Urodynamic Procedure Appointment
The Department of Urology
Eye and Ear Institute
915 Olentangy River Road
Columbus, Ohio 43212

Check in with the Department of Urology on the 2nd floor.

Date: __________________________

Procedure Time: ________________

Come with a full bladder- please do not use the restroom upon arrival.

You are able to eat and drink the day of the procedure (there are no restrictions), and please remember to take your daily prescribed medication(s).

Also, remember to bring a list of your current medications and allergies.

**Please understand if you are more than 15 minutes past your arrival procedure time your appointment might be cancelled and you will need to be rescheduled. Call the office if you need to reschedule or running late. (614) 293-8155.**
What is urodynamics?

Urodynamics is the investigation of the function of the lower urinary tract – the bladder and urethra – using physical measurements, such as urine pressure and flow rate as well as clinical assessment.

The assessment begins with a medical history and examination – which may, for example, reveal abnormalities within the lower abdomen or pelvis that are contributing to the lower urinary tract symptoms.

The patient is then given an urination (voiding) diary to be kept for three days, to document their fluid intake and output, including episodes of incontinence.

- Bladder capacity
- The frequency of passage of urine
- Episodes of incontinence
- Getting up at night to urinate

The diary can also outline other problems, such as excessive fluid intake.

A midstream specimen of urine is sent to the laboratory in order to exclude infection.

A pad test may be performed for women complaining of urinary incontinence. This test determines the severity of any incontinence and objectively demonstrates the symptom. The patient drinks 500ml of water and walks about performing normal everyday tasks, while wearing a pre-weighed pad.

The pad is then re-weighed and a gain of more than 1g per hour is taken to represent urinary incontinence.

What diagnosis can be made from urodynamic studies?

Urine produced in the kidneys is transported to the bladder by rhythmical contractions of the ureters.

At appropriate occasions the bladder is emptied via the urethra, by contraction of the normally relaxed detrusor muscle that constitutes the wall of the urinary bladder.

The detrusor muscle’s behavior is thought to sometimes become ‘unstable’, leading to the lower urinary tract symptoms – such as problems with frequency, urgency and getting up at night to pass urine.

In men, many of these same symptoms can be caused by enlargement of the prostate gland (BPH) and urodynamic studies can help to differentiate the two causes.

For obstruction, the International Continence Society has agreed that presently the only way to objectively diagnose it or grade its severity is a urodynamic pressure-flow study.
For incontinence the issue is more complicated. There are two main types of incontinence:

- Stress urinary incontinence (SUI) that’s caused by a deficiency of the closure mechanism of the bladder
- Urge incontinence that’s caused by over activity of the bladder. This over activity can be demonstrated urodynamically by filling cystometry.

**Filling cystometry**

Bladder pressure is measured because the bladder is filled to capacity with a salt solution (normal saline) at a rate of 10 to 100ml/minute, with the patient lying down.

The catheter is usually performed using a urinary catheter passed through the urethra into the bladder.

The catheter contains two channels. One channel is used for filling, and pressure can be recorded through the other. A ‘volume versus pressure’ graph, which is called a cystometrogram (CMG), is produced.

The cystometrogram is basically performed to evaluate the compliance and stability of the detrusor muscle. Eighty five per cent of all incontinence occurs in women, and three quarters of those suffer with stress incontinence (ie leakage in the absence of over activity).

Compliance is simply the elastic property of the detrusor muscles. An evaluation of compliance is an evaluation of the ability of the bladder to ‘stretch’ to ‘normal’ capacity, while maintain low pressures.

Stability is evaluated by observing the detrusor while filling the bladder to normal. The evaluation determines the presence or absence of detrusor over activity (or instability).

Vesical pressure is the pressure that’s measured inside the bladder, with a catheter that’s specifically designed for pressure monitoring in the urinary tract.

This is a combination of the pressure being exerted on the bladder by the abdominal contents, the weight or pressure of any urine in the bladder and the force that the detrusor muscle is exerting on the fluid. The pressure in an empty bladder is usually called resting pressure, which changes with position.

The normal bladder resting pressures vary between 8 and 40cm of water (ie the pressure exerted at the bottom of a column of water 40cm high), depending upon the particular patient and position during study.

Abdominal pressure is measured by placing a special catheter either in the rectum or the vagina. Abdominal pressure information is significant because the bladder is contained in the floor of the abdominal cavity, and it’s important to isolate pressures and activities occurring in the bladder itself.
The detrusor pressure is a subtracted pressure that's calculated by subtracting the abdominal pressure from the vesical pressure. In doing so, artefacts from abdominal straining, gas and the weight of the abdominal contents are removed from the information being processed from the catheter in the bladder, thereby representing the actual activities taking place in the bladder during the CMG.

A bladder with normal compliance will demonstrate no greater than 15cm water increase in detrusor pressure because it progresses from empty to capacity during a CMG.

When the bladder is properly positioned in the abdominal cavity, both it and the bladder neck are above the pelvic floor muscles. With aging, or after childbirth, the female pelvic floor can relax, causing the base of the bladder neck to fall below the pelvic floor.

For a patient to remain dry, the pressures in the urethra must remain greater than the pressure in the bladder, during filling.

The average urethral closure pressure for a female is 60cmH20 and for a male it is 80cmH20.

**Flow-pressure study**

This is usually performed immediately after filling cytometry.

The urethral catheter is narrow enough that voiding can occur around it. The important measurement from the study is the detrusor pressure at maximum flow.

By this method, obstruction to passage of urine (high pressure, low flow) can be distinguished from a lack of tone in the detrusor muscle (low pressure, low flow).

Many women void simply by relaxing the urethral sphincter with no associated rise in detrusor muscle pressure, which can make the study difficult to interpret. Following voiding, it's usual to measure the amount of any urine left in the bladder.

**Videocystourethraphy**

In situation of particular complexity, flow-pressure studies are combined with the use of X-ray screening in order to gain additional information about the anatomy of the bladder and urethra, (Ultrasound scanning can also be used to demonstrate an abnormally low bladder neck.)

**Who should have it done?**

Not all patients being investigated for lower urinary tract symptoms will require a full urodynamic assessment. But the studies outlined are particularly helpful when previous treatment has failed and are essential prior to surgical treatment of incontinence or bladder prolapsed.