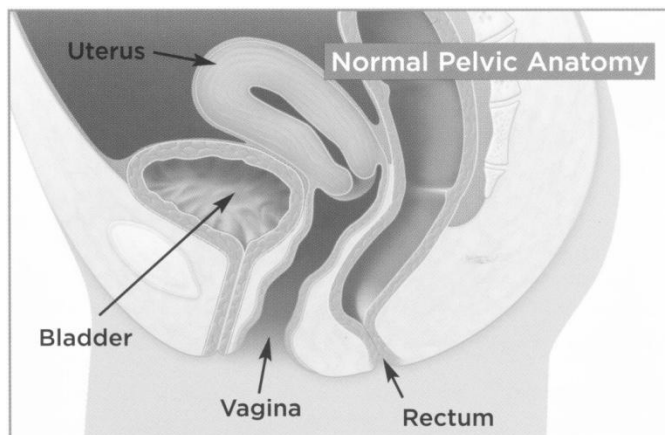


## PELVIC PROLAPSE

Pelvic relaxation is a very common condition in Gynecology. Pelvic organ prolapse is a common problem with 30% of women age 50 -89 years presenting with associated complaints. Eleven percent of women undergo a corrective surgery for pelvic organ prolapsed by age 80. [1,2] It is increasingly clear that pregnancy and age are the two key factors in development of pelvic organ prolapse. Recent studies are confirming that vaginal delivery, compared to C – Section, is more responsible for pelvic organ prolapse. A 2011 study showed the hazard ratio for having surgery for pelvic organ prolapsed compared to women only having Cesarean Delivery was 2.1 after first vaginal delivery and 4.5 after three or more vaginal deliveries. Peak incidence of surgery was three decades after the deliveries. [3]

Three divisions have been identified and are presented separately: Anterior, Posterior and Apical defects. All of these defects are strongly related to pregnancy and delivery. It is widely acknowledged that the key predisposing factor for pelvic relaxation is pregnancy and childbirth. Studies have confirmed that women who have been pregnant have a higher likelihood of developing findings consistent with pelvic relaxation as they age than women who have never been pregnant. Women with pregnancy and vaginal delivery are more likely than women delivering via Cesarean Section to develop these defects. Normal pelvic cross-sectional anatomy is diagrammed below:



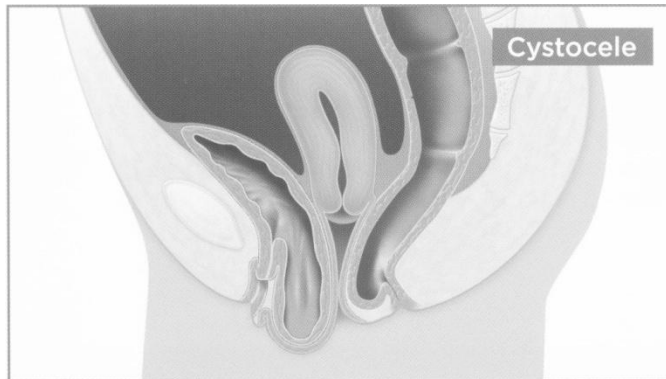
Stretching of the pelvic supports and tearing of the endo-pelvic fascia leads to a variety of defects which are summarized below.

### **SYMPTOMS**

#### **Anterior Compartment Defect (Cystocele)—**

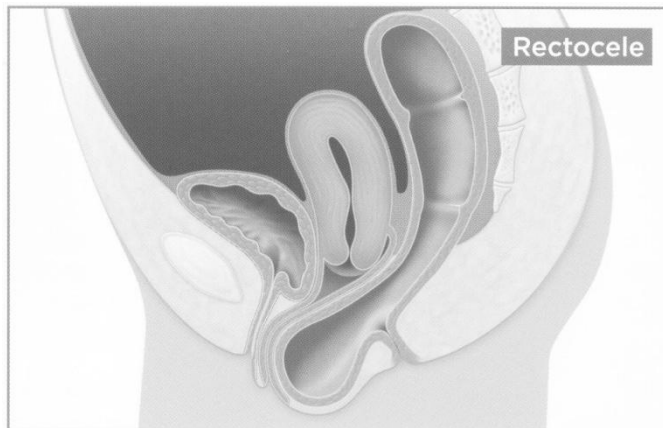
A mass sagging into the vagina is the most common symptom of anterior compartment defect. In many women this is completely asymptomatic. In some women an anterior defect is also associated with unanticipated loss of urine with cough, strain or sneezing. This condition is termed Genuine Stress

Urinary Incontinence (SUI). Unfortunately other conditions also result in unanticipated urinary loss so appropriate diagnostic testing should in most instances be undertaken to confirm the diagnosis of SUI.



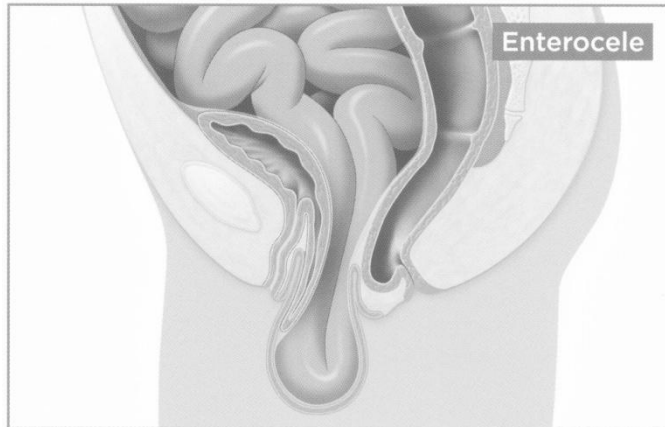
#### Posterior Compartment Defect (Rectocele)—

A bothersome mass protruding into the vagina is the most common symptom of posterior compartment defect. Inability to finish defecation without compressing the posterior vaginal wall remains the only true indication for correcting a posterior compartment defect.



#### Apical Defect (Enterocele)—

The most common symptom of an apical defect is worsening pelvic pain and pressure through the day particularly on days with significant exertion. The pain and pressure is often relieved with rest over night. Apical defect can either manifest with decensus, or dropping of the uterus or by descent of the vaginal cuff in women who have previously undergone hysterectomy.



## SURGICAL CORRECTIONS

### Anterior Compartment Defect—

Cystocele, or protrusion of the anterior vaginal mucosa into the vagina, not associated with unanticipated loss of urine may not require correction. If the mass protrudes outside the labia a correction is warranted. Typically, DWC physicians offer an Anterior Avaulta procedure for these women. The anterior vaginal mucosa is surgically divided from the deep tissue and a piece of polypropylene mesh is inserted with anchors secured through the Obturator Foramen on both sides. Excess mucosa is trimmed and the defect is closed in the midline.

If unanticipated loss of urine is another presenting complaint further diagnostic studies are required. Diagnosis of genuine stress urinary incontinence (SUI) can only definitively be made following urodynamic study from a competent provider.

Most studies indicate pregnancy and childbirth are the leading causes of SUI. A 2004 study from New England Journal of Medicine showed women who were pregnant and had Cesarean Delivery were 1.6 times more likely than a woman who was never pregnant of developing SUI later in life. [4] Women who were pregnant and delivered vaginally were 3.7 times more likely than a woman who was never pregnant of developing SUI later in life, and 2.3 times more likely than women having Cesarean Section of developing SUI. Another study by Handa and colleagues [5] followed women twenty five years after birth and assessed outcomes. They found women who had a non-instrumental, vaginal birth were three times more likely to have SUI and POP than women who had C – Section prior to onset of labor and a five times elevated risk for POP alone. Women with instrumental vaginal birth were four times more likely to have SUI and POP and eight times more likely to have only POP than women who had C – Section prior to onset of labor.

There are few treatments for urinary stress incontinence. Kegel exercises are one option. These require multiple repetitions on a daily basis over several months. Most patients never do these frequently or for a

sufficient length of time to notice a meaningful benefit. Electronic nerve stimulation is another option that mimicks Kegel exercises but does not require as much patient participation.

Surgical treatment of urinary stress incontinence has evolved over the years. The “standard of care procedure” 25 years ago was the Marshall-Marchetti-Krantz (MMK) operation. This procedure required open abdominal surgery with several post-operative days in the hospital and weeks off work for convalescence. The MMK procedure was morphed into laparoscopic paravaginal repair by the early 1990s with plication of the paravaginal tissue to the Cooper’s ligaments to change the angle between the urethra and the bladder. This procedure provided identical results but by virtue of being done through tiny, laparoscopy incisions, could be done as an out-patient with minimal time off work.

Newer procedures have been developed over the last ten to fifteen years that do not even require laparoscopic access. The first such procedure, Trans-Vaginal Tape (TVT) involves passing synthetic graft material from behind the pubis down under the urethra and back up again. Over a decade of experience with TVT is available. TVT offers a minimally invasive approach, is highly efficacious and has a very low incidence of adverse events associated with its use. The most common untoward event associated with TVT is bladder perforation because trocars are passed in the retropubic space blindly.

A newer generation of procedures involves passing tape in a hammock-like manner through the obturator foramen to elevate the midurethra—the Transobturator Tape procedure (TOT). Based on the anatomy of its placement, TOT is far less likely to injure the bladder in its placement.

Data from Barber, et al, suggests similar efficacy in treatment of genuine SUI with TOT vs. TVT. [6] An equivalence trial involving 170 patients is published. One year after surgery 79% of patients with TVT and 82% of patients with TOT were either “much better” or “very much better.” As expected bladder perforation was 7% in the TVT group and 0% in the TOT group. Additional studies are under way which will likely substantiate the efficacy of the TOT in treatment of SUI.

	TVT	TOT	P
Stress incontinence symptoms*			
Any	12/83 (15)	11/73 (15)	.91
Bothersome†	11/83 (13)	9/73 (12)	.86
Urge incontinence symptoms‡			
Any	29/81 (36)	23/72 (32)	.61
Bothersome†	27/81 (33)	21/72 (29)	.58
Anticholinergic use postoperatively	16/84 (20)	10/74 (12)	.34
Bladder diary			
Incontinence episodes/d	0 (0–16)	0 (0–7)	.18
Pads/d	0 (0–5)	0 (0–6)	.43
No incontinence episodes on diary	46/70 (66)	44/64 (69)	.71
Patient global impression of improvement			.88
Very much better	45/82 (56)	38/75 (51)	
Much better	18/82 (23)	23/75 (31)	
Somewhat better	6/82 (7)	5/75 (7)	
No different	7/82 (9)	5/75 (7)	
Somewhat worse	4/82 (5)	3/75 (4)	
Much worse	2/82 (2)	1/75 (1)	

TVT, tension-free vaginal tape; TOT, transobturator tape.  
Data are expressed as n/N (%) or median (range).

The newest variation of TransObturator Tape is single incision TOT securing the mesh through a single vaginal incision. A recent metaanalysis compared results of traditional vs. single incision TOT procedures from 1996 through 2011. [7] This study demonstrated single incision TOT was associated with lower subjective and objective cure rates than traditional TOT. Re-operation rate was also higher for single incision surgery. DWC continues to favor traditional TOT procedures.

The potential for mesh erosion and the preoperative care involving local vaginal administration of estrogen is described. Post-operative vaginal discharge, vaginal discomfort, bleeding or partner stating "something is felt" in the vaginal wall are all signs of mesh erosion. Vaginal mesh erosion occurs in about 5 - 7% of patients using polypropylene graft material. Erosion of mesh into urethra or bladder are far more uncommon consequences.

DWC ordinarily does not cosmetically correct anterior vaginal prolapsed unless mucosa protrudes beyond the labia majus. When required, Anterior vaginal repair with Anterior Colporrhaphy is far less successful in treatment of Stress Urinary Incontinence than repair with Type 1 polypropylene mesh. [8] Mesh erosion in this study occurred in 14% of cases.

Management of post-operative mesh erosion include application of local estrogen cream or local, in-office, excision of the protuberant mesh.

#### Posterior Compartment Defect—

The key defect here is a diastasis or separation of the levator ani muscles in the midline allowing the rectum to bulge anteriorly. The traditional repair of a posterior compartment defect is a Rectocele Repair. In this surgery the posterior vaginal wall is opened in the midline well cephalad to the origin of the bulging. A series of absorbable sutures are placed drawing the muscle together in the midline while rectal examination confirms no incursion of sutures into the rectum or kinking of the rectum. Excess vaginal mucosa is trimmed and the posterior compartment is closed.

A Posterior Avaulta procedure is a newer alternative in which a piece of polypropylene mesh is placed posterior to the vaginal mucosa. With this procedure there is no deliberate plication of the levator ani muscles. After the posterior space is opened, mesh is inserted in the usual manner and positioned with four perineal punctures of a proprietary positioning device. Redundant vaginal mucosa is excised and the defect closed. As the mesh heals in place there is reduction of the rectocele. As with any mesh procedure, extrusion of the mesh may result at a frequency of about 5-7%. In most cases extruded mesh can be trimmed at the mucosal surface and does not require major revision.

#### **American College of Obstetrician Gynecologists**

Because of heightened media attention, ACOG recently published Committee Opinion 513 dealing with vaginal placement of synthetic mesh. [9] They state, "vaginally placed mesh may enhance the support of the anterior compartment compared with native tissue repairs." They state there is insufficient data to base an opinion on mesh for posterior compartment prolapse. Their opinion only deals with vaginally

placed mesh (it does not make any statement regarding laparoscopically placed mesh for apical vaginal vault prolapsed-- see below). Premium must be placed on patient preference and differential assessment of risks and benefits.

#### Apical Defect—

A variety of repairs are available depending on the presentation and whether the patient wishes to conserve the uterus. The most significant prolapses require hysterectomy as part of the correction.

#### Uterus present with patient desiring conservation of the uterus—

Shortening of the utero-sacral ligaments often results in enhanced support of the cervix within the vaginal barrel. Proprietary procedures including Metra and Elevest may be offered depending on the precise anatomy of the defect. These measures are of only minimal benefit to women with significantly prolapsed uteri and sometimes technically infeasible as the utero-sacral ligaments can not be identified. It is, of course, the rupture of the utero-sacral ligaments with pregnancy and childbirth which permits the uterine prolapse in the first place.

#### Uterus present with patient desiring removal of the uterus—

Vaginal, laparoscopic or robotic hysterectomy can be performed to relieve symptoms related to uterine prolapse. Concomitant elevation of the vaginal barrel may be required to assure it does not prolapse post operatively. Vagino-sacropexy is then performed for this purpose (see below). Recent data from Nosti, et al, demonstrates no increase in incidence of mesh erosion when vagino-sacropexy is performed with polypropylene mesh at time of hysterectomy. [10] Total laparoscopic hysterectomy or laparoscopic supra-cervical hysterectomy can be combined with sacrocolpopexy as the definitive procedures for treatment of combined uterine and vaginal wall prolapsed. We have been performing LSH and sacrocolpopexy for well over a decade with excellent outcomes. This technique has recently been published demonstrating good results and low recurrence rate. [11]

#### Uterus absent—

Enterocoele of vaginal vault prolapsed is most often corrected with Vagino-Sacropexy. Apical defect is likened to a pocket turning inside out. A variety of corrections for this condition are discussed: perineal Avaulta procedure, transvaginal Sacro-Spinous Ligament fixation and laparoscopic / robotic vagino-sacropexy are compared and contrasted.

Anterior Avaulta is placed trans-perineally. This procedure is less effective as it does not independently support the apex. This is an attractive procedure for surgeons not capable of performing vagino-

sacropexy. The anterior mesh gives support to the anterior vaginal wall and prevents it from descending. Large areas of mesh sub-mucosally can sometimes be palpated by her partner during normal coitus. Mesh erosion is also a recognized complication. Anterior Avaulta is combined with perineorrhaphy in cases where large anterior compartment prolapses are noted.

Sacro-Spinous fixation is an older procedure where a pulley stitch is put through a defect in the posterior, apex of the vagina and affixed to the sacro-spinous ligament. The suture is tensioned and the apex closed. Potential for injury to bowel with this fairly blind procedure exists. The vagina deviates toward the patient's right side and is not in the midline. Breakdown is possible as the apex does not have as wide a base of support as with contemporary mesh procedures. Recurrence rate of prolapse is higher with this procedure than vagino-sacropexy. [12]

Vagino-Sacropexy or Sacrocolpopexy is currently the Gold Standard therapy for her condition. [13,14] A "Y" shaped polypropylene mesh is affixed to the anterior and posterior vaginal barrel after parietal peritoneum is dissected free and the bladder flap is reduced. The arm of the "Y" is then tacked to the sacral promontory after the retroperitoneum is opened. Pre-operative treatment includes use of estrogen cream in the vagina to thicken the mucosa. This will be continued afterwards for several months to assist in healing. Patient will have to avoid val salva and abdominal exercise for twelve weeks as well. The likelihood of mesh erosion is 5%.

The mesh is retroperitonealized after placement and any "windows" are closed so as to preclude any internal hernia of bowel or omentum with healing. [15]



Sacrocolpopexy with prophylactic procedure for Stress Incontinence—

What should be done for women who are continent with significant prolapse planning sacrocolpopexy? Data has existed suggesting that occult cases of Stress Urinary Incontinence (SUI) can progress to overt SUI after correction of the vaginal prolapse. In the Colpopexy and Urinary Reduction Efforts (CARE) trial, women without SUI symptoms with stage II to IV prolapse who were planning sacrocolpopexy were randomly assigned to undergo sacrocolpopexy with or without Burch colposuspension. [16-18] Women with advanced POP who were continent before surgery, prophylactic Burch colposuspension at the time of abdominal sacrocolpopexy reduced postoperative SUI. At 24-month follow-up, the prevalence of stress incontinence was significantly lower in the Burch versus no Burch group (32 and 45 percent).

Liang, et al, published a prospective study of 79 continent women, 49 of whom had positive testing for occult SUI testing prior to prolapse repair surgery with or without tension-free vaginal tape midurethral sling (TVT). [19] Among these women, the rate of postoperative de novo SUI was significantly decreased in the women in the TVT versus no TVT group (10 versus 65 percent). Women with negative occult SUI testing did not undergo TVT and none developed SUI postoperatively.

Because of these data, DWC Surgeons often choose to place a mid-urethral sling when sacrocolpopexy is performed for correction of significant pelvic prolapse.

Meaningful enhancement of life quality following apical vaginal prolapse correction with sacrocolpopexy is well recognized. [20]



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