quantities into the detrusor muscle, avoiding the triogene. Analgesia, e.g. through inhaled anaesthetic such as nitrous oxide is provided and patients must be taught self catheterisation as an increase in post-void volume can occur.

2.6.3 Management

Although general recommendations for management of bowel dysfunction in MS include maintaining a high-fibre diet, high fluid intake, regular bowel routine and the use of enemas or laxatives, the evidence to support the efficacy of these recommendations is scant¹³¹. Long-term pharmacological treatment to prevent bowel dysfunction is not recommended and can lead to habituation. However, pharmacological treatment cannot always be avoided¹³².

Sacral nerve stimulation has been used for the treatment of faecal incontinence¹³³. This procedure has not been systematically studied in MS, but may lead to substantial benefit in some patients.

2.7 Sexual Dysfunction

2.7.1 Background

Normal sexual function involves a complex series of physical and psychological factors that are easily disturbed in a chronic disease such as MS. Sexual problems are not only distressing but can have a large impact on QoL for both patients and their partners¹³⁴. The most prevalent sexual complaint in men with MS is erectile dysfunction (ED), which has been estimated to affect up to 70% of patients^{135,136}.

2.7.2 Assessment: Role of the MS Nurse

The MS Nurse can approach sexual health and well-being in a number of ways. A first step may be to normalise the topic with an open question; for example “Many people with MS find they have some problems with sexual function and it is a very common problem - have you experienced any issues”. This can bring an opportunity to begin immediate discussion about the issues of sexual and personal relationships, or allow for the person to come back to you when they feel able. Information about locally available counselling and support services can also be made available. The individual and any partner(s) should be offered an opportunity to see a specialist in sexual problems for advice on lubricants and the use of sexual aids, and for general information regarding sexual relations¹³⁷.

4.8.3 Management

Treatments for sexual dysfunction in patients with MS of both genders are, in the main, the same as for the general population and largely depend on the aetiology of the problem. Oral phosphodiesterase 5 (PDE5) inhibitors can be prescribed for patients with ED and there is evidence to suggest that sildenafil can be effective in both sexes at doses up to 100 mg, although the data in men are more robust¹³⁸. Tadalafil has the advantage of being effective for up to 36 hours which may mean less planning and pressure to have sexual intercourse to a schedule. In an Italian study, 78% of men with MS responded to 10-20mg doses of tadalafil, with statistically significant improvements in erectile function and in sexual satisfaction scores¹³⁹.

A variety of topical lubricants, gels and creams are available to overcome vaginal dryness, and androgen therapy with such compounds as methyltestosterone or dehydroepiandrosterone can help to increase libido, particularly in women with low androgen concentrations¹⁴⁰. However, long-term use of these latter compounds is not advised due to their side effect profile.

2.8 Depression

2.8.1 Background

Depression may be experienced by over one-half of people with MS at some point in their lifetime⁸⁹. Depression may be related to underlying disease processes, the challenge of living with MS, DMT therapy, or a combination of these⁸⁹.

2.8.2 Assessment: Role of the MS Nurse

People with MS should be assessed for depression during routine clinic visits, and urged to report symptoms to their MS Nurse and/or their general practitioner⁸⁹. Specific tools/scales are available to detect depression, and assess the severity/need for therapy. Anxiety state is an important factor to consider as it is an indicator of depression risk, which is highest the first 5 years after diagnosis. Studies have found positive correlations between anxiety scores and depression scores, indicating that the two conditions are related. Anxiety has also been shown to be prominent in the period surrounding MS diagnosis disclosure, particularly in women^{141,142}.



People with MS should be assessed for depression during routine clinic visits, and urged to report symptoms to their MS Nurse and/or their general practitioner.

2.8.3 Management

Pharmacologic therapy for depression should be initiated when indicated, and may commonly be with an SSRI or tricyclic antidepressant.

Adverse events with SSRI therapy include decreased appetite, somnolence or sleep disturbances, dizziness and tremor, nausea, dry mouth, constipation, diarrhoea, asthenia, increased body weight and sexual dysfunction. Rarely, a neuroleptic malignant syndrome-like event may occur when starting therapy with an SSRI. Symptoms include hyperthermia and rigidity, myoclonus and confusion.

The tricyclic antidepressants are associated with anticholinergic side effects including dry mouth, dilated pupils, hyperpyrexia, urinary retention and constipation. Other events may include dizziness, weakness and anxiety/insomnia.

2.9 Cognition

2.9.1 Background

Some degree of cognitive impairment is noted in approximately 45–65% of patients with MS¹⁴³. The impairment may start at early stages of the disease and cognition continues to deteriorate with disease progression¹⁴⁴. The main symptoms of these deficits include problems with concentration, mental exhaustion and fatigue, spurious actions, learning difficulties and forgetfulness.

2.9.2 Management

There are no approved drugs for treatment of cognitive deficits in MS. Off-label use of donepezil in 69 people with MS has been reported to have positive effects but this could not be confirmed in a larger trial¹⁴⁵. A study with memantine was terminated early following evidence of treatment-related worsening of neurological symptoms¹⁴⁶. Rivastigmine has shown no significant effects on cognitive problems in MS patients in smaller studies so far, but is currently being investigated in a larger multicentre study with 200 patients¹⁴⁷.

2.10 Pain

2.10.1 Background

Pain is experienced by more people with MS than was previously thought⁸⁹; the most recent estimates suggest around one-half of patients experience a range of symptoms¹⁴⁸ (*Table 5*).

Type	Examples and frequency	Pharmacologic Management
Acute	Paroxysmal pain	Anticonvulsants
	Trigeminal neuralgia (1.9–3%)	Anticonvulsants or antispasmodics
	Lhermitte's phenomenon (>25%)	Surgical procedures
	Dystonic spasms (10–20%)	
Chronic	Low back pain	Anticonvulsants
	Dysesthetic extremity pain	Nonsteroidal anti-inflammatory drugs
	Spasms, cramps (common)	Opioid narcotics
	Complex regional pain syndrome (rare)	Nerve blocks, tricyclic antidepressants

Table 5 – Pain syndromes in multiple sclerosis⁸⁹

Acute pain may worsen, or become more frequent as MS progresses. Paroxysmal pain may occur at any site depending on the nerve affected; **trigeminal neuralgia** may occur in up to 3% of patients⁸⁹.

2.10.2 Management

Many therapies used for pain in people with MS is based on clinical experience rather than evidence from large scale clinical trials¹⁴⁸, and a number of agents are used (*Table 6*).

Agent	Common uses in multiple sclerosis*	Common adverse effects
Anticonvulsants		
Carbamazepine	Trigeminal neuralgia Lhermitte's sign paroxysmal pain‡	Altered taste Ataxia Bone marrow depression Constipation Diplopia Dizziness Dysarthria Gastrointestinal upset Hyponatraemia Impaired alertness Sedation
Lamotrigine	Trigeminal neuralgia	Ataxia Blurred vision Diplopia Dizziness Headache Insomnia Irritability
Pregabalin	Central neuropathic pain Paroxysmal pain Trigeminal neuralgia	Blurred vision and loss of visual acuity Dizziness Vertigo Drowsiness/fatigue Mood changes Ataxia/tremor Gastrointestinal upset ¹⁴³ .
Gabapentin	Central neuropathic pain Lhermitte's sign Paroxysmal pain Trigeminal neuralgia	Ataxia Diplopia Fatigue Gastrointestinal upset Nystagmus Sedation Tremor
Clonazepam	Paroxysmal pain	Ataxia Dizziness Lethargy Sedation
<i>Tricyclic antidepressants</i>		
Amitriptyline	Central neuropathic pain	Blurred vision Constipation Drowsiness Dry mouth Sedation Urinary retention
<i>Muscle relaxant</i>		
Baclofen	Painful tonic spasms Trigeminal neuralgia	Dizziness Fatigue Gastrointestinal upset Seizures Transient drowsiness Weakness

* Some medications may not be available in all countries; not necessarily based on published studies.
 ‡ Paroxysmal pain refers to short, frequent and stereotyped pain with a sudden onset (ie. Lhermitte's sign or paroxysmal pelvic pain)

Table 6 – Drugs commonly used in the treatment of pain syndromes in MS¹⁴⁸

For acute paroxysmal pain anticonvulsants represent first line therapy; examples of drugs used include carbamazepine, gabapentin, pregabalin, levetiracetam or lamotrigine¹⁵⁰.

Carbamazepine may cause leucopenia, thrombocytopenia and more rarely, agranulocytosis and anemia. Therefore a pre-treatment blood count is usually recommended¹⁵¹. Patients should also be advised to report any signs or symptoms suggestive of infection (e.g. fever, sore throat) or bruising/skin reactions to their doctor¹⁴⁹. Because of the risk of liver function abnormalities it is also usual to check liver function tests before therapy, and periodically during therapy¹⁵¹. Patients treated with carbamazepine may suffer more adverse events than those treated with gabapentin or lamotrigine, and discontinuation may be more frequent¹⁴⁸.

Pregabalin is a therapy approved for peripheral and central neuropathic pain. The usual dose is 150 mg per day given as two or three divided doses which can be increased to 300 mg per day after 3 to 7 days, and if needed, to a maximum dose of 600 mg per day after an additional 7-day interval. The adverse events with pregabalin are similar to gabapentin and for people with MS receiving pregabalin it is important to consider whether any visual symptoms are adverse events of therapy, or secondary to their MS. The higher doses of gabapentin used for neuropathic pain can result in events being more frequent or severe than with pregabalin - although comparative studies have not been done in people with MS.

Treatment of neuropathic pain in people with MS is highly individualised⁸⁹; for acute paroxysmal pain combination therapy may be required, while trigeminal pain may be treated with anticonvulsants or antispasmodics such as baclofen or misoprostol^{89,150,154}. Small studies of treatment options for trigeminal neuralgia suggest that the majority of patients may gain benefit from therapy (carbamazepine, gabapentin, lamotrigine)¹⁴⁸. Tricyclic antidepressants may also be used for neuropathic pain, although adverse events can be wide ranging and significant (see section Depression)¹⁵⁵. For those who fail to respond to pharmacotherapy, surgical procedures or microvascular decompression may be considered¹⁴⁸.

Overall it has been suggested approximately 50% of patients may respond to first line anticonvulsant therapy for neuropathic pain syndromes in MS, however response is highly variable between patients, and requires ongoing review and assessment¹⁴⁸.



Approximately 50% of patients may respond to first line anticonvulsant therapy for neuropathic pain syndromes in MS.

Lhermitte's sign is a sensation of 'electric shock' like tingling experiences throughout the body, often down the spine when the patient bends their head⁸⁹. It may occur in one-quarter to one-third of people with MS which if troublesome can be treated with surgery⁸⁹.

Chronic neuropathic pain is also common in people with MS and, like acute neuropathic pain, anticonvulsants are the usual first-line therapy, with NSAIDs, opioids, tricyclic antidepressants or nerve block^{89,150}. Dystonic spasms can cause both acute and chronic pain and antispasmodics (see section 'spasticity') can provide relief.

Depending on local clinical practice, patients with chronic pain may be able to attend a specialist Pain Clinic for assessment and management. Pain Clinics vary in the treatment/therapies offered and not all centres will have a specific pain clinic.

2.11 Role of Complementary & Alternative Medicine

Complementary and alternative medicine (CAM) refers to those forms of treatment which are not widely in use by orthodox healthcare professionals. Complementary refers to those treatments that are used in conjunction with orthodox medicine. Alternative refers to those treatments that are used instead of more conventional approaches.

Between one-third and two-thirds of people with MS will use complementary and alternative medicines, for many reasons and often as an adjunct to conventional therapy¹⁵⁶. Many of those who use complementary and alternative medicines claim to derive benefit from these therapies including diet, omega-3 fatty acids and antioxidants¹⁵⁶.

There are few trials of these agents; however some have been shown to interact with conventional therapy (for example, St Johns Wort taken with orthodox SSRI can cause serotonin shock syndrome) (*Table 7*)¹⁵⁶. Patients should be given evidenced-based information on CAMS so that they can make informed choices and be advised to report use of complementary therapies to their MS Nurse or clinician, to ensure safety and prevent potentially dangerous interaction.



Between one-third and two-thirds of people with MS will use complementary and alternative medicines; individuals should be encouraged to report use to their MS Nurse or clinician.

Agent	Origin	Comments
Omega-3 fatty acids	Essential fatty acid which must be obtained in the diet (e.g. flax, soya, fish and fish oils such as mackerel and salmon).	One clinical trial has suggested a trend towards reduced EDSS scores, however there were study limitations. Appears to be safe, with mild indigestion and gastrointestinal upset reported.
Lipoic acid	Antioxidant and dietary supplement.	Has been shown in a small study to improve markers of inflammation in people with MS. Mild gastrointestinal effects and headache are the most common adverse events.
Ginko biloba	Traditional Chinese herbal remedy.	Although a suggested beneficial effect on cognition is controversial, there is some limited evidence of an effect in people with MS. Well tolerated.
Ginseng	Traditional Chinese herbal remedy.	Suggested to decrease fatigue, although effects in MS patients have not been proven. Large doses can cause adverse effects (hypertension, nervousness, irritability and insomnia).
Green tea	Suggested to have immunomodulatory effects	Limited, if any clinical studies in MS patients, but studies have been started. Generally well tolerated, although high doses used in cancer studies have caused liver dysfunction.
Vitamin D	Vitamin, produced in the skin from exposure to UV light. Low levels (both intake and serum) associated with an increased prevalence of MS in epidemiological studies.	Clinical studies to assess the effect in patients with MS are ongoing. Some centres are advocating supplementing with 1000iu per day and in particular during winter months
Cannabis	May improve pain and spasticity The active ingredient, THC, may be available as a controlled substance in some countries (e.g. to improve appetite in AIDS patients and as an antiemetic in cancer patients)	Studied in several randomised trials in MS-related spasticity. Overall therapy was well tolerated and improved patients self-reports of spasticity, however objective measures did not improve.
St John's Wort	Thought to have anti-depressant activity, and a meta-analysis reported superiority to placebo and equivalence to conventional anti-depressants ¹⁵¹	Generally well tolerated, but can cause photosensitivity and also interact with other medications through cytochrome P450.
Diet	Many 'MS diets' exist, usually suggesting low-fat and/or high fish consumption.	Evidence is limited and it is important to ensure suggested diets do not impair overall nutritional status.

Table 7 – Common complementary and alternative medicines¹⁵⁶

4.13 Summary



- In addition to DMT, people with MS may require therapy to improve symptoms of MS which are both common and troublesome.
- If untreated these symptoms worsen quality of life and have a significant impact on the ability to maintain activities of daily living.
- The treatment options for symptom management in MS are often based on clinical experience rather than large clinical trials.
- It may be necessary to seek advice from other specialists for complex cases, for example a urologist for bladder problems.

Symptoms	Treatment	Nursing Considerations
Fatigue	<ul style="list-style-type: none"> CNS stimulants (pemoline, modafinil) Amantadine Selective serotonin reuptake inhibitors (SSRIs), eg fluoxetine 	<ul style="list-style-type: none"> Restlessness or sleep disturbance may occur Help patients with dosing schedule, titrate dose up
Bladder dysfunction	<ul style="list-style-type: none"> Anticholinergics (eg oxybutynin) Antimuscarinics (eg tolterodine) α-Blockers (eg terazosin) 	<ul style="list-style-type: none"> Determine if urinary tract infection is present Monitor retention Monitor fluid balance Follow overall elimination pattern consider contribution of other medications Provide strategies to avoid side effects eg dry mouth
Bowel dysfunction	<p>Constipation</p> <ul style="list-style-type: none"> Stool softeners Bulk-forming agents Mini-enemas Stimulants Suppositories 	<ul style="list-style-type: none"> Urgency/diarrhea Bulk-forming agents Anticholinergics Antimuscarinics <ul style="list-style-type: none"> Provide bowel training regimens; many of the medications should not be used long-term Consider contributory effects of their medications eg steroids or antibiotics Consider lifestyle issues Encourage exercise Provide diet counselling
Pain	<ul style="list-style-type: none"> Anticonvulsants (phenytoin, carbamazepine, gabapentin, lamotrigine) Tricyclic antidepressants (amitriptyline, nortriptyline) Duloxetine hydrochloride 	<ul style="list-style-type: none"> Watch for sedation Start with low dose and titrate up Monitor outcomes; alter treatment as necessary; supportive measures can help
Spasticity	<ul style="list-style-type: none"> GABA antagonists (oral or intrathecal baclofen) α-Agonists (tizanidine) Anticonvulsants (diazepam, clonazepam, gabapentin) Botulinum toxin 	<ul style="list-style-type: none"> Time doses to maintain therapeutic blood levels Titrate doses up (especially with baclofen) Watch for sedation or cognitive symptoms; may require a change in dosage or medication Combination treatments may help Intrathecal baclofen requires surgical insertion of a programmable pump
Depression	venlafaxine, bupropion)	(may cause fluid retention)

Table 8 – Therapies which may be used for symptom management

- The MS Nurse should be aware of the symptoms a patient may experience, and be prepared to ask about potentially ‘personal’ symptoms that patients may be reluctant to raise themselves.
- This requires the nurse to build a relationship based on trust and to be aware of the potential treatment options.
- In addition patients may commonly decide to take complementary and alternative remedies; it is important the patient’s MS care team is made aware of these therapies in order that appropriate advice can be given if required.



Reflective learning point

How do you assess severity of symptoms in people with MS and, therefore, decide if recommendation for pharmacological intervention is required?

What strategies do you employ to ensure your patients are reporting all their symptoms and the severity of their symptoms?

What factors influence your choice of management of symptoms associated with MS?

3 Non-Pharmacologic Management of Symptoms

3.1 Introduction

Intro

MS is associated with multiple symptoms which will have a huge impact on the well-being of the person with MS, their families and their quality-of-life. This section will review the non-pharmacologic therapies recommended to manage the symptoms of MS, with the goal of improving or maintaining function and preserving the person's quality-of-life. The MS Nurse can help an individual's self-care through therapeutic partnership, fostering treatment in a team-patient relationship, educating patients and caregivers, helping to enhance the patient's support network, and setting realistic goals^{158,159}.



The MS Nurse can help an individual's self-care through therapeutic partnership, fostering treatment in a team-patient relationship, educating patients and caregivers, helping to enhance the patient's support network, and setting realistic goals.

During initial consultations with the person with MS, it is important that the MS Nurse completes a comprehensive review of physical and emotional symptoms. Information should be sought on the effects of MS on mobility, vocational ability, the need for aids or adaptations and the availability of personal support. It is important for the MS Nurse to look beyond the perceived need of an individual to their actual need.

3.2 Fatigue

The management of MS fatigue can help improve quality of life for people with MS at any stage of life. Other symptoms, such as depression, being in pain, or sleep disturbance from bladder problems or spasms, can all worsen fatigue. Fatigue may also be the result of inactivity, poor diet, stress or an infection. Some medications can increase drowsiness and worsen fatigue. This applies to all types of treatments - prescription, over the counter, alternative and illicit - regardless of whether they are being used to treat MS or not. Of the drugs for MS symptoms, treatments for spasms, stiffness and pain can be associated with an increase in fatigue.

A thorough assessment by the nurse should include looking at diet, fitness, sleep, activity, depression and stress, heat, thyroid function, blood counts and MS status (exacerbation or worsening of MS) (Table 9).

Assessment of Fatigue	
1.	Determine: <ul style="list-style-type: none"> ▪ The nature of fatigue ▪ If fatigue is a new symptom ▪ If symptoms of fatigue are continuous or intermittent, acute or chronic
2.	Identify possible contributing factors, such as: <ul style="list-style-type: none"> ▪ Relapse ▪ Medications ▪ Concurrent illness (eg infection) ▪ Level of activity ▪ Heat ▪ Lifestyle patterns such as <ul style="list-style-type: none"> sleep (exclude primary sleep disorders) diet exercise (types and levels of tolerance and endurance) ▪ Psychosocial issues ▪ Pain
3.	Assess the severity of fatigue
4.	Determine its effect on daily activities
5.	Determine the impact of fatigue on other MS-related symptoms
6.	Identify existing management strategies and coping behaviours

Table 9 – Assessment of fatigue

The next step is to implement strategies that will help manage the effects of fatigue (table 10). Fatigue management and energy conservation have been proposed as effective acute and long-term strategies to minimise fatigue in MS^{160,161}. Both approaches rely on a person reflecting on their own fatigue and the way that it affects their daily life. It does not take the fatigue away but aims to make living with fatigue easier:

Take frequent rests – The person with MS should try to balance activities with rests and learn to allow time to rest when planning a day's activities. Rest means doing nothing at all; frequent short rests are preferable to one long one. Also some people find relaxation helpful.
Prioritise activities – Suggest to the person that they try to put activities in order of priority so that those that must be done are completed before the person runs out of energy. Decide if jobs could be done by other people, consider outside help, and consider jobs that could be cut out of the daily routine or done less often, e.g. ironing.
Plan ahead – The person may find it helpful to make a daily or weekly timetable of activities that need to be done. Spread heavy and light tasks throughout the day. Set realistic targets and breakdown large complicated tasks into smaller stages that can be spread throughout the day.
Organise tools, materials and work area – This involves organising the work area for example the kitchen so that tools and objects that are in continual use like tea, coffee and crockery are placed at a height between hip and shoulder and heavy objects and less used items are placed from the hip to the floor.
Adopt a good posture – Activities should be carried out in a relaxed and efficient way minimising stress on the body, which will in turn save energy. Maintaining an upright and symmetrical posture during all tasks and resting on a perching stool while carrying out tasks if necessary. Avoid excessive twisting and bending.
Lead a healthy lifestyle – Exercise is essential but exercise should be balanced with rests. Physiotherapists can advise on specific exercises that may be relevant. Eat a well-balanced diet; further advice is available from dieticians. Avoid heavy meals or only plan a light activity afterwards ⁵¹ .
When appropriate referral to a sleep specialist

Table 10 – Management strategies for fatigue

Several additional nonpharmacological/complimentary approaches have been proposed (table 11), including physiotherapy¹⁶³, aerobic exercise¹⁶⁴, yoga¹⁶⁵ or cooling¹⁶⁶. The observed positive effects have been small, although these approaches did benefit from having no adverse side effects. More recently, a controlled trial has demonstrated that progressive resistance training can improve muscle strength and functional capacity in MS, and this is associated with improvement in fatigue, mood and quality of life¹⁶⁷.

Non-Pharmacological Interventions for Fatigue	
1.	Promote patient understanding of MS-related fatigue: <ul style="list-style-type: none"> Provide written information sources as appropriate
2.	Implement energy conservation strategies through: <ul style="list-style-type: none"> Referral to an occupational therapist Adaptations to home and work environments
3.	Encourage appropriate lifestyle modifications with regards to: <ul style="list-style-type: none"> Nutrition and fluid balance Sleep patterns Activity and rest patterns Temperature control cooling techniques environmental temperature control (e.g. air conditioning) avoiding temperature extremes Refer patient to a physiotherapist for: assistive devices
4.	Inform patient of the following therapies that may contribute to fatigue as well as their side effect profiles: <ul style="list-style-type: none"> Antispasticity medications Anticonvulsants Antidepressants Certain alternative medicines (e.g. chamomile, ginseng and sage)
5.	Advise patient to discuss ongoing evaluation of fatigue-management strategies with their doctor

Table 11 – Non pharmacologic approaches for managing fatigue

In addition to teaching these techniques, a fatigue management programme often involves counselling, liaison with statutory services and advice regarding access to disability resources. An occupational therapist can offer education regarding both fatigue management principles as well as practical problem solving which aims to address fatigue related distress at the level of activity and participation. Fatigue management education delivered in a face to face format in community settings has been found to significantly reduce impact of fatigue on daily life, improve QOL and increase self-efficacy in randomised trials¹⁶¹. Other ways of delivering the course such as by teleconference were also successful¹⁶⁸.



A fatigue management programme often involves counselling, liaison with statutory services and advice regarding access to disability resources.



Nursing tip

In what way might you work together with someone who has MS to assess the impact of their fatigue?

To begin with, I usually use a fatigue scale to confirm the presence and severity of the fatigue. I try to determine if it is physical (occurring after physical activity) or if it is more prominent after psychological efforts (for example, following tasks that demand concentration).

- How would you then enable them to effectively self-manage fatigue—what approaches would you suggest?

I ask the person to keep a fatigue diary for several weeks, listing all activities undertaken with a fatigue rating (eg. rating scale from 0-10, using a visual analogue scale that is simple and practical). I recommend patients make a clear plan for the day, to avoid trying to do too many things at one time. Eating small meals several times a day rather than one big meal later in the day can help lessen the effects of fatigue. It is also important to remember to drink regularly to avoid dehydration.

3.3 Cognition

As the healthcare professional with the most regular contact with people with MS, the MS Nurse plays a pivotal role in recognising the signs of cognitive problems, identifying the need to refer individuals for formal evaluation, and monitoring progress of these deficits and effectiveness of interventions.



The MS Nurse plays a pivotal role in recognising the signs of cognitive problems, identifying the need to refer individuals for formal evaluation, and monitoring progress of these deficits and effectiveness of interventions.

Although cognitive dysfunction is a sensitive area to broach with people with MS and their families, it is now generally accepted that openly recognising the problem is considerably more helpful than pretending it does not exist. Recognition allows constructive discussion and the learning of compensatory strategies¹⁶⁹.

Cognitive impairment is caused by MS lesions; however, secondary factors, such as depression, fatigue, medication effects, or comorbid conditions including thyroid, cerebrovascular, cardiopulmonary disease or sleep disorders may also contribute¹⁶².

People with MS may complain of having trouble concentrating, remembering daily job or home routines, and making decisions^{162,170}. However, an individual may not recognise subtle cognitive symptoms and should be asked whether they are having difficulty remembering appointments or conversations, understanding written material, or being easily distracted and having difficulty focusing on tasks¹⁷¹.

Several different questionnaires and testing batteries have been proposed for screening and evaluation of cognitive deficits in people with MS^{172,173}, but there is no general consensus on which questionnaires and tests are most beneficial.

Cognitive impairment may be improved by addressing secondary causes and comorbid conditions, and by limiting distractions and organising tasks at home or work¹⁶². Recent evidence suggests that a “mentally active lifestyle” could potentially prevent or slow further cognitive decline¹⁷⁴. Counselling may be beneficial in helping patients and family members to understand and accept deficits, develop coping strategies, learn how to take advantage of strengths to compensate for impairments, and adjust expectations¹⁷⁵.



Nursing tip

What might you look for, and what questions might you ask, when assessing for signs/indicators of difficulties with cognition?

There are a number of things I look out for in my patients including:

- Are they following my instructions regarding their medication?
- Are they missing any of our scheduled appointments?
- Are they having any difficulty taking part in our discussions?
- Has the carer/patient reported any changes in behaviour (memory, concentration, ability to follow instructions)?

When discussing cognitive problems with my patients, I explain some of the things that MS patients report (for example, memory problems and problems with concentration). I then ask the person if they have experienced any of these things. In normal circumstances, the discussion will lead on from here and I am able to ask, for example, about any possible problems at work / household issues etc.

I also explain that fatigue can sometimes cause cognitive problems, but that these problems disappear after rest; heat can also have a similar effect - for example, in Finland people love saunas and afterwards there can be fatigue and some cognitive problems which will resolve with time.

MS Nurses may help people with MS and their families adjust to cognitive deficits. *Figure 5* lists strategies that have proved helpful in the management of cognitive problems. Nurses could suggest these strategies to patients and their families and work with them to overcome some of the problems presented by cognitive impairment.



MS Nurses may help people with MS and their families adjust to cognitive deficits. Nurses could suggest strategies to patients and their families and work with them to overcome some of the problems presented by cognitive impairment.

Strategies to Help Cope with Cognitive Deficits

1. Make lists (eg, shopping, “to do”)
2. Use calendars for appointments and reminders for events; develop a consistent daily routine
3. Develop a memory notebook to log daily events, reminders, messages, driving directions
4. Organise the environment so that items used regularly remain in familiar places
5. Modify the learning environment for patients’ comfort (eg, heat, light, etc)
6. Schedule the teaching session for early in the day, and limit it to a short period of time to minimise fatigue
7. Conduct conversations in quiet places to minimise distractions
8. Repeat information, and write down important points
9. Use simple, step-by-step instructions—include the obvious
10. Follow verbal instructions with written backup, and use visuals (ie, diagrams, pictures) when possible
11. Involve care partners in instructions (ie, follow-up phone call to care partner, family at home)
12. Teach basic organisation skills
13. Openly discuss concern about cognitive dysfunction
14. Have the care partner monitor the patient for safety
15. Keep the patient mentally stimulated (eg, puzzles, word finds, computer games)
16. Introduce change slowly, one step at a time

Figure 5 – Strategies to help cope with cognitive deficits

Management of cognitive impairment is difficult and cognitive rehabilitation in MS is in its relative infancy¹⁷⁶, although nonpharmacological therapeutic procedures, particularly types of cognitive training, have been shown to be at least partially effective¹⁷⁷⁻¹⁷⁹.

3.4 Bladder Dysfunction

Poor bladder control is very disabling and many regard this as one of the worst aspects of their MS¹⁸⁰. Unpredictable urinary urgency, frequency and a danger of incontinence will make a person unwilling to venture out, and housebound, when access to toilets is uncertain.



Poor bladder control is very disabling and many regard this as one of the worst aspects of their MS.

The MS Nurse is likely to be in a position to initiate the process of identifying urological dysfunction. The evaluation can be started by reviewing symptoms recorded in the patient's medical records over time (*table 12*). Along with the use of a voiding diary and a check of the patient's post-void residual at the time of each visit, this can aid the MS nurse in recognising which urinary dysfunction could be affecting the patient¹⁸¹.



The MS Nurse is likely to be in a position to initiate the process of identifying urological dysfunction.

Assessment of Bladder Dysfunction	
1.	Determine the nature of the bladder problem: <ul style="list-style-type: none"> ▪ Describe symptoms <ul style="list-style-type: none"> frequency urgency hesitancy burning and discomfort incontinence retention and nocturia ▪ Determine onset and duration of symptoms
2.	Categorise bladder dysfunction into one of the following categories according to the presenting symptoms: <ul style="list-style-type: none"> ▪ Failure to store ▪ Failure to empty ▪ Combination failure to store and failure to empty
3.	Identify possible contributing factors, such as: <ul style="list-style-type: none"> ▪ Concurrent medical conditions (eg urinary tract infection, other infections, constipation) ▪ Medications ▪ Reduced mobility ▪ Nutrition and fluid intake ▪ Lifestyle issues
4.	Assess the impact of the bladder dysfunction on the following aspects of daily living: <ul style="list-style-type: none"> ▪ Sexual activity ▪ Recreation/social activities ▪ Employment ▪ Quality of life
5.	Identify existing management strategies and coping behaviours

Table 12 – Assessment of bladder dysfunction

Non pharmacological treatments involve the use of pelvic floor muscle training (Kegel exercises), stimulation, biofeedback, pessaries, bladder retraining, and sometimes **intermittent catheterisation** (*table 13*).

Non-Pharmacologic Interventions for Bladder Dysfunction	
1.	Rule out urinary tract infection through urinalysis and urine culture
2.	Instruct the patient to keep a 24-hour "urolog" (ie log of fluid intake-output)
3.	Perform a post-void residual (PVR) test <ul style="list-style-type: none"> ▪ Ensure the patient consumes 2 litres of fluid the day prior to the test ▪ Instruct the patient to drink two 240 ml glasses of fluid on the day of the test ▪ Instruct the patient to void and measure urine volume prior to PVR ▪ Measure PVR by intermittent urinary catheterisation or use a bladder scanner (ultrasound)
4.	Educate the patient on the role of medications and intermittent catheterisation in controlling symptoms
5.	Instruct the patient to perform clean, intermittent catheterisation (if the patient is willing and able and if PVR is greater than 100 ml)
6.	Assist the patient to develop a drinking and voiding schedule
7.	Educate the patient about factors that may influence symptoms, such as: <ul style="list-style-type: none"> ▪ Caffeine ▪ Aspartame ▪ Alcohol ▪ Infection ▪ Constipation
8.	Refer patient to a urologist if symptoms remain unmanageable or if complications develop or are suspected

Table 13 – Non pharmacologic approaches for managing bladder dysfunction

The UK consensus statement on the management of the bladder in MS¹⁸² stated that successful management could be achieved based on a simple algorithm which includes testing for a urinary tract infection and measurement of the post micturition residual urine volume. Obtaining a detailed urinary history, often combined with the keeping of a micturition diary, can also be valuable in determining the source of MS-related bladder dysfunction. This is in contrast with guidelines from other countries that recommend cystometry.

Intermittent catheterisation

Intermittent catheterisation is a technique for managing urinary problems related to insufficient emptying of the bladder. The aims of intermittent catheterisation are to prevent infections, avoid residual urine in the bladder, improve bladder elasticity, promote continence and protect kidneys¹⁸¹. Catheterisation allows for complete emptying of the bladder at scheduled intervals, therefore frequency and nocturia can be significantly reduced. The nurse has the challenge of helping the patient accept intermittent catheterisation as a part of the rehabilitation process, as, if performed according to a prescribed schedule, it can promote improved bladder functioning.

Adequate information and through instruction by nurses help empower people to take control and master the treatment, which can potentially contribute to ongoing compliance and long-term urinary tract health. A major requirement for success with this technique is patient motivation. As a general rule, if patients are able to write and feed themselves they are likely to be able to perform the technique¹⁸¹.

The MS Nurse can also have an important role in teaching the person with MS behaviour strategies that aid in both evaluating and treating urinary dysfunction. The MS Nurse is often the primary instructor of techniques related to intermittent catheterisation procedures.

3.5 Bowel Dysfunction

Bowel dysfunction is common in people with MS. An online survey of 155 people with MS suggested that few strategies employed by patients resulted in successful bowel management and that there was a need for high-quality research on all aspects of managing bowel dysfunction in MS in order to improve patients' QoL¹⁸³.

Although general recommendations for management of bowel dysfunction in MS include maintaining a high-fibre diet, high fluid intake, regular bowel routine and the use of enemas or laxatives, the evidence to support the efficacy of these recommendations is limited¹⁸⁴ and reflected by poor patient satisfaction¹⁸³. Biofeedback retraining has been shown to be effective treatment in some patients, particularly those with limited disability and a nonprogressive disease course¹⁸⁴ (*table 14 and 15*).

General interventions the nurse should try and implement	
1.	Educate the patient about the causes of bowel dysfunction
2.	Adjust medication regimens that may be contributing to the bowel dysfunction
3.	Instruct the patient to take advantage of the urge to defaecate (this ensures regular emptying of the bowels) <ul style="list-style-type: none"> Educate the patient about the gastrocolic reflex that occurs 20-30 minutes after a meal
4.	Establish a regular bowel routine individualised for the patient <ul style="list-style-type: none"> Assist the patient in determining a regular time for bowel defaecation
5.	Encourage dietary changes such as: <ul style="list-style-type: none"> High-fibre intake Adequate fluid intake: 1.5-2 litres/day Regular mealtimes
6.	Encourage regular physical activity
Interventions specific to constipation	
1.	Encourage regular and consistent mealtimes and increased fibre intake
2.	Instruct the patient on correct positioning for adequate defaecation <ul style="list-style-type: none"> Patient should bend forward and elevate knees so that they are higher than hips (a footstool may be required)
3.	Advise on the following sequential therapies: <ul style="list-style-type: none"> Bulk-forming agents Stool softeners Therapies that may be used alone or in combination with bulk-forming agents or stool softeners

Table 14 – Interventions for constipation

Interventions specific to faecal incontinence / involuntary bowel movement	
1.	Ensure adequate evacuation of bowels on a regular basis
2.	Rule out bowel infection using stool cultures
3.	Avoid unnecessary use of antibiotics
4.	Educate patient to: <ul style="list-style-type: none"> Avoid bowel irritants such as: <ul style="list-style-type: none"> Alcohol Caffeine spicy foods other identified dietary triggers Use medication(s) for control of faecal incontinence/ involuntary bowel movement
5.	Recognise that anxiety and stress may play a role in this problem
6.	Provide ongoing evaluation of bowel dysfunction

Table 15 – Interventions for faecal incontinence

It may take several weeks for nonpharmacologic interventions to be effective. The person with MS should understand that the goal of the bowel programme is to have predictable regular eliminations with a soft, formed stool, which decreases the problems of constipation or faecal incontinence. Another goal of an adequate bowel training programme is the long-term avoidance of the need for strong laxatives and enemas.

3.6 Speech and Swallowing

Dysarthria and dysphagia may or may not occur at the same time. The speech and language pathologist specialises in evaluating and treating speech, communication, cognitive, and swallowing problems. Dysphagia evaluation may include videofluoroscopic or barium swallow studies to track the movement of food during swallowing. Treatment is rehabilitative and educational. Changing the head or body position during eating may relieve the symptom. Eating smaller quantities at any one time may reduce fatigue and choking.

3.7 Spasticity / Mobility

The assessment and management of spasticity requires expertise, and the involvement of a multidisciplinary team. Treatment is primarily physical, and supplemented by pharmacological treatments, which can be systemic or focal. Management strategies should be goal directed, and targeted to the needs of the individual.



The assessment and management of spasticity requires expertise, and the involvement of a multidisciplinary team. Treatment is primarily physical, and supplemented by pharmacological treatments.

Two core principles of spasticity management are:

1. Optimising an individual's posture and movement through use of appropriate seating, stretching and exercise programmes¹⁸⁵.
2. Preventing or managing factors that may increase spasticity and spasms (see below). These procedures are paramount in the management of spasticity irrespective of other treatment options used¹⁸⁵.
 - **Optimising bladder and bowel management:** Any change, such as urinary retention or infection, constipation or diarrhoea, can trigger an increase in spasms. Resolving these issues is important before considering changing other aspects of spasticity management such as drug regimes.
 - **Maintaining skin integrity:** Preventing skin irritation, breakdown, infection and pressure sores minimises the risk of triggering spasticity.
 - **Maximising hygiene:** Good hygiene not only promotes healthy skin but also identifies other spasticity trigger factors such as ingrown toenails, deep vein thrombosis (DVT) or tight fitting clothes or orthoses¹⁸⁶.

Painful spasms can be managed with stretching, transcutaneous electrical nerve stimulation (TENS) and application of cold compresses¹⁸⁷; however, evidence to support cold applications for treatment of spasticity is unclear. [Skilled rehabilitation strategies are recommended for both focal and generalised spasticity.](#)

These principles need to be regularly considered and reviewed over time and used in conjunction with medical treatments. Pivotal to their success is ongoing multidisciplinary teamwork across hospital and community settings working collaboratively with the person with spasticity to effectively manage their symptoms^{185,188}.

A spasticity management programme only works if the person is able to successfully implement it. Individual habits and preferences, such as the person's ability or desire to stretch regularly, can make or break a programme. At the same time, factors related to MS such as cognitive changes (difficulties with attention, concentration, comprehension, and recall), limited mobility, fatigue, or depression can make it very difficult for even a highly motivated person to commit to a treatment programme¹⁸⁹.

[Skilled rehabilitation strategies are recommended for both focal and generalised spasticity.](#)

Tightness and muscle shortening can be addressed with prolonged stretching, range-of-motion exercise, and posture and positioning changes. Range-of-motion exercise may also improve joint mobility and reduce the risk of joint contracture.

Management of weakness includes strengthening exercises and, where necessary, use of braces, splints, orthotics, and mobility aids. Exercises should be done in a cool environment and with attention to avoiding muscle fatigue. Biofeedback may help relieve hypertonicity and concurrent contraction of agonist and antagonist muscles. Relaxation may help with hypertonicity, and balance/coordination activities and timing exercises may help with co-contractions.

MS Nurses have a significant role in educating a person on managing trigger factors and about the available treatments to manage spasticity. They can provide ongoing support and advice to a person and their family as they live with, and adjust to, managing spasticity and spasms over time. In the context of spasticity, MS nurses may have any of the following roles, which will be dependent on their working environment:

- Recognition when spasticity becomes problematic, and initiating referral to community-based therapists/neurorehabilitation team.
- Education about spasticity triggers such as tight clothing.
- Provision and reinforcement of advice in spasticity management to patients.
- In some teams, the nurse may be able to prescribe systemic treatments.
- Assisting in the prevention and management of the complications of spasticity as part of the multidisciplinary team.



MS Nurses have a significant role in educating a person on managing trigger factors and about the available treatments to manage spasticity. They can provide ongoing support and advice to a person and their family as they live with, and adjust to, managing spasticity and spasms.

A person with MS who experiences reduced mobility should be assessed, preferably by a rehabilitation service. Firstly it's important to identify and treat any underlying impairment especially weakness, fatigue, spasticity, ataxia, sensory loss and loss of confidence. Rehabilitation usually involves task-related practice of a specific mobility activity or activities (for example, walking, transferring, using a wheelchair, climbing stairs). It may be possible to provide suitable equipment, including wheelchairs, driving equipment and adaptive technology (with training in its use). In addition, alterations to the environment may be possible, which will help maintain the individual's independence. It is also valuable to teach family carers how to safely assist with (or take over) tasks in support of everyday living¹⁸⁸.

3.8 Balance

Improving balance and gait involves many issues such as ataxia, strength, vision, spasticity, tremors, and fatigue¹⁹⁰. A multidisciplinary approach is important. Appropriate adaptive equipment can help maintain function as disability increases. However, people with MS may be reluctant to use assistive equipment and often need training and encouragement from the MS team, especially if safety is an issue. Using assistive devices can reduce fatigue and frustration, and patients will have the energy to accomplish more once they reach their destination.



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Improving fatigue and tremors and increasing endurance may help improve balance. Vestibular rehabilitation attempts to help patients adapt to balance problems and equipment has been designed to improve stability. Assistive devices, hand rails, and safety training can be considered to reduce the risk of falling.

Specific balance and gait interventions depend on the specific impairments that contribute to the problem. For example, maintaining postural control is an important outcome. Programmes such as Tai Chi, yoga, and aquatics may be helpful in maintaining gait and balance function.

9.10 Pain / Sensation

Pain is a complex, multidimensional phenomenon. It is an unpleasant experience, particularly when combined with the other symptoms of MS. It impacts upon many aspects of an individual's psychosocial and spiritual well-being and can be difficult for the individual to cope with.



Pain is an unpleasant experience, particularly when combined with the other symptoms of MS. It impacts upon many aspects of an individual's psychosocial and spiritual well-being and can be difficult for the individual to cope with.

Undiagnosed or sub therapeutically managed clinical depression, loss of sleep, mobility problems, financial insecurity, feelings of low self-esteem, all result in people finding it hard to manage their pain. This needs to be remembered when developing pain management strategies for people with MS. Pain intensity has been shown to be related to levels of fatigue and depression and impacts patients' QoL, limiting both their daily activities and their working life¹⁹¹. The importance of developing coping strategies is paramount and these can include relaxation, distraction, exercise regimes and the use of therapies that can be self-administered such as TENS and massage.

People with MS can experience pain due to problems other than their MS, so possible factors such as concurrent arthritis, rheumatism, previous injuries and surgery should be considered. Simply acknowledging that the pain is real is reassuring for some people with MS, particularly when many of them will have been told, sometimes by health professionals, that MS is not associated with pain.

When a person with MS presents with pain he/she should be assessed to identify the cause. This, along with impact on QoL and functioning, should be taken into consideration when devising a treatment plan (*table 16 and 17*). If pain remains unresolved it is advisable to refer them onto a specialist multidisciplinary pain team, if possible¹⁹².

Pain Assessment	
1.	Acknowledge and validate the person's pain experience
2.	Inform the person that there is a range of strategies used to provide pain relief
3.	Identify the nature of pain and its intensity by using the following: <ul style="list-style-type: none"> • Short-Form McGill Pain Questionnaire • Visual analogue scales • Faces pain scale
4.	Ensure that each site of pain is considered separately and try to establish the underlying cause.
5.	Obtain a pain history, discuss and review previous analgesic medication/interventions, and compliance.
6.	Identify possible contributing factors, such as: <ul style="list-style-type: none"> • Relapse • Poor access to health care • Immobility • Concurrent illness (eg osteoporosis, disc herniation, migraine) • Goals/activity (eg gardening, sport, physical employment) • Psychosocial issues • Other MS-related symptoms
7.	Explore, assess and analyse emotional and/or spiritual contributory factors that could be related to pain.
8.	Determine the impact of pain on the following <ul style="list-style-type: none"> • Daily activities • Sexuality • Employment • Other MS-related symptoms • Psychological wellbeing (eg depression, anxiety, fear) • Psychosocial wellbeing

Table 16 – Pain assessment

A thorough clinical and neurological examination is required and the use of a pain diary is recommended to document triggers, intensity, concomitant features, duration and pain-relief methods employed. Several studies have shown that visual analogue scales are the most appropriate method for recording pain severity (*figure 6*).¹⁹³⁻⁹⁵



Figure 6 – Example of a visual analogue scale to measure pain

To effectively manage MS pain a detailed evaluation is essential (*table 9 and 10*). Information required includes exploring previous pain experiences, the person's pain symptoms, onset, duration, frequency, location, the severity, its characteristics, relieving strategies and the impact on daily living activities. Anxiety, fear and depression do not necessarily increase the pain experience; however it does affect an individual's reaction to pain.

Pain Management	
1.	Explain and educate the person on the possibility of co-existing conditions contributing to chronic musculoskeletal pain: <ul style="list-style-type: none"> • Osteoporosis • Degenerative disc disease
2.	Refer patient to a physiotherapist and occupational therapist for assessment and rehabilitation interventions such as: <ul style="list-style-type: none"> • Assistive equipment • Seating, posture and gait training • Exercise
3.	Encourage the person to keep a pain diary to help identify pain variation periods throughout the day and night
4.	Explore pain management strategies <ul style="list-style-type: none"> • Resting for periods throughout the day • Restricting mobility • Regular medications • Support aids • Relaxation techniques • Hot packs/cold packs
5.	Acknowledge and discuss complementary therapies <ul style="list-style-type: none"> • Acupuncture • Reflexology • Yoga • Tai-chi • Massage • Relaxation • Visualisation • Aromatherapy • Reiki • Meditation

Table 17 – Pain management

3.10 Pressure sores

3.10.1 Introduction

Pressure sores, also referred to as pressure ulcers, bed sores, or decubitus ulcers, are areas of localised damage to the skin, which usually occur over bony prominences in any area of the body¹⁹⁶. Pressure sores may range from minor breaks to very large deep areas of dead tissues extending over many square centimetres; the skin can erode all the way down to the muscle, or even the bone. Once present they can be difficult to heal, and can cause general malaise and worsening of most impairments, and they carry a risk of generalised or localised infections.

3.10.2 Pathophysiology of Pressure Sores

When pressure of short duration is relieved, tissues demonstrate reactive hyperaemia, reflecting increased blood flow to the area. However, sustained high pressure leads to decreased capillary blood flow, occlusion of blood vessels and lymphatic vessels, and tissue ischaemia (see *figure 7*). These changes are ultimately responsible for necrosis of muscle, subcutaneous tissue, dermis and epidermis, and consequent formation of pressure ulcers¹⁹⁷.

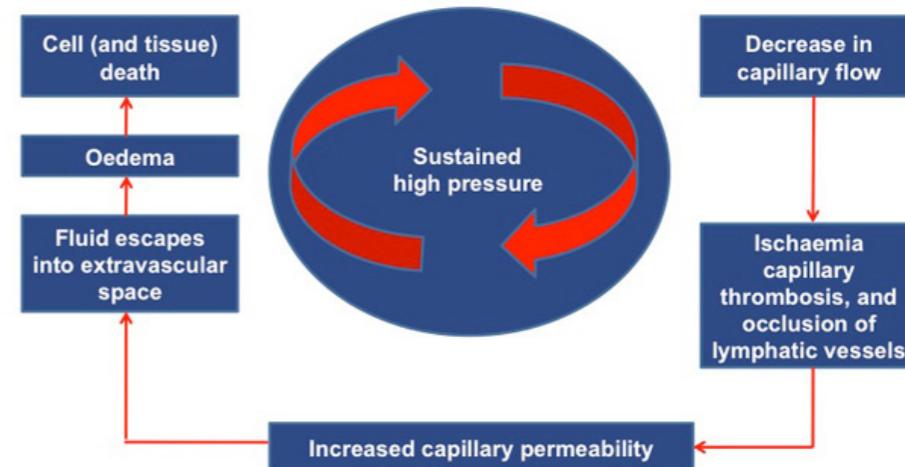


Figure 7 – Pathophysiology of pressure ulceration

The European Pressure Ulcer Advisory Panel (EPUAP) classification system¹⁹⁸ for pressure ulcers highlights that damage can be occurring even when the skin is not broken.

Grade	Evidence
1	Non-blanchable erythema of intact skin. Discolouration of the skin, warmth, oedema, induration or hardness may also be used as indicators, particularly on individuals with darker skin.
2	Partial thickness skin loss involving epidermis, dermis, or both. The ulcer is superficial and presents clinically as an abrasion or blister.
3	Full thickness skin loss involving damage to or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia.
4	Extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures with or without full thickness skin loss.

Table 18 – European Pressure Ulcer Advisory Panel (EPUAP) guide to pressure ulcer classification

3.10.3 What causes pressure sores?

Pressure sores are caused by a combination of factors both outside and inside the body. The three external factors which can cause pressure ulcers either on their own or in any combination are pressure, shear and friction.

While immobility is a primary cause, other factors also increase the risk of pressure sores. These include paralysis or spasticity, which can decrease mobility; numbness and loss of sensation, which can result in the inability to feel the friction or irritation; advanced age, which is often accompanied by decreased mobility; poor nutrition, which hinders healing of the skin; and incontinence, because moist, wet or soiled skin can exacerbate the irritation.

Additional factors that are known to place people at even higher risk of acquiring pressure ulcers include:

- neurologically compromised.
- obese or overweight.
- poor posture.
- using equipment, such as seating or beds, which does not provide appropriate pressure relief¹⁹⁹.

Pressure, shear and friction

Pressure is the most important factor in pressure ulcer development. Shearing occurs when the body weight is sliding against a surface, for example when poorly seated or sliding down a bed away from a back rest. Friction is caused when two surfaces rub together, often skin against a bed or a chair surface. Any moisture present on the skin as a result of excessive sweating or incontinence will exacerbate the problem - the effects of friction are up to five times worse if moisture is present.

3.10.4 Role of the MS Nurse in Managing Pressure Sores

Most pressure ulcers can be avoided by good anticipatory management. A systematic evaluation of risk factors will help to identify patients at risk of pressure ulceration. These individuals should be assessed regularly, and risk assessment scales should be used as an adjunct to, not a substitute for, clinical judgment²⁰⁰. Several risk assessment scales are currently used, including the Norton Scale, Waterlow scoring system and the Braden score, but vary in the risk factors assessed.

Patients and carers should be advised of warning signs that can increase the risk of developing a pressure ulcer. Questions the nurse should consider include:

- Are you eating or drinking less than usual?
- Is moving becoming more difficult?
- Is your skin regularly exposed to moisture?
- Is your skin prone to being very dry, sore or red?
- Have you been ill recently?
- Have you lost or gained a lot of weight recently?
- Has there been any change in your level of spasms?

Spasms can cause friction and shearing forces on the skin and a vicious cycle can be entered whereby the spasms cause the wound to worsen and the wound exacerbates the spasms. Every person with MS who uses a wheelchair should be assessed for their risk of developing a pressure ulcer¹⁹². The individual should be informed of the risk, and offered appropriate advice. Whenever they are admitted to hospital (for whatever reason), their need for pressure-relieving devices and procedures should be assessed. The assessment should be clinical, specifically taking into account the risk features associated with MS, and not simply the recording of a pressure ulcer risk score; it should lead to the development and documentation of an action plan to minimise risk (table 19).

Reduce pressure	When possible alter position, even slightly, every 20 minutes during the day. If seated this could take the form of rolling slightly from cheek to cheek in the chair.
Appropriate equipment – cushions & mattresses	This includes: bed, armchair, wheelchair, car seat, office chairs, all equipment when on holiday, hospital or away from home for any reason. Seek advice from a nurse or occupational therapist. Avoid any form of ring cushion as this can occlude blood vessels and cause pressure damage itself.
Nutrition	Eat a well-balanced diet. Advice and diet sheets can be obtained from a dietician. Even a short period of not eating well increases the risk of skin damage, particularly if the patient is unwell with flu for example.
Hygiene and skin care	Skin should routinely be kept clean and fresh. Avoid allowing skin to be wet. Check for red areas on the skin once or twice a day. Reddened areas should fade within minutes when pressure is relieved.
Transferring	Obtain good instruction and support in transfer techniques and correct use of equipment. Avoid sliding and pushing when this may result in friction.
Positioning	Learn correct positioning for comfort and pressure relief, particularly when seated.

Table 19 – Simple tips for the prevention of pressure ulcers

5.12 Summary



- Effective symptom management is an important component of therapy to maintain quality of life.
- Effective symptom management often requires a multidisciplinary team approach, including pharmacologic treatments as well as other more supportive approaches.
- It is important for MS Nurses to ask about and address symptoms of MS as part of the comprehensive management of the person with MS.



Reflective learning point

What do you feel are the most important management strategies to teach people with MS suffering from symptoms of fatigue and spasticity?

Describe how important symptom management is in your day to day role as MS Nurse?

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Accredited by the RCN and ICN, in association with the EANN

