



Stress incontinence is an involuntary loss of urine that occurs during physical activity, such as coughing, sneezing, laughing, or exercise and is due to pelvic floor muscle weakness. It is the commonest form of incontinence.

*Once you can laugh at your own weaknesses,
you can move forward*

GOLDIE HAWN 1945 - US ACTRESS

If sudden extra pressure ('stress') is exerted on the bladder, urine leaks when the pelvic floor muscles and urethra fail to withstand the extra pressure. This weakness may start during pregnancy. Typically the urine loss is just a small amount each time the stress is applied.

TYPES OF INCONTINENCE

1 Stress incontinence

Stress incontinence happens when sudden increases in abdominal pressure produce small amounts of urine loss. This occurs as a result of coughing, sneezing, laughing, giggling and exercising.

2 Urge incontinence

Urge incontinence is the involuntary loss of urine associated with urgency of micturition. The urine loss is usually a flood. With sensory urgency the patient feels the urge to pass urine but the bladder pressure has not risen. The bladder muscle has not contracted. With motor urgency the patient feels the need to void urine but in this instance the bladder muscle has contracted.

Idiopathic urge incontinence

The cause of this type of urge incontinence is unknown. It is commonly referred to as an unstable bladder. This is a good name to describe it as it implies a certain degree of unpredictability.



Neurogenic urge incontinence

Neurogenic urge incontinence is found in neurological disorders such as Multiple Sclerosis, stroke, Parkinson's disease, spinal cord injuries etc. Detrusor hyperreflexia describes this condition. The detrusor is the muscle of the bladder.

3 Mixed incontinence

A combination of stress and urge incontinence is known as mixed incontinence

4 Functional incontinence

Functional incontinence occurs when a person fails to use toilet facilities correctly. There may be a variety of reasons. People in wheelchairs may not get to a suitable toilet in time. Confusion, Alzheimers syndrome, dementia, poor mobility or poor sight may contribute. There are many more causes for this behavioural problem.



Manneken Pis of Brussels



5 Overflow incontinence

Overflow incontinence is associated with chronic retention of urine. This is much more common in men than women. The bladder muscle is either poorly functioning or non-functioning. The result is a large capacity bladder which at capacity starts to dribble urine every few minutes. Common causes include prostatic obstruction. Diabetes may affect the nerves to the bladder and lead to detrusor atonicity. Multiple sclerosis can produce atonicity but this is unusual as the majority of cases give rise to urge incontinence. In women ovarian cysts and large fibroids can press on the bladder to cause this.

6 Fistulae

A fistula is an abnormal connection between two epithelial surfaces. If the bladder connects to the skin or vagina or rectum then urine can escape producing incontinence.

7 Congenital

Ectopia vesicae is a rare congenital defect where the baby is born with the bladder opening directly onto the anterior abdominal wall.

Ureters normally insert into the bladder. Rarely, they drain into the urethra or the vagina in which case incontinence may ensue. In this instance they are referred to as ectopic ureters.

FEMALE STRESS INCONTINENCE

Mechanism

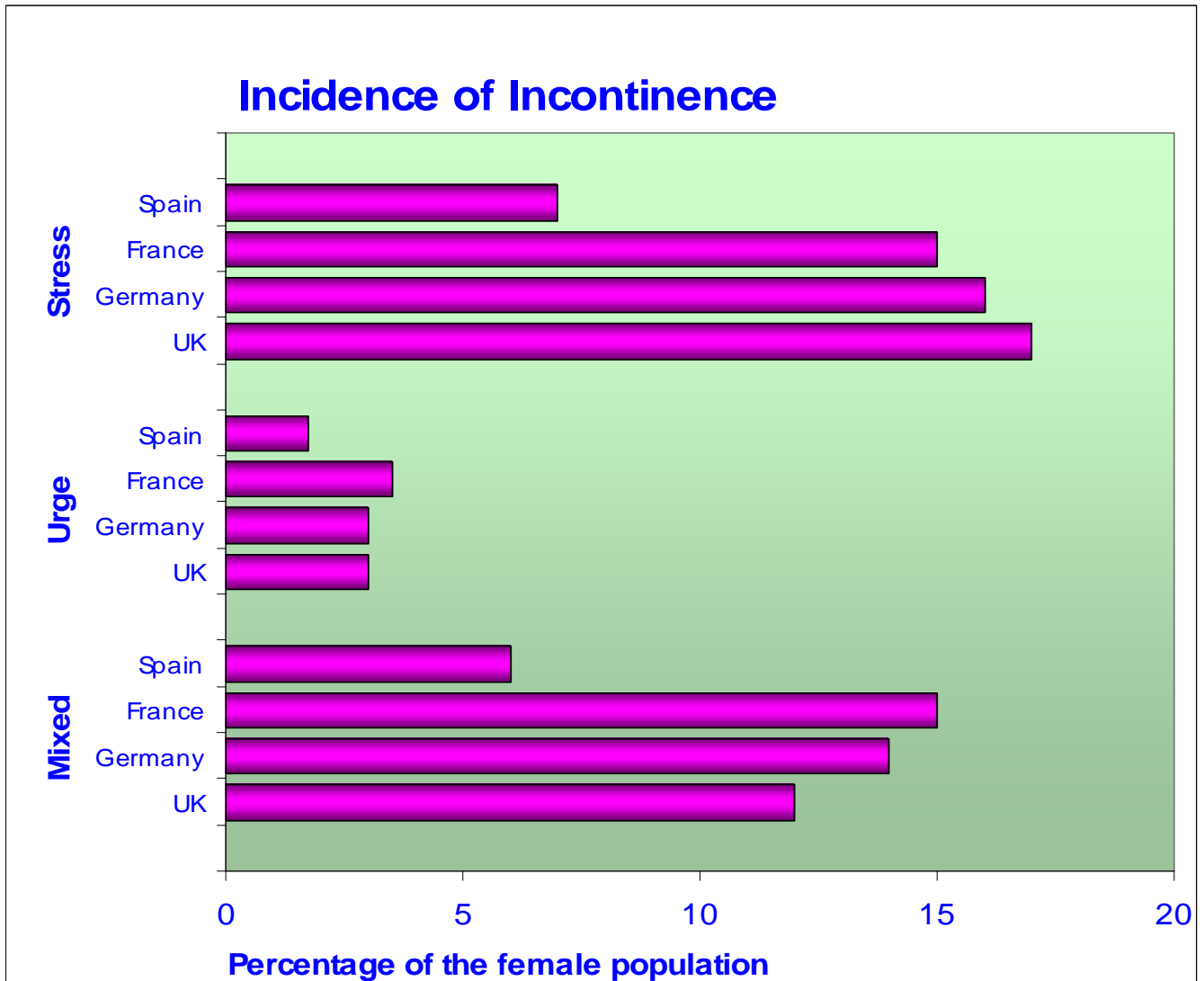
The bladder and urethra are normally situated in the abdominal cavity. Any rise in abdominal pressure is transmitted to the bladder and urethra equally. If the pelvic floor musculature is weakened then the urethra descends on coughing. A rise in abdominal pressure is transmitted to the bladder alone. This pressure exceeds the urethral pressure leading to leakage of a small aliquot of urine.

Incidence

Female stress incontinence is very common. It is estimated that four million women are affected in the UK and 13 million in USA. 1 in 5 women over the age of 40 have some degree of stress incontinence.



Navajo Falls - USA



Age

The incidence rises after child bearing age and further rises after the menopause.

Sex

This article will deal with female stress incontinence. However men can suffer from if following a prostatectomy.



Predisposing factors

A weakened pelvic floor musculature plays an important part in this condition. Pregnancy is also implicated. In the last 3 months the levels of female hormones rises dramatically. Progestogens are thought to relax the muscles and ligaments in the pelvis prior to the birth. The increased weight of the enlarged uterus may contribute. Actual childbirth has been suggested as a possible cause. Episiotomy (a cut in the perineum at the moment of birth) was once implicated but latest research suggests it is not. The menopause and its sudden change in hormone status also give rise to stress incontinence. The degree of stress leakage can be worse in the week prior to menstruation where the hormone levels suddenly alter. Obesity predisposes as well as a chronic cough. Women who have had a hysterectomy are more at risk as are those who have undergone pelvic radiotherapy. Stress leakage is also commonly associated with prolapses.

Presentation

Involuntary loss of urine may occur when

- Coughing
- Sneezing
- Exercising
- Physical activity

A full urological history is taken. How much the incontinence is interfering with quality of life is assessed.

Examination

A full abdominal examination is performed. An internal examination will allow the stress leakage to be witnessed. Any degree of vaginal prolapse can be assessed.

Investigations

- Blood tests** Routine blood tests are performed. They are required if surgery is contemplated. Renal function tests such as urea and creatinine will detect any renal failure.
- Urine tests** Urinalysis is a dipstick test. It will detect the presence of blood and white blood cells in the urine.



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Female Incontinence

- Ultrasound** A bladder scan can measure any residual urine after voiding. This is an easy test to perform as most of the machines are now portable. Ultrasound scans will pick up problems in the kidneys. Hydronephrosis (back pressure effects) in the kidneys can be detected.
- Diary** Recording how much fluid is consumed plus the time and amount of urine passed can provide a good overview of the patient's symptoms. This is usually performed over three to four days.
- Cystoscopy** A cystoscopy is an endoscopic examination of the bladder. The cystoscope is passed up the urethra. Any obstruction can also be assessed. Once in the bladder the residual urine can be measured. If the bladder wall is thickened then trabeculation is seen. With trabeculation the muscle fibres are seen under the urothelium. They look like thick cords of tissue running randomly under the lining.
- Urodynamics** In this test the pressures in the bladder and rectum are monitored whilst the bladder is filled. Voiding characteristics are also measured. The test assesses how the bladder is functioning. The degree of any bladder outflow obstruction is quantified by urodynamic assessment. Obstruction is assessed gauging the flow rate produced by the bladder pressure. Obstruction is diagnosed when there is a poor flow produced by a high bladder pressure. Urodynamic assessment can also be performed in conjunction with video facilities. Obstruction at various sites can be diagnosed on the video. Stress incontinence can be witnessed during the test by asking the patient to cough many times.

Treatment

The treatment of stress urinary incontinence includes both conservative and surgical options. The management of urge incontinence will not be discussed in this article.



Conservative

Pads and protective garments

These are widely available in chemists and supermarkets. They represent the commonest type of treatment for mild cases. They also help to control skin excoriation due to urine coming in contact with the skin.

Pelvic floor exercises

These exercises strengthen the urinary sphincter and pelvic floor muscles. The most commonly practised exercise is to squeeze the pelvic muscles as if urination was to be stopped mid stream. Once the exercise has been practised for a while it can be done at any time in any place. The exercises will lead to some improvement with time. Minor degrees of stress incontinence will be improved completely. However more severe forms will not be cured. Cones inserted into the vagina may assist pelvic floor exercises.

Bladder Training

More frequent toileting can relieve some of the problems by keeping the bladder as empty as possible. Timing of diuretic therapy and control of alcohol and caffeine (both of which act as diuretics) may be useful.

Drug Therapy

Anticholinergic (antispasmodic) drugs can control an overactive bladder and can be useful in mixed incontinence. Examples include tolterodine (Detrusitol®), oxybutynin (Ditropan®) and solifenacin (Vesicare®). However they have one side effect which is a dry mouth.

Amitriptilline and imipramine are two anti-depressants which have anticholinergic activity.

Electrical Stimulation

This has been tried. It involves many sessions of treatment and is not often performed.

Urethral inserts

These are devices that are inserted into the urethra to prevent the stress leakage. Their use is limited. Because they are invasive their use is restricted to predicted episodes of leakage such as playing tennis etc.



Ring Pessaries

These devices are used in the management of prolapse. The ring is inserted into the vagina. It can stop any prolapse coming down and hence improve any stress leakage.

Catheters

Intermittent self catheterisation is beneficial in overflow incontinence. The patient inserts a small tube into the bladder in order to empty it.

Surgery

Anterior Vaginal Repair

This technique was first described by Howard Kelly in 1913. It is the oldest surgical technique for stress incontinence. The operation is often combined with urethral buttress sutures. Buttress operations are being performed less and less nowadays owing to relative poor results.

Marshall-Marchetti-Krantz repair

This open operation was first reported in 1949. Victor Marshall was a urologist while Andrew Marchetti and Kermit Krantz were gynaecologists. Suspension sutures are inserted into the urethra. They are tied to the back of the pubic bone. In so doing the urethra is prevented from descending during coughing. Problems with the sutures eroding through were not uncommon. The sutures often loosened leading to a return of the stress incontinence. Overall the long term results were poor. It is rarely performed today.

Burch Colposuspension

Burch described this procedure in 1961. Basically the vagina is sutured to the pubic bone in order to suspend the bladder neck. This operation has a good success rate but it is an open procedure with a lot of dissection.



Sling procedures

Transvaginal bladder neck suspension was described by Pereyra in 1959. It is a minimally invasive technique. Modifications since then include Stamey (1975), Raz (1981), and Gittes (1987) bladder neck suspensions. The Stamey repair utilises needles inserted retropubically from above in order to suspend the bladder neck. Nylon sutures lift the vagina up. The suture is anchored suprapubically. Initial success rates were good but the long-term success rate with transvaginal bladder neck suspensions has been disappointing. These techniques have been largely supplanted by the TVT repair.

Tension-free Vaginal Tape “TVT”

This procedure was pioneered in Sweden nearly 20 years ago by Ulmsten. It utilises a polypropylene mesh tape which is inserted around the mid-urethra via an anterior vaginal incision. The tape is passed up retropubically. It does not require any fixation. A cystoscopy checks that the bladder has not been entered. The procedure is commonly performed under spinal anaesthesia which allows the positioning of the tape without tension or tightening to exactly control the stress leakage. This is the only tape procedure that has short and longer term results. It has a good success rate which is maintained. This technique is gaining in popularity

Trans-Obturator Tape “TOT”

This procedure is a development of the TVT. The procedure is performed similarly to the TVT except that the tapes are passed through the obturator foramen of the pelvic bone. The medium to long term results are as yet unknown.

Injection techniques

Several injection techniques have been developed. Silicone and collagen are used. The procedures are performed either peri-urethrally or endoscopically. The latter is the more usual. Silicone (Macroplastique®) is the most common used. It is injected beneath the mucosa near the bladder neck. It has the



consistency of toothpaste and act as bulking agents. There are few side effects and if it is not successful then it does not preclude any other treatment. Polyterafluoroethylene (Teflon®) has been used in the past but may migrate away from the urethra.

Artificial urinary sphincter

Artificial urethral sphincters work by inflating a cuff that is positioned around the urethra. The cuff is connected to a pump and a water reservoir. The cuff is inflated all the time compressing the urethra. When the patient wishes to void the cuff is deflated to allow the urine to pass. The cuff then re-inflates to gain continence again. These devices are the last resort in the management of urinary stress incontinence.

Further Information

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