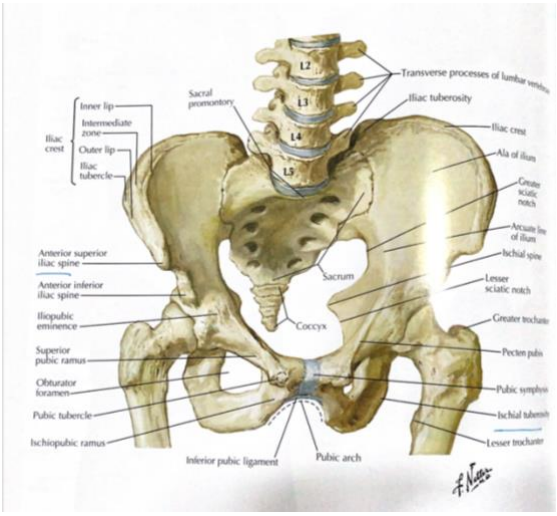
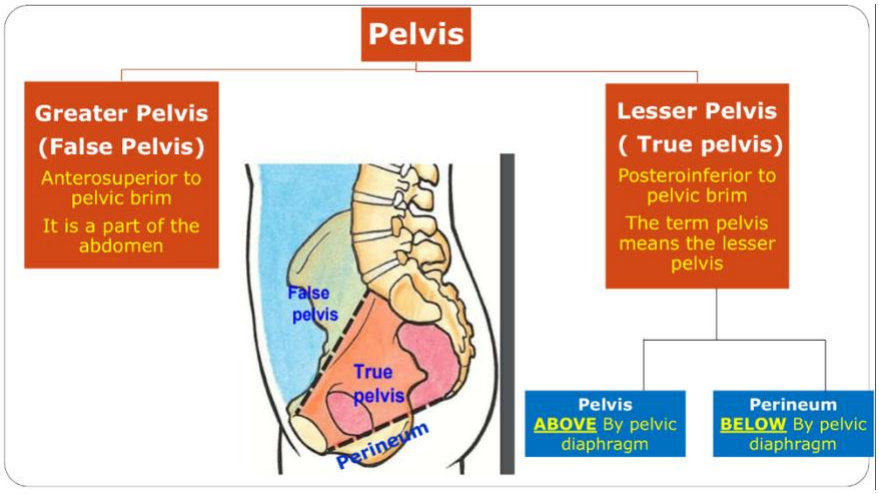
UGS/ANATOMY:

⇨ Quick revsion لايام الجاهلية عقولة دكتورة هبة:



let's start with the pelvis;)

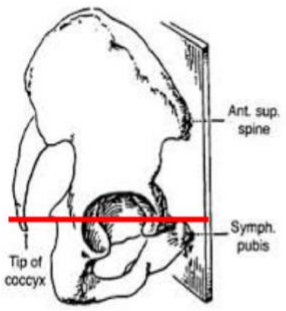
The pelvic brim: The oblique plane extend from the SACRAL PROMONTORY to the UPPER MARGIN OF SYMPHYSIS PUBIS.

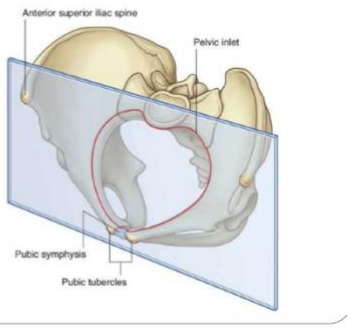


Normal position of the pelvis

In erect posture, the pelvis lies with the anterior superior iliac spine and pubic tubercles in the same vertical plane

The ischial spine and upper border of symphysis pubis in the same horizontal plan.



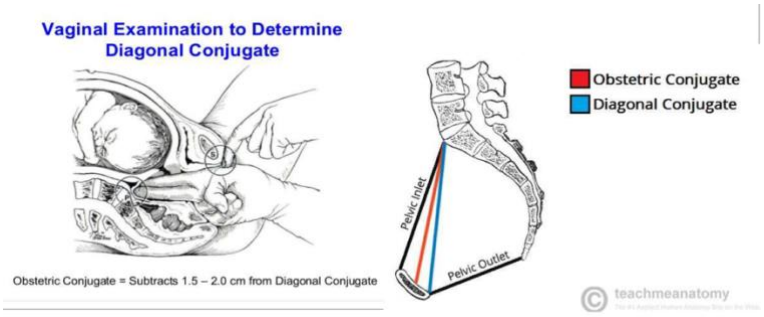


#True pelvis :

Feature	Pelvic Inlet	Pelvic Cavity	Pelvic Outlet
Shape	Transversely Oval (Females)/ Triangular or heart-shaped (Males)	Bowel like (extra)	Diamond-shaped (extra)
Formation			
**Anteriorly*	Pubic symphysis	Ant. Wall (SHORT): Bodies of pubic bones & symphysis pubis	Pubic arch
* *Posteriorly*	Sacral promontory	Post.wall(LONG): Sacrum &coccyx	Coccyx
* *On either side*	Ala of the sacrum, sacroiliac joint, arcuate line, pectinal line, pubic crest	Lateral wall: Pelvic surface of parts of pubis, ischium, ilium Subdivisions: By pelvic diaphragm (levator ani and coccygeus muscles),It divided into pelvis above and perineum below.	Anterolateral: Ischiopubic rami Lateral angles: Ischial tuberosities Posterolateral: Sacrotuberous ligaments
Diameters			
**Anteroposterior*	From: Sacral promonory TO: Uppe border of symphysis pubis	-	From: lower border of symphysis pubis To: Coccyx (THE WIDEST)
* *Oblique*	From: Sacroiliac joint TO: Oppisite iliopubic eminence	-	From: mid point of sacrotubeous ligament To: junction between pubic and ischial rami on the opposite side
* *Transverse*	Between 2 Arcuate line (THE WIDEST)	-	Btween 2 ischial tuberosities

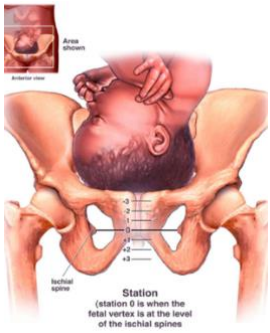
#Some important terms in clinical practice:

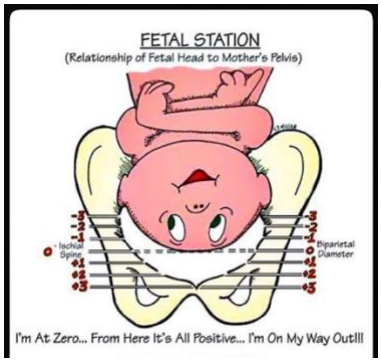
- ⇨ Diagonal conjugate: Distance between PROMONOTRY OF SACRUM & LOWER BORDER OF THE SYMPHYSIS PUBIS. (shorter diagonal cojugate indicate contracted pelvis)
- ⇨ Obstetric conjugate: Distance between PROMONOTRY OF SACRUM & MOST PULGING POINT ON THE BACK OF SYMPHYSIS PUBIS. (Less than diagonal cojugate by 1.5 to 2 cm).



#Fetal head stations:

	Bony landmark
-2	Above ischial spines
-1	
0	**At ischial spines**
+1	Below ischial spines (head visible at the introitus).
+2	
+3	

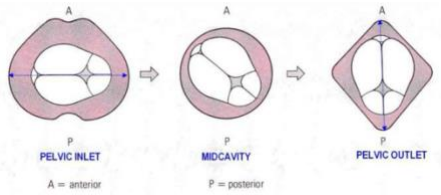




#Rotation of head during labour:

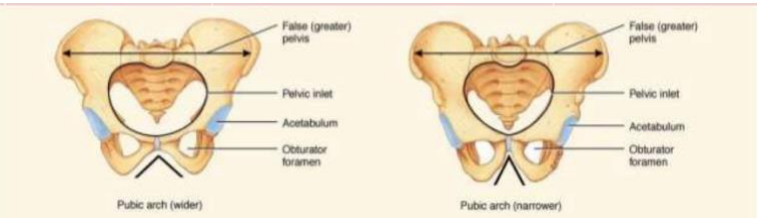
-Widest diameter of pelvic canal changes from transverse diameter at pelvic inlet toAnterior posterior diameter at pelvic outlet

-To obtain best fit of fetal head, the longest diameter (occipitofrontal) of the fetal head passes through the widest diameter of the pelvis. Therefore the head must rotate during labour.



#Sex differentiation in the pelvis:

		Female	Male
1	**Inlet**	Wider, transversely oval	Smaller, heart shaped
2	**Cavity**	Wider, shallower	Narrow, deeper
3	**Outlet**	Larger	Smaller
4	**Subpubic angle**	Wide Angle	Acute angle
5	**Ischial tuberosities**	Are everted externally	Are turned in
6	**Sacrum**	Wider, shorter	Narrower, longer
7	**Side of pubic arch**	Everted externally	Not everted



#Types of female pelvis:

Type of Pelvis	Description
Gynaecoid pelvis	**it is the typical female pelvis.**
Android pelvis	**it is the female pelvis with some male features. تزكروا ANDROGEN**
Anthropoid pelvis	**it simulates the pelvis of apes. It has small transverse diameter and LONG ANEROPOSTERIOR diameter. Hint: long diameter AN with AN**
Platypelloid pelvis	**it is a flat pelvis in which the inlet has LARGER TRANSVERSE diameter much than the anteroposterior diameter.**

#Clinical conditions:

1) Fracture Pelvis:

- If the pelvis breaks at any one point, the fracture will be stable and no displacement will occur.

- If two breaks occur in the pelvis the fracture will be unstable and displacement will occur

- Complications of Pelvic Fractures (not very imp.) :

o Injury to Male urethra and urinary bladder

o Rectum rarely damaged

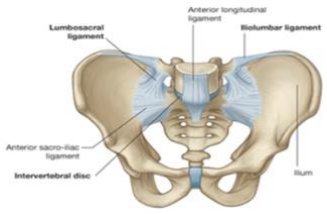
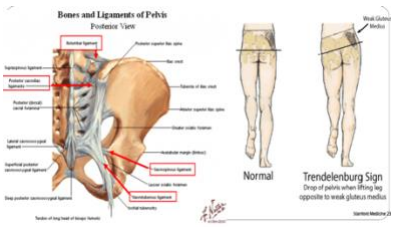
o Bleeding from blood vessels injury

o Injury to nerves especially sciatic nerve in fracture include greater sciatic notch

2) Coccydynia:

Is common and is usually caused by direct trauma to the coccyx, as in falling down a flight of concrete steps.

#Joints of the pelvis:

Joint	Type/Description	Ligaments	Movements and Functions
1) Pubic Symphysis	It is a secondary cartilaginous joint between the two pubic bones.	Superiorly: Superior pubic ligament Inferiorly: The arcuate pubic ligament.	
2) Sacrococcygeal Joint	It is a secondary cartilaginous joint between sacral apex and coccygeal base.		
3) Sacroiliac Joint  	It is plane synovial joint between sacral and iliac auricular surfaces.	- The ventral sacroiliac ligament: it lies anteroinferior to the joint - The interosseous sacroiliac ligaments (the strongest ligament): lies posterior to the joint. - The dorsal sacroiliac ligament: lies dorsal to the interosseous ligament.	- It transmits the body weight from lumbar spine to the hip bones. - It allows slight rotation around a horizontal axis when the trunk is flexed on the hip joints.

#Ligaments of the pelvis:

Vertebropelvic Ligaments	Description
1) Iliolumbar ligament	Extends from the tip of the L5 transverse process to iliac crest.
2) Lumbosacral ligament	Extends from the inferior aspect of L5 transverse process to the lateral part of the ala of sacrum.
3) Sacrotuberous ligament	It extends between lower part of the sacrum and coccyx and ischial tuberosity.
4) Sacrospinous ligament	Extends from ischial spine to the lateral margins of sacrum and coccyx.

#Functions of the vertebropelvic ligaments:

Functions of the Vertebropelvic Ligaments	
The iliolumbar and lumbosacral ligaments	-Prevent the anteroinferior displacement of L5 vertebra under effect of body weight.
The sacrotuberous and sacrospinous ligaments	-Convert the greater and lesser sciatic notches into foramina. -They also prevent the upward tilting of the lower part of sacrum under effect of body weight.

*Relaxation of Pelvic Ligaments and Increased Joint Mobility in Late Pregnancy:

-Increased levels of sex hormones and the presence of the hormone relaxin cause the pelvic ligaments to relax during the last half of pregnancy.

- This allowing increased movement at the pelvic joints.

-Relaxation of the sacro-iliac joints and pubic symphysis permits as much as a 10–15%

increase in diameters (mostly transverse, including the interspinous distance)

-The coccyx is also able to move posteriorly.

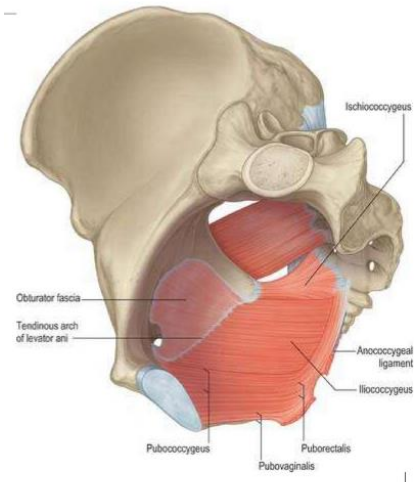
-This is facilitating passage of the fetus through the pelvic canal.

**(“swayback”) posture:

-Relaxation of sacro-iliac ligaments permitting greater rotation of the pelvis and contributing to this posture.

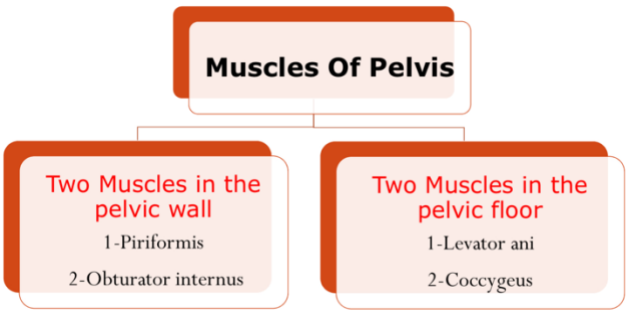
#Pelvic fascia:

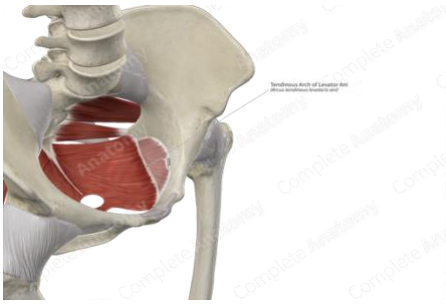
Any thing with This color will be covered in the coming lectures inshallah;)

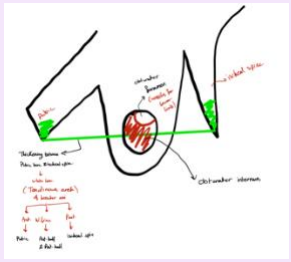


Pelvic Fascia	**Details**
Piriformis fascia	is a part of parietal pelvic fascia. Anteriorly related to it internal iliac vessels Posteriorly related to it sacral nerves(الدكتور ربطها انه spinal cord post. => nerves post.)
Obturator fascia	-It covers the pelvic surface of obturator internus. -It fuses with the periosteum at the margins of the muscle except at obturator groove where it passes below obturator nerves and vessels. -Between the lower border of pubic body and ischial spine, the fascia thickens to form tendinous arch (white line) which gives origin for levator ani muscle. -Below level of levator ani, the fascia lies in the lateral wall of ischiorectal and form the pudendal canal around the internal pudendal A. and pudendal N.

#Muscles of the Pelvis:





Muscle	Origin	Insertion	Nerve Supply	Action
Coccygeus	Ischial spine	Lower end of the sacrum and into the coccyx	A branch of the 4th and 5th sacral nerves	The two muscles assist the levator ani in supporting the pelvic viscera.
Levator ani 	- Lower part of back Body of pubis - White line of Obturator fascia - Pelvis surface of Ischial spine See below…..	—	- On its pelvic surface: fourth sacral N. (sacral plexus) - On its perineal surface: perineal branch (of pudendal N.)	1. Supports and maintains the pelvic viscera in position. 2. It resist the rise in intra pelvic pressure during the straining 3. Sphincter action on the anorectal junction, and vagina.

***Notes:**

-Levator ani and coccygeus (of both sides) form the pelvic diaphragm which forms the pelvic floor:

*The part of the pelvis above levator ani is the pelvic cavity.

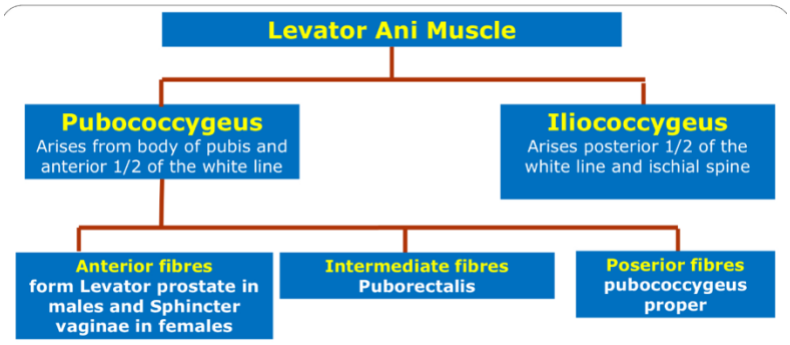
*The part of the pelvis below levator ani is the perineum.

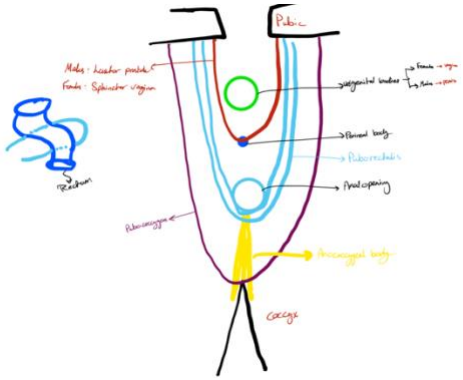
-The part of obturator internus above origin of levator ani is in the side wall of the pelvic cavity.

-The part of obturator internus below origin of levator is in the side wall of ischiorectal fossa of the perineum.

-Anterior borders of the 2 Levator ani muscles are separated by a gap which is filled by puboprostatic ligaments (in male) or pubovesical ligaments (in female).

-Levator Ani muscle:





Levator Ani Muscle	**Origin / Path / Insertion / Function**
1)Pubococcygeus	Arises from body of pubis and anterior 1/2 of the white line
-Levator prostatae or sphincter vaginae	It pass **horizontally** and backwards around the sides of prostate in male or sides of vagina in female to insert into the perineal body. It supports the prostate, constrict the vagina and stabilize the **perineal body.** Perineal Body : is a mass of fibrous tissue, in front of the anal canal. In the male : it lies between anal canal and bulb of the penis. In the female : it lies between anal canal and lower part of vagina.
-The puborectalis	It passes **inferomedially** to become continuous with the opposite ones behind the anorectal junction, so form a U-shaped sling. It is inserted into **Anococcygeal body**
-Pubococcygeus proper	It pass **medially** to be attached to side of **coccyx** and **anococcygeal Body** Anococcygeal body :A small fibrous mass between the tip of the coccyx and the anal canal.
2)Iliococcygeus	It arises from posterior 1/2 of the white line and ischial spine. Its fibres pass **medially inferior** to the pubococcygeus proper and has the same insertion into side of coccyx and the anococcygeal raphe.

#Functional Significance of the Pelvic Floor in the Female:

-It helps in head rotation during second stage of labour.

-Injury to the pelvic floor:

- Can happen during a difficult childbirth
- This leads to loss of support for the pelvic viscera leading to:

1-Uterine and vaginal prolapse,

2-Herniation of the bladder (cystocele)

3-Alteration in the position of the bladder neck and urethra, leading to **stress incontinence** (patient dribbles urine whenever the intra- abdominal pressure is raised, as in coughing).

4-Prolapse of the rectum may also occur.

#Arteries Of The Pelvis:

This item includes;

❖Internal iliac artery

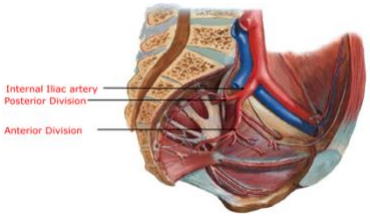
❖Other arteries:

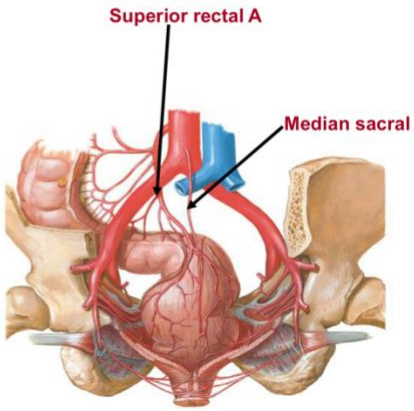
- ✓ Superior rectal artery (continuation of the inferior mesenteric A)
- ✓ Median sacral artery (from Aorta)
- ✓ The two ovarian arteries (from Aorta) .

Internal Iliac Artery :

Beginning : Opposite the lumbosacral disc

Termination : Upper margin of greater sciatic foramen by dividing into anterior and posterior divisions.





#Branches of Internal Iliac Artery:

Anterior Visceral branches	Anterior Parietal branches	Posterior division parietal branches
Superior vesical A.	Obturator A.	Iliolumbar A.
Inferior vesical A. ***(OR vaginal in female)***	Internal pudendal A	Two lateral sacral arteries
Middle rectal A.	Inferior gluteal A.	Superior gluteal A.
Uterine A. ***(has NO corresponding branch in the male)***		

صدول بالطبع

PoSterior with Superior

Division	Branch	Details
Posterior Division	Iliolumbar Artery (muscular)	-It divides into iliac and lumbar branches to supply iliacus, psoas major and quadratus lumborum muscles
	Two Lateral Sacral Arteries (superior, inferior)	-These are the arteries of sacral canal. -They enter the ventral sacral foramina to supply contents of sacral canal and then come through the dorsal sacral foramina to supply the overlying muscles
Anterior Division	Superior Vesical Artery (Obliterated Umbilical Artery)	-It was the umbilical artery in the fetus. -Its **proximal part is patent** (= superior vesical A.). -It gives branches to the bladder, ureter and vas deference. -Its **distal part is fibrosed** form medial umbilical ligament which form the medial the medial umbilical fold of peritoneum.
	Inferior Vesical Artery (Vaginal Artery in the female)	-It supplies base of the urinary bladder, seminal vesicle, prostate and **gives artery of the vas** which runs in the spermatic cord and **anastomoses with the testicular artery.** -In female: The vaginal A. supplies the base of the bladder and gives vaginal branches which **anastomose with vaginal branches from uterine A**.
	Middle Rectal Artery	-It supplies the musculosa of rectum, seminal vesicles and prostate in the male and vagina in the female. -It **anastomoses with other rectal arteries**
	Uterine Artery (in females)	-It runs medially on the upper surface of the pelvic diaphragm. -It ends by **anastomosing with the ovarian A.** -It supplies pelvic part of ureter, vagina (azygos arteries), cervix and of uterus, medial part of the uterine tube
	Obturator Artery	-In the pelvis, it gives a pubic branch which anastomoses with the pubic branch of inferior epigastric artery on the posterior surface of the body of the pubis. -It enters the thigh through obturator foramen
	Internal Pudendal Artery	-It **leaves** the pelvis through the **greater sciatic foramen** and enters the gluteal region **below the piriformis muscle.** -It then **enters** the perineum by passing through the **lesser sciatic foramen** and passes forward in the **pudendal canal** with the pudendal nerve
Other arteries in the pelvis	Superior Rectal Artery	-The superior rectal artery is a direct continuation of the inferior mesenteric artery as it crosses the left common iliac artery. - It supplies the mucous membrane of the rectum and the upper half of the anal canal.
	Ovarian Artery	-The ovarian artery arises from the abdominal part of the aorta at the level L2.
	Median Sacral Artery	-The median sacral arises at the bifurcation of the aorta . - It descends over the anterior surface of the sacrum and coccyx.

#Venous drainage of the pelvis:

Vein	**Details**
Internal Iliac Vein	-It begins opposite the upper part of greater sciatic foramen. -It ends at pelvic brim by joining the external iliac vein to form the common iliac vein. -**It receives veins similar to the branches of internal iliac artery except the iliolumbar vein which ends in the common iliac vein.** **>>N.B:** -The internal iliac veins ***drain blood from the pelvic viscera*** by means of visceral veins ***and drain blood from the internal vertebral venous plexuses*** by means of the valveless lateral sacral veins. -Increase in the pelvic pressure (e.g. coughing & straining) may cause reflux of blood backwards up to the internal vertebral venous plexuses. -In this way, primary tumors in pelvic viscera give rise to secondaries in the lumbar vertebrae.
Superior Rectal Vein	-Arises from the internal rectal venous plexus of rectum and ascends to become inferior mesenteric vein which joins splenic vein
Median Sacral Vein	-Begins in front of sacrum and ascends to join **left common iliac vein**
Ovarian Veins	-The **right joins I.V.C**. and **the left joins left renal vein**