

## Patient information from the BMJ Group

# Stress incontinence

In this section

[What is it?](#)

[What are the symptoms?](#)

[How is it diagnosed?](#)

[How common is it?](#)

[What treatments work?](#)

[What will happen?](#)

[Questions to ask](#)

## Stress incontinence

If you often leak urine when you sneeze, laugh, or exercise, you probably have a condition called stress incontinence. Many women get this problem, especially after they've had a child. Stress incontinence can be uncomfortable and embarrassing, but there are treatments that work well.

We've brought together the best research about stress incontinence in women and weighed up the evidence about how to treat it. You can use our information to talk to your doctor and decide which treatments are best for you.

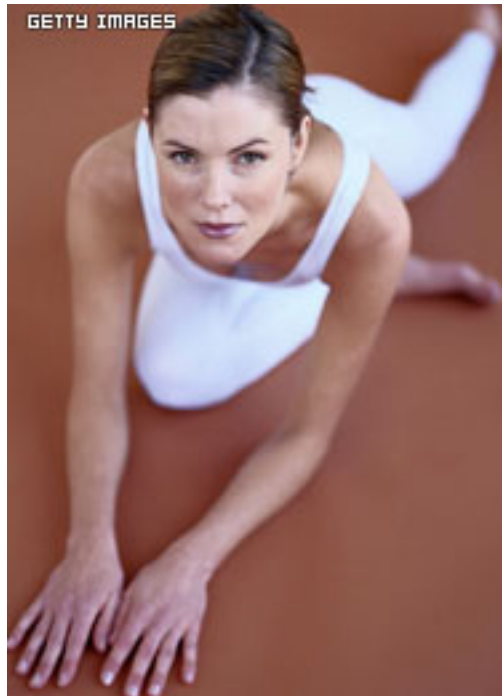
## What is stress incontinence?

If you have stress incontinence, the muscles that keep your bladder closed are weak. Things like sneezing and coughing put extra pressure on the muscles and urine leaks out. Many women get this problem, especially after they've had children.

You may think you just have to put up with this problem. You may even feel too embarrassed to go to your doctor. But there are many treatments for stress incontinence that work well.

## Stress incontinence

### Key points about stress incontinence



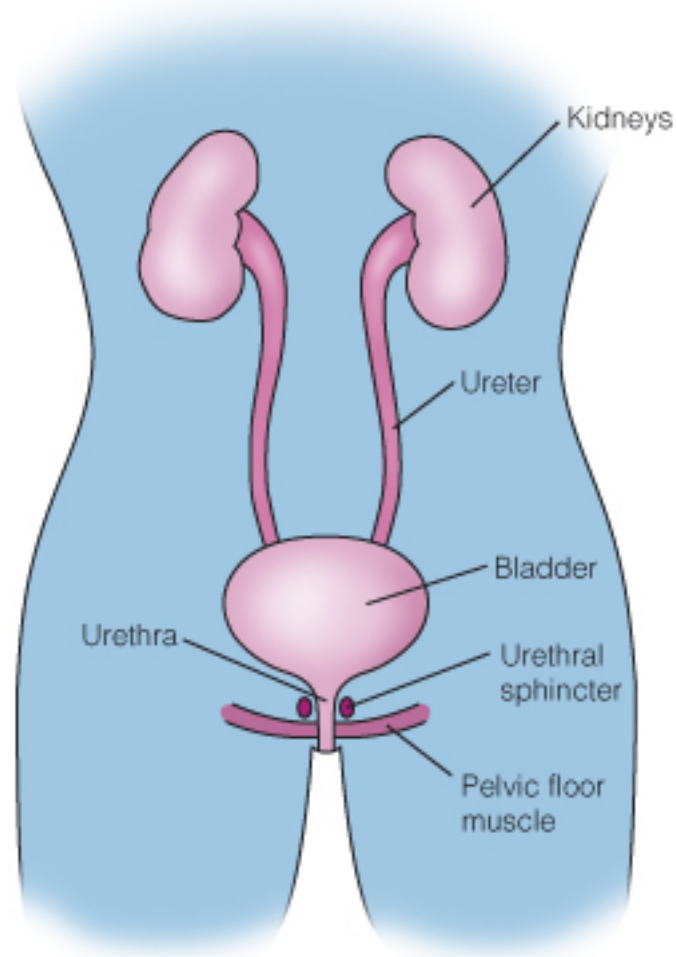
Stress incontinence can stop you enjoying exercise or aerobics.

- Stress incontinence is common. About half of women get it at some time in their lives.
- You're most likely to get stress incontinence after you've had a baby, and it can get worse as you get older.
- If you're bothered by your stress incontinence you should see your doctor. Treatment can help no matter how long you've had the problem.
- Pelvic floor exercises are the main treatment. They're safe and they work.
- Doctors can prescribe a drug treatment for stress incontinence. It's called duloxetine (brand name Yentreve).
- If your incontinence is causing you a lot of distress, you may want to consider surgery.

### How things normally work

To understand stress incontinence, it helps to know about the parts of your body that make, carry, and store urine.

## Stress incontinence



Urine is made in your kidneys and stored in your bladder. Your pelvic floor muscles help your bladder hold in urine.

- Your **kidneys** make urine. They're in the middle of your back, on either side of your spine. They take out waste and excess fluid from your blood. This becomes urine.
- From your kidneys, urine flows down two tubes (one on each side of your body) called **ureters** and into your **bladder**.
- Your bladder stores urine. It's a muscular bag, a bit like a balloon. It reacts to signals from your brain sent through your nervous system. When your bladder squeezes or tightens (contracts), urine is forced out.
- From your bladder, urine flows out through a tube called the **urethra** and out of your body.
- A ring of muscle called the **urethral sphincter** sits at the bottom of your bladder. This works like a valve. When it opens, urine flows out of your bladder. When it closes, it helps to hold urine in your bladder.

## Stress incontinence

- Underneath your bladder are your **pelvic floor muscles**. They're important because they support your bladder and help it hold in urine.

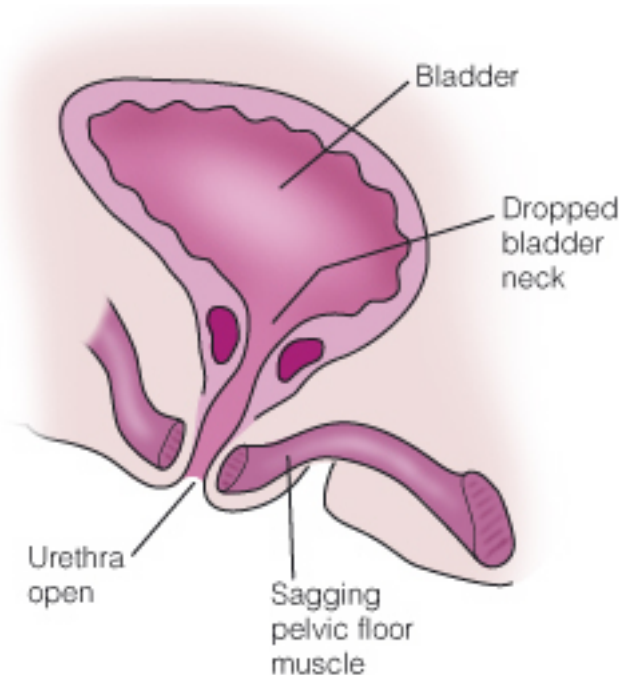
### How your body controls urine

When you're not passing urine, your urethral sphincter and your pelvic floor muscles stay tightened (contracted). This keeps the opening of your bladder closed, so urine can't get out.

When your bladder gets full and you want to empty it, your brain sends a signal for your bladder to squeeze the urine out. At the same time, your sphincter muscles and your pelvic floor muscles relax. This lets urine flow out.

To find out more, see [How much urine do you make, and how often should you go?](#)

### What goes wrong in stress incontinence?



If your pelvic floor muscles are weak, urine may leak out of your bladder.

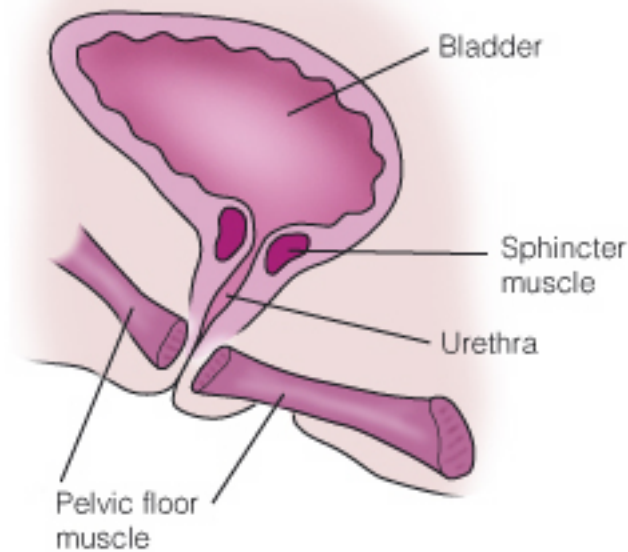
Incontinence means that you have problems holding in urine.

There are many types of incontinence. But stress incontinence is the most common type, especially for women. For more information, see [Other types of incontinence](#) .

If you've got stress incontinence, it means that urine leaks from your bladder when something puts extra pressure on the muscles in this area.

This often happens when you cough, sneeze, laugh, exercise, or lift things. Usually only a little urine leaks, and it happens very quickly. <sup>[1]</sup>

## Stress incontinence



Pelvic floor exercises make your pelvic floor muscles stronger.

Two things can lead to stress incontinence. <sup>[2]</sup>

- Your **pelvic floor muscles** get weak and can't tighten (contract) properly. This is the most common cause of stress incontinence.
- Your **sphincter muscles** get weak or damaged and can't contract properly.

Both of these sets of muscles help keep the opening of your bladder (the bladder neck) closed. If they're weak, they can't cope with any extra pressure on them: for example, from a sneeze. So if you do sneeze, your bladder neck opens for a second. This lets urine leak out.

### Stress incontinence: why me?

Some women are more likely to get stress incontinence than others.

## Stress incontinence



You're more likely to get stress incontinence after you've had a baby.

Most women who get stress incontinence get it after they've had a baby. We've listed some of the causes below.

### Childbirth

Most women who get problems leaking urine do so after they have a baby. It doesn't matter what kind of birth you have, having a baby puts you at risk of stress incontinence.

<sup>[5]</sup> A survey of more than 15,000 women under 65 showed that: <sup>[5]</sup>

- About 5 in 100 women who haven't had children get stress incontinence
- About 7 in 100 women who have a baby by **caesarean section** get stress incontinence (a caesarean is when surgeons make a cut through your tummy to get the baby out)
- About 12 in 100 women who have had a baby through the vagina get stress incontinence.

The number of children you have also increases your risk. Leaking happens to about three-quarters of women who have had three births through the vagina. <sup>[6]</sup>

Doctors think that your pelvic floor muscles get weakened as the baby passes through your vagina. <sup>[6]</sup> These muscles help to support your bladder and hold in urine. If they don't work properly, urine can leak out. But these muscles may also come under pressure from pregnancy itself. This may be the reason that even women who have a caesarean

## Stress incontinence

delivery are at increased risk of stress incontinence. Having a baby by forceps delivery (where doctors use large tongs to pull a baby out through your vagina) can be especially harmful to these muscles.

### Getting older and going through the menopause

Very few women younger than 30 (only about 3 in 100) get incontinence. But the risk goes up as you get older. About one-third of women older than 80 get incontinence.<sup>[7]</sup>

As you get older, your muscles may get weaker. This includes your pelvic floor muscles. And as you go through the **menopause**, your body makes less of a **hormone** called **oestrogen**. Oestrogen helps to keep your muscles healthy, especially the sphincter muscles at the bottom of your bladder. So, during the menopause, the sphincter muscles may get weaker.

The muscles in your pelvic area help keep urine in your bladder. If they get weak, urine can leak out.

### Smoking

If you smoke, or have smoked in the past, you're twice as likely to get incontinence as a non-smoker.<sup>[8]</sup> Doctors think that smoking might increase the risk of stress incontinence because you're more likely to cough if you smoke and the chemicals in smoke may affect the bladder and muscles around it.

### Obesity

If you're very overweight ( **obese** ), the extra pounds you carry put more pressure on the muscles around your bladder. This can make them weaker and less able to hold urine in your bladder.

### Surgery in your pelvic area

If you have a caesarean section, a hysterectomy, or another kind of surgery in this area, there is a small chance that some of the muscles could be damaged. This could make it more likely that you'll get stress incontinence. But this is rare.

### Coughing a lot

Illnesses that make you cough a lot, such as **bronchitis**, put extra pressure on the muscles in your abdomen. This includes the muscles around your bladder neck. If these get weaker, it can lead to stress incontinence.

### Your genes

There's some evidence that if you have a sister who has stress incontinence, then you're more likely to get it than if you have a sister who doesn't have it.<sup>[9]</sup> This suggests that there might be genes that you inherit from your parents that make you more likely to get stress incontinence.

### What are the symptoms of stress incontinence?

There's only one symptom of stress incontinence. You leak urine when there's extra pressure on your bladder and the muscles around it.

This usually happens suddenly when you laugh, cough, sneeze, exercise, or lift something. But sometimes it happens if you just stand up. <sup>[1]</sup>

- At first, this may happen only once in a while. And you may leak only a little urine. It's a nuisance rather than embarrassing.
- But the problem may get worse if you don't do anything about it. <sup>[6]</sup> You may start to leak more urine more often. You may need to change your underwear several times a day. And you may need to wear pads.
- Stress incontinence may become so frequent or uncontrollable that you're afraid to leave home in case you have an accident. Not surprisingly, this can get you down. <sup>[10]</sup>

But not all women with incontinence find it a problem. If you leak a little urine only occasionally you may not be bothered by it. But if you find that it interferes with life, it's worth seeing your doctor. There are some very simple treatments that work well. And it's never too late to get help. Treatments can help even if you've had symptoms for a few years.

### How do doctors diagnose stress incontinence?

It's usually clear from your symptoms whether you have stress incontinence. But your doctor will ask you questions and may do some tests to find out what's causing your symptoms.

You may be referred to a doctor specialising in the treatment of stress incontinence. This might be a **urologist** (a doctor with specialist knowledge of the parts of your body that make, carry, and store urine) or a **gynaecologist** (a doctor with specialist knowledge of diseases and conditions that particularly affect women).

You may also be referred to a **continence nurse** or a **physiotherapist** who specialises in teaching pelvic floor exercises. You could go to a continence clinic to try simple treatments for stress incontinence that don't involve surgery.

### Questions your doctor may ask

Your doctor may ask you about: <sup>[15]</sup>

- Your symptoms
- Illnesses you've had



## Stress incontinence

- Medicines you are taking or have taken
- Surgery you've had
- Your pregnancies and experience of childbirth.

### Keeping a diary

You may be advised to keep a bladder diary for a week, or a frequency and volume chart.

<sup>[1]</sup> You'll write down when you go to the toilet, if you leak any urine, and what you drink. Your doctor may also ask you to measure how much urine you pass in 24 hours. To do this, you can use a special pan that fits over the rim of your toilet. <sup>[15]</sup>

Your doctor may also ask you to write down how many pads you use each day or how wet they get over several hours. This tells your doctor how much urine you're leaking.

<sup>[15]</sup> It's called a **pad test**.

### Having an examination

Your doctor may examine the area around your vagina and back passage (rectum) for medical conditions that can cause incontinence. For example, constipation can cause incontinence. Also, if you have poor reflexes and feeling in this area, it can mean that your nerves are damaged. <sup>[15]</sup>

### Tests on your urine

Your doctor may send a sample of your urine to be tested in a laboratory, or use a dipstick to test your urine straight away. <sup>[14]</sup> This checks for signs of **infection** or another problem.

<sup>[15]</sup> This test is called a urinalysis. It should be done before you start any treatment. <sup>[14]</sup>

### Tests on your bladder

#### Urodynamic tests

These are tests to check how well your bladder is working. You need to have these tests before surgery for stress incontinence. <sup>[14]</sup> They can tell if you also have another type of incontinence (see [Other types of incontinence](#)) or if there are any other complications. This information will help you and your doctor choose the right treatment for you.

#### Uroflowmetry test

A uroflowmetry test measures how much urine you pass and how fast it comes out. To do this, you pass urine into a toilet that has a pan to catch your urine, and a measuring device. You do this in private. A graph shows how fast your urine came out and helps your doctor tell if your bladder is working normally.

# Stress incontinence

## Cystometry

This test measures how much liquid your bladder can hold and the pressure inside your bladder. A doctor or nurse will put a small tube called a catheter into your bladder to empty it. Then a smaller tube is used to fill your bladder with water. Another tube is usually put into your back passage (rectum) to measure the pressure there as well. You'll be asked how you feel as your bladder fills and when you get the urge to pass urine. And you may be asked to cough to see if you leak any urine. This test may be slightly uncomfortable, but it shouldn't hurt. <sup>[14]</sup>

## How common is stress incontinence?

Stress incontinence is very common.

One study found that about 1 in 6 women have this condition. <sup>[11]</sup>

But the real number of women affected is probably much higher. This is because many women with stress incontinence don't like to admit they have the problem. They never see their doctor about it, so they're not included in the numbers.

In one survey, half the women questioned said they'd leaked urine at some time in the past year. <sup>[12]</sup> Over 1,000 women with an average age of 48 took part in this research.

Although you can get stress incontinence at any age, it is more common as you get older. <sup>[13]</sup>

## What treatments work for stress incontinence?

If you leak urine when you cough, sneeze, exercise, or laugh, you probably have stress incontinence. Many women get this problem, especially after they've had children.

You may think you have to put up with this problem. You may even feel too embarrassed to see your doctor. But there are many treatments for stress incontinence that work well.

If stress incontinence has made you nervous about going out and doing things you used to enjoy, treatment will help you get your confidence back so that you can lead an active life.

There are lots of treatments to choose from, including exercises and different types of surgery. Doctors usually start treating stress incontinence with simple treatments, such as exercises, before recommending surgery. <sup>[16]</sup>

## Key points about treating stress incontinence

- **Pelvic floor exercises** (also known as Kegel exercises) are safe and work well. They make the muscles of your pelvic floor stronger. They're usually the first treatment that doctors recommend.

## Stress incontinence

- Doctors can prescribe a drug treatment for stress incontinence. It's called duloxetine (brand name Yentreve).
- If neither exercises nor medicines help, surgery to lift your bladder back into the right position usually works.
- Surgery through small cuts in your abdomen (called **keyhole surgery** or laparoscopic surgery) may work as well as surgery through a large cut (called **open surgery**).
- A type of surgery using vaginal tape seems to work just as well as the standard operation. And you're likely to recover more quickly afterwards.

The National Institute for Health and Care Excellence (NICE), which advises the government on health care, says that women should try pelvic floor exercises first, and only have duloxetine or surgery if exercises haven't helped. <sup>[14]</sup>

### Treatments for stress incontinence

Which treatments work best for stress incontinence? We've divided the treatments into ones that don't involve surgery and ones that do. We've looked at the best research and given a rating for each treatment according to how well it works.

- [Treatments where you don't have surgery](#)
- [Treatments where you have surgery](#)

For help in deciding what treatment is best for you, see [How to use research to support your treatment decisions](#).

### Treatment Group 1

#### Treatments where you don't have surgery

##### Treatments that are likely to work

- [Duloxetine](#) : This is a drug that can help with stress incontinence. It's usually used to treat depression. The brand name is Yentreve. [More...](#)
- [Pelvic floor exercises](#) : These special exercises strengthen your pelvic floor muscles. These muscles prevent urine from leaking. [More...](#)
- [Vaginal cones](#) : These are plastic, cone-shaped weights that you hold inside your vagina. This makes your pelvic floor muscles stronger. [More...](#)
- [Electrical stimulation](#) : This is a way of making your pelvic floor muscles tighten (contract) without doing it yourself. You put a probe in your vagina or back passage

## Stress incontinence

(rectum), and the probe gives off a mild electric current. This makes your muscles contract. [More...](#)

### Treatments that work, but whose harms may outweigh benefits

- [Hormone replacement therapy \(HRT\)](#) : Hormone replacement therapy contains a kind of hormone called an **oestrogen**, either alone or combined with another hormone called a progestogen. HRT products you put in your vagina are the type likely to work for stress incontinence. They include creams (Ovestin), tablets (Vagifem), and a ring (Estring). [More...](#)

### Other treatments

We haven't studied these treatments in the same detail as other treatments on our site. (See Our method.) But we wanted to cover these treatments because you may have questions about them.

- [Weight loss](#)

## Treatment Group 2

### Treatments where you have surgery

#### Treatments that work

- [Colposuspension](#) : You can have this operation through a large cut in your abdomen (open surgery) or through several small cuts (keyhole surgery). If your bladder has moved out of place, your doctor may suggest this surgery to lift it back into the right place. [More...](#)

#### Treatments that are likely to work

- [Slings](#) : These work like hammocks for your bladder. You need an operation to have them put in. [More...](#)

### Treatments that work, but whose harms may outweigh benefits

- [Tension-free vaginal tape](#) : This is a type of sling that your doctor puts under your bladder. You need an operation to have it put in. It's sometimes called TVT for short. [More...](#)

### Treatments that need further study

- [Transobturator tape](#) : This is a type of tape similar to tension-free vaginal tape, but it goes in a different position. You need an operation to have it put in. The full name for this operation is transobturator foramen procedure. It is sometimes called TOT for short. [More...](#)

## Stress incontinence

### Treatments that are unlikely to work

- [Anterior vaginal repair](#) : This is surgery through your vagina to pull your bladder and urethra back into the right place. It's more often used to repair a prolapse of your bladder (when your bladder drops down into your vagina). [More...](#)
- [Needle suspension](#) : This is surgery through your vagina to lift the opening of your bladder back to its normal position. [More...](#)

### Other treatments

We haven't studied these treatments in the same detail as other treatments on our site. (See Our method.) But we wanted to cover these treatments because you may have questions about them.

- [Implants](#)
- [Artificial sphincters](#)

### What will happen to me?

The good news is that, out of all the different types of incontinence, stress incontinence is the easiest to treat. There are several treatments that work well. And not all treatments involve drugs or an operation. You can do exercises for stress incontinence yourself, at home.

If your symptoms are mild and don't cause you problems you may not want to do anything about them. But even if you only have a bit of leaking, it's worth doing [exercises to strengthen the muscles of your pelvic floor](#) .

You may want to seek help if incontinence is affecting daily life, especially if:

- You stop doing things you used to enjoy, such as sport and dancing, because you're worried about leaking urine
- You have to wear pads, which can be uncomfortable and a nuisance.

It is important to know that it's never too late to ask for help. Treatments work just as well if you've had symptoms for just a few weeks or for many years.

If you don't have treatment for your stress incontinence, it's unlikely your symptoms will clear up on their own. We can't tell you if they will get worse because there isn't any good research about what happens if you don't have treatment. Some women get other problems.

- If your pelvic floor muscles are very weak, you may get a **prolapse**. This happens when the front wall of your vagina and part of your bladder drops down into the entrance of your vagina. Sometimes the tube that carries urine from your bladder

## Stress incontinence

(your urethra) drops down too. You may get an uncomfortable feeling in your vagina. You might need surgery to repair a prolapse.

- You may get urge incontinence as well as stress incontinence.<sup>[4]</sup> See [Other types of incontinence](#) to learn more.
- If things get worse, you may have to go to the toilet so often that it starts to interfere with what you can do and where you can go.<sup>[14]</sup> You may lose confidence and [feel depressed](#).<sup>[4]</sup>

But even if your stress incontinence is severe, surgery often works well. Any operation carries a risk of problems. But surgery for stress incontinence is fairly safe. And most women who have it find their symptoms get better.<sup>[14]</sup>

### Questions to ask your doctor

If you have stress incontinence, you might want to ask your doctor these questions to find out more.

- How do you know that I have stress incontinence?
- Why did I get it?
- Will it get worse?
- Will it get better?
- What's the best treatment for me?
- How long will it take for the treatment to work?
- Does the treatment have any side effects?
- Will I need surgery?
- Will I be cured?
- If I have surgery will it get rid of my symptoms completely?
- How long will the effects of surgery last?

---

## Treatments:

### Duloxetine

# Stress incontinence

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on duloxetine?](#)

This information is for people who have stress incontinence. It tells you about duloxetine, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

## Does it work?

Yes. Taking duloxetine can reduce how often you leak urine and help you enjoy life more.

<sup>[18]</sup> But we don't know if the benefits last. <sup>[18]</sup>

About 1 in 3 women taking duloxetine for stress incontinence have side effects and 1 in 8 stop taking the drug because of the side effects. <sup>[18]</sup>

## What is it?

Duloxetine belongs to a group of drugs called serotonin and noradrenaline reuptake inhibitors (SNRIs). It's also used to treat depression and some forms of pain. But it has also been tried as a treatment for stress incontinence, where its brand name is Yentreve. (It has another brand name, Cymbalta, when not being used in stress incontinence.)

The National Institute for Health and Care Excellence (NICE), which advises the government on health care, says that women should only be offered duloxetine if they have already tried [pelvic floor exercises](#), and they are not suitable for surgery, or don't want to have surgery. <sup>[14]</sup>

## How can it help?

If you take duloxetine each day, you're likely to: <sup>[18]</sup>

- Leak urine less often
- Enjoy life more.

In one study, women who took duloxetine had fewer leaks than women who were taught how to do pelvic floor exercises. <sup>[19]</sup>

## How does it work?

Duloxetine increases the amounts of two chemicals in your body: serotonin and noradrenaline. These chemicals help the muscles around your bladder neck work properly.

<sup>[20]</sup> They may also increase the amount of urine that your bladder can hold. <sup>[20]</sup>

### Can it be harmful?

Some women taking duloxetine for stress incontinence stopped their treatment because they felt sick. <sup>[20]</sup> <sup>[21]</sup> <sup>[22]</sup> <sup>[23]</sup> In one study, nearly one-third of women stopped their treatment because of this. <sup>[24]</sup>

Other problems women got included **diarrhoea**, headaches, dizziness, sleepiness, and a dry mouth. <sup>[25]</sup> <sup>[19]</sup> <sup>[20]</sup> <sup>[21]</sup> <sup>[22]</sup> <sup>[23]</sup>

Doctors are advised to keep a careful check for signs of suicidal thoughts in anyone taking **antidepressants**. If you're taking duloxetine (or any other antidepressant) and you're worried about any thoughts or feelings you have, see your doctor straight away.

If you take too much duloxetine, you could get a condition called serotonin syndrome. <sup>[26]</sup> This happens when you get too much serotonin in your body, and it can be fatal.

The symptoms of serotonin syndrome can include confusion, shivering, sweating, and feeling jittery or restless. <sup>[27]</sup> You should get medical help immediately if you have any of these symptoms while you are taking duloxetine

The chance of getting serotonin syndrome may be higher if the dose you are taking is increased. <sup>[27]</sup> Taking duloxetine with some other types of medicines (for example, some other antidepressants and triptans for migraine) may also increase the chance of getting serotonin syndrome. This is mostly likely to happen when you start taking the other medicine or start taking a higher dose.

### How good is the research on duloxetine?

There's some good research that shows duloxetine can help if you have stress incontinence. We found one review of the research that looked at 10 good-quality studies ( **randomised controlled trials** ). <sup>[28]</sup>

The review found that women who took duloxetine each day:

- Leaked urine less often during treatment
- Enjoyed life more than those who took a dummy treatment (a **placebo** )
- Leaked urine less often compared with people who had training to do pelvic floor exercises.

---

## Pelvic floor exercises

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)



## Stress incontinence

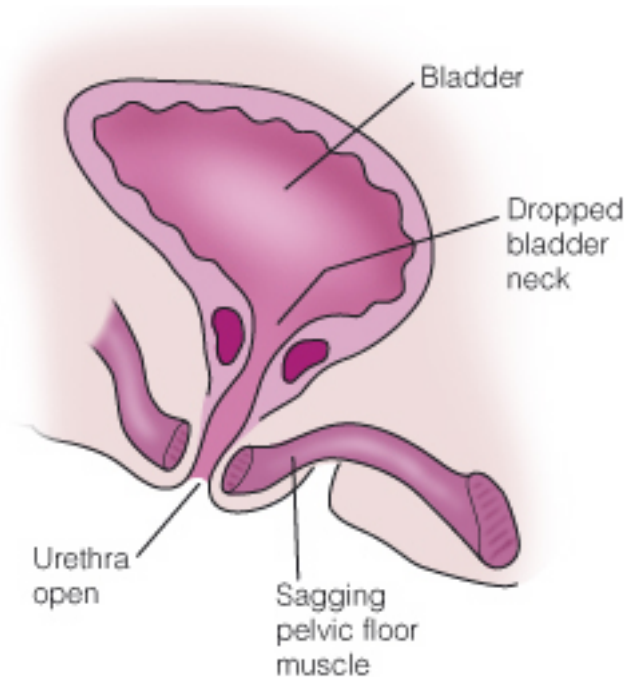
[Can they be harmful?](#)

[How good is the research on pelvic floor exercises?](#)

This information is for people who have stress incontinence. It tells you about pelvic floor exercises, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Do they work?

Yes, these exercises are likely to work. If you do pelvic floor exercises regularly, your symptoms are likely to get better. But you have to continue doing these exercises to keep the pelvic floor muscles strong.



If your pelvic floor muscles are weak, urine may leak out of your bladder.

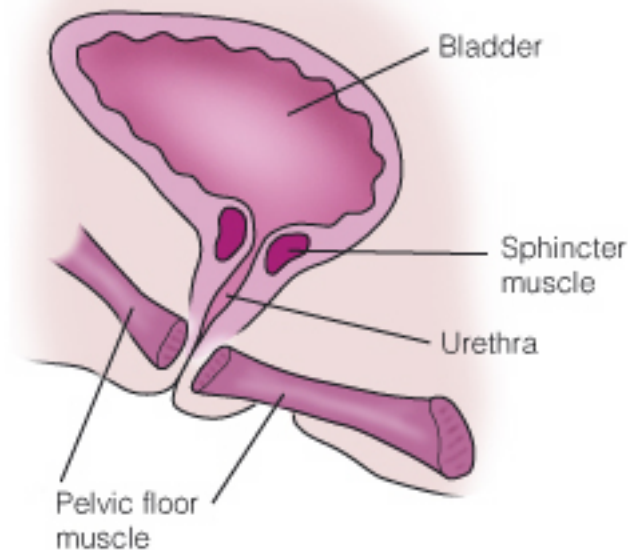
### What are they?

Pelvic floor exercises are also known as **Kegel exercises**.

Your pelvic floor muscles support your bladder and your womb. They also help to close your bladder and the tube (urethra) that carries urine from your bladder to the outside.

If you exercise these muscles they get stronger. So you're less likely to leak urine from your bladder.

## Stress incontinence



Pelvic floor muscle exercises make your pelvic floor muscles stronger.

To learn more, see [Pelvic floor exercises: how to do them](#) .

### Biofeedback

Some people use biofeedback to help learn where their pelvic muscles are and to make sure they're doing these exercises correctly. A nurse or physiotherapist puts a monitor in your vagina or back passage. This doesn't hurt. You know if you're getting the pelvic floor exercises right because a sound goes off or an image appears on a screen to let you know.

In one large summary of the research, women who had biofeedback as well as pelvic floor muscle training did slightly better than women who just had the muscle training. However, it's possible that the better results with biofeedback might have been because those people got to spend more time with health professionals, such as nurses. <sup>[29]</sup>

### How can they help?

If you do pelvic floor exercises regularly for three months to six months, you have a good chance of improvement. <sup>[30]</sup> About 6 in 10 women say their symptoms are better or have gone completely after doing these exercises.

Pelvic floor exercises work as well as [electrical stimulation](#) and [vaginal cones](#) and slightly better than [hormone replacement therapy \(HRT\)](#) . <sup>[30]</sup> <sup>[31]</sup> <sup>[32]</sup>

We're not sure how soon you will start to see the benefits of the exercises. Most doctors advise you do them for at least three months. One study showed you need to do a minimum of 24 muscle contractions a day, for at least six weeks, to start to see benefit from these exercises. It also showed exercises may work better for younger women. <sup>[33]</sup>

## Stress incontinence

### How do they work?

If you have stress incontinence, the muscles that support the opening (or neck) of your bladder and keep it closed are weak. When there's extra pressure on your bladder and these muscles (for example, when you cough or sneeze), your bladder can't stay closed. So drops of urine leak out of the tube that carries urine from your bladder to the outside (your urethra).

Being pregnant, giving birth, being overweight, and getting older can all weaken your pelvic floor muscles. For more, see [Stress incontinence: why me?](#) But these muscles are just like other muscles, and exercise can make them strong again.

When you do pelvic floor exercises the right way, they strengthen the muscles at the bottom of your bladder where your urine comes out. If you have mild or moderate stress incontinence, regular exercise can build up these muscles and help you get back bladder control. But you have to continue doing them to keep the muscles strong.

### Can they be harmful?

None of the studies we looked at found any side effects for pelvic floor exercises. These exercises are safe and do not cause any pain.

### How good is the research on pelvic floor exercises?

There's some good evidence that pelvic floor exercises can help with stress incontinence. A big summary of the research (called a [systematic review](#)) looked at 16 good-quality studies ([randomised controlled trials](#)) that altogether involved many hundreds of women. <sup>[30]</sup>

About 60 in every 100 women who did the exercises were cured or had fewer leaks after three months to six months. <sup>[30]</sup> This compared with 3 in every 100 women who didn't do the exercises.

However, half of the women who did pretend exercises (as a [placebo](#)) also found that their symptoms improved. <sup>[30]</sup> So we can't be certain how much of the improvement came from doing the exercises.

Another big summary of the research found that women who did group exercise sessions, as well as one-to-one pelvic muscle training with a therapist, did slightly better than women who only had one-to-one sessions. <sup>[34]</sup>

Pelvic floor exercises work just as well as [electrical stimulation](#) and [vaginal cones](#), and slightly better than [hormone replacement therapy \(HRT\)](#). <sup>[30] [31] [32]</sup>

Pelvic floor exercises do not work as well as [slings](#). One study found that 77 in 100 women were cured after surgery to have a sling fitted, compared with 59 in 100 after pelvic floor therapy. <sup>[35]</sup>

### Vaginal cones

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on vaginal cones?](#)

This information is for people who have stress incontinence. It tells you about vaginal cones, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

#### Do they work?

Yes. Vaginal cones are likely to help you strengthen your pelvic floor muscles and stop leaking urine.

But they don't work any better than [pelvic floor exercises](#) .

#### What are they?

Vaginal cones help you do pelvic floor exercises (also called Kegel exercises). Your pelvic floor muscles help to hold your bladder and the tube that carries urine from your bladder to the outside (your urethra) in place. When the muscles get weak, it is hard to stop urine from leaking out.

Vaginal cones are small, plastic, cone-shaped objects that you hold inside your vagina. They usually come as a set of five cones that increase in weight from 20 grams to 100 grams (from 0.7 ounces to 3.6 ounces). The cones are all the same size and have a string on the end to help you take them out.

You can't get vaginal cones on prescription, although you may be able to borrow a set from the local continence clinic. Otherwise you can buy or order them yourself from a pharmacy.

It's best to talk to your nurse or [physiotherapist](#) before using cones. You need to know how to use the cones properly and how to do the exercises.

You start by putting the lightest cone into your vagina with the larger end up. If you can hold this inside for a minute, you then move on to the next cone. When you find the cone that you can hold for just about a minute, that's the one you start with.

You need to hold the cone in your vagina for 15 minutes, twice a day. When you can do this, you move on to the next heaviest cone.

Vaginal cones aren't for everyone. Some women find it hard to use the cones for physical reasons, and other women find them unpleasant to use.

### How can they help?

If you use vaginal cones, you might leak urine less often than if you have no treatment. <sup>[31]</sup>

Vaginal cones don't seem to work any better than pelvic floor exercises. <sup>[31]</sup>

### How do they work?

If you have stress incontinence, the muscles (including your pelvic floor muscles) that support your bladder neck and keep it closed are weak. When there's extra pressure on your bladder and these muscles (for example, when you cough or sneeze), your bladder neck can't stay closed. So drops of urine leak out of the tube that carries urine from your bladder to the outside (your urethra).

Vaginal cones help you strengthen your pelvic floor muscles. The cones help you tighten (contract) these muscles because if you feel the cone slipping out, you have to tighten them to keep the cone in place. So using cones makes these muscles stronger.

### Can they be harmful?

There isn't enough evidence to know if vaginal cones cause harm.

About 22 in 100 women stop using vaginal cones before treatment is completed. <sup>[31]</sup> Some of the reasons women have given for stopping treatment early include: lack of motivation to continue with the treatment, unpleasantness, discomfort, bleeding, and vaginal prolapse (this is when the front wall of the vagina and part of the bladder drop down into the entrance of the vagina). <sup>[31]</sup> But we don't know how common these problems are.

### How good is the research on vaginal cones?

There's not much good evidence on vaginal cones. We found one summary of the research (known as a [systematic review](#)) that looked at 23 studies involving 1,806 women. <sup>[31]</sup> The review found that vaginal cones appear to be better than not having treatment. The review also found that vaginal cones appear to be as effective as [pelvic floor exercises](#) and [electrical stimulation](#). We can't be sure about these results, though, because the studies were not very good.

---

## Electrical stimulation

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on electrical stimulation?](#)

## Stress incontinence

This information is for people who have stress incontinence. It tells you about electrical stimulation, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

Yes. Electrical stimulation may work as well as [pelvic floor exercises](#) to reduce leaking. But it can have side effects.

### What is it?

Electrical stimulation means passing a mild electric current through your pelvic floor muscles. This makes them tighten (contract). The aim is to help you strengthen these muscles so they work better at keeping your bladder neck closed. This will stop urine leaking out when your bladder's under extra pressure, like when you cough or sneeze.

To stimulate your pelvic floor muscles in this way, your [physiotherapist](#) or nurse places a probe in or near your vagina. He or she then passes an electric current through the probe. You shouldn't feel any pain, but you might feel tingling or a 'pins-and-needles' feeling.

If you're comfortable using the machine yourself, you can do this at home. Your physiotherapist or nurse will tell you how often to do it. You might do it for 20 minutes to 60 minutes a day for about three weeks.

### How can it help?

Electrical stimulation can strengthen your pelvic floor muscles so that you don't leak as much urine. <sup>[16] [36] [37] [38] [39] [40]</sup> It's especially helpful if you can't tighten (contract) these muscles at all.

It may work as well as [pelvic floor exercises](#) , [vaginal cones](#) , and [hormone replacement therapy \(HRT\)](#) . <sup>[41] [32] [30]</sup>

Most of the research looked to see whether electrical stimulation reduced leaking. We're not sure if it can get rid of stress incontinence completely. <sup>[42]</sup>

### How does it work?

If you have stress incontinence, the pelvic floor muscles that support the opening of your bladder (your bladder neck) and keep it closed are weak. When there's extra pressure on your bladder and these muscles (for example, when you cough or sneeze), your bladder neck can't stay closed. So drops of urine leak out of the tube (urethra) that carries urine from your bladder to the outside.

Electrical stimulation is an artificial exercise of your pelvic floor muscles. These muscles help to keep your bladder closed so that urine doesn't leak out. The better they work, the less likely you are to leak urine. Exercising them should make them stronger and less likely to open when you cough, sneeze, or laugh.

## Stress incontinence

If you have damaged nerves, electrical stimulation may also help these nerves to grow again. This will also help to reduce leaks.

### Can it be harmful?

A few women who have electrical stimulation get these problems: <sup>[30]</sup> <sup>[43]</sup>

- Tenderness and irritation in the vagina
- Bleeding
- Tingling in the thigh
- Urinary tract infection
- Problems using the machine.

Some women who have tried this treatment have not been too keen on it, probably because of the problems mentioned above. <sup>[41]</sup>

### How good is the research on electrical stimulation?

We found one summary of the research (known as a **systematic review**) that included one study. <sup>[16]</sup> We also found five other good-quality studies. <sup>[36]</sup> <sup>[37]</sup> <sup>[38]</sup> <sup>[39]</sup> <sup>[40]</sup> Most of these studies were small and involved fewer than 50 women.

The studies found that electrical stimulation worked better than dummy stimulation (a kind of **placebo**). It helped strengthen women's pelvic floor muscles and reduced the amount of leakage they had. <sup>[16]</sup> <sup>[36]</sup> <sup>[37]</sup> <sup>[38]</sup> <sup>[39]</sup> <sup>[40]</sup>

Electrical stimulation seems to help just as much as [pelvic floor exercises](#), [vaginal cones](#), and some types of [hormone replacement therapy](#). <sup>[41]</sup> <sup>[32]</sup> <sup>[44]</sup>

Another review compared results from 12 different studies. But it said many of the studies were not very good quality and did not last long enough to see whether electrical stimulation could cure stress incontinence. <sup>[42]</sup>

---

## Hormone replacement therapy (HRT)

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on hormone replacement therapy \(HRT\)?](#)

## Stress incontinence

This information is for people who have stress incontinence. It tells you about hormone replacement therapy (HRT), a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

There's some evidence that using oestrogen cream or tablets in the vagina helps improve stress incontinence. But other forms of HRT (such as tablets you swallow, for example) may make the problem worse.

There are risks with taking HRT that may increase the longer you take it. HRT may increase your risk of breast cancer, heart disease, a stroke, or blood clots in your lungs (pulmonary embolism), although doctors think the risks are lower with vaginal HRT. Doctors usually only advise you take HRT for incontinence for a limited time.

### What is it?

HRT stands for hormone replacement therapy. You can get several forms of HRT, including creams and tablets that you put in your vagina.

Most forms of HRT contain a type of oestrogen. Oestrogen is the main female hormone. Oestrogen is important for a healthy reproductive system (the parts of your body that let you get pregnant and give birth). Oestrogen may also be important for keeping other parts of your body in good condition. They include your bladder, urethra (the tube which takes urine out), and vagina, and the muscles of your pelvic floor.

Many women take HRT around the menopause to replace some of the oestrogen that the body stops making at this time. Doctors normally prescribe it to relieve symptoms such as hot flushes or a dry vagina. But your doctor might suggest you try a short course of HRT if you're deciding whether to have surgery for stress incontinence, or if you have to wait a long time for an operation.

If you still have your womb (uterus), you'll be offered a combination of oestrogen and another hormone called progestogen. Taking oestrogen on its own increases your risk of getting cancer of the lining of the womb (endometrial cancer). Adding progestogen to the oestrogen lowers your risk of getting this kind of cancer. This type of treatment is known as **combined HRT**. Some common brands of combined HRT are:

- Evorel
- Nuvelle
- Premique
- Prempak-C.



## Stress incontinence

If you've had an operation to remove your womb (a **hysterectomy**) you can take oestrogen without progestogen because there is no risk of getting endometrial cancer. Some common brand names of oestrogen-only HRT are:

- Estraderm
- Evorel.

There are lots of HRT products. You can take it as a skin patch, a tablet, or a vaginal ring. To read more, see [Different kinds of HRT products](#) .

You can also get oestrogen tablets and creams that you put in your vagina. Some doctors advise taking HRT this way for incontinence. Here are the names of some oestrogen creams and vaginal tablets:

- Estring (vaginal ring)
- Ovestin (cream)
- Vagifem (vaginal tablets).

If you use vaginal cream or tablets, you may still need to take progestogen tablets to protect you against cancer of the lining of the womb.

### How can it help?

One large summary of research (a **systematic review**) found that using oestrogen in the vagina in the form of creams or tablets improved symptoms of all types of incontinence, including stress incontinence. However, the studies don't tell us if the benefits continue after stopping treatment. The researchers think it's unlikely, given that women would then revert to naturally lower oestrogen levels. <sup>[45]</sup>

The same research also found that women who took HRT tablets that are swallowed (this type of treatment, which goes into the bloodstream, is called systemic HRT) reported that their incontinence got worse. In fact, in one study, women who did not have incontinence at first were more likely to develop it after taking HRT tablets. This worsening of symptoms applied to women who were taking oestrogen on its own as well as women taking oestrogen combined with progestogen. But we don't know if it applies to other forms of systemic HRT, such as patches.

### How does it work?

If you have stress incontinence, the muscles that support the opening of your bladder (called your bladder neck) and keep it closed are weak. When there's extra pressure on your bladder and these muscles (for example, when you cough or sneeze), your bladder neck can't stay closed. So, drops of urine leak out of the tube that carries urine from your bladder to the outside (your **urethra**).

## Stress incontinence

Stress incontinence becomes more common as women get older. Your body makes much less oestrogen at the menopause, and doctors think this may be one reason why stress incontinence happens. <sup>[32]</sup>

Your urethra, bladder, and pelvic floor muscles have nerve cells that respond to oestrogen. The theory is that getting back some oestrogen can help keep these muscles healthy.

### Can it be harmful?

Yes. If you take HRT for just a short time (less than a year) there's a chance you may get some vaginal spotting, breast tenderness, or nausea. <sup>[45]</sup> Other side effects are headaches and mood swings. But you're less likely to get these if you use vaginal tablets or cream.

HRT can cause more serious side effects if you take it for a longer time, although the risk is thought to be lower for products you use in the vagina. Doctors normally advise only a short course of HRT for stress incontinence.

Research shows that taking combined HRT (oestrogen and a progestogen) increases the risk of getting breast cancer, blood clots, stroke, and heart disease. <sup>[46]</sup> <sup>[47]</sup> <sup>[48]</sup> <sup>[49]</sup> <sup>[50]</sup> If you take oestrogen on its own, your risk of stroke is increased. <sup>[50]</sup>

The increase in these risks is small. And you have to take HRT for a long time to get them. To learn more about the long-term side effects of HRT, see our information on [HRT for menopause](#) .

In one study of women who had had their womb removed, taking oestrogen-only HRT for about seven years increased the risk of stroke. <sup>[51]</sup> But there was no increased risk of getting breast cancer, heart disease, or blood clots in the lung. <sup>[51]</sup>

If you still have your womb and take oestrogen on its own, you're more likely to get cancer of the womb lining (this is called **endometrial cancer**). <sup>[52]</sup> Women who still have a womb are usually advised to take a form of HRT that includes progestogen. This can protect you from endometrial cancer.

### How good is the research on hormone replacement therapy (HRT)?

In the past, the research on HRT and stress incontinence was not clear. Some studies found it could help, while others suggested it might make it worse, or not make much difference. But, more recently, a big summary of research (called a **systematic review** ) included 34 good-quality studies and involved about 20,000 women, 10,000 of whom received some form of HRT. The studies used different combinations of types of oestrogen and lengths of treatment. Overall, the results are reliable. <sup>[45]</sup>

The summary found some evidence to indicate that oestrogens used in the form of vaginal creams and tablets helped with all types of incontinence. There wasn't enough evidence to say whether the benefits continued after treatment stopped, and there was no evidence about possible long-term side effects.

## Stress incontinence

The review found that women who took HRT in the form of a tablet were more likely to report worsening incontinence than women taking a dummy ( placebo ) tablet. This evidence comes mainly from two very large trials involving over 17,000 women with incontinence.

One of the studies included in the review found that women who took HRT were about twice as likely to have stress incontinence a year later.

---

## Weight loss

In this section

[What is it?](#)

[How can it help?](#)

This information is for people who have stress incontinence. It tells you about weight loss, a treatment used for stress incontinence.

We haven't looked at the evidence for weight loss in the same detail we have for the other treatments we cover. (See Our method to learn more.) But we wanted to cover this treatment because people often have questions about it.

### What is it?

About one-third of women in developed countries are **obese** (very overweight). Stress incontinence is more common in women who are obese.<sup>[53]</sup> If you're obese, the extra weight may put more pressure on your abdomen. And this may put extra stress on your pelvic floor muscles, which help keep urine in your bladder. So losing weight might help.

### How can it help?

There isn't very much research looking at whether losing weight will help stop your leaking. There are a few small studies showing that women who lose weight have fewer leaks.<sup>[54]</sup>

And there is one good study (a **randomised controlled trial** ) that looked at whether a weight loss programme reduced the number of leaks in overweight women with incontinence.<sup>[54]</sup> It compared what happened in women who were in a diet, exercise, and behaviour change programme aimed at losing weight, with women in an education programme.

It found that those in the weight loss programme lost an average of 7.8 kilograms (just over a stone), while those in the education group lost an average of 1.5 kilograms (just over 3 pounds).

The women in the weight loss group had less stress incontinence, and reduced the average number of leaks they had a week from nine to four.

---

## Colposuspension

# Stress incontinence

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on colposuspension?](#)

This information is for people who have stress incontinence. It tells you about colposuspension, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

## Does it work?

Yes. If your bladder has slipped down out of its normal place, a type of surgery called **colposuspension** will lift it back into position. This operation should help to stop you leaking urine.

Colposuspension is the best operation for curing stress incontinence. The benefits also last longer than other types of surgery.

## What is it?

Colposuspension is an operation. If you've tried simple treatments for stress incontinence, such as [pelvic floor exercises](#), and they haven't worked, your doctor may suggest you have surgery.

There are many different types of surgery. The aim is to pull the opening (or neck) of your bladder up to its normal place. This makes it less likely that urine will leak out.

Colposuspension is the most common type of operation for stress incontinence. During this operation, the top of your vagina is lifted up and the surgeon uses stitches to tie it behind your pubic bone (the bone behind your pubic hair). The stitches are permanent.

There are two ways to do this operation: open surgery or keyhole surgery.

### Open retropubic colposuspension

This operation is done through a large cut in your lower abdomen. Your vagina is lifted up in the space behind your pubic bone. Your pubic bone is the bone behind your pubic hair. Surgeons then use stitches to tie your vagina behind your pubic bone. Because the opening of the bladder lies in front of the upper vagina it is lifted into its normal position. The stitches are permanent.

There are two main types of open retropubic colposuspension.

- **Burch colposuspension:** This is the most common type. The stitches are tied to the [cartilage](#) behind the pubic bone.
- **Marshall-Marchetti-Krantz urethropexy:** The stitches are tied to the bone.

## Stress incontinence

### Keyhole (or laparoscopic) colposuspension

This operation is done through two or three very small cuts in your lower abdomen. Doctors call this **laparoscopic surgery**. It's done with a special tube called a laparoscope. This is a long tube with a light, a camera, and instruments at the end. It's put into your body through a small cut (the 'keyhole') in your belly button. The camera at the end sends pictures to a television screen. And the instruments let your surgeon operate on the area.

### What will happen?

All operations that involve your bladder are serious. It may take two months or more for you to get back to your normal routine.

See [Surgery for stress incontinence: what to expect](#) to learn more.

### How can it help?

Overall, colposuspension works well for stress incontinence.

- Open retropubic colposuspension (the most common operation) works really well. About 8 in 10 women who have this operation are completely dry or much better afterwards.<sup>[55]</sup> The benefits of open retropubic colposuspension last for at least five years.<sup>[55]</sup>
- Keyhole (laparoscopic) colposuspension works just as well as open retropubic colposuspension.<sup>[55] [56] [57]</sup>

Open colposuspension works better than another operation called [anterior vaginal repair](#).<sup>[58]</sup> After a year, about 85 in 100 women who have open colposuspension are cured, compared with 70 in 100 women who have anterior vaginal repair. And after five years, those numbers are 80 in 100 for colposuspension and 60 in 100 for anterior vaginal repair.

Open colposuspension also works better than an operation called [needle suspension](#).

Open colposuspension works as well as [tension-free vaginal tape](#) for at least two years and [slings](#) for at least six years.<sup>[56] [59]</sup>

## Stress incontinence



If your bladder has dropped down out of position, urine may leak out.

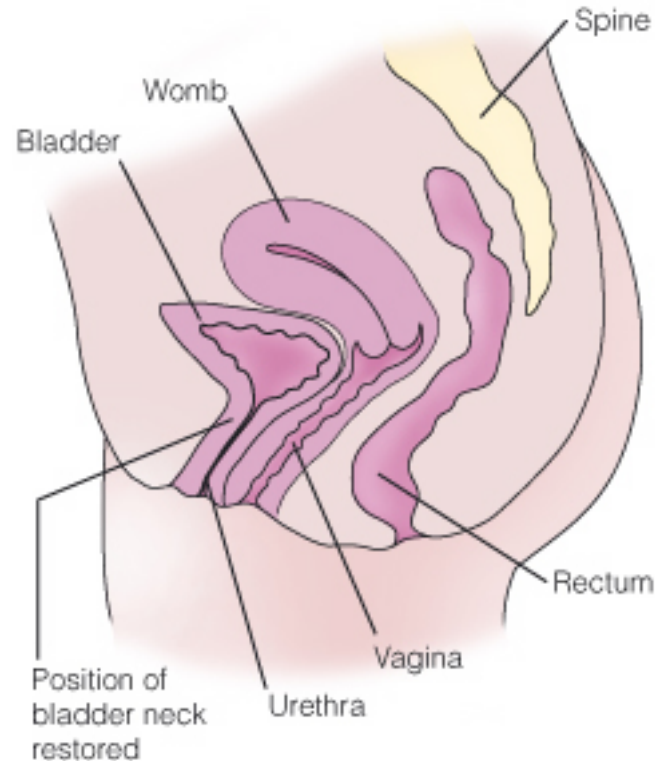
### How does it work?

If you have stress incontinence, the muscles that support your bladder are weak. So, the opening of your bladder (called the bladder neck) may drop out of place.

It becomes harder for the opening to stay closed. When there's extra pressure on your bladder (when you cough or sneeze, for example) drops of urine leak out.

Surgery lifts the opening of your bladder and urethra (the tube that carries urine from your bladder) back into the right place. This means that urine is less likely to leak out.

## Stress incontinence



You can have surgery to lift your bladder back to its correct position.

Once your bladder is back in the right place, the muscles around your bladder neck and the muscles of your pelvic floor will be able to work properly again, sealing off your bladder when you're not passing urine. But if these muscles are weak, urine might still leak out.

### Can it be harmful?

Like most operations, colposuspension can have serious side effects.<sup>[55]</sup> The risks of side effects are about the same for open retropubic colposuspension and laparoscopic colposuspension.<sup>[57]</sup> <sup>[60]</sup>

- There's a small chance that you may need to pass urine more often during the day and at night. This is called an **overactive bladder**. It happens to about 1 in 16 women who have open colposuspension.
- There's a chance that your womb (uterus) will slide down into your vagina. Doctors call this a **uterine prolapse**. This is because your vagina is pulled up along with your bladder. You may need a second operation to repair this.
- About 1 in 10 women have problems passing urine after open retropubic colposuspension. If this happens, you may have to put a small tube called a catheter into your urethra to drain urine from your bladder.

## Stress incontinence

- Your bladder or the tubes from your **kidneys** to your bladder (your ureters) may be injured during the operation. If this happens, you may need a second operation. But this is rare.
- You may get pain in the lower part of your abdomen, This happens to 1 in 16 women. It is more common after the Marshall-Marchetti-Krantz technique.

As with any operation, there's a risk of an **infection** of your wound, serious bleeding, and clots in your blood vessels. If you get one of these problems, you may need to stay in hospital longer.

### How good is the research on colposuspension?

There are two ways to do this operation: open retropubic colposuspension and keyhole (or laparoscopic) colposuspension.

#### Open retropubic colposuspension

There's good evidence that this operation is helpful. We found four large summaries of the research (called **systematic reviews**).<sup>[59] [61] [55] [62]</sup> They all found that colposuspension can help if you have stress incontinence.

The first summary compared open colposuspension with a type of surgery called anterior vaginal repair.<sup>[61]</sup> It looked at eight good-quality studies that included nearly 1,000 women altogether. The studies found that about 8 in 10 women who had open retropubic colposuspension were still better five years after their operation. About 6 in 10 women who had anterior vaginal repair were better five years after their operation.

The second summary found that open colposuspension worked better than pelvic floor exercises and needle colposuspension.<sup>[61]</sup> These findings are based on the results of two studies that included 120 women (versus pelvic floor exercises) and seven studies in 570 women (versus needle colposuspension). Two other summaries found that colposuspension worked just as well as tension-free vaginal tape and slings.<sup>[62]</sup>

Since these summaries, a large study has found that 324 women who had a particular kind of sling operation did better than 329 women who had colposuspension. In the study, 47 in 100 women who had the sling surgery did better, compared with 38 in 100 who had colposuspension. But women who had the sling surgery had more complications afterwards. These complications included infections, difficulty urinating, and developing a different kind of incontinence called **urge incontinence**.<sup>[63]</sup>

#### Keyhole (laparoscopic) colposuspension

A review of the research found that keyhole surgery (laparoscopic colposuspension) worked just as well as open colposuspension.<sup>[57]</sup>



### Slings

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[How do they work?](#)

[Can they be harmful?](#)

[How good is the research on slings?](#)

This information is for people who have stress incontinence. It tells you about surgical slings, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

#### Do they work?

Yes, slings can help to reduce or stop leaking. They work as well as some other types of surgery.

But having a sling fitted is a more serious operation than some other types of surgery for incontinence. So, slings are usually used for women who have not been helped by other types of surgery.

#### What are they?

Slings are strips of material. They are 2.5 centimetres (1 inch) wide and 12 centimetres (5 inches) long. They're made either from tissue taken from your abdomen or from a man-made material, such as polytetrafluoroethylene (Gore-Tex). To have a sling put in, you need to have a large cut in your lower abdomen and another in your vagina.

During the operation, your surgeon passes the sling around your bladder neck so it hangs a bit like a hammock. The ends of the sling are then joined to the inside of your abdomen. The sling lifts up the tube that carries urine out of your bladder (your **urethra**). This brings the tube up to its normal position where it can work better. The sling also helps to close the bladder neck when you cough or sneeze.

You'll be given a **general anaesthetic** or a spinal anaesthetic ( **epidural** ) for the surgery, so you won't feel anything. You'll probably need to stay in hospital for a few days.

A newer type of sling, called a mini-sling, is inserted through a single cut. The operation is done under a local anaesthetic, which means you will be awake during the procedure but you will not feel any pain.

Slings are usually used if you have a more complicated type of incontinence, especially if your sphincter muscles aren't working properly. If you've had other operations for incontinence and they haven't worked or the benefits have worn off, your doctor may suggest sling surgery.

### How can they help?

Nearly all women who have a sling put in are dry or much better afterwards.<sup>[59]</sup> And they stay dry or better for at least six years after their operation.<sup>[64]</sup>

But some slings might work better than others. A sling made from your own tissue may weaken with time so that your symptoms come back.<sup>[65]</sup> Slings made from synthetic materials may last longer but can cause more problems, such as **infection**. They may also wear away.<sup>[64]</sup>

In one study, 95 in 100 women who had a sling made of synthetic material had no incontinence two years after their operation.<sup>[65]</sup> And 70 in 100 women with a sling made from their own tissue had no incontinence.

Slings seem to work as well as [colposuspension](#), [needle suspension](#), and [tension-free vaginal tape](#).<sup>[59] [66] [67]</sup> (These are all types of surgery.) But you may get more problems after having a sling fitted than after a needle suspension operation, tension-free vaginal tape, or an [anterior vaginal repair](#).<sup>[59] [67] [68] [69]</sup>

### How do they work?

If you have stress incontinence, the muscles that support your bladder and keep its opening (neck) closed are weak. When there's extra pressure on your bladder and these muscles (for example, when you cough or sneeze), your bladder neck can't stay closed. So drops of urine leak out of the tube that carries urine from your bladder to the outside (your urethra).

The sling acts like a hammock for your bladder neck and urethra, giving them extra support. It holds up your bladder neck. So when you sneeze or cough, for example, your sphincter muscle should stay shut so urine can't leak out.

### Can they be harmful?

Your womb is more likely to drop down (this is called a **uterine prolapse**) and you're more likely to have difficulty urinating if you have a sling than if you have a type of surgery called [anterior vaginal repair](#).<sup>[68]</sup>

You're more likely to get a high temperature, get an infection, lose a lot of blood, and get **blood clots** after you have a sling fitted than after you have a [needle suspension](#).<sup>[59]</sup>

You're more likely to get some minor problems with a sling than after open colposuspension.<sup>[64]</sup> For example, after a few years your sling may wear away or you may have problems urinating.<sup>[64]</sup> These problems are both easy to deal with. One study found that women who have a sling fitted are as likely to get side effects as women who have surgery to put in [tension-free vaginal tape](#).<sup>[66]</sup> Another study found that slings

## Stress incontinence

were more likely to cause problems than tape.<sup>[69]</sup> Tension-free vaginal tape (TVT) is a newer type of sling.

A study that compared the mini-sling to tension-free vaginal tape found that women who had the mini-sling were more likely to have severe incontinence after the procedure.<sup>[67]</sup> About 16 in 100 women who had the mini-sling had severe incontinence one year after the procedure, compared with 5 in 100 women who had TVT.<sup>[67]</sup>

Another study found that different kinds of sling caused different problems depending on exactly where they were placed. For example, some kinds were more likely to cause a hole in the bladder, while others might be more likely to cause some nerve damage.<sup>[70]</sup>

### How good is the research on slings?

There's some good evidence that slings work, but there's also evidence that slings can cause more problems than some other treatments for stress incontinence.

Studies suggest that slings can work as well as [tension-free vaginal tape](#) , [colposuspension](#) , and [needle suspension](#) .<sup>[59]</sup> <sup>[64]</sup> <sup>[66]</sup> <sup>[67]</sup> And slings work better than [pelvic floor exercises](#) .<sup>[67]</sup> But more women have had problems with a sling than with the other treatments. One study followed women for six years. Of the 17 women, two found that their sling wore away. And 1 of the 17 women had problems urinating.<sup>[64]</sup>

Another study found that slings were more likely than an operation called [anterior vaginal repair](#) to cause a uterine prolapse (where your womb drops down through your vagina) or problems urinating.<sup>[68]</sup>

Compared with needle suspension, slings were more likely to cause a high temperature, an infection, blood loss, or a blood clot in the lung.<sup>[59]</sup>

One large study found that one type of sling, a fascial sling, did better than standard colposuspension. About 47 in 100 women who had the sling surgery had fewer urine problems, compared with 38 in 100 who had colposuspension. But women who had the sling surgery had more complications afterwards. These complications included infections, difficulty urinating, and developing a different kind of incontinence called [urge incontinence](#) .<sup>[63]</sup>

---

## Tension-free vaginal tape

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on tension-free vaginal tape?](#)

## Stress incontinence

This information is for people who have stress incontinence. It tells you about tension-free vaginal tape, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

Yes. Tension-free vaginal tape seems to work for most women. You'll need an operation to put in vaginal tape. But there is a very small risk of serious complications from this type of surgery.

Vaginal tape works as well as a bigger operation called [colposuspension](#) .

### What is it?

Tension-free vaginal tape (TVT) is a newer type of [sling](#) . The main difference between vaginal tape and traditional slings is that you don't need a large cut in the abdomen to have vaginal tape put in.

The operation to put in vaginal tape takes about 30 minutes. The tape is made from a man-made material, such as polypropylene (Prolene).

The first part of the operation is done through your vagina. A surgeon places the tape under the middle part of your [urethra](#) (the tube that carries urine from your bladder). The tape is then pulled through two tiny cuts on the surface of your abdomen, just above your pubic area. But doctors do not pull the tape tight, as they do with other types of sling. That's why it's called tension-free. Your body makes scar tissue that grows into the tape and keeps it in place. This gives extra support for your urethra.

The National Institute for Health and Care Excellence (NICE), the government body that advises doctors about which treatments should be available on the NHS, has approved the use of vaginal tape.<sup>[56]</sup> But you can only choose this treatment if:<sup>[14]</sup>

- Simpler treatments, such as [pelvic floor exercises](#) , haven't worked
- Your surgeon is properly trained to do this new treatment
- You know about the pros and cons of the different treatments.

Vaginal tape seems to work well, but we don't know yet if it's safe in the long term.

You'll probably be given a [local anaesthetic](#) or [epidural](#) for this operation. This means you won't be asleep, but you won't feel any pain.

Vaginal tape has some advantages over other types of surgery for stress incontinence.

- The operation takes about 30 minutes, compared with about an hour for most types of surgery.

## Stress incontinence

- You get back to normal much more quickly. You'll need about two weeks to recover from vaginal tape surgery. For standard surgery, recovery can take two months.
- You're less likely to need strong painkillers after the operation. Only about 1 in 5 women who have a vaginal tape operation need strong painkillers called [opiates](#) . For other kinds of surgery, nearly everyone needs these painkillers afterwards.
- You'll be able to leave hospital sooner (usually within a few days).

As in other operations for incontinence, you'll need a tube (called a **catheter**) to empty your bladder straight after the operation. The tube will be removed as soon as you can empty your bladder yourself.

Your doctor may suggest a newer operation using vaginal tape, which is slightly different from the one we describe here. For more details, go to [Transobturator tape \(TOT\)](#) .

### How can it help?

More than 8 in 10 women who have tension-free vaginal tape get better. They no longer leak urine when they laugh, cough, sneeze, or exercise. <sup>[56]</sup> <sup>[66]</sup>

The benefits of this operation seem to last at least two years. This is how long studies have looked at women after their operation so far. The benefits could last much longer. But this is a new treatment so we'll have to wait for the results of longer studies before we know how long the tape works for.

Vaginal tape works just as well as a bigger operation called [colposuspension](#) . <sup>[56]</sup> <sup>[57]</sup> <sup>[71]</sup> But you should be back to doing your normal activities in half the time it takes women to recover from colposuspension. On average, women who had a vaginal procedure were up and about after 10 days. Those who had a colposuspension took 21 days to get back on their feet. <sup>[56]</sup>

Vaginal tape works slightly better than [keyhole \(laparoscopic\) colposuspension](#) . <sup>[56]</sup> The benefits also seem to last longer. For example, all women who have vaginal tape or colposuspension say their symptoms are better three months after having their operation. <sup>[56]</sup> But one or two years after having their operation, 9 in 10 women who have vaginal tape are still well compared with 8 in 10 women who had colposuspension.

Vaginal tape works as well or better than traditional [slings](#) . <sup>[66]</sup> <sup>[72]</sup> It also works better than [transobturator tape](#) , with a lower chance that you'll need a second operation. <sup>[73]</sup>

### How does it work?

If you have stress incontinence, the muscles that support your bladder neck are weak. When there's extra pressure on your bladder and these muscles (for example, when you

## Stress incontinence

cough or sneeze), your bladder neck can't stay closed. So drops of urine leak out of the tube that carries urine from your bladder to the outside (your urethra).

Vaginal tape is made into a U-shaped sling. It goes under the middle of your urethra. The tape supports your urethra and keeps your bladder closed.

### Can it be harmful?

We don't know about the long-term effects of vaginal tape because it's a fairly new treatment. Information on what happens after the operation has been collected for only about five years.

But we already know of some possible problems with vaginal tape.

- The main problem with this treatment is that your bladder may be punctured during this surgery.<sup>[56]</sup> This doesn't usually cause any long-lasting problems provided it is spotted. Your bladder will usually get better on its own, although a few women need stitches. If your bladder is cut by accident, you'll need to have a tube put in your bladder to drain the urine. This has to stay in place for seven days to 10 days. But you may not have to stay in hospital all this time.
- There's a 1 in 10 chance that your bladder won't work very well after the operation. You might need to pass urine more often and feel as if you have to go urgently. This feeling should pass.
- There is a very small chance that some of your blood vessels and nerves will be injured during the operation. You may need more treatment.
- There is a chance that after a while the tape could wear away and not work so well. We don't know for certain how many women are affected by this problem because the tape has not been used or studied for long enough. Bits of the tape could wear away and go into your urethra or bladder. You might need surgery to open your bladder if this happens.<sup>[74]</sup>
- There's a small chance that the operation will work so well that you'll have trouble passing urine. You may need to put a disposable tube in your bladder to drain the urine. This is called **self-catheterising**. You may need to do this for a few weeks or even months after the operation.
- With any operation, there's a small risk that you'll have serious bleeding, your wound will become infected or you'll get a clot in the blood vessels. If this happens, you may need to stay in hospital longer than planned.

There have also been some reports of life-threatening problems with vaginal tape surgery. These problems can happen if your bowel is punctured during surgery. But this is rare.

<sup>[75]</sup>

### How good is the research on tension-free vaginal tape?

There's good evidence that surgery using vaginal tape works well. This is a fairly new treatment, so many of the studies we found compared how it worked with older treatments.

One small study involving 53 women compared vaginal tape with an older operation using [slings](#).<sup>[66]</sup> The two operations worked about as well as each other. Nearly 9 in 10 women were cured, whether they had vaginal tape or a sling.

A review of the research that looked at two studies involving over 400 women found that vaginal tape worked just as well as an operation called [colposuspension](#).<sup>[56]</sup> <sup>[76]</sup> And, women who had surgery with vaginal tape recovered faster after their operation.

A big summary of the research (which looked at 8 studies in total) compared surgery using vaginal tape with laparoscopic (keyhole) colposuspension. It found vaginal tape worked as well as, or slightly better than, the keyhole surgery.<sup>[57]</sup>

---

## Transobturator tape (TOT)

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on transobturator tape \(TOT\)?](#)

This information is for people who have stress incontinence. It tells you about transobturator tape (TOT), a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

We're not certain. We don't know if this new type of vaginal tape operation works as well as other kinds of surgery for incontinence. There aren't enough studies yet.

### What is it?

Transobturator tape (or TOT for short) is similar to an operation called [tension-free vaginal tape](#) (TVT). But the way the tape is put in and fitted is different in TOT. This may make TOT safer because there is less chance that your bowel or blood vessels will be injured.

During both operations using vaginal tape, a surgeon makes a small cut in your vagina through to your urethra (the tube that carries urine from your bladder to outside your body). He or she then places the tape under the middle part of your urethra. Your body makes scar tissue that grows into the tape and keeps it in place. This gives extra support for your urethra, making it less likely that you'll leak urine.

If the surgeon uses the TVT method, the tape ends are passed upwards through a space behind your pubic bone. They are brought to the surface through two tiny cuts in your

## Stress incontinence

abdomen, just above your pubic area. But in vaginal tape using TOT, the tape ends are passed sideways through a natural space in your hip bone (called the obturator foramen). They are brought to the surface through tiny cuts just to the side of the lips of your vagina. <sup>[14]</sup>

Unlike the TVT method, in the TOT method tape doesn't go near your bladder. This reduces the chances of damage to your bladder, damage to your bowel (the tube that takes waste away from your stomach), and injury to blood vessels, which can cause serious bleeding ( haemorrhage ). The TOT method also avoids cutting your abdomen.

The National Institute for Health and Care Excellence (NICE), the government body that decides which treatments should be available on the NHS, says this type of operation is safe enough and works well enough for use in the NHS. But you should understand the risks of TOT before you agree to it. <sup>[14]</sup>

### How can it help?

In one good study, more than 8 in 10 women were cured whether they had the TOT method or TVT. <sup>[77]</sup> In this study, the two methods worked as well as each other in the short term. But we don't know how long the benefits of this operation last because this is such a new treatment and there are no long-term studies.

However, another study found that the TOT method wasn't as good as TVT. Six months after surgery, TOT had worked for 21 in 100 women, compared with 45 in 100 for TVT. <sup>[73]</sup> And more women who'd had surgery using TOT needed a second operation.

### How does it work?

If you have stress incontinence, the muscles that keep your bladder closed are weak. Things like sneezing and coughing put extra pressure on the muscles and urine leaks out.

TOT tape helps keep your bladder closed.

### Can it be harmful?

The main side effect of TOT is finding it hard to pass urine afterwards. This affects about 1 in 20 women. <sup>[77]</sup> Another problem that can happen is that the tape rubs against your vagina or urethra, which can wear bits of the tape away. If this happens, the tape may not work as well. In studies, this happened to about 1 in 50 women. <sup>[77]</sup>

Other side effects are rare, but they include: <sup>[78]</sup> <sup>[79]</sup> <sup>[80]</sup> <sup>[81]</sup> <sup>[70]</sup>

- Heavy bleeding (haemorrhage)
- Damage to your urethra



## Stress incontinence

- Damage to your bladder
- Damage to your vagina
- Bruising
- **Infection** .

### How good is the research on transobturator tape (TOT)?

There isn't enough evidence to say how well transobturator tape (TOT) works. We only found one good-quality study (a randomised controlled trial). It looked at 110 women. Half of the women had transobturator tape (TOT) and half had tension-free vaginal tape (TVT). In the study, more than 8 in 10 women were cured, whichever operation they had. <sup>[82]</sup>

Three other studies also compared the operations. None of the studies showed that one worked better than the other. Two studies found that women who had transobturator tape had fewer problems after the operation. <sup>[83]</sup> <sup>[84]</sup> But one study found that women who had TVT had fewer problems. So we don't know for sure which is best. <sup>[85]</sup>

We need more research on TOT to say how well it works for stress incontinence and how it compares with other treatments.

---

## Anterior vaginal repair

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on anterior vaginal repair?](#)

This information is for people who have stress incontinence. It tells you about anterior vaginal repair, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

Anterior vaginal repair (anterior colporrhaphy) doesn't work as well as another type of surgery called [colposuspension](#). And 1 in 4 women who have this operation will need a second operation for incontinence.

### What is it?

Anterior vaginal repair is a type of surgery.

## Stress incontinence

If you've tried simple treatments for stress incontinence, such as [pelvic floor exercises](#), and they haven't worked, your doctor might suggest you have surgery. There are many different types of surgery that pull the opening of your bladder up to its normal place and make it less likely that urine will leak out.

This operation is done through your vagina. Doctors use this treatment when your leaking is frequent and your bladder and the tube that carries urine from your bladder to the outside (your **urethra**) have slipped into your vagina. This is called a **prolapse**. During this operation, your bladder and urethra are stitched back into their normal places.

All operations involving your bladder are serious. It may take two months or more for you to get back to your normal routine.

To learn more, see [Surgery for stress incontinence: what to expect](#).

### How can it help?

Overall, surgery works well for stress incontinence. But anterior vaginal repair doesn't work as well as another type of surgery, called [open retropubic colposuspension](#).<sup>[61]</sup> A year after their surgery, about 71 in 100 women who have anterior vaginal repair are cured, compared with 86 in 100 women who have open colposuspension. And after five years, only 62 in 100 women who have anterior vaginal repair are still cured, compared with 79 in 100 women who have colposuspension.

### How does it work?

If you have stress incontinence, the muscles that support your bladder are weak. So your bladder and the tube that carries the urine (your urethra) may drop down out of place. It becomes harder for the opening of the bladder to stay closed. When there's extra pressure on your bladder (for example, when you cough or sneeze), drops of urine leak out.

Surgery lifts your bladder and urethra back into the right place. It means that urine is less likely to leak out.

Once your bladder is back in the right place, the muscles around it and the muscles of your pelvic floor will be able to work properly again, sealing off your bladder when you're not passing urine. But if these muscles are weak, urine may still leak out.

### Can it be harmful?

If you have anterior vaginal repair, you're more likely to need another type of surgery than if you have other surgery. Nearly 1 in 4 women who have anterior vaginal repair need another operation.<sup>[61]</sup>

And with any operation, there's a risk of an **infection** of your wound, serious bleeding, and clots in your blood vessels. If you get one of these problems, you may need to stay in hospital longer.

### How good is the research on anterior vaginal repair?

There's quite good evidence to show that anterior vaginal repair doesn't work as well as an operation called [open retropubic colposuspension](#) . We found a summary of the research (a systematic review ) that looked at eight good quality-studies ( randomised controlled trials ) that included 929 women. <sup>[58]</sup>

Five years after anterior vaginal repair, about 6 in 10 women were still cured. <sup>[58]</sup> About 8 in 10 women who had open retropubic colposuspension were still cured.

Two studies that involved nearly 500 women found that anterior vaginal repair seems to work about as well as an operation called [needle suspension](#) . <sup>[58]</sup>

---

## Needle suspension

In this section

[Does it work?](#)

[What is it?](#)

[How can it help?](#)

[How does it work?](#)

[Can it be harmful?](#)

[How good is the research on needle suspension?](#)

This information is for people who have stress incontinence. It tells you about needle suspension, a treatment used for stress incontinence. It is based on the best and most up-to-date research.

### Does it work?

Needle suspension doesn't work as well as other types of surgery for stress incontinence, such as [open retropubic colposuspension](#) , and more things can go wrong during this operation.

### What is it?

Needle suspension is a type of surgery for incontinence. Your doctor may suggest surgery if other treatments haven't helped you.

The most common operation for stress incontinence is [colposuspension](#) . During this operation, the top of your vagina is lifted up and the surgeon uses stitches to tie it behind your pubic bone (the bone behind your pubic hair). The stitches are permanent. There are two ways to do this operation, either through a large cut in your lower abdomen (this is called **open retropubic colposuspension**) or through two tiny cuts (this is called laparoscopic or **keyhole colposuspension**).

**Needle suspension** is slightly different. You have two tiny cuts on your lower abdomen (just like in laparoscopic colposuspension). The surgeon also looks at the opening of your bladder (your bladder neck) through your urethra. This is called a **cystoscopy**. In order to lift and support the opening of the bladder, a loop of nylon stitch is passed from

## Stress incontinence

the vagina to the skin surface. The loop lifts the tissues on either side of the opening of the bladder.

All operations involving the bladder are serious. It may take two months or more for you to get back to your normal routine.

To learn more, see [Surgery for stress incontinence: what to expect](#) .

### How can it help?

About 8 in 10 women who have this operation get better.<sup>[86]</sup> They no longer leak urine when they laugh, cough, sneeze, or exercise. However, about half the women who have this operation get one or more problems afterwards.<sup>[86]</sup>

Needle suspension doesn't work quite as well as open colposuspension.<sup>[86]</sup>

Needle suspension works about as well as [anterior vaginal repair](#) and [slings](#) .<sup>[58]</sup> <sup>[59]</sup>

### How does it work?

If you have stress incontinence, the muscles that support your bladder are weak. So the opening of your bladder (the bladder neck) may drop out of place. It becomes harder for the bladder opening to stay closed. When there's extra pressure on your bladder (when you cough or sneeze, for example), urine leaks out.

In this operation, doctors use a loop of nylon stitch to support your bladder neck. When you do things which put pressure on the bladder, such as cough, sneeze, or jump, the stitches are pulled upwards, lifting the bladder neck. This should stop you leaking urine.

### Can it be harmful?

With any operation, there's a small risk that you'll have serious bleeding, your wound will become infected, or you'll get a clot of blood in your blood vessels. If this happens, you may need to stay in hospital longer. If you have needle suspension, you are more likely to have this sort of problem than with other sorts of surgery.<sup>[86]</sup>

Your bladder can be injured during needle suspension.<sup>[87]</sup>

### How good is the research on needle suspension?

There's some good evidence from a large summary of the research (a [systematic review](#) ) that needle suspension doesn't work as well as an operation called [open retropubic colposuspension](#) .<sup>[87]</sup> The summary looked at seven good-quality studies involving nearly 600 women.

About 23 in 100 women who had needle suspension didn't think their operation had worked.<sup>[87]</sup> Only 14 in 100 women who had open retropubic colposuspension didn't think it had worked.

## Stress incontinence

Results from other studies show that needle suspension works about as well as [anterior vaginal repair](#) and [slings](#), two other types of surgery. <sup>[58]</sup> <sup>[59]</sup>

---

### Implants (bulking agents)

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

This information is for people who have stress incontinence. It tells you about implants (bulking agents), a treatment sometimes used for stress incontinence.

#### Do they work?

We haven't looked at this treatment in as much detail as the other treatments on our site. (See Our method to learn more.) But we wanted to cover this treatment because you may be interested in it.

#### What are they?

Implants are substances, sometimes called bulking agents, that are injected around your [urethra](#) (the tube that carries urine from your bladder to the outside). The implant presses on your urethra to help it stay closed when you're not passing urine. In theory, by pressing your urethra closed, implants should provide a barrier that stops urine from flowing out.

Implants can be made from fat from your body, from collagen (a type of [protein](#)), and from other substances including silicone and carbon particles. <sup>[88]</sup> They're given as injections. The procedure takes about half an hour. You'll be given a [local anaesthetic](#) or a [general anaesthetic](#), so you won't feel anything.

#### How can they help?

Implants can help with symptoms of stress incontinence in the short term. But dummy ( [placebo](#) ) injections with salt solution (saline) may also result in short-term improvements.

<sup>[88]</sup> About half of the women who have collagen implants say they are satisfied with the results one year after having the procedure. <sup>[88]</sup>

But we don't know how long the benefits last. And implants don't work as well as surgery (such as [colposuspension](#)), although surgery has more side effects.

One summary of the research (a [systematic review](#)) found a study that compared implants with [pelvic floor exercises](#). Implants appeared to be better at treating stress incontinence than pelvic floor exercises, after three months. But we don't know if the benefits last longer than three months. Also, many of the women who had implants had side effects: <sup>[88]</sup>

- 73 in 100 women had difficulty urinating

## Stress incontinence

- 47 in 100 women had pain when urinating.

Doctors normally only recommend implants to women who can't have major surgery for some reason (if they can't have a general anaesthetic, for example) or who have mild stress incontinence after an operation (such as colposuspension).

---

### Artificial sphincters

In this section

[Do they work?](#)

[What are they?](#)

[How can they help?](#)

[Can they be harmful?](#)

This information is for people who have stress incontinence. It tells you about artificial sphincters, a treatment sometimes used for stress incontinence.

#### Do they work?

We haven't looked at this treatment as thoroughly as the other treatments we cover. (See Our method to learn more.) But we wanted to cover this treatment because people may have questions about it.

#### What are they?

An artificial sphincter is a ring, shaped like a doughnut. A sphincter is a tight ring of muscle and there is one that keeps urine in your bladder. If your sphincter muscles stop working properly, urine will trickle out of your bladder all the time.

An artificial sphincter is supposed to do the work instead. A surgeon puts it around your urethra (the tube that carries urine from your bladder to the outside). You pump fluid into the ring so that it squeezes your urethra closed. This stops urine leaking when you laugh or sneeze. When you want to go to the toilet, you let the fluid out of the ring by pressing a pump near your vagina. This takes the pressure off your urethra so that it can open, and urine from your bladder can flow out.

Most doctors will recommend an artificial sphincter only if all other treatments have failed. You need an operation to have the artificial sphincter put in. You'll have a general anaesthetic for this operation, so you won't be awake, and you may have to stay in hospital for a few days afterwards to recover. You won't be able to use the artificial sphincter straight away. You'll have to wait until all the tissue around it heals. This can take about six weeks. After that, a therapist or nurse will teach you how to use it.

#### How can they help?

We don't know whether artificial sphincters work because there hasn't been any good research.

### Can they be harmful?

Problems with an artificial sphincter are common:

- It can cause an **infection**
- It can cut into your urethra or vagina
- Your body may reject the sphincter
- The pump may break down or stop working properly.

Also, you may find that some activities, such as cycling, are more awkward if you have an artificial sphincter put in.

---

### Further informations:

#### How much urine do you make, and how often should you go?

How much urine your body makes depends on how much you eat and drink, and how much you sweat. Most people make 1.5 litres to 2 litres (2 pints to 3 pints) every 24 hours. <sup>[3]</sup>

You may have noticed that when it's hot you don't need to go as often and your urine is a darker yellow. This is because you're using more water to keep cool by sweating, so your body has less to make into urine.

How often you need to go to the toilet also depends on how much urine your body makes. Most people go four times to eight times a day. But this depends on other things too, such as how strong your bladder is and how you've 'trained' your bladder. If you have stress incontinence, you're likely to go more often than you used to.

#### Other types of incontinence

##### Urge incontinence

This is when you have a sudden and strong urge to pass urine. The urine comes out in a rush that you can't control. This can happen at any time. It happens when your bladder tightens (contracts) for no reason. It's sometimes called an 'overactive' or 'spastic' bladder.

##### Problems reaching the toilet in time

There are lots of things that can make it difficult to get to the toilet in time. For example, if you're in a wheelchair, you may not be able to get there quickly enough. Or someone

## Stress incontinence

with Alzheimer's disease may not be able to think clearly enough to get to a toilet in time. These types of problems often happen in older adults who live in nursing homes.

### Incontinence caused by an infection

An infection in the tube that carries urine out of your bladder (your urethra) can sometimes cause incontinence. The incontinence should pass when your infection clears up. These kinds of infections are most common in children, especially girls, and need to be treated.

### Incontinence caused by medicine

Sometimes a medicine you are taking may make you incontinent. This should pass when you stop taking the drug. If a medicine is causing problems for you, see your GP. He or she may be able to give you something else. <sup>[1]</sup>

### Having more than one kind of incontinence

You may get more than one type of incontinence. The most common combination is stress incontinence and urge incontinence. This combination is called mixed incontinence.

<sup>[4]</sup> It's important to get both types diagnosed, as they may need different treatments.

## Pelvic floor exercises: how to do them

### Find the right muscles

- Try to stop the flow of urine when you're sitting on the toilet. If you can do this, you've found the right muscles to exercise.
- Imagine you're trying to stop passing wind, and squeeze these muscles. If you have a 'pulling' feeling, then you're squeezing the right muscles.
- Lie down and put your finger in your vagina and squeeze as if you're trying to stop urine from coming out. If you feel tightness on your finger, then you've found the right muscles.
- If you're not sure, ask your doctor, nurse, or physiotherapist to help you find these muscles. Many women squeeze the wrong muscles at first.
- Be careful not to squeeze other muscles at the same time, such as muscles in your thighs, back, and stomach. Squeeze only the muscles of your pelvic floor, and don't hold your breath! Breathe slowly and deeply.



## Stress incontinence

- Draw your muscles up and in. Try not to strain down. Rest a hand lightly on your stomach. If you feel your stomach pushing out against your hand, then you're straining down. If you find that you always push down, check with your doctor, nurse, or physiotherapist to learn how to do the exercise properly.

### Get the most benefit from your exercise

- You should do pelvic floor exercises at least three times every day. <sup>[14]</sup>
- Pull in the muscles of your pelvic floor and hold for four seconds. Then relax for four seconds.
- Repeat this 10 to 15 times each time you exercise. Work up to holding each contraction for six seconds, eight seconds, and then 10 seconds.
- Do your exercise for five minutes at least three times a day in different positions: lying down, sitting, and standing.
- You can do these exercises anywhere and any time, but they usually don't work as well if you do them watching television, for example. You need to concentrate, especially at first.
- Get into a routine of doing the exercises. For example, you may like to do them five minutes before you get up in the morning and five minutes before you go to sleep.

### Be patient

You may start to feel some benefit from these exercises after one week. You should do the exercises for at least three months, and continue them if they help. <sup>[14]</sup> But it takes from six weeks to 20 weeks for most women with stress incontinence to notice a change in urine loss.

If you do these exercises regularly you should notice an improvement.

## Surgery for stress incontinence: what to expect

There are two main ways to do surgery on your bladder: surgery through a cut in your lower abdomen or surgery through your vagina. For [needle suspension](#) , [slings](#) , and [vaginal tape](#) operations, both these ways are used together.

### Surgery through your abdomen

If you're having surgery through a cut in your lower abdomen, such as [open retropubic colposuspension](#) or a sling:

## Stress incontinence

- You'll usually need to stay in hospital for several days
- You'll have a **general anaesthetic** to make you sleep during the operation
- Your operation will last one hour to two hours
- After the operation, you'll need a tube (called a **catheter**) in your bladder to let the urine out
- You'll need to try to pass urine normally after a day or so
- As soon as you're able to pass urine, the catheter will be taken out
- You might be in some pain after the operation, but you'll be given painkillers
- The pain should start to go away after a few days
- It may take six to eight weeks for you to get back to normal
- You may not be able to drive or have sex for up to six weeks
- You shouldn't do any vigorous exercise until after you've had a check-up and your doctor says it's OK.

In a type of surgery called [keyhole \(laparoscopic\) colposuspension](#), the surgeon needs only to make very small cuts in your lower stomach. This type of surgery is called **keyhole surgery**. If you have keyhole colposuspension, you'll be able to go home sooner.<sup>[17]</sup>

### **Surgery through your vagina**

If you're having a type of surgery called [anterior vaginal repair](#) or [needle suspension](#) :

- You'll usually need to stay in hospital for several days (but not as long as you would for open colposuspension because the outside skin is not cut)
- You may be given a **general anaesthetic** (so that you're asleep during the operation) or an anaesthetic into your spine (you stay awake but you can't feel anything)
- Your operation will take between 40 minutes and 60 minutes
- After the operation, you'll need a tube (called a **catheter**) in your bladder to empty the urine
- As soon as you're able to pass urine, the catheter will be taken out

# Stress incontinence

- You'll probably be in some pain after surgery, but you'll be given painkillers
- The pain should start to go away after a day or two
- It may take about six weeks for you to get back to normal.

## Glossary:

### Alzheimer's disease

People who have Alzheimer's disease slowly lose their memory and ability to think clearly. As the disease gets worse, they get more confused and start acting differently. Several changes happen in the brain that stop it working properly. Small lumps called amyloid plaques grow in the parts of the brain used for memory and thinking. And bundles of twisted threads called 'neurofibrillary tangles' form inside brain cells. These stop brain cells communicating with each other, and they can cause cells to die. Also, in Alzheimer's disease, the brain does not have enough chemical messengers (neurotransmitters), and holes or gaps appear where brain cells have died.

### infection

You get an infection when bacteria, a fungus, or a virus get into a part of your body where it shouldn't be. For example, an infection in your nose and airways causes the common cold. An infection in your skin can cause rashes such as athlete's foot. The organisms that cause infections are so tiny that you can't see them without a microscope.

### caesarean section

A caesarean section is an operation to take a baby out of a mother's womb. The surgeon makes a cut through her abdomen to take the baby out. You have this if there's a risk that a normal delivery through your vagina would cause harm to you or your baby.

### menopause

When a woman stops having periods, it is called the menopause. This usually happens around the age of 50.

### hormones

Hormones are chemicals that are made in certain parts of the body. They travel through the bloodstream and have an effect on other parts of the body. For example, the female sex hormone oestrogen is made in a woman's ovaries. Oestrogen has many different effects on a woman's body. It makes the breasts grow at puberty and helps control periods. It is also needed to get pregnant.

### obesity

If your body stores more energy than you need, this can make you overweight. The excess energy is stored in your fat cells. If your weight goes above a certain level, doctors call this obesity. Obesity is considered a medical condition. The excess weight can be a strain on your bones and joints. And if you are obese, you're more likely to get other diseases. Doctors have developed a scale for telling how much excess weight you have. This measure, called the body mass index (BMI), depends on your height.

### bronchitis

Bronchitis is inflammation of one or both of the major airways (called bronchi) that lead in and out of your lungs.

### physiotherapist

A physiotherapist is a health professional who is trained to use physical activity and exercises to help people's bodies heal.

### general anaesthetic

You may have a type of medicine called a general anaesthetic when you have surgery. It is given to make you unconscious so you don't feel pain when you have surgery.

### diarrhoea

Diarrhoea is when you have loose, watery stools and you need to go to the toilet far more often than usual. Doctors say you have diarrhoea if you need to go to the toilet more than three times a day.

### antidepressant

Antidepressants are medicines used to treat depression and sometimes other conditions. They work by changing the levels of chemicals in your brain called neurotransmitters. There are three main types of antidepressants, which work in different ways: selective serotonin reuptake inhibitors (SSRIs), monoamine oxidase inhibitors (MAOIs) and tricyclic antidepressants (TCAs).

### randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

# Stress incontinence

## placebo

A placebo is a 'pretend' or dummy treatment that contains no active substances. A placebo is often given to half the people taking part in medical research trials, for comparison with the 'real' treatment. It is made to look and taste identical to the drug treatment being tested, so that people in the studies do not know if they are getting the placebo or the 'real' treatment. Researchers often talk about the 'placebo effect'. This is where patients feel better after having a placebo treatment because they expect to feel better. Tests may indicate that they actually are better. In the same way, people can also get side effects after having a placebo treatment. Drug treatments can also have a 'placebo effect'. This is why, to get a true picture of how well a drug works, it is important to compare it against a placebo treatment.

## systematic reviews

A systematic review is a thorough look through published research on a particular topic. Only studies that have been carried out to a high standard are included. A systematic review may or may not include a meta-analysis, which is when the results from individual studies are put together.

## randomised controlled trials

Randomised controlled trials are medical studies designed to test whether a treatment works. Patients are split into groups. One group is given the treatment being tested (for example, an antidepressant drug) while another group (called the comparison or control group) is given an alternative treatment. This could be a different type of drug or a dummy treatment (a placebo). Researchers then compare the effects of the different treatments.

## urinary tract infection

A urinary tract infection (UTI) happens when bacteria invade the walls of your urinary tract, which includes your kidneys, bladder and urethra. An uncomplicated UTI is one that involves your bladder and urethra, but not your kidneys. A complicated UTI involves your kidneys and can be harder to treat. Doctors may refer to a kidney infection as pyelonephritis.

## oestrogen

Oestrogen is the name given to three female sex hormones: oestradiol, oestrone and oestriol. Oestrogen causes women's sexual development during puberty: it is needed to develop breasts, have periods and get pregnant. Oestrogen is also thought to affect women's health in other ways. It may influence their mood, cholesterol levels and how their bones grow. Men have very low levels of oestrogen in their bodies, but doctors aren't completely sure what it does. Oestrogen is an important ingredient in most types of contraceptive pill and hormone replacement therapy.

## stroke

You have a stroke when the blood supply to a part of your brain is cut off. This damages your brain and can cause symptoms like weakness or numbness on one side of your body. You may also find it hard to speak if you've had a stroke.

## pulmonary embolism

A pulmonary embolism can give you chest pain, make you feel breathless and uncomfortable or make you breathe rapidly. A pulmonary embolism is dangerous and can kill you if it is not treated.

## progesterone

Progesterone is a hormone that plays a part in a woman's menstrual cycle and in pregnancy. A form of this hormone made in the laboratory, called progestogen, is often added to contraceptive pills and hormone replacement therapy (HRT).

## hysterectomy

A hysterectomy is an operation to take out a woman's womb (also called her uterus). Sometimes the ovaries and fallopian tubes are removed as well.

## urethra

Your urethra is the tube that carries urine from your bladder out of your body. In a man, the urethra runs through the inside of the penis. In a woman, the urethra is shorter and opens onto the top of the vagina.

## cartilage

Cartilage is a rubbery type of tissue that's usually found at the ends of your bones. It acts like a shock absorber to keep the bones from grinding against each other. It also gives shape to certain parts of your body, such as your nose and the outside of your ears.

## kidney

Your kidneys are organs that filter your blood to make urine. You have two kidneys, on either side of your body. They are underneath your ribcage, near your back.

## epidural

Layers of tissue cover your brain and spinal cord. The epidural space is the space between two of these layers. Before surgery or a procedure, you may be given pain medicine in the epidural space of your spinal cord. You'll have no feeling in your body below where the medicine was injected.

## blood clot

A blood clot forms when the cells in blood clump together. Sometimes this happens to stop you from bleeding if you've had an injury. But it can also happen on the inside of your blood vessels, even when you haven't had an injury. A blood clot inside a blood vessel is called a thrombus.

# Stress incontinence

## local anaesthetic

A local anaesthetic is a painkiller that's used to numb one part of your body. You usually get local anaesthetics as injections.

## opiates

Opiates are medicines made from opium, which occurs naturally in poppy plants. Opiates work well to relieve pain. But you can get addicted to them if you don't use them correctly.

## haemorrhage

Haemorrhage is a word doctors use for bleeding. Any time blood escapes from a vessel, it's called a haemorrhage.

## proteins

A lot of your body's tissues are made out of proteins. Proteins can be made in your cells. Proteins are also part of the food you eat, particularly meat and dairy products. Your body breaks down the protein you eat into amino acids. Your cells then use these amino acids to build new proteins, which make up muscles, joints, hair and other parts of your body.

## Sources for the information on this leaflet:

1. National Institute of Diabetes and Digestive and Kidney Diseases. Urinary incontinence in women. October 2007. Available at <http://kidney.niddk.nih.gov/kudiseases/pubs/uiwomen> (accessed on 28 February 2014).
2. Ashton-Miller JA, Howard D, DeLancey JO. The functional anatomy of the female pelvic floor and stress continence control system. *Scandinavian Journal of Urology and Nephrology*. 2001; 207: 1-7, 106-125.
3. U.S. National Library of Medicine. Medline Plus: urine 24-hour volume. February 2014. Available at <http://www.nlm.nih.gov/medlineplus/ency/article/003425.htm> (accessed on 28 February 2014).
4. Abrams P, Cardozo L, Fall M, et al. The standardisation of terminology of lower urinary tract function: report from the Standardisation Sub-committee of the International Continence Society. *Neurourology and Urodynamics*. 2002; 21: 167-178.
5. Rortveit G, Daltveit AK, Hannestad YS, et al. Urinary incontinence after vaginal delivery or cesarean section. *New England Journal of Medicine*. 2003; 348: 900-907.
6. Sampsel CM, Burns PA, Dougherty MC, et al. Continence for women: evidence-based practice. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*. 1997; 26: 375-385.
7. Simeonova Z, Milsom I, Kullendorff A-E, et al. The prevalence of urinary incontinence and its influence on the quality of life in women from an urban Swedish population. *Acta Obstetrica et Gynecologica Scandinavica*. 1999; 78: 546-551.
8. Bump RC, McClish DK. Cigarette smoking and urinary incontinence in women. *American Journal of Obstetrics and Gynecology*. 1992; 167: 1213-1218.
9. Buchsbaum GM, Duecy EF, Kerr LA, et al. Urinary incontinence in nulliparous women and their parous sisters. *Obstetrics and Gynecology*. 2005; 106: 1253-1258.
10. Royal College of Physicians. Incontinence: causes management and provision of services. Royal College of Physicians, London, UK; 1995.
11. Sommer P, Bauer T, Nielsen KK, et al. Voiding patterns and prevalence of incontinence in women: a questionnaire survey. *British Journal of Urology*. 1990; 66: 12-15.
12. Kuh D, Cardozo L, Hardy R. Urinary incontinence in middle aged women: childhood enuresis and other lifetime risk factors in a British prospective cohort. *Journal of Epidemiology Community Health*. 1999; 53: 453-458.
13. Ballanger P, Rischamnn P. Female urinary incontinence: an overview of a report presented to the French Urological Association. *European Urology*. 1999; 36: 165-174.
14. National Institute for Health and Care Excellence. Urinary incontinence: the management of urinary incontinence in women. Clinical guidelines CG171. September 2013. Available at <http://guidance.nice.org.uk/CG171> (accessed on 28 February 2014).
15. Jackson S. Female urinary incontinence: symptom evaluation and diagnosis. *European Urology*. 1997; 32: 20-24.

## Stress incontinence

16. Berghmans LCM, Hendriks HJM, Bo K, et al. Conservative treatment of stress urinary incontinence in women: a systematic review of randomised controlled trials. *British Journal of Urology*. 1998; 82: 181-191.
17. Su TH, Wang DG, Hsu CY, et al. Prospective comparison of laparoscopic and traditional colposuspensions in the treatment of genuine stress incontinence. *Acta Obstetrica et Gynecologica Scandinavica*. 1997; 76: 576-582.
18. Mariappan P, Ballantyne Z, N'Dow JM, et al. Serotonin and noradrenaline reuptake inhibitors (SNRI) for stress urinary incontinence in adults (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
19. Ghoniem GM, Van Leeuwen JS, Elser DM, et al. A randomized controlled trial of duloxetine alone, pelvic floor muscle training alone, combined treatment and no active treatment in women with stress urinary incontinence. *Journal of Urology*. 2005; 173: 1647-1653.
20. Norton PA, Zinner NR, Yalcin I, et al. Duloxetine versus placebo in the treatment of stress urinary incontinence. *American Journal of Obstetrics and Gynecology*. 2002; 187: 40-48.
21. Dmochowski RR, Miklos JR, Norton PA, et al. Duloxetine versus placebo for the treatment of North American women with stress urinary incontinence. *Journal of Urology*. 2003; 170: 1259-1263.
22. van Kerrebroeck P, Abrams P, Lange R, et al. Duloxetine versus placebo in the treatment of European and Canadian women with stress urinary incontinence. *BJOG: An International Journal of Obstetrics and Gynaecology*. 2004; 111: 249-257.
23. Millard RJ, Moore K, Rencken R, et al. Duloxetine vs placebo in the treatment of stress urinary incontinence: a four-continent randomized clinical trial. *British Journal of Urology International*. 2004; 93: 311-318.
24. Cardozo I, Drutz HP, Baygani SK, et al. Pharmacological treatment of women awaiting surgery for stress urinary incontinence. *Obstetrics and Gynecology*. 2004; 104: 511-519.
25. Lin AT, Sun MJ, Tai HL, et al. Duloxetine versus placebo for the treatment of women with stress predominant urinary incontinence in Taiwan: a double-blind, randomized, placebo-controlled trial. *BMC Urology*. 2008; 8: 2.
26. Boyer EW, Shannon M. The serotonin syndrome. *New England Journal of Medicine*. 2005; 352: 1112-1120.
27. National Institute for Health and Care Excellence. Depression: the treatment and management of depression in adults. Clinical guideline 90. October 2009. Available at <http://www.nice.org.uk/nicemedia/pdf/cg90niceguideline.pdf> (accessed on 28 February 2014).
28. Mariappan P, Ballantyne Z, N'Dow JM, et al. Serotonin and noradrenaline reuptake inhibitors (SNRI) for stress urinary incontinence in adults (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
29. Herderschee R, Hay-Smith EJ, Herbison GP, et al. Feedback or biofeedback to augment pelvic floor muscle training for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
30. Hay-Smith EJC, Dumoulin C. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
31. Herbison GP, Dean N. Weighted vaginal cones for urinary incontinence (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
32. Moehrer B, Hextall A, Jackson S. Oestrogens for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Update Software, Oxford, UK.
33. Choi H, Palmer MH, Park J. Meta-analysis of pelvic floor muscle training: randomized controlled trials in incontinent women. *Nursing Research*. 2007; 56: 226-234.
34. Hay-Smith EJ, Herderschee R, Dumoulin C, et al. Comparisons of approaches to pelvic floor muscle training for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.

## Stress incontinence

35. Labrie J, Berghmans BL, Fischer K, et al. Surgery versus physiotherapy for stress urinary incontinence. *New England Journal of Medicine*. 2013; 369: 1124-1133.
36. Brubaker L, Benson JT, Bent A, et al. Transvaginal electrical stimulation for female urinary incontinence. *American Journal of Obstetrics and Gynecology*. 1997; 177: 536-540.
37. Yamanishi R, Yasuda K, Sakakibara R, et al. Pelvic floor electrical stimulation in the treatment of stress incontinence: an investigation study and a placebo controlled double-blind trial. *Journal of Urology*. 1997; 158: 2127-2131.
38. Preisinger E, Hofbauer J, Nurnberger N, et al. Possibilities of physiotherapy for urinary stress incontinence. *Zeitschrift fur Physikalische Medizin Balneologie Med. Klimatologie*. 1990; 19: 75-79.
39. Sung MS, Choi YH, Back SH, et al. The effect of pelvic floor muscle exercises on genuine stress incontinence among Korean women: focusing on its effects on the quality of life. *Yonsei Medical Journal*. 2000; 41: 237-251.
40. Jeyaseelan SM, Haslam EJ, Winstanley J, et al. An evaluation of a new pattern of electrical stimulation as a treatment for urinary stress incontinence: a randomized, double-blind, controlled trial. *Clinical Rehabilitation*. 2000; 14: 631-640.
41. Herbison P, Plevnik S, Mantle J. Weighted vaginal cones for urinary incontinence (Cochrane review). In: *The Cochrane Library*. Update Software, Oxford, UK.
42. Shamliyan TA, Kane RL, Wyman J et al. Systematic review: randomized, controlled trials of nonsurgical treatments for urinary incontinence in women. *Annals of Internal Medicine*. 2008; 148: 459-473.
43. Bo K, Talseth R, Holme I. Single blind, randomised controlled trial of pelvic floor exercises, electrical stimulation, vaginal cones, and no treatment in management of genuine stress incontinence in women. *BMJ*. 1999; 318: 487-493.
44. Hay-Smith EJ, Bo K, Berghmans LC, et al. Pelvic floor muscle training for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Update Software, Oxford, UK.
45. Cody JD, Jacobs ML, Richardson K, et al. Oestrogen therapy for urinary incontinence in post-menopausal women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
46. Women's Health Initiative Investigators. Risk and benefits of estrogen plus progestin in healthy postmenopausal women: principal results from the Women's Health Initiative randomized controlled trial. *Journal of the American Medical Association*. 2002; 288: 321-333.
47. Collaborative Group on Hormonal Factors in Breast Cancer. Breast cancer and hormone replacement therapy: collaborative reanalysis of data from 51 epidemiological studies of 52,705 women with breast cancer and 108,411 women without breast cancer. *Lancet*. 1997; 350: 1047-1059.
48. Beral V, Banks E, Reeves G. Evidence from randomised trials on the long-term effects of hormone replacement therapy. *Lancet*. 2002; 360: 942-944.
49. Daly E, Vessey MP, Hawkins MM, et al. Risk of venous thromboembolism in users of hormone replacement therapy. *Lancet*. 1996; 348: 977-980.
50. Bath PMW, Gray LJ. Association between hormone replacement therapy and subsequent stroke: a meta-analysis. *BMJ*. 2005; 330: 342.
51. WHI Steering Committee. Effects of conjugated equine estrogens in postmenopausal women with hysterectomy. *Journal of the American Medical Association*. 2004; 291: 1710-1712.
52. Grady D, Gebretsadik T, Kerlikowske K, et al. Hormone replacement therapy and endometrial cancer risk: a meta-analysis. *Obstetrics and Gynecology*. 1995; 85: 304-313.
53. Cummings JM, Rodning CB. Urinary stress incontinence among obese women: review of pathophysiology therapy. *International Urogynecology Journal*. 2000; 11: 41-44.

## Stress incontinence

54. Subak LL, Wing R, West DS, et al. Weight loss to treat urinary incontinence in overweight and obese women. *New England Journal of Medicine*. 2009; 360: 481-490.
55. Lapitan MC, Cody JD. Open retropubic colposuspension for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
56. Cody J, Wyness L, Wallace S, et al. Systematic review of the clinical effectiveness and cost-effectiveness of tension-free vaginal tape for treatment of urinary stress incontinence. *Health Technology Assessment*. 2003; 7: 1-189.
57. Dean NM, Ellis G, Wilson PD, et al. Laparoscopic colposuspension for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
58. Glazener CM, Cooper K. Anterior vaginal repair for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
59. Rehman H, Bezerra CC, Bruschini H, et al. Traditional suburethral sling operations for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
60. Kitchener H C, Dunn G, Lawton V, et al. Laparoscopic versus open colposuspension - results of a prospective randomised controlled trial. *BJOG: an International Journal of Obstetrics and Gynaecology*. 2006; 113: 1007-1013.
61. Glazener CM, Cooper K. Anterior vaginal repair for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Wiley, Chichester, UK.
62. Cody J, Wyness L, Wallace S, et al. Systematic review of the clinical effectiveness and cost-effectiveness of tension-free vaginal tape for treatment of urinary stress incontinence. *Health Technology Assessment*. 2003; 7: 1-189.
63. Albo ME, Richter HE, Brubaker L, et al. Burch colposuspension versus fascial sling to reduce urinary stress incontinence. *New England Journal of Medicine*. 2007; 356: 2143-2155.
64. Culligan PJ, Goldberg RP, Sand PK. A randomized controlled trial comparing a modified Burch procedure and a suburethral sling: long term follow up. *International Urogynecology Journal and Pelvic Floor Dysfunction*. 2003; 14: 229-233.
65. Choe JM, Ogan K, Battino BS. Antimicrobial mesh versus vaginal wall sling: a comparative outcomes analysis. *Journal of Urology*. 2000; 163: 1829-1834.
66. Wadie BS, Edwan A, Nabeeh AM. Autologous fascial sling vs polypropylene tape at short-term followup: a prospective randomized study. *Journal of Urology*. 2005; 174: 990-993.
67. Barber MD, Weidner AC, Sokol AI, et al. Single-incision mini-sling compared with tension-free vaginal tape for the treatment of stress urinary incontinence: a randomized controlled trial. *Obstetrics & Gynecology*. 2012; 119: 328-337.
68. Black NA, Downs SH. The effectiveness of surgery for stress incontinence in women: a systematic review. *British Journal of Urology*. 1996; 78: 497-510.
69. Meschia M, Pifarotti P, Bernasconi F et al. Tension-free vaginal tape (TVT) and intravaginal slingplasty (IVS) for stress urinary incontinence: a multicenter randomized trial. *American Journal of Obstetrics and Gynecology*. 2006; 195: 1338-1342.
70. Brubaker L, Norton PA, Albo ME, et al. Adverse events over two years after retropubic or transobturator midurethral sling surgery: findings from the Trial of Midurethral Slings (TOMUS) study. *American Journal of Obstetrics and Gynecology*. 2011; 205: 498.
71. Agur W, Riad M, Secco S, et al. Surgical treatment of recurrent stress urinary incontinence in women: a systematic review and meta-analysis of randomised controlled trials. *European Urology*. 2013; 64: 323-336.
72. Basu M, Duckett J. A randomised trial of a retropubic tension-free vaginal tape versus a mini-sling for stress incontinence. *British Journal of Obstetrics & Gynaecology*. 2010; 117: 730-135.



## Stress incontinence

73. Schierlitz L, Dwyer PL, Rosamilia A, et al. Effectiveness of tension-free vaginal tape compared with transobturator tape in women with stress urinary incontinence and intrinsic sphincter deficiency: a randomized controlled trial. *Obstetrics & Gynecology*. 2008; 112: 1253-1261.
74. Patry G, Bolduc S, Martineau G, et al. Colovaginal fistula: an unusual complication of the tension-free vaginal tape procedure. *Journal of Urology*. 2004; 172: 972-973.
75. U.S. Food and Drug Administration. Medical devices database: MAUDE - manufacturer and user facility device experience. Available at <http://www.fda.gov/MedicalDevices/DeviceRegulationandGuidance/PostmarketRequirements/ReportingAdverseEvents/ucm127891.htm> (accessed on 28 February 2014).
76. Ward KL, Hilton P. A prospective multicenter randomized trial of tension-free vaginal tape and colposuspension for primary urodynamic stress incontinence: two-year follow-up. *American Journal of Obstetrics Gynecology*. 2004; 190: 324-331.
77. Enzelsberger H, Schalupny J, Heider R, et al. TVT versus TOT: a prospective randomized study for the treatment of female stress urinary incontinence at a follow-up of 1 year. *Geburtshilfe Frauenheilkd*. 2005; 65: 506-511.
78. Rajan S, Kohli N. Retropubic hematoma after transobturator sling procedure. *American Journal of Obstetrics and Gynecology*. 2005; 105: 1199-1202.
79. Game X, Mouzin M, Vaessen C, et al. Obturator infected hematoma and urethral erosion following transobturator tape implantation. *Journal of Urology*. 2004; 171: 1629.
80. Khunda A, Calvert SM. Tape erosion into the vagina. *Journal of Obstetrics and Gynaecology*. 2005; 25: 413.
81. Caquant F, Collinet P, Deruelle P, et al. Perineal cellulitis following trans-obturator sub-urethral tape Uratape. *European Urology*. 2005; 47: 108-110.
82. Enzelsberger H, Schalupny J, Heider R, et al. TVT versus TOT: a prospective randomized study for the treatment of female stress urinary incontinence at a follow-up of 1 year. *Geburtshilfe Frauenheilkd*. 2005; 65: 506-511.
83. Barber MD, Kleeman S, Karram MM, et al. Transobturator tape compared with tension-free vaginal tape for the treatment of stress urinary incontinence: a randomized controlled trial. *Obstetrics & Gynecology* 2008; 111: 611-621.
84. Latthe PM, Foon R, Tooze-Hobson P. Transobturator and retropubic tape procedures in stress urinary incontinence: a systematic review and meta-analysis of effectiveness and complications. *BJOG: an International Journal of Obstetrics & Gynaecology*. 2007; 114: 522-531.
85. Laurikainen E, Valpas A, Kivela A, et al. Retropubic compared with transobturator tape placement in treatment of urinary incontinence: a randomized controlled trial. *Obstetrics and Gynecology*. 2007; 109: 4-11.
86. Lapitan MC, Cody DJ, Grant AM. Open retropubic colposuspension for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Update Software, Oxford, UK.
87. Glazener CM, Cooper K. Bladder neck needle suspension for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*. Update Software, Oxford, UK.
88. Kirchin V, Page T, Keegan PE, et al. Urethral injection therapy for urinary incontinence in women (Cochrane review). In: *The Cochrane Library*, Wiley, Chichester, UK.

## Stress incontinence

---

This information is aimed at a UK patient audience. This information however does not replace medical advice. If you have a medical problem please see your doctor. Please see our full [Conditions of Use](#) for this content. For more information about this condition and sources of the information contained in this leaflet please visit the Best Health website, <http://besthealth.bmj.com> . These leaflets are reviewed annually.

