

Review

Urinary Leakage During Sexual Activity: A Narrative Review of an Underdiagnosed Female Pelvic Floor Disorder

Mihaela Bot^{1,2}, Andreea Borisilavski^{1,2,*} and Radu Vladareanu^{1,2} ¹ Department of Obstetrics and Gynecology, “Carol Davila” University of Medicine and Pharmacy, 8 Eroii Sanitari Blvd., 050474 Bucharest, Romania² Department of Obstetrics and Gynecology, Elias University Emergency Hospital, 17 Mărăști Blvd., 050474 Bucharest, Romania

* Correspondence: andreea.borisilavski@drd.umfcd.ro

Abstract

Coital urinary incontinence is a frequently underdiagnosed manifestation of female pelvic floor dysfunction, characterized by involuntary urine leakage during sexual activity, particularly during vaginal penetration or orgasm. Although interest in this condition has increased in recent years, it remains insufficiently investigated in clinical practice and is often underreported by patients because of stigma, emotional distress, and the negative impact on intimate relationships and quality of life. Current evidence supports the existence of distinct pathophysiological mechanisms depending on the timing of urinary leakage. Leakage occurring during vaginal penetration is more commonly associated with stress urinary incontinence, urethral hypermobility, and pelvic support defects, whereas orgasm-associated urinary incontinence appears to be more closely related to detrusor overactivity and complex pelvic neurophysiological mechanisms. Hormonal changes associated with the peri- and postmenopausal period may further contribute to symptom progression through alterations in urethral and vaginal trophicity, local vascularization, and pelvic neuromuscular function. Clinical evaluation remains challenging because many affected women do not voluntarily report symptoms due to embarrassment or social stigma, therefore it requires targeted questioning regarding urinary leakage during sexual activity, associated lower urinary tract symptoms, and the impact on female sexual health. Therapeutic management should be individualized and tailored to the predominant underlying mechanisms, including pelvic floor rehabilitation, behavioral interventions, pharmacological treatment, local hormonal therapy, and surgical management of stress urinary incontinence or pelvic support defects. Minimally invasive and regenerative therapies, such as vaginal laser therapy, platelet-rich plasma, cellular therapies, and neuromodulation, represent promising therapeutic approaches. Greater awareness and proactive screening during urogynecological evaluation are essential for improving diagnosis, individualized treatment, sexual health, and overall quality of life in affected women.



Academic Editors: Jean De la Rosette and Lorenzo Romano

Received: 28 May 2026

Revised: 14 July 2026

Accepted: 28 July 2026

Published: 3 August 2026

Copyright: © 2026 by the authors.

Licensee MDPI, Basel, Switzerland.

This article is an open access article distributed under the terms and conditions of the [Creative Commons Attribution \(CC BY\)](https://creativecommons.org/licenses/by/4.0/) license.

Keywords: coital urinary incontinence; female sexual dysfunction; stress urinary incontinence; detrusor overactivity; pelvic floor dysfunction; overactive bladder; pelvic organ prolapse; menopause; urogynecology; sexual health; pelvic floor rehabilitation; neuromodulation; regenerative therapies

1. Introduction

Urinary incontinence (UI) and female sexual dysfunction are among the most common pelvic floor disorders, with a substantial impact on quality of life (QoL), emo-

tional wellbeing, psychosexual health, and self-perception. Although these conditions frequently coexist, involuntary urine leakage during sexual activity remains an under-reported and insufficiently explored symptom, despite its significant psychological and relational consequences [1].

Involuntary urine leakage during sexual activity, particularly during vaginal penetration or orgasm, described in the literature as coital urinary incontinence (CUI), represents a complex manifestation of pelvic floor dysfunction situated at the interface between urogynecology and female sexual medicine [1].

Although this symptomatology was long considered rare, current evidence suggests that urinary leakage associated with sexual activity is considerably more common than previously believed, with reported prevalence varying widely depending on the study population, definitions used, assessment tools, and the extent to which the symptom is actively investigated during clinical history taking [2,3].

Among women diagnosed with UI, the prevalence of urinary leakage associated with sexual activity ranges widely in the literature, from approximately 10% to more than 60%. The symptom is more frequently reported in patients with severe stress urinary incontinence (SUI), overactive bladder, or mixed urinary incontinence (MUI). Nevertheless, CUI remains profoundly underdiagnosed. Many patients avoid spontaneously reporting these symptoms because of stigma, emotional distress, and the misconception that urine leakage during sexual activity represents an inevitable consequence of childbirth, menopause, or aging [2,4].

At the same time, the impact of CUI on female sexual health remains insufficiently assessed in clinical practice, although its consequences often extend far beyond the urinary symptom itself, affecting sexual arousal, sexual satisfaction, intimate relationships, and QoL [5]. In some cases, persistent fear of urinary leakage may lead to anticipatory anxiety and progressive reduction in sexual activity, transforming sexual intercourse into an experience dominated by stress and hypervigilance. Moreover, many women develop avoidance behaviors, sometimes progressing to sexual abstinence, without seeking medical evaluation. Avoidance of certain sexual positions and preventive bladder emptying before intercourse are frequently described in the literature [6].

The relationship between urinary continence and female sexual function is considerably more complex than simple sphincteric dysfunction. Contemporary concepts increasingly support the idea that continence mechanisms, pelvic organ support, and female sexuality represent interdependent components of the same anatomical and functional pelvic unit [1]. Pelvic connective tissue integrity, neuromuscular function, local vascularization, and hormonal balance play interconnected roles in both urinary continence and female sexual function. As a result, UI, pelvic organ prolapse, and associated sexual dysfunction commonly coexist and may mutually influence one another [7].

Despite growing interest in female pelvic floor pathology, urinary leakage associated with sexual activity continues to be insufficiently represented in the literature. Published studies frequently employ heterogeneous definitions and assessment methods, while the impact on female sexual function is often analyzed secondarily compared with urinary symptom severity. In recent years, however, the literature has increasingly begun to address coital urinary incontinence as a distinct manifestation of pelvic floor dysfunction [8].

The aim of this article is to provide a contemporary overview of CUI, focusing on the underlying pathophysiological mechanisms, the clinical characteristics of urinary leakage associated with penetration and orgasm, targeted medical history and pelvic examination, the impact on female sexual health, and currently available therapeutic options.

2. Materials and Methods

This manuscript was conducted as a narrative review of the current literature addressing CUI in women.

A comprehensive literature search was performed using the PubMed/MEDLINE, Scopus, and Google Scholar databases to identify publications relevant to the pathophysiology, clinical evaluation, and management of CUI. The search included articles published up to June 2026 and was performed using combinations of the following keywords: coital urinary incontinence, urinary leakage during intercourse, urinary leakage during orgasm, female sexual dysfunction, stress urinary incontinence, overactive bladder, detrusor overactivity, pelvic floor dysfunction, pelvic organ prolapse, menopause, pelvic floor muscle training, neuromodulation, platelet-rich plasma, and regenerative therapies.

Original research articles, systematic and narrative reviews, clinical guidelines, and expert consensus documents published in English were considered for inclusion. Priority was given to studies specifically addressing CUI and its association with female pelvic floor disorders. Because of the limited number of studies dedicated exclusively to CUI, additional evidence regarding UI, female sexual dysfunction, overactive bladder, pelvic floor disorders, menopause, and emerging therapeutic approaches was included when considered clinically relevant to provide a comprehensive overview of the topic.

The identified publications were reviewed for relevance based on their scientific quality, clinical applicability, and contribution to the understanding of CUI. Additional references were identified through manual screening of the reference lists of selected articles. Owing to the heterogeneity of the available literature and the limited number of studies specifically investigating CUI, the evidence was synthesized narratively rather than quantitatively.

3. Pathophysiology of Coital Urinary Incontinence

The pathophysiological mechanisms involved in CUI are complex and vary according to the timing of urinary leakage during sexual activity. Current evidence supports the existence of distinct mechanisms underlying urinary leakage associated with vaginal penetration compared with orgasm-associated leakage, although overlap between these clinical forms frequently exists. Interpretation of available data is limited by the heterogeneity of definitions and clinical assessment methods, with many studies failing to clearly differentiate between the two clinical presentations [3,7].

Urinary leakage associated with vaginal penetration is most commonly correlated with severe SUI, urethral hypermobility, and impairment of the support mechanisms of the proximal urethra and bladder neck. During penetration, mobilization of the anterior vaginal wall and alterations in vesicourethral dynamics may promote urinary leakage in patients with impaired pelvic support structures and altered continence mechanisms. In addition, anterior compartment prolapse and pelvic floor support abnormalities may further contribute to symptom development through alterations in urethral support during sexual activity [5,9].

Female orgasm is a complex neurophysiological phenomenon involving the integration of autonomic, somatic, and sensory components of the pelvic nervous system [10,11]. During orgasm, activation of sympathetic and parasympathetic nervous structures, pudendal nerve stimulation, and contractions of the striated pelvic floor musculature occur in association with changes in vesicourethral dynamics and pelvic visceral sensitivity [12].

The innervation of the urinary bladder and structures involved in female sexual function demonstrates significant peripheral and central neural interconnections. Autonomic fibers originating from the pelvic plexus, together with somatic pathways mediated by the pudendal nerve, contribute simultaneously to urinary continence, pelvic

sensation, and the female sexual response. In this context, intense stimulation of pelvic structures during orgasm may facilitate activation of bladder reflex pathways in susceptible individuals [8,13–15].

Numerous urodynamic studies have demonstrated an association between orgasm-associated UI and detrusor overactivity. In these patients, activation of neurovesical reflexes and increased bladder excitability may promote involuntary bladder contractions and consequent urinary leakage during orgasm [16].

Emerging evidence indicates that the pathophysiology of CUI extends beyond isolated anatomical defects of pelvic support. In particular, orgasm-associated urinary leakage appears to involve complex neurophysiological and functional mechanisms. However, the exact interplay between pelvic neural pathways, the female orgasmic response, and urinary leakage remains incompletely elucidated [3,13].

Menopause-related hormonal changes may progressively contribute to the development and worsening of CUI. Estrogen deficiency is associated with multiple structural and functional alterations of the lower genitourinary tract, including vaginal and urethral atrophy, reduced vascularization, decreased collagen content, and impaired tissue elasticity. Collectively, these changes may weaken pelvic floor support and continence mechanisms. Furthermore, reduced tissue perfusion may adversely affect pelvic neuromuscular trophicity and alter the function of autonomic and somatic nerve pathways involved in the innervation of the urethra, vagina, and bladder neck [17,18].

Current evidence suggests that the pathophysiology of coital urinary incontinence differs according to the timing of urinary leakage during sexual activity. The main clinical and pathophysiological characteristics of the two clinical presentations are summarized in Table 1.

Table 1. Main pathophysiological characteristics of penetration- and orgasm-associated coital urinary incontinence [3,5,7–18].

Characteristic	Penetration-Associated CUI	Orgasm-Associated CUI
Timing of urinary leakage	During vaginal penetration	During orgasm
Predominant underlying mechanism	SUI	Detrusor overactivity (DO)
Main pathophysiological factors	Urethral hypermobility; impaired support of the proximal urethra and bladder neck; anterior vaginal wall mobilization; altered vesicourethral dynamics	Increased bladder excitability; activation of neurovesical reflexes; activation of autonomic and somatic neural pathways; increased pelvic visceral sensitivity
Associated pelvic findings	Anterior compartment prolapse and pelvic floor support abnormalities are frequently associated	No specific pelvic anatomical abnormality; may coexist with SUI or pelvic floor dysfunction
Neurophysiological mechanisms	Not considered the predominant mechanism	Activation of sympathetic and parasympathetic pathways, pudendal nerve stimulation, and central and peripheral neural pathways involved in bladder control and female orgasm
Typical urodynamic finding	Urodynamic SUI	DO
Potential influence of estrogen deficiency	May aggravate urethral support impairment through reduced tissue trophicity and elasticity	May contribute to altered pelvic neuromuscular function, tissue perfusion, and bladder sensitivity

Abbreviations: CUI, coital urinary incontinence; DO, detrusor overactivity; SUI, stress urinary incontinence.

The proposed pathophysiological mechanisms underlying penetration- and orgasm-associated coital urinary incontinence are illustrated in Figure 1.

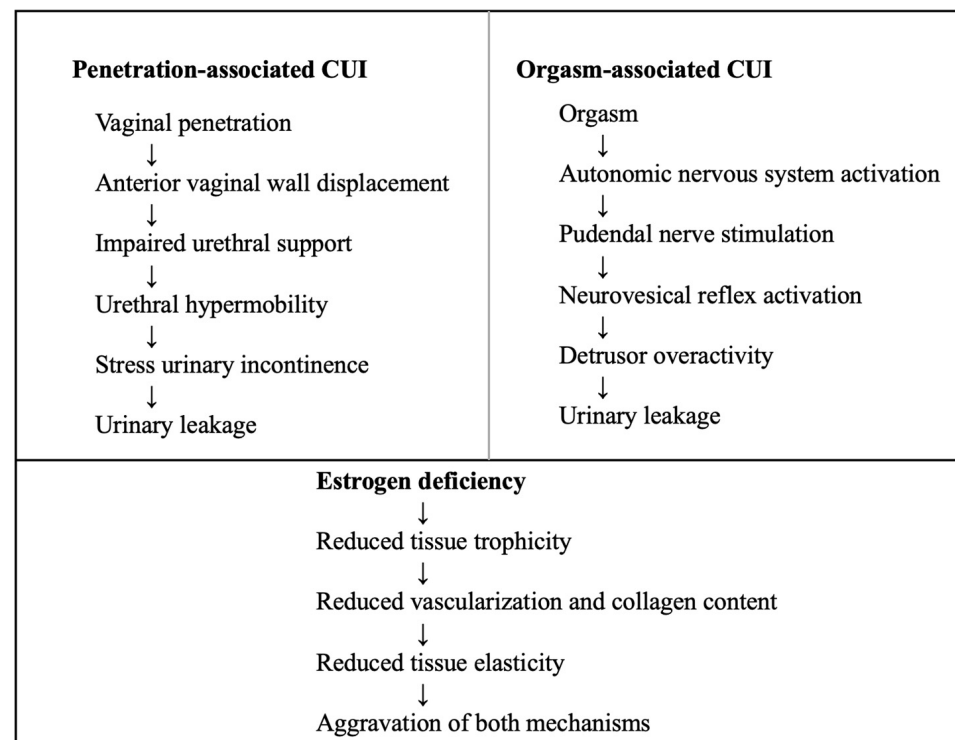


Figure 1. Proposed pathophysiological mechanisms of penetration- and orgasm-associated coital urinary incontinence (CUI). Penetration-associated CUI is predominantly related to impaired urethral support and SUI, whereas orgasm-associated CUI is mainly associated with activation of neurovesical reflexes and detrusor overactivity. Estrogen deficiency may contribute to both mechanisms by reducing tissue trophicity, vascularization, collagen content, and tissue elasticity.

4. Clinical Evaluation

The evaluation of CUI is predominantly based on history and clinical evaluation and requires targeted questioning regarding the occurrence of urinary leakage during sexual activity. Clinical history taking should establish the timing of urinary leakage, differentiating symptoms associated with vaginal penetration from those occurring during orgasm. It is also important to determine whether symptoms occur constantly or intermittently and to identify factors that may influence urinary leakage, including bladder fullness, specific sexual positions, and orgasm intensity [3].

Associated urinary symptoms should also be evaluated, including stress urinary incontinence, symptom severity, urinary urgency, frequency, nocturia, and symptoms of overactive bladder [1].

Assessment of the impact on female sexual health should include changes in sexual arousal and satisfaction. It is important to establish symptom onset, progression over time, and the relationship between symptoms and the transition to peri- and postmenopause. Symptom duration, patient age at symptom onset, and the time elapsed since menopause may provide relevant information regarding the contribution of hormonal and genitourinary changes to symptom development [1,3,8].

The urogynecological examination should include evaluation of pelvic floor support, identification of pelvic organ prolapse, assessment of vaginal and urethral trophicity, and evaluation of urethral mobility and potential anterior compartment defects. Assessment of urethral trophicity includes evaluation of the urethral meatus and periurethral mucosa, identifying signs of atrophy and tissue fragility. In selected cases, evaluation may be

complemented by urodynamic testing, particularly in patients with mixed symptomatology or suspected detrusor overactivity [1].

Several questionnaires have been used in the literature to evaluate urinary symptoms and their impact on female sexual function, including the International Consultation on Incontinence Questionnaire Female Lower Urinary Tract Symptoms Sexual Matters associated with Lower Urinary Tract Symptoms module (ICIQ-FLUTSsex), the Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire (PISQ), and the Female Sexual Function Index (FSFI) [19–22].

However, there is currently no standardized instrument dedicated exclusively to the assessment of COI [3,23,24].

The main components of the clinical evaluation of women with CUI are summarized in Table 2.

Table 2. Clinical evaluation of women with coital urinary incontinence.

Assessment Domain	Key Aspects to Evaluate
Medical history	Timing of urinary leakage (during vaginal penetration or orgasm); frequency of symptoms (constant or intermittent); bladder fullness; sexual position; orgasm intensity [1,3].
Associated lower urinary tract symptoms	Stress urinary incontinence; urinary urgency; urinary frequency; nocturia; overactive bladder symptoms [1,3].
Female sexual health	Changes in sexual arousal and satisfaction; impact on sexual activity; symptom onset and progression; relationship with peri- and postmenopause [3,7,8].
Urogynecological examination	Pelvic floor support; pelvic organ prolapse; vaginal and urethral trophicity; urethral mobility; anterior compartment defects; signs of urethral and periurethral atrophy [1,17].
Additional investigations	Urodynamic testing in selected patients with mixed urinary symptoms or suspected detrusor overactivity [1,3,25].
Validated questionnaires	ICIQ-FLUTSsex [22], PISQ-IR [21], FSFI [20]; currently, no questionnaire is specifically dedicated to the assessment of CUI [3,23,24].

Abbreviations: CUI, coital urinary incontinence; FSFI, Female Sexual Function Index; ICIQ-FLUTSsex, International Consultation on Incontinence Questionnaire Female Lower Urinary Tract Symptoms Sexual Matters Associated with Lower Urinary Tract Symptoms; PISQ-IR, Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire—IUGA Revised.

5. Therapeutic Options

The management of CUI should be individualized and adapted to the clinical characteristics and underlying pathophysiological mechanisms involved, within the context of the frequently multifactorial nature of symptoms. Therapeutic management should consider the coexistence of SUI, overactive bladder symptoms, pelvic floor support abnormalities, and genitourinary syndrome of menopause, as well as their impact on female sexual function and QoL [3,8,17].

Many patients spontaneously adopt behavioral strategies aimed at reducing symptoms, including bladder emptying before intercourse, limiting fluid intake before sexual activity, or avoiding certain sexual positions. Although these measures may reduce the frequency of urinary leakage episodes in some patients, they do not address the underlying pathophysiological mechanisms [1,3].

5.1. Conservative Treatment

Conservative treatment frequently represents the first therapeutic step in the management of coital urinary incontinence, particularly in patients with mild or moderate symptoms and in the absence of severe anatomical pelvic floor defects [26].

Pelvic floor rehabilitation and pelvic floor muscle training are among the most commonly used conservative interventions. These approaches aim to improve vesicourethral support, optimize pelvic neuromuscular control, and enhance the ability of pelvic floor musculature to respond to pressure variations and mechanical stress occurring during sexual activity. Available evidence reported improvement in CUI among patients with SUI undergoing pelvic floor rehabilitation programs [3,27,28].

In peri- and postmenopausal patients, local estrogen therapy may contribute to improved vaginal and urethral trophicity and reduction in symptoms associated with genitourinary syndrome of menopause. Improvement in tissue trophicity and local vascularization may exert beneficial effects on both urinary symptoms and sexual discomfort associated with genitourinary atrophy [3,16].

In certain situations, conservative management may also include interventions targeting overactive bladder symptoms, such as bladder training and management of factors promoting urinary urgency. Nevertheless, available evidence regarding the exclusive efficacy of conservative treatment in CUI remains limited, as most studies evaluate this symptom within the broader context of female UI [3,25,28].

Although Serati et al. initially proposed a conceptual distinction between penetration-associated and orgasm-associated CUI, subsequent clinical studies have demonstrated that the overlap between SUI and detrusor overactivity is more common than previously appreciated. El-Azab et al. reported that women with MUI may exhibit both mechanisms simultaneously, while the more recent urodynamic study by Çetinkaya et al. further supported the coexistence of stress-related and urgency-related mechanisms in many patients. Collectively, these findings indicate that the pathophysiology of CUI is frequently multifactorial and reinforce the importance of individualized diagnostic evaluation and treatment selection [3,12,25].

5.2. Pharmacological Treatment

Pharmacological treatment may play an important role, particularly in patients with overactive bladder symptoms or urodynamically demonstrated detrusor overactivity. In these situations symptom control may contribute to reducing episodes of urinary leakage associated with sexual activity, especially those occurring during orgasm [3,29].

Antimuscarinic agents represent one of the most widely used therapeutic options for controlling overactive bladder symptoms. By reducing involuntary bladder contractions and improving urinary urgency, these therapies may reduce the frequency of urinary leakage in some patients. However, associated adverse effects, including xerostomia, constipation, and medication intolerance, may limit long-term adherence [30,31].

Beta-3 adrenergic receptor agonists represent an important therapeutic alternative, exerting effects on bladder muscle relaxation and improvement of overactive bladder symptoms, frequently with a more favorable tolerability profile compared with antimuscarinic agents [32].

In peri- and postmenopausal patients, local vaginal estriol therapy may have beneficial effects on urinary symptoms associated with estrogen deficiency through improvement of urethral and vaginal trophicity and enhancement of local vascularization [17,29,33,34].

Nevertheless, evidence regarding the specific efficacy of pharmacological therapies in coital urinary incontinence remains scarce. Most studies evaluate treatment outcomes

within the broader spectrum of mixed urinary incontinence and overactive bladder, without specifically analyzing their impact on urinary leakage associated with sexual activity [3,25].

5.3. Surgical Treatment

Surgical treatment may represent an effective therapeutic option in patients in whom CUI is predominantly associated with SUI and pelvic floor support defects. Surgical intervention is generally considered in women with moderate to severe symptoms, frequent urinary leakage episodes, substantial impairment of QoL, and clinically significant SUI, particularly after failure of conservative management [3].

Midurethral sling procedures, including tension-free vaginal tape (TVT) and transobturator tape (TOT), are among the most widely used surgical interventions for stress urinary incontinence and have been associated with improvement of coital urinary incontinence symptoms in selected patients [35,36].

Numerous studies have reported improvement or resolution of coital urinary incontinence following surgical treatment of stress urinary incontinence, particularly in patients with urinary leakage associated with vaginal penetration. Available literature have also demonstrated improvement in urinary symptoms and reduction in their impact on sexual activity following surgical treatment of SUI [23,37]. In the SISTEr study, the proportion of sexually active women reporting urinary incontinence significantly decreased postoperatively, from 53% preoperatively to 9% at follow-up. In parallel, the proportion of patients reporting limitation of sexual activity because of fear of urinary leakage decreased from 52% to 10% after surgery [38].

In patients with significant anterior compartment defects and major pelvic support abnormalities, correction of pelvic anatomical defects may further contribute to reducing urinary leakage associated with sexual activity. Available data suggest that surgical treatment is more effective in patients whose symptoms are predominantly stress-related. In contrast, in patients with mixed urinary incontinence, surgical correction of pelvic support defects may improve the stress-related component without directly influencing mechanisms associated with bladder overactivity or detrusor overactivity. In such cases, urgency symptoms and urinary leakage associated with sexual activity may persist postoperatively and require additional conservative or pharmacological treatment [3,25,39,40].

Consequently, careful patient selection and realistic preoperative counseling remain essential in the management of CUI [3].

5.4. Emerging Therapeutic Perspectives

In recent years, interest in minimally invasive and regenerative therapies for female pelvic floor disorders has increased significantly. In the context of CUI, these therapies aim to improve tissue trophicity, enhance urethral support, and improve pelvic neuromuscular function, with potential benefits for both urinary symptoms and female sexual function [41].

Vaginal laser therapy and radiofrequency-based therapies have been proposed as therapeutic options for patients with menopausal urogenital symptoms and mild to moderate urinary incontinence. Proposed mechanisms include stimulation of collagen remodeling, increased local vascularization, and improvement of vaginal and urethral mucosal trophicity. Some studies have reported improvement in urinary symptoms and female sexual function following these therapies; however, available evidence remains heterogeneous, and the lack of prospective randomized studies limits the formulation of firm recommendations [18,27,41,42].

While observational studies have generally reported improvements in urinary symptoms and female sexual function, randomized controlled evidence remains limited. Furthermore, current international recommendations consider vaginal laser therapy a promising

but still investigational approach, emphasizing that additional high-quality prospective studies are required before its routine use can be recommended in clinical practice [41,42].

Interest in regenerative therapies, including platelet-rich plasma (PRP) and cellular therapies, has also increased, driven by advances in regenerative medicine and growing interest in restoring pelvic floor function through biological and tissue-based mechanisms [43].

Cellular therapies employ various cell types with regenerative potential, particularly mesenchymal stem cells and adipose-derived cells, aiming to stimulate tissue regeneration, collagen remodeling, enhancement of local vascularization, and optimization of pelvic neuromuscular function. These therapies aim not only to improve anatomical pelvic support but also to influence processes involved in tissue trophicity, neuromuscular function, local innervation, and the regenerative capacity of periurethral and vaginal structures [44].

In the context of CUI, interest in these approaches derives from the complex and multifactorial nature of symptoms, involving anatomical, hormonal, vascular, and neurophysiological components simultaneously. Nevertheless, clinical experience regarding the use of regenerative therapies in CUI remains limited, and available evidence is still insufficient to support standardized recommendations [45].

Neuromodulation represents one of the most promising modern therapeutic directions investigated in female pelvic floor disorders, particularly in patients with overactive bladder symptoms and detrusor overactivity. Sacral neuromodulation acts predominantly on sacral nerve roots, especially S3, which are involved in the control of the urinary bladder, urethra, and pelvic structures. By influencing neurovesical reflexes and reducing bladder excitability, these therapies may improve urinary urgency, urge urinary incontinence, and detrusor overactivity. Interest in neuromodulation for CUI derives from the interconnection between neurological mechanisms involved in bladder control and female sexual function. In this context, reduction in bladder overactivity through neuromodulation may also exert favorable effects on urinary leakage associated with sexual activity in selected cases. Sacral neuromodulation is primarily performed in specialized neurourology and urogynecology centers and requires a multidisciplinary approach and careful patient selection [46].

At present, evidence regarding the efficacy of emerging therapies in CUI remains extremely limited, with most available data extrapolated from studies evaluating female UI and pelvic floor disorders more broadly. Existing studies generally include small patient populations and short follow-up periods. Additional prospective studies are required to evaluate long-term efficacy and define optimal patient selection criteria [31,47].

Recent literature further supports the need for caution regarding emerging and minimally invasive therapies. For vaginal laser therapy, recent position statements emphasize that, although observational studies have reported improvements in genitourinary symptoms, urinary symptoms, and sexual function, robust evidence remains insufficient to support routine use in clinical practice [48]. Similarly, recent PRP studies and reviews suggest a favorable safety profile and potential symptomatic benefit in female SUI, but the evidence remains heterogeneous, with small study populations, variable protocols, and limited follow-up [49,50]. For cellular therapies, recent reviews indicate that regenerative cell-based approaches may be safe and biologically plausible for female SUI, although clinical efficacy remains insufficiently established and larger randomized trials are still required [43]. In the field of neuromodulation, contemporary data support its role in refractory OAB, but outcome reporting remains inconsistent and evidence specifically addressing CUI is lacking [51]. Overall, these findings reinforce that emerging therapies for CUI should currently be interpreted as extrapolated, mechanism-based therapeutic possibilities rather than standardized treatment options.

The currently available therapeutic approaches for CUI, together with their principal indications and the evidence available in the literature, are summarized in Table 3.

Table 3. Current therapeutic approaches for coital urinary incontinence.

Therapeutic Approach	Main Indication	Proposed Mechanism of Action	Evidence Available in the Literature
Behavioral interventions [1,3,26]	Mild symptoms; adjunctive management	Bladder emptying before intercourse; fluid intake modification; avoidance of triggering sexual positions	Limited; mainly based on clinical experience
Pelvic floor muscle training (PFMT) [23,27,28]	SUI; mild to moderate CUI	Improves pelvic floor strength, vesicourethral support, and neuromuscular control	Moderate
Local vaginal estrogen therapy [17,29,33,34]	Peri- and postmenopausal women with genitourinary syndrome of menopause	Improves vaginal and urethral trophicity and local vascularization	Moderate
Antimuscarinic agents [30,31]	OAB; detrusor overactivity	Reduces involuntary bladder contractions and urinary urgency	Moderate
β 3-adrenoceptor agonists [31,32]	OAB; detrusor overactivity	Promotes bladder relaxation during the storage phase	Moderate
Midurethral sling procedures (TVT/TOT) [35–38]	SUI; penetration-associated CUI	Restores urethral support	Strong
Vaginal laser/radiofrequency therapies [41,42,48]	Selected patients with GSM and mild UI	Collagen remodeling, improved tissue trophicity and vascularization	Limited
PRP and cellular therapies [43,44,47,49,50]	Investigational	Tissue regeneration and neuromuscular restoration	Very limited
Sacral neuromodulation [31,46,51]	Refractory OAB; detrusor overactivity	Modulates sacral neural pathways controlling bladder function	Limited

Abbreviations: CUI, coital urinary incontinence; GSM, genitourinary syndrome of menopause; OAB, overactive bladder; PRP, platelet-rich plasma; SUI, stress urinary incontinence; TOT, transobturator tape; TVT, tension-free vaginal tape; UI, urinary incontinence.

The proposed clinical approach to women presenting with CUI, integrating the diagnostic evaluation and individualized therapeutic strategy based on the predominant underlying mechanism, is illustrated in Figure 2.

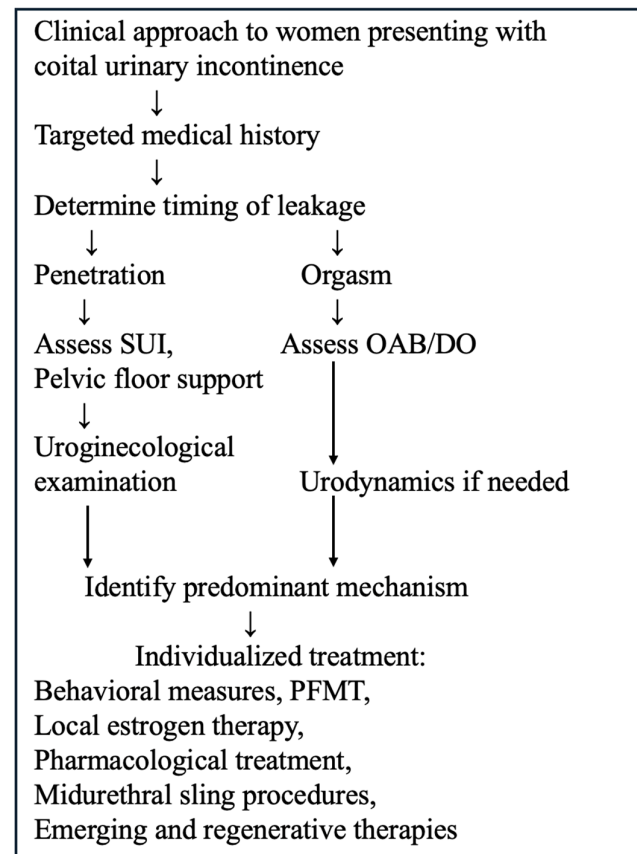


Figure 2. Proposed clinical approach to women presenting with coital urinary incontinence (CUI). Initial evaluation should determine whether urinary leakage occurs during vaginal penetration or orgasm, as this distinction helps identify the predominant underlying mechanism and guides individualized therapeutic management. Treatment should be tailored according to the associated lower urinary tract symptoms, pelvic floor abnormalities, and patient characteristics. Abbreviations: DO, detrusor overactivity; OAB, overactive bladder; PFMT, pelvic floor muscle training; SUI, stress urinary incontinence.

6. Clinical Implications and Future Perspectives

Current evidence suggests that the best therapeutic outcomes are achieved in patients with CUI predominantly associated with SUI and urinary leakage during vaginal penetration, situations in which surgical treatment may lead to significant symptom improvement. However, this also highlights the need to identify alternative therapeutic strategies for patients with mild or moderately symptomatic disease, in whom surgical indications should be carefully weighed [25,42].

In this context, the combination of pelvic floor rehabilitation, local hormonal therapy, and minimally invasive or regenerative therapies may represent an intermediate therapeutic step, particularly in peri- and postmenopausal patients with associated genitourinary trophic changes. These interventions deserve prospective evaluation because of their minimally invasive nature, absence of hospitalization requirements, and potential to provide a therapeutic alternative before surgical correction in carefully selected cases [5,8,17].

Despite increasing interest in CUI, important gaps in the available literature remain. Most published studies are observational, involve relatively small patient populations, and frequently evaluate coital urinary incontinence as a secondary outcome within broader studies on urinary incontinence or female sexual dysfunction. Well-designed prospective studies using standardized definitions and validated outcome measures are needed to improve understanding of the condition and optimize therapeutic decision-making [2,3,18,25].

The currently available evidence on coital urinary incontinence is derived from a limited number of studies with heterogeneous designs. The principal publications that have shaped the current understanding of CUI are summarized in Table 4.

Table 4. Landmark studies contributing to the current understanding of coital urinary incontinence.

Study	Design	Main Contribution
Serati et al., 2009 [3]	Narrative review	Proposed the distinction between penetration- and orgasm-associated CUI and summarized available therapeutic approaches.
El-Azab et al., 2011 [25]	Clinical study	Demonstrated the association between orgasm-associated CUI, detrusor overactivity, and stress urinary incontinence.
Grzybowska & Wydra, 2017 [7]	Clinical study	Showed the negative impact of CUI on quality of life and female sexual function.
Gray et al., 2018 [18]	Cross-sectional study	Reported that active questioning substantially increases CUI detection.
Athey et al., 2024 [2]	Multicentre observational study	Provided contemporary prevalence data and clinical associations of CUI.
Harding et al., 2025 [31]	EAU Guideline	Current recommendations for conservative, pharmacological, and surgical management of female LUTS relevant to CUI.

Abbreviations: CUI, coital urinary incontinence; LUTS, lower urinary tract symptoms.

7. Conclusions

CUI represents a complex and frequently underdiagnosed manifestation of female pelvic floor dysfunction, in which continence mechanisms, pelvic support, hormonal status, and the neurophysiological sexual response interact closely. Differentiating between urinary leakage occurring during penetration and that associated with orgasm has direct implications for clinical evaluation and therapeutic decision-making.

Therapeutic management should be personalized, stepwise, and adapted to the predominant underlying mechanisms. Active inquiry regarding this symptom during clinical history taking is essential, as many patients do not report it spontaneously. Prospective studies are needed to evaluate the efficacy of combined therapies and to better define the role of conservative, regenerative, and surgical treatments within the therapeutic algorithm of CUI.

Author Contributions: Conceptualization, M.B., A.B. and R.V.; methodology, M.B.; validation, M.B. and R.V.; investigation, M.B.; data curation, M.B., A.B. and R.V.; writing—original draft preparation, A.B. and M.B.; writing—review and editing, R.V.; visualization, M.B. and A.B.; supervision, R.V.; project administration, M.B.; All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new data were created or analyzed in this study. Data sharing is not applicable to this article.

Conflicts of Interest: The authors declare no conflicts of interest.

Abbreviations

CUI	coital urinary incontinence
DO	detrusor overactivity
FSFI	Female Sexual Function Index
GSM	genitourinary syndrome of menopause
LUTS	lower urinary tract symptoms
OAB	overactive bladder
PFMT	pelvic floor muscle training
PISQ-IR	Pelvic Organ Prolapse/Urinary Incontinence Sexual Questionnaire–IUGA Revised
PRP	platelet-rich plasma
QoL	quality of life
SUI	stress urinary incontinence
TOT	transobturator tape
TVT	tension-free vaginal tape
UI	urinary incontinence

References

- Haylen, B.T.; De Ridder, D.; Freeman, R.M.; Swift, S.E.; Berghmans, B.; Lee, J.; Monga, A.; Petri, E.; Rizk, D.E.; Sand, P.K.; et al. An international urogynecological association (IUGA)/international continence society (ICS) joint report on the terminology for female pelvic floor dysfunction. *Neurourol. Urodyn.* **2010**, *29*, 4–20. [[CrossRef](#)] [[PubMed](#)]
- Athey, R.; Gray, T.; Kershaw, V.; Radley, S.; Jha, S. Coital Incontinence: A Multicentre Study Evaluating Prevalence and Associations. *Int. Urogynecol. J.* **2024**, *35*, 1969–1975. [[CrossRef](#)] [[PubMed](#)]
- Serati, M.; Salvatore, S.; Uccella, S.; Nappi, R.E.; Bolis, P. Female Urinary Incontinence During Intercourse: A Review on an Understudied Problem for Women’s Sexuality. *J. Sex. Med.* **2009**, *6*, 40–48. [[CrossRef](#)] [[PubMed](#)]
- Lau, H.-H.; Huang, W.-C.; Su, T.-H. Urinary leakage during sexual intercourse among women with incontinence: Incidence and risk factors. *PLoS ONE* **2017**, *12*, e0177075. [[CrossRef](#)] [[PubMed](#)]
- Rodríguez-Almagro, J.; Hernández Martínez, A.; Martínez-Vázquez, S.; Peinado Molina, R.A.; Bermejo-Cantarero, A.; Martínez-Galiano, J.M. A Qualitative Exploration of the Perceptions of Women Living with Pelvic Floor Disorders and Factors Related to Quality of Life. *J. Clin. Med.* **2024**, *13*, 1896. [[CrossRef](#)] [[PubMed](#)]
- Pinheiro Sobreira Bezerra, L.R.; Britto, D.F.; Ribeiro Frota, I.P.; Lira Do Nascimento, S.; Moraes Brilhante, A.V.; Lucena, S.V.; Moura Brasil, D.M. The Impact of Urinary Incontinence on Sexual Function: A Systematic Review. *Sex. Med. Rev.* **2020**, *8*, 393–402. [[CrossRef](#)] [[PubMed](#)]
- Grzybowska, M.E.; Wydra, D.G. Coital incontinence: A factor for deteriorated health-related quality of life and sexual function in women with urodynamic stress urinary incontinence. *Int. Urogynecol. J.* **2017**, *28*, 697–704. [[CrossRef](#)] [[PubMed](#)]
- Rogers, R.G. Sexual function in women with pelvic floor disorders. *Can. Urol. Assoc. J.* **2013**, *7*, 199. [[CrossRef](#)] [[PubMed](#)]
- Azadzoi, K.M.; Siroky, M.B. Neurologic Factors in Female Sexual Function and Dysfunction. *Korean J. Urol.* **2010**, *51*, 443. [[CrossRef](#)] [[PubMed](#)]
- Ramos, S.A.; Guimarães, T.; Bollens, R. Urethral leak: An unusual symptom of pudendal nerve entrapment. *Cent. Eur. J. Urol.* **2020**, *73*, 46–48. [[CrossRef](#)] [[PubMed](#)]
- Wise, N.J.; Frangos, E.; Komisaruk, B.R. Brain Activity Unique to Orgasm in Women: An fMRI Analysis. *J. Sex. Med.* **2017**, *14*, 1380–1391. [[CrossRef](#)] [[PubMed](#)]
- Çetinkaya, Ş.E.; Seval, M.M.; Varlı, B.; Dökmeci, F. The association of coital incontinence with clinical factors and single voiding cycle ambulatory urodynamic monitoring findings in women. *Front. Med.* **2023**, *10*, 1160637. [[CrossRef](#)] [[PubMed](#)]
- De Groat, W.C.; Griffiths, D.; Yoshimura, N. Neural Control of the Lower Urinary Tract. *Compr. Physiol.* **2014**, *5*, 327–396. [[CrossRef](#)] [[PubMed](#)]
- Tajkarimi, K.; Burnett, A.L. The Role of Genital Nerve Afferents in the Physiology of the Sexual Response and Pelvic Floor Function. *J. Sex. Med.* **2011**, *8*, 1299–1312. [[CrossRef](#)] [[PubMed](#)]

15. Levin, R.J. The Physiology of Sexual Arousal in the Human Female: A Recreational and Procreational Synthesis. *Arch. Sex. Behav.* **2002**, *31*, 405–411. [[CrossRef](#)] [[PubMed](#)]
16. Șerbănescu, L.; Mirea, S.; Ionescu, P.; Petrica, L.A.; Iorga, I.C.; Surdu, M.; Surdu, T.V.; Rotar, V. Involuntary Urine Loss in Menopause—A Narrative Review. *J. Clin. Med.* **2025**, *14*, 7664. [[CrossRef](#)] [[PubMed](#)]
17. Robinson, D.; Cardozo, L.D. The role of estrogens in female lower urinary tract dysfunction. *Urology* **2003**, *62*, 45–51. [[CrossRef](#)] [[PubMed](#)]
18. Gray, T.; Li, W.; Campbell, P.; Jha, S.; Radley, S. Evaluation of coital incontinence by electronic questionnaire: Prevalence, associations and outcomes in women attending a urogynaecology clinic. *Int. Urogynecol. J.* **2018**, *29*, 969–978. [[CrossRef](#)] [[PubMed](#)]
19. Todhunter-Brown, A.; Hazelton, C.; Campbell, P.; Elders, A.; Hagen, S.; McClurg, D. Conservative interventions for treating urinary incontinence in women: An Overview of Cochrane systematic reviews. *Cochrane Database Syst. Rev.* **2022**, *2022*, CD012337. [[CrossRef](#)] [[PubMed](#)]
20. Rosen, C.; Brown, J.; Heiman, S.; Leib, R. The Female Sexual Function Index (FSFI): A Multidimensional Self-Report Instrument for the Assessment of Female Sexual Function. *J. Sex. Marital. Ther.* **2000**, *26*, 191–208. [[CrossRef](#)] [[PubMed](#)]
21. Rogers, R.G.; Rockwood, T.H.; Constantine, M.L.; Thakar, R.; Kammerer-Doak, D.N.; Pauls, R.N.; Parekh, M.; Ridgeway, B.; Jha, S.; Pitkin, J.; et al. A new measure of sexual function in women with pelvic floor disorders (PFD): The Pelvic Organ Prolapse/Incontinence Sexual Questionnaire, IUGA-Revised (PISQ-IR). *Int. Urogynecol. J.* **2013**, *24*, 1091–1103. [[CrossRef](#)] [[PubMed](#)]
22. Jackson, S.; Donovan, J.; Brookes, S.; Eckford, S.; Swithinbank, L.; Abrams, P. The Bristol Female Lower Urinary Tract Symptoms questionnaire: Development and psychometric testing. *Br. J. Urol.* **1996**, *77*, 805–812. [[CrossRef](#)] [[PubMed](#)]
23. Jha, S.; Walters, S.J.; Bortolami, O.; Dixon, S.; Alshreef, A. Impact of pelvic floor muscle training on sexual function of women with urinary incontinence and a comparison of electrical stimulation versus standard treatment (IPSU trial): A randomised controlled trial. *Physiotherapy* **2018**, *104*, 91–97. [[CrossRef](#)] [[PubMed](#)]
24. Stamos, D.; Sapouna, V.; Astraka, K.M.; Thanopoulou, S.; Giannakis, I.; Pantou, A.; Baltogiannis, D.; Paschopoulos, M.; Sofikitis, N.; Zachariou, A. Female Sexual Function and Pelvic Floor Muscle Training: A Narrative Review. *Cureus* **2025**, *17*, e85751. [[CrossRef](#)] [[PubMed](#)]
25. El-Azab, A.S.; Yousef, H.A.; Seifeldein, G.S. Coital incontinence: Relation to detrusor overactivity and stress incontinence. *Neurourol. Urodyn.* **2011**, *30*, 520–524. [[CrossRef](#)] [[PubMed](#)]
26. Frigerio, M.; Barba, M.; Cola, A.; Braga, A.; Celardo, A.; Munno, G.; Schettino, M.; Vagnetti, P.; De Simone, F.; Di Lucia, A.; et al. Quality of Life, Psychological Wellbeing, and Sexuality in Women with Urinary Incontinence—Where Are We Now: A Narrative Review. *Medicina* **2022**, *58*, 525. [[CrossRef](#)] [[PubMed](#)]
27. Bo, K.; Talseth, T.; Holme, I. Single blind, randomised controlled trial of pelvic floor exercises, electrical stimulation, vaginal cones, and no treatment in management of genuine stress incontinence in women. *BMJ* **1999**, *318*, 487–493. [[CrossRef](#)] [[PubMed](#)]
28. Dumoulin, C.; Cacciari, L.P.; Hay-Smith, E.J.C. Pelvic floor muscle training versus no treatment, or inactive control treatments, for urinary incontinence in women. *Cochrane Database Syst. Rev.* **2018**, *2018*, CD005654. [[CrossRef](#)] [[PubMed](#)]
29. Bodner-Adler, B.; Alarab, M.; Ruiz-Zapata, A.M.; Latthe, P. Effectiveness of hormones in postmenopausal pelvic floor dysfunction—International Urogynecological Association research and development—Committee opinion. *Int. Urogynecol. J.* **2020**, *31*, 1577–1582. [[CrossRef](#)] [[PubMed](#)]
30. Gormley, E.A.; Lightner, D.J.; Faraday, M.; Vasavada, S.P. Diagnosis and Treatment of Overactive Bladder (Non-Neurogenic) in Adults: AUA/SUFU Guideline Amendment. *J. Urol.* **2015**, *193*, 1572–1580. [[CrossRef](#)] [[PubMed](#)]
31. Harding, C.K.; Lapitan, M.C.; Arlandis, S.; Bø, K.; Cobussen-Boekhorst, H.; Costantini, E.; Groen, J.; Nambiar, A.K.; Omar, M.I.; Peyronnet, B.; et al. *EAU Guidelines on Management of Non-Neurogenic Female Lower Urinary Tract Symptoms*; Edn Presented at the EAU Annual Congress; European Association of Urology (EAU): Arnhem, The Netherlands, 2025.
32. Chapple, C.R.; Kaplan, S.A.; Mitcheson, D.; Klecka, J.; Cummings, J.; Drogendijk, T.; Dorrepaal, C.; Martin, N. Randomized Double-blind, Active-controlled Phase 3 Study to Assess 12-Month Safety and Efficacy of Mirabegron, a β 3-Adrenoceptor Agonist, in Overactive Bladder. *Eur. Urol.* **2013**, *63*, 296–305. [[CrossRef](#)] [[PubMed](#)]
33. Mac Bride, M.B.; Rhodes, D.J.; Shuster, L.T. Vulvovaginal Atrophy. *Mayo Clin. Proc.* **2010**, *85*, 87–94. [[CrossRef](#)] [[PubMed](#)]
34. Allafi, A.H.; Al-johani, A.S.; Babukur, R.M.; Fikri, J.; Alanazi, R.R.; Ali, S.D.M.H.; Alkathiry, A.; Alfozan, A.M.; Mayoof, K.I.A.A.H.; Abualhamael, M.A. The Link Between Menopause and Urinary Incontinence: A Systematic Review. *Cureus* **2024**, *16*, e71260. [[CrossRef](#)] [[PubMed](#)]
35. Atilgan, A.E.; Eren, E.Ç. The effect of tension-free vaginal tape on coital incontinence concomitant with stress urinary incontinence. *LUTS Low. Urin. Tract Symptoms* **2021**, *13*, 118–122. [[CrossRef](#)] [[PubMed](#)]
36. Ford, A.A.; Rogerson, L.; Cody, J.D.; Ogah, J. Mid-urethral sling operations for stress urinary incontinence in women. *Cochrane Database Syst. Rev.* **2015**, *7*, CD006375. [[CrossRef](#)] [[PubMed](#)]

37. Roumeguere, T.; Quackels, T.; Bollens, R.; Degroote, A.; Zlotta, A.; Bossche, M.; Schulman, C. Trans-Obturator Vaginal Tape (TOT) for Female Stress Incontinence: One Year Follow-Up in 120 Patients. *Eur. Urol.* **2005**, *48*, 805–809. [[CrossRef](#)] [[PubMed](#)]
38. Tennstedt, S. Design of the stress incontinence surgical treatment efficacy trial (SISTER). *Urology* **2005**, *66*, 1213–1217. [[CrossRef](#)] [[PubMed](#)]
39. Barber, M.D.; Maher, C. Epidemiology and outcome assessment of pelvic organ prolapse. *Int. Urogynecol. J.* **2013**, *24*, 1783–1790. [[CrossRef](#)] [[PubMed](#)]
40. Maher, C.; Feiner, B.; Baessler, K.; Schmid, C. Surgical management of pelvic organ prolapse in women. *Cochrane Database Syst. Rev.* **2013**, *4*, CD004014. [[CrossRef](#)] [[PubMed](#)]
41. Ruffolo, A.; Braga, A.; Torella, M.; Frigerio, M.; Cimmino, C.; De Rosa, A.; Sorice, P.; Castronovo, F.; Salvatore, S.; Serati, M. Vaginal Laser Therapy for Female Stress Urinary Incontinence: New Solutions for a Well-Known Issue—A Concise Review. *Medicina* **2022**, *58*, 512. [[CrossRef](#)] [[PubMed](#)]
42. Salvatore, S.; Ruffolo, A.F.; Phillips, C.; Athanasiou, S.; Cardozo, L.; Serati, M.; the EUGA Working Group. Vaginal laser therapy for GSM/VVA: Where we stand now—A review by the EUGA Working Group on Laser. *Climacteric* **2023**, *26*, 336–352. [[CrossRef](#)] [[PubMed](#)]
43. Dankova, I.; Pyrgidis, N.; Tishukov, M.; Georgiadou, E.; Nigdelis, M.P.; Solomayer, E.-F.; Marcon, J.; Stief, C.G.; Hatzichristou, D. Efficacy and Safety of Platelet-Rich Plasma Injections for the Treatment of Female Sexual Dysfunction and Stress Urinary Incontinence: A Systematic Review. *Biomedicines* **2023**, *11*, 2919. [[CrossRef](#)] [[PubMed](#)]
44. González Enguita, C.; Garranzo García-Ibarrola, M.; Tufet I Jaumont, J.J.; Garde García, H.; González López, R.; Quintana Franco, L.M.; Torres Zambrano, G.M.; García-Arranz, M. Cell Therapy in the Treatment of Female Stress Urinary Incontinence: Current Status and Future Proposals. *Life* **2024**, *14*, 861. [[CrossRef](#)] [[PubMed](#)]
45. Gandhi, J.; Chen, A.; Dagur, G.; Suh, Y.; Smith, N.; Cali, B.; Khan, S.A. Genitourinary syndrome of menopause: An overview of clinical manifestations, pathophysiology, etiology, evaluation, and management. *Am. J. Obstet. Gynecol.* **2016**, *215*, 704–711. [[CrossRef](#)] [[PubMed](#)]
46. Feloney, M.P.; Stauss, K.; Leslie, S.W. Sacral Neuromodulation. In *StatPearls [Internet]*; Updated 18 April 2024; StatPearls Publishing: Treasure Island, FL, USA, 2026. Available online: <https://www.ncbi.nlm.nih.gov/books/NBK567751/> (accessed on 27 May 2026).
47. Borislavski, A.; Petca, A. Between Promise and Proof: Evaluating PRP's Role in Modern Gynecology. *Medicina* **2025**, *61*, 1514. [[CrossRef](#)] [[PubMed](#)]
48. Giarenis, I.; Tsiapakidou, S.; Zacche, M.; Mukhopadhyay, S.; Mahmood, T. European Board and College of Obstetrics and Gynaecology (EBCOG) position statement on the use of laser vaginal devices for treatment of genitourinary syndrome of menopause, vaginal laxity, pelvic organ prolapse and stress urinary incontinence. *Eur. J. Obstet. Gynecol. Reprod. Biol.* **2024**, *299*, 342–344. [[CrossRef](#)] [[PubMed](#)]
49. Ashton, L.; Nakatsuka, H.; Johnson, C.M.; Kenne, K.; Kreder, K.J.; Kruse, R.; Wendt, L.; Takacs, E.B.; Vollstedt, A.J. A single injection of platelet-rich plasma injection for the treatment of stress urinary incontinence in females: A randomized placebo-controlled trial. *Urology* **2024**, *193*, 63–68. [[CrossRef](#)] [[PubMed](#)]
50. Pitsillidi, A.; Vona, L.; Bettocchi, S.; Schiermeier, S.; Noé, G.K. PRP therapy for stress urinary incontinence and pelvic organ prolapse: A new frontier in personalized treatment? *J. Pers. Med.* **2025**, *15*, 214. [[CrossRef](#)] [[PubMed](#)]
51. Roman, M.P.; Ciortea, R.; Doumouchtsis, S.K.; Măluțan, A.M.; Bucuri, C.E.; Ormindean, C.M.; Suciu, V.E.; Nati, I.D.; Căilean, A.; Miha, D. Comparison of different treatment outcomes for refractory overactive bladder: A systematic review and meta-analysis. *Toxins* **2025**, *17*, 479. [[CrossRef](#)] [[PubMed](#)]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.