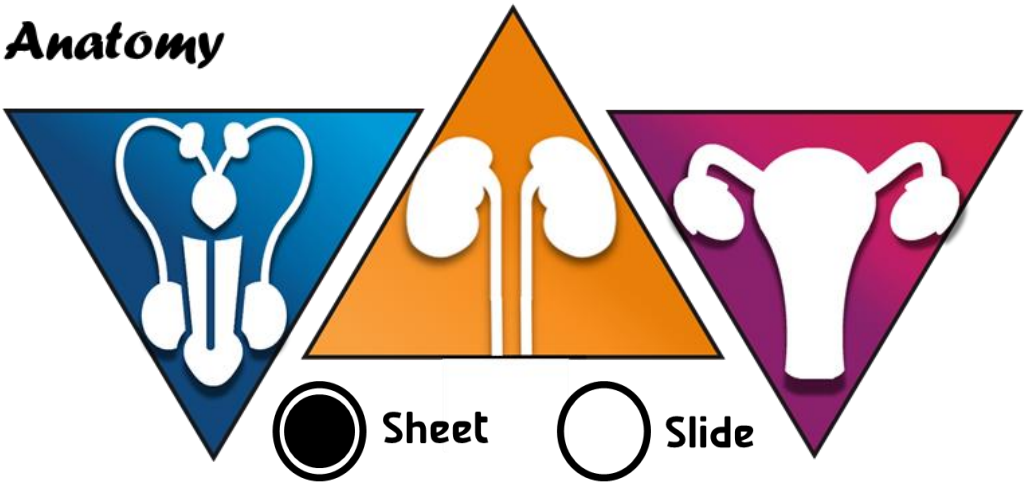
Urogenital system



Number: - 12

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❖ Contents of this lecture:

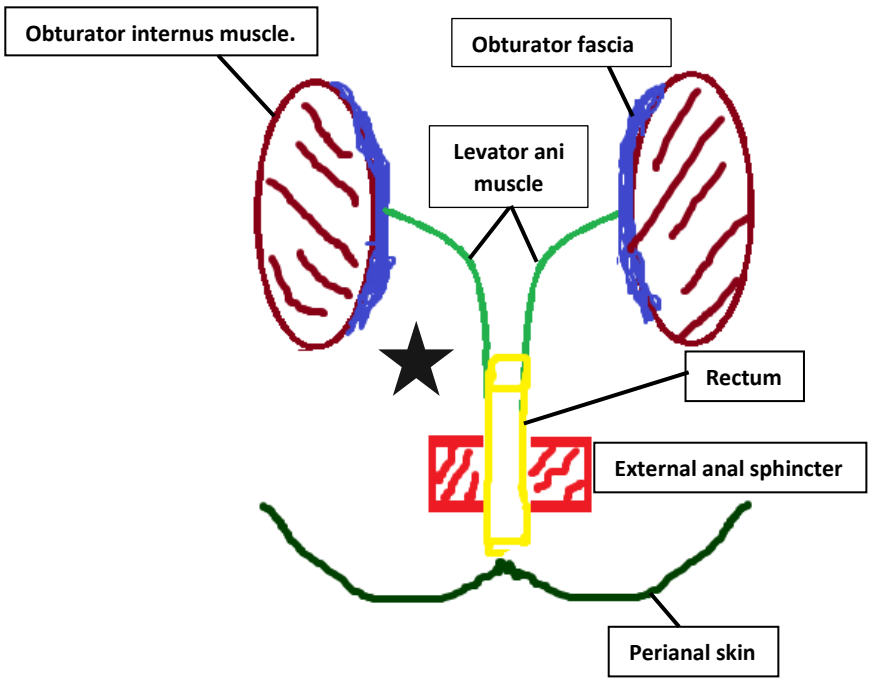
1- Ischiorectal Fossa

2- Internal Pudendal artery (Course and relation)

3- Pudendal nerve (Course and relation)

4-Superficial and deep perineal pouches (Boundaries and contents)

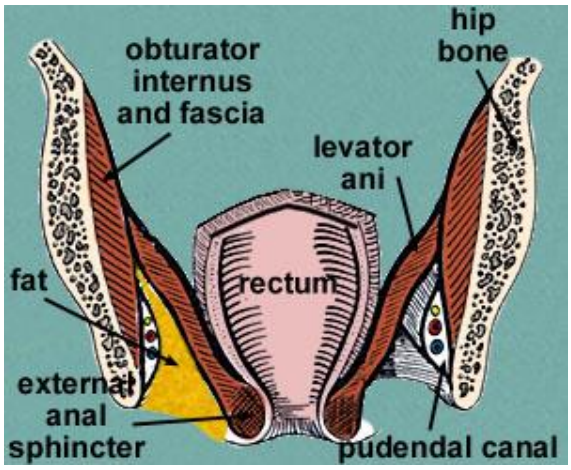
1-Ischiorectal fossa.



❖ This figure indicates a coronal section in the posterior of anal canal.

❖ Location: It is a wedge-shaped space on either side of the anal canal.

❖ If you look at the figure you will find the obturator internus muscle and obturator fascia on each side, the rectum and the anal canal in the middle, notice that the anal canal is surrounded by a muscle called external anal sphincter.



❖ The ischiorectal fossa is pyramidal in shape it has an apex, base and 4 walls:

- ❖ **Apex:** Origin of levator ani from the white line.
- ❖ **Base:** perianal skin.
- ❖ **Medial wall:** Levator ani and the external anal sphincter.
- ❖ **Lateral wall:** Obturator internus muscle and Obturator fascia.

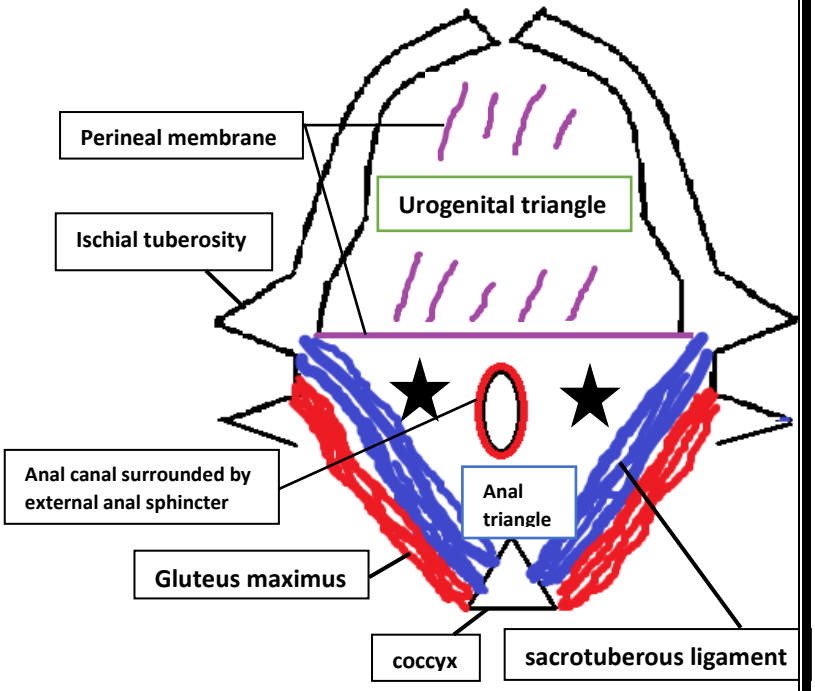
As for the anterior and the posterior relationships: (Look at the next figure):

- Note: Remember from the previous lecture we said that the urogenital triangle is covered by a membrane called **perineal membrane.**

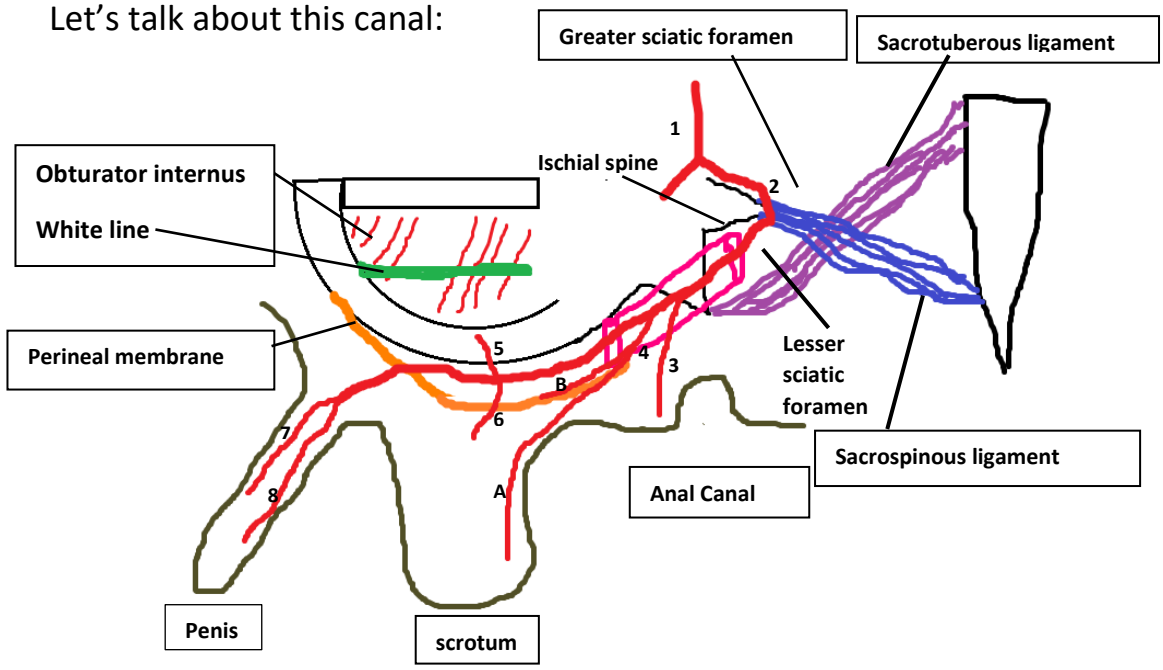
- **Anterior:** posterior border of the perineal membrane.

- **Posterior:** Sacrotuberous ligament, and the gluteus <u>maximus</u> muscle.

** note that only gluteus maximus is related to the ischiorectal triangle, because it is the only one that originates from medial side (sacrum), gluteus Medius and minimus originates from the ilium**.**



- In the lateral wall of the fossa there is a canal called pudendal canal: it is formed by the splitting of the obturator fascia.
  Let's talk about this canal:



- First, let's divide the area above into spaces:
    - Above **the white line** (pelvic diaphragm) is the pelvis, below it is the perineum.
    - The perineum if further divided into two triangles by a line joining the anterior parts of the ischial tuberosities:
        - Anteriorly: Urogenital triangle.
        - Posteriorly: Anal triangle.
    - The urogenital triangle is divided by the perineal membrane into:
        - Deep perineal pouch: between the pelvic diaphragm and the perineal membrane.
        - Superficial perineal pouch: between the perineal membrane and Colles fascia.
    - The anal triangle contains the ischiorectal fossa around the anal canal and the pudendal canal in the lateral wall of the fossa.
- Now back to the pudendal canal, this canal starts from the lesser sciatic foramen and ends in the deep perineal pouch, it will transmit the pudendal artery and nerves.

2- Internal Pudendal artery:

- The artery originates from the internal iliac artery (1), from the anterior division (2), the artery leaves the pelvis through the greater sciatic foramen, then cross the ischial spine it goes to the lesser sciatic foramen and enters the perineum, then it enters the pudendal canal and gives 2 branches:
    - ✓ Inferior rectal artery (3) around the rectum.
    - ✓ Perineal artery (4), which gives another 2 branches:
        - Posterior scrotal artery (A).
        - Transverse perineal artery (B).

Then it leaves the pudendal canal to enter the deep perineal pouch in which it gives two branches to two important structures:

- ✓ For the urethra: urethral artery (5).
- ✓ For the bulb of the penis: artery of the bulb (6)

Then it pierces the perineal membrane to enter the superficial pouch and gives 2 branches:

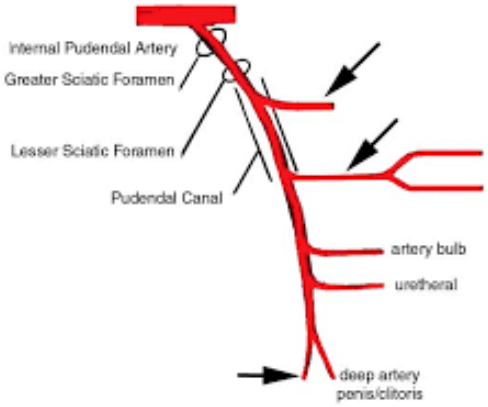
- ✓ Dorsal artery of the penis (7).

- ✓ Deep artery of the penis (8).

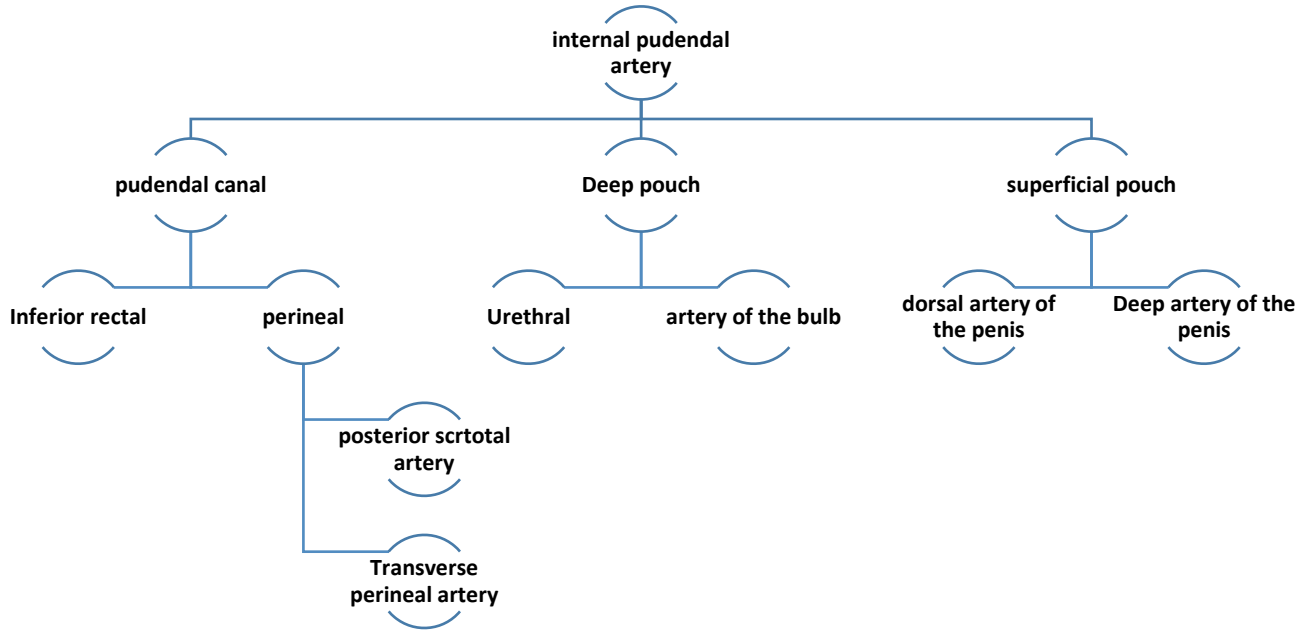
In females	In males
Inferior rectal artery	Inferior rectal artery
Perineal artery	Perineal artery
Posterior labial branches	Posterior scrotal branches
Artery of bulb of vestibule	Artery of bulb of penis
Dorsal artery of clitoris	Dorsal artery of the penis
Deep artery of clitoris	Deep artery of the penis

Note: In female the scrotal artery will be replaced by labial and the penis arteries will be replaced by clitoris arteries.

Note: In the beginning of the route of the artery we said that it leaves the pelvis through the greater sciatic foramen and then to the lesser sciatic foramen around the ischial spine then to the pudendal canal and eventually reaches the deep perineal pouch. You may be wondering why it did not pierce the pelvic diaphragm and directly reached the deep pouch?! The answer is because of the levator ani muscle that might contract and compress the artery, so it protects it self by going in another safer route which we mentioned previously.



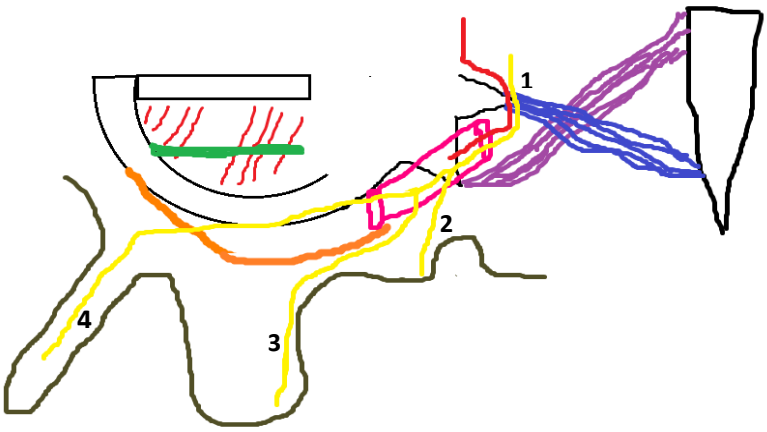
Recap:



Pelvis → greater sciatic foramen → around the ischial spine → lesser sciatic foramen → pudendal canal → deep perineal pouch → superficial perineal pouch

3- pudendal nerve: The pudendal nerve is a branch form the sacral plexus (s2, s3, s4), just like the pelvic splanchnic nerve.

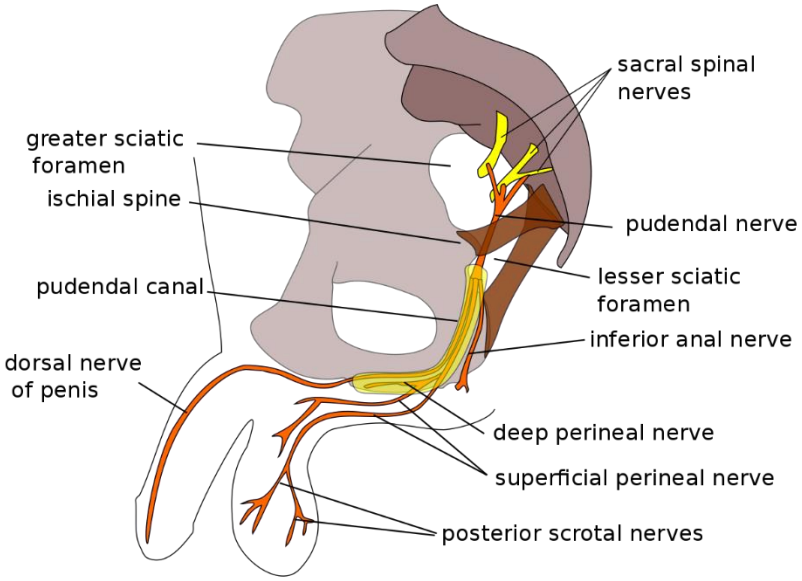
- The nerve will leave the pelvis through the greater sciatic foramen cross the ischial spine (1), (we said previously that also the internal pudendal artery will pass next to the ischial spine), **the nerve will be medial to the artery** posterior to ischial spine nerve then artery), then it enters through the pudendal canal giving 3 branches (2 mixed; motor & sensory and one sensory):



✓ Inferior rectal nerve (2) (Mixed):
- Motor: External anal sphincter and levator ani muscle "Muscle in the medial wall of ischiorectal fossa".
- Sensory: anal canal below pectinate line, skin around the anus and lower inch of vagina (somatic nerve supply).

✓ Perineal nerve (3) (Mixed):
- Motor: to all muscles in the superficial and deep perineal pouches.
- Sensory: It gives 2 scrotal (labial) nerves, they pierce perineal membrane to supply posterior 2/3 of scrotum (or labium majora).

✓ Dorsal nerve of the penis (Clitoris in females) (4) (sensory):
- Sensory: It enters the deep perineal pouch, then pierces the perineal membrane to enter the superficial perineal pouch. Then it runs on dorsum of penis, supplying its skin and glans.



4- Contents of the ischiorectal fossa, deep pouch and superficial pouch.

- The contents in general are divided into genitourinary structures, nerve and vessels and muscles.

A) Contents of ischiorectal fossa:

1- Internal Pudendal artery 2- pudendal nerve

3- inferior rectal artery 4- inferior rectal nerve

5- posterior scrotal artery 6- posterior scrotal nerve

7- Perforating cutaneous N. (S2, S3); supply the skin of the buttocks.

8-Pad of Fat: It is rich in fibroelastic fibres and has two functions:

• It acts as a cushion support for rectum and anal canal.

• It allows distention of the rectum and anal canal during defaecation, then compress them after termination of the act.

B) Contents of the deep perineal pouch:

Nerves and vessels:

1- Internal Pudendal artery.
2- Urethral artery.
3- Artery of the bulb.
4- Transverse Perineal artery.
5- Dorsal nerve of the penis.
6- Perineal nerve.

Contents of Deep Perineal pouch

	Male	Female
Urogenital Structures	• Membranous urethra • Bulbourethral glands	• Part of the urethra • Part of vagina
Muscles	• Sphincter urethrae • Deep transverse perineal muscles (These two muscles form the *urogenital diaphragm.)*	
Vessels	▪ Internal pudendal A. ▪ Artery of bulb. ▪ Urethral A. ▪ Perineal A.	▪ Internal pudendal A. ▪ Artery of bulb of vestibule. ▪ Perineal A.
Nerves	▪ Dorsal N. of penis. ▪ Perineal N.	▪ Dorsal N. of clitoris. ▪ Perineal N.

N.B. : the greater vestibular glands of the female lie in the *superficial* perineal pouch, the bulbourethral glands of the male lie in the *deep* perineal pouch

Muscles: (urogenital diaphragm):

1- External urethral sphincter
2- Deep transverse perineal muscles

Genitourinary structures:

1- Membranous urethra in males and urethera in females)
2- Bulbourethral glands (in females' part on the vagina).

C) Contents of the Superficial perineal pouch:

Nerve and vessels:

1- Dorsal artery of the penis
2- Deep artery of the penis
3- Scrotal arteries
4- Internal Pudendal artery.
5- Dorsal nerve of the penis
6- scrotal nerves

Contents of Superficial Perineal Pouch

	Male	Female
Urogenital Structures	• Root of penis (2 crura) • Penile urethra in corpus spongiosum (bulb of penis)	• Root of clitoris (2 crura) • Two bulbs of vestibule • Greater vestibular glands.
Muscles	•Two ischiocavernosus muscles cover the 2 crura • Bulbospongiosus muscle covers bulb of penis. • Two superficial transverse perineal muscles.	• Two ischiocavernosus • Bulbospongiosus muscle • Two superficial transverse perineal muscles.
Vessels	• Dorsal A. of penis. • Deep A. of penis. • Two scrotal arteries	• Dorsal A. of clitoris. • Deep A. of clitoris. • Two labial arteries.
Nerves	• Dorsal N. of penis. • Two scrotal nerves	• Dorsal N. of clitoris. • Two labial nerves

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Muscles:

1- Two ischiocavernosus muscles cover the 2 crura.
2- Bulbospongiosus muscle covers bulb of penis (vestibule in female).
3- Two superficial transverse perineal muscles.

Genitourinary structures:

Male: crus of the penis and the bulb. Penile urethra

Female: crus of clitoris, bulb of vestibule, Vagina & Greater vestibular glands which open in the vagina.

Note: In males there is the bulbourethral gland which is present in the deep pouch and opens in the superficial pouch.

	Male	Female
A-Genitourinary structures	• Urethra. • Ducts of bulbo-urethral glands.	• Urethra. • Vagina
B- Vessels	▪ Internal pudendal A. ▪ Artery of the bulb ▪ Perineal A. ▪ Urethral A.	▪ Internal pudendal A. ▪ Artery of the bulb of vestibule. ▪ Perineal A.
C- Nerves	▪ Dorsal nerve of penis. ▪ Perineal N.	▪ Dorsal nerve of clitoris. ▪ Perineal N.

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In females there is the greater vestibular gland which is present in the superficial pouch and opens in the vagina.

5- structures piercing perineal membrane:

- If we Compare these structures with the contents of the deep perineal membrane, we will find that they are the same, meaning that the contents of the deep pouch will pierce the perineal membrane.

6 - Applied anatomy on the ischiorectal fossa:

- Infections in the ischiorectal pad of fat is common and lead to abscess formation. The abscess may rupture medially into the anal canal or downwards into the skin at the fossa. This may lead to **anal fistula** (it connects between the anus and the skin and may pass fecal material or pus to the perianal skin)
- **Sacral fistula:** Connects between the skin and the coccyx.

****Please Do not forget to refer to the slides for further pictures.**

Sorry for any mistake

I wish you Best of luck 😊