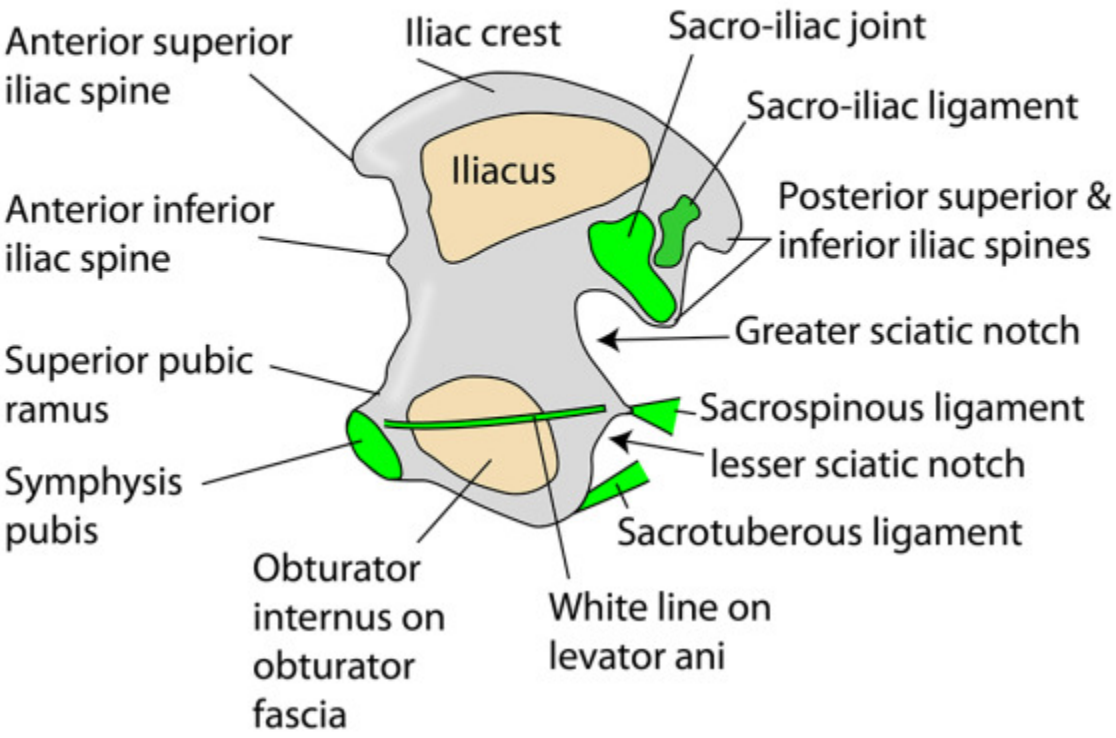
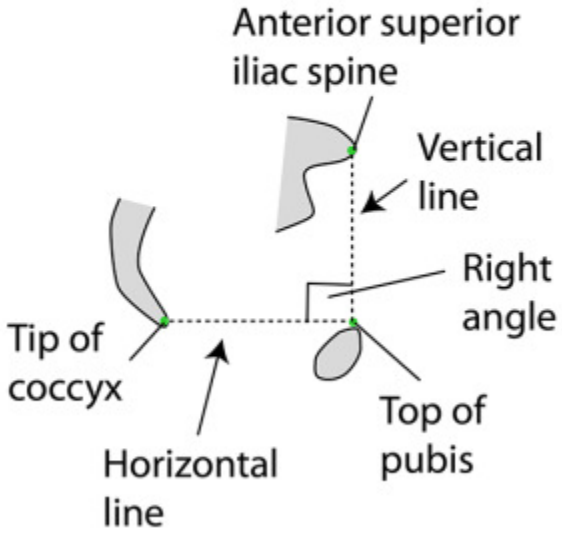
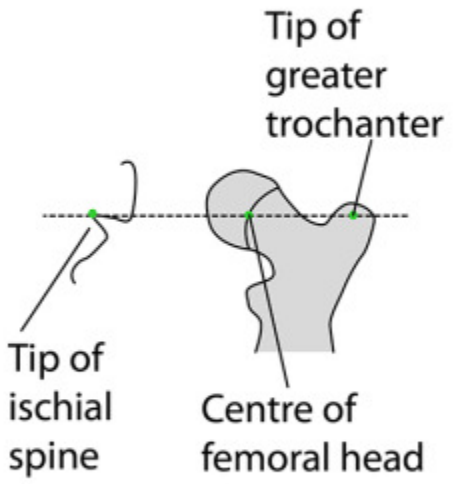
PELVIC BONES - GENERAL & ORIENTATION



ORIENTATION OF PELVIS

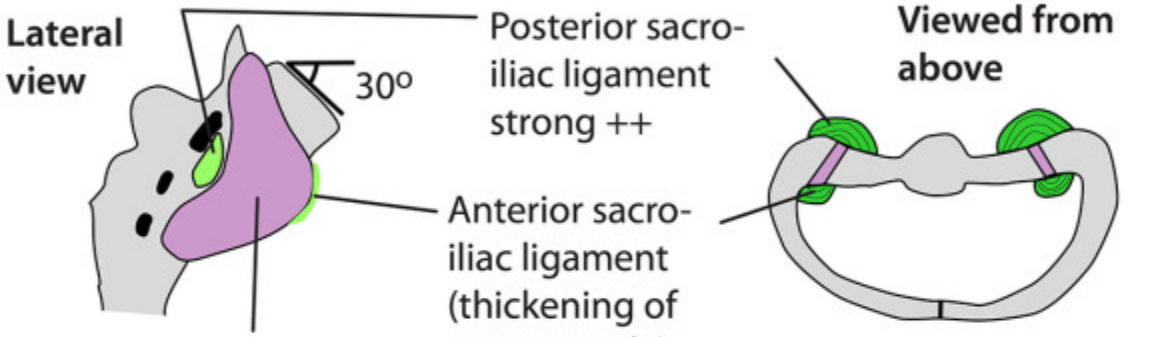


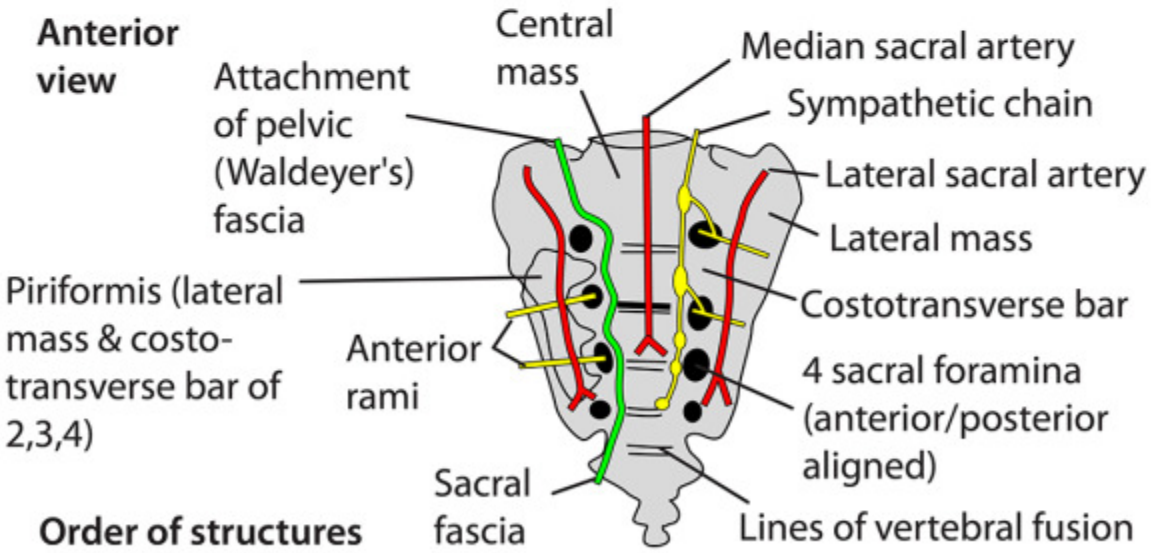


On a horizontal line

SACRUM - GENERAL & SACRO-ILIAC JOINT

- 5 fused vertebrae (may be 6 or 7)
- L5 may be sacralised
- Spina bifida occulta common
- Iliolumbar ligament from iliac crest to tip of 5th lumbar transverse process. Quadratus lumborum arises from it

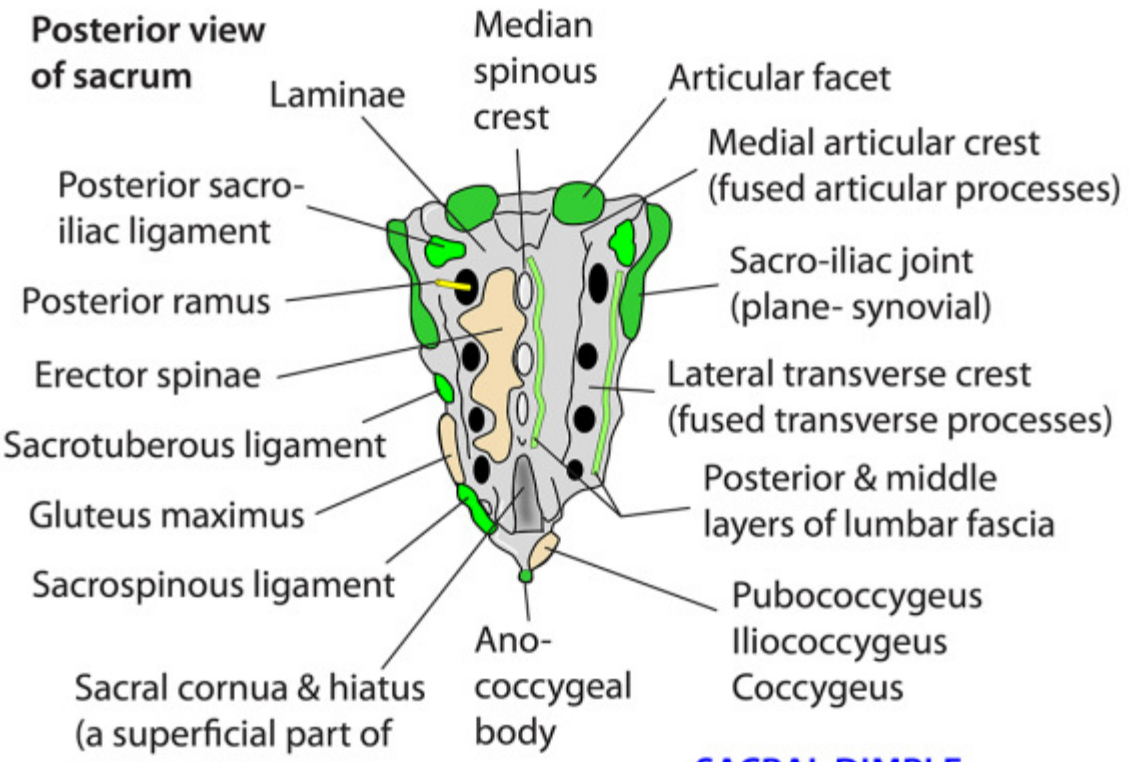




Order of structures from posterior to anterior is:
Bone, periosteum, piriformis, anterior ramus, pelvic fascia, lateral sacral artery, branches of iliac artery, ureter, peritoneum, bowel

SACRUM - POSTERIOR ATTACHMENTS & DURAL SAC

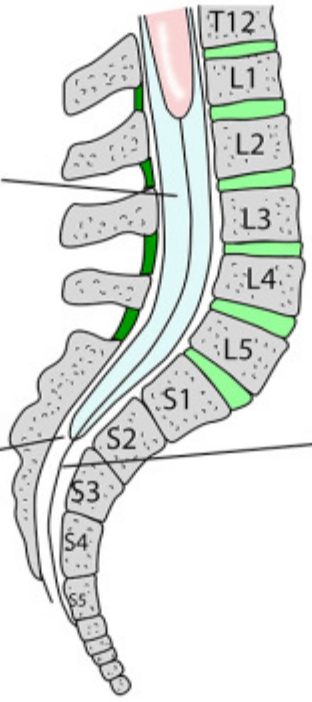
Posterior view of sacrum



SACRAL DIMPLE

- S2
- End of dural sac
- Posterior inferior iliac spine
- Mid sacro-iliac joint

Lateral view of sacrum



Spinalcord ends at lower border of L1

Dural sac (subarachnoid space) ends at S2. It contains CSF, nerve roots & filum terminale (pia that extends to the coccyx)

S2 end of dural sac

Extradural space below S2 with loose fat and veins

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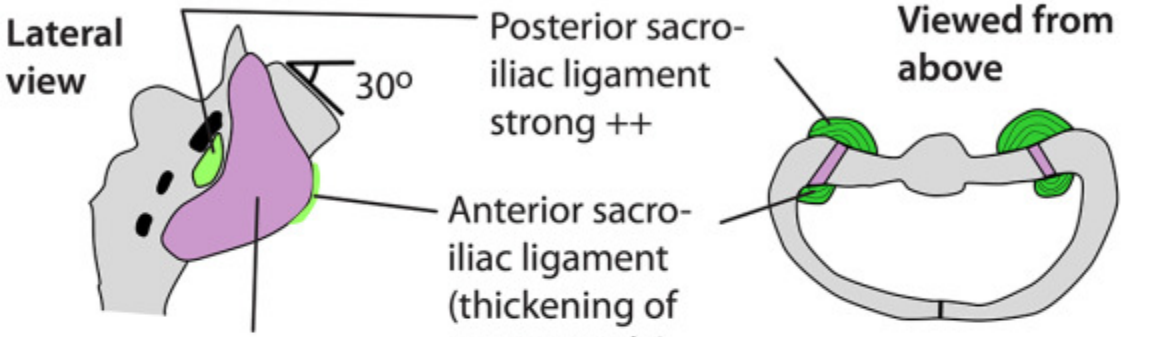

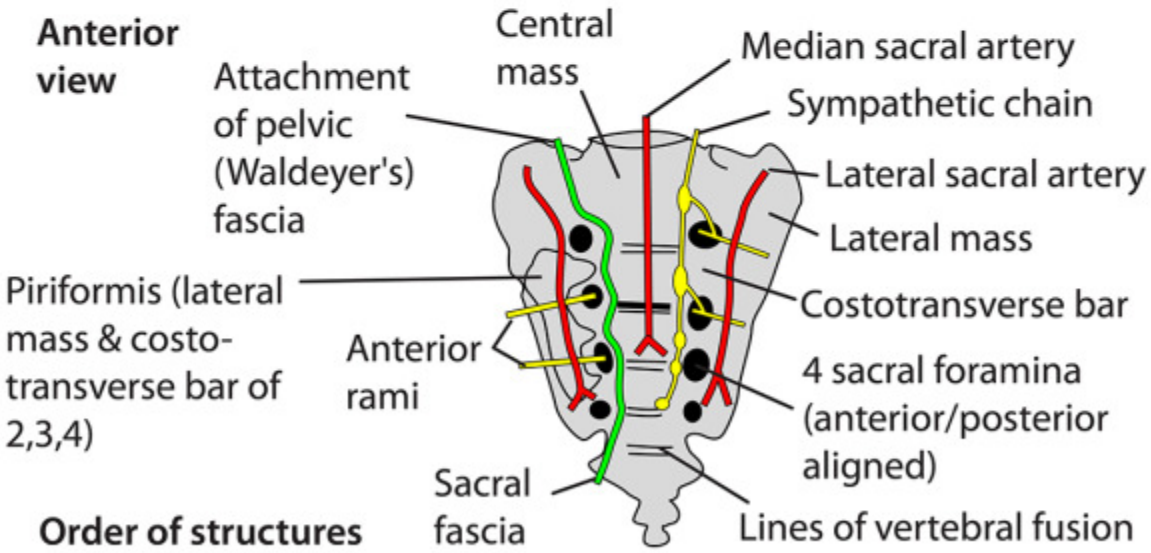

Order of structures from posterior to anterior is:
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PELVIC BONES - SEX DIFFERENCES

Looking at the pelvic bones it should be possible to tell whether they come from a male or a female. Many of the pointers here will be helpful. Remember that the purpose of bones is to give form, provide muscle attachments, give protection, provide movement and they also have metabolic functions.

FEMALE				MALE
Not so heavy	+	**BUILD**	+++	Heavy
Short segment of long cone		**SHAPE**		Long segment of short cone
Gynaecoid		**INLET**		Android
1/3 1/3 1/3		**SACRUM**		1/4 1/2 1/4
>90º		**SUBPUBIC ANGLE**		<90º
Oval		**CANAL**		Round
Minimal	+	**MUSCLE MARKINGS**	+++	Marked
Smooth		**ISCHIOPUBIC CREST**		Rough (crura)
Elongated (triangular)		**OBTURATOR FOSSA**		Rounded (oval)
Nearly right angled		**GREATER SCIATIC NOTCH**		Less than right angle (J shaped)
Greater		**PUBIC TUBERCLE TO ACETABULAR MARGIN V DIAMETER OF ACETABULUM**		Equal or less

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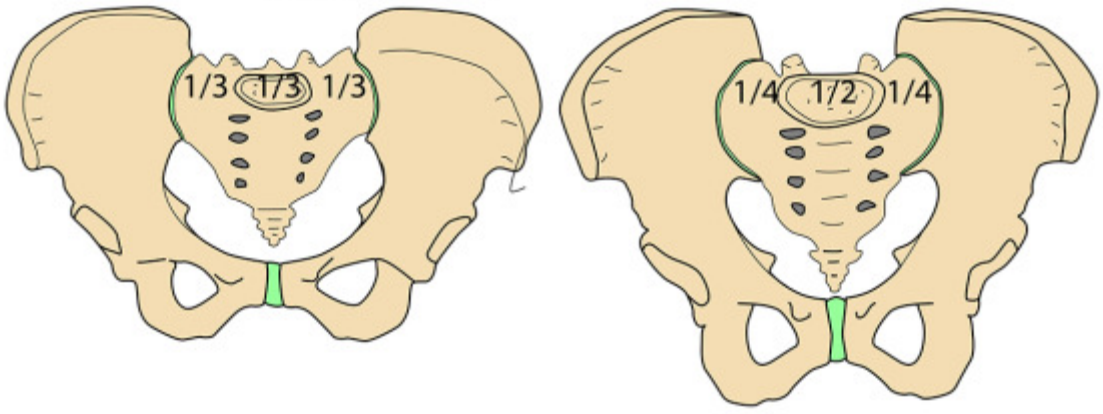
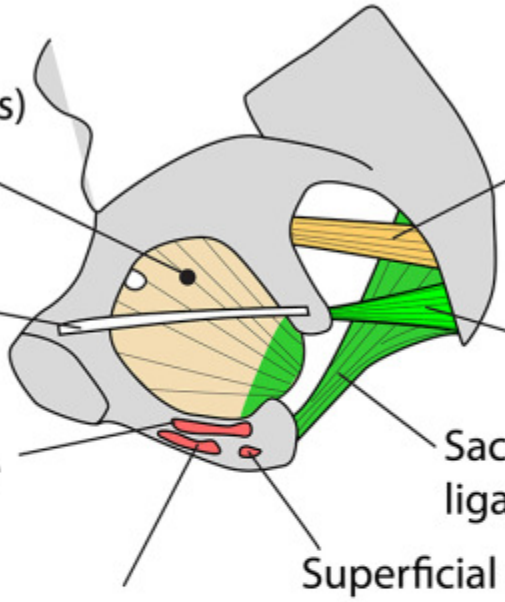
OUTLET: From coccyx to inferior border of symphysis pubis
INLET: From promontary ot sacrum to superior border of symphysis pubis



PELVIS - GENERAL

- True pelvis is below pelvic brim
- False pelvis is above pelvic brim

Obturator-
- foramen
- membrane
- muscle (internus)
- fascia
- canal

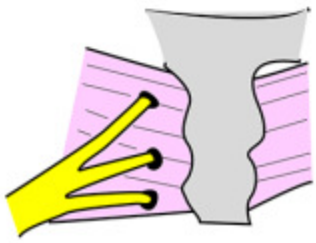


LATERAL WALL

- Ilium, ischium, pubis
- Obturator membrane & internus muscle
- Sacrotuberous & sacro-spinous ligaments
- Pelvic fascia
- Piriformis

ANTERIOR WALL

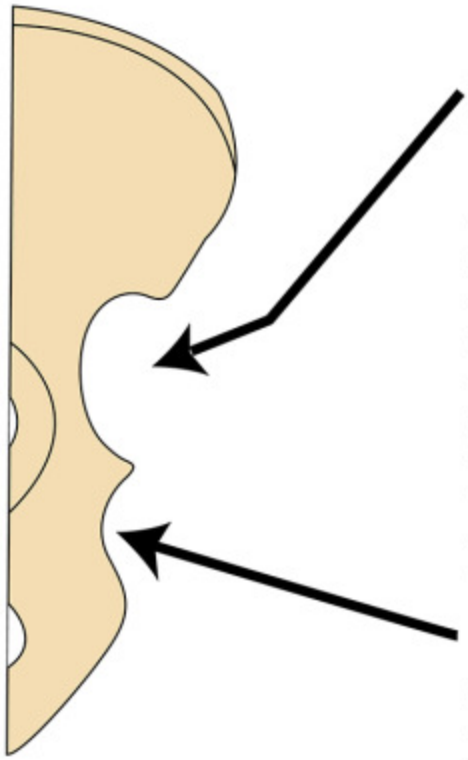
- Symphysis pubis
- Body of pubis
- Pubic rami



POSTERIOR WALL

- Sacrum
- Coccyx
- Piriformis
- Sacral plexus
- Sacralfascia

SCIATIC FORAMINA
STRUCTURES ENTERING & LEAVING



VIA GREATER SCIATIC FORAMEN

- Superior gluteal vessels
- Superior gluteal nerve (L4,5,S1)

PIRIFORMIS (S1,2)

- Inferior gluteal vessels
- Inferior gluteal nerve (L5,S1,2)
- Sciatic nerve (L4,5,S1,2,3)
- Perforating cutaneous nerve (S2,3)
- Posterior femoral cutaneous nerve (S1,2,3)
- Nerve to quadratus femoris (L4,5,S1)
- Nerve to obturator internus (L5,S1,2)
- Pudendal nerve (S2,3,4)
- Internal pudendal vessels

VIA LESSER SCIATIC FORAMEN

- Tendon of obturator internus
- Nerve to obturator internus
- Internal pudendal vessels

Pudendal nerve

There are six nerves that arise from the roots of the sacral plexus that have the letter "P"

Piriformis, nerve to :	S1,2	**Remains** in pelvis to supply this muscle
Posterior femoral cutaneous nerve:	S1,2,3	**Leaves** pelvis via greater sciatic foramen
Perforating cutaneous nerve:	S2,3	**Leaves** pelvis via greater sciatic foramen
Pudendal nerve:	S2,3,4	**Leaves** pelvis via greater sciatic foramen
Pelvic splanchnic (parasympathetic) nerves:	S2,3,4	**Remains** in pelvis to supply pelvic organs
Perineal branch of S4:	S4	**Remains** in pelvis to supply levator ani

3 nerves remain in the pelvis & 3 exit via the greater sciatic foramen

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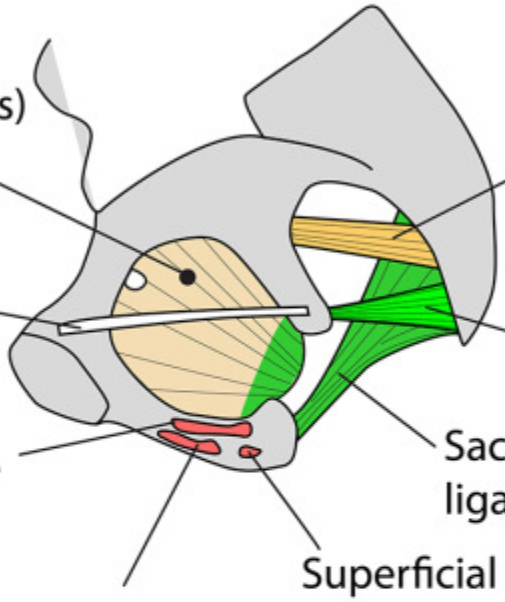

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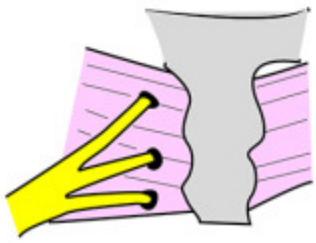
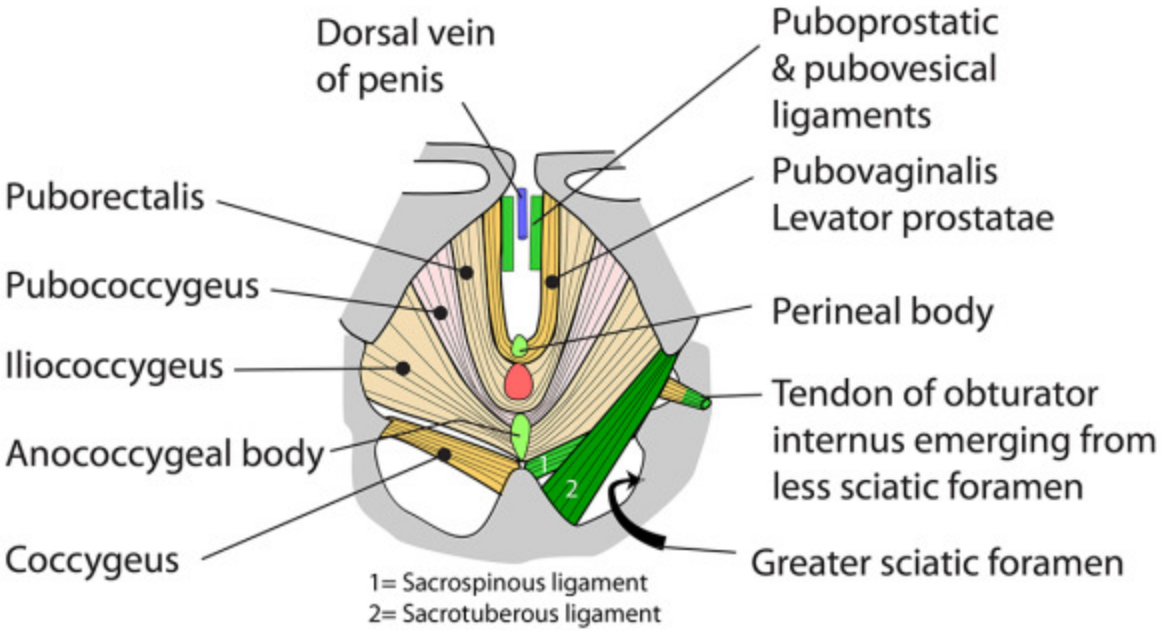


POSTERIOR WALL

- Sacrum
- Coccyx
- Piriformis
- Sacral plexus
- Sacralfascia

PELVIC FLOOR FROM BELOW

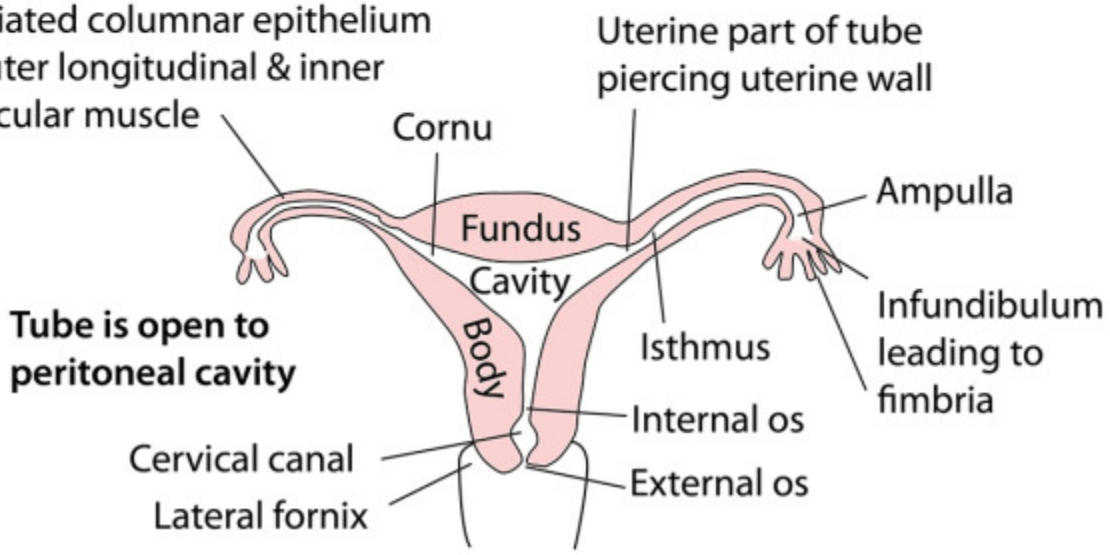
- Covered superiorly and inferiorly with fascia (epimysium)
- Nerve supply for levator ani is perineal branch of S4. S5 for coccygeus



UTERUS - GENERAL

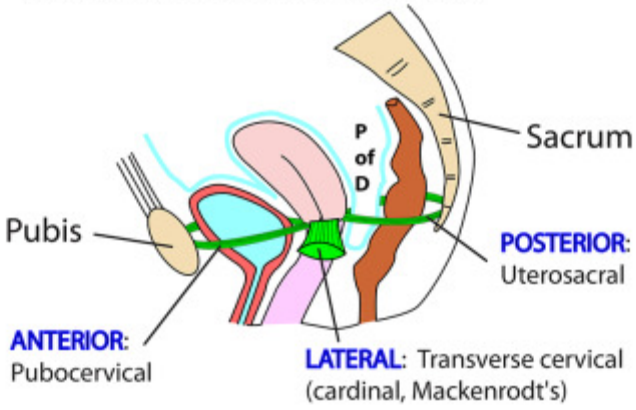
- Pear shaped
- Usually anteverted to 90 degrees & anteflexed to 170 degrees
- Has no submucosa
- Histology - Cervix: Tall columnar epithelium becoming squamous outside, alkaline mucus
  Rest of uterus: Endometrium with glands, arterioles, smooth whorls of muscle, columnar epithelium
- Nerves - Motor: Parasympathetic activate muscle
  Sympathetic relax muscle. Both from pelvic plexus
  Sensory: Parasympathetic for cervix
  Sympathetic for uterus
- Blood supply (see broad ligament)
- Venous drainage: Highly plexiform to vesical and rectal plexuses
- Relations: Anterior- vesicouterine pouch, posterior/superior bladder anterior fornix, small bowel
  Posterior- Pouch of Douglas, ileum, sigmoid
  Lateral- Uterine vessels, ureter, lateral fornix, broad ligament

Fallopian tube. 10cm long
Ciliated columnar epithelium
Outer longitudinal & inner circular muscle



UTERUS - SUPPORTS & DEVELOPMENT

- Suspensory ligament of ovary, round ligament & broad ligament are NOT supportive
- Ligaments:
  - LATERAL:Transverse cervical (cardinal, Mackenrodt's)
  - POSTERIOR: Uterosacral
  - ANTERIOR: Pubocervical
- Muscles: Pubovaginalis & puborectalis are part of levator ani, perineal body & urogenital diaphragm



These ligaments/Supports are condensations of fascia known as parametrium.

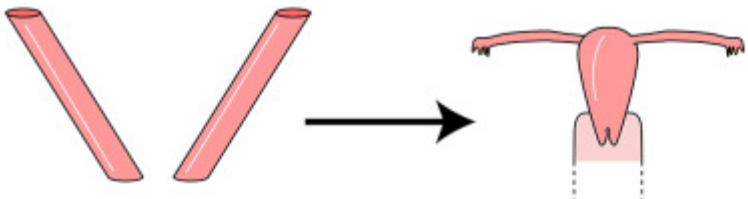
PARAMESONEPHRIC DUCTS (female)

DEVELOPMENT

- Mullerian
- Appear lateral to mesonephric ducts

In female: Uterus, tubes, upper 1/3 vagina

In male: Utricle, appendix testis. Ducts are destroyed by Mullerian Inhibiting Substance at 50 days

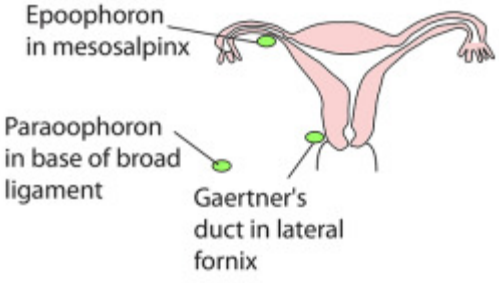


Lower 2/3 of vagina is from the lower part of the urogenital sinus

MESONEPHRIC REMNANTS

Blind tubules

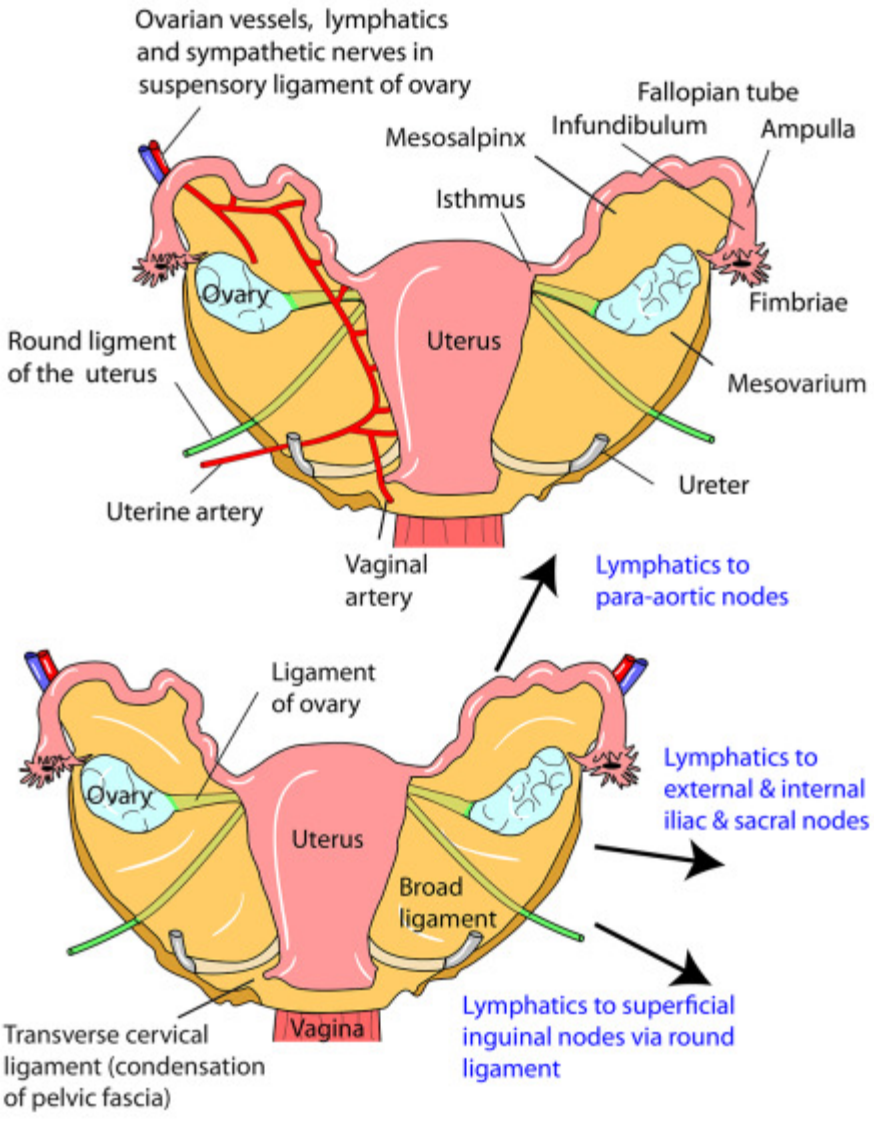
- Anomalies
- Bicornuate uterus
- Unicollis (+/- rudimentary horn)
- Cervical atresia
- Vaginal atresia



UTERUS - BROAD LIGAMENT

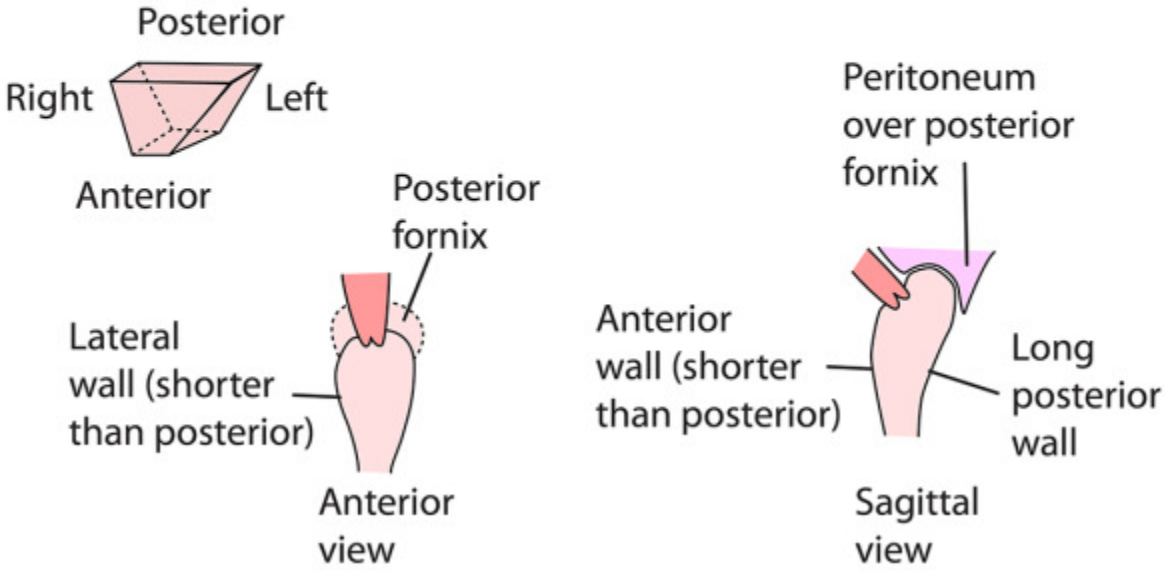
- Double layer of peritoneum draped over uterus and tubes. Distal ends of tubes stick out of posterior layer of it and lie free.
- Between two layers are arteries and veins, round ligament, ligament of ovary, lymphatics. The ovary is partially covered by a separate posterior fold of the broad ligament (mesovarium) but the surface of the ovary is devoid of peritoneum to allow exit of the ova.
- The tubes lie in the upper edge of the broad ligament (mesosalpinx).
- The ureters pass through the base of the broad ligament in close relationship to the uterine artery which lies in base of broad ligament, at level of os, to supply uterus, vagina and anastomoses with ovarian artery superior to ureter.
- Fallopian tube is 10cm long. Outer longitudinal & inner circular muscle and ciliated columnar lining.
- Round ligament of uterus passes to labium majus. Blood supply branch of ovarian & inferior epigastric arteries.
- Sensory: General visceral afferents via pelvic plexus. In parasympathetics from cervix; in sympathetics for rest of uterus and tube. No parasympathetics to ovary

POSTERIOR ASPECT OF BROAD LIGAMENT



VAGINA - GENERAL

- 10cm long
- Potential space apart from posterior fornix which is real space
- Fornices: Anterior, lateral & posterior
- Artery: Vaginal branch of uterine, middle rectal, inferior vesical gives vaginal
- Veins: Pelvic floor plexus to internal iliac
- Nerves: Sympathetic from pelvic plexus for vasoconstriction, smooth muscle action, stretch sensation
  Somatic - perineal branches of pudendal, ilio-inguinal at anterior introitus
- Lymphatics: External/internal iliac, sacral, superficial inguinal below hymen
- Support: levator ani (pubovaginalis) & perineal body
- Structure: Non-keratinising stratified squamous epithelium, smooth muscle, sweat glands, no mucous glands
- Development: Upper third from paramesonephric ducts
  Lower two thirds from urogenital sinus
- Shape: Wider left to right at top
  Wider anterior to posterior at introitus

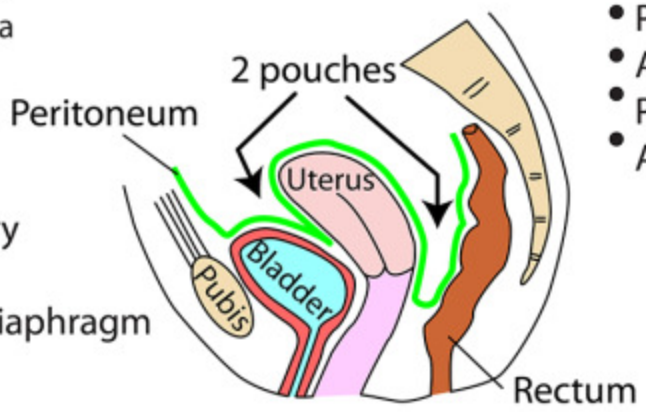


VAGINA - RELATIONS

ANTERIOR
- Bladder
- Urethra

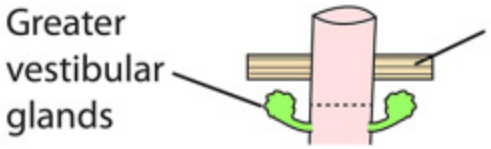
POSTERIOR
- Pouch of Douglas
- Ampulla of rectum
- Perineal body
- Anal canal

LATERAL
- Ureter
- Uterine artery
- Levator ani
- Urogenital diaphragm



FEMALE: In females the uterus "sticks up" into the pelvis between the bladder & rectum giving two pouches. The vesicouterine pouch anteriorly & the rectouterine pouch posteriorly

VESTIBULE OF VAGINA



Interrupted line gives site of hymen

Superficial pouch containing:
- Hymen
- Greater vestibular glands (Bartholin's glands)