

## APPENDIX 1

# THE URINARY SYSTEM LEARNING PACK

**This pack may be used as a learning aid for  
Care/ Support staff**

**This Learning Pack contains a brief outline of the following  
areas:**

- **The Urinary System**
- **Understanding Urine and the Bladder**
- **Urinary Incontinence**
- **Stress Incontinence**
- **Urge Incontinence**
- **Indications for Urinary catheterisation**
- **Intermittent Urinary Catheterisation**
- **Urethral Catheterisation**
- **Suprapubic Catheterisation**

## THE URINARY SYSTEM

The Urinary System, also known as the urinary tract, is the body's filtering system. As blood passes through the kidneys, waste products are removed and together with excess fluids are excreted as urine. The urinary system also regulates the volume and composition of fluids in the body, keeping an internal chemical balance.

The urinary system consists of:

**Two Kidneys:** Each kidney is about 10-12.5cm long and as blood passes through them they filter out waste products that will be excreted from the body as urine.

**Two Ureters:** Each kidney has a ureter, which carries urine away from the kidney into the bladder.

**The Bladder:** The bladder is a hollow muscular organ made up of three types of muscle that stores urine until it is convenient and the muscles at the bladder outlet (urethral sphincter) relax allowing urine to be expelled from the body through the urethra.

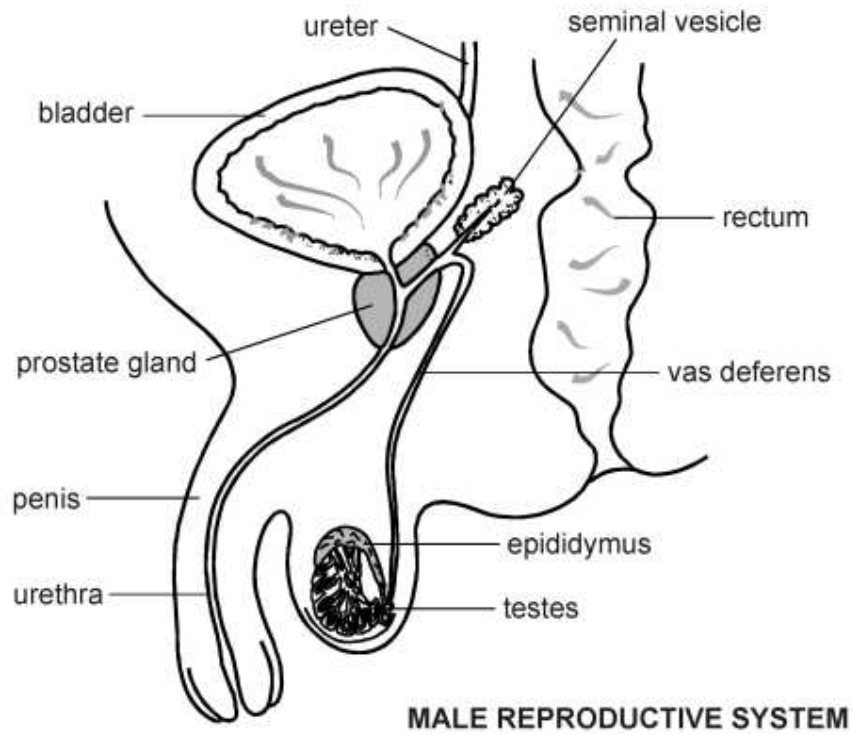
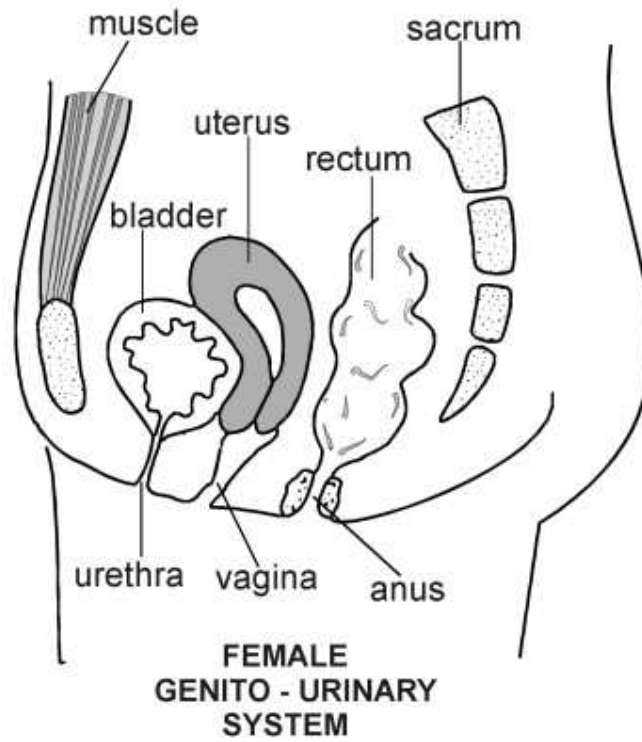
**The Urethra:** The **female** urethra is short (4cm) which causes frequent urinary tract infections. It lies just in front of the vagina.

The **male** urethra is about 20cm long and is made up of three sections:

- The spongy urethra.
- The membranous urethra
- The prostatic urethra

The male urethra transports both urine and semen out of the body. The prostate gland lies at the upper end of the urethra as it leaves the bladder. In older men the prostate gland can enlarge compressing on the urethra and cause problems with urination. The male urethra runs through the penis to an outlet at its tip.

Please see the diagrams below.

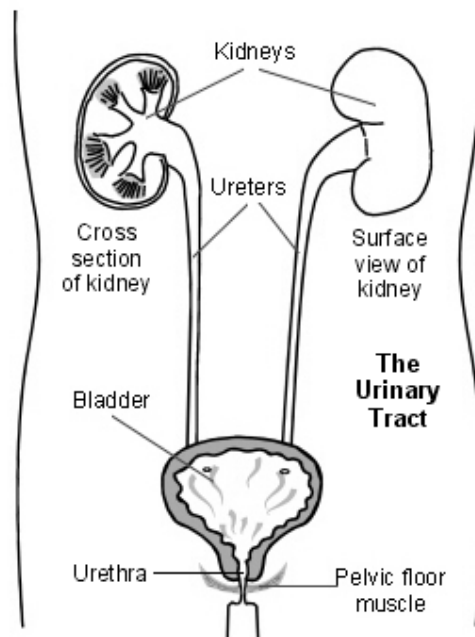


## UNDERSTANDING URINE AND THE BLADDER

The kidneys make urine all the time. A trickle of urine is constantly passing to the bladder down the ureters (tubes from the kidneys to the bladder). You make different amounts of urine depending on how much you drink, eat and sweat.

The bladder is mainly made of muscle and stores the urine. It expands like a balloon as urine comes down the ureters. The outlet for urine (the urethra) is normally kept closed. This is helped by the muscles beneath the bladder that sweep around the urethra (the pelvic floor muscles). When a certain amount of urine is in the bladder you become aware that the bladder is getting full. When you go to the toilet to pass urine, the bladder muscle contracts (squeezes) and the urethra and pelvic floor muscles relax.

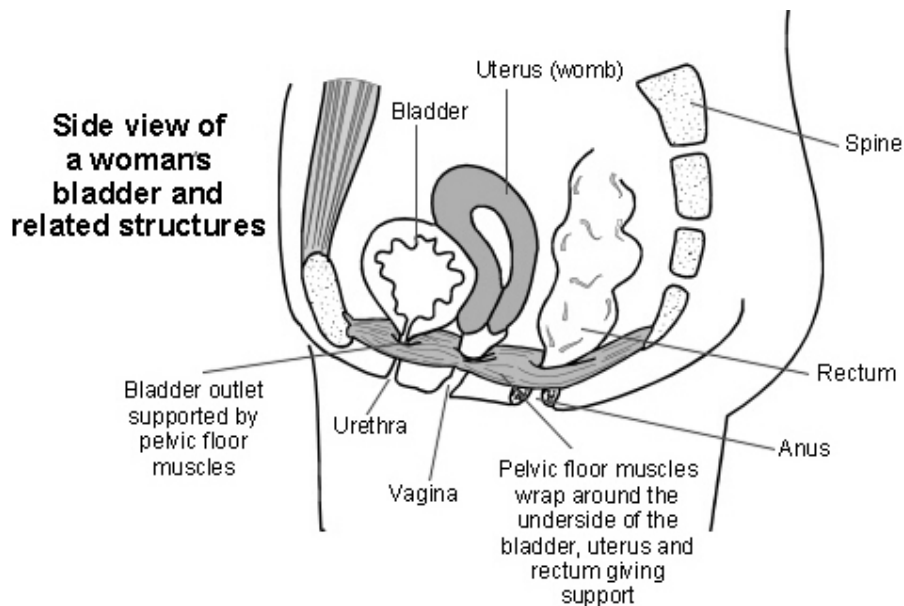
Complex nerve messages are sent between the brain and the bladder and pelvic floor muscles. These make you aware of how full your bladder is and tell the right muscles to contract (squeeze) or relax at the right time.



## URINARY INCONTINENCE

If you have urinary incontinence it means you pass or leak urine when you do not want to. It is classified into different types, depending on the cause.

- **Stress incontinence** is usually due to weak pelvic floor muscles.
  - Urine leaks when you cough, laugh, jump, etc.
  - Treatment is mainly by strengthening the pelvic floor muscles.
  - Surgery to 'tighten' the tissues under the bladder may be needed.
- **Urge incontinence** is due to an 'irritable bladder' that contracts (squeezes) suddenly.
  - Bladder retraining is the first treatment. This trains you to 'hold on' for longer.
  - Medication can help to relax the bladder muscle.
- **A combination** of stress and urge incontinence commonly occur.
- **Neuropathic incontinence** is due to damage to nerves supplying the bladder. For example, spinal cord problems, multiple sclerosis, etc.
- **Overflow incontinence** is due to a blockage of the urine outlet which upsets the normal control of passing urine. Urine pools in the bladder behind the blockage, but small amounts of urine bypass the blockage and trickle down the urethra. The most common example is incontinence caused by an enlarged prostate gland in men which partly blocks the bladder outlet.



## **STRESS INCONTINENCE**

Stress incontinence is when urine leaks when there is a sudden extra pressure ('stress') on the bladder. Urine leaks because your pelvic floor muscles and urethra cannot withstand the extra pressure. (The previous diagram shows how the pelvic floor muscles support the bladder and nearby structures.) The incontinence develops because the pelvic floor muscles are weakened. Small amounts of urine may leak, but sometimes it may be quite a lot and cause embarrassment.

Urine tends to leak most when you cough, laugh, or when you exercise (like jump or run). In these situations there is sudden extra pressure within the abdomen and on the bladder.

### **How common is stress incontinence?**

Stress incontinence is the most common form of urinary incontinence. It is estimated that about 3 million people in the UK are regularly incontinent. Overall this is about 4 in 100 adults, and well over half of these are due to stress incontinence. However, stress incontinence becomes more common in older women and as many as 1 in 5 women over the age of 40 have some degree of stress incontinence.

(The second most common type of incontinence is urge incontinence, see below. Treatment is different to stress incontinence. Some people have both stress incontinence and urge incontinence.)

### **What causes stress incontinence?**

The common reason for the pelvic floor muscles to become weakened is childbirth. Stress incontinence is common in women who have had several children. It is also more common with increasing age as the muscles become weaker, and in women who are obese.

### **What are the treatments for stress incontinence?**

Strengthening the pelvic floor muscles is the usual first treatment. About 6 in 10 cases can be cured or much improved with this treatment. Surgery may be advised if the problem continues.

#### **Strengthening the pelvic floor muscles**

The pelvic floor muscles are a group of muscles that wrap around the underside of the bladder and rectum (see diagram). Exercises to strengthen these muscles are the usual first treatment. A doctor may refer to a continence advisor or physiotherapist to help with this. The sort of exercises advised are as follows.

1. Sit in a chair with your knees slightly apart. Imagine you are trying to stop wind escaping from your anus (back passage). You will have to squeeze the muscle around the anus. You should feel some movement in the muscle. Don't move your buttocks or legs.
2. Now imagine you are passing urine and are trying to stop the stream. You will find yourself using slightly different muscles to the first exercise, and these are the ones to strengthen. Next time you go to the toilet try the 'stop test'.

This means halfway through emptying your bladder use these muscles to try and stop the flow of urine. Don't be discouraged if you are only able to reduce it slightly. With time you should be able to stop the flow completely. If you are not sure that you are exercising the right muscles, put a couple of fingers into your vagina. You should feel a gentle squeeze when doing the exercise.

Practising the exercises.

1. Sit, stand or lie with your knees slightly apart. Slowly tighten your pelvic floor muscles as hard as you can. Hold to the count of five, then relax. Repeat at least 5 times. These are called slow pull-ups. Do the same exercises quickly without counting to 5. Repeat at least 5 times. These are fast pull-ups. Do 5 slow pull-ups and 5 fast pull-ups at least 10 times a day.
2. Get into the habit of doing exercises whilst going about everyday life. For example, when answering the phone, washing up, etc.
3. Do the exercise at times when you feel you might leak, for example, when lifting something heavy or when you cough.
4. Do the 'stop test' on your urine once a day. After several weeks the muscles will start to feel stronger. You may find you can hold on longer than 5 seconds and you can do more pull ups without the muscle feeling tired. You should find it easier to stop your urine.

It takes time and practice to become good at these exercises. But, you should start to see benefits after a few weeks. Do persevere and, if possible, continue exercising as a part of everyday life to stop the problem recurring.

Sometimes a continence advisor or physiotherapist will advise extra methods, in addition to exercises, to strengthen the pelvic floor muscles. For example, sometimes a special electrical device is used to stimulate the pelvic floor muscles with the aim of making them stronger.

### **Surgery**

Various surgical operations are used to treat stress incontinence. They aim to 'tighten' or support the muscles and structures below the bladder. Surgery is often successful.

### **Some general lifestyle measures which may help**

- **GP may refer to the local continence adviser.** They can give practical advice on how to manage, and advise on treatment. They may be able to supply pants, pads, etc.
- **Getting to the toilet.** Make this as easy as possible. If you have difficulty getting about, consider special adaptations like a handrail or a raised seat in your toilet. Sometimes a commode in the bedroom makes life much easier.
- **Smoking** can cause cough which can aggravate symptoms. It would help not to smoke.

### **Can stress incontinence be prevented?**

It is thought that if you do regular pelvic floor exercises (as described above) after you have a baby, then stress incontinence is less likely to develop in the future.

## URGE INCONTINENCE

- **Urgency** is a symptom where you get a sudden urgent desire to pass urine. You are not able to put off going to the toilet.
- **Urge incontinence** is when urine leaks before you get to the toilet when you have 'urgency'.

Urgency and urge incontinence are sometimes called an unstable or overactive bladder, or detrusor instability. (Detrusor is the medical name for the bladder muscle.)

If you have urgency or urge incontinence, you also tend to pass urine more often than normal (this is called 'frequency'). Sometimes this is several times during the night as well as many times during the day. Some women also find they leak urine during sex, especially during orgasm.

### How common is urge incontinence?

Urge incontinence is the second commonest cause of incontinence. About 3 in 10 cases of incontinence are due to urge incontinence. It can occur at any age, but commonly first starts in early adult life. Women are more commonly affected than men.

(The most common type of incontinence is stress incontinence which is dealt with in a separate leaflet. Very briefly, stress incontinence occurs when the pressure in the bladder becomes too great for the bladder outlet to withstand. Urine tends to leak most when you cough, laugh, or when you exercise. Some people have both stress incontinence and urge incontinence.)

### What causes urge incontinence?

The cause is not fully understood. The bladder muscle seems to contract (squeeze) too early when the bladder fills. The normal bladder control is reduced. The bladder muscle may give wrong messages to the brain, and the bladder may feel fuller than it actually is. Symptoms may get worse at times of stress.

### Some general lifestyle measures which may help

- **GP may refer to a local continence adviser.** They can give practical advice on how to manage. They may be able to supply pants, pads, etc. They may also help and advise on treatment.
- **Getting to the toilet.** Make this as easy as possible. If you have difficulty getting about, consider special adaptations like a handrail or a raised seat in your toilet. Sometimes a commode in the bedroom makes life much easier.
- **Caffeine.** This is in tea, coffee, coke, and is part of some painkiller tablets. It is a mild diuretic and also stimulates the bladder muscle. So, it will make urine form more often and may make urgency symptoms worse. It may be worth trying without caffeine for a week or so to see if symptoms improve.
- **Drinking.** Cutting back the amount of fluid that you drink may be advised if you drink more than average.

## What are the treatments for urgency and urge incontinence?

- Bladder retraining is usually advised at first. This can work well in up to half of cases.
- Medication may be advised instead of, or in addition to, bladder retraining.
- Pelvic floor exercises may also be advised if you have some stress incontinence in addition to the urgency symptoms (see separate leaflet on stress incontinence).
- Surgery is not commonly advised for urge incontinence, but may be a last resort in some cases.

### Bladder retraining (sometimes called 'bladder drill')

The aim is to slowly stretch the bladder so that it can hold larger volumes of urine. In time, the bladder muscle should become less irritable. This means that more time can elapse between feeling the desire to pass urine, and having to get to a toilet. Leaks of urine are then less likely. A doctor, nurse, or continence advisor will explain how to do bladder retraining. The advice may be something like the following.

Start by making a chart for each day of the week (see example below). Your doctor or nurse may have some pre-printed charts to give you. To begin with it is worth having an old measuring jug by the toilet so you can measure the volume of urine you pass each time you go to the toilet. Make a note of the times you pass urine, and the volume that you pass.

The aim is to 'hold on' for as long as possible before going to the toilet. This will seem difficult at first and sitting on a hard seat may help. With time it will become easier as the bladder becomes used to holding larger amounts of urine. The idea is to try to extend the time between toilet trips. It may take several weeks, but the aim is to pass urine only 5 or 6 times in 24 hours.

Here is an example of the sort of chart that might develop.

#### Day 1 of bladder retraining

Time:	8.30am	10.15am	12.30pm	1.30pm	4.00pm	6.00pm	<i>etc.</i>
Urine passed:	200ml	150ml	100ml	50ml	150ml	100ml	

You should also note any times that urine leaks. As time goes on the chart should hopefully look more like the following, with larger volumes and longer time intervals.

#### Day 30 of bladder retraining

Time:	7.30am	10.30am	2.30pm	5.30pm	9.10pm	11.10pm	<i>etc.</i>
Urine passed:	200ml	250ml	300ml	200ml	150ml	200ml	

Bladder retraining can be difficult, but becomes easier with time and perseverance. It works best if combined with encouragement, advice, and support from a continence advisor, nurse, or doctor.

### **Medication**

Medication may be prescribed for urgency and urge incontinence. Various medicines are available and include: oxybutynin, tolterodine, trospium chloride, and propiverine. (These also come in different brand names.) They work by blocking certain nerve impulses to the bladder which 'relaxes' the bladder muscle.

Medication improves symptoms in at least half of cases. The amount of improvement varies from person to person. You may have fewer toilet trips, fewer 'leakages', and less 'urgency'. However, it is uncommon for symptoms to go completely with medication alone.

Symptoms may return after you finish a course of medication. However, if you combine a course of medication with a bladder retraining programme, the long term outlook may be better and symptoms may be less likely to return when you stop the medicine.

Side-effects are quite common with these medicines, but are often minor and tolerable. Read the information sheet which comes with your medicine for a full list of possible side-effects. The most common is a dry mouth, and simply having frequent sips of water may counter this. Other common side-effects include dry eyes, constipation and blurred vision. However, the medicines have differences, and you may find that if one medicine causes troublesome side-effects, a switch to a different one may suit you better.

## **INDICATIONS FOR URINARY CATHETERISATION**

Urinary catheterisation is carried out for the following reasons:

- To empty the bladder before or after abdominal/pelvic/rectal surgery or examinations or before childbirth
- To determine residual urine
- To allow for irrigation of the bladder
- To introduce drugs (chemotherapy)
- To enable bladder function tests to be performed
- To measure urinary output and kidney function
- To relieve incontinence when no other means is practical
- To bypass an obstruction
- To relieve retention

There are three methods of catheterisation that are commonly used with persons with physical disabilities:

1. Intermittent Self Urinary Catheterisation
2. Urethral Catheterisation
3. Suprapubic Catheterisation

## **INTERMITTENT SELF URINARY CATHETERISATION**

This is a clean (as opposed to sterile) technique that involves the episodic introduction of a soft catheter into the bladder to remove urine. After the catheter is removed the bladder is empty and the person is catheter-free for intermittent periods. This process is usually done four to five times a day to prevent urinary retention.

Studies have shown that those using the clean as opposed to the sterile technique did not encounter problematic urinary tract infection. The advantages include improved quality of life, greater freedom to express one's sexuality and reduced urinary tract complications.

Persons suitable for intermittent self-catheterisation include:

- Those who can comprehend the technique
- Those who have a reasonable degree of manual dexterity
- Those who are highly motivated
- Those who have a willing partner or carer to perform the technique
- Those who can position themselves to attain reasonable access to the urethra.

The catheters used for intermittent catheterisation are technically described as semi-disposable, are designed to be washed and dried after each use and reused for a limited period of one week. The catheter should be stored in a plastic container after each use. They come in a variety of sizes according to one's needs.

## **URETHRAL CATHETERISATION**

Urethral Catheterisation is the introduction of a latex or silicone tube into the bladder via the urethra using aseptic technique. The catheter is anchored inside the neck of the bladder by a water filled balloon and is attached to a drainage bag.

Catheters come in various sizes and lengths depending on whether one is male or female. Silicone catheters are used for long-term catheterisation.

Drainage bags also come in various sizes i.e. 1 and ½ litre bags that can be attached to the leg via straps for daytime use and 2 litre bags for use at night. Leg bags can be attached to the larger night bag for convenience at night. Most bags come with a self-sealing sleeve that can be used to obtain samples of urine without introducing infection.

## **SUPRAPUBIC CATHETERISATION**

Suprapubic catheterisation is the insertion of a urinary catheter through the anterior abdominal wall into the dome of the bladder. It is usually performed under general or local anaesthesia. For long-term use a large bore silicone catheter is used.

The advantages of suprapubic catheterisation include:

- A reduced risk of urinary tract infection
- Increased level of independence
- Less impediment to sexual intercourse

Caring for a suprapubic catheter is the same as that of a urethral catheter. Once the insertion site is healed the site and catheter can be cleansed during bathing using soap and water.

### **References**

Mallett, J. & Dougherty, L. (2000). *The Royal Marsden Hospital Manual of Clinical Nursing Procedures*. Blackwell Publishing, Oxford.

Nicol, M., Bavin, C., Bedford-Turner, S., Cronin, P. & Rawlings-Anderson, K. (2004). *Essential Nursing Skills*. Mosby, United Kingdom.

Robertson, B. & O'Kell, S. (1995). *Study Guide for Health and Social care Support Workers*. First Class Books Pub., Bristol.