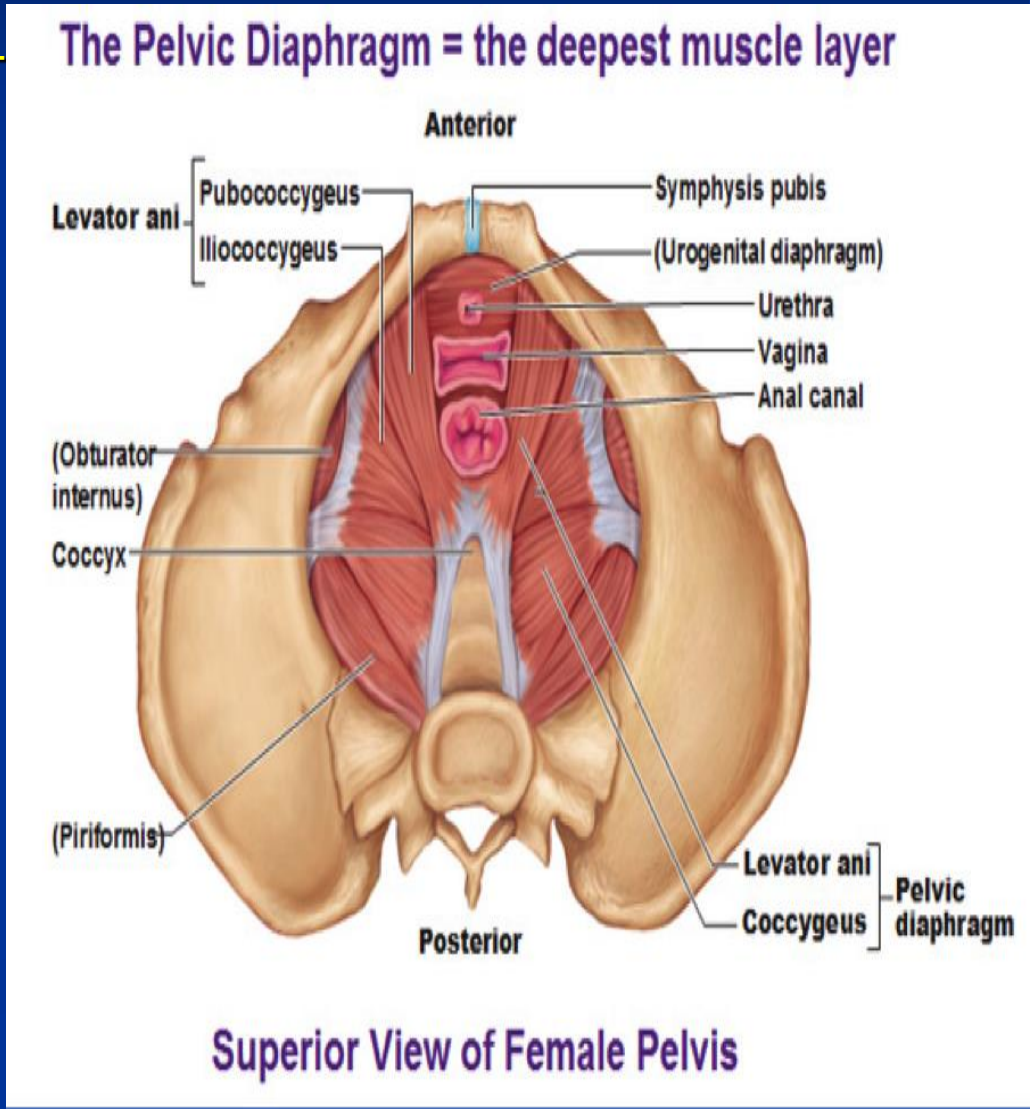
Pelvic diaphragm

Pelvic diaghragm/ levator ani muscle------

- 3 striated muscle-
  - Ileococcygeus.
  - Pubococcygeus
  - Puborectalis.

Levator hiatus- btw 2 pubococcygeus-

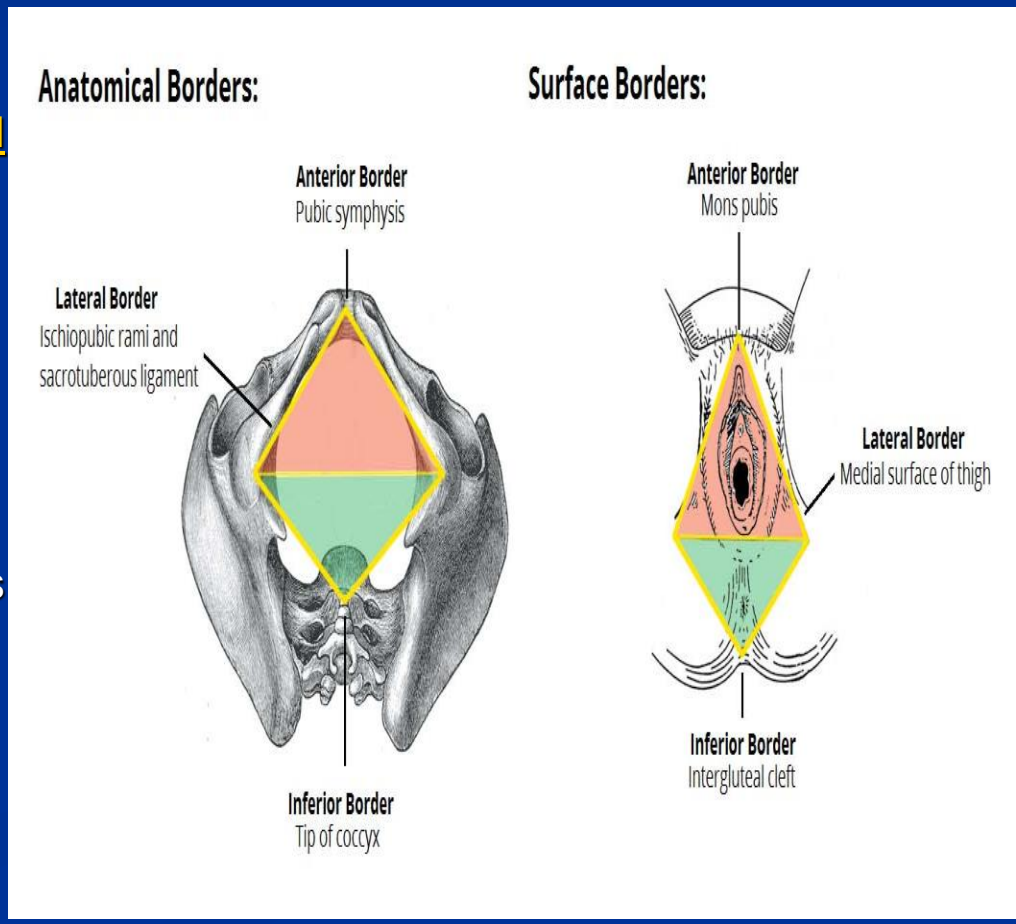
  - Lower rectum
  - Urethrae
  - Dorsal v. of penis
  - Vagina.



Perineum

Region between the thighs inferior to the pelvic diaphragm.

- In front: pubic arch & arcuate ligament.
- Behind: tip of the coccyx
- Side: inferior rami of pubis and ischial tuberosity, & sacrotuberous ligament
- superiorly: pelvic floor
- inferiorly: skin and fascia.



Part:

Line connecting ischial tuberosities divides perineum into 2 triangles:

- urogenital triangle-- penis or vagina.
- Anal triangle containing the anus.

The *perineal body* (or central tendon of *perineum*)

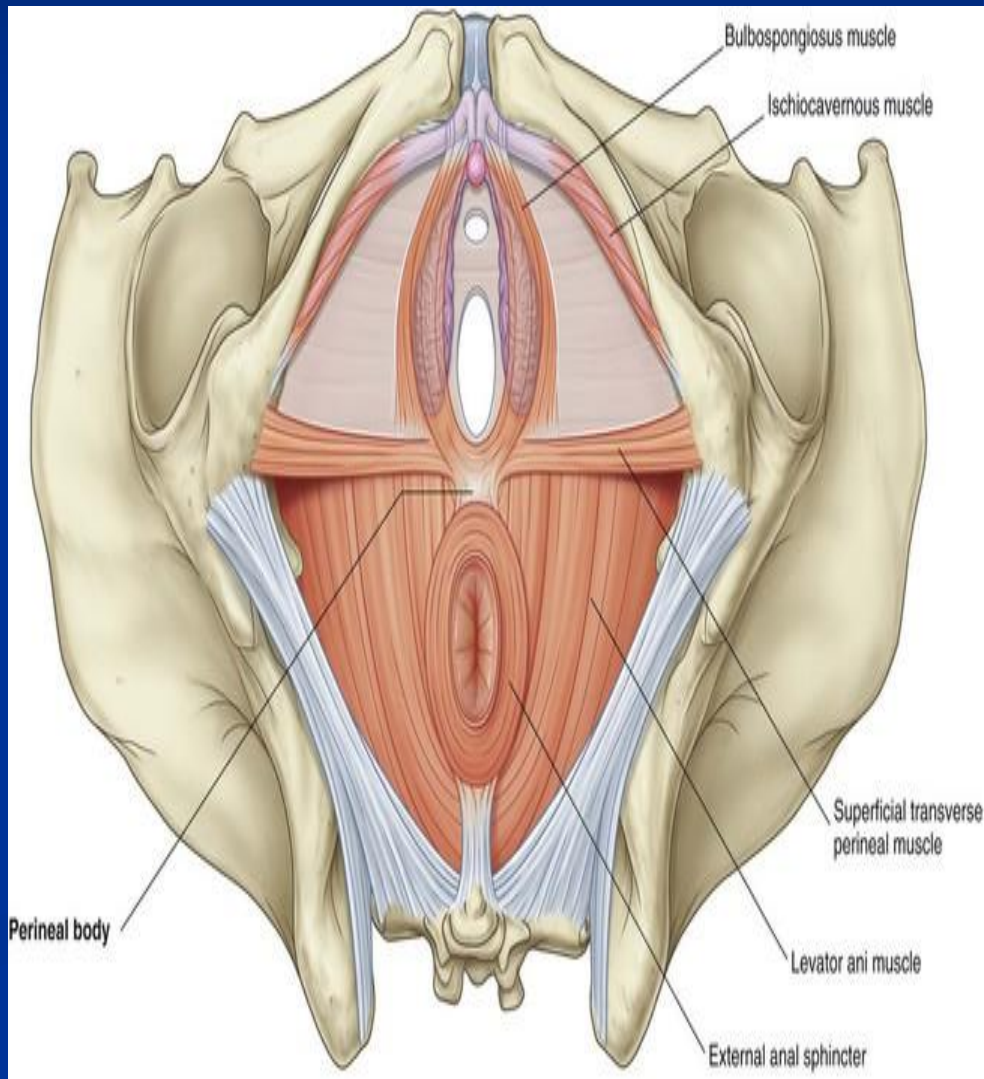
Pyramidal fibromuscular mass at the junction between the urogenital triangle and the anal triangle.

Location:

- In males--between the bulb of penis and the anus;
- In females--between the vagina and anus, & about 1.25 cm in front of anus.

Following muscles are attached:

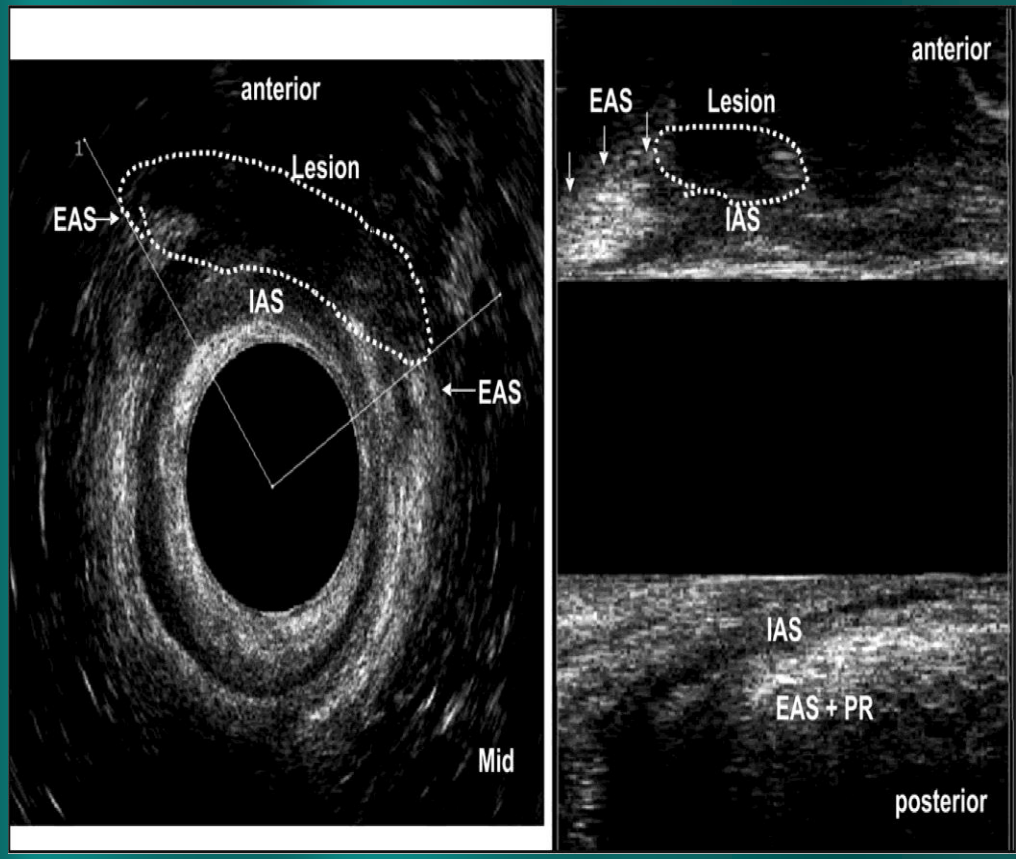
- EAS
- Bulbospongiosus muscle
- Superficial transverse perineal muscle
- Anterior fibers of the levator ani
- Fibers from external urinary sphincter
- Deep transverse perineal muscle



Diagnostic Studies

Endoanal Ultrasound-

- Anatomical assessment----in incontinence, fistulous disease, and anal pain.
  - IAS--- hypoechoic.
  - EAS---hyperechoic and
  - Scar---mixed echogenecity.
- Perineal body thickness (PBT)
  - <10 mm---- abnormal, and
  - >12 mm---- unlikely to have a sphincter defect.



Anterior plane of dissection—

Close rectal
Mesorectal
Extramesorectal.

Close rectal or perimuscular plane –

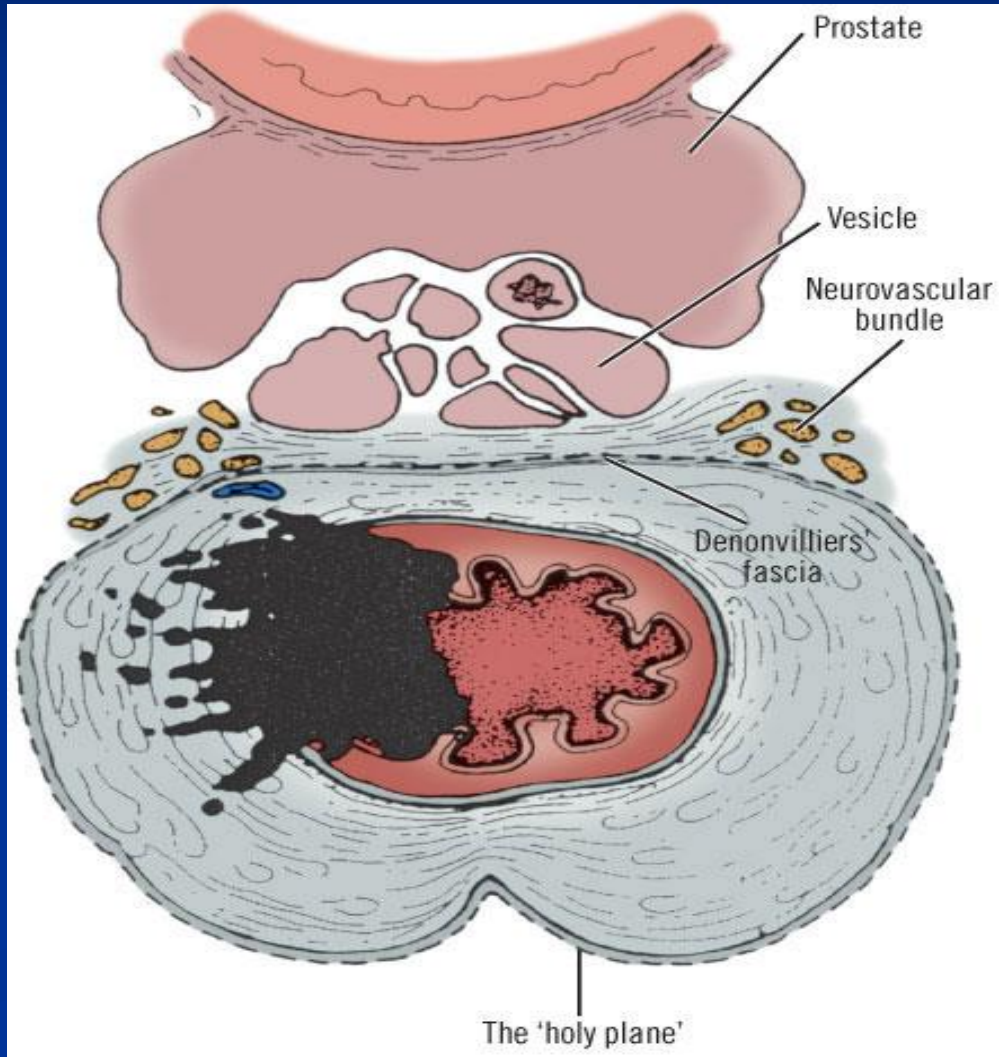
- Inside the fascia propria of the rectum,
- More difficult and bloody.

Mesorectal plane---

- Natural anatomic plane.
- More appropriate.

Extramesorectal plane---

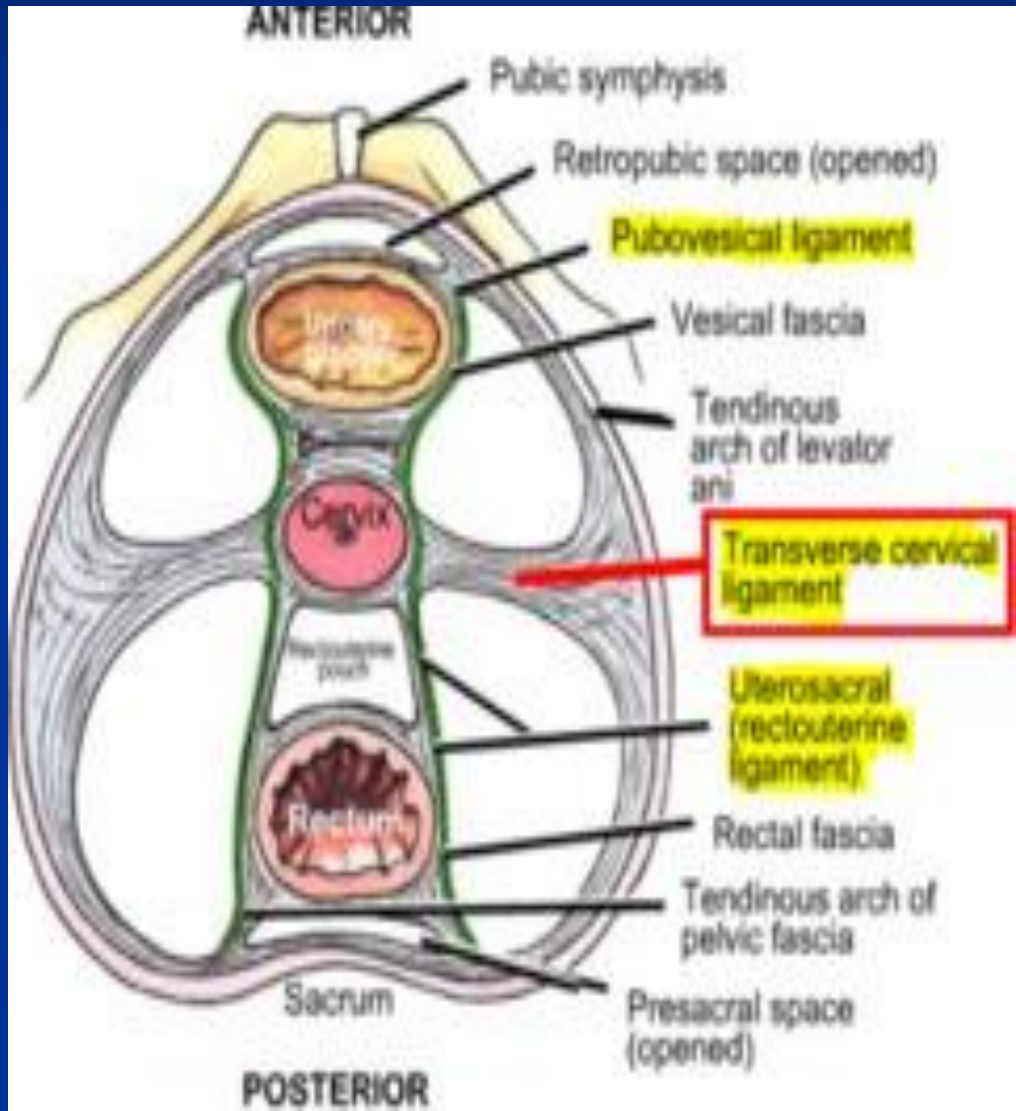
- Resection of the DF with the exposure of prostate and seminal vesicles
- High risk of mixed nerve injury-- damage of the periprostatic plexus.



Pelvic compartment

Investigation:

- Dynamic cystoproctography or cystodefecography
- 4 contrast study to outline—
  - SI ,
  - bladder
  - vagina,
  - rectum.



Pelvic floor disorder

Anterior compartment (urinary)----

- cystocele and
- hypermobile bladder neck.

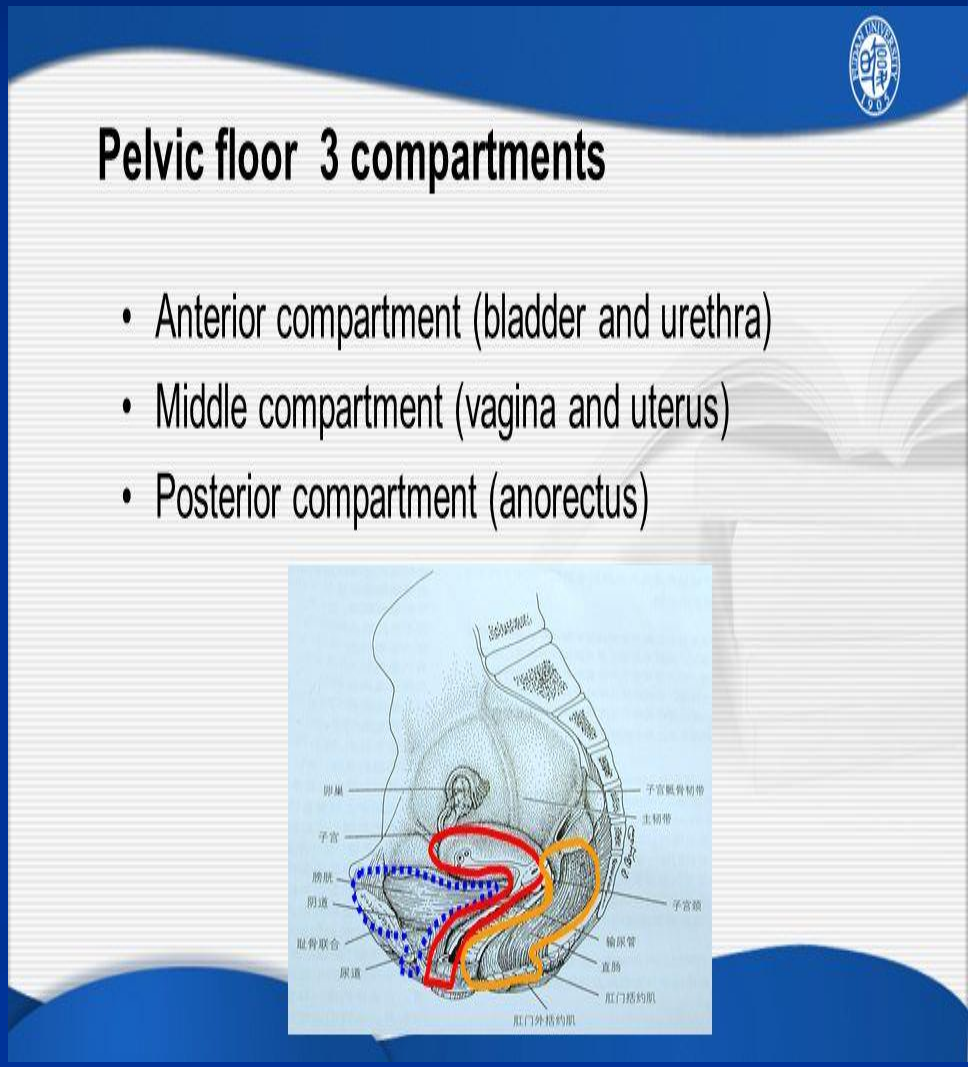
Middle compartment(genital)-----

- vaginal vault prolapse;
- Uterine prolapse.

Posterior compartment (anorectal)---

- rectocele,
- enterocele, and
- Rectal Intussusception

- 95% of the women with pelvic floor dysfunction had abnormalities of all 3 compartments.



Pelvic floor disorder

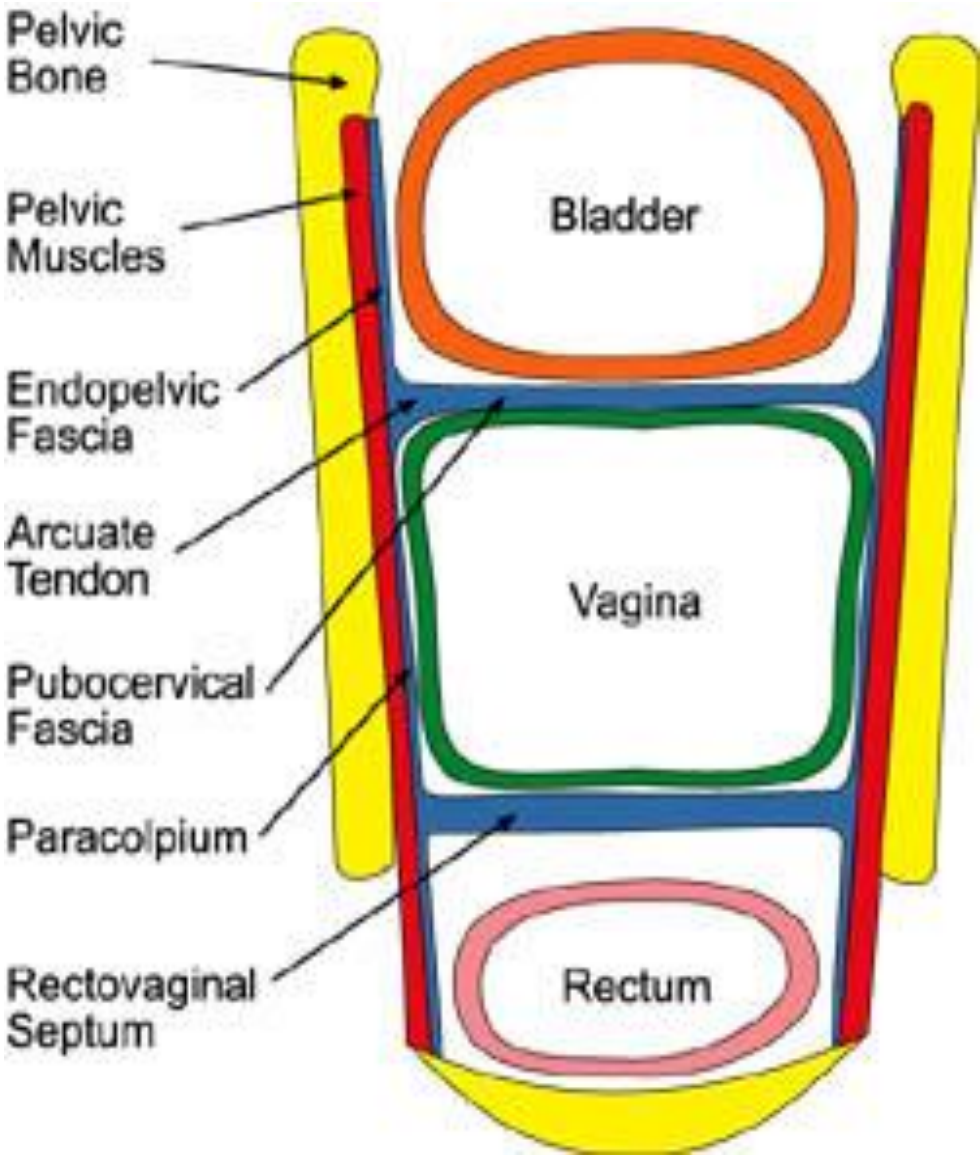
Results from loss of pelvic floor support.

Sex variation:

- Commonly women
  - Anatomical differences in the size of the genital hiatus.
- More in aged person.

The exact etiology: unclear.

- Chronic stretching of the pelvic muscles leads to myopathic injury.



Pelvic Floor Descent/ Failure

Excessive perineal descent -

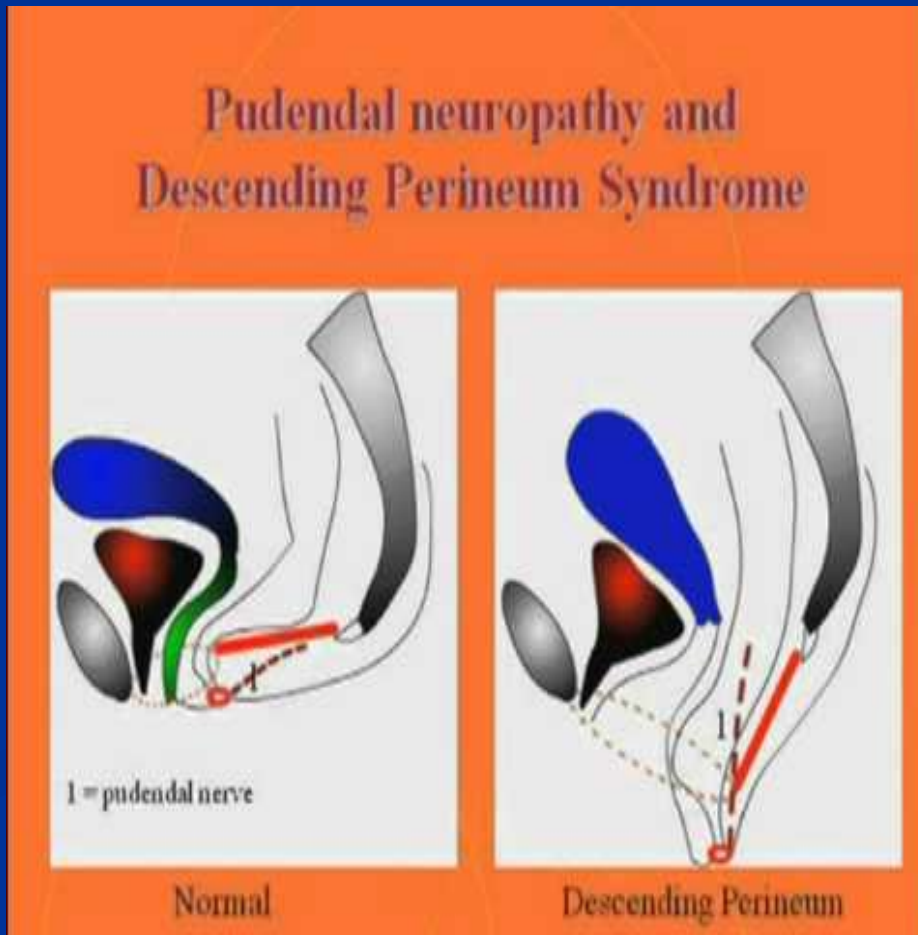
- FI,
- Severe constipation,
- SRUS,
- anterior mucosal and full-thickness rectal prolapse.
- Urinary voiding problem.

Pathophysiology:

- Abnormal perineal descent, during straining, ----traction and damage to the pudendal & pelvic floor nerves---- neuropathy & muscular atrophy.

- Irreversible pudendal nerve damage occurs after a stretch of 12% of its length, and

- Descent of perineum of 2 cm, estimated to cause pudendal nerve stretching of 20%.



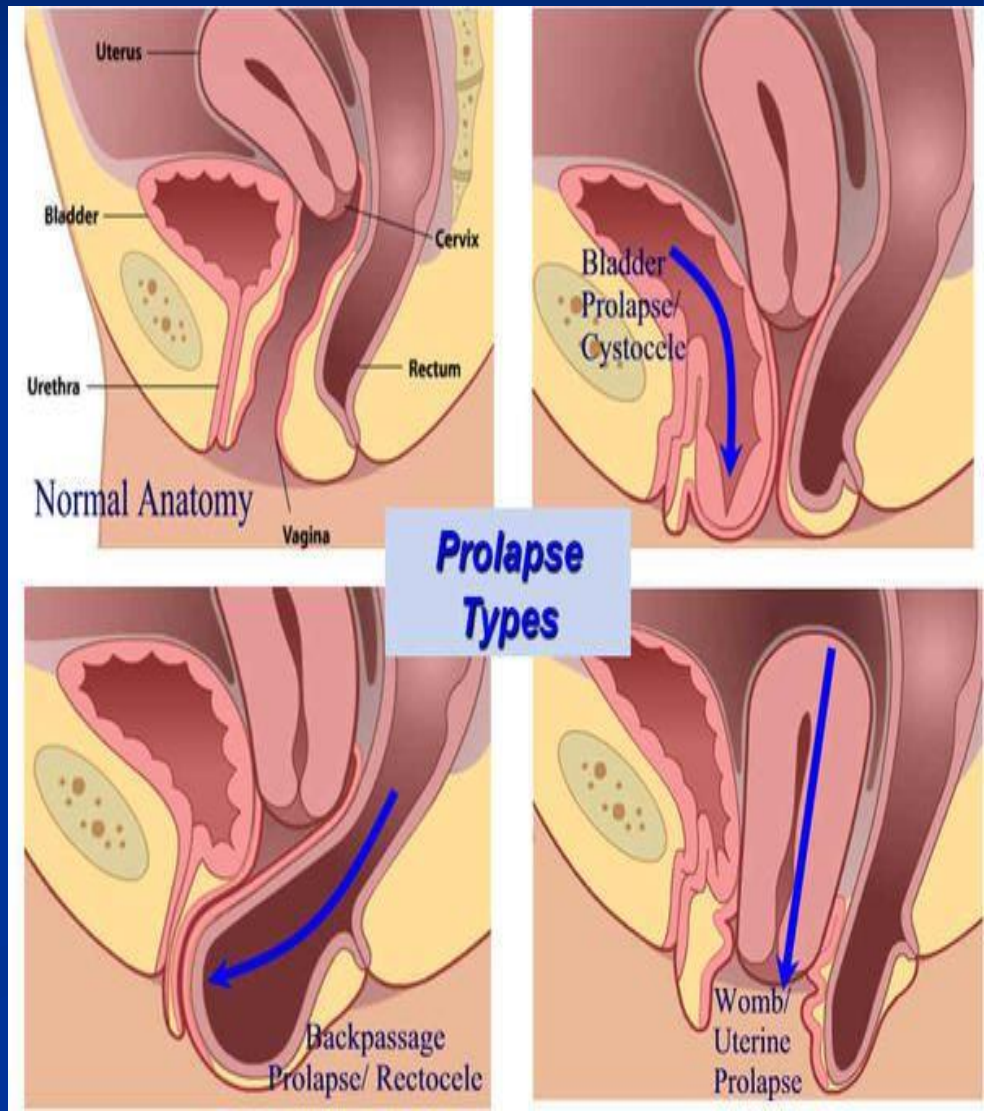
Diagnosis:

Precipitating factor :

- Chronic straining- 75% of subjects.
- Increased age
- Female.
- Neuropathy.
- **Chronic illness**
- **Malnutrition**
- **Internal prolapse**
- **Genitourinary & rectal prolapse.**

O/E-

- Obliteration of perineal concavity- outward ballooning of perineum.
- Genital or rectal prolapse.



Investigation:

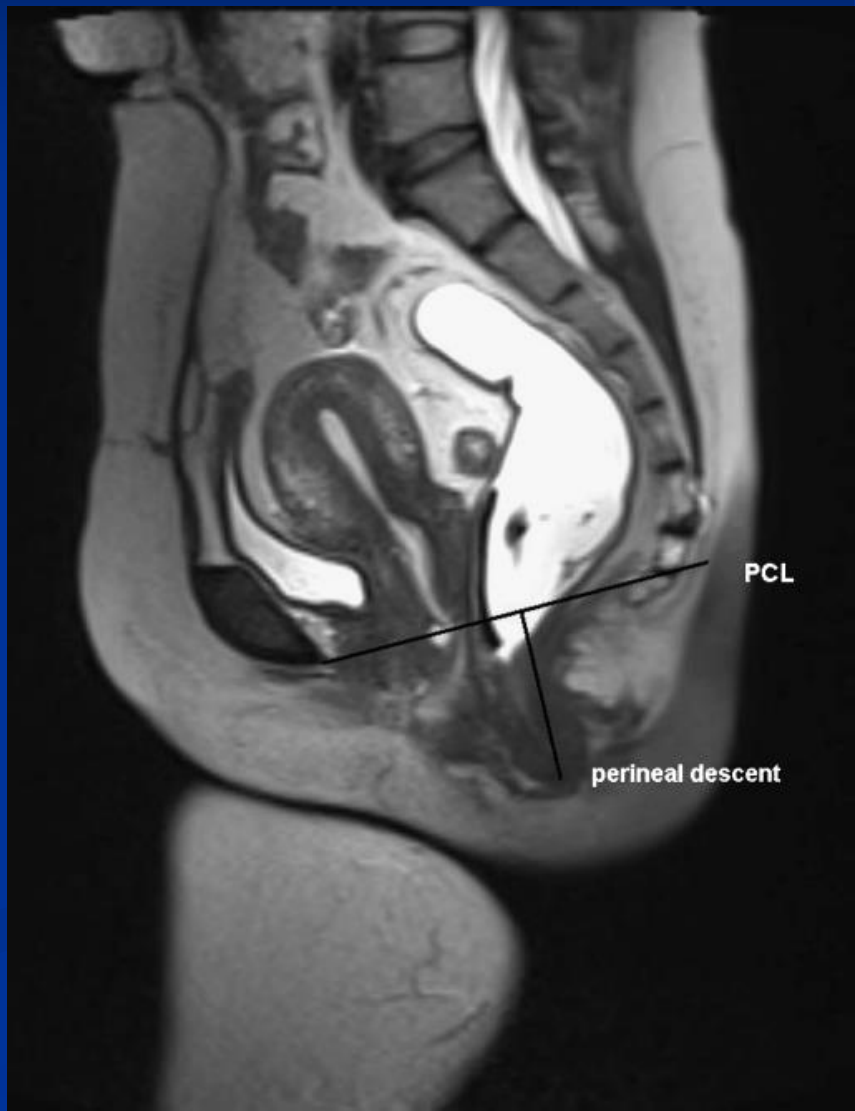
St Mark's perineometer placed on the ischial tuberosities---movable latex cylinder on the perineal skin----The distance between the level of the perineum and the ischial tuberosities is measured at rest & straining.

Interpretation:

- **Negative- plane** of the perineum is above the tuberosities.
- Positive- descent below this level.
- The plane of the perineum at rest should be −2.5±0.6 cm, descending to +0.9±1.0 cm on straining.

Dynamic proctography- The anorectal angle normally lies on a PCL & descends by 2±0.3 cm on straining.

- In DPS----descends 5-6 cm from PCL.

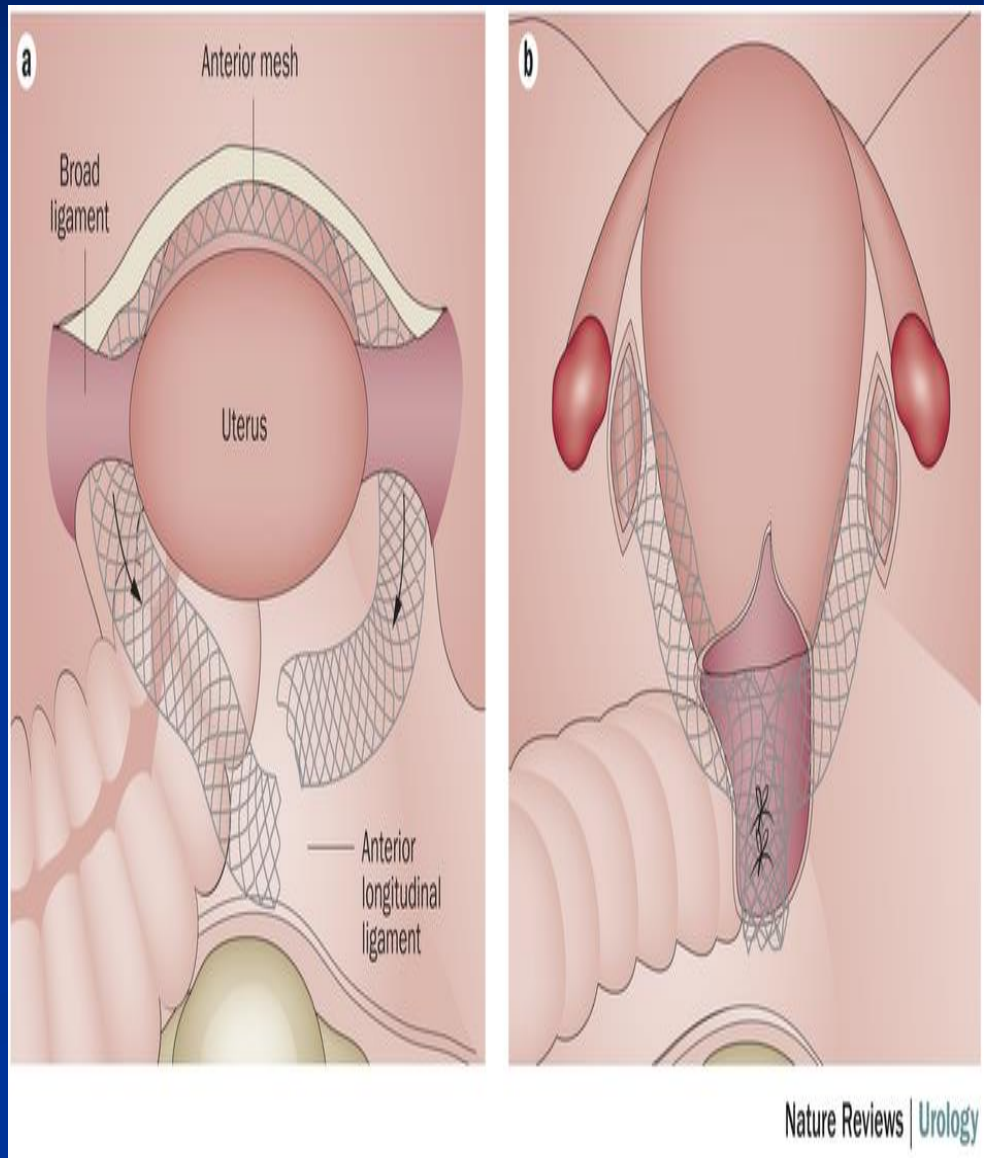


Management:

- Dietary fibre.
- Laxative.
- Bowel training----avoid straining.

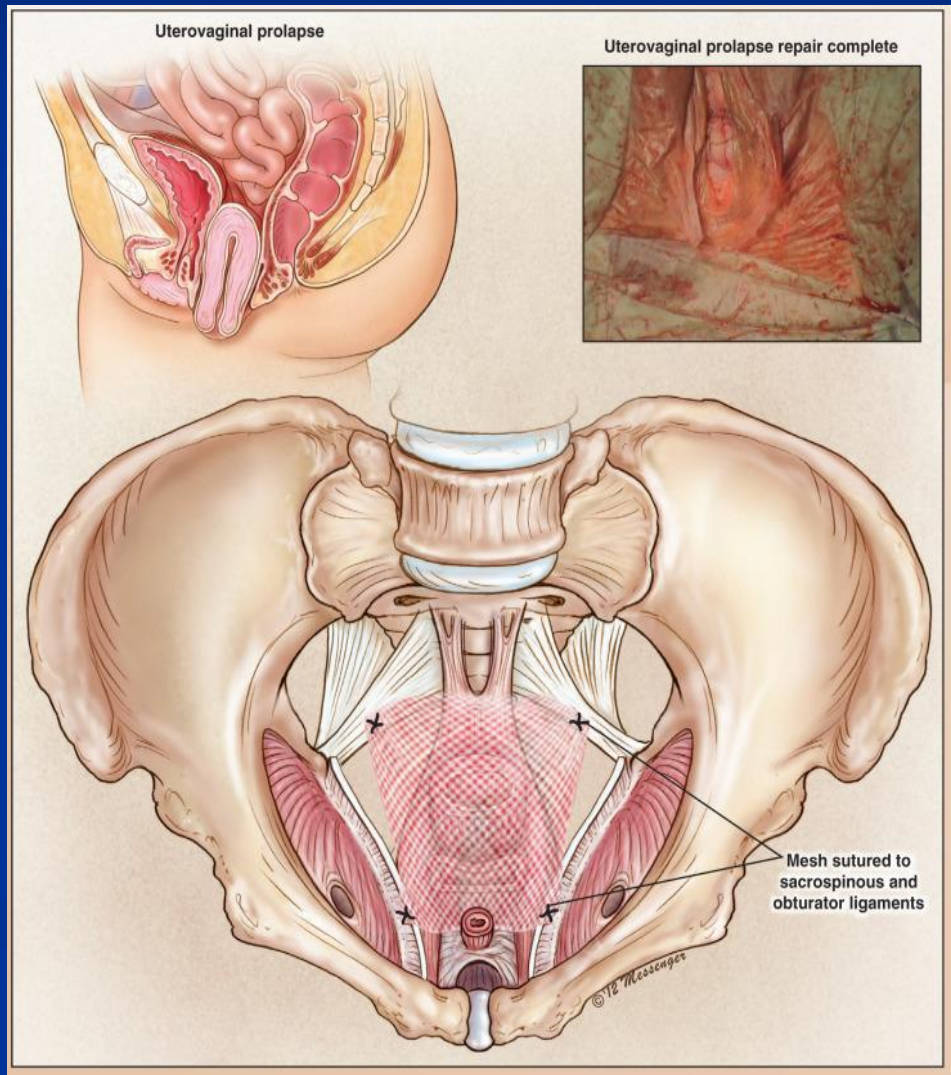
Surgery:

- Restoration of pelvic floor by-
  - mesh &
  - suspension or
  - resection of rectum.
- Combined- abd. Colporectopexy with obliteration of Cul De sac.
- Combined abdominoperineal approach -colporectopexy with plication of levator & ant. Perineorrhaphy.



In pelvic floor laxity- cystocele rectocele enterocele-----

- Total pelvic Marlex mesh repair.



Rectocele

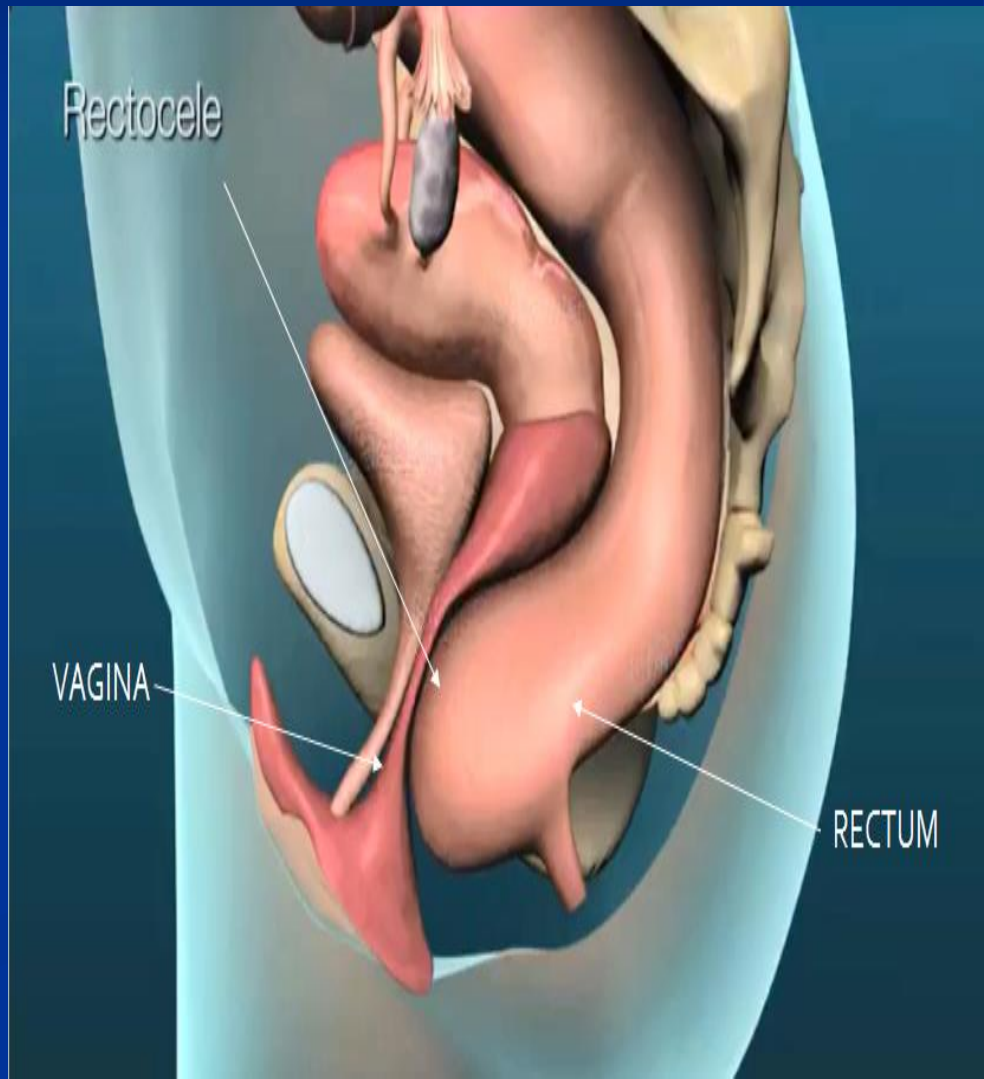
Herniation of the anterior rectal wall into the lumen of the vagina.

Pathogenesis:

- Chronic straining on a weakened rectovaginal septum both by-
  - obstetric trauma and
  - Progressive pelvic floor deficiency, as part of the aging process.
- Others believe that rectoceles ---ODS by trapping of feces---further straining ---aggravates the problem.
- 4^{th} or 5^{th} decade of life.

5 most common presenting symptoms---

- excessive straining,
- incomplete evacuation,
- manual assistance required,
- sense of fullness,
- Bowel movement <3/week.



Defecography

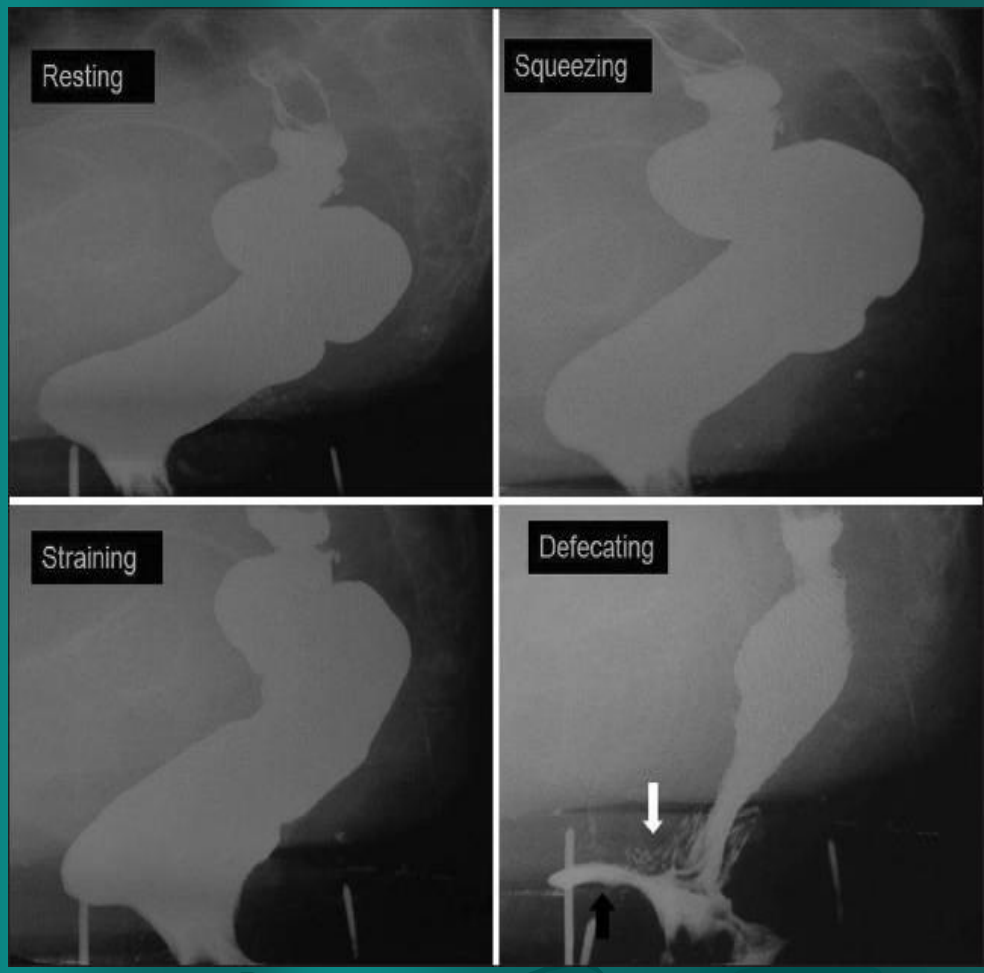
Radiological visualization of the act of defecation.

Provides a picture –

- Successive phases of defecation.
- Dynamic impression of pelvic floor.
- Changes in the rectal configuration and the anorectal angle.
- degree of evacuation.

Value in FI–-

- Demonstrate presence of incomplete evacuation---overflow incontinence.



Diagnosis:

- adequate history
- bimanual or rectovaginal palpation.
- **A hooked finger -** pocket-like defect.
- Defecography- <2 cm=insignificant.
  - >3 cm in depth- abnormal.

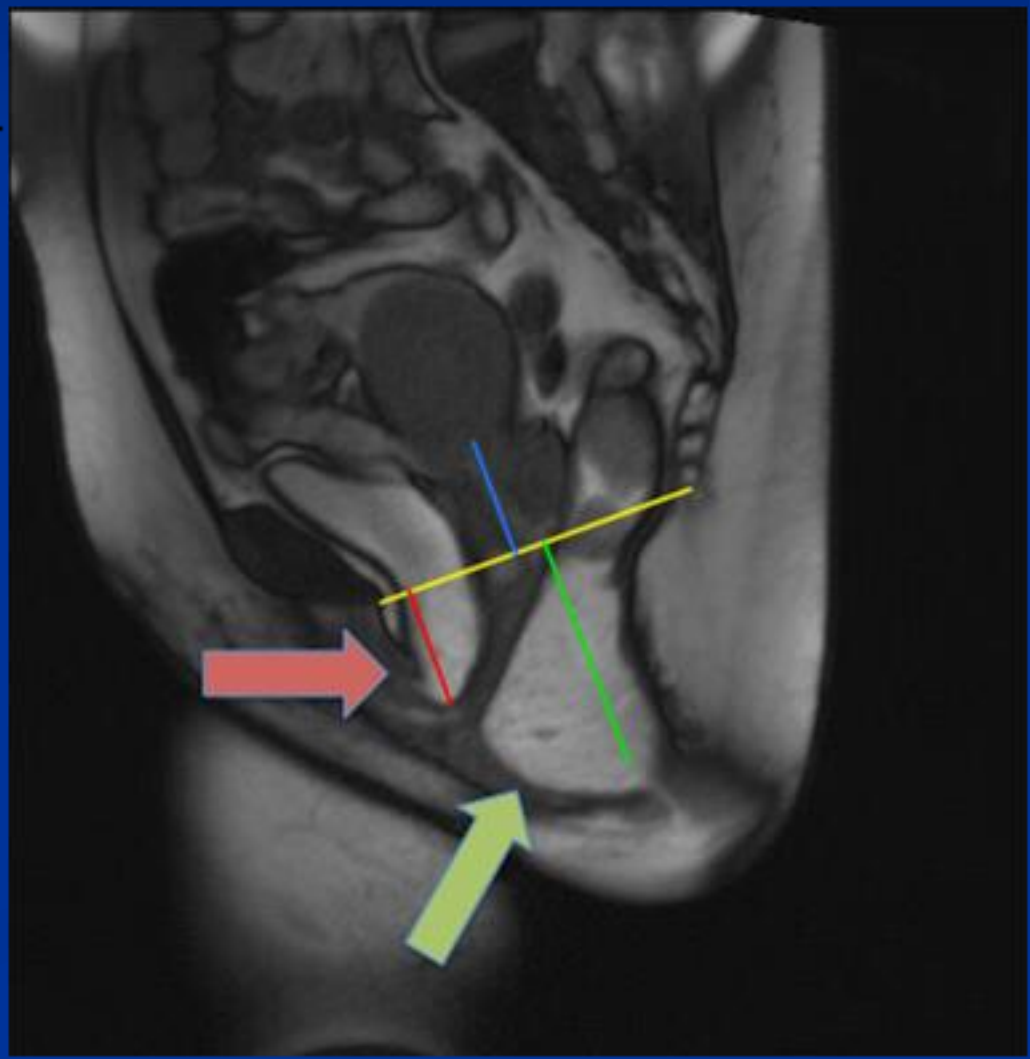
Investigation:

Defecography –

- Size,
- Barium trapping,
- Intussusception,
- evacuation, and perineal descent

Serves 3 major purposes:

- Preoperative presence and size,
- Additional pelvic floor abnormalities,
- Assessment of postop changes.



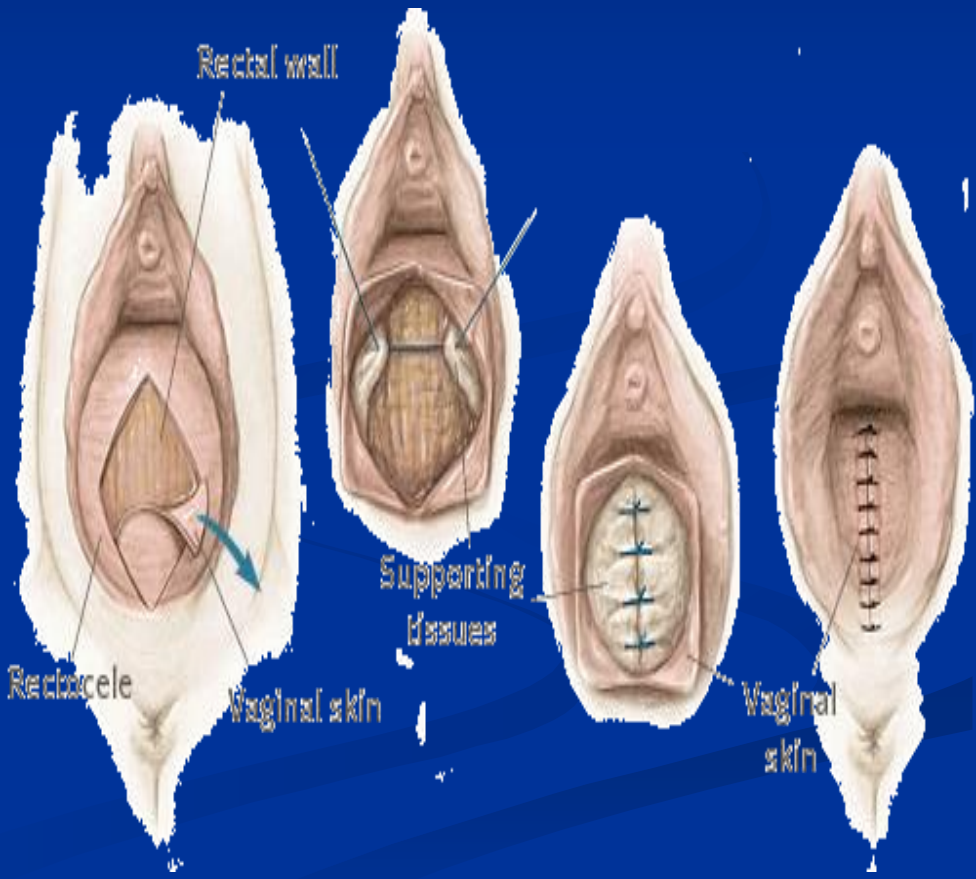
Rectocele Repair

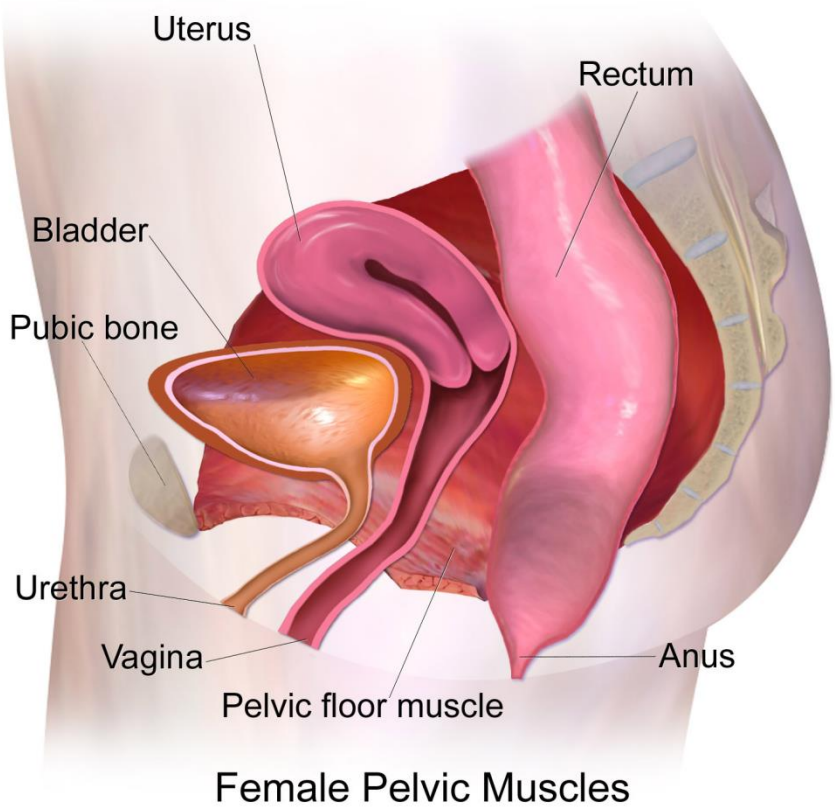
- Transvaginal,
- Transanal
- Transperineal
- Abdominal.

Till now it is not known which treatment is the most optimal one.

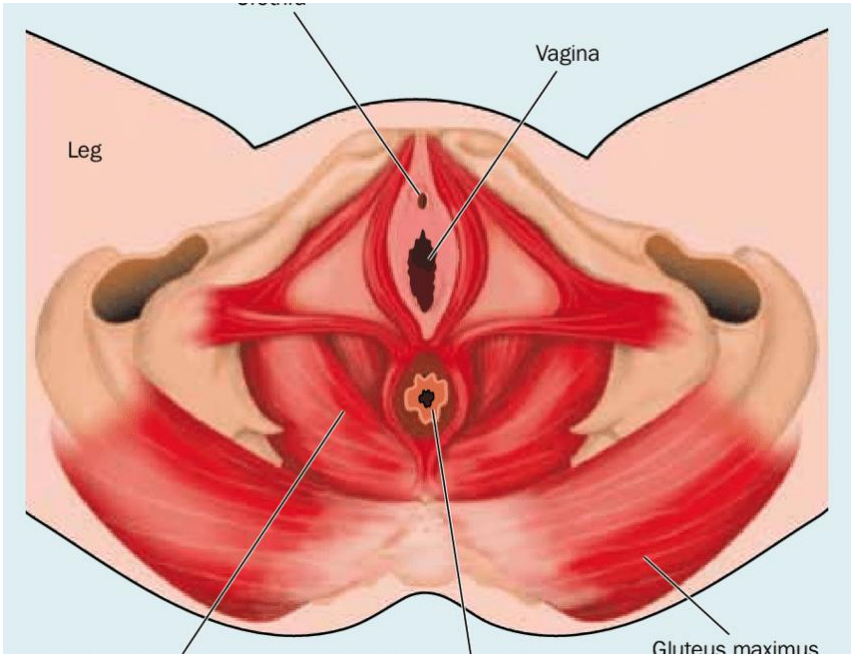
Prognosis:

- Previous hysterectomy,
- Large rectocele on defecography,
- Preop. use of enemas & laxatives related to a poor outcome.





Female Pelvic Muscles


Vagina
Leg
Gluteus maximus

CLASSIFICATION OF PELVIC ORGAN PROLAPSE

1. Uterine prolapse: 1st, 2nd, or 3rd, degree

2. Vaginal prolapse: which may be;

A) Anterior vaginal wall prolapse

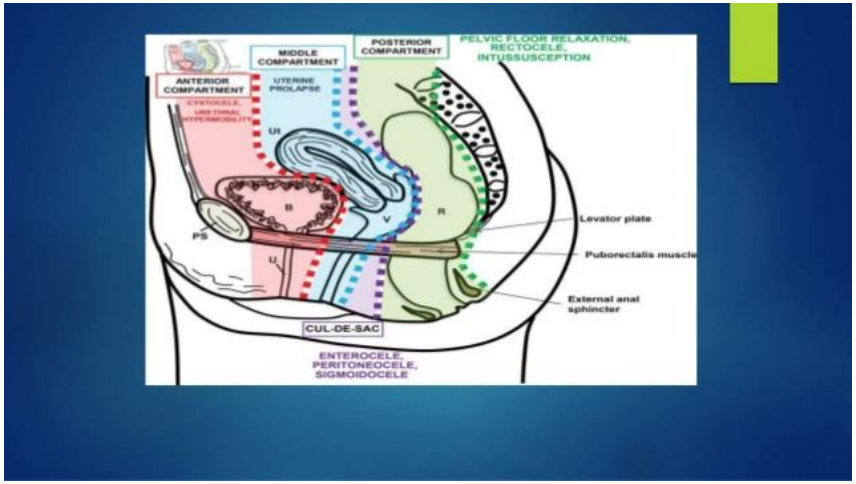
- Cystocele (bladder descent)
- Urethrocele (urethral descent)
- Cystourethrocele (both bladder and urethral descent)

B) Posterior vaginal wall prolapse

- Rectocele (rectal descent)
- Enterocele (small bowel descent through the Pouch of Douglas)

3. Combined Uterovaginal prolapse:

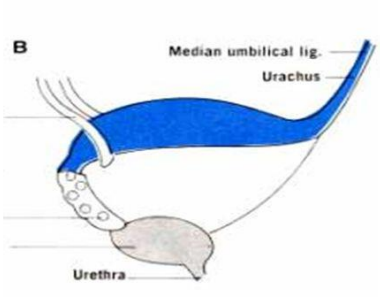
4. Vault prolapse:

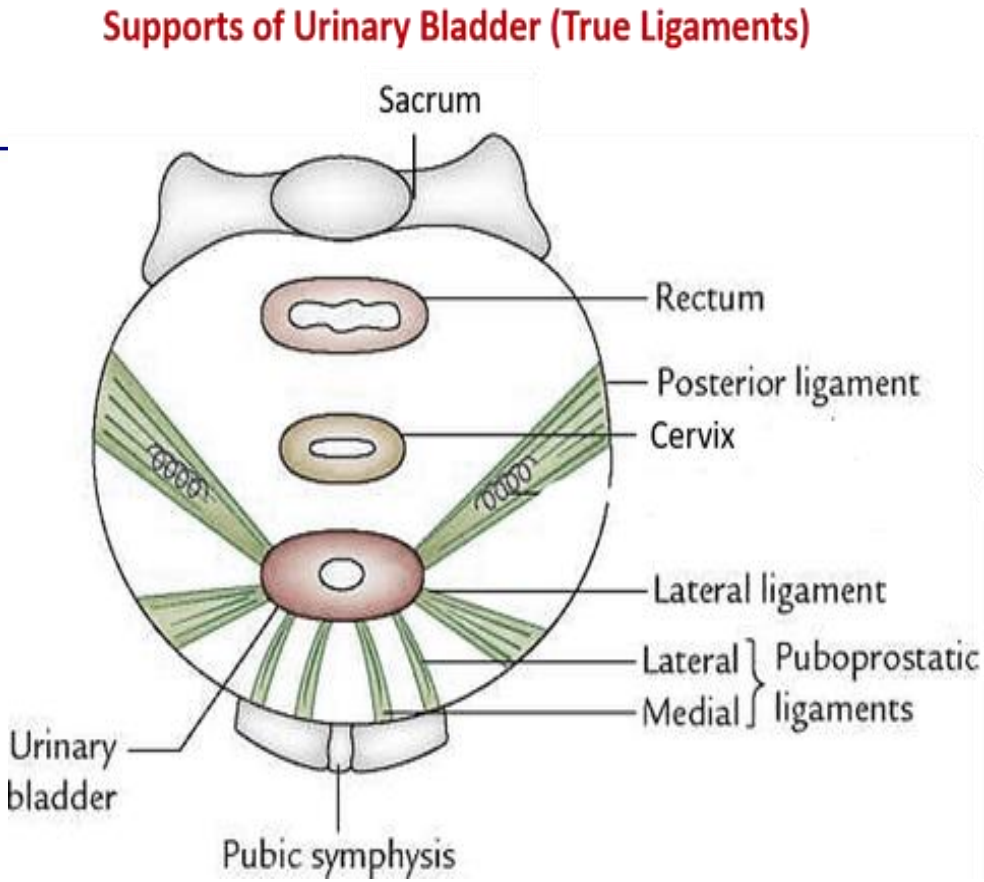


Supports of bladder

Ligaments of bladder

- Ligaments support the bladder. Two types. True & false.
- **True ligaments:** Thickened pelvic fascia.
- Lateral true ligament – attached from side of bladder to lateral pelvic wall.
- Posterior true ligament – attached from lateral borders of base of the bladder to lateral wall
- Medial & lateral puboprostatic ligaments (pubovesical in female) – attached from body of pubis to prostate.
- Median umbilical ligament – formed by urachus.





Pelvic organ prolapse

Classification

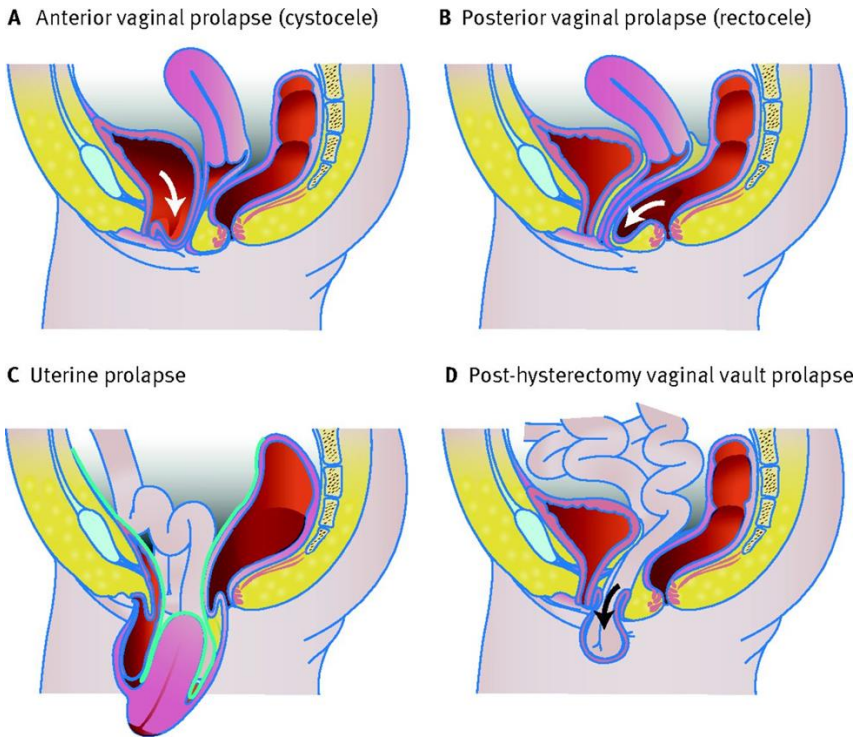
Anterior vaginal wall prolapse
- Urethrocele: urethral descent
- Cystocele: bladder descent
- Cystourethrocele: descent of bladder and urethra .

Posterior vaginal wall
- Rectocele: rectal descent
- Enterocele: small bowel descent

Apical vaginal prolapse
- Uterovaginal: uterine descent with inversion of vaginal apex

occur when the lateral cervical ligaments become weakened .

- Vault prolapse: post-hysterectomy inversion of vaginal apex ,due to inadequate support by lateral cervical ligaments



Pathophysiology of cystocele

Pathophysiology of cystocele

- Weakened pubocervical fascia at the medial edge of the levator muscle
- Detachment of lateral vaginal wall from the pelvic side wall at the white line of arcus tendineus fascia

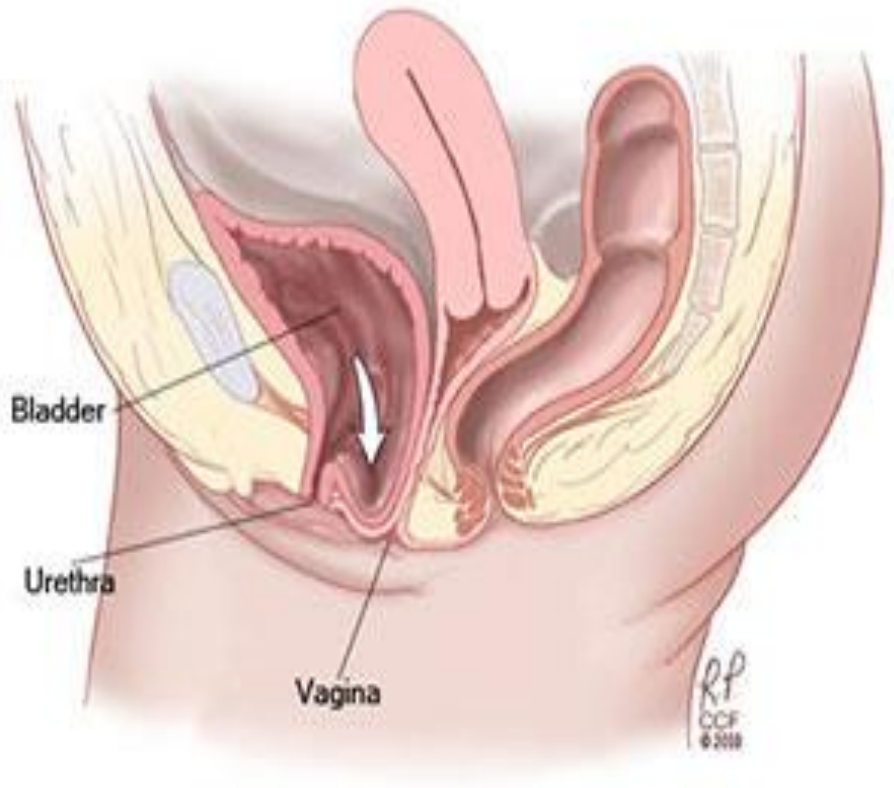
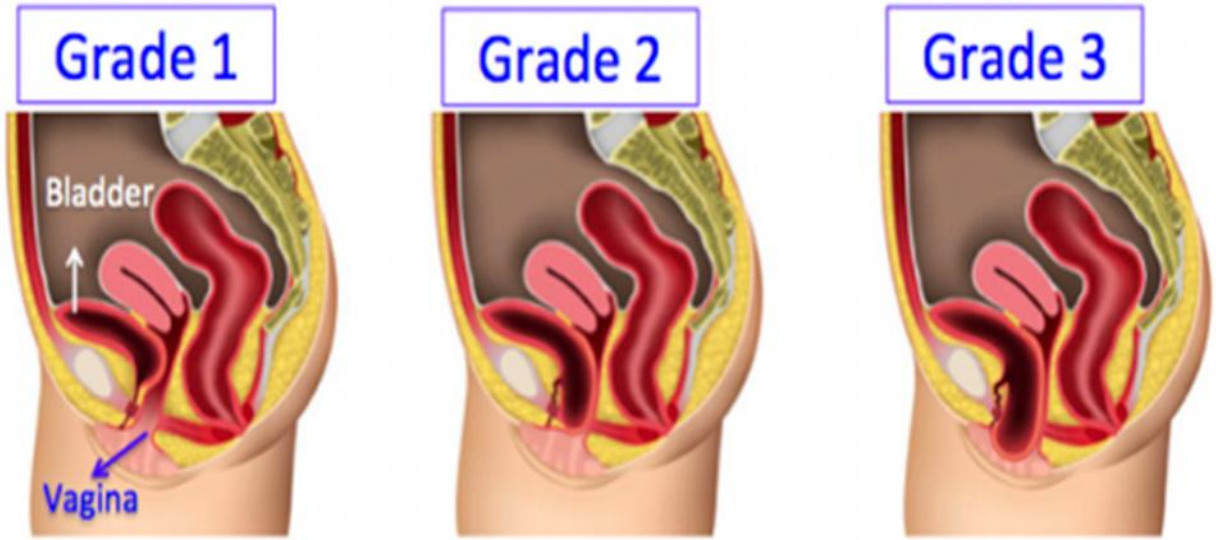


Table 2. Staging of Pelvic Organ Prolapse

Baden-Walker system		*Pelvic organ prolapse quantification system*	
Grade	*Description*	*Stage*	*Description*
0	Normal position for each respective site, no prolapse	0	No prolapse
1	Descent halfway to the hymen	I	Greater than 1 cm above the hymen
2	Descent to the hymen	II	1 cm or less proximal or distal to the plane of the hymen
3	Descent halfway past the hymen	III	Greater than 1 cm below the plane of the hymen, but protruding no farther than 2 cm less than the total vaginal length
4	Maximal possible descent for each site	IV	Eversion of the lower genital tract is complete

Adapted with permission from Onwude JL. Genital prolapse in women. BMJ Clin Evid. *2012;3:817.*



DEFINITION AND CLASSIFICATION

A prolapse is **protrusion** of an organ or structure beyond its normal confines. Prolapses are **classified** according to their location and the organs contained within them

Anterior vaginal wall prolapse

Urethrocele
Urethral descent
Cystocele
Bladder descent
Cystourethrocele
Descent of bladder and urethra

POSTERIOR vaginal wall prolapse

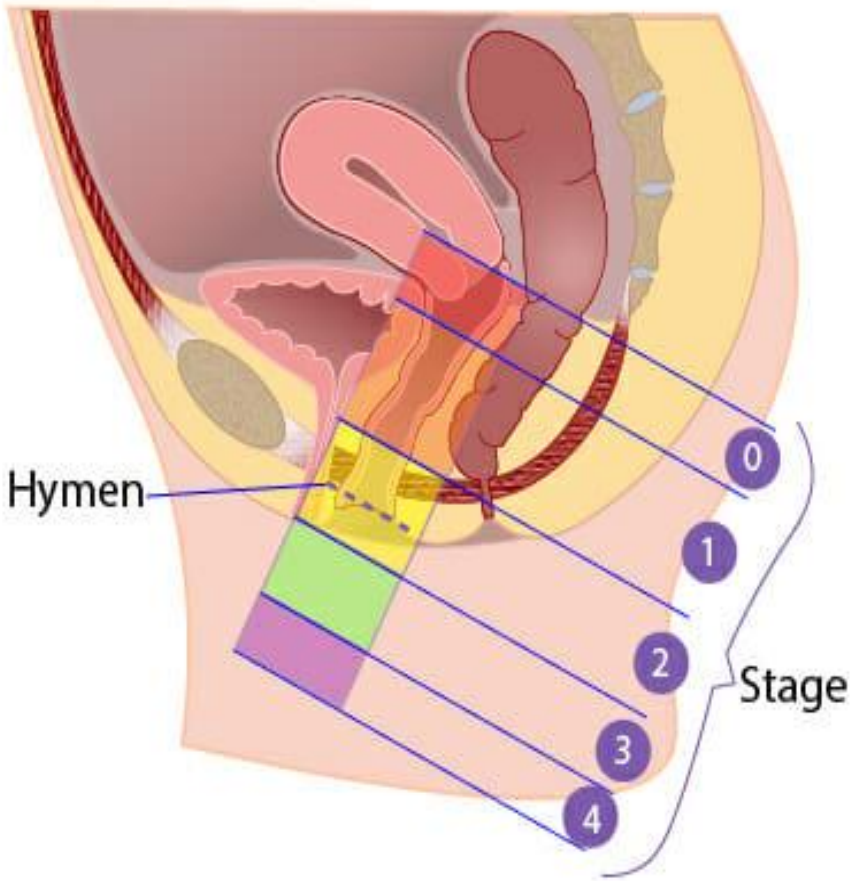
Rectocele
Rectal descent
Enterocele
Small bowel descent

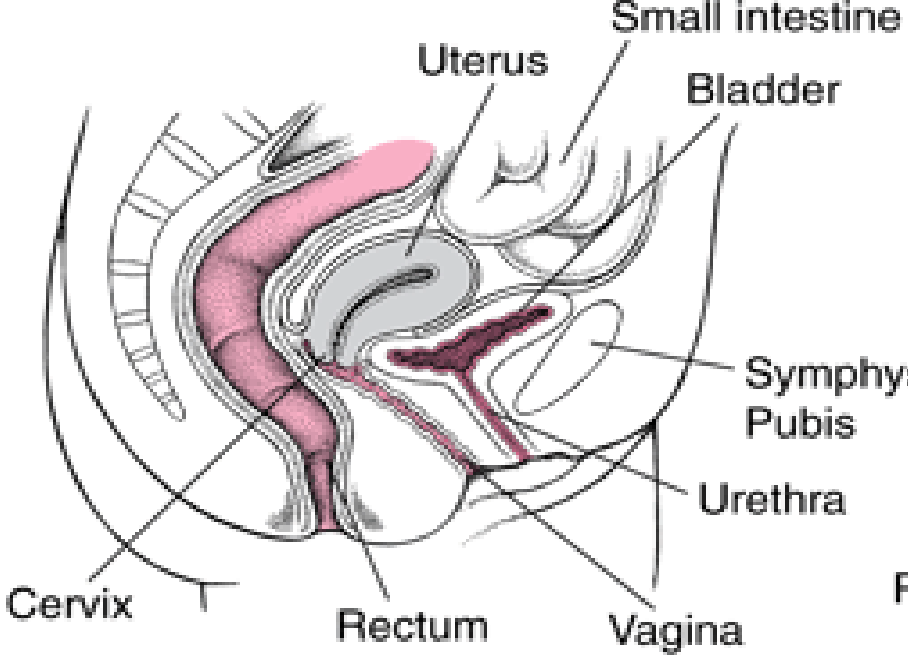
APICAL vaginal prolapse

Uterovaginal
Uterine descent with inversion of vaginal apex
Vault
Post-hysterectomy inversion of vaginal apex

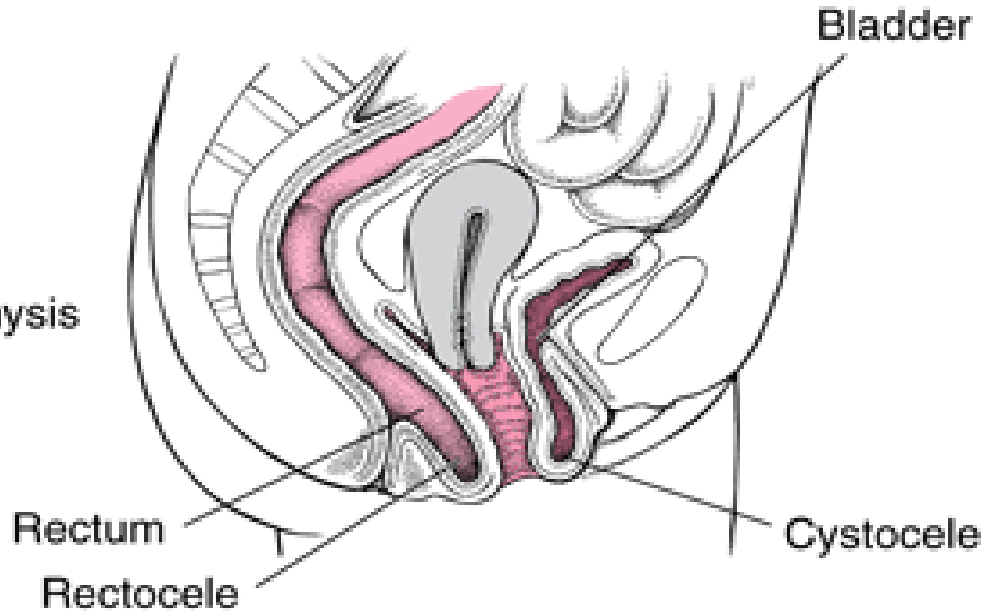
POPQ

Table 1. Pelvic Organ Prolapse Quantification (POPQ) Staging System	
Stage 0	No prolapse (apex can descend within 2 cm of hymen)
Stage I	Leading edge descends to 1 cm above hymen
Stage II	Leading edge descends to within 1 cm of the hymen
Stage III	Leading edge extends >1 cm beyond hymen but <2cm of total vaginal length
Stage IV	Complete eversion, leading edge >2 cm of total vaginal length

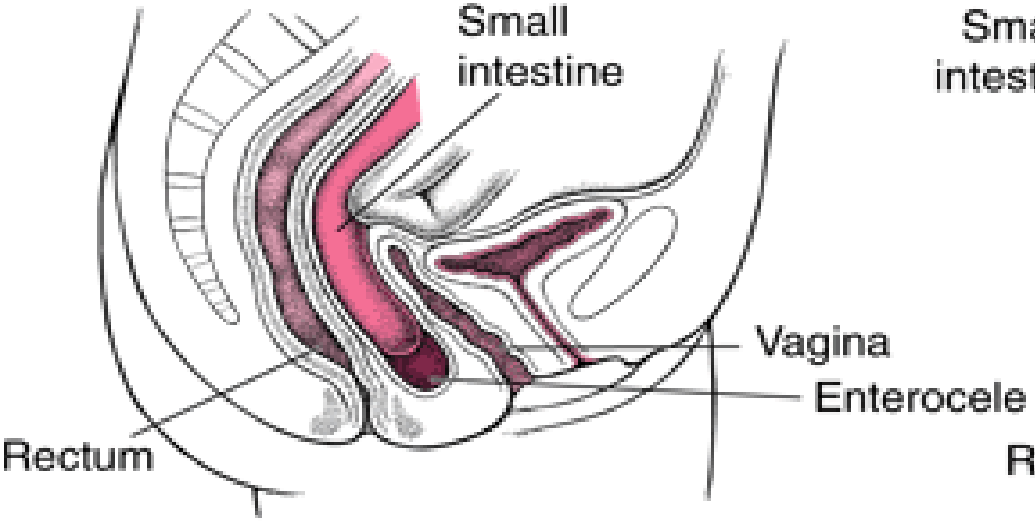




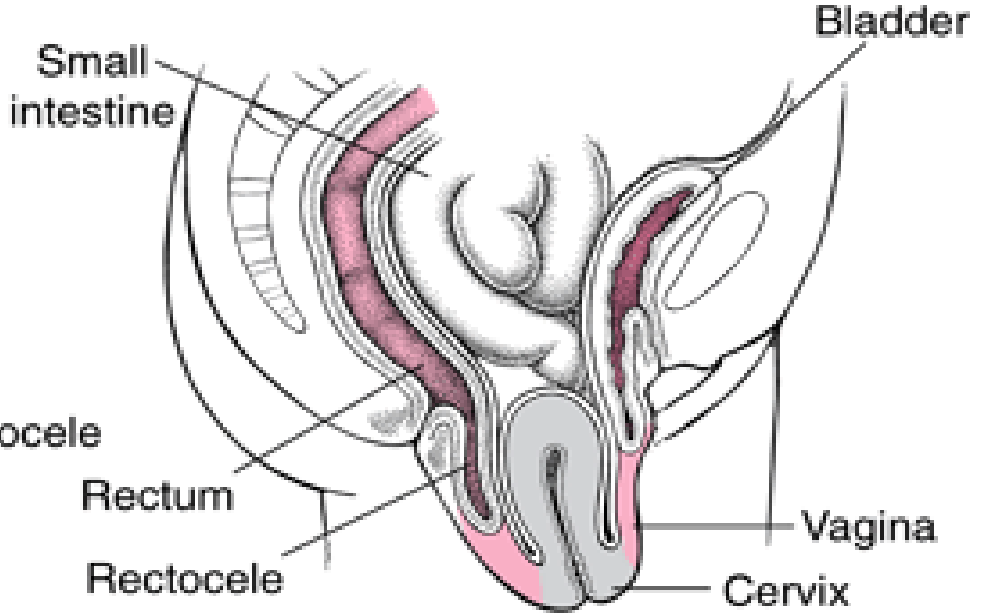
Normal



Rectocele and Cystocele



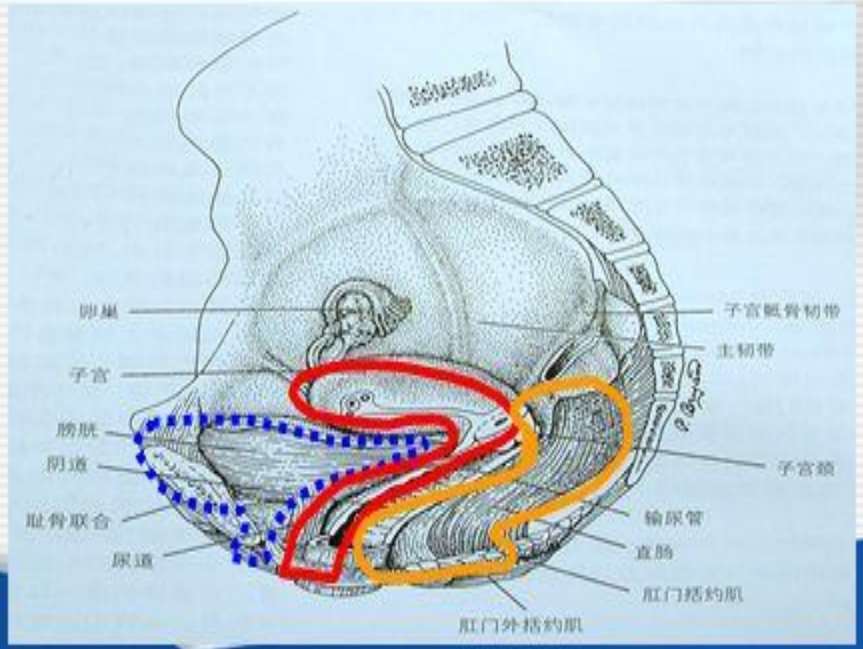
Enterocele



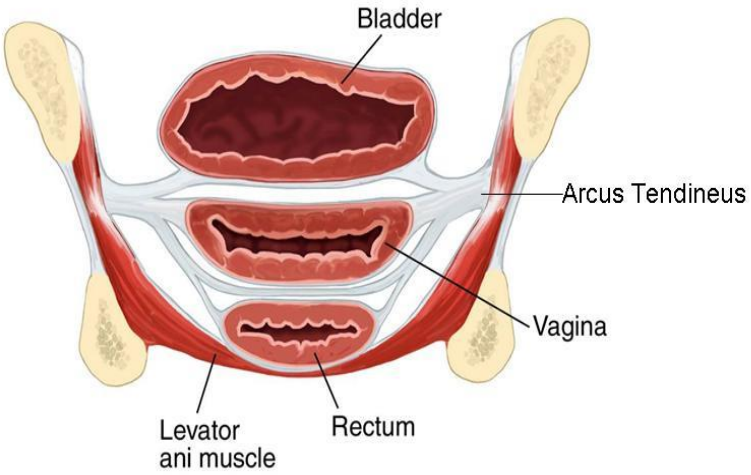
Prolapse of Uterus and Vagina

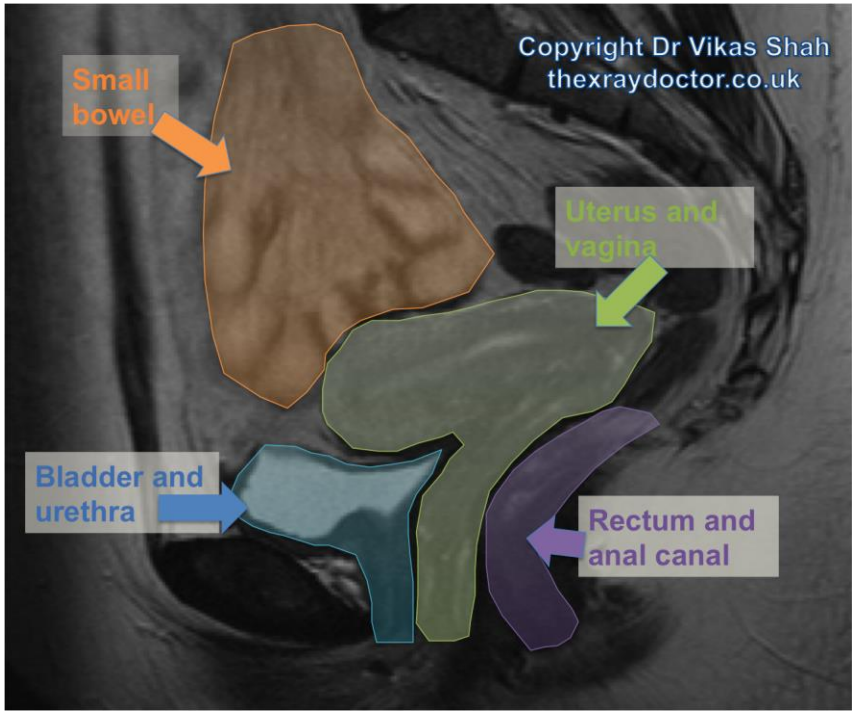
Pelvic floor 3 compartments

- Anterior compartment (bladder and urethra)
- Middle compartment (vagina and uterus)
- Posterior compartment (anorectus)



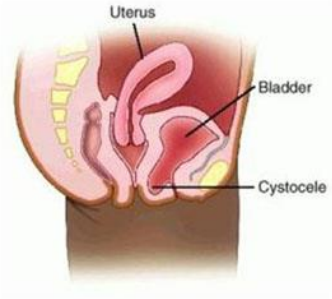
Normal Pelvic Floor Fascia Structures

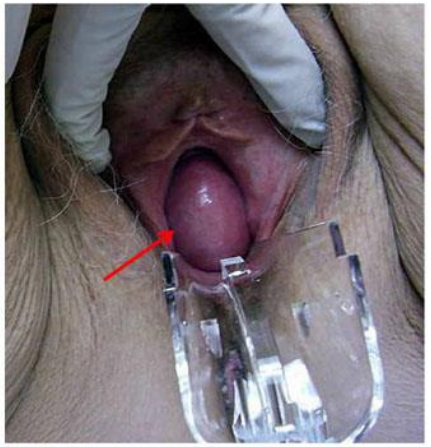




Cystocele/Urethrocele

- **Pathophysiology/ Etiology**
- Associated with obstetric trauma to fascia, muscle, and ligaments (results in poor support)
- Often becomes apparent years later, when genital atrophy associated with aging occurs
- May also be due to congenital defect or appear after hysterectomy





Vaginal exam revealing protrusion of a cystocele (arrow)

Diagnosis:

- adequate history
- bimanual or rectovaginal palpation.
- **A hooked finger -** pocket-like defect.
- Defecography- <2 cm=insignificant.
  - >3 cm in depth- abnormal.

Investigation:

Defecography –

- Size,
- Barium trapping,
- Intussusception,
- evacuation, and perineal descent

Serves 3 major purposes:

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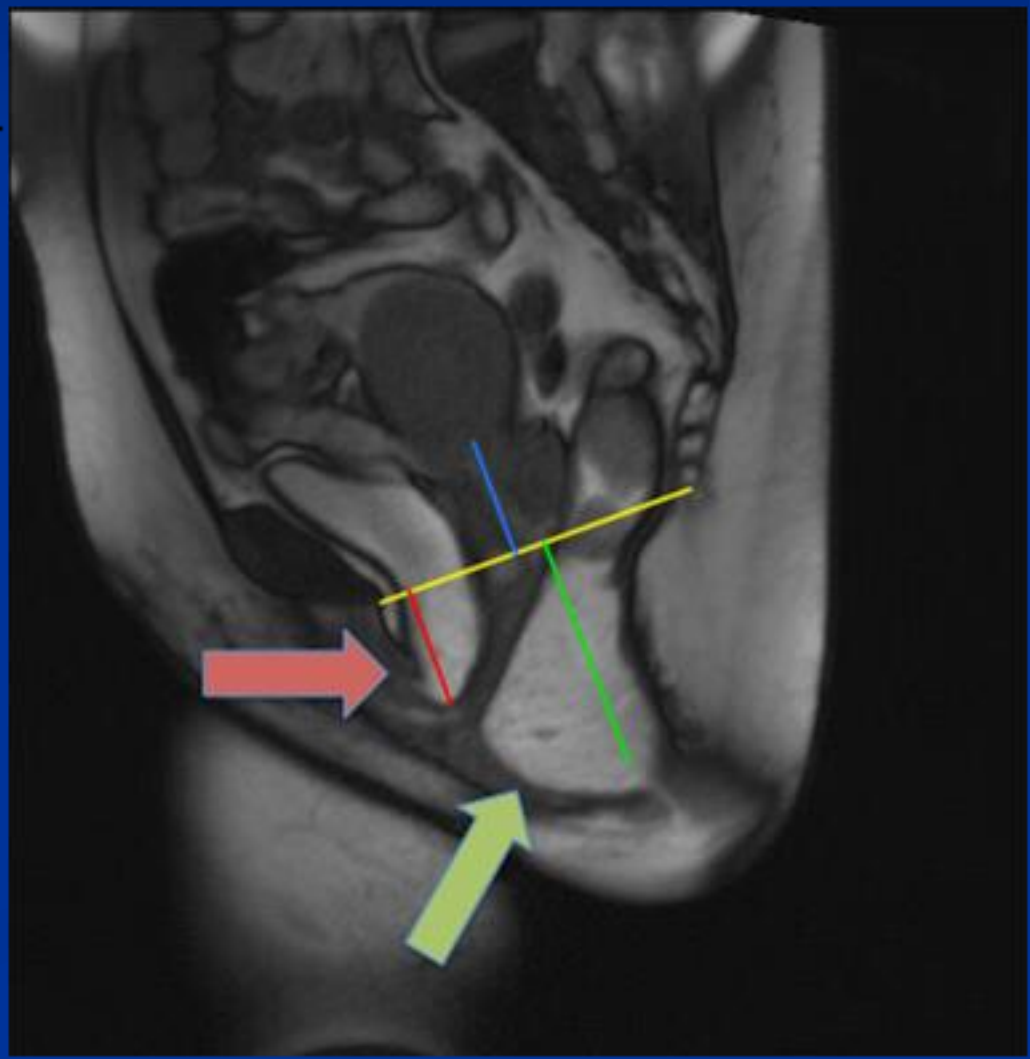

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Herniation of the anterior rectal wall into the lumen of the vagina.

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- Chronic straining on a weakened rectovaginal septum both by-
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- Others believe that rectoceles ---ODS by trapping of feces---further straining ---aggravates the problem.
- 4^{th} or 5^{th} decade of life.

5 most common presenting symptoms---

- excessive straining,
- incomplete evacuation,
- manual assistance required,
- sense of fullness,
- Bowel movement <3/week.