



A REVIEW ON URINARY INCONTINENCE IN WOMEN

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ABSTRACT

Urinary incontinence (UI) is the most common health related problem that affect the quality of life in women. There are mainly two types of urinary incontinence to be described: stress urinary incontinence which cause urine leak due to association with physical activities, and urgency incontinence which cause urine leak associated with sudden desire to void. The potential cause of incontinence are the dysfunction of the detrusor muscles or the muscles of pelvic floor, dysfunction in controlling of storage and voiding. A full diagnostic evaluation for the urinary incontinence are medical history, urine analysis, physical examination and assessing the quality of life. The treatment includes surgical and non surgical options to increase bladder capacity.

KEYWORDS: Urinary Incontinence, Detrusor Muscles

INTRODUCTION

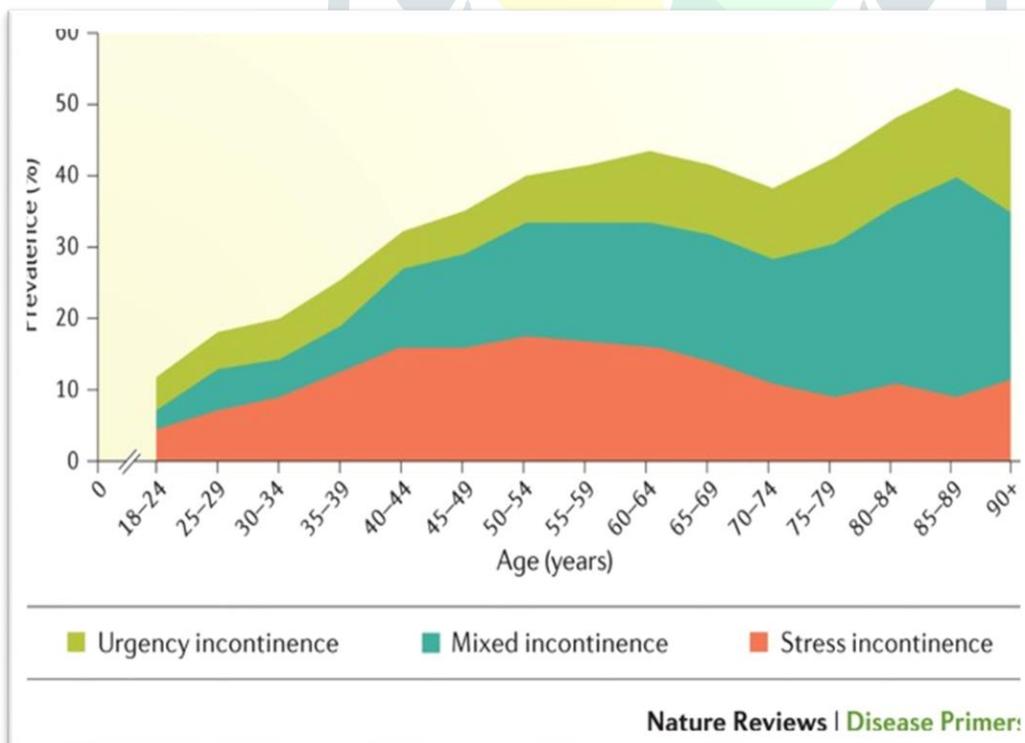
Urinary Incontinence is defined as the involuntary loss of bladder control or leakage of urine. And occur in both men and women. In men the Urinary Incontinence is due to the enlargement of the prostate or due to the damage in continence mechanisms during the surgery or due to radiotherapy for prostate cancer. In women Urinary Incontinence is due to the dysfunction of bladder or pelvic floor muscle that may arise during pregnancy or childbirth or at the time of menopause. The Urinary Incontinence in women is more common and has higher prevalence and has unique pathophysiology.

The Urinary Incontinence is mainly divided into Two type: Stress Incontinence and Urgency Incontinence. The International Continence Society defines the stress incontinence as the complaint of urine leakage associated with cough, sneezing, and physical exertion. The Urgency Incontinence is defined as the complaints of leakage of urine due to sudden desire to void. The Mixed Urinary Incontinence is defined as the mix of both stress and urgency incontinence which shows uncontrollable urge to void accompanied by leakage of urine during physical activity.

There are some rare type of incontinence in women, Postural Incontinence, Nocturnal Incontinence, Coital Incontinence, Functional Incontinence. Postural Incontinence is defined as loss of urine during change in body position. Nocturnal enuresis is defined as the leakage of urine during sleep. Coital incontinence is the loss of urine during sexual intercourse. The Functional incontinence refers to the incontinence due to the setting of physical or cognitive impairment like hip fracture or dementia that leads to the limits in mobility and due to inability to pass information regarding the bladder fullness. Most of the incontinence are more common with obesity and ageing or natural consequence of childbirth.

EPIDEMIOLOGY

The range of reported prevalence for urinary incontinence of any subtype in adult women is broad (5–72%), with studies converging on a prevalence of approximately 30%. The studies specifically measuring severe urinary incontinence, defined as urine leakage several times per week, have a more consistent reported prevalence of 6–10% in Europe and the United States. The age-specific incidence is <2 per 1,000 person-years in women <40 years of age but it increases with age.



PATHOPHYSIOLOGY

Bladder structure and function

The bladder, urethra and urinary sphincters work to store urine at low pressure and to void voluntarily at socially convenient or appropriate times. The detrusor muscle and internal urethral sphincter are smooth muscle, whereas the external urethral sphincter and pelvic floor muscles are striated muscle are present in bladder. The bladder lumen is lined with epithelial cells called urothelium and the basement membrane mucosal layer that protect the underlying detrusor muscle from toxins contained in the urine and communicate with neural cells that coordinate the storage and voiding phases.

Voiding up to 7 times per day in the waking hours is considered normal with a micturition volume of 250–300ml per void.

The pathophysiological underlying causes of incontinence are controversial. The several factor for the mechanism of stress and urgency incontinence include damage to the endopelvic fascia and pelvic floor muscles that support the urethra, decreased function of the striated urinary sphincter, changes in the compliance and innervation of the detrusor muscle, changes in the urothelium, changes in urine composition and changes in the central nervous system.

Stress Urinary Incontinence

The mechanism for Stress Urinary Incontinence are urethral hypermobility resulting from loss of support of the bladder neck and urethra. And weakness of the urinary sphincter and it can result from trauma, repeated urogynaecological surgeries, neurological disease, ageing or diseases leading to systemic muscular atrophy.

Urgency Urinary Incontinence

The Urgency Urinary Incontinence involves physiological perturbations to bladder function. There are three main aetiologies intrinsic to the bladder that cause to urgency incontinence: detrusor overactivity, poor detrusor compliance and bladder hypersensitivity.

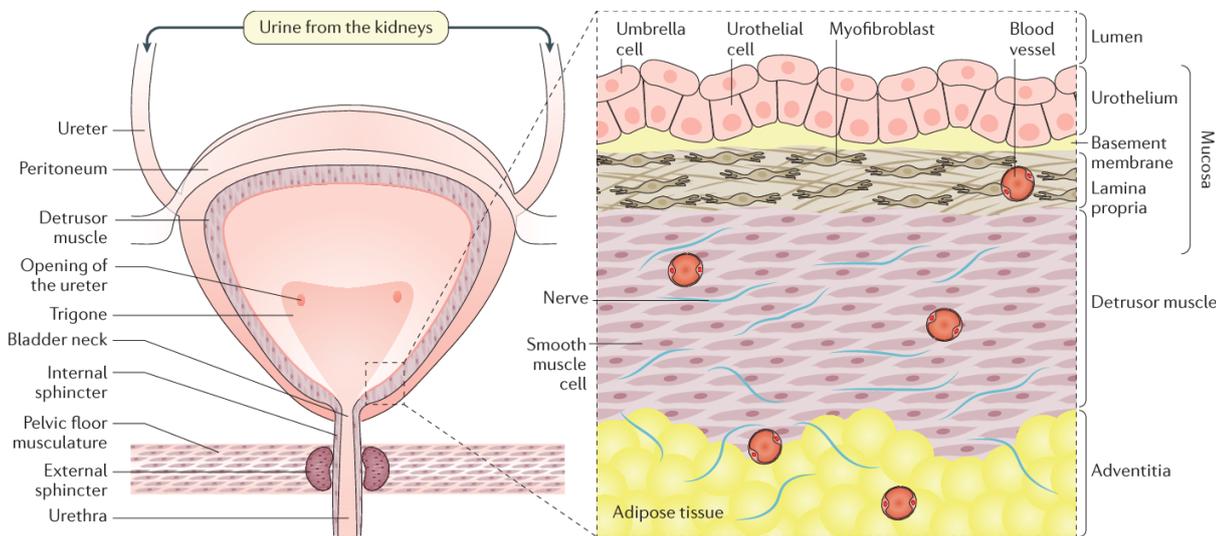


Figure 2 | **Anatomy and histology of the female bladder.** The bladder lies immediately behind the pubic bones.

SYMPTOMS AND RISKFACTOR

The symptoms of Urinary Incontinence includes patient history like the onset, duration and timing of urinary incontinence and the voiding symptoms. The risk factors or the situation which can exacerbate urinary incontinence are age, obstetric history, gynaecological status (the presence of pelvic organ prolapse, defecatory dysfunction or anal incontinence, sexual dysfunction and urogenital syndrome of menopause), medical status (the presence of a UTI, dementia, delirium, diabetes mellitus or diabetes insipidus, cardiorespiratory disorders, chronic cough, obesity and obstructive sleep apnoea) and pharmacological status the use of hormonal replacement therapy, α -adrenergic agonists and antagonists, calcium channel blockers, diuretics, lithium therapies, opioid analgesics, anticholinergics and angiotensin--converting enzyme inhibitors. Other physical factors like smoking status, frequency of heavy lifting also should assessed.

DIAGNOSIS

PHYSICAL EXAMINATION

The physical examination includes the functional assessment and the mental status and body mass index of the patient. Abdominal examination should assess for pelvic masses, a palpable bladder and costovertebral angle tenderness. The urogenital examination shows vaginal atrophy and incontinence associated with dermatitis. A positive cough stress test can be done to observe the urethral leakage and it is done by provoking a series of forceful coughs in the supine or standing position with a comfortably full (~300 ml) bladder volume has a high sensitivity and specificity for diagnosing stress urinary incontinence.

UROLOGICAL TESTS

The diagnosis require objective measure such as voiding diaries, pad tests, urine analysis and urodynamic test.

Urinalysis.

Urinalysis is done by using a colorimetric reagent test strip evaluates urine for a range of chemical parameters including pH, protein, glucose, ketones, occult blood, bilirubin, urobilinogen, nitrite, leukocyte esterase and specific gravity.

Post-void residual volume assessment.

The post-void residual (PVR) volume is determined by measuring the volume remaining in the bladder immediately after voiding; it is a measure of the completeness of bladder emptying. The PVR volume can be achieved using ultrasonography.

Voiding diaries.

As an objective measure of mean voided volume, frequency and urinary incontinence frequency, 3- 7day voiding diaries are widely used as a reliable tool that is sensitive to small changes. Three types of diary can be used: a micturition chart to record the timing of each void, a frequency–volume diary to record the volume voided with the time and a bladder diary to record additional information on urinary incontinence episodes, pad usage, fluid intake, fluid type and sensation of urgency. Some women might be unable to complete the bladder diary for functional reasons, such as cognitive impairment or the leakage may be difficult to accurately record. Under these circumstances, other methods, such as pad tests.

Pad testing.

Pad testing uses an absorbent perineal pad worn by the patient to detect the presence of urinary incontinence and to measure the volume lost, and can be a useful correlate with symptoms.

Pelvic floor imaging.

Ultrasonography and other radiological modalities have been used to investigate urinary incontinence by visualizing the morphology, movement and function of structures, including the pelvic organs, bladder, bladder neck, urethral sphincter and urethra. Ultrasonography have role in confirming the findings of the patient history and clinical examination, assessing postoperative complications.

Urodynamic studies.

Urodynamic studies consist of a series of investigations assessing lower urinary tract function that include uroflowmetry, voiding cystometry, filling cystometry, urethral function and provocative manoeuvres to demonstrate urinary incontinence.

Auxiliary tests using fluoroscopy or ambulatory equipment might also be done. Urodynamic studies are done if the incontinence diagnosis remains uncertain after the initial assessment, when symptoms do not correlate with physical findings or after failed previous treatment. Similarly, urodynamic studies should be performed in patients who are considered for invasive, morbid or irreversible overactive bladder or detrusor overactivity treatments, and in those with neurogenic or obstructive voiding conditions.

Alpha adrenergic agonists	Increase smooth muscle tone in urethra and prostatic capsule and may precipitate obstruction, urinary retention, and related symptoms
Alpha adrenergic antagonists	Decrease smooth muscle tone in the urethra and may precipitate stress urinary incontinence in women
Angiotensin converting enzyme inhibitors	Cause cough that can exacerbate UI
Anticholinergics	May cause impaired emptying, urinary retention, and constipation that can contribute to UI. May cause cognitive impairment and reduce effective toileting ability.
Calcium channel blockers	May cause impaired emptying, urinary retention, and constipation that can contribute to UI. May cause dependent oedema which can contribute to nocturnal polyuria
Cholinesterase inhibitors	Increase bladder contractility and may precipitate urgency UI
Diuretics	Cause diuresis and precipitate UI
Lithium	Polyuria due to diabetes insipidus
Opioid analgesics	May cause urinary retention, constipation, confusion, and immobility, all of which can contribute to UI
Psychotropic drugs Sedatives Hypnotics Antipsychotics Histamine1 receptor antagonists	May cause confusion and impaired mobility and precipitate UI Anticholinergic effects Confusion

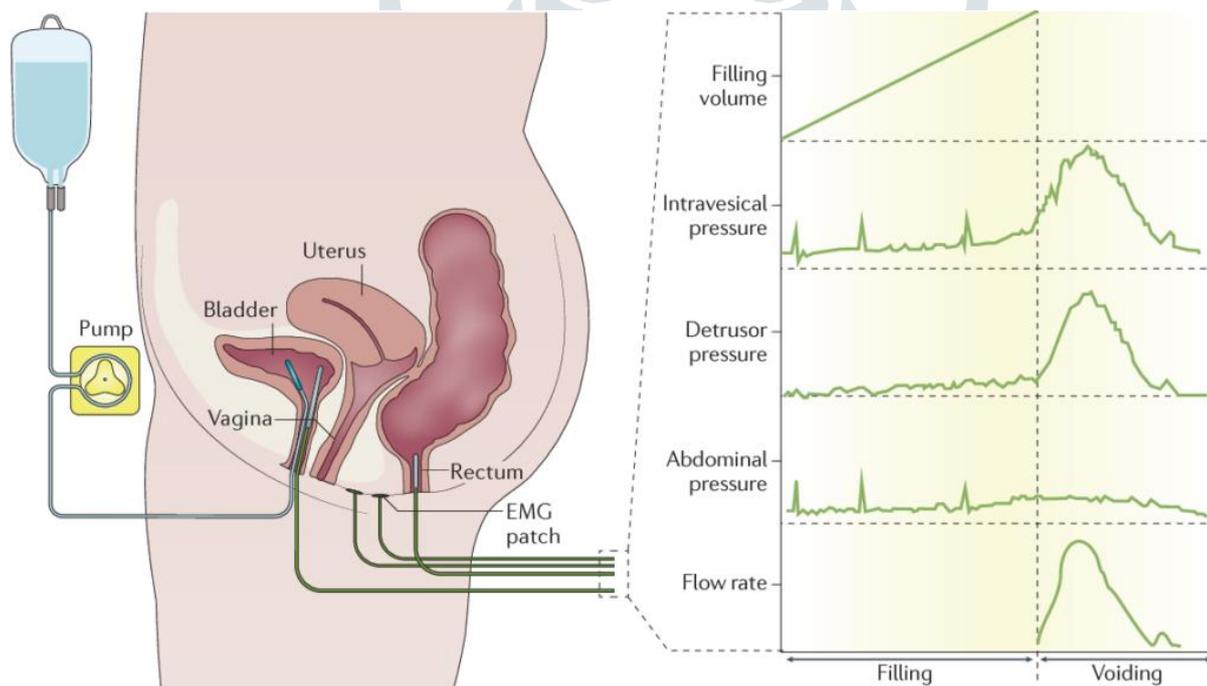


Figure 7 | **Multichannel urodynamic testing.** Invasive (catheterized) pressure measurements during urodynamic studies

MANAGEMENT

The management of Urinary Incontinence in adult women is an iterative process. For some affected women, Urinary Incontinence causes sufficient bother and intrusion to warrant consideration of treatment. The options range from lifestyle modification to more-invasive surgical interventions. Resolution of their Urinary Incontinence by actively engaging in pelvic floor rehabilitation, lifestyle changes (including fluid optimization), pharmacological treatment or surgery to resolve persistent symptoms.

NON-SURGICAL INTERVENTIONS

Women with Mixed Urinary Incontinence experience symptom reduction as they done changes including weight loss, timed voiding or bladder retraining and fluid optimization.

Weight loss.

Weight reduction in women who are overweight or obese can substantially improve symptoms and associated factors.

PFMT.

PFMT aims to improve pelvic floor muscle function. The strongest evidence of benefit is for supervised PFMT in Women with Stress Incontinence, with less efficacy in those with urgency incontinence. Women are taught to consciously contract their pelvic floor muscles before and during any increase in abdominal pressure, such as coughing, to avert leakage, and simultaneously to build up the support of the pelvic floor through regular muscle strength training.

Incontinence pessaries and intravaginal devices.

Women seeking treatment for Stress Urinary Incontinence who avoid surgery, and are unable to adhere to behavioural therapy, can use vaginal continence pessaries¹²⁰, which aim to compress the urethra. These treatments show the greatest benefit in those with severe stress Urinary Incontinence.

Continence aids and products.

Counselling and guidance about the appropriate use of incontinence aids and pads are important for enhancing quality of life and reducing the stigma of incontinence. The range of products includes mobility aids, accessible commodes and containment products, such as absorbent pads or catheters.

MEDICAL INTERVENTIONS

Should first-line lifestyle, behavioural and physical therapies be ineffective in treating urinary incontinence, a range of pharmacological agents are available, depending on the specific incontinence symptoms.

Vaginal oestrogen.

Low-dose vaginal oestrogen should be offered when appropriate to women with urogenital atrophic changes, to promote improved blood supply and decrease LUTS.

Anticholinergic drugs for Urgency Incontinence.

Anticholinergic drugs (also known as antimuscarinics) are used as first-line therapy. Anticholinergic drugs act directly on the detrusor muscle, which leads to reductions in Urgency Urinary Incontinence, with concomitant improvements in urinary urgency, voiding frequency and, to a lesser extent, nocturia. The drugs cause typical cholinergic

adverse effects, including dry mouth, constipation, blurred vision, somnolence and confusion.

Serotonin–noradrenaline reuptake inhibitors for Stress Incontinence.

Duloxetine is a serotonin–noradrenaline reuptake inhibitor (SNRI) Duloxetine was licensed for the treatment of stress incontinence in the European Union after RCTs initially suggested efficacy. Now the drug is not recommended as first line drug.

β₃-adrenergic agonists for Urgency Incontinence.

Mirabegron is a β₃-adrenergic receptor agonist that acts directly on the detrusor muscle. Mirabegron is used in patients for whom there is a contraindication or risk of cognitive or other adverse effects from anticholinergics.

Table 1 | **Drugs licensed for urgency urinary incontinence**

Class	Medications	Common adverse effects
Non-selective antimuscarinic	<ul style="list-style-type: none"> • Fesoterodine fumarate • Oxybutynin chloride* • Oxybutynin transdermal patch • Oxybutynin gel • Tolterodine tartrate* • Trosipium chloride* 	<ul style="list-style-type: none"> • Dry mouth • Blurred vision • Constipation • Impaired cognition • Impaired memory
Selective M ₃ antimuscarinic	<ul style="list-style-type: none"> • Darifenacin • Imidafenacin[‡] • Solifenacin succinate 	<ul style="list-style-type: none"> • Dry mouth • Dry eyes • Constipation • Blurred vision
β ₃ -adrenergic agonist	Mirabegron	<ul style="list-style-type: none"> • Headache • Dizziness • Dry mouth • Hypertension

*Immediate and extended release. †Currently licensed only in Japan, Thailand, the Philippines and South Korea.

INVASIVE INTERVENTIONS

Stress Incontinence surgery

. Although conservative measures should be tried first, surgery to treat stress Urinary Incontinence is highly effective in reducing symptoms. Women with Mixed Incontinence are candidates for surgery but are likely to need adjunctive treatment for their urgency incontinence. Synthetic mid-urethral sling placement is currently the first-line surgical procedure. A small number of women develop de novo urgency urinary incontinence symptoms following stress incontinence surgery which can be associated with position, tension or the inadvertent introduction of surgical material within the bladder or urethra. Once such complications are excluded, traditional treatment for Urgency Urinary Incontinence can be initiated. More commonly, women with Mixed Urinary Incontinence undergo surgery to resolve the stress urinary incontinence component of their condition. Although some of these women experience resolution of their Urgency Urinary Incontinence, some have ongoing, bothersome symptoms. Treatments aimed at reducing urgency urinary incontinence symptoms that were not effective before surgery should be

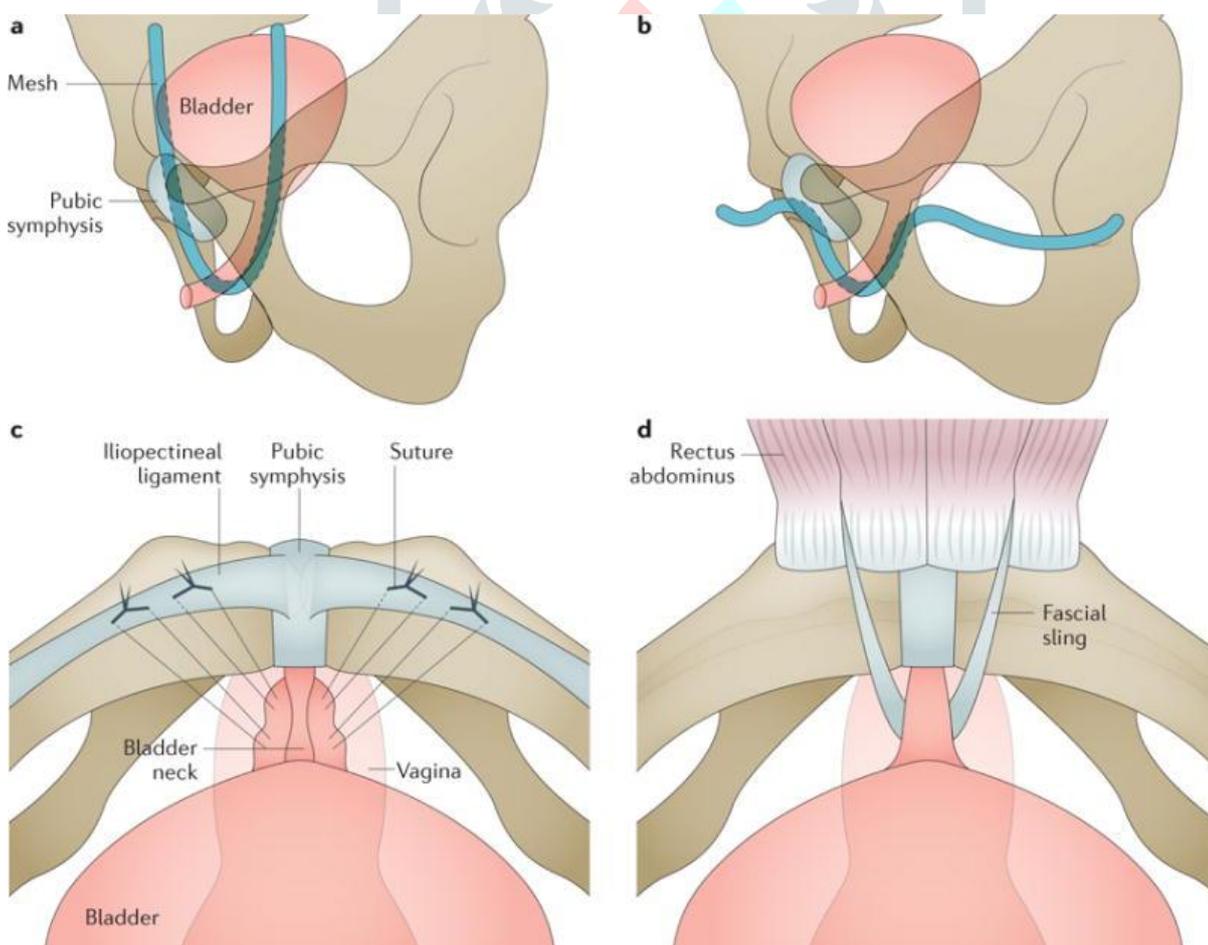
tried again, especially if after the surgery the symptoms of Stress Urinary Incontinence are reduced or resolved.

Neuromodulation.

Neuromodulation uses direct electrical stimulation to modify bladder sensation and contraction. It is preferred by women with Urgency Incontinence who wish to avoid daily oral medication. Implantable neurostimulation uses a programmable stimulator placed subcutaneously that delivers low amplitude electrical stimulation to the sacral plexus via a lead through the S3 foramen. These therapies should be considered third line after failure of first-line and second-line therapies.

Intravesical on a botulinum toxinA injections.

Intravesical injection of on a botulinum toxinA is essentially a form of ‘chemical’ neuromodulation that acts at the detrusor presynaptic neuromuscular junction. It has an efficacy similar to oral medication for U urgency Urinary Incontinence but without the need for a daily medication. The administration procedure is usually performed under a general anaesthetic, and is accordingly reserved as a third-line treatment.



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