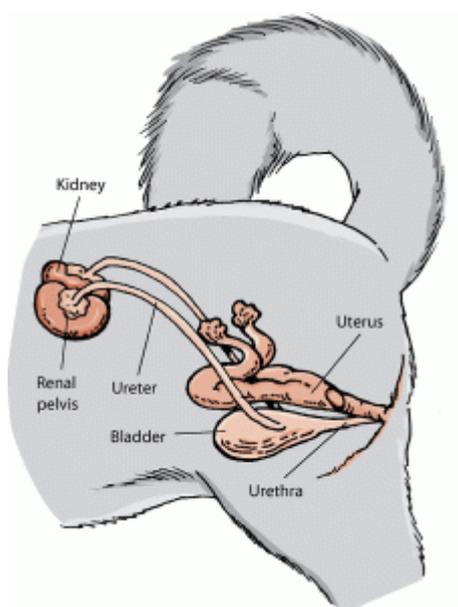


# Urethral Sphincter Mechanism Incompetence - My Dog Wet the Bed!

If your dog leaks urine when s/he lays down to rest or sleep, s/he may be living with a condition called urethral sphincter mechanism incompetence or USMI, a common disorder in adults dogs, particularly females. Indeed this condition may affect up to 20% of female dogs, and usually manifests within three years of ovariectomy (spaying).



(Illustration courtesy of [The Merck Manual for Pet Health](#))

Urethral sphincter mechanism incompetence may also be called

- Spay incontinence
- Hormone-responsive incontinence
- Estrogen-responsive incontinence
- Testosterone-responsive incontinence

## What causes urethral sphincter mechanism incompetence?

We don't completely understand the exact mechanism(s) that cause USMI.

However several factors have been implicated as potential contributors to urine leakage (incontinence) noted with USMI patients, including:

- Age - as animals age, the collagen content of urogenital tissues changes, potentially contributing to urine leakage
- Decreased responsiveness of hormone receptors in the urethra
- Abnormal length of the urethra
- Abnormal anatomical position of the urethra and/or urinary bladder
- Body size (30% occurrence is dogs weighing more than 20 kilograms / 44 pounds vs. 10% in dogs weighing less than 20 kilograms / 44 pounds)
- Overweight & obesity
- Anatomical anomalies of the vagina and/or vestibule

Certain breeds are over-represented for having USMI, including:

- German shepherds
- Doberman pinschers
- Labrador retrievers
- Old English sheepdogs
- English springer spaniels
- Boxers
- Giant schnauzers
- Rottweilers
- Weimeraners
- Irish Setters



Urethral sphincter mechanism incompetence can actually occur *before* spaying in Doberman pinschers, Boxers and Giant schnauzers. Male dogs, particularly those that are castrated, may also be diagnosed with USMI.

## **How do I know if my dog is living with urethral sphincter mechanism incompetence?**

The gold-standard test to confirm a patient is living with USMI is called a urethral pressure profile or urethral profilometry. With this test, one can visually document a lower-than-normal pressure within the urethra that allows urine to inappropriately leak from the urinary bladder to the environment. Unfortunately this diagnostic technique is not readily available even at veterinary colleges and referral specialty hospitals. Thus veterinarians most commonly diagnose USMI based on a patient's history, complete physical examination (including a neurological evaluation), and some important laboratory tests, including:

1. Complete blood count (CBC)
2. Serum biochemical profile (CHEM)
3. Urinalysis (UA)
4. Urine culture (UCS)

The typical patient with USMI should have a normal CBC/CHEM/UA and a negative UCS. However some patients with USMI can develop bacterial urinary tract infections. Diagnostic imaging is not typically helpful unless a patient's history raises concern for uroliths (stones) in the urinary system and/or an anatomical abnormality. A veterinarian may recommend some imaging studies if a patient doesn't respond as expected to initial therapies, and these patients are likely best helped through consultation with a board-certified veterinary internal medicine specialist.

## **How is urethral sphincter mechanism incompetence treated?**

Urethral sphincter mechanism incompetence is most commonly treated with specific medications, but some surgical interventions may be attempted when medical management fails to adequately resolve urine leakage.

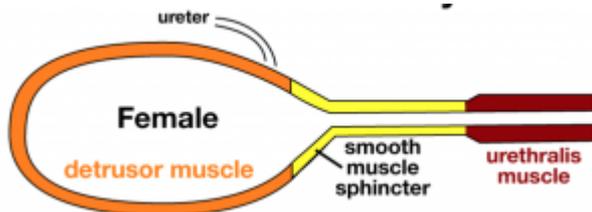
*It is unlikely any one form of treatment will singularly provide long-term resolution 100% of the time.*

A patient's initial response commonly diminishes with time, and most therapies,

medical or surgical, cure approximately 50% of affected patients long term.

### *Medical therapies:*

Specific drugs can be prescribed in an attempt to improve urinary continence by increasing the tone of the urethral sphincter or reducing pressure within the urinary bladder.



(Illustration courtesy of [Veterinary Anatomy at the University of Minnesota](#))

Phenylpropanolamine (aka: Proin®, Propagest®, Propalin®, Uriflex®, Uricon®, Cystolamine®, PPA) is a common first-choice medication used to treat USMI. This drug stimulates specific receptors in the urethra to increase sphincter tone.



When a female animal is spayed, her ovaries (and typically her uterus too) are surgically removed. These sex organs produce specific hormones, including estrogen that helps control the tightness of the urethral sphincter. With time after spaying, the loss of estrogen can cause the urethral sphincter to become leaky. Happily some affected spayed dogs will respond to estrogen replacement therapy, and the urethral sphincter can be stimulated to close more efficiently. The most common estrogen drug prescribed for female dogs is diethylstilbestrol (aka: DES).

A major potential adverse reaction to this medication is the development of aplastic anemia. If prescribed, patients should have a CBC evaluated periodically, and families must be advised to wear gloves when administering this medication (the drug can be absorbed through the skin to potentially cause aplastic anemia in people too!).



Unfortunately many animals will eventually stop responding to estrogen replacement therapy despite increasing dosages, likely due to desensitization of estrogen receptors.

*A combination of PPA and DES may be useful, potentially reducing individual drug doses and the possibility of adverse reactions.*

In July 2011, the United States Food and Drug Administration approved a new medication to treat urinary incontinence in dogs. The drug, estriol (Incurin®), is very similar to DES, and works by increasing the tone of the urethral sphincter. The most common side effects are reduced appetite (13%) and vomiting (10%); reducing the dose generally controls these adverse reactions. Bone marrow suppression has not been reported with estriol at the very low doses needed to correct urinary incontinence associated with USMI. Approximately 90% of dogs will either be completely continent or significantly improved with this medication.



Testosterone supplementation can be used in male dogs with USMI. This type of hormone replacement can increase the tone of the urethral sphincter to reduce urine leakage. Traditionally this form of hormone replacement is administered via an injection given by a veterinarian, but some have anecdotally reported success with an oral (by mouth) formulation. Unfortunately male dogs living with USMI do not respond as well to medical management compared to females.

Consultation with a board-certified veterinary internal medicine specialist can be invaluable to help you select the most beneficial medical therapy for your pet living with USMI.

### *Surgical therapies:*

Some patients will simply not respond to drug therapy. In medically unresponsive dogs, options are limited to the following:

1. Conservative management - diapers, confinement to certain areas of the home or to the outside, water-proof bedding
2. Surgery
3. Urethral bulking
4. Euthanasia

Surgical procedures to improve urinary incontinence associated with USMI include techniques that do the following:

- Increase the pressure within the urethral to oppose urine leakage (urethral resistance)
- Increase urethra length
- Re-locate the anatomical position of the urinary bladder (i.e.: colposuspension)

These surgeries are not commonly performed, and a consultation with a board-certified veterinary surgeon is strongly recommended to help you make the most appropriate decision for your pet. Surgical interventions intended to increase urethral resistance can cause an animal to experience some discomfort during urination. Procedures that increase the length of the urethra carry significant potential risks, and are generally reserved for animals with congenital abnormalities of the urethra. Surgery to reposition the urinary bladder (colposuspension) allows the normal (and higher) pressure of the abdominal

cavity to act on the urinary bladder and urethra to help reduce urine leakage. A previous investigation showed a cure-rate of 53% with most dogs demonstrating improved continence; unfortunately 10% of dogs failed to respond to colposuspension.

Urethral bulking involves injecting an chemical into the first part of urethra using a special fibre-optic camera called a cystoscope. The injection of bulking agents into the urethra creates artificial urethral cushions that help close the urethra more appropriately, thus restoring continence. Cystoscopy is a specialized procedure, and should only be performed by those with extensive training and experience like board-certified veterinary internal medicine specialists. Just as with most unique surgery tools, technically your family veterinarian can purchase the special equipment to perform cystoscopies. But the question isn't "Can my primary care doctor do the cystoscopy?" but rather "Is my primary care doctor the best person to perform the cystoscopy?"

## **The take-away message about urethral sphincter mechanism incompetence...**

Urine leakage secondary to USMI is a commonly condition in dogs, particularly spayed females. Drugs have been developed that help reduce urine leakage, and each has its advantages and potential drawbacks. A consultation with a board-certified veterinary internal medicine specialist would likely be quite beneficial in helping you make the best drug decision for your pet. Unfortunately affected animals may not positively respond to medical management, and specialized procedures and/or delicate surgery may be required to control clinical signs.

To find a board-certified veterinary internal medicine specialist, please visit the [American College of Veterinary Internal Medicine](#)

To find a board-certified veterinary surgeon, please visit the [American College of Veterinary Surgeons](#)

Wishing you wet-nosed kisses,

cgb