In nearly all cases of SCI there will be some impact on bladder function, this is because –

- Your bladder will need to be managed by method which is likely to involve -
  
  - A device (such as a urinary catheter) and / or other equipment (external sheath).
  
  - Emptying according to the volume of urine in your bladder, which is related to your blood pressure and drinking pattern.
  
  - A set routine, as you are unlikely to have normal sensation to remind you to empty your bladder.

- Autonomic (automatic) management of the blood pressure (which is directly related to urine production) is usually altered. When you are sitting your blood pressure is lower and this reduces your urine output. When you lie down, your blood pressure increases to normal and your urine output increases.

These factors can increase the likelihood of urinary complications.

After SCI it is normal to have low levels of bacteria in the bladder. Bacteria from the skin and urethra are easily brought into the bladder with intermittent or indwelling urethral and suprapubic catheter management.

- Urinary Tract Infection/s (UTI);

- Sediment (may be sandy, gravel, egg-shell or stringy mucous in nature)

- Kidney or bladder stones

When the production of urine is low there is a higher likelihood of developing any or all of these complications.

- A full bladder, blocked catheter or UTI may cause Autonomic Dysreflexia, this must be treated immediately.
Urinary Tract Infection (UTI) is the most common complication.

You may notice one or some of the following symptoms. You do not need to experience all of these symptoms to have a UTI.

- Fever
- Haematuria (the appearance of blood in the urine)
- Generally feeling unwell
- Experiencing Autonomic Dysreflexia
- Increased spasms
- Increased neuropathic or nerve pain
- Pain or discomfort when passing urine
- Leaking of urine
- Sweating
- Shivering
- Offensive smelling urine*
- Cloudy urine, or urine containing blood or debris*

* Some people can experience the last two symptoms without necessarily having a UTI.

What Should I do If I think I Have A UTI?

- See your GP or local doctor who may take a urine specimen or order a urine test
  - A specimen should only be taken from -
    - An indwelling urethral or supra pubic catheter and sterile leg bag system that has been inserted for less than 24-36 hours.
    - A new sterile Nelaton catheter (if self-catheterising).
  - Taking a specimen from a non-sterile catheter or leg bag will only result in a false positive result (It is likely to be an indication of colonisation of bacteria only, not a clinical infection).
  - On its own, a positive culture is meaningless, especially in the presence of a catheter.
  - There should always be symptoms of clinical infection in order to justify taking antibiotics.
- If you have a urethral or a supra-pubic indwelling catheter, it should be changed otherwise bacteria may re-emerge after antibiotics are finished and a UTI can recur.
• If you self-catheterise, you should -
  o use a new sterile catheter for each catheterisation.
  o start with a new catheter if you are using a registered reusable catheter.

• Drink plenty of water. If you increase your fluid intake, remember to pass a catheter more frequently or drain your leg bag more often.

• Take antibiotics only as prescribed by your doctor, making sure that your urine has been tested first so that you are taking the correct antibiotic.

• Check your skin more regularly, as you may be more susceptible to pressure injury (sores, ulcers) when sick or if you have leaked any urine.

Leaking around a urethral catheter, (or voiding for those with a Supra-pubic catheter) often indicates a blocked catheter or cystitis. Changing the size of the indwelling catheter (or the balloon size) is unlikely to stop leaking.

Please contact the Community Lifestyle Advisors at PARAQUAD SA for a copy of the Spinal Cord Injury Medical Guidelines for Treatment of UTI handout sheet to assist your GP or local doctor to manage your urinary tract infection.

Main Factors in Developing Urinary Complications After SCI

**Poor Fluid Intake** – Is more likely to lead to development of urinary tract infections.

**Poor Technique** – Especially actual insertion technique; choice of lubricant formats (sachet vs tube) and choice of catheter.

**Poor Cleanliness** – Especially with management of equipment (cleaning and storage) used for catheterisation.

**Inappropriate Investigation** – Urine specimens should only be taken from a “new” sterile catheter and sterile leg bag system that has been inserted for less than 24-36 hours. Frequent infections should be investigated with blood tests to assess kidney function and also a renal bladder ultrasound to exclude calculi (stones).

**Inappropriate Antibiotic Treatment** – UTI’s should only be treated with an antibiotic sensitivities based (laboratory result), for sufficient periods. Please contact the Community Lifestyle Advisors at PARAQUAD SA for a copy of the Spinal Cord Injury Medical Guidelines for Treatment of UTI handout sheet to assist your GP or local doctor to manage your urinary tract infection.
Preventative Medications

There are no medications which will guarantee prevention of UTI.

However, some or all of the following have been used with varying success:

- Hiprex™ 1g twice daily (probably not effective with IDC because the urine doesn’t stay in the bladder for long enough) – needs acidic urine (ph. 5-6.5) to work.

- Vitamin C supplementation – at least 1g twice daily
  Note: Ascorbic Acid based Vitamin C not Ascorbate based Vitamin C is recommended.

- Cranberry extract – tablets or capsules 2 x 5000 iu daily, are preferred to the juice and its effectiveness is suggested to work due to it being very high in Vitamin C but may have other active agents which inhibit bacterial growth in the urine.
  Note: Cranberry juice is very high in calories and is a factor to be considered if calorie control is relevant for weight or diabetic management.

Vitamin C and Cranberry juice can also have an impact on your dental health.

Sediment

Cloudy urine can occur due to urinary tract infections, proteinuria, kidney or ureteral stones, infections to the kidney and in renal failure.

People with urinary tract infections have more sediment than do healthy people. This sediment includes protein, leukocytes, or white blood cells, and bacteria. Protein in the urine can be found with many other disorders, but the presence of bacteria is unique to persons with infections. In this instance, doctors consider the urine sediment to be abnormal.

Indwelling catheter drainage does not allow the normal physiological flushing and scouring action of micturition. In addition the bladder is incompletely emptied as a result of urine pooling below the catheter balloon.

Causes For Urine Sediments To Appear

Protein may appear in urine if the kidneys are having trouble filtering particles and larger particles than usual get into the urine. Often, these are protein particles. Protein in urine is called Proteinuria. The most common protein found in urine is a protein called Albumin. Albumin in urine is called Albuminuria. A symptom of Proteinuria or Albuinuria is cloudy looking urine.

Another possible cause of sediments to appear in urine are possible kidney problems such as kidney stones. A symptom of having cloudy urine is often suggestive of a possible kidney stone that may soon need to be removed. There are also many non-urinary metabolic problems that can be suspected with noticeable sediment. It is a sign that the body is trying to get rid of extra chemicals and substances, and using the urinary tract as one possible route to get rid of the excess materials. If that is the case, you may experience a number of additional non-urinary symptoms such as changes in digestion, weakness, or other changes in your body.
Another cause of urine sediment is Urinary Tract Infections. The problem does not even have to be related to the urinary tract. Any kind of a metabolic condition can cause your body to attempt to remove the extra waste via the urinary tract, thus creating an unusual appearance of the urine since the chemical composition of it is different than usual.

### Kidney or Bladder Stones

Stones form in the bladder when waste products crystallise. In most cases, these stones are made up of calcium. Stones are usually between 0.2cm and 2cm, but may be smaller or much larger.

Kidney stones are made of salts and minerals in the urine that stick together to form small "pebbles." They can be as small as grains of sand or as large as golf balls.

Kidney stones form when a change occurs in the normal balance of water, salts, minerals, and other things found in urine. The most common cause of kidney stones is not drinking enough water.

Kidney stones are created when certain substances in urine -- including calcium, oxalate, and sometimes uric acid -- crystallize. These minerals and salts form crystals, which can then join together and form a kidney stone.

Kidney stones usually form, or begin to form within the kidney, where urine collects before flowing into the bladder via the ureters.

Why some people form kidney stones and others don't is not always clear. Kidney stone disease is more common in young and middle-aged adults than in the elderly, and more prevalent in men than women.

Anything that causes urine to remain in the bladder creates the right environment for stones to form because waste products won't be removed as they normally would. This may occur because the bladder isn't emptying completely.

**Risk factors for bladder stones include** -

- Being male.
- Poor fluid intake.
- Incomplete emptying of the bladder.
- Recurrent urine infections.
- Bladder stones can cause irritation and also cause incontinence, also known as irritable bladder. Stones may also block catheters, and cause repeated bladder infections.
What Causes Kidney Stones?

Kidney stones may form when there's a change in the normal balance of the water, salts, and minerals found in urine. Different kinds of changes result in different types of kidney stones. There are many factors that can trigger changes in the urine, ranging from chronic medical conditions to what you eat and drink.

Most urinary stones are composed of calcium oxalate crystals - a kind of salt in the urine that's difficult to dissolve. Uric acid is a less common cause of stones. If your urine is chronically infected with certain organisms, you can be prone to getting different types of kidney stones as well.

Certain people are frequent "stone formers." A person who has one stone has a 50% chance of developing another stone over 10 years.

Sometimes the answer is simple and easy to rectify but if you have any concerns contact -

Community Lifestyle Advisors at PARAQUAD SA 08 83553500 or www.pgasa.asn.au or speak to your GP.

As with the non-spinal cord population it is important to maintain a healthy urinary system. For men, it is important to discuss with your Doctor or Urologist the risks for prostate cancer and have recommended screening as prescribed.

References and Resources

- Department of Health and Ageing; Bladder and Bowel website: www.bladderbowel.gov.au
- Continence Foundation of Australia www.continence.org.au
- ParaQuad NSW: http://www.paraquad.org.au/
- Independence Australia: www.independenceaustralia.com.au

PQSA Community Lifestyle Advisors 08 83553500 or www.pgsa.asn.au

SORT Spinal Outreach Team at Hampstead Rehabilitation Centre 82221433

www.spinal.co.uk

Paraquad NSW Publication page

Direct link to Rural Spinal Cord Injury Project ‘Management of Neurogenic Bladder’:

Paraquad NSW Publication ‘Continence Management’

www.scireproject.com
Bladder Health and Function Following Spinal Cord Injury

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