# Open urethroplasty

## Patient information leaflet

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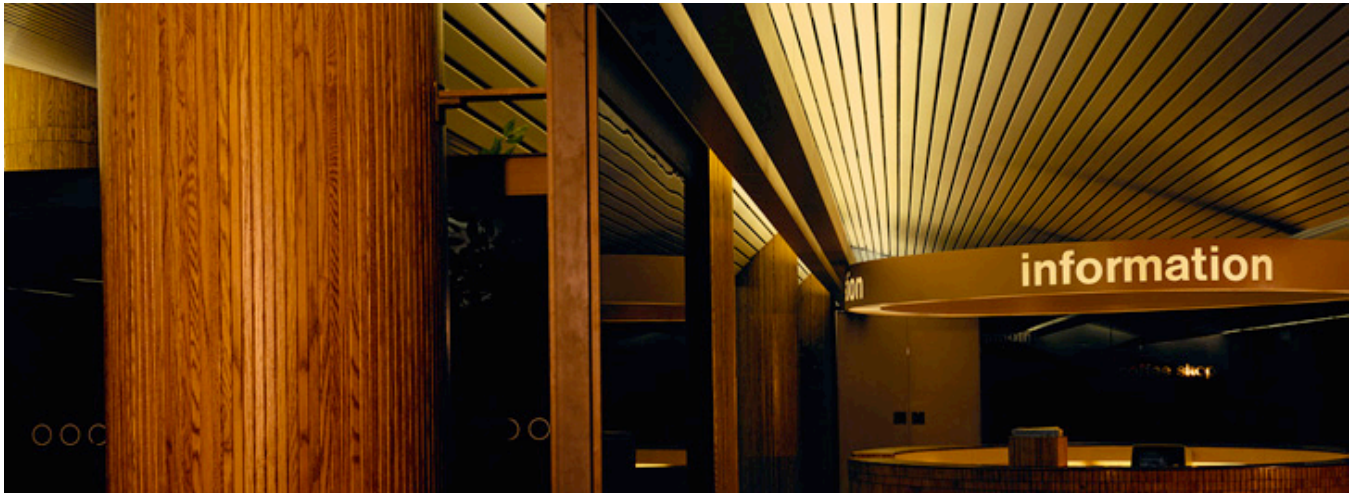
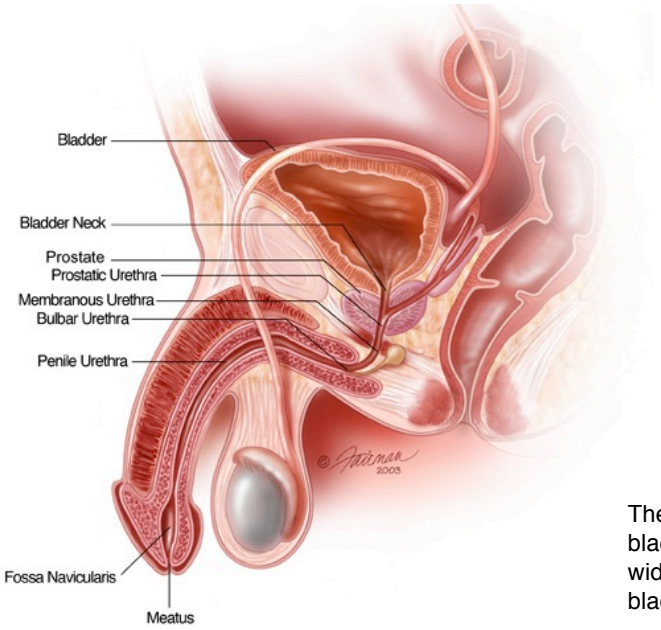





# Urethral stricture disease

# Treatment information for patients

## Urethral strictures

The urethra is a tube that transports urine from the bladder to the tip of the penis. Normally, the urethra is widely patent (open) throughout, and therefore, as the bladder empties, there is no restriction of flow.

A urethral stricture is a disease process associated with a narrowing or stenosis of the involved segment of the urethra. The consequence of a urethral stricture is obstructive urination. This means that as the bladder contracts (squeezes to empty), the flow through the urethra is impaired the way a kink/pinch in a garden hose is associated with a major reduction of water flow.

### Causes of Urethral Strictures

**Straddle Injury:** A common urethral stricture cause is straddle trauma injury to the urethra. This may be a specific impact injury associated with bleeding and an inability to urinate. More often patients do not develop symptoms until months or years after an injury. These strictures are typically in the bulbar urethra. In some cases, patients are found to have bulbar strictures and do not recall a specific trauma. The bulbar urethra is relatively unprotected, and many boys and young men have some trauma to this area from a bicycle bar, a fence, being kicked, hit by a ball or any other impact to the scrotal area.

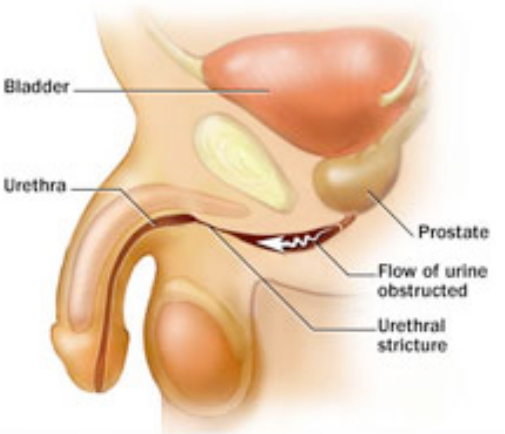
**Pelvic Bone Fracture Posterior Urethral Disruptions:** Common causes of pelvic fractures in men include automobile and motorcycle motor vehicle accidents and crush injuries, often work related. When the pelvis is fractured, in some cases there is an associated tear of the membranous portion of the posterior urethra. In most cases the ends separate, and the patient is completely unable to urinate.

**Lichen Sclerosus** = Lichen Sclerosis (LS): This is also known as Balanitis Xerotica Oblitarans or BXO. This is often a debilitating disease of unclear aetiology. Men with LS have whitish discoloration of the penile skin and can develop strictures involving the meatus alone, or longer strictures of anterior and posterior urethra.

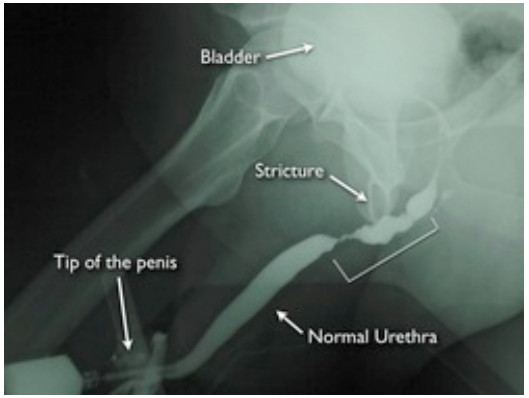
**Hypospadias Surgery**: When a boy is born with an incomplete development of the urethra, called hypospadias, treatment with surgery to add tissue to the urethra and bring the opening to the tip of the penis can be complicated by urethral stricture development.

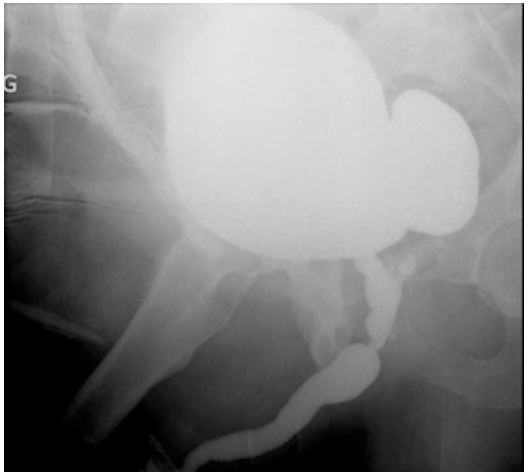
**Urologic Procedures:** When catheters or instruments are advanced through the urethra into the bladder to treat urologic or other diseases, the instrumentation can cause damage to the urethra and subsequent stricture formation. In particular, the fossa navicularis, the portion of the urethra close to the urethral opening at the tip of the penis, is the area most often affected. In addition, prostate surgery or radiation can be associated with very complex strictures involving the bladder neck and/or membranous urethra.

**Other Causes**: Other causes include foreign body insertion into the urethra and hospital treatment with catheterisation. Urinary tract infections and infections affecting the urethra (urethritis – e.g. gonorrhoea etc.) can lead to stricture formation.




Urethral strictures lead to more than just poor flow



## Symptoms and Consequences

A common consequence of urethral stricture disease is a reduction in urine flow rate and a prolonged time needed to empty the bladder. Symptoms can develop suddenly or very gradually. In some cases, patients are so "used to" their slow flow rate, they do not appreciate that there is a problem, but when asked, recall that when standing next to others at a urinal, the sound is different, and others require less time to urinate. If the only problem associated with stricture disease were a slow flow rate, it would be very reasonable for many patients to not pursue treatment and just "live with" the condition. Unfortunately, the obstruction to urine flow caused by urethral strictures can lead to many serious problems and consequences:

When there is urethral obstruction, the bladder has to squeeze harder to overcome the resistance. Eventually, the bladder wall thickens. This represents damage to the bladder. The interior of the bladder is no longer smooth. Visualization of the inside of the bladder reveals an abnormal strand-like appearance, and imaging reveals significant irregularity of the bladder wall. This is called trabeculation.

In addition, the bladder can become enlarged. As this enlargement progresses, the bladder often becomes less able to empty during urination. Patients retain significant volumes of fluid in the bladder after urination.

As the bladder becomes progressively damaged, additional symptoms can include frequent voiding during the day and at night (called nocturia), sudden urges to urinate (urgency) and a sensation of incomplete emptying. Incomplete emptying can lead to recurrent infections of bladder, prostate and epididymis.

Higher voiding pressures inside the bladder eventually lead to “backpressure” and reflux of urine into the upper urinary tract resulting in progressive damage of the kidneys with renal failure.

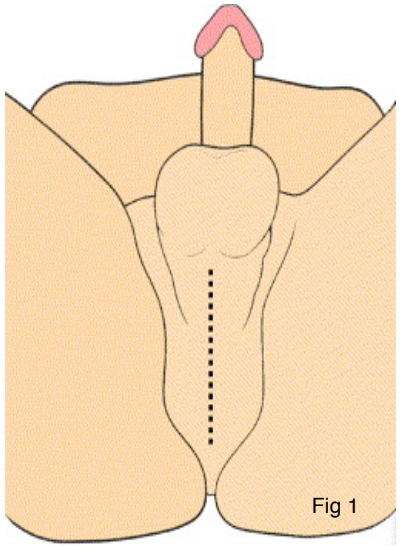


Fig 1

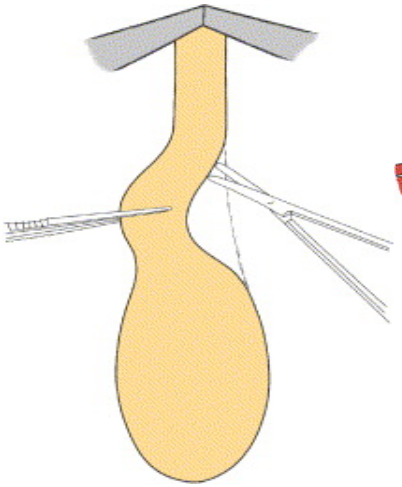


Fig 2

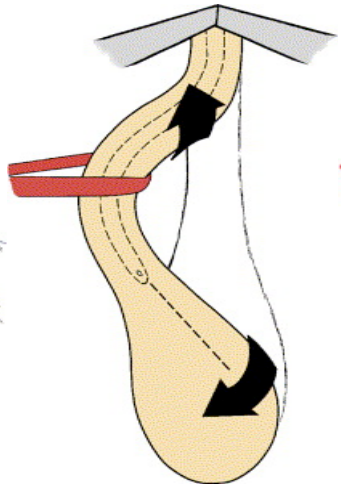


Fig 3

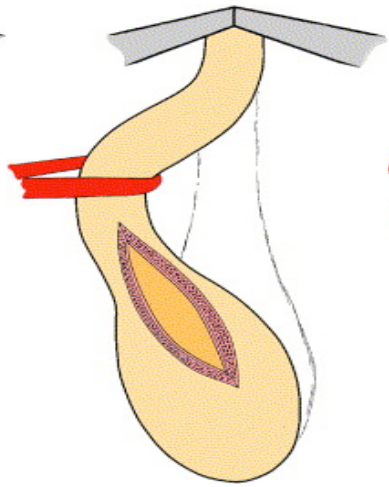


Fig 4

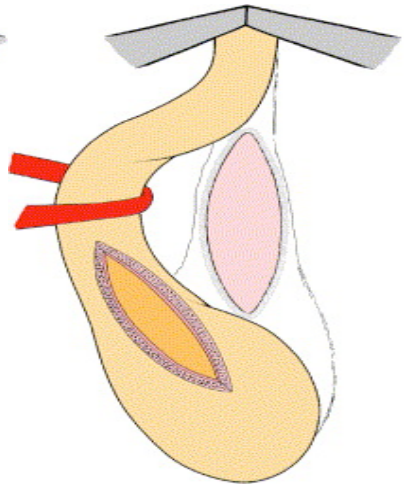


Fig 5

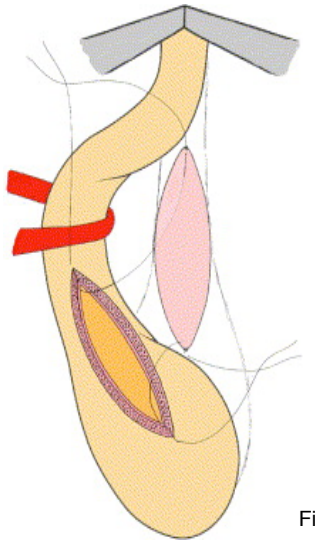


Fig 6

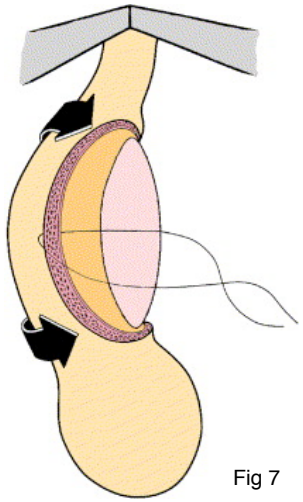
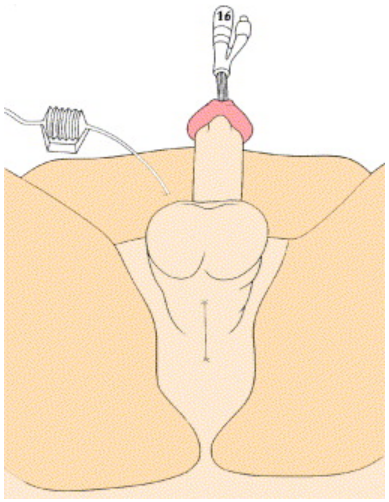


Fig 7



There are multiple techniques for the open repair of urethral strictures. The type of repair depends largely on the extent and location of the stricture and the preferences and experience of the surgeon.

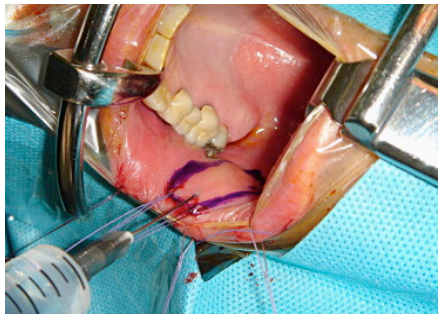
A common technique in the bulbar urethra is the *dorsal onlay buccal mucosal graft urethroplasty*:

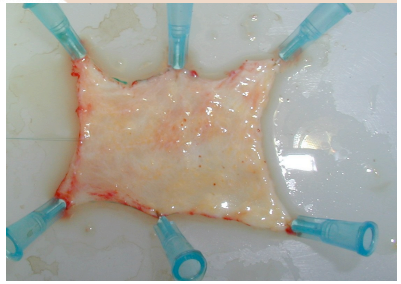
Through a midline perineal incision (Fig.1) the surgeon identifies the narrowed segment of the urethra. The urethra will then be separated from the underlying tissue (corpora cavernosa = erectile cylinders of penis) (Fig.2) and rotated by 180 degrees (Fig.3). The strictured urethral segment will be fully opened (Fig.4). A small strip of graft tissue – usually harvested from the inside of the cheek, the lip or tongue – is placed on the underside of the corpora (Fig. 5). The graft will be attached to the corpora and the urethra will be rotated back into its original position (Fig.6). Suture lines on either side will create a watertight closure between the previously opened urethral edges and the graft (Fig.7). A Silicone catheter will passed through the reconstructed urethra and left in place for about 3 weeks until the reconstructed urethra has healed. The wound will be closed and a small drain will remain inside the wound for one day.

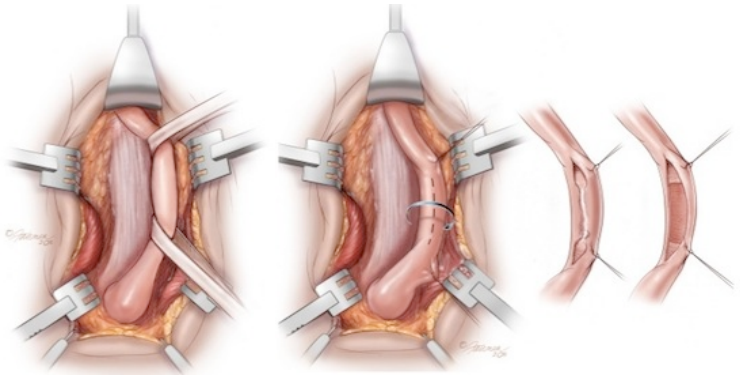
Most patients will be able to leave the hospital after 24hours on a short course of antibiotics. Before removing the catheter an x-ray examination will be performed.

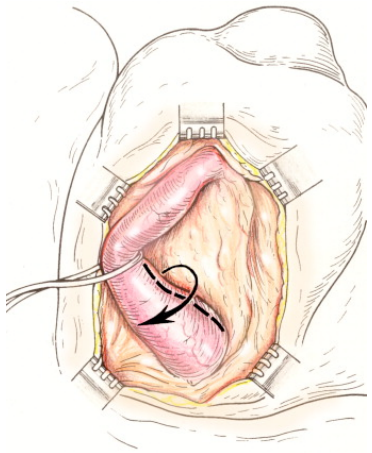
Example for open reconstructive urethral surgery:

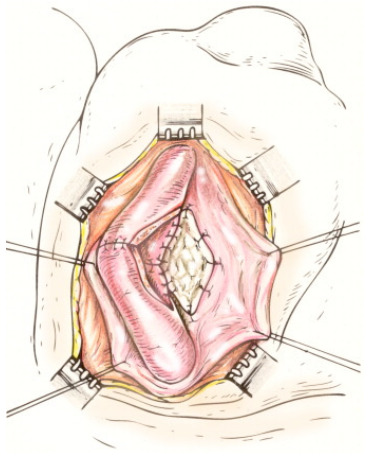
Dorsal onlay buccal mucosal graft urethroplasty







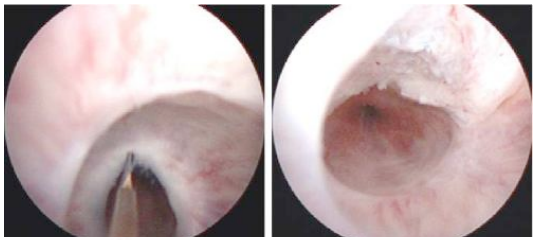


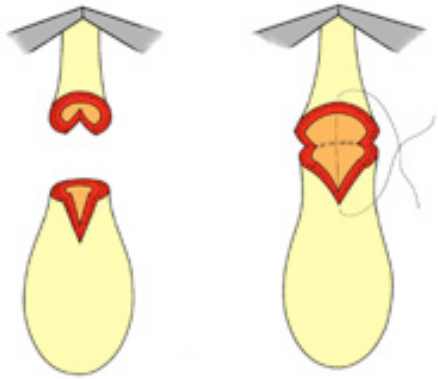


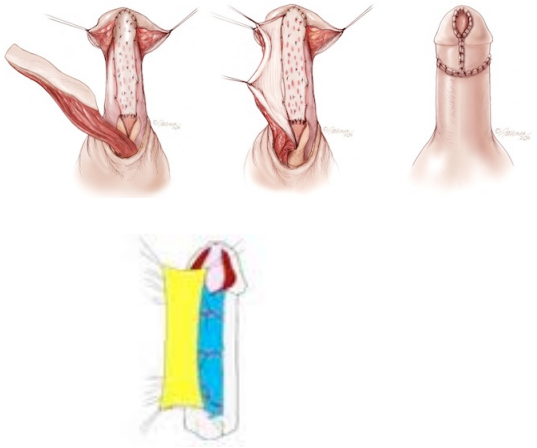
## Outcome and possible complication

Unfortunately, although less invasive, endoscopic surgery or simple dilatation is often associated with recurrence of the stricture (in about 80% of cases). Postoperative bleeding and urethral injury are possible.

Open reconstructive techniques have far higher success rates but may come with occasional procedure-specific complications: erectile difficulties can be experienced in a very small number of patients (<2%). This can include very rarely decreased penile glans sensitivity, coldness of the glans during erection, and a glans that is not completely swollen during erection. Ejaculatory problems can occur due to postoperative dysfunction of the periurethral muscles. Ventral onlay grafts can lead to formation of small urethral pockets (diverticulae), which can disturb the flow of urine and lead to post-void dribbling or even recurrent infections. Stricture recurrence occurs in about 10% of patients undergoing open repair. Other complications include wound infection and formation of fistulae between urethra and skin. Fistulae will require further surgery to repair the defect. Complications at the harvesting site of the mucosal graft are very rare but may include persistent numbness, tightness or discomfort in the mouth. Most experts however agree, that long-term complications such as persistent neurosensory deficit are extremely rare. In patients where an end-to-end anastomosis after excision of the strictured urethral segment has been performed postoperative chordae and mild penile shortening has been reported, primarily in older patients with less compliant urethral tissue.







## Optical urethrotomy

The internal urethrotomy procedure is performed in the operating room using an endoscopic instrument (a telescope that is advanced through the penis). There is a small blade towards the tip of the instrument that can be deployed once the stricture is reached to cut the stricture internally to "open it up" in one or more places.  Since internal urethrotomy is performed using a telescope, it is often called an optical urethrotomy. Subsequently, an indwelling catheter is placed to stent the urethra open for some period of time (often 3-5 days) as the urethra heals. An optical urethrotomy is usually the first procedure to treat a urethral stricture. However, in many cases, scarring and tissue contraction lead to recurrent strictures with the need for further treatment.

## End-to-end anastomotic urethroplasty

In patients with short bulbar urethral strictures it is often possible to remove the narrowed segment completely. After careful mobilization of the urethra both healthy ends can then be rejoined with multiple fine sutures. A catheter will be left in place for 2-3 weeks. A final x-ray will confirm that the joint has healed completely and that there is adequate caliber of the urethral lumen before patients will be able to pass urine naturally again.

## Other open urethroplasty procedures with skin grafts

There are multiple open procedures to repair recurrent urethral strictures with graft material taken from both mouth as well as penile skin. In some cases it might be necessary to perform surgery in two stages with an interval of several weeks or months between the two separate procedures. Location and extent of the stricture as well as the experience of the surgeon will determine the technique used.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