

Physical Examination and Office-based Assessment of Women with Urinary Incontinence and Pelvic Organ Prolapse

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ABSTRACT

Urinary incontinence with or without pelvic organ prolapse (POP) is a very common complaint in women; skillful assessment of pelvic floor disorders is increasingly needed. In this review, we use physical examination and office-based assessment to evaluate urinary incontinence and pelvic floor dysfunction in women. This practical, step-by-step program of focused examination includes detailed diagrams and guidelines for making clinical diagnoses during office visits. Sophisticated history-taking, a bladder diary, stress testing, postvoid residual (PVR) volume measurement, and POP-quantitative (POP-Q) system can all be very helpful for managing lower urinary tract symptoms (LUTS). This office-based evaluation can also help clinicians make better use of techniques for further investigation, such as multi-channel urodynamics. In addition to performing a standard gynecologic exam, clinicians should assess patients for evidence of POP. Lower urinary tract infection can cause urgency, frequency, and nocturia, mimicking urge incontinence or interstitial cystitis. Documentation of PVR volume with ultrasound bladder scanning is a prerequisite for incontinence or anterior/apical prolapse treatment procedures. PVR assessment offers essential information for interpreting postoperative voiding difficulty and allows clinicians to initiate immediate planning for management of the condition. *Keywords:* assessment, urinary incontinence, pelvic organ prolapse

INTRODUCTION

Urinary incontinence with or without pelvic organ prolapse (POP) is a very common complaint in gynecologic, urologic or family medicine practice. Prevalence rates vary considerably according to the definition and survey method used, as well as the population studied. Urinary incontinence is thought to affect 10% to 25% of women 15 to 64 years old, becoming more common with age [1]. A woman's lifetime risk of undergoing surgical treatment for prolapse or urinary incontinence is 11.1% by the age of 80 [2]. As the proportion of postmenopausal women increases over the next several decades, these medical needs will become even more prevalent [3]. Thus, to achieve better quality medical care, it is necessary to develop office-based skills for assessing pelvic floor disorders effectively.

The bladder, urethra and surrounding connective tissues comprise an integral unit. During the filling phase, the bladder is under low

pressure, acting as a compliant reservoir with urethral reflex closure pressure exceeding bladder pressure. During voiding, the urethra first relaxes, followed by detrusor contraction and a rise in bladder pressure [4]. The physiologic and pathologic behaviors of the bladder/urethral unit are listed in Table 1.

When assessing lower urinary tract dysfunction (LUTD), there may be disparities between symptoms and underlying pathophysiology [5]. This phenomenon is particularly evident with voiding symptoms in contrast to storage symptoms. While voiding disorders clearly affect principally men, this article focuses primarily on storage disorders, which are more common in women [5]. Clinical assessment and office investigation are important for women with lower urinary tract symptoms (LUTS), and meticulous assessment and evaluation are feasible for most gynecologists without specialized equipment. Detailed history-taking, bladder diaries, focused physical and pelvic examinations and simple office tests can together provide sufficient data to diagnose most diseases in an office environment. This step-by-step approach allows clinicians to immediately begin managing the condition even before referring patients for advanced investigation. It can also help clinicians decide whether sophisticated urodynamics are necessary for the patient.

TAKING A THOROUGH PATIENT HISTORY

It is easy to get a comprehensive pelvic floor history using a detailed questionnaire completed prior to a patient's initial office visit. Firstly, elicit the patient's main complaint, including its impact on her lifestyle. Secondly, describe other essential aspects of pelvic floor history, including symptoms, quantifying their duration, frequency, and severity. Third, ask about any previous treatment the patient has undergone. The Incontinence Impact Questionnaire (IIQ) and the Urogenital Distress Inventory (UDI) have been used to assess life impact and symptom distress, respectively, of urinary incontinence and related conditions. Short form versions are more useful than the long form versions for many clinical and research applications [6]. The IIQ-7 evaluates how urinary leakage and/or prolapse affects household chores, physical recreation, entertainment activities, traveling more than 30 minutes away from home, social activities, and emotional health. UDI-6 evaluates items that commonly bother patients, including frequent urination, leakage related to urgency, leakage related to activity such as coughing or sneezing, low volume leakage, difficulty emptying bladder, and pain or discomfort in the lower abdominal or genital area [6]. LUTS include storage, voiding and postmicturition symptoms, symptoms associated with sexual intercourse, pelvic organ prolapse, and genital and lower urinary tract (LUT) pain [7].

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Evaluate urinary continence

Storage-related symptoms range from increased daytime frequency, nocturia, and urgency to urinary incontinence, etc. Urinary incontinence means any involuntary leakage of urine. If a patient does not volunteer a history about urinary incontinence, she should be asked about it. Urinary leakage may need to be distinguished from sweating or vaginal discharge. Ask her to describe any incontinent episodes she has experienced, particularly the frequency and amount of urine lost.

- Stress urinary incontinence is involuntary leakage on effort or exertion, such as on sneezing or coughing.
- Urge urinary incontinence is involuntary leakage accompanied by or immediately preceded by urgency.
- Mixed urinary incontinence is involuntary leakage associated with urgency and exertion or effort, including sneezing or coughing.

The severity of incontinence can be crudely estimated by the type and quantity of pads or panty liners used. Evaluate the level of activity needed to provoke an incontinent episode: incontinence with positional changes between lying, sitting, and standing is more severe than occasional incontinence accompanying vigorous exercise. Many women experience mixed incontinence, meaning a combination of urinary incontinence due to stress and urge loss. Other storage symptoms of LUTS are listed using standardized terminology approved by the international continence society (ICS) 2002 in Table 2 [7].

Evaluate voiding dysfunction

Elicit any symptoms of voiding dysfunction, such as slowed stream, splitting or spraying, intermittent flow, hesitancy, straining, and terminal dribble. Post micturition symptoms are listed in Table 3, including a feeling of incomplete emptying, postvoiding dribbling and retention [7].

Evaluate symptoms associated with sexual intercourse

Don't overlook ramifications for sexual function, particularly symptoms of discomfort, pain, or incontinence associated with sexual activity. Dyspareunia, vaginal dryness, and incontinence are among the symptoms women may describe during or after intercourse. Patients should be encouraged to describe these symptoms as fully as possible. For example, it is helpful to identify urine leakage during penetration, intercourse, or at orgasm [7].

Evaluate symptoms of POP

Women who have a prolapse may describe symptoms including vaginal pressure, feeling a lump ("something coming down"), low backache, heaviness, dragging sensation, or the need to digitally replace the prolapse in order to defecate or micturate [7].

Evaluate bowel function

Questions about a patient's bowel function, such as frequency, consistency, and constipation should be included.

Table 1. Bladder-Urethra Unit Physiologic and Pathologic conditions

	Normal		Abnormal	
	Bladder	Urethra	Bladder	Urethra
Storage	Relaxed	Contracted	Overactive	Incompetent under stress or inappropriate relaxation
Voiding	Contracted	Relaxed	Underactive Acontractile	Functional or anatomic obstruction

Table 2. Standardized Terminology for Lower Urinary Tract (LUT) Storage Symptoms Approved by the ICS in 2002 [7]

Increased daytime frequency	the complaint that he/she voids too often by day. This term is equivalent to pollakisuria used in many countries
Nocturia	the complaint that the individual must wake one or more times at night to void
Urgency	the complaint of a sudden compelling desire to pass urine, which is difficult to defer
Urinary incontinence	the complaint of any involuntary leakage of urine
Stress urinary incontinence	the complaint of involuntary leakage on effort or exertion, or on sneezing or coughing
Urge urinary incontinence	the complaint of involuntary leakage accompanied by or immediately preceded by urgency
Mixed urinary incontinence	the complaint of involuntary leakage associated with urgency and also with exertion, effort, sneezing or coughing
Enuresis	any involuntary loss of urine. If it is used to denote incontinence during sleep, it should always be qualified with the adjective "nocturnal"
Nocturnal enuresis	the complaint of loss of urine occurring during sleep
Other types of urinary incontinence	may be situational, for example, incontinence during sexual intercourse or giggling

Table 3. Standardized Terminology for Lower Urinary Tract (LUT) Voiding Symptoms Approved by the ICS 2002 [7]

Slow stream	the perception of reduced urine flow, usually compared to previous performance or in comparison to others
Intermittency	the individual describes urine flow, which stops and starts, on one or more occasions, during micturition
Hesitancy	an individual describes difficulty in initiating micturition resulting in a delay in the onset of voiding after the individual is ready to pass urine
Straining to void	the muscular effort used to either initiate, maintain or improve the urinary stream
Terminal dribble	an individual describes a prolonged final part of micturition, when the flow has slowed to a trickle/dribble

- Ask about use of laxatives or anti-diarrheal medications, since these may not be included on her list of medications.
- Also inquire about "splinting"-the use of a finger pressing in the vagina or on the perineum during fecal evacuation-as this can be a sign of posterior prolapse or rectocele.
- Ask specifically about anal incontinence involving liquid, gas, or solid stool.

MEASURING THE FREQUENCY, SEVERITY AND IMPACT OF LUTS

After evaluating the subjective symptoms obtained from the patients' history, the next step is documenting objective information (signs), as listed in Table 4 [7].

- Urinary incontinence (a sign) is defined as urine leakage evident during examination: this may be urethral or extraurethral [7].
- Stress urinary incontinence is the observation of involuntary leakage from the urethra synchronous with exertion/effort, or sneezing or coughing, presumably due to raised abdominal pressure [2].

Bladder diaries and other recording of micturition events

Bladder diaries are an inexpensive way to obtain information about a woman's daily bladder function. The patient completes it over a 24-hour period, recording oral fluid intake, episodes of incontinence and associated activities, and voiding volumes and times [8]. The amount of fluid intake listed on voiding diaries is often surprising and can provide clues to treatment.

- Micturition time chart: this records only the time of micturition, day and night, for at least 24 hours.
- Frequency volume chart (FVC): this records the volumes voided as well as the time of each micturition, day and night, for at least 24 hours.
- Bladder diary: this records the times of micturition and voided volumes, incontinence episodes, pad usage and other information such as fluid intake, degree of urgency and degree of incontinence

[7].

The ICS defines adult polyuria as more than 2,800 mL of urine output in 24 hours [8]. Not uncommonly, patients experiencing polyuria may complain of urinary frequency, nocturia, and occasional stress incontinence. The bladder diary shows 24-hour fluid intake as high as 3,500 mL, with a similar amount of urinary output. The bladder diary alone reveals when the symptoms such as polyuria, frequency and nocturia are attributable to excessive fluid intake. The symptoms can then be relieved simply by fluid restriction and tea and/or coffee reduction.

The amount of urine leakage

Pad tests can be used to quantify the amount of urine lost during incontinence episodes. Methods range from a short provocative test to a 24-hour pad test [7]. Pad tests are widely used in patient-oriented research, as an objective way of assessing treatment effectiveness. They are performed on women with a full bladder, quantifying the volume of urine lost by weighing a perineal pad before and after specified activities [9]. Modified 20-minute pad testing has also been proposed with the infusion of 250 mL of water into the bladder. In quantitative studies, the two pad tests showed fair agreement, and the pad weight results for the 1-hour test revealed significantly larger amounts than the 20-minute pad test. The 20-minute pad test demonstrated greater sensitivity in women with stress urinary incontinence [10].

PHYSICAL EXMINATIONS

Abdominal examination

The bladder may be felt by abdominal palpation or by suprapubic percussion. Pressure suprapubically or during bimanual vaginal examination may also induce the desire to pass urine [7].

Perineal/vaginal inspection

Perineal and vaginal inspection allow for description of the skin, e.g. atrophy or excoriation, abnormal anatomical features and obser-

Table 4. Standardized Terminology for Signs Suggestive of Lower Urinary Tract Dysfunction (LUTD) as Approved by the ICS in 2002 [7]

Urinary incontinence	urine leakage seen during examination: this may be urethral or extraurethral
Stress urinary incontinence	the observation of involuntary leakage from the urethra, synchronous with exertion/effort, or sneezing or coughing. It is presumed to be due to raised abdominal pressure
Extra-urethral incontinence	observation of urine leakage through channels other than the urethra
Uncategorized incontinence	observation of involuntary leakage that cannot be classified into one of the above categories on the basis of signs and symptoms

Table 5. Recent Revisions to ICS 2002 Terminology Recommendations [5,8]

Previous term	New term
Genuine stress incontinence	Urodynamic stress incontinence
Incontinence related to urethral instability*	Urethral relaxation incontinence
Incontinence related to involuntary detrusor contraction*	Detrusor overactivity incontinence
Detrusor instability	Idiopathic detrusor overactivity
Detrusor hyper-reflexia	Neurogenic detrusor overactivity
Early sensation of bladder filling during filling cystometry*	Increased bladder sensation
Diminished sensation of bladder filling during filling cystometry*	Reduced bladder sensation
No sensation of bladder filling during filling cystometry*	Absent bladder sensation

*No prior defined term

vation of incontinence [7]. Stress tests are a simple method to document the extent of stress incontinence before any anti-incontinence procedure is considered.

- Stress test: ask the patient to come to her office visit with a full bladder, as if she had an ultrasound appointment. At the start of the physical exam, perform the stress test with the patient in a standing (or squatting) position. The full bladder and standing position mimic the real daily life circumstances of incontinence episodes, and can reduce false-negative results.

First, have the patient stand with one foot on the step of the examination table. Then, sit on a stool and separate the labia with one hand, so that the urethral meatus is visible. Have the patient cough forcefully several times while you observe the meatus for loss of urine. A spurt of urine coincident with the cough is a positive result. If the patient has a significant amount of prolapse, i.e. stage III or IV, repeat the stress test with the prolapse replaced to eliminate the effect of any urethral kinking and to detect occult urinary incontinence. The prolapse can be reduced using a pessary or the posterior blade of a speculum. After the stress test, have the patient void into a measuring device to record the volume.

Uroflowmetry and Postvoid residual volume (PVR)

Uroflowmetry is noninvasive determination of urine flow characteristics. It reflects the final result of the act of voiding. The PVR amount enables the clinician to determine the bladder's ability to empty. Patients with abnormal uroflowmetry or much PVR require more detailed evaluation to further elucidate the cause of voiding dysfunction.

A patient who undergoes uroflowmetry should be well hydrated with a reasonably full bladder. The patient should be encouraged to void in as normal a fashion as possible. After measuring urine flow, physicians can measure residual urine either by urinary catheterization or ultrasound. When using ultrasound, perform transabdominal imaging in the transverse and mid-sagittal planes. The bladder's diameter in 3 planes (anterior-posterior, transverse, and sagittal/longitudinal), approximate the bladder volume [11].

- Formula: Volume (mL) = $\frac{4}{3} \pi \times \text{height (cm)} \times \text{length (cm)} \times \text{width (cm)}$
(If no bladder dimension is greater than 5 cm, the PVR must be less than 65 mL)

The documentation of PVR is a prerequisite for any incontinence or anterior/apical prolapse procedure; the clinician will also need this information to interpret any postoperative voiding difficulties and to counsel patients at increased risk of such difficulties.

Evaluate pelvic floor tone

This portion of the examination assesses the strength of the pelvic-floor musculature. Place 1 or 2 fingers in the vagina and instruct the patient to contract her pelvic floor muscles (i.e., the levator ani muscles). Then gauge her ability to contract these muscles, as well as the strength, symmetry, and duration of the contraction. Pelvic floor muscle function can be semi-quantitatively defined by the tone at rest and the strength of a voluntary or reflex contraction according to a validated grading system (e.g. Oxford 1-5, with 0 = no contraction, 1 = flicker, 2 = weak, 3 = moderate, 4 = good, 5 = strong) [12]. Pelvic muscle contraction may be assessed by visual inspection, palpation, electromyography or perineometry. Factors to be assessed include strength, duration, displacement, and repeatability [7].

Rectal examination

Rectal examination allows description of observed and palpable anatomical abnormalities in the anal sphincters. It is the easiest method of assessing pelvic floor muscle function in children and men. In addition, in children with urinary incontinence, rectal examination is essential to rule out fecal impaction [7].

- Pelvic floor muscle function can be qualitatively defined during rectal examination by the tone at rest and the strength of a voluntary contraction, whether strong, weak or absent.

Women with an external anal sphincter defect may lack the normal stellate pattern around the anus anteriorly because of an absence of contractile tissue. A rectal exam should be performed at rest and with voluntary squeezing of the anal sphincter to assess resting tone and squeeze strength of the muscle complex. In addition, the bulk of this complex can be palpated to determine whether a structural defect is present (usually found anteriorly).

Neurologic examination

Although it is unlikely that significant neurologic disease contributes to the patient's pelvic floor dysfunction, the ramifications of any disease can be substantial. Thus, perform a focused neurological exam to evaluate mental status, lower-extremity and perineal sensation and reflexes. The two relevant spinal cord reflexes are the bulbo-cavernosus and the anal wink [13]. Interpret these tests with caution, however, since an anal wink may be absent in some women who are otherwise neurologically normal [14].

ASSESSING URETHRAL HYPERMOBILITY AND POP

Assess urethral hypermobility

In women with stress urinary incontinence, it is important to determine whether urethral hypermobility is present, since this finding may influence surgical management. Although a midurethral sling, e.g. tension-free vaginal tape, can be used for both urethral hypermobility and internal sphincter deficiency, patients with urethral hypermobility have a different success rate compared with those suffering from internal sphincter deficiency [15,16].

- Q-tip test: Measure mobility by placing a lubricated sterile cotton swab within the urethra so that the tip of the swab is at the urethrovesical junction. Lubrication with xylocaine gel may reduce discomfort. Measure the angle between the swab and the horizontal plane with a goniometer, both while the patient is not straining and while the patient is straining at maximum. Urethral hypermobility exists if the angle is more than 30°, either at rest or with straining [17].

A hypermobile urethra is thought to correlate with decreased support of the urethra and the urethrovesical junction, which have been implicated in the development of stress incontinence [18]. Many surgical interventions for stress incontinence are designed to increase support to this area. In 1996, the American College of Obstetricians and Gynecologists (ACOG) published surgery guidelines for genuine stress incontinence (revised term USI) due to urethral hypermobility in patients without a history of previous anti-incontinence surgery [19]. The office evaluation of pelvic floor disorders outlined in this article meets the ACOG criteria.

Indications for surgery for USI with hypermobile urethra

These criteria include:

- History and demonstration of stress urinary incontinence
- Absence of transient causes of urinary incontinence
- No significant urge
- Normal PVR volume
- Normal voiding habits
- Absence of pregnancy
- Absence of neurologic findings or history
- Counseling the patient about other conservative therapy

Quantitative evaluation of POP examination

POP is defined as the descent of one or more of the anterior vaginal wall, the posterior vaginal wall, and the apex of the vagina (cervix/ uterus in the presence of uterus or vault/ cuff after hysterectomy). Absence of prolapse is defined as stage 0 support; prolapses can range in severity from stage I to stage IV [7]. POP may occur in association with urinary incontinence and other lower urinary tract dysfunctions and may, on occasion, mask incontinence [7].

- Anterior vaginal wall prolapse is defined as descent of the anterior vagina so that the urethrovesical junction (a point 3 cm proximal to the external urinary meatus) or any anterior point proximal to it is less than 3 cm above the plane of the hymen.
- Prolapse of the apical segment of the vagina is defined as any descent of the cervix or vaginal cuff scar (after hysterectomy) below a point 2 cm less than the total vaginal length above the plane of the hymen.
- Posterior vaginal wall prolapse is defined as any descent of the posterior vaginal wall so that a midline point on the posterior vaginal wall 3 cm above the level of the hymen or any posterior point proximal to it is less than 3 cm above the plane of the hymen.

Pelvic organ prolapse quantitative (POP-Q) system:

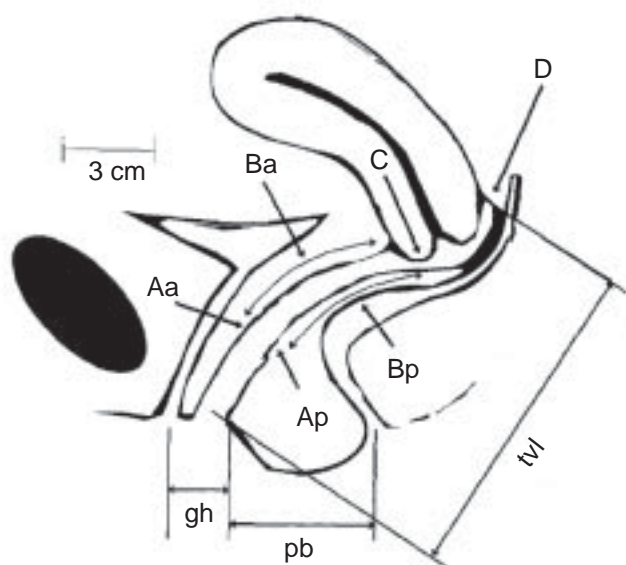
In addition to the standard gynecologic examination, patients com-

plaining of or presenting with prolapse should undergo objective measurement using the POP-Q system. In 1996, the ICS published standardized terminology that has since been adopted by most specialty organizations [20]. The POP-Q system describes the location and severity of prolapse by measuring segments of the vaginal wall and external genitalia, rather than the terms cystocele, rectocele, and enterocele. While the patient is straining, six specific sites are evaluated. Each site is measured (in centimeters) in relation to the hymenal ring, a fixed, easily identified anatomic landmark. The hymenal ring is thus the zero point of reference. If a site is above the hymen, it is assigned a negative number; if it prolapses below the hymen, the measurement is positive. Use a Sims speculum or the posterior blade of a bivalve speculum to isolate the different vaginal compartments. In women with stress urinary incontinence, it is important to determine whether urethral hypermobility is present.

The 6 POP-Q sites

The 6 POP-Q sites are illustrated in Fig. 1A [20]

- Aa: The point in the midline of the anterior vaginal wall 3 cm proximal to the urethral meatus, corresponding to the urethrovesical junction. By definition, the range of position Aa is -3 to +3.
- Ba: On the anterior vaginal wall, the most dependent position between point Aa and the vaginal cuff or anterior vaginal fornix.
- C: Cervix or vaginal cuff (posthysterectomy).
- D: Posterior fornix corresponding to the pouch of Douglas (this point is omitted in the absence of a cervix).
- Ap: The point in the midline of the posterior vaginal wall 3 cm proximal to the hymenal ring. By definition, the range of position Ap is -3 to +3.
- Bp: On the posterior vaginal wall, the most dependent position between Ap and the vaginal cuff or posterior fornix.
- GH: The genital hiatus is measured from the midportion of the urethral meatus to the posterior margin of the genital hiatus.
- PB: The perineal body is measured from the posterior margin of the



anterior wall	anterior wall	cervix or cuff
Aa	Ba	C
genital hiatus	perineal body	total vaginal length
gh	pb	tvL
posterior wall	posterior wall	posterior fornix
Ap	Bp	D

Fig 1. (A) Six sites (points Aa, Ba, C, D, Bp and Ap), genital hiatus (gh), perineal body (pd) and total vaginal length (tvL) used for pelvic organ support quantification. (B) Three-by-three grid for recording quantitative description of pelvic organ support (Reproduced from reference [20] under the permission of Elsevier Com).

genital hiatus to the midportion of the anus.

- TVL: Total vaginal length is the greatest depth of the vagina.

GH and PB are measured while the patient is straining, TVL is measured while not straining.

Staging each compartment

When all nine measurements have been taken, a stage can be assigned to each compartment: anterior, apex (uterine or vault), and posterior (Fig. 1B) [19]. The stages are:

- Stage 0: No prolapse demonstrated. Points Aa, Ap, Ba, and Bp are all at -3 cm and either point C or point D is within 2 cm of TVL.
- Stage 1: The most distal portion of the prolapse is 1 cm above the level of the hymen (above -1).
- Stage II: The most distal portion of the prolapse is 1 cm proximal to or distal to the hymen.
- Stage III: The most distal portion of the prolapse is 1 cm below the hymen but protrudes no further than 2 cm less than the total vaginal length.
- Stage IV: Complete eversion is present.

Most parous women are stage I, II, or III. As stage II falls between -1 and +1, it follows that stage I is above this and stage III is below.

LABORATORY STUDIES

Initial laboratory studies should include a urine dipstick analysis and possible culture to evaluate for infection or hematuria. A LUT infection can produce symptoms of urgency, frequency, and nocturia, mimicking urge incontinence or interstitial cystitis. Hematuria may herald a more worrisome but rare condition such as transitional cell bladder cancer.

INDICATIONS FOR URODYNAMIC STUDY

Although the basic office evaluation outlined here provides adequate information to properly treat most women with urinary incontinence, further evaluation is appropriate in some cases. A thorough discussion of urodynamics is beyond the scope of this article, but it is important to understand when a patient may require additional investigations. Recent revisions of the ICS terminology recommendations are listed in Table 5 [5,8]. Further evaluation may involve simple or multichannel urodynamics, cystoscopy, and various forms of urinary tract imaging. However, such tests are clearly not necessary for all patients. Multichannel urodynamics after office-based assessment is recommended in the following situation [9]: if:

- The patient is still left with an uncertain diagnosis (for example, as a result of major discrepancies between the history, the voiding diary, and symptom scales).
- surgery is under consideration.
- the patient has hematuria in the absence of an infection.
- there is an elevated PVR.
- there is a neurological condition that may complicate treatment (such as multiple sclerosis).
- in the presence of marked POP.
- when there have been numerous prior surgical attempts at correction.

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