

Pelvic Organ Prolapse

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The levator ani pelvic muscles and surrounding connective tissues provide support for the pelvic organs. Disruption of this natural anatomic system results in descent or prolapse of one or more of the pelvic structures: bladder and urethra, rectum, uterus and cervix, and small bowel. Patients with prolapse often present with associated urinary, defecatory, and sexual dysfunction, although many women who have prolapse on examination are clinically not affected.¹ The finding of prolapse on exam is not well correlated with symptoms. Thus, pelvic organ prolapse encompasses a wide range of disorders, from asymptomatic altered anatomy to complete eversion of the vagina. The lifetime risk that a woman in the United States will have surgery for prolapse and urinary incontinence is estimated at 11%.² The direct cost of prolapse surgery is greater than \$1 billion per year.³

The pathophysiology of prolapse is multifactorial. Risk factors can be predisposing, inciting, promoting, and decompensating.⁴ Risk factors include family history, connective tissue disorders, race, gravidity and parity, prior prolapse surgery, myopathy, neuropathy, advancing age, menopause, and elevated intrabdominal pressure from obesity, constipation, occupational activities, or

chronic cough. Nulliparity does not protect against prolapse: one fifth of the nulliparous women in the Women's Health Initiative had some degree of prolapse.⁵

DIAGNOSTIC APPROACH

History

In evaluating a patient with pelvic organ prolapse, it is important to ascertain symptoms and bother, because many patients with prolapse are asymptomatic. Patients who are symptomatic will present with complaints in at least one of four categories: lower urinary tract dysfunction, defecatory dysfunction, sexual dysfunction, or feeling and /or seeing a "bulge". Symptoms of lower urinary tract dysfunction may include hesitancy, slow stream, need for position change to void, or incomplete bladder emptying. Some women with advanced prolapse may recount a history of stress incontinence that has improved over time. This is likely due to the urethral obstruction or "kinking" caused by the advancing prolapse. Symptoms of defecatory dysfunction include incomplete evacuation and the need for application of manual pressure to the perineum or posterior vagina to complete a bowel movement, commonly called "splinting." Pelvic prolapse may interfere with sexual activity secondary to embarrassment, concern, or fear of incontinence.

Awareness or palpation of an actual protrusion usually occurs when prolapse is at or below the hymen, but women with prolapse above the hymen may complain of pelvic pressure or heaviness.

The patient interview should address all of the above. Additionally, questions regarding conditions that may contribute to the progression of pelvic prolapse should be asked, such as gravidity and parity, menopausal status, conditions or activities contributing to elevated intra-abdominal pressure, and prior surgery. Again, the interview should assess how much bother the symptoms are creating for the patient. Several validated questionnaires are available to quantify and qualify symptoms. Finally, it is important to ascertain patient treatment goals. Patients will benefit from reassurance and education regarding their condition.

Physical Examination

Physical exam begins with visual inspection of the vulva and vagina. The provider can assess the patient's neurologic function in the pelvis by testing for an anal wink (bulbocavernosus reflex) and the dermatomes of the perineum and upper leg. Efficiency of bladder emptying can be assessed by measuring a voided volume and the post void residual by either catheterization or ultrasound. The extent of

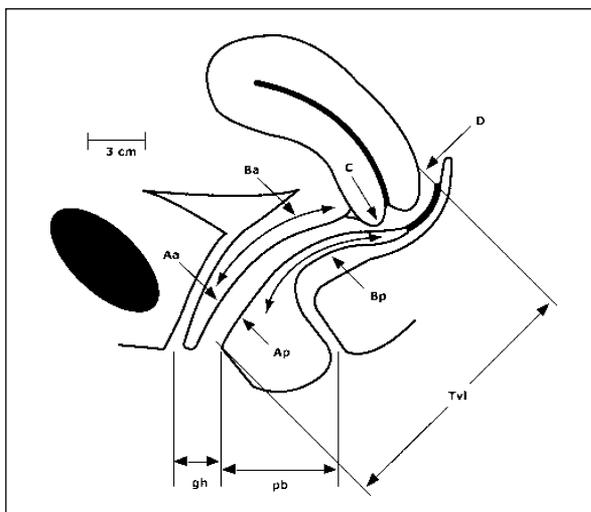


Figure 1. Six sites (points Aa, Ba, C, D, Bp, and Ap), genital hiatus (gh), perineal body (pb), and total vaginal length (tvl) used for pelvic organ support quantitation. (6)

Table 1. Pelvic Organ Prolapse Quantification Staging (6)

Stage 0	No prolapse is demonstrated.
Stage 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
Stage II	The most distal portion of the prolapse is =1 cm proximal to or distal to the plane of the hymen
Stage 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
Stage VI	Essentially, complete eversion of the total length of the lower genital tract is demonstrated. The distal portion of the prolapse protrudes to at least (TVL-2) cm

pelvic organ prolapse should then be systematically evaluated and with Valsalva efforts. If the prolapse is advanced this is often not difficult. However, if prolapse is not obvious, the use of a “split” vaginal speculum is needed to determine which vaginal supports (anterior, apical, posterior) are affected by prolapse. Retraction of the posterior wall of the vagina with the single blade of a speculum will help identify anterior prolapse, and vice versa, retraction of the anterior wall of the vagina with the single blade of a speculum will help identify posterior vaginal prolapse. The supports of either uterus/ cervix or post hysterectomy vaginal cuff of the vagina, that is the apex, are assessed with the bivalve speculum.

The International Continence Society developed a standard system for measuring and staging prolapse known as the **Pelvic Organ Prolapse Quantification (POPQ)** system.⁶ This standardized system allows for objective evaluation of prolapse findings, accurate communication between providers, and reliable pre and post-treatment comparison points. The POP-Q system measures nine locations on the vagina and vulva in relation to the hymen. (Figure 1) All measurements, except for the measurement of total vaginal length, are taken with the patient performing a maximal Valsalva maneuver with an empty bladder. Also, if the full extent of prolapse is not appreciated with the patient in the supine or lithotomy position, the patient is examined in the standing position. The POP-Q measurements are then used to assign a stage of prolapse (from 0-IV) for each patient according to the most advanced site. (Table 1)

A bimanual examination should then be performed to assess the uterus (cervical length, uterine size and contour, uterine mobility, and the quality of uterine supports) and adnexa. The examiner may also palpate the pelvic levator ani muscles. Muscle tenderness, baseline muscle tone, as well as ability and strength of voluntary contraction that is, the “Kegel squeeze”, may be determined at this time. It is important to note if a woman can locate and contract her pelvic muscles. If she cannot, a program of pelvic muscle strength training by a physical therapist would be advised, as an unsupervised course of Kegel exercises will likely not be beneficial. Rectal exami-

nation is performed to assess rectal sphincter tone and its voluntary contraction. Rectal prolapse and defects in the rectovaginal septum may be appreciated more fully at this time as well.

Adjunctive testing

Women with prolapse who are seeking treatment should undergo bladder testing to unmask any bladder dysfunction. Occult stress incontinence and voiding dysfunction are often seen in women with prolapse.^{7,8} Bladder testing of either simple or complex cystometry, and flow studies with prolapse extended and reduced will reveal such conditions. Reduction will mimic bladder and urethral function once prolapse is repaired or resupported. Instruments such as a single blade speculum, large cotton Q-tips (scopettes), ring forceps, or pessary can be used to reduce the prolapse.

Imaging such as dynamic pelvic floor MRI and defecography are not routinely necessary in women with pelvic organ prolapse, but can clarify etiologies of bowel, bladder or sexual dysfunction; thus they may be useful in formulating management recommendations in a select group of women. Cystoscopy may be needed as well.

Nulliparity does not protect against prolapse...

TREATMENT

Indications for treatment

Management of pelvic organ prolapse is based upon symptom bother. If the presence of pelvic prolapse is not sufficiently bothersome to the patient to warrant active intervention, watchful waiting is reasonable. Education and reassurance regarding anatomy, symptom progression, and possible treatment options is recommended for these patients. Patients who choose to have no intervention for their prolapse should be encouraged to follow symptom-directed therapy, pelvic floor muscle training, and be monitored for progression of prolapse. As described in the Diagnostic section, a quantitative measurement of prolapse by the POP-Q staging system allows for subsequent comparison of prolapse progression.

When bladder or bowel evacuation

becomes compromised or impossible secondary to prolapse, emergent treatment is needed for reduction of the prolapse. If bladder emptying is compromised, resulting in increased post void residuals, patients should be counseled on the possible risk of recurrent urinary tract infections and upper urinary tract damage. In addition, the protruding vaginal epithelium is at risk for erosion and/ or abrasion with advanced prolapse; it can rarely become infected.

If a woman chooses to move forward with active management of her prolapse, she should be counseled about non-surgical and surgical treatment options. Treatment goals should be outlined and patient expectations understood.

Non-surgical treatment

Non-surgical management is ideal for patients who wish to avoid surgery or who present with medical conditions that make them poor surgical candidates. Pessary use is the only specific non-surgical treatment available, but pelvic floor muscle training and symptom directed therapy might reduce the progression of prolapse symptoms.⁹

Symptom directed therapy

Symptom -directed therapy is aimed at altering specific symptoms that are bothersome to the patient and which may contribute to the progression of prolapse. Many practitioners utilize symptom-directed therapy as an adjunct to surgical management in an effort to optimize surgical outcome.

Patients who complain of incomplete evacuation of stool, or the need to splint during bowel movements, should undergo a complete gastrointestinal evaluation, diet and bowel history. If no GI pathology is diagnosed, bowel habits should be regulated to prevent straining and promote regular evacuation. Increasing water and fiber intake should be reinforced. Addition of osmotic laxatives may be done as necessary.

Incomplete bladder emptying, or symptoms of urinary frequency and urgency may be controlled with such methods as timed voids or fluid intake alteration. A voiding diary is helpful for patients to record their daily intake and voiding patterns.

In general, exercise and weight loss

are not proven to decrease prolapse symptom progression, but are encouraged for overall health.

Pelvic floor muscle training

Commonly called Kegel exercises, pelvic floor muscle training is aimed at increasing the strength and endurance of the pelvic muscles. The pelvic muscles, specifically the levator ani muscles (pubococcygeus, ileococcygeus, puborectalis), act in concert with ligaments and connective tissue to support the pelvic organs. Strengthening these muscles therefore theoretically increases the support of these organs. There is no direct evidence that pelvic floor muscle exercises prevent or treat pelvic organ prolapse; however, they are effective for urinary and fecal incontinence and may be beneficial for prolapse.¹⁰ Pelvic floor muscle exercises, like symptom directed therapy, can be used as an adjunct to surgical management. There are virtually no adverse effects of pelvic floor muscle exercises; however, the patient must be willing to invest the time. Few women effectively locate and contract their pelvic muscles when asked to during a vaginal examination. Therefore, independent unsupervised exercise of these muscles may not be as beneficial as supervised exercise with a physical therapist.

Pessary Use

A vaginal pessary is a removable device placed in the vagina to support areas of pelvic organ prolapse. A variety of pessaries are available, made of rubber, plastic, or silicone-based materials. (Figure 2) Like all types of non-surgical management, pessary use is aimed at decreasing symptom frequency and severity. They are a choice of therapy in women who have medical contraindications to surgery or debilitated, and for any woman who desires to avoid surgery. Pessaries may also be used before implementing a surgical plan to assess symptom resolution or to document occult urinary incontinence with reduction of prolapse.

Pessaries are available in a variety of shapes depending on the type of prolapse and vaginal configuration. Broadly, there are support and space-occupying pessaries, and a pessary is fitted to each individual patient. The pessary should be both stable and comfortable, and patients should be able to urinate and defecate without difficulty. Up to 75% of women can be successfully fitted with a pessary; unsuccessful

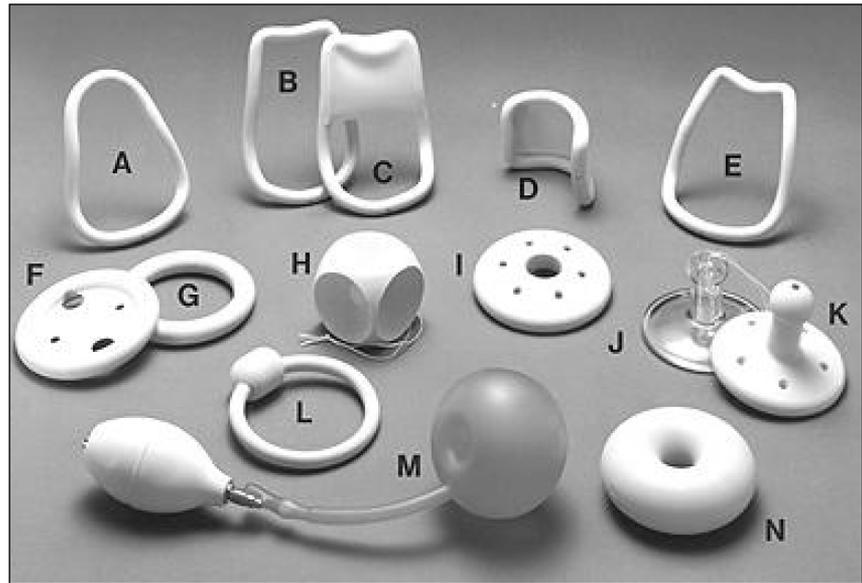


Figure 2: Types Of Pessaries: A) Smith; (B) Hodge; (C) Hodge with support; (D) Gehrung; (E) Risser; (F) Ring with diaphragm; (G) Ring; (H) Cube; (I) Shaatz; (J) Rigid Gellhorn; (K) Flexible Gellhorn; (L) Incontinence ring; (M) Inflatoball; (N) Donut. (Image from UpToDate)

fitting is associated with short vaginal length and a wide introitus.¹¹ Approximately 90% of women who are successfully fitted with a pessary are satisfied at 2 months.¹²

Patients can insert and remove some types of pessaries on their own, or they may return to their provider for insertion

and removal approximately every three months. At the office visit, the provider inspects the vagina for erosion. Maintenance with estrogen cream and/or Trimo-San® (Milex Inc, Chicago, IL) is recommended to maintain vaginal health during pessary use.

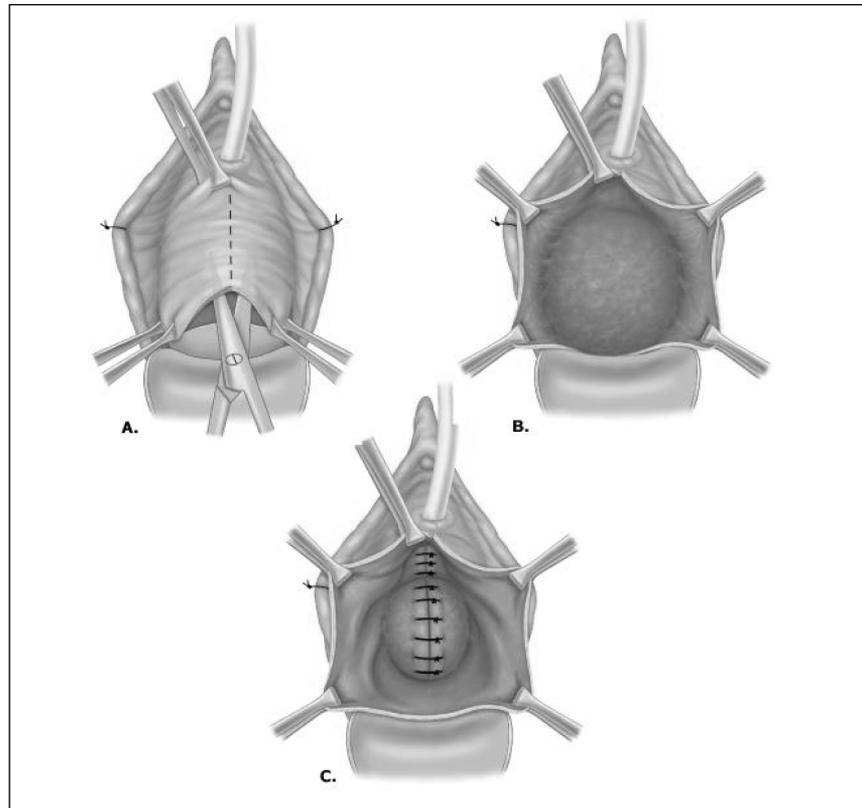


Figure 3. Anterior vaginal colporrhaphy (Image from UpToDate)

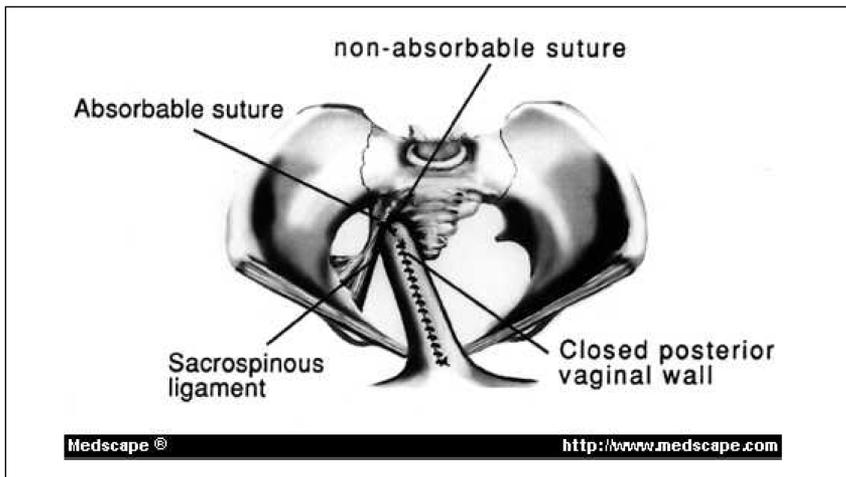


Figure 4. Sacrospinous Ligament Fixation

The main contraindication to pessary use is inability to follow up for treatment monitoring, which would result in pessary neglect and subsequent incarceration and fistula. Relative contraindications to pessary use are severe vaginal atrophy, active vaginitis, and persistent vaginal erosion with pessary use, which may necessitate periodic discontinuation of the pessary. Vaginal neoplasm should be ruled out in these cases of non-healing lesions.

Surgical treatment

The primary aim of prolapse surgery is to improve prolapse symptoms and bowel, bladder or sexual dysfunction associated with the prolapse. Surgery is aimed at either reconstructing the vagina or obliterating the vagina to achieve symptom relief.

Obliterative procedures

For patients who do not desire vaginal function, or who are at high risk for complications during reconstructive procedures, an obliterative procedure, or colpocleisis, may be an appropriate treatment choice. This is performed transvaginally, and can be done with or without a uterus in place. Recurrence rates for colpocleisis are low; however, this may be due to self-selection of a patient population that has a limited life span and activity level.

Reconstructive procedures

Theoretically, prolapse is caused by a disruption and dysfunction of one or both of the natural anatomic supports: connective tissues and muscles. Reconstructive surgery of the vagina repairs or replaces the connective tissue supports, restoring struc-

ture and function of the vagina. Reconstructive surgery may use the patient's endogenous support structures, or may attempt to replace deficient support with a graft material. Approaches to pelvic reconstructive surgery for prolapse include vaginal, abdominal, and laparoscopic, or a combination of the above. Depending on the location of prolapse and prolapse symptoms, each compartment of the vagina (anterior, apical, posterior) may be addressed with a specific approach. In addition, concomitant surgery may be planned for the anal sphincter and/or bladder neck. As comparable data for prolapse operations are poor, surgical route is determined based on the type and severity of prolapse, surgeon preference, and desired outcome.

One of the most important complications to remember when counseling a patient regarding reconstructive surgery is anatomic failure, or recurrence. All patients who undergo prolapse surgery must understand that each approach is associated with a recurrence rate, and though lifestyle factors can be modifiable, inherent connective tissue and muscle damage likely contributes to failure.

Anterior vaginal repair

Anterior vaginal prolapse has traditionally been repaired transvaginally with an anterior colporrhaphy. This entails exposure and plication of the patient's vesicovaginal connective tissue in the midline. (Figure 3) Graft material may be used in addition to or instead of the plication. The aim of graft material in this compartment is to effectively augment the vesicovaginal connective tissue, and therefore theoretically increase anatomic success and outcome. Paravaginal repair of the anterior vaginal wall may be approached either transvaginally, abdominally, or laparoscopically. This is aimed at reattaching the lateral vaginal sulcus to the arcus tendineous fascia pelvis. There are poor data comparing the above surgical approaches. Therefore a surgeon must consider patient presentation, surgeon preference, and concomitant surgeries when choosing an approach to anterior vaginal wall repair.

Posterior vaginal repair

Posterior vaginal prolapse has traditionally been repaired transvaginally with a posterior colporrhaphy. Like an anterior

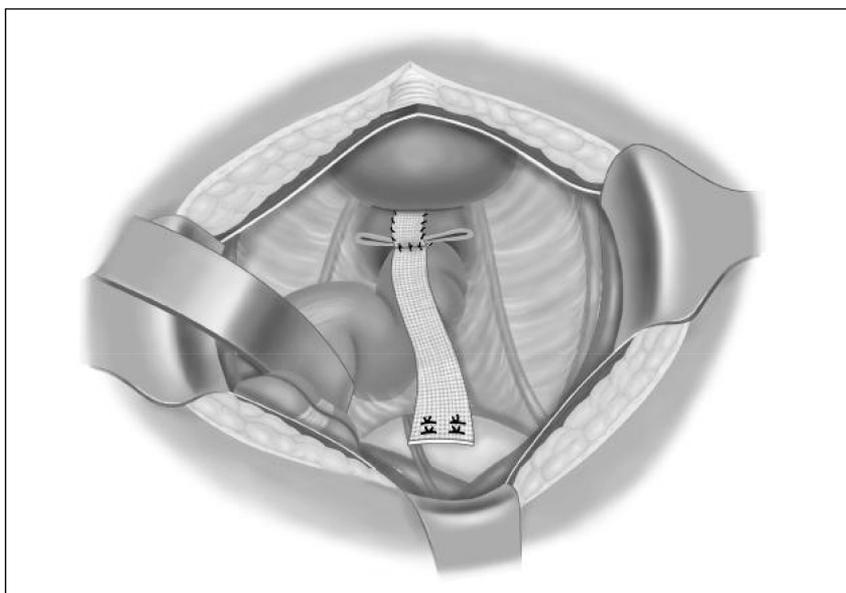


Figure 5: Abdominal Sacrocolpopexy (Image from UpToDate)

colporrhaphy, this entails exposure and plication of the connective tissue supports of the rectum, or rectovaginal connective tissue. This can be done with either a site-specific or midline repair, and may be augmented with graft use. Procedures that are commonly combined with a posterior vaginal repair include a levator muscle plication and/or a perineorrhaphy. Perineorrhaphy is usually carried out when there is a separation of the perineal muscles, and is often used to restore the natural posterior deflection of the vagina in the pelvis. Colorectal surgeons will often approach posterior vaginal prolapse transanally.

Vaginal apical repair

Apical prolapse of the vagina includes uterine prolapse with or without small bowel (enterocele) and vault prolapse (when the uterus is absent), which typically includes small bowel. Hysterectomy alone does not repair prolapse of the vaginal apex. It is usually performed by pelvic reconstructive surgeons to gain vaginal access to structures from which to suspend the vagina. Thus, a vaginal vault suspension procedure must be performed with a hysterectomy for apical prolapse.

There are several vaginal approaches to apical prolapse. Each re-suspends the vagina by using strong ligaments or fascia. A sacrospinous ligament fixation is traditionally performed after removal of the uterus, and entails attaching the vaginal apex to the sacrospinous ligament. (Figure 4) Uterosacral ligament suspension is traditionally performed after removal of the uterus when done from a vaginal approach, or may be performed abdominally or laparoscopically with the uterus removed or in place. The surgeon performs uterosacral ligament suspension by attaching the vaginal apex to the uterosacral ligament remnants at the level of the ischial spines bilaterally. Though not the traditional approach, there are reports of sacrospinous ligament fixation and uterosacral suspension being approached vaginally with the uterus in place. Vaginal approaches to apical prolapse are likely similar with respect to anatomic outcome and recurrence rate.¹³ Sacrospinous ligament fixation is extraperitoneal, but may have increased risk of vascular and nerve injury, while uterosacral suspension is intraperitoneal and therefore may carry a risk of bowel or ure-

teral injury, and may be more challenging in post-hysterectomy vault prolapse.

Abdominal and laparoscopic approaches to apical prolapse can be performed with or without the uterus in place. Surgeons who perform abdominal sacral colpopexy use graft material attached to the anterior and posterior vaginal apex to suspend the apex to the anterior longitudinal ligament of the sacrum. (Figure 5) This can be done with the uterus in place, called a hysteropexy. Uterosacral ligament suspension can also be approached abdominally, with or without the uterus in place. Success rates of the few trials available for comparison of vaginal and abdominal approaches to apical prolapse tend to favor abdominal sacral colpopexy, though complications of abdominal entry and graft use need to be weighed when considering how to approach each patient.

Addressing concomitant symptoms

Symptoms of urinary, bowel, and sexual dysfunction must be discussed with patients before surgery, and resolution of such symptoms may or may not occur with surgical anatomic replacement of the pelvic organs. If a woman demonstrates stress incontinence with pessary support of the pelvic organs preoperatively, she is at a higher risk of having post-operative stress incontinence, and may benefit from an anti-incontinence procedure.¹⁴ Fecal incontinence may be addressed with an anal sphincteroplasty at the time of surgery.

SUMMARY

Pelvic organ prolapse can encompass a range of disorders, from asymptomatic, altered anatomy to complete eversion of the vagina and may present with associated urinary, defecatory, and sexual dysfunction. Patient symptoms are important to elicit, because many patients with prolapse are asymptomatic. Ascertaining patient treatment goals is necessary when discussing options for management, and patients can choose from conservative, noninvasive treatment and prevention to surgical reconstruction. As comparable data for prolapse operations are poor, surgical route is determined based on the type and severity of prolapse, surgeon preference, and desired outcome.

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The author has no financial interests to disclose.

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