

Urinary Dysfunction and MS



National
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Based on **Urinary Dysfunction and Multiple Sclerosis: A Clinical Practice Guideline for Professionals developed by the Multiple Sclerosis Council for Clinical Practice Guidelines.**

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Introduction

Normal bladder function is important not only for a person's overall health, but also for feelings of comfort and self-esteem. Fortunately, successful bladder management strategies are making it possible for people with MS to carry out their daily activities at home and at work with confidence — secure in the knowledge that they have their bladder function under control. These same advances have significantly decreased the incidence of bladder complications and the number of MS-related hospitalizations.

In order to achieve confidence and control, it is important to understand:

- How the normal bladder functions
- The changes that can occur in MS to interfere with normal bladder function
- The available treatments and management strategies to regain and/or maintain bladder comfort and control, and prevent unnecessary complications

This booklet can help you be an informed participant in your MS care. Keep in mind, however, that no two people with MS are exactly alike, and that healthcare providers may differ somewhat in their management of MS urinary symptoms.

Normal bladder function

This section explains how the urinary system works, and defines the technical terms in the rest of the text.

The purpose of the urinary system is to remove waste products from the blood and eliminate them from the body.

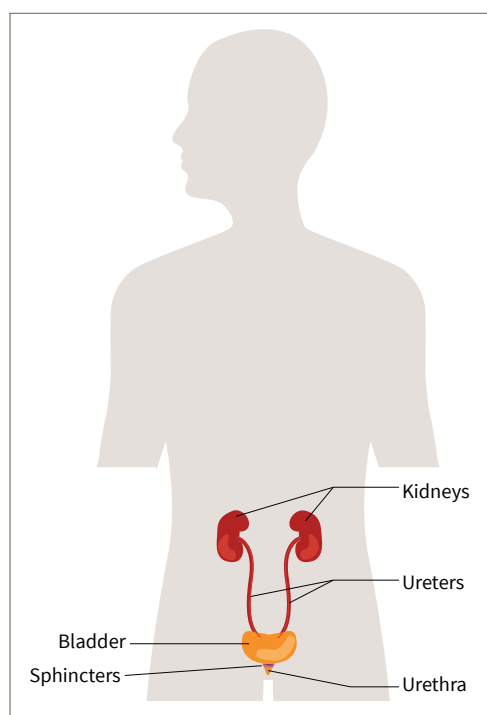
When the urinary system is functioning normally, the process of urination feels natural and controlled. Urine collects slowly in the bladder, causing it to expand. Once the bladder has accumulated four to eight ounces of urine, nerve endings in the bladder transmit signals to the spinal cord which, in turn, transmits signals to the brain that voiding needs to occur. The person experiences the need to urinate and makes a decision when and where to do so. As the person prepares to urinate, the brain relays a return signal to the spinal cord that triggers the voiding reflex. The voiding reflex causes two things to happen simultaneously:

- The detrusor muscle contracts to expel the urine from the bladder.
- The external sphincter relaxes and opens to allow the urine to pass freely into the urethra and out of the body.

Urinary system components

- **Kidneys** — organs that extract impurities and water from the blood to produce urine
- **Ureters** — thin tubes that carry urine from the kidneys to the bladder
- **Bladder** — elastic sac that stores the urine prior to voiding (urination)
- **Detrusor muscle** — muscular portion of the bladder that contracts to expel urine from the bladder into the urethra and out of the body
- **Internal and external sphincters** — circular bands of muscle fibers located between the bladder and urethra. The internal sphincter is controlled involuntarily and helps to keep the urethra closed, while the external sphincter can be relaxed and tightened consciously
- **Urethra** — tube that carries the urine from the bladder, through the meatus, to the outside of the body
- **Meatus** — external opening of the urethra in both women and men

Urinary tract system



Types of bladder dysfunction in MS

MS-related lesions (areas of inflammation, demyelination, scarring and/or neuronal damage) in the brain or spinal cord can disrupt this normal process by interfering with the transmission of signals between the brain and urinary system. Three primary types of bladder dysfunction can result:

Storage dysfunction

Failure to store urine is caused, in part, by an over-active detrusor muscle that begins to contract as soon as a small amount of urine has collected in the bladder. These contractions repeatedly signal the need to void, even though the bladder has not reached normal capacity. Because of demyelination, the spinal cord is unable to forward the signals from the bladder all the way to the brain. Without the involvement of the brain, the process of urination becomes less controlled. The urge to urinate becomes a reflex response to the frequent, repeated spinal cord signals. This type of storage dysfunction can result in the following symptoms:

- **Urgency** — inability to delay urination once the urge to void has been felt
- **Frequency** — need to urinate in spite of having voided very recently
- **Nocturia** — need to urinate during the night
- **Incontinence** — inability to control the time and place of urination

Emptying dysfunction

Demyelination in the area of the spinal cord that signals the voiding reflex can also result in a failure to empty the bladder. Although the bladder fills with urine, the spinal cord is unable to send the appropriate message to the brain (to signal the need to void) or to the external sphincter (to signal the need to relax). In the absence of voluntary control, the bladder continues to fill and expand. The eventual result is an enlarged, flaccid (overly relaxed) bladder, accompanied by the following symptoms:

- **Urgency**
- **Dribbling** — uncontrolled leakage of urine
- **Hesitancy** — delay in ability to initiate urination even though the need to void is felt
- **Incontinence**

Combined dysfunction

Failure to store in combination with failure to empty (formally known as **detrusor-external sphincter dyssynergia**) results from a lack of coordination between muscle groups. Instead of working in coordination with one another (with the detrusor contracting to expel urine while the external sphincter relaxes to release it), the detrusor and external sphincter contract simultaneously, trapping the urine in the bladder.

The resulting symptoms can include:

- **Urgency**
- **Dribbling**
- **Hesitancy**
- **Incontinence**

Urinary tract infection

In addition to these common types of bladder dysfunction, people with MS are at increased risk of urinary tract infections. Although anyone can develop an infection in the urinary tract, they are more common in people who are unable to fully empty their bladder. Urine that remains in the bladder over a prolonged period of time breeds excessive bacteria, eventually leading to infection. Storage of urine also allows mineral deposits to settle and form stones that promote infection and irritate bladder tissues. The symptoms of a urinary tract infection can include:

- **Urgency**
- **Frequency**
- **A burning sensation**
- **Abdominal and/or lower back pain**
- **Elevated body temperature**
- **Increased spasticity** — common symptom of MS caused by an abnormal increase in muscle tone that results in involuntary muscle stiffness and/or spasms
- **Dark-colored or cloudy, foul-smelling urine**

A person who has a urinary tract infection may also experience a **pseudoexacerbation** (also called a **pseudo relapse**). The infection and accompanying elevation in body temperature may cause other MS symptoms to flare temporarily, mimicking a true exacerbation, even though there is no underlying disease activity. Once the infection has been treated, these MS symptoms resolve and return to the person's pre-infection baseline. Thus

healthcare providers look for bladder symptoms or other evidence of infection when trying to determine if a person is having an exacerbation.

Diagnosis & treatment

Some of the same symptoms as described above can be caused by very different types of problems; symptoms alone cannot uncover exactly what type of bladder dysfunction is occurring. Further testing is required to identify the problem — and determine the appropriate treatment. Report any bladder changes to the physician or other healthcare professional who manages your MS. (In some settings it is the physician who manages urinary symptoms; in others, a nurse, nurse practitioner or physician's assistant (PA) is the primary contact person. The term "provider" will be used for the remainder of the booklet.)

Your provider will do the necessary tests and recommend a treatment regimen to relieve symptoms, prevent unnecessary complications, and allow you to be more comfortable and confident in your daily life.

There is no reason to feel embarrassment about discussing these problems with your provider. Most people with MS will experience urinary symptoms at one time or another. Prompt, open discussions with your provider are the fastest, safest and most effective way to manage urinary dysfunction,

prevent complications, and regain comfort and confidence. Your recommended strategy is to report any changes in urinary function — either positive or negative — at every visit to your provider.

Steps to diagnosis

Once you have described your symptoms to your provider, he or she is likely to take the following steps:

Screen

Screen for a urinary tract infection (UTI), since any or all of the symptoms listed above could be caused by a UTI and UTIs are common in MS. The two methods used to screen for a UTI are:

- **Urinalysis** — microscopic study of a sample of urine
- **Dipstick** — quick and convenient; the paper stick changes color in response to various indicators of infection in a urine sample. The dipstick technique is slightly less reliable than microscopic urinalysis
 - UTI should not be diagnosed with bacteria in the urine alone. Many people with MS (particularly people who catheterize) consistently have bacteria in the urine. For this reason the presence of white blood cells in the urine (known as pyuria) is a more accurate indicator of infection
- **Urine for Culture and Sensitivity (Urine for C & S)** — finds out what microorganism is causing the infection and which antibiotic is likely to be effective against it

If positive

If the screening test is positive (i.e., detects evidence of infection), your provider will probably take the following steps:

1. Prescribe an antibiotic to treat the infection. The type and duration of treatment will differ depending on your symptoms, history, and prior use of catheterization (intermittent or indwelling catheters — see pages 7–8). Regardless of the specific antibiotic that is prescribed for you, **it is essential to take the full amount as directed even if your symptoms subside.** Stopping the medication prematurely is likely to result in a recurrence of the symptoms because the infection has not been fully treated.
2. If the symptoms continue, the provider may do a **Culture & Sensitivity (C&S)**. Drops of urine, collected from a sterile urine sample, are placed in a culture medium in the laboratory to allow the bacteria to grow for 48 hours. The bacteria are identified and tested against several antibiotics to determine which would be the most effective.
3. If the symptoms persist, or you have repeated infections, the provider will likely refer you to a urologist (a specialist in the urinary system) to identify what type of ongoing bladder dysfunction might be causing the urinary symptoms. The urologist will do specialized testing (described on page 10) to identify the source of the problem.

If negative

If the screening test is negative, indicating that no infection is present, your provider will initiate testing to determine which type of bladder dysfunction is causing your symptoms. The most important question to be answered is whether you are retaining urine in your bladder after attempting to empty it completely. Urine left in the bladder (**post-void residual urine**) can cause any of the symptoms described above. **Post-void residual (PVR)** testing is usually done in one of two ways:

- **Diagnostic catheterization** — Immediately after you have voided, your provider will pass a thin, hollow tube, called a catheter, through the meatus into the urethra. This will drain the remaining urine out of the bladder so it can be measured. Although people dislike the idea of catheterization, most find it to be a quick and easy procedure that causes little discomfort.
- **Bladder ultrasound** — After you have urinated, the provider will apply a gel to your lower abdomen and slide a small instrument over the area to obtain an image that can be analyzed to measure residual urine.

With either method, a residual amount of less than 100ml is normal.

Treatment process

Treatment of storage dysfunction

If the PVR test determines that you are retaining less than 100ml of urine, your provider will likely conclude that your symptoms are caused by an overactive bladder detrusor muscle. He or she may recommend various behavioral interventions (see Table 1, page 9) or prescribe medication to relax the detrusor muscle. Anticholinergic medications are the most commonly prescribed. These include:

- darefenasin (Enablex®)
- fesoterodine (Toviaz®)
- oxybutynin (Ditropan®, Ditropan XL®, Oxtrol Transdermal Patch®, Gelnique Gel®)
- solifenacin succinate (Vesicare®)
- imipramine (Tofranil®)
- tolterodine (Detrol® and Detrol LA®)
- trospium chloride (Sanctura®)

While any of these can relieve urgency, frequency, nocturia or incontinence, you may need to try a few before finding the one that works best for you. The major side effects of these medications are dry mouth, constipation, drowsiness and memory problems. Another medication option for overactive bladder is mirabegron (Myrbetriq®). This medication helps relax the smooth muscle that surrounds the bladder and increases the bladder's capacity to store urine. Because mirabegron

works differently in the body than the anticholinergic medications, the side effects are different. The most common side effects reported with mirabegron are increased blood pressure, common cold symptoms, urinary tract infection and headache.

If treatment with any of these medications does not successfully manage your overactive bladder, your provider may recommend treatment with onabotulinumtoxin A (BOTOX®), which is approved by the FDA to treat incontinence resulting from an overactive bladder that has not responded adequately to medications. This powerful neurotoxin temporarily relaxes the overactive bladder muscle. BOTOX is delivered by injection into the bladder muscle under cystoscopy, which is a procedure that allows the doctor to visualize the inside of the bladder. This procedure may be done under general anesthesia. The effects of the medication typically last about three months, at which time the injection can be repeated.

The most common side effects with BOTOX include urinary tract infection and urinary retention. In addition, the FDA labeling for this medication carries a boxed warning that the injections may cause serious side effects that can be life threatening, including problems with swallowing, speaking or breathing, and the possibility that the toxin may spread to other areas of body away from the injection site.

Treatment of emptying dysfunction

If the PVR determines that you are retaining more than 100ml of urine after voiding, your provider may recommend **intermittent self-catheterization (ISC)**. This relatively simple technique works quickly and effectively to eliminate residual urine.

Depending on the symptoms you are experiencing, and the amount of residual urine, your provider will recommend that you catheterize 3–4 times per day. While many people are reluctant to begin this procedure, most quickly discover the comfort and security it provides. Women are usually less resistant than men because of their experience inserting tampons, but men generally have an easier time because of the greater accessibility of the urinary opening.

The regular practice of ISC acts like physical therapy for the bladder. Some people find that bladder function returns to normal or near normal after several weeks or months. They can discontinue ISC at that time. For others, the practice of ISC remains a regular part of everyday life, promoting effective bladder drainage and preventing complications.

If symptoms persist in spite of ISC, your provider will probably initiate treatment for Combined Dysfunction (see page 8).

For those who continue to retain too much urine in the bladder, the provider may also recommend a few dietary changes (see Table 2 on page 10) to make the urine more acidic.

INTERMITTENT SELF-CATHETERIZATION (ISC) PROCEDURE

1. Wash hands thoroughly and urinate, if you are able.
2. Wash around the urinary opening (meatus) with soap and water or a pre-packaged towelette.
3. Insert the catheter and allow urine to flow into the toilet.
4. Remove the catheter.
5. Use a new catheter for each catheterization if your insurance covers single-use catheters; if not, wash your catheter with soap and hot water and store in a plastic bag.

In the event that ISC is not sufficient to take care of the problem, or other symptoms interfere with self-catheterization, your provider may recommend the use of an indwelling (Foley) catheter. An **indwelling catheter** consists of a flexible rubber tube that remains in the bladder to allow urine to flow into an external drainage bag. A small balloon, which inflates after insertion, holds the catheter in place. In general, indwelling catheters should only be used on a short-term basis in order to avoid damage to the urethra.

Treatment of combined dysfunction

For people who experience problems with both the emptying and storage, a combination of strategies is usually recommended that includes intermittent catheterization to remove the residual urine, and one of the bladder medications described above to reduce bladder overactivity. Occasionally, other medications may also be prescribed, including:

1. **Antispasticity agents** to relax the sphincter muscle:
 - baclofen (Lioresal®)
 - tizanidine hydrochloride (Zanaflex®)
2. **Alpha-adrenergic blocking agents** to promote the flow of urine through the sphincter:
 - alfuzosin (Uroxatral®)
 - doxazosin (Cardura®)
 - silodosin (Rapaflo®)
 - tamsulosin (Flomax®)

On the very **rare** occasions when none of the medications or self-care strategies are sufficient to manage MS-related bladder symptoms, a simple surgical procedure called suprapubic cystostomy can be performed. A tube is inserted into the bladder through an opening in the lower abdomen to allow the urine to drain into an external collection bag. When the situation requires, other surgical options are also available.

Table 1: Behavioral interventions in treating storage dysfunction

Behavior	Why it helps and tips
Drink enough water to keep the urine light yellow.	To flush wastes, bacteria, and mineral deposits from the urinary system. Establish regular “water-break” times.
Limit intake of fluids that contain caffeine or alcohol.	These substances act as bladder irritants and contribute to storage dysfunction.
Restrict fluid intake beginning approximately two hours before starting any activity where no bathroom will be available, and avoid drinking fluids after dinner to avoid disrupted sleep.	Do not, however, restrict fluid intake on a continuous basis, because that greatly increases the risk of infection by interfering with the normal flushing of the bladder and making the urine overly concentrated.
Wear an absorbent pad for extra protection.	A variety of products are available for women and men, all containing a powder which turns to gel when moistened. Some men may choose to use a condom catheter (also called a Texas catheter) some of the time. This external device consists of a condom-like sheath that fits over the penis and is connected to a drainage bag. The bag is strapped to the leg inside the trousers.
Do regular pelvic floor (Kegel) exercises to help control incontinence in women (can also be adapted for use by men).	A nurse or physical therapist can assist you to learn the proper technique, which involves contracting and relaxing the muscles that support the urethra, bladder, uterus, and rectum. Pelvic floor physical therapy uses pelvic floor training, biofeedback, neuromuscular stimulation and daily home exercises to reduce urinary urgency, frequency and loss of bladder control.
Plan to urinate every two hours while awake.	Timed voiding can help train the bladder and reduce overfilling.

*NOTE: In the event that none of these measures is effective, your provider may prescribe an anti-cholinergic medication to force the bladder to retain urine. You would then be taught additional strategies for emptying your bladder (see page 7).

Table 2: Dietary changes in treating emptying dysfunction

Diet	Why it helps and tips
Limit intake of citrus juices.	Surprisingly, citrus juices make urine more alkaline than acidic, which favors the growth of bacteria.
Take cranberry tablets or drink cranberry juice daily. Generally, tablets are better than juice because juice is sweetened to counter the sour taste, and it's wiser to avoid a daily dose of extra sugar or high-fructose corn syrup. It is also easier to take cranberry tablets than drink the large amounts of cranberry juice required to acidify the urine.	Cranberry may help to prevent bacteria from sticking to the cells that line the bladder. Cranberry may be a helpful preventive measure but may also increase urgency or irritation because of its acidity. Cranberry should never be used to self-treat an existing UTI.

Other treatment options

Some clinicians have also used another strategy to manage bladder dysfunction — electrical stimulation of the sacral nerve. Stimulation of the nerves can stimulate pelvic muscle contractions or detrusor (bladder muscle) contractions. This stimulation can be accomplished in different ways.

- One method is electrical stimulation provided by a surgically-implanted stimulator that helps the bladder muscle to store and expel urine appropriately. The stimulator delivers electrical impulses that mimic those that would normally be

delivered by undamaged nerves. While the data available for this intervention are still quite limited, you may want to discuss electrical stimulation with your physician. However, you and your doctor should keep in mind that you may not be able to have an MRI if you have an implanted sacral nerve stimulator.

- Another type of sacral nerve stimulation intervention is percutaneous posterior tibial nerve stimulation, or PTNS. In this procedure, a needle is placed in the posterior tibial nerve, located on the inner leg at the ankle. An electrical impulse is delivered to the nerve that in turn stimulates the sacral nerves. The usual treatment is 30 minutes once weekly for 12 weeks. Additional treatment can be given if symptoms recur.

When urinary problems persist

Should your bladder problems persist despite standard medications and self-care techniques, you should be referred to a urologist (a physician who specializes in problems of the urinary tract) for further testing to rule out other problems. Possible tests include:

- **Ultrasound** — kidneys and urinary bladder are visualized in order to check for blockage or stones.
- **Radioisotope renal scan** — assesses kidney function. A short-acting radioisotope, that allows the entire urinary system to be visualized, is injected into a vein and excreted by the kidneys. Residual urine is measured by noting the amount of radioisotope remaining in the bladder after urination.
- **Intravenous pyelogram (IVP)** — similar to the radioisotope study in that it requires an injection of special dye and provides a picture of the entire urinary system. It differs, however, in that it is an X-ray that requires an empty bowel in order for the urinary system to be visible. The IVP is therefore used less frequently because it requires the use of enemas and/or laxatives before the examination.
- **Urodynamic studies** — measures the pressure within the bladder (the bladder is filled with sterile fluid) and assess the function of the external sphincter. The person lies on an examining table and the physician or nurse inserts a small urinary catheter and a rectal probe for the duration of the procedure.

- **Cystoscopy** — a thin tube with a light and a magnifier is passed through the urethra into the bladder, the doctor is able to examine the interior of the bladder for inflammation, polyps, and other abnormalities that might cause urinary symptoms.

The impact of other factors on bladder function

Mobility problems

Safe and comfortable self-care activities require adequate mobility, which in turn depends upon: strength; balance; coordination; flexibility; absence of pain; adequate sensory input to feet, legs, arms and hands; and an accessible environment.

In addition to diagnosing and treating the bladder dysfunction you may be experiencing, the provider will be assessing your ability to move easily and comfortably in an environment that is accessible and safe (**mobility assessment**).

Other medical considerations

Occasionally, bladder problems in a person with MS may be related to other MS symptoms, to medications that the person is taking, or to diseases other than the MS. People may have difficulty with bladder management because of fatigue, constipation, cognitive problems or other MS-related changes. These will need to be

assessed and treated in order for bladder management to improve.

Bladder problems can also result from medical conditions unrelated to MS, such as pregnancy, diabetes, prolapsed bladder or uterus, enlarged prostate, arthritis or the post-menopause period. Various medications, especially those for hypertension, can affect urinary function.

STRATEGIES TO IMPROVE MOBILITY

1. Medical or surgical interventions to manage spasticity
2. Rehabilitation, including physical and occupational therapies, to provide:
 - Home exercise program to enhance flexibility, strength, endurance
 - Energy management strategies to conserve energy and minimize fatigue
 - Balance and mobility training to improve walking
 - Assistance with activities of daily living
 - Adaptive equipment to conserve energy, promote safety, and enhance mobility and productivity
 - Adaptive clothing for ease and convenience
 - Home/office modifications to improve bathroom access and safety

It is very important for your MS-care provider to know all the medications you are taking — prescription, nonprescription, and dietary supplements such as vitamins and herbs — regardless of the condition for which you are taking them (see Appendix 1).

Summary

In addition to being uncomfortable and embarrassing, the bladder symptoms of MS can have a significant impact on a person's long-term health. The impact of these symptoms can be limited by reporting urinary symptoms promptly to your healthcare provider. Based on the information you give, your provider can do the testing necessary to diagnose the underlying problem and recommend the appropriate medications and management strategies.

The treatment interventions described here are more effective the earlier they are implemented — before the problems have become severe. They can help you manage your symptoms, and prevent unnecessary, potentially dangerous complications, so you can pursue your daily activities with comfort and confidence.

Appendix 1: My medications list

Keep this list current, and bring it with you when you visit your regular doctor and see any new doctor.

Your name _____ Date ____ / ____ / ____

Prescription medications

Name	How much?	How often?

Nonprescription medications

Name	How much?	How often?

Herbal and alternative products, vitamins, dietary supplements

Name	How much?	How often?

Appendix 2: Medication information

ANTICHOLINERGIC MEDICATIONS

Many of the medications used to treat bladder symptoms have anticholinergic effects that dry the mouth (potentially causing significant dental problems) and increase the risk of constipation. It is important to:

- Use good basic dental hygiene
- Brush after every meal and floss at least once a day
- Avoid overindulgence in caffeinated beverages
- Moisten the air with a cool-air vaporizer
- Use saliva substitutes sold over the counter to provide instant wetness relief and promote oral health
- Chew sugarless gum, or suck on sugarless hard candy for 5–10 minutes every two hours to stimulate the saliva glands
- Drink plenty of fluids and maintain a healthy bowel regime

Chemical Name: alfuzosin (al-**fyoo**-zoh-sin)

Brand Name: Uroxatral® (U.S.)

Generic Available: No

Description: Alfuzosin is generally used to treat the signs and symptoms of benign enlargement of the prostate. It helps to relax the muscles in the prostate and bladder, and is used in MS to promote the flow of urine.

Chemical Name: baclofen (**bak**-loe-fen)

Brand Name: Lioresal® (U.S. and Canada)

Generic Available: Yes (U.S. and Canada)

Description: Baclofen acts on the central nervous system to relieve spasms, cramping, and tightness of muscles caused by spasticity in MS. It is usually administered orally in pill form. An intrathecal delivery system is available for individuals with significant spasticity who cannot tolerate a sufficiently high dose of the oral form of the medication. The intrathecal system delivers the medication via a surgically implanted pump directly into the fluid surrounding the spinal cord.

Chemical Name: ciprofloxacin (sip-roe-**flox**-a-sin)

Brand Name: Cipro® (U.S. and Canada)

Generic Available: Yes (U.S. and Canada)

Description: Ciprofloxacin is one of a group of antibiotics (fluoroquinolones) used to kill bacterial infections in many parts of the body. It is used in MS primarily to treat urinary tract infections. Cipro administered with tizanidine (used for spasticity) results in higher concentrations of tizanidine in the blood, which could lead to clinically significant adverse events such as increased sedation.

Chemical Name: darifenacin (dar-i-**fen**-a-sin)

Brand Name: Enablex® (U.S. and Canada)

Generic Available: No

Description: Darifenacin is an extended-release antispasmodic/antimuscarinic medication that works by relaxing the bladder muscles to prevent urgent, frequent, or uncontrolled urination.

Chemical Name: desmopressin (des-moe-**press**-in) acetate

Brand Name: DDAVP Nasal Spray® (U.S. and Canada)

Generic Available: No

Description: Desmopressin acetate is a hormone used as a nasal spray. The hormone works on the kidneys to control frequent urination.

Chemical Name: doxazosin (dox-ah-**zoh**-sin)

Brand Name: Cardura® (U.S. and Canada)

Generic Available: Yes (U.S. and Canada)

Description: Doxazosin is generally used to treat the signs and symptoms of benign enlargement of the prostate. It helps to relax the muscles in the prostate and bladder, and is used in MS to promote the flow of urine.

Chemical Name: fesoterodine (fess-oh-**tare**-oh-deen)

Brand Name: Toviaz® (U.S. and Canada)

Generic Available: Yes (U.S. and Canada)

Description: Fesoterodine is used to treat overactive bladder (a condition in which the bladder muscles contract uncontrollably and cause frequent urination, urgent need to urinate, and inability to control urination).

Chemical Name: mirabegron (**mir-a-beg**-ron)

Brand Name: Myrbetriq® (U.S. and Canada)

Generic Available: No

Description: Mirabegron reduces the symptoms of an overactive bladder (urgency, frequency, incontinence) by relaxing the smooth muscle surrounding the bladder and increasing the bladder's capacity to hold urine.

Chemical Name: onabotulinumtoxinA (oh-nah-**bot**-yoo-lye-num-A)

Brand Name: BOTOX® (U.S.)

Generic Available: No

Description: OnabotulinumtoxinA is a nerve toxin that may relieve spasms in certain muscles, including urinary bladder muscles.

Chemical Name: oxybutynin (ox-i-**byoo**-ti-nin)

Brand Name: Ditropan® (U.S. and Canada)

Generic Available: Yes (U.S.)

Description: Oxybutynin is an antispasmodic/anticholinergic that helps decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

Chemical Name: oxybutynin (ox-i-**byoo**-ti-nin) chloride — extended release

Brand Name: Ditropan XL® (U.S. and Canada)

Generic Available: Yes (U.S.)

Description: This form of oxybutynin is an extended-release antispasmodic/anti-cholinergic that is formulated to help decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

Chemical Name: oxybutynin (ox-i-**byoo**-ti-nin)-transdermal

Brand Name: Oxytrol® (U.S. and Canada)

Generic Available: No

Description: This form of oxybutynin, which is delivered via a skin patch, is an antispasmodic/anti-cholinergic medication that helps decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

Note: In January 2013, the U.S. Food and Drug Administration (FDA) approved an oxytrol patch for use by women over age 18 without a prescription (over-the-counter); this product is marketed as Oxytrol for Women®. Men still need a prescription in order to take oxybutynin in any form.

Chemical Name: oxybutynin (ox-i-**byoo**-ti-nin)-gel

Brand Name: Gelnique® Gel: (U.S. and Canada)

Generic Available: No

Description: This form of oxybutynin, which is delivered via a topical gel, is an anti-spasmodic/anticholinergic medication that helps decrease muscle spasms of the bladder and the frequent urge to urinate caused by these spasms.

Chemical Name: silodosin (si-lo-**doe**-sin)

Brand Name: Rapaflo® (U.S. and Canada)

Generic Available: No

Description: Silodosin is generally used to treat the signs and symptoms of benign enlargement of the prostate. It helps to relax the muscles in the prostate and bladder, and is used in MS to promote the flow of urine.

Chemical Name: solifenacin succinate (sol-i-**fen**-ah-sin **suc**-sin-ate)

Brand Name: Vesicare® (U.S.)

Generic Available: No

Description: Solifenacin succinate is an antimuscarinic medication that is used to treat an overactive bladder causing symptoms of frequency, urgency, and/or urge incontinence. In MS, overactive bladder is seen in failure to store and combined failure to store/failure to empty types of dysfunction.

Chemical Name: tamsulosin (tam-**soo**-loh-sin)

Brand Name: Flomax® (U.S.)

Generic Available: Yes (U.S.)

Description: Tamsulosin is generally used to treat the signs and symptoms of benign enlargement of the prostate. It helps to relax the muscles in the prostate and bladder, and is used in MS to promote the flow of urine.

Chemical Name: tizanidine (tye-**zan**-i-deen) hydrochloride

Brand Name: Zanaflex® (U.S. and Canada)

Generic Available: No

Description: Tizanidine is used in MS to treat the increased muscle tone associated with spasticity. While it does not provide a cure for the problems, it can relieve the spasms, cramping and tightness of muscles.

Chemical Name: imipramine (i-**mip**-ra-mine) hydrochloride

Brand Name: Tofranil™

Generic Available: Yes

Description: Imipramine is an antidepressant but has an anticholinergic effect that benefits bladder frequency at night.

Chemical Name: tolterodine (tole-**tare**-oh-deen)

Brand Name: Detrol® (U.S.)

Generic Available: No

Description: Tolterodine is an antimuscarinic that is used to treat bladder spasms causing urinary frequency, urgency, or urge incontinence.

Chemical Name: tolterodine (tole-**tare**-oh-deen) tartrate

Brand Name: Detrol LA® (U.S. and Canada)

Generic Available: No

Description: Detrol LA (long acting) is an antimuscarinic agent used to treat overactive bladder with symptoms of urgency, frequency, and/or urge incontinence. This problem occurs in failure to store and combined failure to store/failure to empty types of dysfunction. It differs from Detrol in that Detrol LA can usually be taken as a single daily dose.

Chemical Name: trospium chloride (**trose**-pee-um chloride)

Brand Name: Sanctura® (U.S.)

Generic Available: Yes (U.S. and Canada)

Description: Trospium is an antispasmodic/anticholinergic medication that works by relaxing the bladder muscles to prevent urgent, frequent, or uncontrolled urination.

For more detailed information on these medications including common and rare side effects, visit [nationalMSSociety.org/Treating-MS/Medications](https://www.nationalmssociety.org/Treating-MS/Medications) or call the National MS Society at 1-800-344-4867.

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Notes

Notes

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Early and ongoing treatment with an FDA-approved therapy can make a difference for people with multiple sclerosis. Learn about your options by talking to your healthcare professional and contacting the National MS Society at [nationalMSsociety.org](https://www.nationalmssociety.org) or 1-800-344-4867.

The Society publishes many other resources about various aspects of MS. Visit [nationalMSsociety.org/brochures](https://www.nationalmssociety.org/brochures) or call 1-800-344-4867.

Some of our popular pamphlets include:

- Taming Stress in Multiple Sclerosis
- Food for Thought: MS and Nutrition
- MS and Intimacy
- Managing MS Through Rehabilitation

The National MS Society mobilizes people and resources so that everyone affected by MS can live their best lives as we stop MS in its tracks, restore what has been lost and end MS forever. To fulfill this mission, the Society funds cutting-edge research, drives change through advocacy, facilitates professional education, collaborates with MS organizations around the world, and provides programs and services designed to help people with MS and their families move their lives forward.



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