

# Clinical Approach and Office Evaluation of the Patient with Pelvic Floor Dysfunction

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## KEYWORDS

- Pelvic floor disorders • Pelvic organ prolapse
- Urinary incontinence • Anal incontinence
- Pelvic organ quantification system

## PATIENT HISTORY

Pelvic floor disorders are common and have been estimated to affect 24% to 37% of community-dwelling women in the United States.<sup>1,2</sup> Pelvic floor disorders are generally not life-threatening, but they can greatly impair physical functioning, emotional well-being, and quality of life. In addition, women with advanced pelvic organ prolapse (POP) have been shown to have decreased body image.<sup>3</sup> Pelvic floor dysfunction is a major health issue for women, as shown by the 11% lifetime risk of undergoing surgery for prolapse or urinary incontinence.<sup>4</sup>

Traditionally, the goal of treatment has been to restore normal pelvic anatomy. However, restoration of normal anatomy does not necessarily result in return to normal function of the pelvic organs. This problem has led to a symptom-based approach for the evaluation and treatment of pelvic floor dysfunction. During the office evaluation, it is therefore important to focus the history on the patient's specific symptoms and to what degree these symptoms affect quality of life. In addition to clinical history taking, the presence, severity, and impact of pelvic floor disorders and symptoms can be assessed via validated questionnaires. Standardized questionnaires are useful when reproducible assessment is needed at baseline and after treatment. For certain conditions, such as anal incontinence and sexual function, questionnaires may be especially helpful to clinically evaluate symptoms.<sup>5</sup> Several validated questionnaires are

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available for women with pelvic floor disorders, and a limited number have been translated to, and validated in, Spanish. Short forms have also been created and validated.

Although this article artificially divides symptoms of pelvic floor disorders into areas of POP, urinary dysfunction, anal incontinence, sexual dysfunction, and pelvic pain, many of these disorders are often present simultaneously in the same person.

### ***Symptoms of POP***

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Symptomatic POP is the least common of the pelvic floor disorders, with an estimated prevalence of 2.9% to 6.0%.<sup>1,2</sup> However, patients with POP can be symptomatic or asymptomatic. Two of the most common symptoms associated with prolapse are seeing or feeling a vaginal bulge, or the sensation of vaginal bulging or protrusion.<sup>6,7</sup> Other symptoms that patients with POP may report include the inability to wear a tampon, feelings of sitting on a weight, or a bulge rubbing on their underwear.

Patients with POP often have concurrent urinary symptoms, including stress urinary incontinence, urge urinary incontinence, frequency, urgency, urinary retention, or voiding dysfunction. Although these conditions may be caused or exacerbated by prolapse, this cannot be assumed. Urodynamic testing should be performed if surgical correction is planned. In women with advanced prolapse, stress urinary incontinence can be masked by kinking an incompetent urethra, called latent, potential, or occult stress incontinence. Urethral kinking can also progress to urethral obstruction manifested by symptoms of urinary hesitancy, incomplete bladder emptying, or inability to void. The patient may have to push on the lower abdomen (Crede maneuver) to empty her bladder, or may need to manually reduce the vaginal bulge to void (splinting).

Defecatory dysfunction is often present in women with POP, and can manifest itself as straining at stool, incomplete evacuation, splinting of the posterior vaginal wall, digitation of the rectum during bowel movement, or fecal incontinence.<sup>8,9</sup> Although these symptoms can occur in association with posterior vaginal wall prolapse, replacement of the prolapse by surgical correction or with a pessary does not consistently cure the symptoms, and may worsen them.<sup>10–13</sup> For example, constipation has multiple causes besides POP. Therefore, a complete evaluation of other causes in addition to prolapse should be performed if the patient's primary symptom is defecatory dysfunction.

Anecdotal evidence suggests that many patients with POP have pelvic and low back pain. However, a cross-sectional study of 152 consecutive patients with POP did not find an association with pelvic and low back pain after controlling for age and prior surgery.<sup>14</sup> It is possible that the pelvic and low back pain is not due to the bulge itself, but due to altered body mechanics that result from the prolapse. Temporary pessary placement can be beneficial to determine whether certain symptoms can be attributed to the prolapse.

### ***Urinary Dysfunction***

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Urinary incontinence is a common symptom of pelvic floor dysfunction and has a considerable negative impact on the health-related quality of life of women.<sup>15</sup> Depending on the definitions used, the prevalence of urinary incontinence, based on population studies, ranges from 15% to 28%.<sup>1,2,16</sup> Approximately half of patients have symptoms of mixed incontinence, 15% to 33% have symptoms of stress incontinence, and 13% have symptoms of urge incontinence.<sup>2,16</sup> Although history alone is a poor predictor of the type of urinary incontinence,<sup>17–19</sup> it is important to elicit the duration, frequency, severity, and aggravating factors. Urine loss due to elevated intra-abdominal pressure (cough, sneeze, laugh, exercise) is suggestive of stress

incontinence, whereas urine leakage preceded by a strong urge to urinate (and leaking before reaching the toilet) suggests urge incontinence. Urinary frequency during the day and at night (nocturia), bed-wetting (nocturnal enuresis), and leakage associated with orgasm are associated with detrusor overactivity. To screen for urinary tract infections and cancer, one should also ask the patient about symptoms of dysuria, hematuria, and a history of previous bladder and kidney infections. Symptoms of urinary hesitancy, straining, slow urinary stream, postvoid dribble, and incomplete bladder emptying suggest voiding dysfunction. In a retrospective case-control study of 1399 women, the absence of stress incontinence symptoms, symptoms of a vaginal bulge, pelvic pressure, urinary splinting, and the presence of prolapse at or beyond the hymen were shown to be associated with elevated postvoid residual (PVR) urine (PVR  $\geq$  100 mL).<sup>20</sup>

Questions regarding the frequency and amount of urine loss, and the need to change underwear or use pads, suggest increased urinary severity. However, a more reliable method to determine incontinence severity is with a urinary voiding diary. The patient is given a urinary collection bowl or hat and a diary, and is asked to record the volume and frequency of all fluid intake and urine output during the day and night for 1 to 7 days. A 3-day diary has been shown to be equivalent to a 7-day diary for documenting frequency and nocturia.<sup>21</sup> Any episodes of urinary incontinence, and associated events and symptoms (urgency, coughing, sleeping, exercise, and so forth), are recorded. The maximum voided volume can be used to estimate the bladder capacity. The diary is then reviewed by the physician and patient, and changes in the amount or type of fluid intake, or voiding frequency, can be made to improve symptoms. The voiding diary can also be used to monitor the success of treatment, and it can be used as an educational tool to modify patient behavior.

### ***Anal Incontinence***

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Anal incontinence, or the leakage of gas, liquid, or solid stool, is common in women, with a reported prevalence of 25%.<sup>2</sup> If leakage of flatus is excluded, the prevalence of fecal incontinence in population-based studies ranges from 7.2% to 9.0%.<sup>1,22</sup> The cause of fecal incontinence is multifactorial, and includes injury to the anal sphincter complex or its innervation. Other causes include diarrhea, fecal impaction, rectal prolapse, and perineal descent. To evaluate the severity of symptoms, the patient should be asked about the frequency and amount of fecal soilage (fecal staining vs larger amounts), stool consistency, and whether the incontinence occurs with liquid or solid stool. The patient should be questioned about obstetric trauma and difficult delivery, which could suggest anal sphincter injury or pudendal neuropathy. Prior anorectal surgery and chronic constipation may also be contributory factors.

### ***Sexual Dysfunction***

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Female sexual dysfunction is a condition that describes patients with low libido, problems with sexual arousal, inability to achieve orgasm, and dyspareunia. Although not consistent, studies have found that sexual complaints are common in women with pelvic floor disorders.<sup>23–25</sup> In a community-based study of 4106 women, 86% of women with a partner were sexually active. Women with pelvic floor disorders were less likely to be sexually active, and had lower mean satisfaction scores, than unaffected women. However, after regression analysis, sexual activity and satisfaction were independent of pelvic floor disorders.<sup>25</sup> In contrast, in a cross-sectional study of 301 women seeking outpatient gynecologic and urogynecologic care, pelvic floor symptoms were significantly associated with reduced sexual arousal, infrequent orgasm, and dyspareunia.<sup>26</sup> In this study, sexual dysfunction was worse in women

with symptomatic prolapse than in those with asymptomatic prolapse. Women with advanced POP have also been shown to have decreased body image, which may have an effect on sexual function. Because some prolapse procedures, such as posterior repair with levator plication, are believed to contribute to postoperative dyspareunia, care should be taken in planning appropriate surgical procedures for patients with concomitant sexual dysfunction.

### ***Pelvic Pain***

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Historically, POP has been believed to cause pelvic and low back pain; however, this has not been confirmed in research studies.<sup>14</sup> A careful history and physical examination should be performed to evaluate the patient for gynecologic and nongynecologic causes of pelvic pain. Pelvic floor spasm (levator ani spasm, pelvic floor tension myalgia, pelvic floor hypertonia) is a chronic pain condition due to increased tone and tenderness of 1 or several muscles of the pelvic floor (see other articles in this issue). Common symptoms of women with pelvic floor spasm includes low back pain, a heavy feeling in the pelvis, leg pain, pain with defecation, constipation, coccyx pain, and dyspareunia.<sup>27</sup> The pain is generally worsened with activity, prolonged standing and sitting, and stress, and is improved with heat, relaxation, sedatives, and muscle relaxants.<sup>28</sup>

## **PHYSICAL EXAMINATION**

### ***General Examination***

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All women should have an annual well-woman examination including cancer screening. Important components of the general examination include an assessment of mental and functional status; body mass index and nutritional status; mobility and manual dexterity; abdominal and pelvic masses; and abdominal, inguinal, and femoral hernias. A urine dip or urinalysis is recommended to exclude urinary tract infection, hematuria, or glucosuria.

### ***Neurologic Evaluation***

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Although the prevalence of neurologic disease causing urinary and fecal incontinence is low, not identifying these conditions can have considerable consequences to patients. Therefore, a screening neurologic examination should be performed on all patients. This examination should include an evaluation of mental status, sensory and motor function, and reflexes of the lower extremities and lumbosacral spinal cord.

Mental status is evaluated by determining the patient's level of consciousness, orientation, memory, speech, and understanding. A Mini Mental State Examination (MMSE) can be performed in 5 to 10 minutes to screen for cognitive impairment.<sup>29</sup> The MMSE consists of 11 questions that test 5 areas of function: orientation, registration, attention and calculation, recall, and language. The maximum score is 30, and a score of 23 or lower indicates cognitive impairment. Delirium, dementia, brain tumors, and strokes are disorders that may present with altered mental status and changes in bladder or bowel functions.

Sensory function is evaluated by testing the integrity of the lumbosacral dermatomes for the ability to discriminate between light touch, pin prick, and cold sensation. A Q-tip can be broken in half and the soft end used to assess light touch the sharp end is used to assess pin prick. Cold sensation can be assessed by using an alcohol swab. The sensory dermatomes should include the perineal and perianal skin (S2–S4). Other dermatomes of interest include mons pubis and upper labia majora (L1–L2), front of the knees (L3–L4) and the lateral part of the foot (S1).<sup>30</sup> A sensory deficit in a specific

dermatome distribution is consistent with peripheral neuropathy. Numbness and paresthesias in a dermatome distribution can distinguish between central and peripheral neuropathies. However, there can be significant overlap between dermatomes.

Motor function of the lumbosacral cord is assessed by evaluating the strength of the lower extremities. The patient is asked to perform flexion (L2–L3) and extension (L5–S1) of the hip, flexion (L5–S1) and extension (L3–L4) of the knee, dorsiflexion (L4–L5) and plantar flexion (S1–S2) of the ankle, and inversion (L4–L5) and eversion (L5–S1) of the ankle. Motor function is graded from 0 to 5, as noted in **Table 1**.<sup>30</sup> The strength and tone of the levator ani muscles are assessed by palpating the vaginal wall at 5 and 7 o'clock, approximately 2 to 4 cm cephalad to the hymen. The patient is asked to squeeze her vaginal muscles as though she were holding gas or stopping urine flow. The strength of the levator ani muscles can be graded using the Modified Oxford Scale, as noted in **Table 2**.<sup>31</sup> The levator ani muscles should also be assessed for tenderness to palpation or spasm. If tenderness is assessed during palpation, the patient should be asked whether palpation reproduces any pain that the patient experiences in real life. Sensation of the bladder and rectum can be evaluated with cystometry and anal manometry.

The integrity of the pudendal nerve can be evaluated with the anal reflex (anal wink) and the bulbocavernosus reflex. The anal reflex is performed by gently stroking the perianal skin, which causes a reflex contraction of the external anal sphincter. In the bulbocavernosus reflex, the bulbocavernosus and ischiocavernosus muscles contract in response to tapping or squeezing the clitoris. Although absence of these reflexes can result from damage to the sacral cord or pudendal nerve, in 10% of neurologically intact patients, the response is too weak to visualize.<sup>32</sup> Deep tendon reflexes (L2–L4) can be helpful in distinguishing lesions above or below T12. Hyperreflexia of the deep tendon reflexes indicate an upper motor lesion, whereas diminished or absent reflexes indicate a lower motor lesion. Clinically, patients with cauda equina lesions or peripheral neuropathy demonstrate decreased bladder contractility with urinary retention and voiding difficulty.

### **Pelvic Examination**

The goal of the pelvic examination is to objectively assess the anatomy of the pelvic floor and pelvic organs, and to attempt to correlate symptoms with anatomic findings. The severity of prolapse, the degree of pelvic floor support, and the integrity of the connective tissue of the vaginal wall is determined. The examination is performed in the dorsal lithotomy position, with the patient in stirrups. If physical findings do not

<b>Grade</b>	<b>Description</b>
0/5	No muscle movement
1/5	Muscle movement without joint motion
2/5	Movement with gravity eliminated
3/5	Movement against gravity but not against resistance
4/5	Movement against gravity and light resistance
5/5	Normal strength

*Modified from* LeBlond, RF, Brown D, DeGowin R. et al. DeGowin's diagnostic examination. 9th edition. USA: McGraw-Hill Co., Inc.; 2009; with permission.

<b>Grade</b>	<b>Description</b>
0/5	No discernible pelvic floor muscle contraction
1/5	A flicker or pulsing under the examining finger; a weak contraction
2/5	A weak contraction; an increase in tension in the muscle without any discernible lift or squeeze
3/5	A moderate contraction; characterized by a degree of lifting of the posterior vaginal wall and squeezing on the base of the finger with in-drawing of the perineum. A grade 3 or higher contraction is generally discernible on visual perineal inspection
4/5	A good pelvic floor muscle contraction producing elevation of the posterior vaginal wall against resistance and in-drawing of the perineum. If 2 fingers (index and middle) are placed laterally or vertically in the vagina and separated, a grade 4 contraction can squeeze them together against resistance
5/5	A strong contraction of the pelvic floor muscle; strong resistance can be given against elevation of the posterior vaginal wall and approximation of the index and middle fingers as for grade 4/5

*Modified from* Haslam J, Laycock J. Therapeutic management of incontinence and pelvic pain. 2nd edition. London: Springer-Verlag; 2008; with permission.

correlate with symptoms while the patient is performing maximal valsalva, the patient can be examined in the standing position. However, studies have shown there is no difference in severity of prolapse in the lithotomy or standing position,<sup>33</sup> or if the patient is examined in the morning or afternoon.<sup>34</sup> First, the external genitalia are inspected for lesions or rashes. Pads and urine can cause a contact dermatitis or maceration of the skin of the labia majora and vulva. The labia are separated to expose the vestibule and hymen. The anterior vaginal wall and urethra are inspected and palpated. Urethral discharge, tenderness, or masses may indicate a urethral diverticulum, vaginal cyst, carcinoma, or inflammatory condition of the urethra. The patient is asked to cough or valsalva to evaluate for stress urinary incontinence. A Q-tip test (see section on Urethral Mobility) may be performed if the patient has symptoms of stress urinary incontinence. The vaginal epithelium is inspected for atrophy, and the integrity of the perineal body is assessed.

To perform the prolapse evaluation, the patient is asked to valsalva, and the maximal extent of the prolapse is noted (**Fig. 1**). The support of the apex can be evaluated by using a bivalve speculum. The movement of the cervix or vaginal cuff is noted while gradually removing an open bivalve speculum. The support of the anterior and posterior vaginal wall is assessed with a Sim speculum or the posterior blade of a bivalve speculum. The speculum is used to support the apex and posterior vaginal wall while the maximum descent and support defects of the anterior vaginal wall are assessed (**Fig. 2**). Similarly the posterior vaginal wall is evaluated while the apex and anterior vaginal wall is supported (**Fig. 3**).

### **Staging of POP**

Two main classification systems are used to quantify the severity of prolapse. The Halfway System for Grading Pelvic Relaxations was developed by Baden and Walker in the late 1960s and modified in 1992.<sup>35</sup> This system is simple to use and was widely used for years by gynecologic surgeons. The most dependent portion of the pelvic organs (urethra, bladder, uterus, cul-de-sac, and rectum) during maximum straining



**Fig. 1.** Maximum extent of vaginal prolapse is seen without the use of a speculum.

or standing is graded as normal, first, second, or third degree (**Table 3**). Although the Halfway System for Grading Pelvic Relaxations quantifies specific sites of prolapse, it is only an estimation of descent relative to the hymen.

The Pelvic Organ Prolapse Quantification System (POPQ) was drafted by a subcommittee of the International Continence Society (ICS) in 1993 to more accurately quantify pelvic support findings. The POPQ was approved by the ICS in 1995, and by the American Urogynecologic Society (AUGS) and the Society of Gynecologic Surgeons (SGS) in 1996.<sup>36</sup> It has been shown to be a highly reproducible examination with



**Fig. 2.** Evaluation of anterior vaginal wall prolapse using a single-blade speculum to support the posterior vaginal wall and apex.



**Fig. 3.** Evaluation of posterior vaginal wall prolapse using a single-blade speculum to support the anterior vaginal wall and apex.

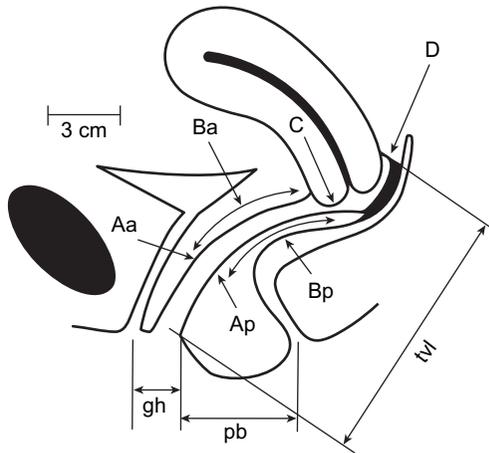
good intra- and interrater reliability.<sup>37</sup> The POPQ system measures 6 sites (2 on the anterior vaginal wall, 2 on the superior vaginal wall, and 2 on the posterior vaginal wall) in relation to a fixed anatomic landmark, the hymen (**Fig. 4**). The position of the 6 sites is measured in centimeters proximal (negative number) or distal (positive number) to the hymen (defined as zero).

The 2 anterior vaginal wall points are point Aa and point Ba (see **Fig. 4**). Point Aa is a fixed point located in the midline of the anterior vaginal wall 3 cm proximal to the external urethral meatus corresponding to the urethrovesical crease. By definition, the range of position of point Aa relative to the hymen is  $-3$  to  $+3$  cm. Point Ba represents the most distal or dependent portion of any part of the anterior vaginal wall from the vaginal cuff or anterior vaginal fornix to point Aa. By definition, point Ba is at  $-3$  cm in the absence of prolapse, and would have a positive value equal to the position of the cuff in women with total posthysterectomy vaginal eversion. The term “anterior vaginal wall prolapse” is preferred to “cystocele” or “anterior

**Table 3**  
Baden Walker Halfway System for grading pelvic relaxations

Grade	Description. Urethrocele, Cystocele, Uterine Prolapse, Culdocele, or Rectocele: Patient Strains Firmly. Grade Posterior Urethral Descent, lowest Part other Sites
0	Normal position for each respective site
1	Descent halfway to the hymen
2	Descent to the hymen
3	Descent halfway past the hymen
4	Maximum possible descent for each site

*Modified from* Baden W, Walker T. Surgical repair of vaginal defects. Philadelphia: JB Lippincott; 1992. p. 14; with permission.



**Fig. 4.** Six sites (Aa, Ba, C, D, Bp, Ap), genital hiatus (gh), perineal body (pb), and total vaginal length (tvl) used for pelvic organ support quantification. (From Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10–17; redrawn with permission.)

enterocele” because the only structure directly visible to the examiner is the surface of the vagina. Likewise, “posterior vaginal wall prolapse” is preferred to “rectocele” or “enterocele” unless the organs involved are identified by ancillary test.<sup>36</sup>

The 2 superior vaginal points are points C and D (see **Fig. 4**). These points represent the most proximal locations of the normally positioned lower reproductive genital tract. Point C represents the most distal or dependent edge of the cervix or the leading edge of the vaginal cuff (hysterectomy scar) after total hysterectomy. Point D represents the location of the posterior fornix or pouch of Douglas in a woman who still has a cervix. Point D represents the level of the uterosacral ligament attachment to the proximal posterior cervix. It is included as a point of measurement to differentiate suspensory failure of the uterosacral ligament complex from cervical elongation. When the location of point C is significantly more positive than the location of point D, it suggests cervical elongation. Point D is omitted in the absence of a cervix.<sup>36</sup>

Two points are located on the posterior vaginal wall: point Ap and Bp (see **Fig. 4**). Point Ap is a fixed point located in the midline of the posterior vaginal wall 3 cm proximal to the hymen. By definition, the range of position of point Ap relative to the hymen is –3 to +3 cm. Point Bp represents the most distal or dependent portion of any part of the upper posterior vaginal wall from the vaginal cuff or posterior vaginal fornix to point Ap. By definition, point Bp is at –3 cm in the absence of prolapse, and would have a positive value equal to the position of the cuff in a woman with total posthysterectomy vaginal eversion.<sup>36</sup>

Other landmarks and measurements of the POPQ include the genital hiatus (gh), perineal body (pb) and total vaginal length (tvl) (see **Fig. 4**). The genital hiatus is measured from the middle of the external urethral meatus to the posterior midline of the hymen. The perineal body is measured from the posterior midline of the hymen to the midanal opening. The total vaginal length is the greatest depth of the vagina in centimeters when points C and D are reduced to normal position. In general, all measurements except for total vaginal length are obtained with the patient performing a maximal valsalva. Measurements can be recorded as a simple line of numbers

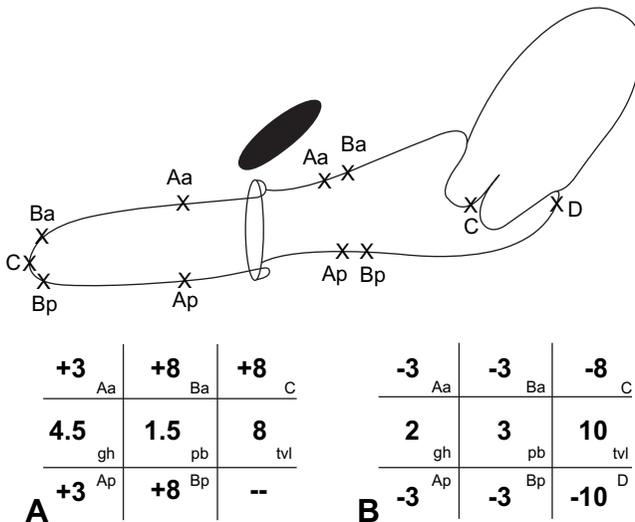
(eg, -3, -3, -7, -9, -3, -3, 9, 2, 2 for points As, Ba, C, D, Bp, Ap, tvl, gh, and pb respectively). As an alternative, a 3-by-3 grid can be used to concisely organize the measurements (**Fig. 5**), or a line diagram can be drawn of the configuration (**Figs. 6** and **7**). Stages are assigned according to the most severe position of the prolapse when the full extent of the protrusion has been demonstrated. The 5 stages of the POPQ examination are described in **Table 4**.<sup>36</sup>

### **Site-Specific Defect Analysis of the Vagina**

Although the POPQ quantifies the degree of vaginal support, it does not identify specific anatomic defects that can be addressed with surgical intervention. Anterior vaginal wall defects include midline, paravaginal, and transverse defects. These defects can be assessed using ringed forceps to support aspects of the anterior vaginal wall while the posterior wall is retracted with a single-blade speculum. A midline defect is caused by a midline tear or attenuation of the anterior vaginal wall fibromuscular layer (pubocervical fascia). This defect is suspected if a midline vaginal bulge is noted when the lateral sulci and apex of the vagina are supported with ringed forceps. A midline defect can also be assessed by closing the blades of the forceps and elevating the midline of the vagina with straining. A transverse defect results from a separation of the anterior vaginal wall fibromuscular layer of the vaginal wall from its attachment to the anterior margin of the pericervical ring, or from a separation of the pericervical ring from its attachment to the uterosacral ligaments.<sup>38</sup> In the first case, a distinct bulging out of the anterior vaginal fornix is seen with the patient straining. The bulge may appear smooth and without rugations owing to the loss of the underlying anterior vaginal wall fibromuscular layer. In the second case, a detachment of each uterosacral ligament to the pericervical ring results in a significant cervical descensus, with no thickness of uterosacral ligaments being palpated near the pericervical ring.<sup>39</sup> A paravaginal defect results from a partial or complete detachment of the lateral vaginal wall from the arcus tendineus fascia pelvis or white line. These defects appear as blunting or descent of the lateral sulcus on either side with straining. Unilateral paravaginal defects can be assessed by supporting each sulcus to the

anterior wall <b>Aa</b>	anterior wall <b>Ba</b>	cervix or cuff <b>C</b>
genital hiatus <b>gh</b>	perineal body <b>pb</b>	total vaginal length <b>tvl</b>
posterior wall <b>Ap</b>	posterior wall <b>Bp</b>	posterior fornix <b>D</b>

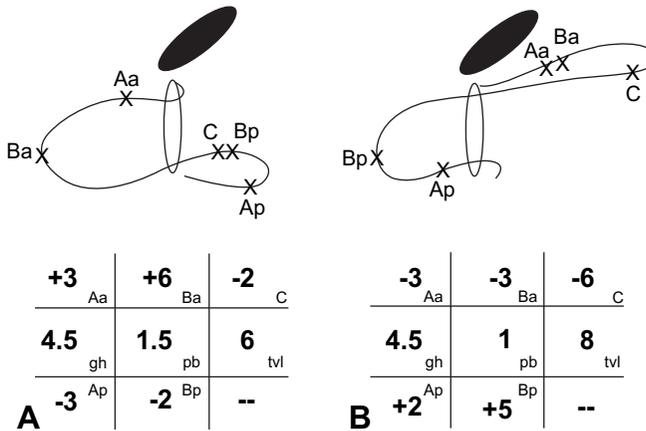
**Fig. 5.** Grid for recording quantitative description of pelvic organ support. (From Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10-17; redrawn with permission.)



**Fig. 6.** (A) Complete eversion of vagina. Most distal point of anterior wall (Ba), vaginal cuff scar (C), and most distal point of the posterior wall (Bp) are all at the same position (+8) and points Aa and Ap are maximally distal (+3). Because total vaginal length equals maximum protrusion, this is stage IV prolapse. (B) Normal support. Points Aa and Ba and points Ap and Bp are all -3 because there is no anterior or posterior wall descent. Lowest point of the cervix is 8 cm above the hymen (-8) and posterior fornix is 2 cm above this (-10). Vaginal length is 10 cm and genital hiatus and perineal body measure 2 and 3 cm, respectively. This condition represents stage 0 support. (From Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10-17; redrawn with permission.)

sidewall separately with closed ring forceps. If this maneuver eliminates the bulge of the anterior vaginal wall with the patient straining, it suggests that this is the site of the support defect. Bilateral paravaginal defects are assessed by opening the blades of the ring forceps and supporting both lateral sulci along the arcus tendineus fascia pelvis. Several studies have shown that the correlation between the clinical examination and intraoperative findings may not be reliable. A retrospective study by Barber and colleagues<sup>40</sup> showed that of 117 women undergoing surgery for anterior vaginal wall prolapse, less than two-thirds of women believed to have paravaginal defects preoperatively had these defects confirmed intraoperatively. The sensitivity of the clinical assessment for paravaginal defects was good (92%) but the sensitivity was poor (52%).<sup>40</sup> A prospective study by Whiteside and colleagues<sup>41</sup> similarly showed poor reproducibility of the clinical examination of anterior vaginal wall defects within the same examiner and between different examiners. Because of these findings, and because, in real practice, most women have a mixture of defects, the clinical value of determining the location of midline, transverse, and paravaginal is questioned.

Apical defects can be seen in patients with uterine or vaginal cuff prolapse. In uterine prolapse, the cervix has become detached from the cardinal-uterosacral ligament complex and the anterior and posterior vaginal wall fibromuscular layers. This defect can be evaluated by using an open bivalve speculum that is slowly retracted while the patient is bearing down. The posterior and lateral fornices are seen bulging, and there is wide lateral and downward mobility of the cervix. It is important to estimate the length of the cervix, because cervical elongation can be seen with



**Fig. 7.** (A) Predominantly anterior support defect. Leading point of prolapse is the upper anterior vaginal wall (Ba; +6). There is significant elongation of bulging at the anterior wall. Point Aa is maximally distal (+3) and vaginal cuff scar is 2 cm above hymen (C = -2). Cuff scar has undergone 4 cm of descent, because it would be at -6 (total vaginal length) if it were perfectly supported. In this example, total vaginal length is not maximum depth of vagina with elongated anterior vaginal wall maximally reduced, but depth of vagina at cuff with point C reduced to its normal full extent, as specified in the text. This condition represents stage III Ba prolapse. (B) Predominant posterior support defect. Leading point of prolapse is upper posterior vaginal wall, point Bp (+5). Point Ap is 2 cm distal to hymen (=2) and vaginal cuff scar is 6 cm above hymen (-6). Cuff has undergone only 2 cm of descent, because it would be at -8 (total vaginal length) if it were perfectly supported. This condition represents stage III Bp prolapse. (From Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. *Am J Obstet Gynecol* 1996;175:10-17; redrawn with permission.)

uterine prolapse. Vaginal cuff prolapse after hysterectomy results from the detachment of the cardinal and uterosacral ligaments from the vaginal apex. In addition, an apical enterocele may be present. In an apical enterocele, the anterior and posterior vaginal wall fibromuscular layers have been separated due to the disruption of the pericervical ring causing the peritoneum to be in direct contact with the vaginal epithelium. The overlying vaginal epithelium appears stretched and smooth, without rugae.<sup>39</sup> Occasionally, small bowel may be palpated or peristalsis may be seen though the vaginal epithelium. However, it may be difficult to discriminate between an enterocele and a high rectocele during physical examination. A rectovaginal examination may be helpful to differentiate the 2, because an enterocele may be palpated as a bulge noted to descend between the vaginal and rectal fingers while the patient is straining. Imaging techniques, such as defecography or dynamic magnetic resonance imaging (MRI) may also be helpful in discriminating between enterocele and high rectocele.

Posterior vaginal wall defects are due to breaks or global attenuation of the posterior vaginal wall fibromuscular layer (rectovaginal fascia). The defects in the posterior vaginal wall fibromuscular layer allow the rectal muscularis to bulge up against the vaginal epithelium. These defects are best evaluated via a rectovaginal examination while supporting the anterior vaginal wall and apex with a single-blade speculum. This method allows the examiner to evaluate breaks or defects and thickness of the posterior vaginal wall fibromuscular layer. Breaks in the distal third of the posterior vaginal wall are called distal posterior vaginal wall prolapse (distal rectocele), and breaks in the upper third of the vagina are called upper posterior vaginal wall

<b>Stage</b>	<b>Description</b>
0	No prolapse is demonstrated. Points Aa, Ap, Ba, and Bp are all at $-3$ cm, and point C or D is between $-TVL$ (total vaginal length) cm and $-(TVL-2)$ cm (ie, the quantification value for point C or D is $\leq -[TVL-2]$ cm). <b>Fig. 6B</b> , represents stage 0
I	The criteria for stage 0 are not met, but the most distal portion of the prolapse is $>1$ cm above the level of the hymen (ie, its quantification value is $<-1$ cm)
II	The most distal portion of the prolapse is $\leq 1$ cm proximal to or distal to the plane of the hymen (ie, its quantification value is $\geq -1$ cm but $\leq +1$ cm)
III	The most distal portion of the prolapse is $>1$ cm below the plane of the hymen but protrudes no further than 2 cm less than the total vaginal length in centimeters (ie, its quantification value is $>+1$ cm but $<+[TVL-2]$ cm). <b>Fig. 7A</b> , represents stage II Ba, and <b>Fig. 7B</b> , represents stage III Bp prolapse
IV	Complete eversion of the total length of the lower genital tract. The distal portion of the prolapse protrudes to at least $(TVL-2)$ cm (ie, its quantification value is $\geq +[TVL-2]$ cm). The leading edge of stage IV prolapse will usually be the cervix or vaginal cuff scar. <b>Fig. 6A</b> , represents stage IV C prolapse.

*Modified from Bump RC, Mattiasson A, Bo K, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J Obstet Gynecol 1996;175:10-17; with permission.*

prolapse (high rectocele). Upper posterior vaginal wall prolapse appears as a bulging down of the posterior lateral walls of the vagina and cul-de-sac toward the middle third of the vagina. These high defects are associated with posterior and apical enteroceles. Richardson and colleagues<sup>42</sup> described site-specific defects located in the superior, inferior, right, left, and midline of the rectovaginal septum. However, the accuracy of detecting these specific defects on clinical examination is limited. In a retrospective comparison of clinical examination and intraoperative findings in 106 patients, Burrows and colleagues<sup>43</sup> found the sensitivity and positive predictive value for all defects to be less than 40%. Not detecting these specific defects preoperatively might be of no clinical consequence.

### ***Evaluation of Perineum and Anal Sphincter***

The perineum and anal sphincter are evaluated via inspection and rectovaginal examination. The perineal body consists of dense connective tissue and muscle fibers, and measures 3 to 4 cm in the anterior posterior direction, and 2 to 3 cm in the craniocaudal direction. It is attached anteriorly to the perineal membrane, and cranially to the posterior vaginal wall. These attachments stabilize the perineal body from downward and lateral movement. There are 5 muscles that attach to the perineal body: 2 paired bulbocavernosus muscles, 2 paired transverse perineal muscles, and the external anal sphincter. Separation of the bulbocavernosus or transverse perineal muscles causes a widened genital hiatus and a short perineal body, which can be seen during the POPQ examination with the patient at rest. A complete separation of the perineal body and external anal sphincter would be the result of a congenital cloaca or a chronic fourth degree laceration. In this situation, the perineal body would be absent.

The perineal body is attached to the sacrum indirectly via its attachment to the posterior vaginal wall fibromuscular layer, which is attached to the uterosacral ligaments. This attachment causes the perineum to be concave in shape, and limits its downward mobility to about 1 cm. Movement of the perineal body greater than

2 cm past the level of the ischial tuberosities suggests perineal descent. Perineal descent is also characterized by bulging and widening of the perineum with valsalva. On POPQ examination of a patient with perineal descent, the genital hiatus and perineal body widen as the patient strains. A perineal rectocele is caused by a complete disruption of the perineal body itself, causing the rectal muscularis to be in direct contact with the perineal skin. On physical examination, the perineal body is elongated and demonstrates ballooning as the patient strains.

To evaluate the anus, the skin of the perineum and anus should be inspected for deformity, scarring, and flattening of the gluteal creases. The presence of a “dovetail sign” suggests anterior separation of the anal sphincter. This appears as loss of the skin creases around the anterior aspect of the external anal sphincter. The patient is asked to squeeze the anal sphincter to look for uniform circular contraction of the muscle. Next, the patient is asked to strain to show perineal descent, and rectal prolapse. A digital rectal examination is performed to assess the internal and external sphincter. The initial resting tone reflects the integrity and strength of the internal anal sphincter. To assess the external anal sphincter, the patient is asked to squeeze the anus as if to hold a bowel movement. Strength, muscle defects, and early “fatigability” are assessed. The patient should also be asked to bear down with a finger still within the anus. Paradoxical contraction of the puborectalis and external anal sphincter during valsalva may indicate anismus. The presence of large amounts of fecal material in the rectum may suggest fecal impaction or neuromuscular weakness. The anus and rectum should also be assessed for masses and hemorrhoids. Ancillary tests such as endoanal ultrasound, defecography, pudendal nerve terminal motor latency, and anorectal manometry can also be ordered to evaluate the anatomy, function, and innervation of the anal sphincter and rectum.

### ***Urethral Mobility***

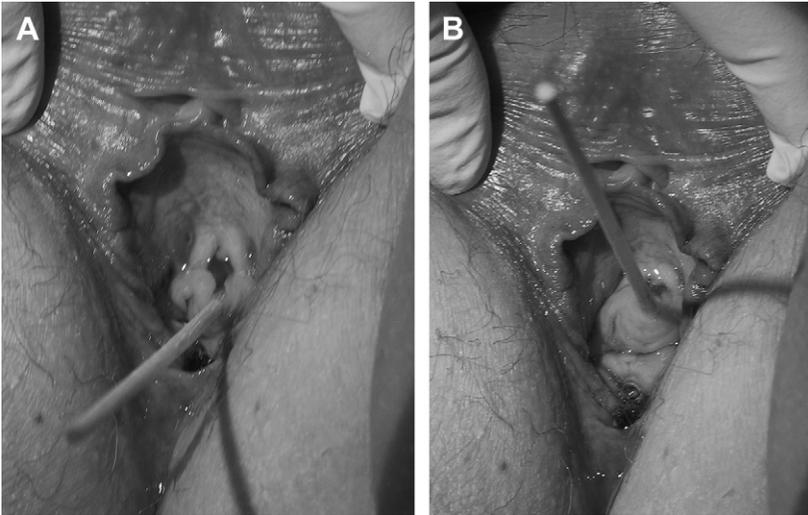
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The support of the bladder neck is assessed by evaluating the mobility of the urethrovaginal junction (UVJ). Direct visualization of the anterior vaginal wall for urethral hypermobility is generally considered inaccurate<sup>44</sup> unless the patient has significant anterior vaginal wall prolapse (POPQ stage II–IV).<sup>45</sup> Urethral hypermobility can be assessed with the Q-tip test or by imaging techniques such as lateral cystourethrogram or ultrasonography.<sup>46</sup> The Q-tip test is performed with the patient in the supine position. First, the external urethral meatus is cleaned with an antibacterial solution. Next, a sterile cotton-tipped applicator that has been lubricated with an anesthetic ointment is inserted transurethally into the bladder, and then withdrawn slowly until definite resistance is felt, indicating that the cotton tip is at the bladder neck (**Fig. 8A**). The resting angle is measured with a goniometer, with the reference being parallel to the floor. The patient is then asked to valsalva or cough, and the excursion angle is measured (see **Fig. 8B**). Urethral hypermobility is generally defined as a movement with straining of more than 30° from the horizontal.<sup>46</sup> Although the Q-tip test reliably predicts urethral hypermobility,<sup>47,48</sup> it has never been demonstrated to be able to diagnose the type of incontinence,<sup>49,50</sup> and there is a wide overlap between continent and incontinent women.<sup>51</sup> Because the main goal of determining urethral hypermobility is to determine which patients benefit from surgical stabilization of the bladder neck, the Q-tip test can be omitted from the basic evaluation if a patient does not desire surgical management.

### ***Evaluation of Urethral Sphincter and Bladder Function***

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The physical examination of the patient with symptoms of urinary incontinence should try to reproduce the patient's symptoms. The patient is asked to cough with the bladder comfortably full. With the patient in the supine position, the external urethral



**Fig. 8.** (A) The Q-tip test demonstrates a normal resting angle of approximately  $0^{\circ}$ . (B) With patient straining, the Q-tip test demonstrates an angle of approximately  $45^{\circ}$ .

meatus is observed for urine loss. Small spurts of urine leakage concurrent with cough suggests stress urinary incontinence, whereas prolonged loss of urine, or leaking after the cough has concluded, suggests detrusor overactivity. If no urine loss is noted and the patient has anterior vaginal wall prolapse, the anterior vaginal wall should be elevated with an instrument to unmask potential or occult urinary incontinence. If urine loss is not seen in the supine position, the patient should be asked to cough in the standing position.

The patient is then asked to void in private, and the voided volume is recorded. The time to void can also be recorded with a stopwatch in lieu of a formal uroflowmetry study. At this time, a clean catch urine sample can be obtained. The PVR urine is then determined via bladder ultrasound or catheterization. Normal values for PVR have not been established, and are based on expert opinion. Volumes less than 50 mL indicate adequate bladder emptying, and volumes greater than 200 mL can be considered inadequate emptying.<sup>52</sup> Clinical judgment must be used when interpreting PVR in the range of 50 to 200 mL, and the test should be repeated if abnormally high values are obtained.

Evaluation of bladder filling and storage can be performed in the office setting via simple cystometry (eyeball cystometry) or via multichannel cystometry. Simple cystometry is performed by placing a transurethral catheter and emptying the bladder. A 60-mL catheter-tip syringe without its piston is then attached to the catheter and held 10 to 15 cm above the pubic symphysis. With the patient in the sitting or standing position, the bladder is filled with sterile saline or water in 50-mL increments. The meniscus of the fluid in the syringe is noted throughout the procedure, because any increase in the meniscus can be due to a detrusor contraction. The patient's first bladder sensation, first desire to void, strong desire to void, and bladder capacity are also noted.<sup>53</sup> The definition of normal bladder capacity lacks consensus, with values ranging from 300 mL to 750 mL.<sup>52</sup> If the patient did not leak with coughing during the initial evaluation, a repeat cough stress test can be performed at bladder capacity after the catheter has been removed. The results of simple cystometry have been shown to be comparable with multichannel cystometry in diagnosing

urodynamic stress urinary incontinence and detrusor overactivity, if these are demonstrated during simple cystometric testing.<sup>54,55</sup> However, a negative cystometry does not rule out the presence of urge urinary incontinence.<sup>55</sup> If the patient has symptoms of urge urinary incontinence and a negative cystometry, multichannel urodynamic testing can be useful.

## SUMMARY

Pelvic floor disorders are common health issues for women and have a great impact on quality of life. Because these disorders can present with a wide spectrum of symptoms and anatomic defects, each patient should be evaluated based on her unique symptoms and physical findings. The goal of treatment is to provide as much symptom relief as possible. After education and counseling, patients may be candidates for nonsurgical or surgical treatment, and expectant management.

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