Chapter 18 / Capítulo 18

Screening, Diagnosis, and Prevention in Clinical Practice: Evidence from Argentine and Latin American Medicine (English Version)
ISBN: 978-9915-704-33-3
DOI: 10.62486/978-9915-704-33-3.Ch18
Pages: 248-270

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Pelvic organ prolapse and urinary incontinence: comprehensive clinical review

Prolapso de órganos pélvicos e incontinencia urinaria: revisión clínica integral

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ABSTRACT

Introduction: the study addressed the importance of the anatomical and functional integrity of the pelvic floor in urinary continence and pelvic organ support. It described how the architecture of the pelvic diaphragm, perineal membrane, and endopelvic fascia explained both urethrovascular physiology and the onset of common disorders. Among these, pelvic organ prolapse (POP) and urinary incontinence (UI) were identified as conditions that shared risk factors, commonly coexisted, and significantly affected patients' quality of life.
Development: the analysis included a description of the pelvic compartments and the function of the levator ani complex, highlighting its role in mechanical support and synergy with continence. It was explained that the phases of bladder filling and emptying depended on coordinated nervous mechanisms, the alteration of which led to incontinence. POP was defined as the descent of pelvic organs due to support failure, with a high prevalence in older women and associated with urinary, sexual, and functional symptoms. DeLancey's support levels and the POP-Q system were presented as standardized diagnostic tools. Therapeutic alternatives were also reviewed, ranging from conservative measures such as pelvic floor exercises and pessaries to reconstructive or obliterative surgical techniques, considering the risks of recurrence and the onset of occult stress incontinence.
Conclusion: the study concluded that a comprehensive understanding of the anatomy and physiology of the pelvic floor was essential for the diagnosis and individualized management of POP and UI. It highlighted the need to balance the benefits and risks of treatments, prioritizing each patient's quality of life through evidence-based clinical decisions.

Keywords: Pelvic Floor; Pelvic Organ Prolapse; Urinary Incontinence; Diagnosis; Treatment.

RESUMEN

Introducción: el estudio abordó la importancia de la integridad anatómica y funcional del piso pelviano en la continencia urinaria y en el sostén de las vísceras pélvicas. Se describió cómo la arquitectura del diafragma pelviano, la membrana perineal y la fascia endopelviana explicaban tanto la fisiología uretrovesical como la aparición de trastornos frecuentes. Entre estos, el prolapso de órganos pélvicos (POP) y la incontinencia urinaria (IU) fueron identificados como condiciones que compartían factores de riesgo, coexistían habitualmente y afectaban de manera considerable la calidad de vida de las pacientes.
Desarrollo: el análisis incluyó la descripción de los compartimientos pélvicos y la función del complejo elevador del ano, resaltando su rol en el soporte mecánico y en la sinergia con la continencia. Se explicó que las fases de llenado y vaciado vesical dependían de mecanismos nerviosos coordinados, cuya alteración conducía a incontinencia. El POP se definió como el

descenso de órganos pélvicos por fallas de soporte, con prevalencia elevada en mujeres mayores y asociada a síntomas urinarios, sexuales y funcionales. Se presentaron los niveles de soporte de DeLancey y el sistema POP-Q como herramientas diagnósticas estandarizadas. Asimismo, se revisaron las alternativas terapéuticas, desde medidas conservadoras como ejercicios del suelo pélvico y pesarios, hasta técnicas quirúrgicas reconstructivas u obliterativas, considerando los riesgos de recurrencia y la aparición de incontinencia de esfuerzo oculta.
Conclusión: el trabajo concluyó que la comprensión integral de la anatomía y fisiología del piso pelviano resultaba esencial para el diagnóstico y manejo individualizado de POP e IU. Se destacó la necesidad de equilibrar los beneficios y riesgos de los tratamientos, priorizando la calidad de vida de cada paciente mediante decisiones clínicas fundamentadas en la evidencia.

Palabras clave: piso pelviano; prolapso de órganos pélvicos; incontinencia urinaria; diagnóstico; tratamiento.

INTRODUCTION

The anatomical and functional integrity of the pelvic floor is crucial for urinary continence and adequate support of the pelvic viscera. Understanding the architecture of the pelvic diaphragm, the perineal membrane, and the endopelvic fascia—together with the compartmental arrangement of the bladder-urethra, uterus-vagina, and rectum-anal canal—allows us to explain both urethrovesical physiology (storage and emptying) and the genesis of the main disorders in this area. Among these, pelvic organ prolapse (POP) and urinary incontinence (UI) share risk factors, often coexist, and significantly affect quality of life. This paper reviews, with a clinical focus, the key anatomical elements (with emphasis on the levator ani complex and DeLancey's support levels), the physiology of filling and urination, and the relationship between POP and UI—including occult SUI—to provide a basis for comprehensive patient assessment. It also describes the clinical and complementary diagnostic criteria (using the POP-Q system as a common language). It summarizes conservative and surgical treatment options, highlighting the need to individualize treatment based on each woman's symptoms, stage, and expectations. Overall, a practical framework is proposed that links anatomy, physiology, and available evidence to guide safe and effective diagnostic and therapeutic decisions.

DEVELOPMENT

Anatomy with a focus on UI and POP

The support for the pelvic organs consists mainly of the pelvic floor (pelvic diaphragm and perineal membrane) and the endopelvic fascia (Testa, 2011).

For educational purposes, the pelvic organs can be divided into three compartments: the anterior compartment, which houses the bladder and urethra; the middle compartment, which contains the uterus and vagina; and the posterior compartment, which contains the rectum, anal canal, and sphincters. All these structures are mechanically supported primarily by the levator ani muscle and, together, participate in urinary and fecal continence (Walters & Karram, 2008).

Pelvic floor muscles

In addition to its passive support function, the pelvic floor acts actively and synergistically with the intrinsic sphincter apparatus during urination. It consists of the pelvic and urogenital diaphragms.

The levator ani muscle naturally works in synergy with the coccygeal muscle, which together form the pelvic diaphragm. This diaphragm extends from front to back, from the pubis to the coccyx, and laterally reaches the walls of the lesser pelvis. Below this diaphragm, more caudally, we find a second group of muscles that make up the urogenital diaphragm, located superficial to the levator ani and involved in urinary continence (Walters & Karram, 2008).

Levator ani muscles

The two levator ani muscles separate the pelvic cavity from the ischiorectal fossae and form most of the pelvic diaphragm, above which the pelvic viscera are suspended. Each levator ani muscle originates from the back of the pubic bone, the pelvic fascia covering the obturator internus muscle, and the ischial spine. From this origin, the extensive fiber bundles run downward and medially.

The anterior fibers surround the vagina and insert into the tendinous center of the perineum. This is the portion of the levator ani muscle that is particularly susceptible to tearing during the expulsive stage of labor. The intermediate fibers form the puborectal bundle, which encircles the rectum and anal canal, and the pubococcygeal bundle, which passes posteriorly to insert into the median raphe, the anococcygeal ligament, located between the ends of the coccyx and the anal canal. The posterior fibers make up the iliococcygeal muscle, which inserts into the anococcygeal ligament and the coccyx (Palma & Dávila, 2006).

The levator ani muscles on both sides form an efficient ring that supports the pelvic viscera. They resist increased intra-abdominal pressure during straining and pushing of the abdominal muscles. They have an important sphincter action at the anorectal junction and the urethra during straining, and they maintain vaginal tone. Their innervation comes from the third and fourth sacral nerves, and their most anterior portion has innervation derived from the perineal branch of the pudendal nerve (Palma & Dávila, 2006).

Perineal membrane and endopelvic fascia

The perineal membrane is a triangular monolayer of dense fibromuscular tissue that closes the urogenital hiatus at the bottom. The vagina and urethra pass through the perineal membrane and are supported by it.

The endopelvic fascia is the most controversial of all the pelvic floor structures. It consists of a network of fibroelastic connective tissue fibers, smooth muscle, vessels, nerves, and lymphatics that adhere to the bladder, vagina, lower portion of the uterus, and rectum, connecting them to the pelvic wall (Testa, 2011).

According to De Lancey (Figure 1), the structures that support the vagina can be divided into three levels, which are:

- Level 1 or suspension: consists of the uterosacral and cardinal ligaments (Mackenrodt's ligament), which suspend the upper vagina and the uterine isthmic-cervical region in an almost horizontal position, allowing them to rest on the levator platform.
- Level 2 or adhesion: at this level, the endopelvic fascia firmly connects the vagina to the proximal bladder-urethra (pubocervical fascia) and to the rectum (rectovaginal fascia). Towards the sides, both fascias join, giving rise to the paracolpos and the tendinous arch of the pelvic fascia, which laterally attaches the vagina to the pelvic wall. Both the pubocervical fascia and the rectovaginal fascia is only a connecting fascia and not an independent structure like ligaments.

- Level 3 or fusion: In its final two centimeters, the vertical portion of the vagina is fused with the surrounding structures: laterally with the levator ani muscles, posteriorly with the perineal wedge, and anteriorly with the distal urethra and perineal membrane. The perineal body or wedge is a fibromuscular structure located between the vulvar fork and the anus. It consists of the insertion of several superficial and deep pelvic muscles. It is fused anteriorly with the vagina, posteriorly with the rectum, and cephalad with the distal insertion of the rectovaginal fascia.

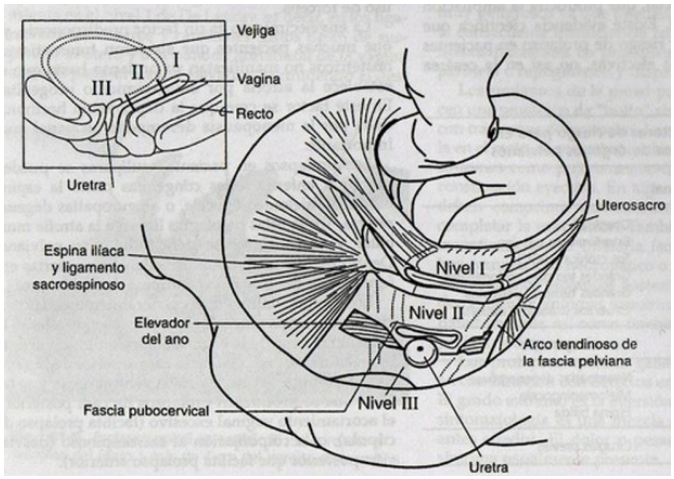

Figure 1. Lancey levels (Wei and De Lancey, 2004).

Urethrovesical physiology

The lower urinary tract has two main functions that occur intermittently: urine storage and emptying. Healthy individuals spend most of the day storing urine, with voluntary interruptions that produce bladder emptying, called urination. The most common disorder of the filling phase (storage or continence) is urinary incontinence; disorders of the emptying or voiding phase are called voiding disorders and are more common in men (Testa, 2011).

Filling and storage phase

As the bladder fills, bladder volume receptors send afferent signals through the pelvic sympathetic nerve, allowing filling to continue. The sympathetic nervous system then facilitates relaxation of the bladder detrusor muscle by stimulating beta receptors and, in turn, inhibits the parasympathetic nervous system at the ganglion level. It also contracts the urethral smooth muscle via an alpha-adrenergic effect, thereby preventing urine leakage. Complementarily, the striated muscles of the pelvic floor remain contracted through somatic pathways conducted in the pudendal nerve (Testa, 2011).

Emptying phase

When an intense urge to urinate occurs, parasympathetic inhibition ceases, stimulating the M2 and M3 muscarinic receptors in the detrusor muscle and thereby triggering bladder contraction. Prior to this, the urethral sympathetic nervous system is inhibited, and the pelvic floor muscles relax to allow urine to pass through the urethra (Testa, 2011).

Pelvic organ prolapse (POP)

According to the Spanish Society of Gynecology and Obstetrics (SEGO) for 2020, POP is defined

as: the descent of one or more organs, including the uterus, vagina, urethra, bladder, rectum, sigmoid colon, or small intestine, from their normal anatomical position. This pathological displacement results from the failure of the supporting structures and can range in severity.

Patients with vaginal symptoms are characterized by the manifestation or sensation of a foreign body, lump, or weight, accompanied or not by pelvic or lumbar pain. Also, and no less important, are sexual dysfunction disorders, where dyspareunia, decreased sexual lubrication, decreased orgasm, and inhibition of desire predominate (Spanish Society of Gynecology and Obstetrics, 2020).

A fundamental fact is that the need for treatment or not will depend on the severity of the symptoms and the woman's need to receive that treatment, since sometimes overtreating an asymptomatic prolapse, just because it was found in a routine examination, leads to new symptoms that the patient did not previously have, mainly when unnecessary surgical treatments are performed (Garcia et al., 2023).

In a descriptive, retrospective study by Arriballaga et al. (2021), patients with advanced POP (stages 3-4) who underwent urodynamic testing prior to surgical treatment were evaluated.

The study showed that women with advanced POP have a significantly increased prevalence of urinary symptoms, including urinary frequency, nocturia, urinary urgency, SUI, OUI, and difficulty emptying the bladder. Regarding UI, OUI was the most prevalent (30 %), while pure forms of SUI and SUI were less common (13 % and 17 %, respectively). This study concluded that OUI is the most common type of incontinence in patients with POP.

Risk factors

The origin of POP is multifactorial and not fully understood. Among its most important causes are some fundamental events that occur in a woman's life: pregnancy and childbirth, menopause, and all those that cause a chronic increase in abdominal pressure or weakening of the pelvic floor (obesity, chronic cough, constipation), and genetic factors, among others. POP affects approximately 50 % of women over the age of 50. It is estimated that 1 in 5 women will require surgical treatment (Welk et al., 2017).

Goncalves Pereira et al. (2024) conducted a descriptive, correlational, cross-sectional study. They studied 30 women with POP and, using interviews as a data collection technique, were able to capture the following results:

Table 1. Risk factors for POP (Goncalves Pereira et al., 2024)

Risk factors	No.	%
Strenuous physical activity	28	93,3
Menopause	25	83,3
Episiotomy	22	73,3
Multiparity	18	60
Prolonged labor	12	40
Fetal macrosomia	12	40
Dystocia	9	30
Chronic constipation	9	30

Hysterectomy	6	20
Obesity	4	13,3
Smoking	4	13,3
Instrumental delivery	2	6,7
Congenital pathologies	1	3,3
Pelvic floor surgery	1	3,3

Diagnosis of POP

The diagnosis of POP is primarily clinical. Defects in the uterine support, vaginal vault, and anterior and posterior walls of the vagina must be evaluated methodically and carefully.

It is important to measure the prolapse in its natural state before positioning the speculum, as it is sometimes found that, once reduced, it is very difficult to protrude it back to its maximum extent. The physician should then ask the patient to cough forcefully or perform Valsalva maneuvers to determine whether the labia separate, whether the genital hiatus opens, or whether the anterior or posterior wall of the vagina protrudes beyond the hymen (Palma & Dávila, 2006).

Typically, the uterine support and the apex of the vagina are evaluated first, isolating the cervix and vaginal vault with the Graves speculum and having the patient simultaneously perform a Valsalva maneuver or exertion. The speculum (a single-blade) is then divided to evaluate the anterior and posterior vaginal walls independently, sequentially isolating the part to be examined (Palma & Dávila, 2006).

Although additional studies are useful and necessary in many cases, the Argentine Federation of Gynecology and Obstetrics Societies (FASGO) recommends that they be performed on an individualized basis for each patient, taking into account symptoms, the type and stage of prolapse, and therapeutic strategies. Among these, in the case of apical and anterior prolapse, we will consider:

- Laboratory: urine sediment and urine culture. Renal function analysis in advanced stages (due to risk of ureteral obstruction).
- Renal ultrasound to assess hydronephrosis in stage IV and bladder prolapse with measurement of post-void residual urine.
- Transperineal ultrasound.
- Urodynamics.

POP-Q classification

In 1996, the ICS, together with the American Urogynecologic Society (AUGS) and the Society of Gynecologic Surgeons (SGS), approved a standardized system for pelvic organ prolapse called POP-Q or Pelvic Organ Prolapse Quantification System, last updated in 2006 and agreed upon in 2010 (Rondón Ramírez et al., 2023).

The system provides measurements at nine (9) points on the vaginal walls and vulva using stress maneuvers (figure 2). All measurements are taken using the hymenal ring as a reference point, as it is a fixed and easily identifiable anatomical structure. The hymenal ring is considered the zero point (0); all structures above the hymenal ring will be considered negative (-) in the measurement, and all those below the hymenal ring will be positive (+), respectively (Palma & Dávila, 2006).

There are six dynamic points: point Aa, point Ba, point Ap, point Bp, point C, and point D. There are also three other static points, which are the genital hiatus (hg), the body of the perineum (cp), and the total length of the vagina (ltv) (Walters & Karram, 2008).

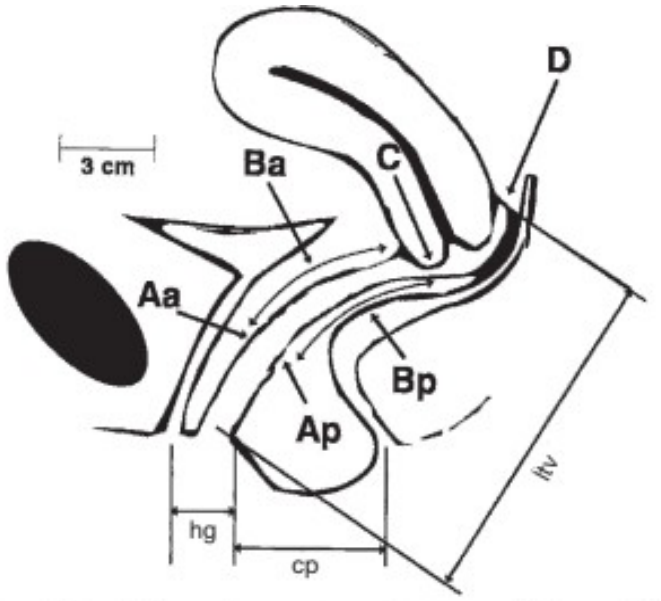

Figure 2. Static and dynamic points of the POP-Q (Collins et al., 2021)

The positions of points Aa, Ba, Ap, Bp, C, and D (if applicable) are measured and recorded with reference to the hymen. A grid can be used to organize them concisely, as shown in figure 3.

pared anterior **Aa**	pared anterior **Ba**	cuello uterino o muñón **C**
hiato genital **hg**	cuerpo del periné **cp**	longitud total de la vagina **ltv**
pared posterior **Ap**	pared posterior **Bp**	fondo de saco posterior **D**

Figure 3. 3x3 grid (Collins et al., 2021).

The prolapse quantification profile provides an ordinal staging system for POP that uses these measurements and is useful for describing populations and making comparisons. Stages are assigned according to the most severe portion of the prolapse when demonstrated with full extension of the prominence. To assign a stage to a specific woman, it is essential first to perform a quantitative description. The five stages of pelvic organ support are described in Table 2.

Table 2. Stages of POP (Collins et al., 2021)

Pop stages	
Stage 0	No prolapse demonstrated. Points Aa, Ap, Ba, and Bp are all at -3 cm, and point C or D is between -TLV (total length of the vagina) cm and -(TLV-2) cm.
Stage I	The criteria for stage 0 are not met, but the most distal portion of the prolapse is >1 cm above the height of the hymen.
Stage II	The most distal portion of the prolapse is ≤1 cm proximal or distal to the level of the hymen.
Stage III	The most distal portion of the prolapse is >1 cm below the plane of the hymen, but protrudes no more than 2 cm less than the total length of the vagina in centimeters.
Stage IV	Basically, complete eversion of the total length of the lower genital tract is observed. The distal portion of the prolapse protrudes at least (LTV-2) cm.

Treatment of POP

POP is a common condition in the female population. However, it is not a life-threatening condition and, as such, its treatment should aim to restore normal functioning of the structures to reduce symptoms and improve quality of life. There are several surgical techniques for treating POP, including vaginal or abdominal approaches, with or without the use of prosthetic material. The choice of a particular technique or mesh should be individualized and always consider the risks and benefits inherent in each (Coutinho et al., 2021).

When treating a patient with POP, the possibility of recurrence must be considered and discussed with the patient. In the study by Mendoza Guerra et al. (2019), 22 of 88 patients (25 %) who underwent surgery for POP experienced recurrence, indicating that 1 in 4 patients were affected.

When comparing the surgical techniques proposed for POP correction, whether conventional techniques or mesh, it was found that anterior colporrhaphy was performed in 72 % of patients with recurrence, posterior colporrhaphy in 14 %, and mesh was used in 14 %.

Another aspect to consider in the treatment of POP is the presence of OUI, which is currently controversial in relation to adding an anti-incontinence procedure when repairing POP. However, a recent systematic review has reported that vaginal POP repair with midurethral sling reduces the postoperative risk of incontinence in women, although with more associated adverse events (bleeding, bladder perforation, prolonged catheterization, and urinary tract infections). Given this, proper patient selection is of utmost importance, with the benefits of surgery outweighing the risks (Arriballaga et al., 2021).

Conservative treatment

Conservative treatment of POP includes hygiene and dietary measures, lifestyle changes, pelvic floor muscle exercises (in early stages), and intravaginal devices (pessaries). Keep in mind that these conservative measures will only be considered in patients who are not candidates for surgical treatment, for example, young patients who have not completed childbearing, older

adults with comorbidities, or patients who do not wish to undergo invasive treatment (Garcia et al., 2023).

Pelvic floor muscle exercises monitored by a trained professional, accompanied by lifestyle modifications and local estrogen therapy, are useful resources in symptomatic stages I and II and can achieve slight retraction of POP and eliminate symptoms.

Vaginal pessaries are currently considered the gold standard in the conservative treatment of pelvic organ prolapse, constituting an excellent treatment resource with a success rate of 41 to 74 %. They are cost-effective, low-risk, and almost free of serious complications and undesirable effects. Periodic replacement (every 3-6 months) is recommended to evaluate the vaginal epithelium and avoid complications associated with their use, such as leukorrhea, metrorrhagia, or incarceration (Garcia et al., 2023).

Surgical treatment

Surgical treatment will always be the definitive treatment for POP. The first thing to consider when deciding on surgery is whether to choose reconstructive or obliterative techniques, which will depend on the patient's current and future sexual status. In addition, if a reconstructive technique is chosen, a decision must also be made between a vaginal or abdominal approach, hysterectomy or uterine preservation, the use of devices/meshes, or surgery with native tissue (Garcia et al., 2023).

In 2020, the IUGA and AUGS produced a joint report on the currently approved and most widely used surgical procedures. Scientific evidence points to ABDOMINAL COLPOSACROPEXY as the gold standard for the surgical treatment of apical prolapse. However, it is well known that more than 80 % of POP surgeries worldwide are performed VAGINALLY.

The truth is that the ideal approach is to tailor the choice of surgery to the patient's characteristics. There is no consensus on which surgery we should choose in each scenario, but in general terms, there is considerable agreement on choosing the approach as follows:

Table 3. Abdominal or vaginal surgery (Garcia et al., 2023)

Preferably abdominal	**Preferably vaginal**
Advanced apical prolapses	Large anterior component in POP
Recurrences/surgical failures	Older adults
Chronic vaginal pain	Previous abdominal and pelvic surgeries
High-impact activities	Comorbidities / surgical risk
Young patients	
Shortened vaginas	

Given that the main associations and corporations recommend that POPs undergoing surgery be those in stages 3 and 4, we must note that these studies also show a higher risk of new IUE in women with advanced POP (Baessler et al., 2018).

Davenport et al. in 2018 demonstrated that women with stage 2 anterior prolapse had a de novo IUE rate of 41,3 % compared to 53,3 % in women with stage 3 anterior prolapse and 66,1 % in those with stage 4 anterior prolapse. In 2020, Cruz et al. conducted a retrospective cohort study evaluating women who underwent POP repair with mesh, without concomitant

anti-incontinence surgery. They identified that the presence of stage 3 or 4 anterior vaginal wall prolapse increased the likelihood of developing de novo UI by 14 times. In continent patients with associated severe POP, there is a possibility of OUI after repair of the anatomical descent; the detection rate of occult OUI has been reported in proportions ranging from 27-80 % in advanced POP, depending on the reduction method and the examiner. In the study by Arriballaga et al (2021), it occurred in 36,5 % of cases.

URINARY INCONTINENCE (UI)

The World Health Organization (WHO) defines health not only as the absence of disease but also as good physical, emotional, and social well-being (Palma & Dávila, 2006).

Until now, UI had been assessed as a symptom or condition, but recent epidemiological studies have shown it to be a medical, social, and economic problem. The ICS defines urinary incontinence as any involuntary loss of urine (Walters & Karram, 2008).

Epidemiology of UI

UI is more prevalent in women. Approximately 50 % of women may experience UI at some point in their lives. Furthermore, the prevalence of UI and pelvic floor disorders is expected to increase in the coming decades, leading to more consultations and directly affecting healthcare systems (Arias Amador et al., 2021).

Its prevalence is difficult to estimate, as it is often an underreported problem due to the taboos associated with this condition, feelings of shame, rejection, social isolation, and, in many cases, mistaken beliefs that UI is a natural part of aging. Several studies identify two peaks in incidence: between the ages of 45 and 54 and from 60 onwards, especially between 75 and 84 (Correa Fuentes et al., 2022).

The Agency for Health Care Policy and Research (AHCPR) confirms that there are 13 million women with incontinence in the US, generating annual costs of $16 million in terms of staff, diapers, geriatric institutions, etc. They estimate that these figures will increase in line with the rise in women's life expectancy, and that the overall impact of urogynecological pathology will increase by 45 % over the next 30 years (Tozzini, 2012).

Risk factors

There are many risk factors for developing UI at some point in life. Aging is one of the main factors associated with UI. However, there are other risk factors for this disease, such as obesity, a sedentary lifestyle, being multiparous, a history of hysterectomy, chronic medical conditions, medications, complications during childbirth, urinary tract infections, hormonal changes, and perineal trauma, among others (Cruz et al., 2022).

UI is two to three times more common in women than in men. The prevalence of UI increases with age. A broad peak in prevalence has been observed between the ages of 40 and 60, with a continued increase after age 65 to 70. The number of births is a well-established risk factor for UI in young and middle-aged women (up to age 50); however, the effect of childbirth diminishes in older women (Walters & Karram, 2008).

Tuda and Carnero Fernández (2020) conducted a study in which 48 female patients were analyzed from their medical records, and the following risk factors and associated pathologies were identified.

Table 4. Risk factors for UI (Tuda and Carnero Fernandez, 2020)	
Macrosomic fetus	8 women (16,3 %)
Instrumental delivery	7 women (14,2 %)
Episiotomy	28 women (57,1 %)
Cystocele	16 women (32,6 %)
Urethrocele	4 women (8,2 %)
Rectocele	9 women (18,3 %)
Prolapse	5 women (10,2 %)
Hysterectomy	6 women (12,2 %)
Overweight/obesity	5 women (10,2 %)

Consequences of UI

UI has significant consequences for the well-being of those affected. Although the ICS has modified its definition of UI (any manifestation of involuntary leakage) so that it no longer requires it to be a social or hygienic problem, this does not diminish the importance of the psychosocial problems associated with UI (Walters & Karram, 2008).

Table 5. Consequences of UI (Walters and Karram, 2008)	
Individual	**Social**
Psychological symptoms: insecurity, anger, apathy, dependence, guilt, humiliation, feelings of abandonment, shame, grief, depression, denial. Sense of self: loss of self-confidence, loss of self-esteem, sexual difficulties, lack of attention to personal hygiene.	*Social interaction* Reduction in social activities, breakdown of social contacts, social isolation, possibility of institutionalization. *Family* Emotional burden and stress on the caregiver. Deterioration of interpersonal relationships. Financial concerns.

Fagerström Sade and López González, in 2020, commented that the social relationships and activities of people suffering from UI were reduced due to involuntary leakage, a fact related, at least in part, to the fear of odor and the shame it generates. This leads to progressive isolation of the patient as the disease progresses.

UI is a condition that affects a large number of women at different stages of their lives. This disease has a direct impact on their quality of life; in some cases, it causes depression and worsens other conditions in some patients, which is why its detection is essential (Salazar Porras et al., 2023).

As previously mentioned, most patients do not seek medical attention spontaneously and, as a result, take palliative measures that change their habits, such as wearing protective diapers, urinating more frequently, and restricting fluid intake. These changes lead to progressive worsening, in some cases leading to the placement of urinary catheters, which increases the incidence of urinary tract infections, morbidity, and mortality, especially in elderly patients admitted to nursing homes (Testa, 2011).

Types of UI

Stress urinary incontinence

According to the ICS definition, SUI is the complaint of involuntary leakage during physical exertion or when coughing or sneezing (Haylen et al., 2010).

Under normal circumstances, at rest, intraurethral pressure is higher than intravesical pressure. The difference in pressure between the bladder and the urethra is known as urethral closure pressure. When intra-abdominal pressure increases, as during coughing, sneezing, or straining, if this pressure is not transmitted equally to the urethra, continence is lost, and urine leakage occurs (DeCherney et al., 2021).

The terminology used by the ICS to define it (stress) is unsatisfactory in Spanish, since, according to the Royal Spanish Academy, stress means a demanding situation to which an individual or one of their organs is subjected, putting them at risk of becoming ill. For this reason, we will continue to use the term stress urinary incontinence (SUI), which, although it does not cover all the factors that trigger incontinence, is more understandable and appropriate for Latin languages (Testa, 2011). Urge urinary incontinence

This is the involuntary loss of urine accompanied or immediately preceded by a feeling of urinary urgency (Haylen et al., 2010).

Symptoms of frequency, nocturia, and enuresis usually accompany it. The incidence of UUI begins to increase after menopause and becomes the most common type of incontinence around the seventh decade of life. It is usually caused by the onset of involuntary detrusor contractions during the filling phase (Testa, 2011).

Mixed urinary incontinence

MUI is the manifestation of involuntary urine leakage associated with urgency and with exertion, exercise, sneezing, or coughing (Testa, 2011).

Mixed incontinence occurs when both stress and urge incontinence are present. Patients may have both symptoms, creating a diagnostic and therapeutic dilemma. The prevalence of mixed incontinence is higher than most physicians assume. A detailed medical history will reveal symptoms of SUI with urine loss associated with coughing, sneezing, or other increases in intra-abdominal pressure, as well as urinary urgency, pollakiuria, and concomitant incontinence. The coexistence of these conditions is multifactorial. Patients with SUI often urinate preventively to avoid a full bladder and subsequent urine leakage, thus conditioning the bladder to a low functional capacity, which can promote premature bladder fullness signaling, resulting in symptoms of frequent urgency (DeCherney et al., 2021).

Hidden stress urinary incontinence

This is not a special type of incontinence but a particular clinical situation, also known as potential or masked SUI.

The ICS and IUGA have not yet standardized the definition of de novo SUI; however, studies conducted in recent years define it as the development of SUI after surgery to correct POP in previously continent women (Cruz et al., 2020).

Haylen et al (2010) defined occult or masked SUI as urine leakage observed only during a

stress test with corrected prolapse in a woman without symptomatic SUI.

Van der Ploeg et al (2016) concluded that to reduce the risk of postoperative UI, prolapse repair can be combined with incontinence surgery, such as midurethral sling or Burch colposuspension. The combination of POP and incontinence surgery reduced the risk of de novo UI. However, 20 percent of people need to be treated with combined surgery to prevent one woman without preoperative SUI symptoms from requiring additional surgery for de novo SUI.

These patients have a large prolapse that compresses the bladder and do not clinically manifest incontinence, but when the prolapse is corrected, incontinence appears. This is a diagnostic error by omission. Therefore, in patients with this type of genital dystopia, we must perform a stress test by reducing the descent of the vaginal wall in order to determine whether there is urine leakage objectively. If this test is not performed before corrective surgery for prolapse, unfortunately, we will encounter a postoperative incidence of OUI of up to 40 % (Testa, 2011).

The discrepancies regarding the incidence of OUI in patients undergoing surgery to repair pelvic floor dysfunction found in studies in recent years raise the question of whether or not it is beneficial to perform anti-incontinence surgery concomitant with POP correction surgery (Baessler et al., 2018).

A retrospective study published in 2017 found new rates of de novo SUI of 6 % in women undergoing surgery to correct POP after 2 months of follow-up (Ugianskiene et al., 2017). Other authors, however, show higher rates, with around 28 % of postoperative SUI (Ennemoser et al., 2012). A 2018 Cochrane systematic review reported that of patients with occult SUI (SUI evidenced by reduction of prolapse at the time of preoperative examination) who underwent surgery to correct POP, 34 % had postoperative SUI (Baessler et al., 2018). Although performing a prophylactic procedure for incontinence in women undergoing surgery for POP reduces the risk of developing de novo SUI, it has been controversial whether exposing all patients to additional surgical risk is ethical and beneficial (Alas et al., 2017).

A 2020 study showed that women with a higher BMI, TBD, and advanced POP had a higher risk of developing new UI (Cruz, 2020). Another study found that UI and advanced POP would also be predictive factors (Davenport et al., 2018). However, the mechanisms underlying UI recurrence remain unclear. Knowledge of the factors that predict this outcome after surgical treatment of POP would be essential to assess whether a concomitant anti-incontinence procedure should be performed (Cruz, 2020).

POP is often associated with SUI. Approximately 55 % of women with stage 2 POP (prolapse ± 1 cm from the hymenal plane) have concomitant SUI, and 33 % of women with stage 4 POP (complete prolapse) have SUI. This probably occurs due to the angulation of the vesicourethral junction during advanced prolapse (Baessler et al., 2018).

When the prolapse is reduced during clinical examination, SUI can be demonstrated in up to 68 % of women (Baessler et al., 2018). If SUI is only evident when the prolapse is reduced, this type of SUI is defined as “occult” SUI (Haylen et al., 2010). HUE can be investigated with the patient in the lithotomy position, with the bladder half full, and with a Valsalva maneuver with reduction of the prolapse, either manually or with a pessary. The test is considered positive if urinary leakage is visible (Svenningsen et al., 2012). HUE can also be diagnosed by urodynamic

testing. After mid-cystometry (200 ml) and POP reduction, the Valsalva maneuver is performed, then repeated with 300 ml of filling. If urinary leakage occurs, it is considered occult urodynamic OUI (Manodoro, 2016).

Davenport et al. performed a secondary analysis of publicly available data from the Colpopexy and Urinary Reduction Efforts (CARE) study to estimate the frequency of de novo SUI in continent women undergoing abdominal sacrocolpopexy for POP repair. De novo SUI occurred in 54 % of cases undergoing surgical repair (Davenport et al., 2018).

Alas et al. found an incidence of 4,4 % of de novo SUI in patients undergoing surgical repair of POP who had no evidence of OUI (Alas et al., 2017). A systematic review reported that of the patients with OUI who underwent surgery for POP correction, 34 % had postoperative OUI (Baessler et al., 2018).

Diagnosis of UI

The diagnosis of UI is based on a series of procedures: medical history, physical examination, urodynamic testing, and imaging techniques of the lower urinary tract. Some of these procedures comprise the basic evaluation, which should be performed on all women with symptoms of UI. In contrast, others, which are more specific, are reserved for complex cases (Spanish Society of Gynecology and Obstetrics, 2019).

The standard for evaluating all UI is multichannel urodynamics, which is costly and limited in availability. Evidence shows that in patients with uncomplicated OUI, both the in-office multichannel urodynamic study and the office urodynamic study adequately identify the different types of urinary incontinence and do not affect treatment outcome (Serati et al., 2019).

Medical history

Medical history is a fundamental element in the evaluation of women with UI symptoms, as it helps us diagnose the type of incontinence by assessing the type and severity of symptoms, their duration, as well as how they appear, any triggering or aggravating factors, their impact on the woman's quality of life, and the coping mechanisms she has implemented to alleviate the discomfort they cause (Muñoz Muñiz et al., 2022).

Although in most cases a proper medical history using specific questions is sufficient, we must not forget that most guidelines recommend the systematic use of validated symptom and quality-of-life questionnaires as a complement.

The questionnaire most commonly used in clinical practice, due to its simplicity, is the International Consultation on Incontinence Questionnaire - Urinary Incontinence - Short Form (ICIQ-UI-SF). It consists of four questions: the first three address the frequency and amount of urine leakage along with its impact on quality of life, and give us the questionnaire score, which can range from 0 to 21, while the fourth question guides us on the type of incontinence (Muñoz Muñiz et al., 2022). If you would like to see the ICIQ-SF questionnaire, it is attached at the end of this paper.

It is also important in the medical history to ask about the predominance of one type of UI over the other in patients with OUI. In addition to the medical history, a specific questionnaire, such as the UDI-6 – Urogenital Distress Inventory – Short Form (see Figure 4), may be useful for identifying this. This questionnaire, by asking about symptoms of both SUI and LUI, can reveal

the symptom that is most bothersome to the patient if she scores her condition differently (Spanish Society of Gynecology and Obstetrics, 2020).

Para cada pregunta señale el número que mejor describa cómo se sintió, ante cada uno de los síntomas, durante el mes pasado.				
¿Experimenta usted algunos de los siguientes problemas y, en caso afirmativo, cuánto le molesta?	Nada	Poco	Moderadamente	Mucho
1. Necesidad de orinar frecuentemente.	0	1	2	3
2. Pérdidas de orina unidas a una sensación de urgencia (necesidad urgente de ir al lavabo).	0	1	2	3
3. Pérdidas de orina cuando realiza una actividad física, estornuda o tose.	0	1	2	3
4. Pérdida de orina en pequeñas cantidades (es decir, gotas).	0	1	2	3
5. Dificultad para vaciar su vejiga.	0	1	2	3
6. Dolor o incomodidad en la parte inferior del abdomen o en la zona genital.	0	1	2	3

Figure 4. UDI 6 (Spanish Society of Gynecology and Obstetrics, 2020)

Physical examination

This includes a general, neurological, and gynecological examination, followed by a focused UI examination. The general examination assesses the woman's health status and anthropometric aspects (weight, height, body mass index).

The neurological examination assesses sensory and motor function, with particular attention to the sacral nerve roots. To this end, we assess the anal and bulbocavernous reflexes and perineal sensitivity. The contractile capacity of the pelvic floor muscles can be assessed using the Oxford scale (Spanish Society of Gynecology and Obstetrics, 2019; see Figure 5).

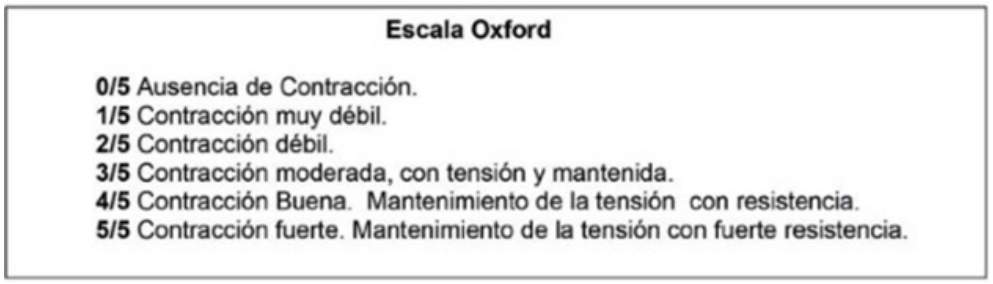

Figure 5. Oxford scale (Spanish Society of Gynecology and Obstetricsb, 2019)

As for the gynecological examination, the trophism of the tissues and the type and degree of any prolapse must be assessed. Scars, malformations, and the presence of pelvic masses must be ruled out. The physical examination focused on UI aims to detect it by assessing the urethra's effort and mobility.

The stress test with a full bladder involves asking the woman to cough while lying down and standing up. If we observe urine leakage from the urethra, this suggests stress UI. In patients with genital prolapse, the stress test should be performed after prolapse reduction to objectively identify stress UI masked by the prolapse (Spanish Society of Gynecology and Obstetrics, 2019).

Additional tests

Urine culture

Urinary tract infections, especially those of the lower urinary tract, can be a temporary cause of UI or coexist with any of the types of UI mentioned above. Consequently, before continuing with other studies or instituting drug therapy, we must rule out a urinary tract infection (Testa, 2011).

Residual urine measurement

This is the volume of urine that remains in the bladder after urination. Its normal value is less than 100 cm3; however, it is more physiological to determine the ratio between pre-void volume and residual volume.

If the post-void residual does not exceed 30 % of the pre-void volume, it is considered normal. Increased residual volume is associated with conditions such as diabetes, large prolapses, neurological disorders, post-operative UFE, etc.

It can be measured using a transurethral catheter or ultrasound (Testa, 2011).

Voiding diary/chart

This is a simple and extremely useful study for the differential diagnosis of UI. It provides information on patients' urinary profiles, is easy to perform, and incurs no costs.

It consists of recording fluid intake and quantifying daytime and nighttime urination for two consecutive days. The time and volume of each urination must be recorded, as well as episodes of leakage and activities being performed at the time of the accident. This allows us to evaluate the total volume urinated, the average, maximum, and minimum volumes, and the presence of nocturia (Tozzini, 2012).

Urodynamics

The term urodynamics refers to the observation of the changing function of the lower urinary tract over time. Conventional urodynamic studies are performed in the urodynamic laboratory and involve filling the bladder through a catheter, usually at a specified rate (Walters & Karram, 2008).

Urodynamic testing is a very useful tool for evaluating female UI, but it is not strictly necessary in all cases. Urodynamics allows us to evaluate both the bladder filling and emptying phases anatomically and hydrodynamically.

The objectives of urodynamics are to reproduce or interpret the patient's symptoms, obtain measurements that allow these symptoms to be objectively assessed, and determine the type of UI (Testa, 2011).

Currently, the usefulness of preoperative urodynamics in patients with POP is controversial, mainly in relation to the nature of the results and their influence on the choice and efficacy of treatments. However, the bladder has been described as an unreliable indicator, and a decision-making process based solely on clinical findings could lead to poorer outcomes, as no alternative method is superior to urodynamic testing. Based on this statement and considering that surgical correction of POP can alter bladder function, various guidelines have recommended performing a preoperative urodynamic study (Arriballaga et al., 2021).

Free uroflowmetry

Uroflowmetry, or measurement of urine volume over time, is a simple, noninvasive test performed by asking the patient to urinate into a special urinal chair. Urine is directed through a funnel into a flow meter, which records the volume over time (Walters & Karram, 2008).

Cystometry

This consists of measuring intravesical pressure, intra-abdominal pressure, and the difference between the two, which is the detrusor pressure. To do this, a 6 to 8 Fr double-lumen intravesical catheter is placed to enable filling and recording of bladder pressure, and a rectal balloon catheter is placed to record abdominal pressure. These catheters will be connected to external transducers that will electronically obtain the detrusor pressure. During the filling phase, the patient must be seated on the flowmetry unit, a toilet designed to detect urine leakage. The study begins with bladder filling, using sterile distilled water at a rapid drip rate (75 to 100 mL/min) at room temperature. In this way, we can evaluate bladder sensitivity, a subjective measure. The patient will refer to this as an initial urge to urinate and later as an intense urge to urinate. In addition, to check for UCE, the patient is asked to perform various Valsalva maneuvers (coughing, straining, changing position, etc.).

She is also stimulated with the sound of running water to assess detrusor activity. We must be alert to any urine leakage and observe the external urethral meatus. Any increase in detrusor pressure not correlated with a change in abdominal pressure will be considered an uninhibited or involuntary detrusor contraction, which is a common cause of urge incontinence.

All pressure events or leakage are recorded by the equipment, which is medically and legally important. It should be noted that the patient must urinate before starting the study so that residual urine can be measured when the catheters are placed (Testa, 2011).

Pressure-flow study

This is the recording of the emptying phase, which allows the evaluation of bladder contractility and the patient's voiding pattern. These studies are relatively important, as some patients are unable to initiate urination due to the obstructive factor of the bladder catheter. The bladder emptying pressure should be less than 50 cm H2O to avoid an obstructive pattern (Testa, 2011).

Treatment of UI

The first step in treatment for both stress and urge components is conservative treatment, including lifestyle changes, bladder retraining, and pelvic floor muscle rehabilitation, along with pharmacological treatment of bladder hyperactivity (Muñoz Muñiz et al., 2022).

Behavioral techniques

In general, these treatments are non-invasive, have a low possibility of side effects, and do not interfere with other future treatments if necessary. In addition, most of them are low-cost. Conservative treatment should be the primary initial management for SUI (Spanish Society of Gynecology and Obstetrics, 2022).

Obesity is a well-defined risk factor. Weight loss reduces UI rates in moderate and morbid obesity. Losing 5 % of initial weight reduces UI (grade of recommendation A) (Spanish Society of Gynecology and Obstetrics, 2022).

It is also advisable to quit smoking and reduce excessive intake of liquids and stimulant

beverages. Another measure to be taken is bladder retraining (Spanish Society of Gynecology and Obstetrics, 2020).

Physical therapy and pelvic floor rehabilitation

Various studies have shown that, in general, pelvic floor muscle rehabilitation (PFMR) is superior to other treatments (such as vaginal cones) for both SUI and OUI. It has also been observed that adding PPMR to bladder retraining, especially in patients with SUI/OUI, is highly beneficial (Spanish Society of Gynecology and Obstetrics, 2020).

PPMR involves the regular practice of active pelvic floor muscle contractions. There is evidence that supervised PPMR offers better results than when practiced with little or no supervision. Therefore, supervised PPMR should be offered as the first line of conservative treatment for women with UI of any age with UI. The application of this treatment requires that, during the initial examination, the ability to voluntarily contract and relax the pelvic floor muscles be assessed by vaginal touch. The assessment made by vaginal touch can be systematized on a scale. Subsequently, the therapist will establish an individualized treatment program (Spanish Society of Gynecology and Obstetrics, 2022).

Surgical treatment

Surgical treatment is chosen in patients with a predominant stress component and failure or inability to perform conservative treatment. Alternatively, in patients with a predominant urgency component, if the stress component significantly affects their quality of life and conservative treatment has failed (Spanish Society of Gynecology and Obstetrics, 2020).

Although there are various surgical techniques for the correction of SUI with proven efficacy (traditional slings, colposuspension), tension-free slings are clearly the most widely used and most evaluated technique to date. It should be noted that surgical treatment outcomes differ depending on the predominant symptom. Thus, cure rates range from 52 % when the predominant symptom is urgency, 60 % when there is no predominant symptom, and 80 % when the predominant symptom is SUI (Spanish Society of Gynecology and Obstetrics, 2020).

Tension-free suburethral slings

The concept of tension-free suburethral slings (BLT) was introduced in 1995 by Ulmsten, who described the technique for placing retropubic slings. This procedure was called tension-free vaginal tape (TVT). Although this acronym has endured to this day, the more correct nomenclature is retropubic BLT.

Subsequently, other procedures for placing BLTs through the obturator space were described, thereby avoiding the complications of the retropubic approach. Thus, in 2001, Delorme described the transobturator "outside-in" technique, which he called the transobturator tape (TOT), and in 2003, de Leval described the transobturator "inside-out" technique. Both techniques are called transobturator BLTs. BLTs are usually polypropylene, monofilament, macroporous meshes that are placed vaginally. They are currently the most widely used techniques in the surgical treatment of SUI (Spanish Society of Gynecology and Obstetrics, 2022).

The correction of SUI with suburethral meshes is highly effective. In 2021, Duro Gómez et al. conducted a study on various surgical procedures for incontinence. They concluded that suburethral mesh placement is as effective in the short term as traditional corrections (open retropubic colposuspension and laparoscopic colposuspension), but with fewer postoperative

complications.

After the introduction of the tension-free sling technique, the treatment of stress incontinence was revolutionized by its simplicity, ease of execution, and high efficacy, becoming the gold standard procedure.

CONCLUSIONS

The study concluded that an integrated understanding of the anatomy of the pelvic floor—including the levator ani complex and DeLancey's levels of support—and of urethrovesical physiology consistently explained the clinical presentation of pelvic organ prolapse (POP) and urinary incontinence (UI). It was noted that both disorders shared risk factors, frequently coexisted, and significantly affected quality of life. Hence, the evaluation had to be systematic and patient-centered, using a common language such as POP-Q and relying on targeted history taking, standardized physical examination, and selected complementary tests. It was also emphasized that the therapeutic approach required individualization: conservative measures were prioritized when possible, and surgical interventions—with knowledge of their recurrence rates and the risk of occult or de novo SUI—were reserved for specific indications, weighing benefits and adverse events. Finally, it was emphasized that shared decision-making, longitudinal follow-up, and multidisciplinary coordination were pillars for improving functional outcomes and quality of life. At the same time, future research should focus on more accurate risk predictors, improved surgical selection criteria, and strategies to prevent recurrence.

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