NEET SS OBG

UROYNEACOLOGY

CONTENT

SURGICAL ANATOMY : BONY PELVIS, PELVIC FLOOR & PELVIC ORGANS

Importance of pelvis and pelvic floor anatomy :

- Symptoms of lower urinary tract pathology and gynaecological conditions are often overlapping and confusing.
- Coexistant urinary issues in female patients with vaginitis and recurrent urinary tract infections.
- Coexistant pelvic organ prolapse contributing to female urinary issues and voiding dysfunction.
- Pelvic floor dysfunction can be a cause as well as result of a pelvic organ condition and can lead to secondary sexual issues :
- Endometriosis of urinary bladder, untreated pelvic inflammatory disease can cause lower urinary tract symptoms (LUTS).
- Bladder pain syndrome/interstitial cystitis can cause pelvic floor spasms leading to painful intercourse (Dyspareunia and secondary vaginismus).
- Fecal and urinary incontinence often coexist and may have underlying neurogenic causes and may cause failure of surgery if not evaluated correctly.

Bony pelvis

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Structure :

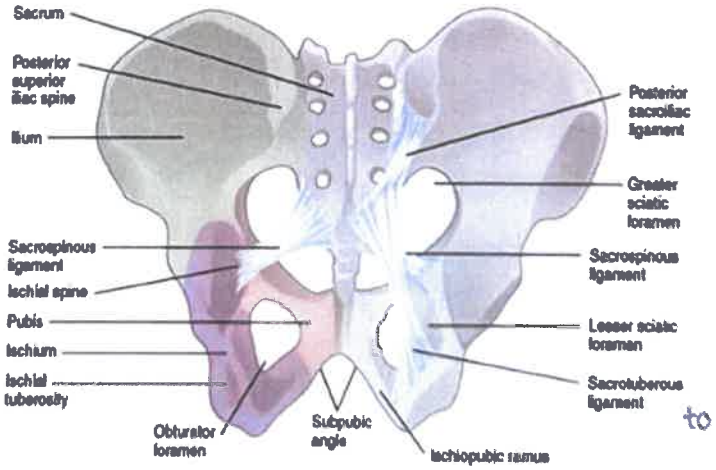
2 hip bones :

- Ilium.
- Ischium
- Pubis.

1 sacrum.

1 coccyx.

4 bones held at 4 joints maintain balance and stability.



Bony pelvis.

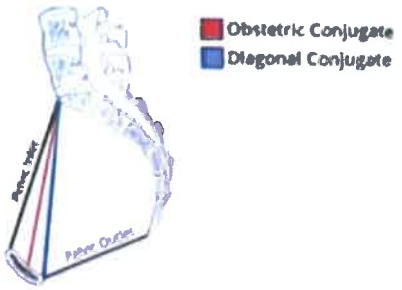
to

Joints :

- 2 Sacroiliac joints.
- 1 Pubic symphysis.
- 1 Sacrococcygeal joint.

Axis inclination of inlet & outlet :

- Helps to maintain abdominal and pelvic organs in place.
- Maintained by spinous ligaments.
- Importance : Baby descends down during labor and head of baby undergoes internal rotation to exit through the outlet.



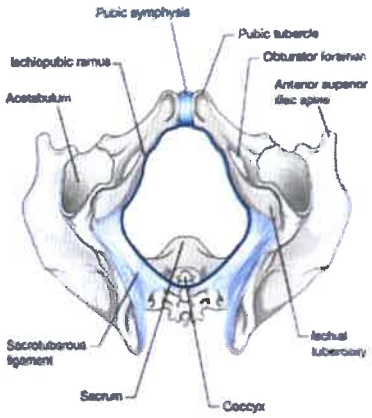
Axis of inclination.

Basal tone of pelvic floor :

Along with coordination of core muscles with respiration in standing and gravity dependant positions prevents organs to fall out of pelvis.

Outlet of pelvis :

- Marked by lower border of pubic symphysis in front, coccyx behind, and laterally by sacrotuberous ligament.
- Diamond shaped.



Pelvic outlet.

Importance :

Urogynaecological procedures.

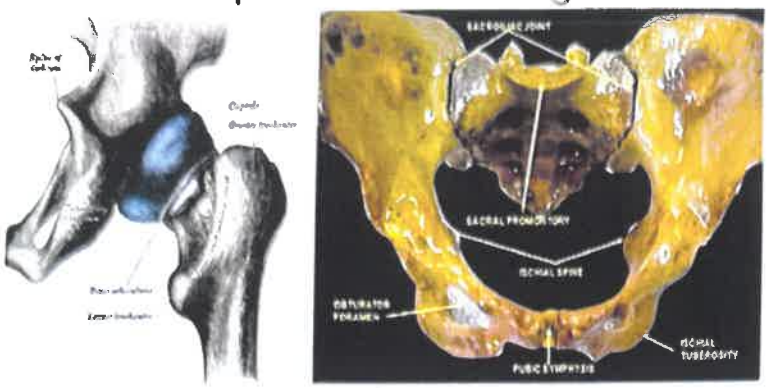
Use of ring pessary for prolapse :

- In patients not fit for surgery.
- Sizes : 1.5 inches to 4 inches.
- Size is based on severity of prolapse and size of pelvic outlet.
- Silicon rings, easily mouldable.
- Holds entire pelvic organ within pelvis.
- Inserted at the level of pubic symphysis and posteriorly bony pelvis bay in the posterior fornix.

Pessaries.

Ring pessary with support

Surgical landmarks ischial spine & ischial tuberosity :



Ischial spine and ischial tuberosity.

Ischial spine : Gives rise to sacrospinous ligament.

Ischial tuberosity : Gives rise to sacrotuberous ligament.

Surgical importance : mark the boundaries of greater and lesser sciatic foramen.

Interspinous & intertuberous diameters : Dimensions of pelvic outlet.

2 : Interspinous diameter.

3 : Intertuberous diameter.

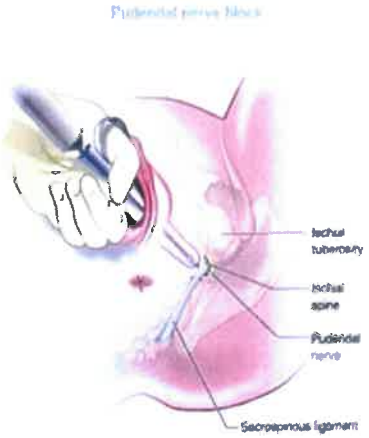
Feasibilty of Non Descent Vaginal Hysterectomy (NDVH) :

- Can be assessed by interspinous and intertuberous space.
- Availabilty of vaginal space.

Availability of vaginal space.

Urogynaecological significance of ischial spine :

- Shortest pelvic diameter : Helps to assess whether uterus can be delivered via vaginal route in NDVH.
- Attachment of sacrospinous ligament : Sacrospinous fixation suture.
- Landmark between greater sciatic notch & lesser sciatic notch.
- Level of external os of uterine cervix.
- Level of ureter crossing below uterine artery.
- Attachment of levator ani muscle.
- Ring pessary for prolapse should stay at this level for accurate support.
- Level of pudendal block/pudendal nerve (S2,3,4) landmark.
- Axis of inlet to outlet changes at this level (Obstetrical significance).

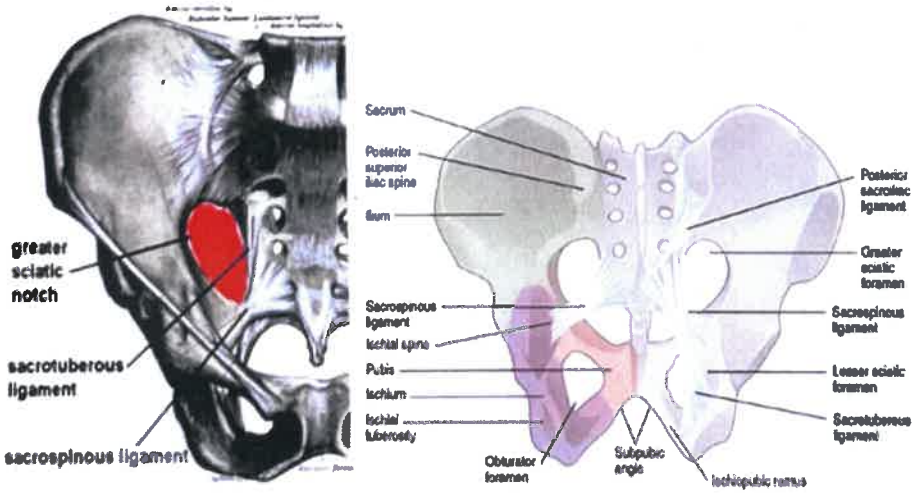


Ligaments of pelvis :

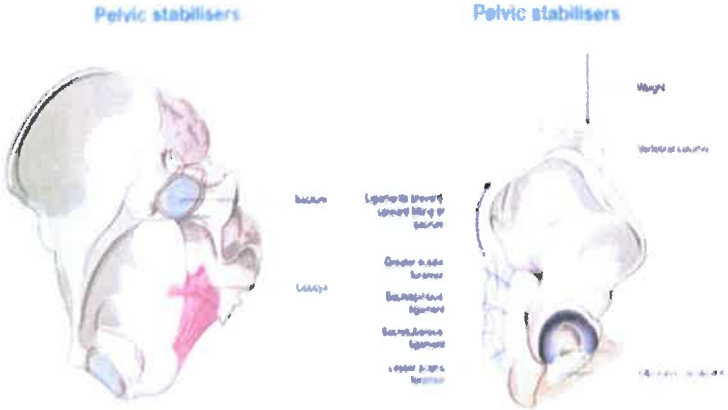
Sacrospinous ligament & sacrotuberous ligament.

Tough ligaments : Pelvic stablisers.

mark the boundaries of greater & lesser sciatic foramen.



Sacrotuberous and sacrospinous ligaments.



Sciatic foramina :

Exit gate of true pelvis.

Greater sciatic foramen :

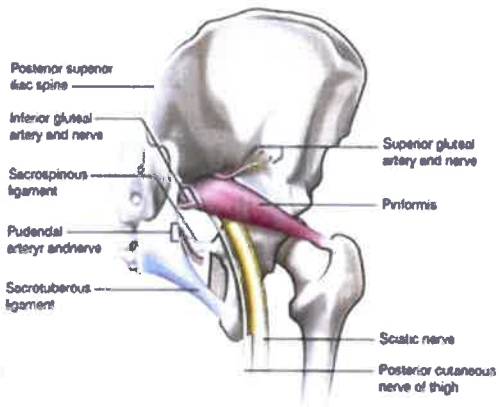
Piriformis muscle : From transverse process and spine and attaches to greater trochanter of femur.

Structures passing above piriformis : Superior gluteal nerves and vessels.

Structures passing below piriformis :

- Inferior gluteal nerves and vessels.
- Sciatic nerve.
- Pudendal nerve and internal pudendal vessels : Exit from greater sciatic foramen, hook around ischial spine and re-enters lesser sciatic foramen.
- Nerve to obturator internus : Exit from greater sciatic foramen and re-enters lesser sciatic foramen.
- Nerve to quadratus femoris.
- Posterior cutaneous nerve of thigh.

Structures passing through greater and lesser sciatic foramens



Lesser sciatic foramen :

- Pudendal nerve and internal pudendal vessels.
- Nerve to obturator internus.

Surgical importance : During sacrospinous fixation for vault prolapse, stitches are avoided in the neurovascular bundle within sacrospinous ligament.

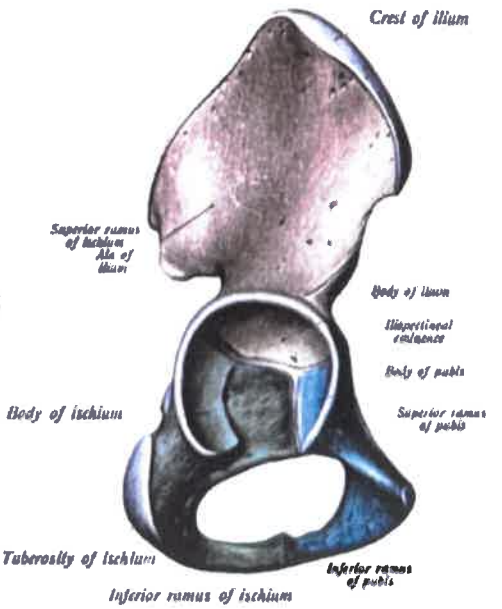
Obturator foramen :

Bounded by superior and inferior pubic rami, ischiopubic ramus.

Covered by obturator membrane, obturator externus and obturator internus.

Surgical importance :

In midurethral sling surgeries, obturator membrane is perforated.

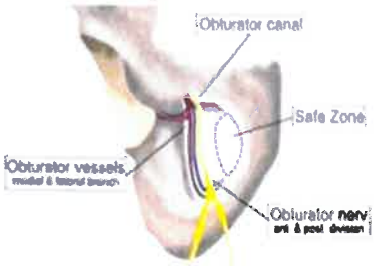


Obturator foramen

Midiuretheral slings :

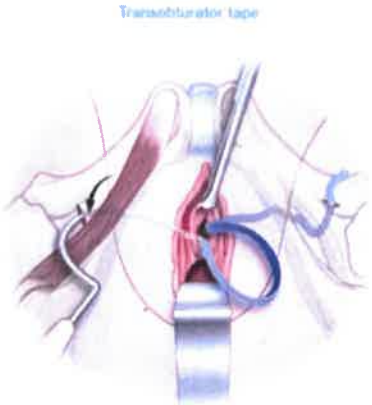
Trans obturator tapes (Synthetic tapes) along with implant placing devices (Transobturator/retropubic needles).

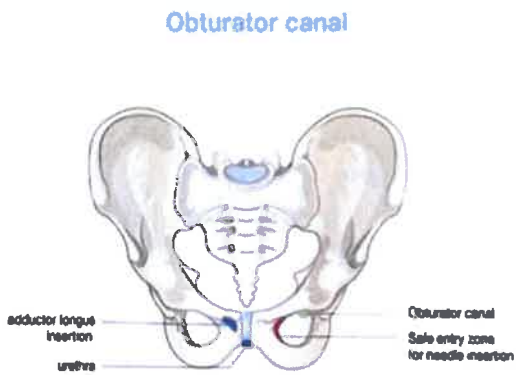
Act as a sling below urethra.



Safe zone of obturator membrane :

- Obturator vessels run in the obturator canal laterally in obturator foramen.
- Avoid unstoppable bleeding, nerve injuries.
- Needle should be kept medially to avoid lateral injury.





Pelvic floor

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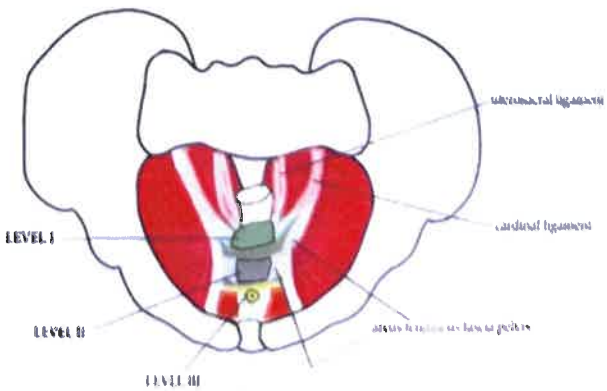
Levator ani muscle :

Skeletal muscle.

3 parts :

- Pubococcygeus.
- Iliococcygeus.
- Ischiococcygeus.

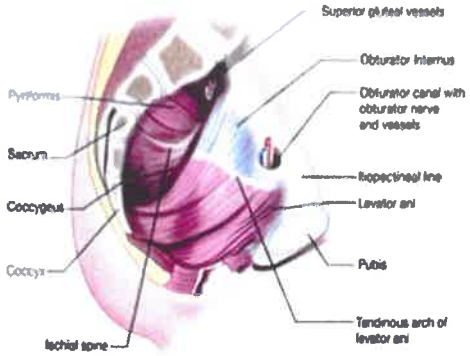
Fan shaped muscle holding entire pelvic organs in place.



Levator ani

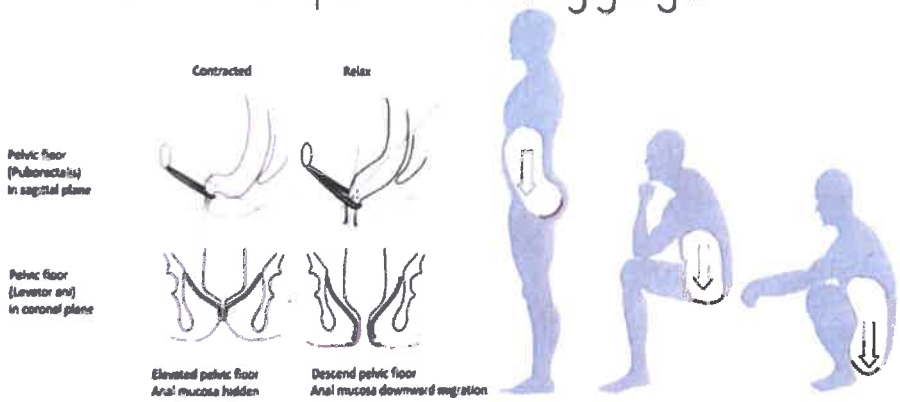
Arcus tendineous fasciae pelvis :

- White line.
- Attachment of levator ani lies over obturator membrane above obturator internus.



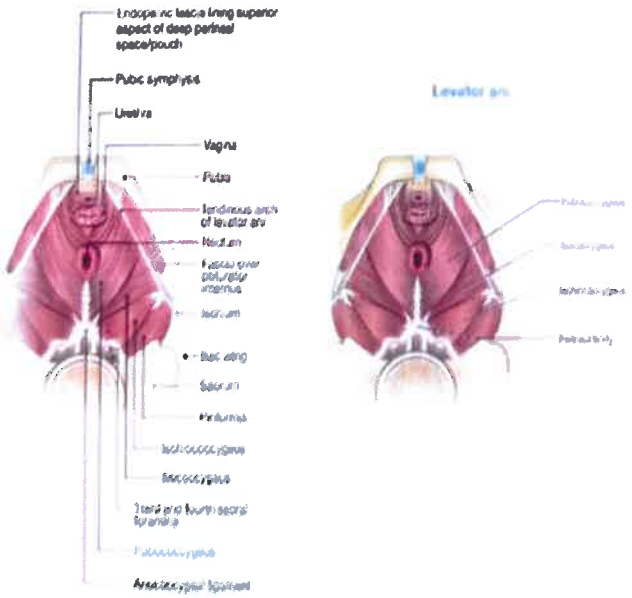
Puborectalis :

- Lowest part of levator ani muscle.
- Puborectalis sling at anorectal junction.
- Maintains anorectal angle for continence.
- Puborectalis relaxes during defaecation to straighten the anorectal angle.
- Puborectalis/levator ani spasm : Pelvic floor dysynergia.



Pubprectalis sling at anorectal junction.

Levator ani - Perineal view :



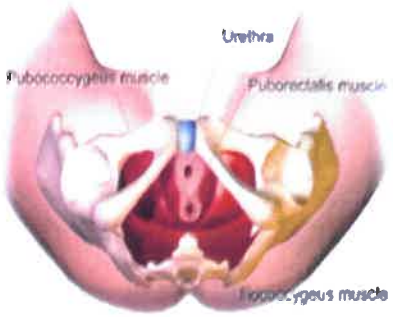
Levator ani : Perineal view.

Sutures are not placed in levator ani : Can lead to painful perineal spams.

Nerve supply : S2, 3, 4 (Pudendal nerve).

Kegel exercises :

For stress urinary incontinence in females.



Female Pelvic Muscles

Pelvic organs & their supports

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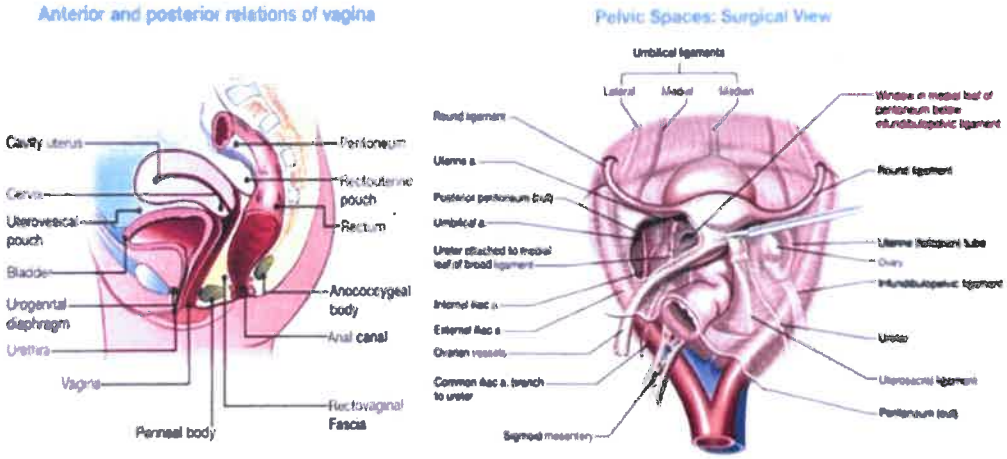
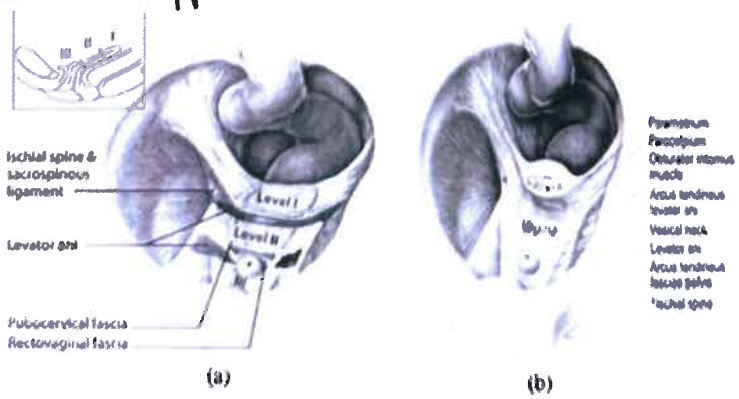
Pelvic organ supports :

1. Connective tissue (Fascial) support : Endopelvic fascia (Sheet of fascia covering all the organs, provides planes for neurovascular bundles.
2. Muscular supports : Levator ani.
3. Ligaments : Delancey's 3 levels of pelvic floor supports.



Delancey 3 levels of supports :



Delancey 3 levels of supports.

delancey level I :

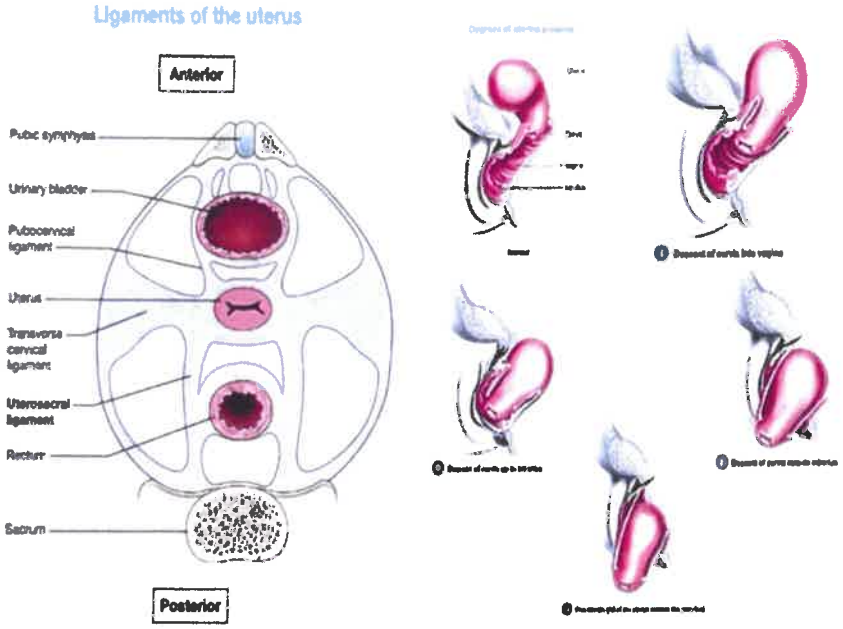
Pericervical ring.

Ligaments joining uterus and cervix to lateral pelvic wall.

- Uterosacral ligament.
- Cardinal ligament.
- Pubocervical ligament.

Defect in level I : Uterine prolapse.

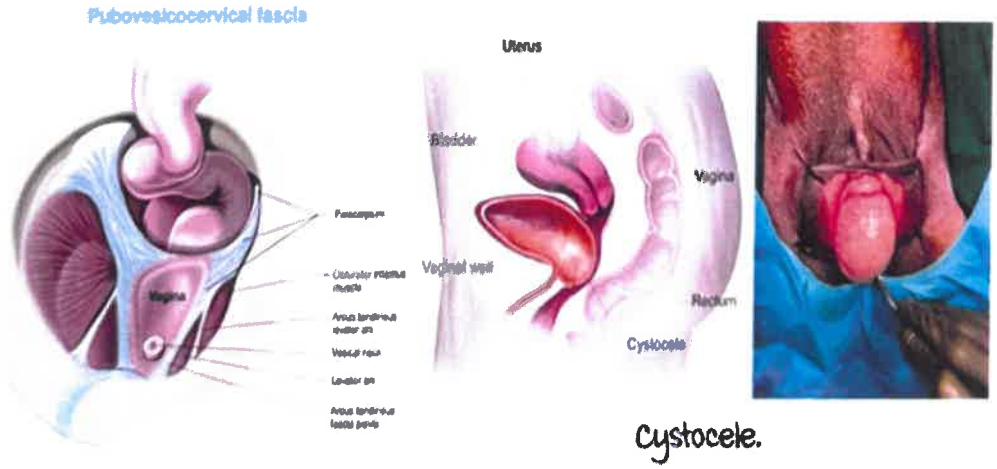
Point of reference : Ischial spine, externally hymen.



delancey level II :

Pubovesicocervical fascia.

Lateral defect : Cystocele.



Cystocele.

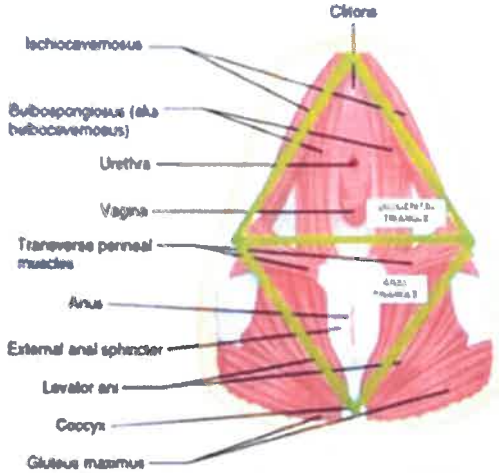
Sometimes level I and level 2 defects both are present.

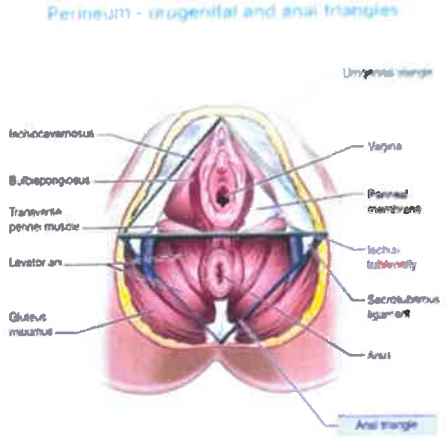
delancey level III supports :

Lowest level of supports.

Perineal body & perineum.

Perineal body : Pyramidal central body where all perineal muscles are inserted.





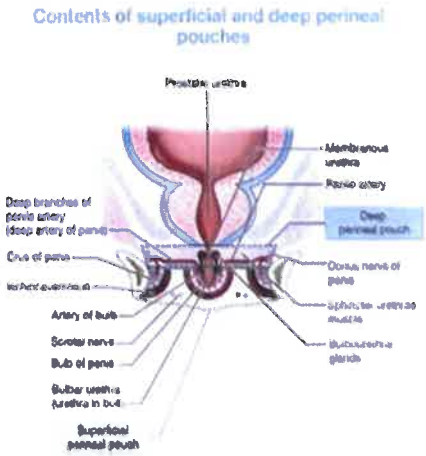
Perineum is divided into anterior urogenital & posterior anorectal triangle.

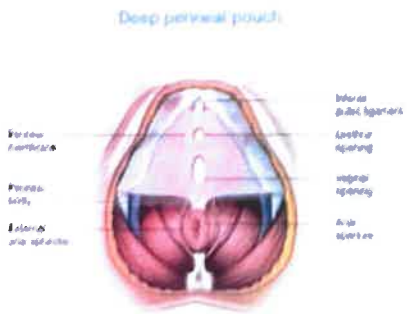
Superficial perineal pouch and muscles :

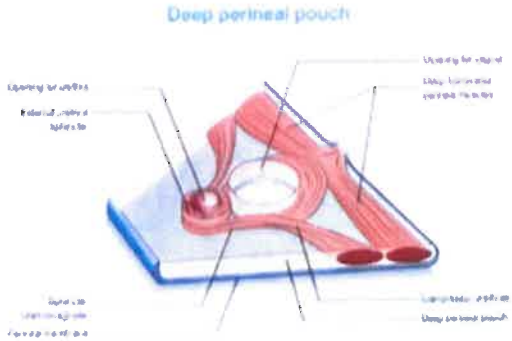
- Separated from deep perineal pouch by perineal membrane.
- Important area for cosmetic gyanecology (Perineal/vaginal tightening).

Deep perineal pouch contents :

- Deep transverse perineal muscles.
- External uretheral sphincter.
- Proximal part of urethra.
- Deep artery to clitoris.
- Dorsal artery of clitoris.
- Artery to bulb of vestibule.
- Urethral artery.
- Dorsal nerve of clitoris.







C : Cervical descent (Anterior lip of cervix).

-7 : No prolapse.

0 : Cervix at hymen (Grade 2 prolapse).

+7 : Complete procidentia.

Inferior row reflects posterior vaginal wall :

Ap : Point 3 cm away from posterior fourchette on posterior vaginal wall (Anorectal junction).

-3 to 0 to +3.

Bp : Maximum dependent position of posterior vaginal wall.

D : Posterior fornix.

-7/-8 to +8.

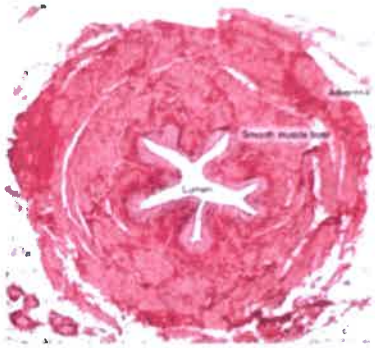
URETER:
PELVIC ANATOMY & APPLIED ASPECTS

Ureter

00:00:21

Anatomy:

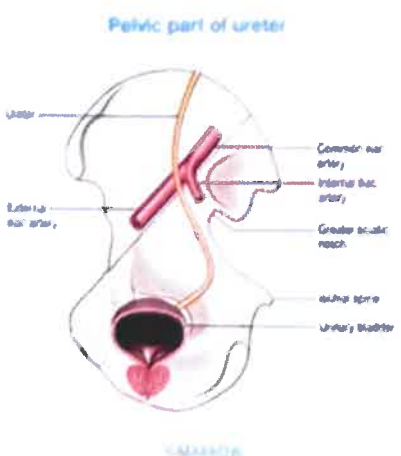
- Starts from renal pelvis-Pelvi-ureteric junction.
- Ends in the bladder at Trigonal entry.
- 25 cm in length.
- Half in the abdomen (Abdominal ureter: 12-15 cms)
- Half in the pelvis (Pelvic ureter: 12-15cms).
- In abdomen: Lies in front of Psoas major.
- Retroperitoneal structure.

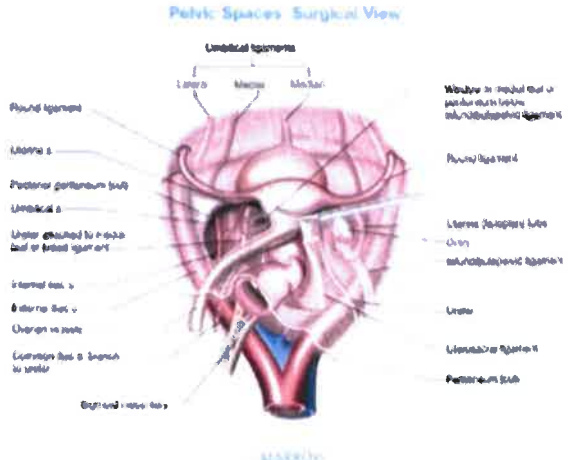


Histology of ureter

Pelvic ureter:

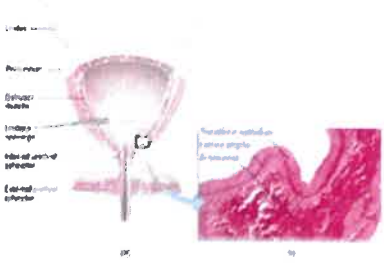
- Crosses pelvic brim at Sacroiliac joints to enter the pelvis.
- Lies in front of the bifurcation of the common iliac arteries.
- Runs through infundibulopelvic ligaments in front & medial to ovarian artery.
- Runs downwards backward laterally along the anterior border of the greater sciatic notch.
- Opposite ischial spine: It turns forward & medially to reach the urinary bladder.
- Runs in the ureteric tunnel in cardinal ligaments below the uterine artery (water under the bridge).
- Enters the bladder wall obliquely.

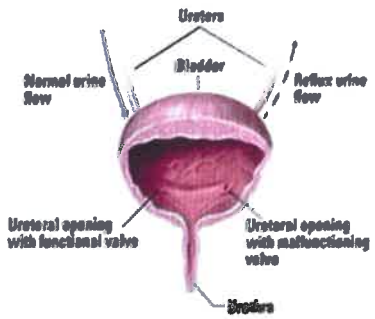




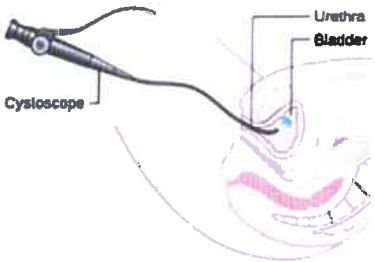
Oblique entry of ureter in bladder :

- Externally, ureteric entry is 5 cm away from another ureteric opening at the bladder.
- Internally, two ureteric orifices are 2.5 cm away at the lateral angle of the trigone.
- Creates an efficient physiological valve while there is no anatomical sphincter to prevent VUR (vesico ureteric reflux).
- Bladder filling closes the ureteric opening due to high pressure inside.
- Flow results from gravity, peristalsis & hydro-static pressure.
- Failure of this physiological sphincter leads to VUR in a chronically High-pressure bladder in cases of neurogenic bladder.
- marked by progressive increase in Pdet during the filling phase.





Oblique entry of ureter in bladder



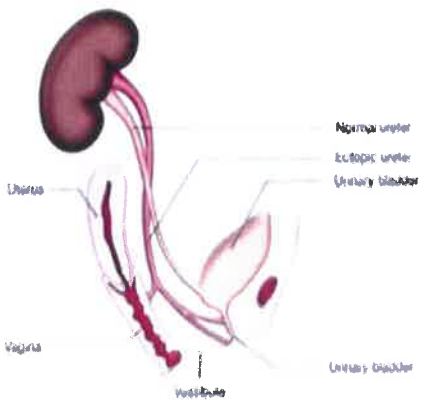
Cystoscopy

Note :

Looking at ureteric openings during cystoscopy is of utmost importance because many times in cases of recurrent UTI, you will find findings which are of clinical significance in cystoscopy. Occasionally in IVU, in CT urogram you may pick up ectopic ureters at different locations.

Ectopic ureter

Ectopic ureter



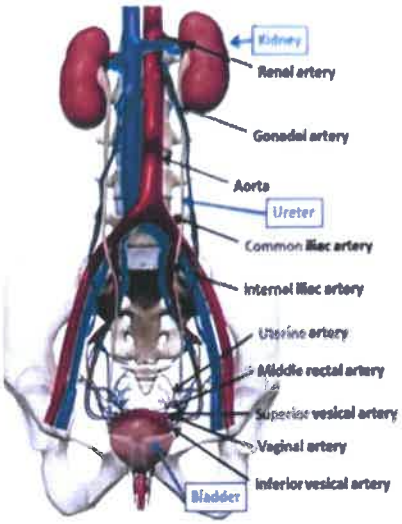
Relation to 3 important vessels :

Common iliac bifurcaion :

- At the entry point in the pelvic brim, it crosses common iliac bifurcation.
- As the common iliac bifurcates the internal iliac artery lies immediately medial to ureter.

Ovarian vessels :

- Ovarain vessels come directly from the aorta. While they run in the infundibulopelvic ligament they come very close/lateral to the ureter.
- Oopherectomy : You have to isolate the ureter and make sure that in your infundibulopelvic ligature the ureter doesn't comes.



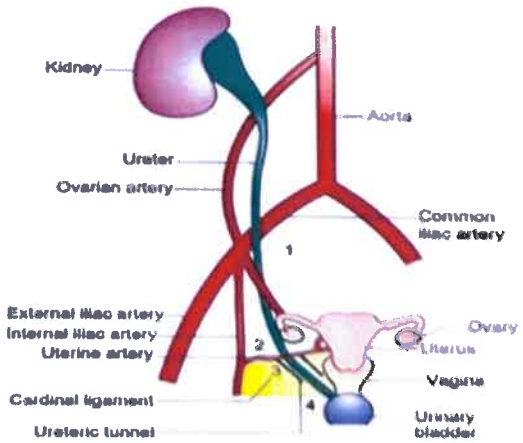
Relation to the vessels

Uterine artery :

- Ureter is below and uterine artery lies right perpendicular to it.
- In abdominal surgeries (Hysterectomy) : Skeletonize the uterine arteries, and push the bladder down to prevent any injury to ureter in the clamp.
- One should reflect the bladder away from the way of the surgical clamps, especially in non-descent vaginal hysterectomes.

3 Injury prone locations of ureter :

- IP ligament : Near ovarian vessels.
- Ureteric tunnels : Near uterine vessels.
- Cardinal ligaments : When trying to clamp, without pushing the bladder up and without opening the anterior pouch.

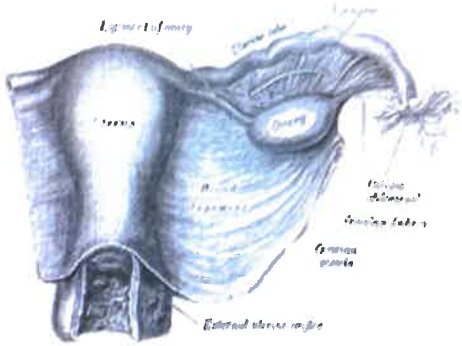


Prone locations of injury to the ureter.

Preventing ureteric injury during urogynaec surgery :

During prolapse surgery/NDVH Surgery :

- Always open the anterior pouch.
- Push bladder completely upwards.
- Stay medial & close to the uterus as much as possible.
- Identify ureters while doing high utero-sacral ligation for vault prolapse

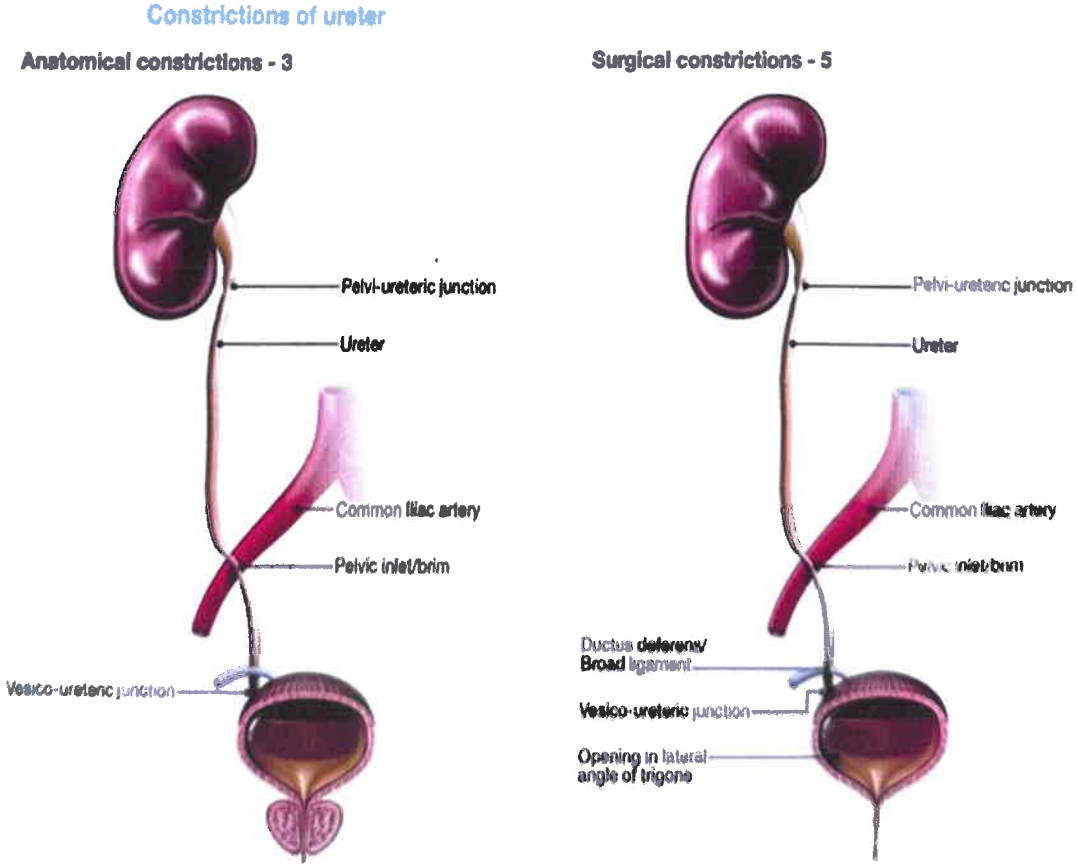


3 Areas of constrictions-renal calculi & renal colic :

It shows three constriction along its course :

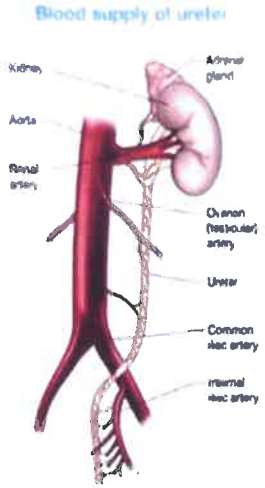
- Between ureter and pelvis.
- At crossing the external iliac artery.
- At entrance to urinary bladder.

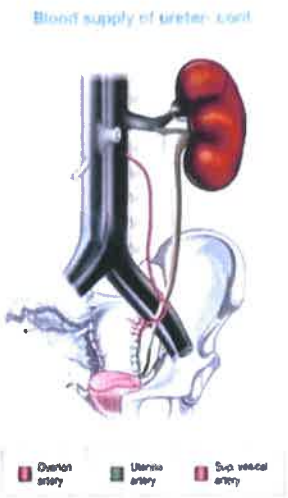
They are the sites of obstruction by renal calculi.



Blood supply :

- Segmental renal.
- Ovarian.
- Uterine.
- Vesical arteries.





Note :

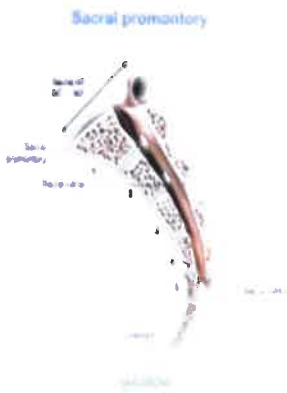
- In abdominal surgeries like internal iliac ligation, when the ureter is exposed, the broad ligament is reflected in such a way that it goes in the medial leaf of peritoneum.
- When the leaf of peritoneum is reflected, the blood supply is taken with itself. Excessive dissection of the pelvic fascias can deprive the ureter from its blood supply.
- In endometriosis surgeries where in an effort of removing the endometriotic deposits one may end up in devascularisation of ureter.

Pelvis

00:16:30

Sacral promontry :

Prominent upper anterior margin of the body of the S1 vertebra, projecting into the pelvic inlet.



Note :

Sacrum is at the tilt.

Sacral Promontary is at an angle of 30 to 60°.

Obstetrics :

- During labour the external rotation of the babies head starts after this level.
- Sacral Promontary is the point where the engaged head goes down.