



# **Anatomy Department**

## **REPRODUCTIVE SYSTEM**

**By**

**Dr.Ahmed Salman**

**Assistant Professor of Anatomy &embryology**

# Perineum

**It is the diamond-shaped lower end of the trunk**

**Glossary :** peri : around, ineo - discharge, evacuate

**Location :** it lies below the pelvic diaphragm, between the upper parts of the thighs.

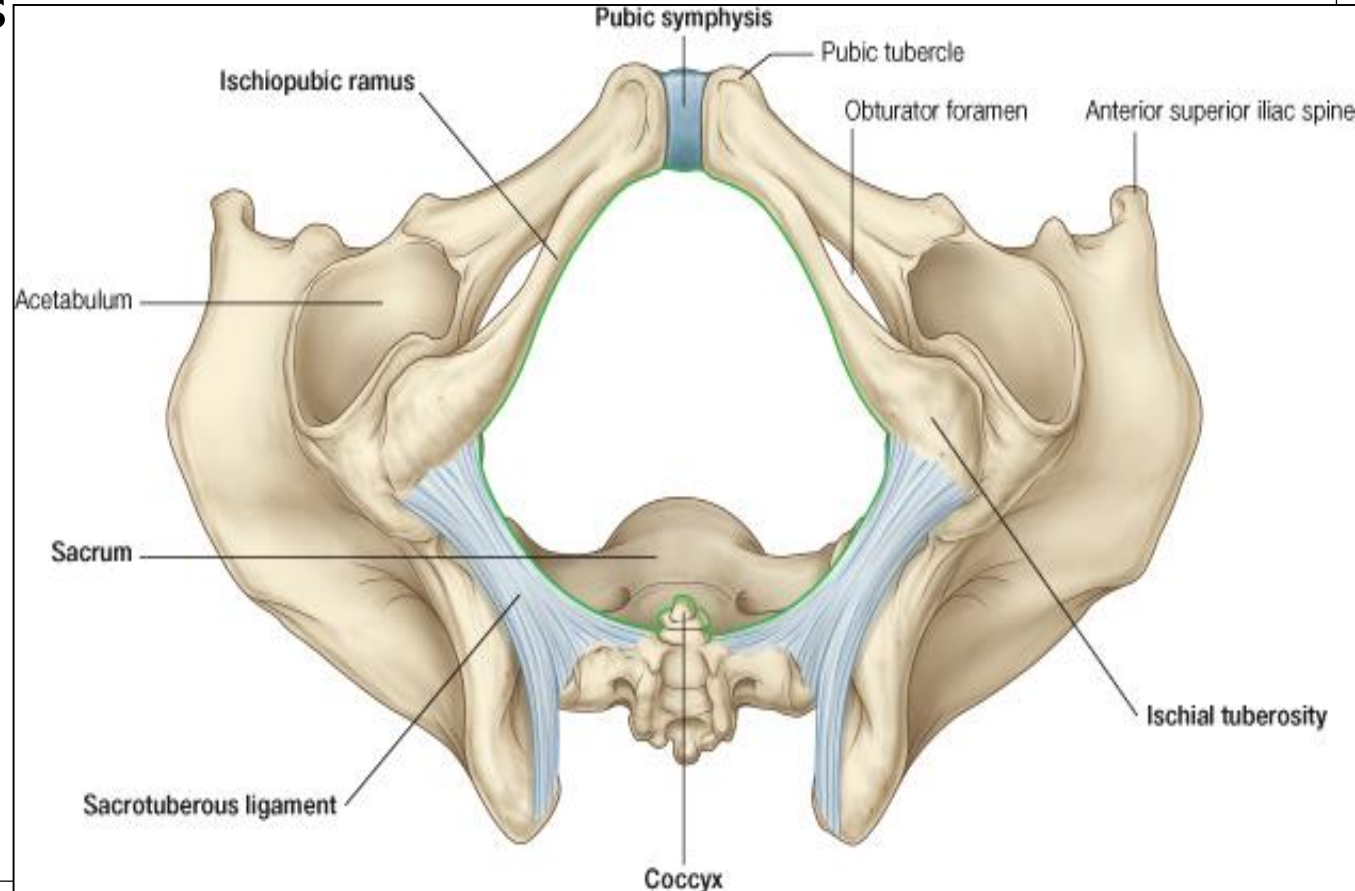
**Boundaries :**

**Anteriorly :** Inferior margin of symphysis pubis.

**Posteriorly :** Tip of coccyx.

**Anterolateral :** Fused rami of pubis and ischium and ischial tuberosity.

**Posterolateral :** Sacrotuberous ligaments

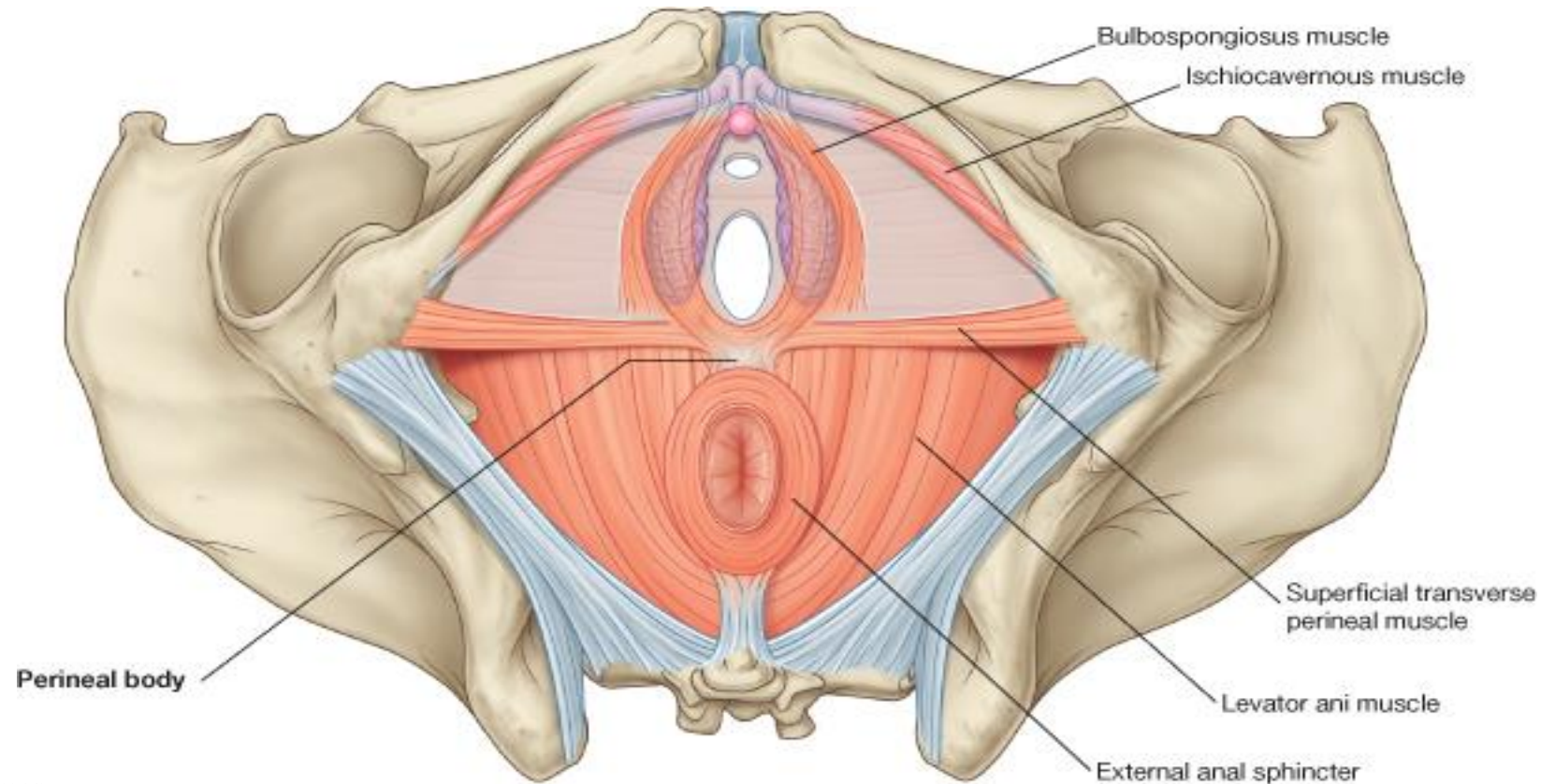


## Divisions of the Perineum :

❖ By a line joining the anterior parts of the ischial tuberosities, the perineum is divided into two triangles :

❖ **Anteriorly** : Urogenital triangle

❖ **Posteriorly** : Anal triangle



# Perineum

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graph TD; A[Perineum] --> B[Urogenital triangle Contains]; A --> C[Anal triangle Contains];
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## Urogenital triangle Contains

- 1-External genitalia in male or female
- 2-Superficial perineal pouch
- 3-Deep perineal pouch

## Anal triangle Contains

- 1-**Anal Canal** in the median plane
- 2-**Ischiorectal fossa** on either side of anal canal
- 3- **pudendal canal** in side wall of ischiorectal fossa

Perineum contains two fibro muscular masses which are :

**A- Anococcygeal raphe (and body) :**

- It is a fibromuscular mass which extends from the tip of coccyx to the recto anal junction.
- It is easily stretched during defaecation and labour and recoiled by the coccygeus muscles.
- It supports the lower part of the rectum.

**B- Perineal body (central tendon of the perineum) :**

- It is a fibromuscular mass situated in the median plane, in front of anus.

**Relations :**

- 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.
- Importance : perineal body supports the uterus and vagina.
- Rupture of it during labour may result in prolapse of uterus

## **Muscles attached to the perineal body : 3 paired and 3 single muscles :**

### **3 paired muscles**

1. Superficial transversus perinei.
2. Deep transversus perinei.
3. Levator prostate or sphincter vaginae part of levator ani.

### **3 single muscles**

1. Bulbospongiosus.
2. Superficial part of external urethral sphincter (sphincter urethrae).
3. Superficial part of external anal sphincter

## The perineal fascia

consists of superficial and deep layers

**Superficial perineal fascia**, consists of a superficial fatty layer and a deep membranous layer (***Colles fascia***).

## The superficial fatty layer

**In females,** It makes up the substance of the labia majora and mons pubis

It is continuous with the fatty layer of subcutaneous tissue of the abdomen (***Camper fascia***)

**In males,** the fatty layer is replaced with smooth (*dartos*) muscle.

It is continuous between with the fatty layer of subcutaneous tissue of the abdomen .

**In both sexes,** it is continuous posteriorly with the ischio-anal fat pad in the anal region .



## The membranous layer (*Colles fascia*).

is attached To

**Posteriorly** : The posterior margin of the perineal membrane and the perineal body

**Laterally**, the **fascia lata** (deep fascia) of the upper medial aspect of the thigh.

**Anteriorly**, in the male, the membranous layer of subcutaneous tissue is continuous with the dartos fascia of the penis and scrotum

**On each side** of and anterior to the scrotum, the membranous layer becomes continuous with the membranous layer of subcutaneous tissue of the abdomen (***Scarpa fascia***) .

In females, the membranous layer passes superior to the fatty layer forming the labia majora and becomes continuous with the membranous layer of the subcutaneous tissue of the abdomen .

## **The perineal fascia (deep perineal, investing, or Gallaudet fascia)**

- Invests the ischiocavernosus, bulbospongiosus, and superficial transverse perineal muscles.
- It is also attached laterally to the ischiopubic rami.
- Anteriorly, it is fused to the suspensory ligament of the penis

# The perineal fascia

```
graph TD; A[The perineal fascia] --> B[Superficial perineal fascia]; A --> C[Deep perineal (Gallaudet fascia)]; B --> D[The superficial fatty layer]; B --> E[The membranous layer (Colles fascia)]; D --> F[It is continuous with (Camper fascia)]; E --> G[It is attached to fascia lata]; E --> H[It is continuous with (Scarpa fascia)];
```

## Superficial perineal fascia

### The superficial fatty layer

It is continuous with (***Camper fascia***)

### The membranous layer (***Colles fascia***)

It is attached to fascia lata

It is continuous with (***Scarpa fascia***)

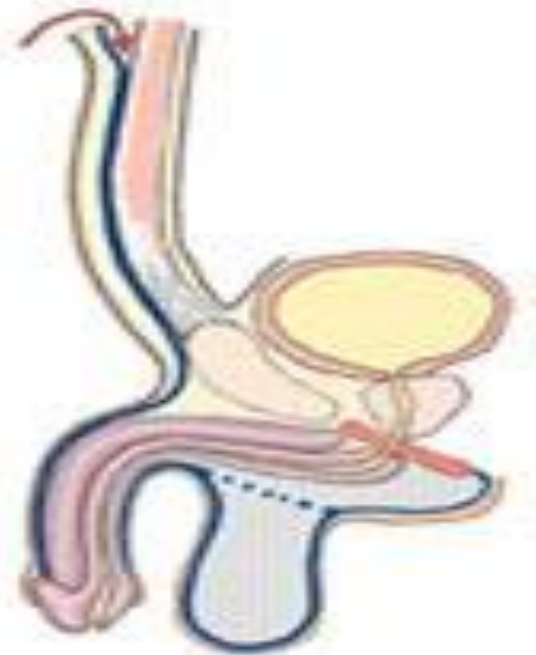
## Deep perineal (Gallaudet fascia)

## Urogenital triangle:

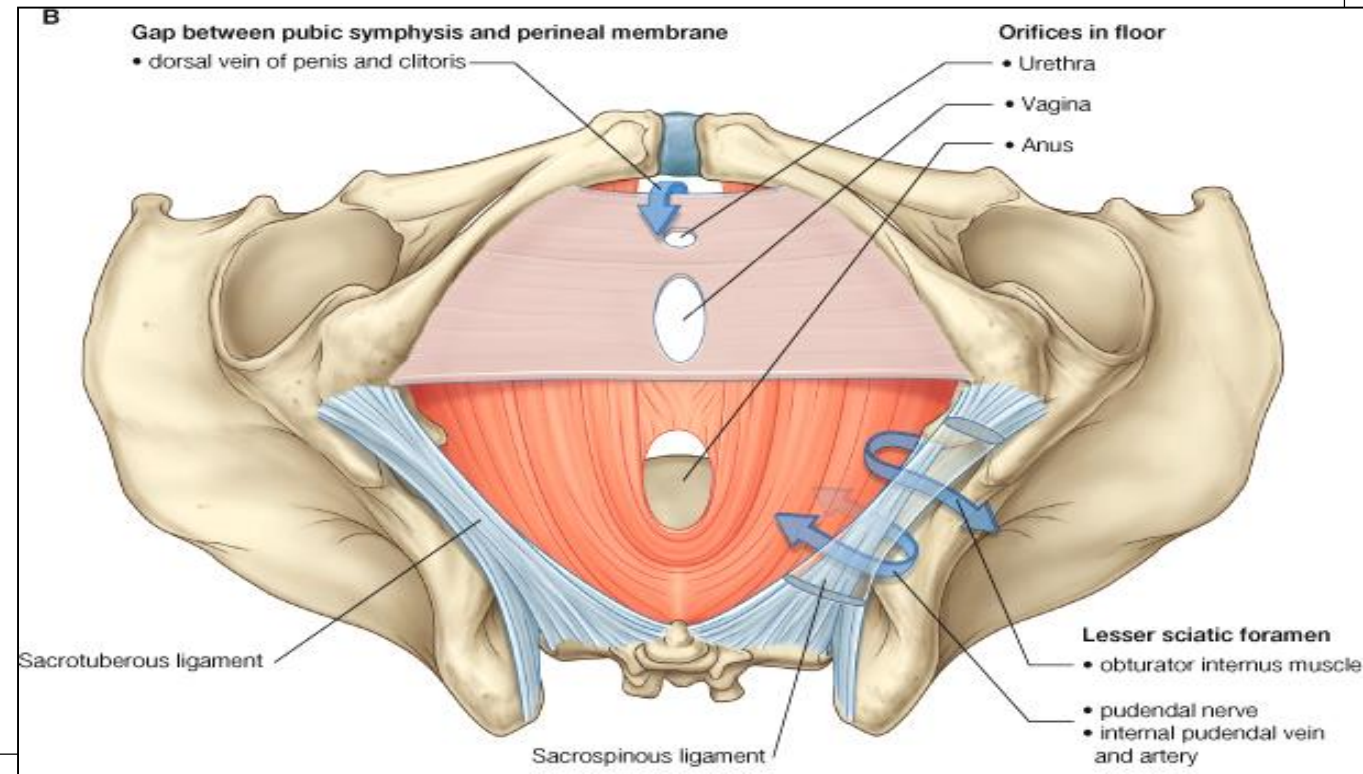
### The perineal membrane

It is a triangular fibrous sheet which lies across the pubic arch

- Forms *the floor* of the deep perineal pouch.
- Forms the *roof* of the superficial perineal pouch

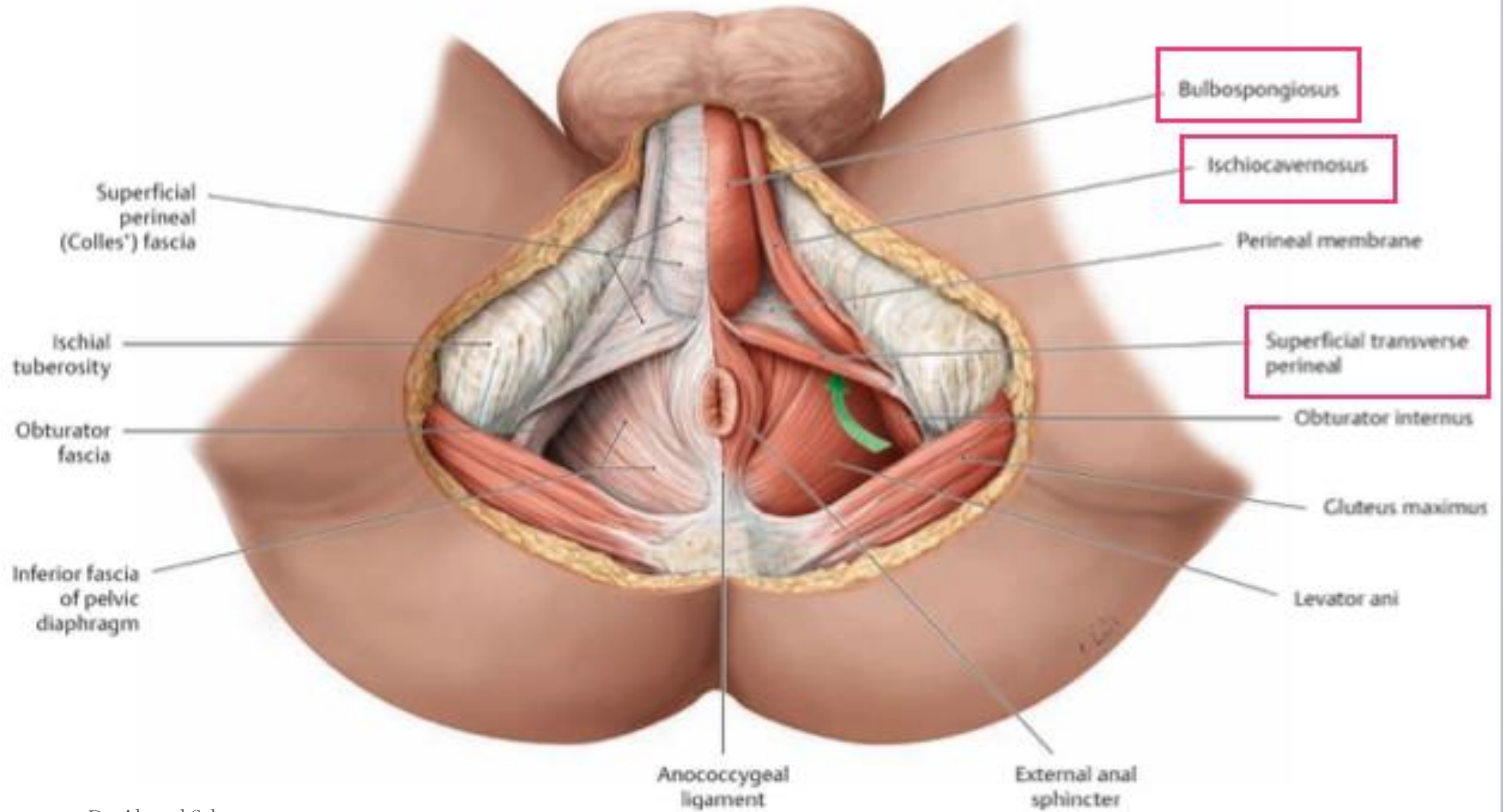


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## Structures piercing perineal membrane in the male and the female

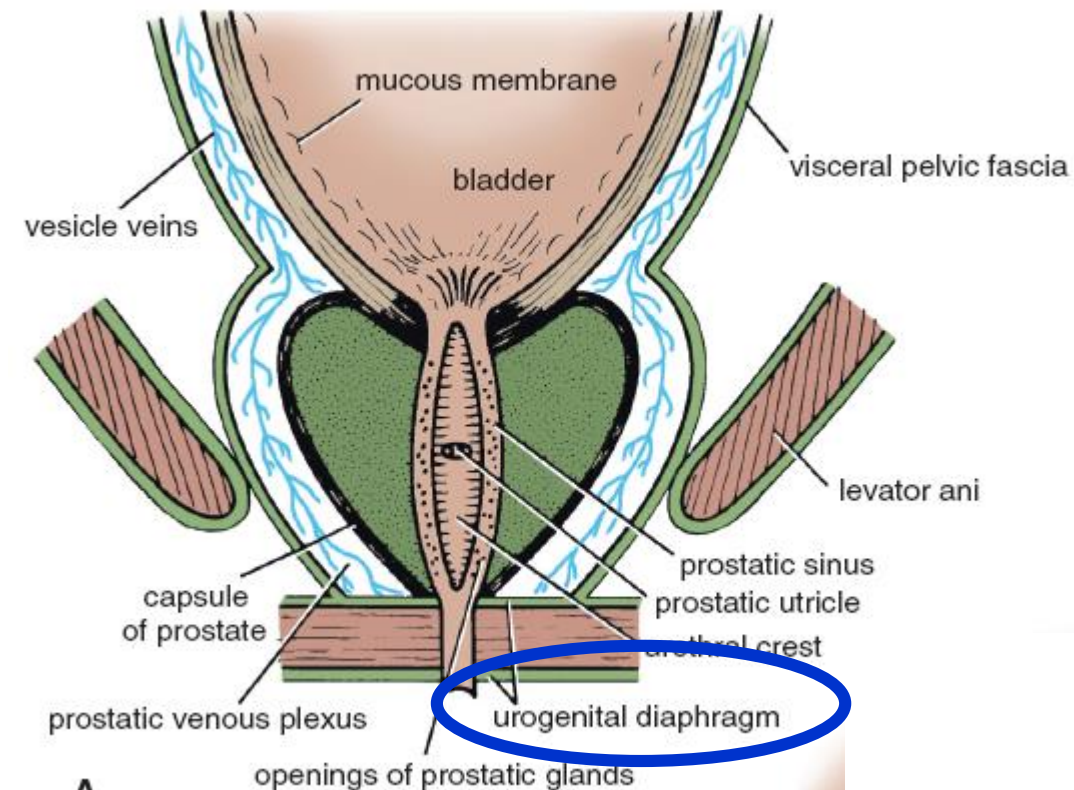
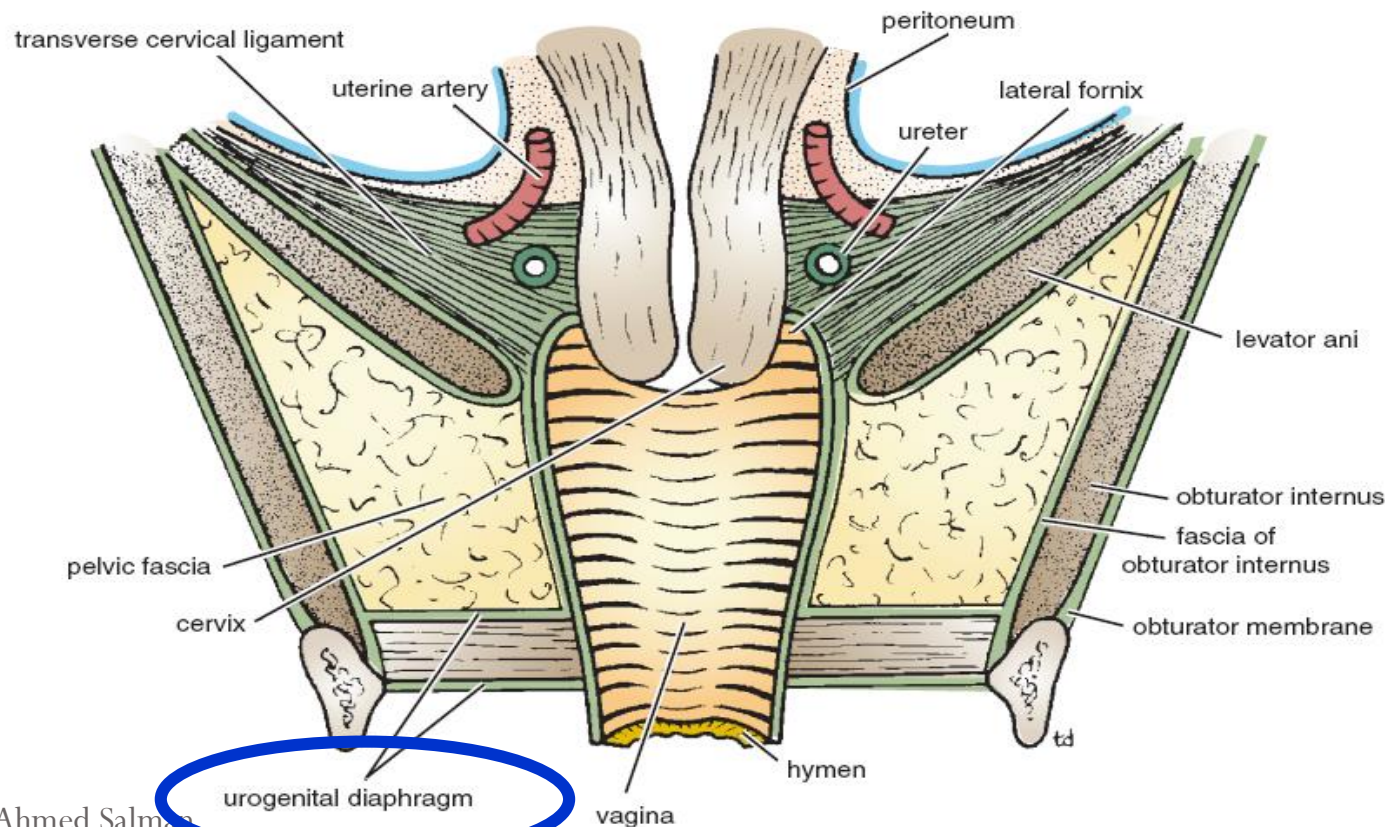
	Male	Female
A-Genitourinary structures	<ul style="list-style-type: none"><li>• Urethra.</li><li>• Ducts of bulbo-urethral glands.</li></ul>	<ul style="list-style-type: none"><li>• Urethra.</li><li>• Vagina</li></ul>
B- Vessels	<ul style="list-style-type: none"><li>• Internal pudendal A.</li><li>• Artery of the bulb</li><li>• Urethral A.</li></ul>	<ul style="list-style-type: none"><li>• Internal pudendal A.</li><li>• Artery of the bulb of vestibule.</li></ul>
C- Nerves	Dorsal nerve of penis.	Dorsal nerve of clitoris.





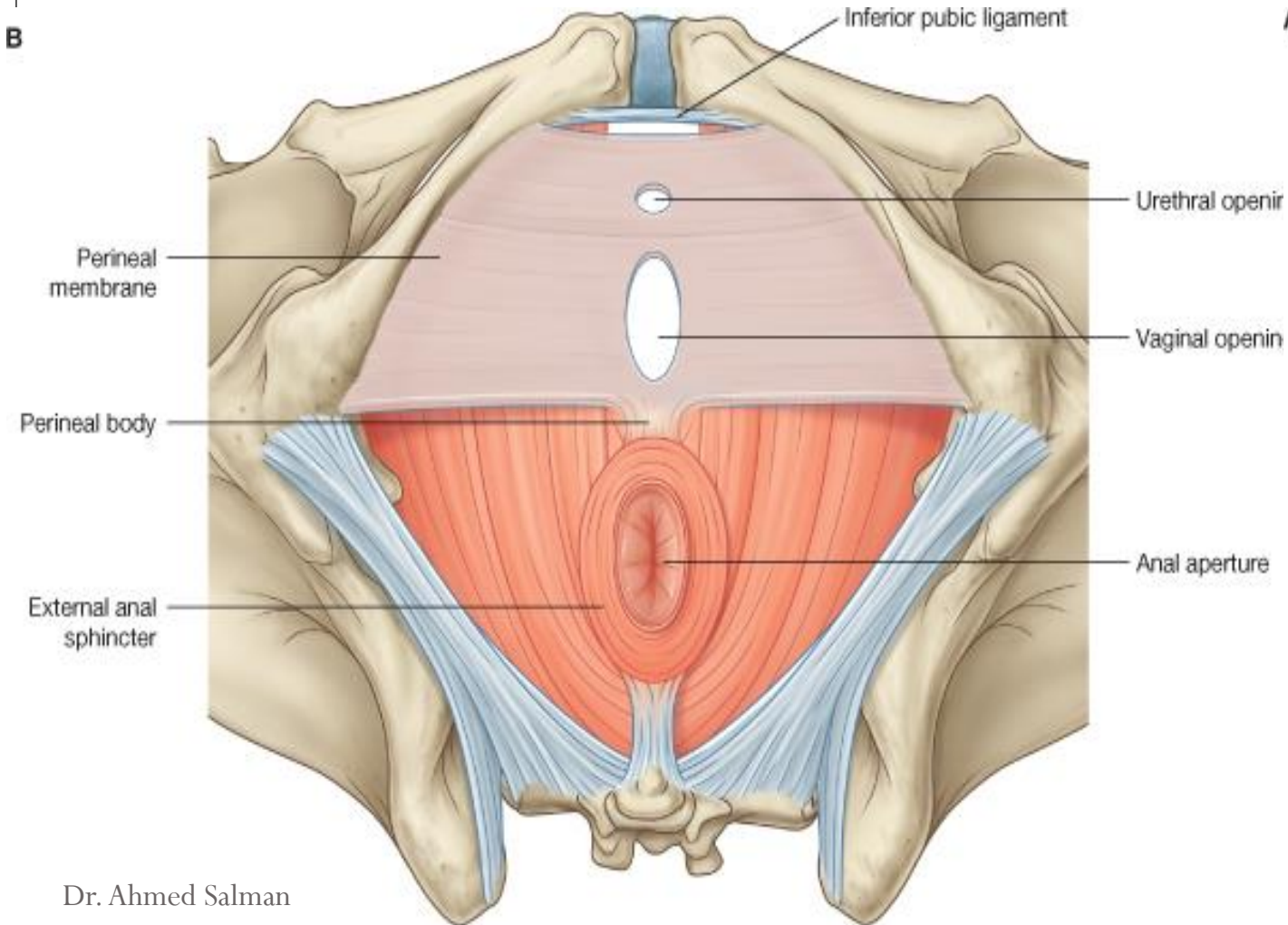
# Urogenital Diaphragm

- It is a triangular musculofascial diaphragm situated in the anterior part of the perineum
- It fills the gap of the pubic arch
- It is formed by the **sphincter urethrae** and the **deep transverse perineal** muscles
- These two muscles are enclosed between a superior and an inferior layer of fascia of the urogenital diaphragm.
- The inferior layer of fascia is the perineal membrane.

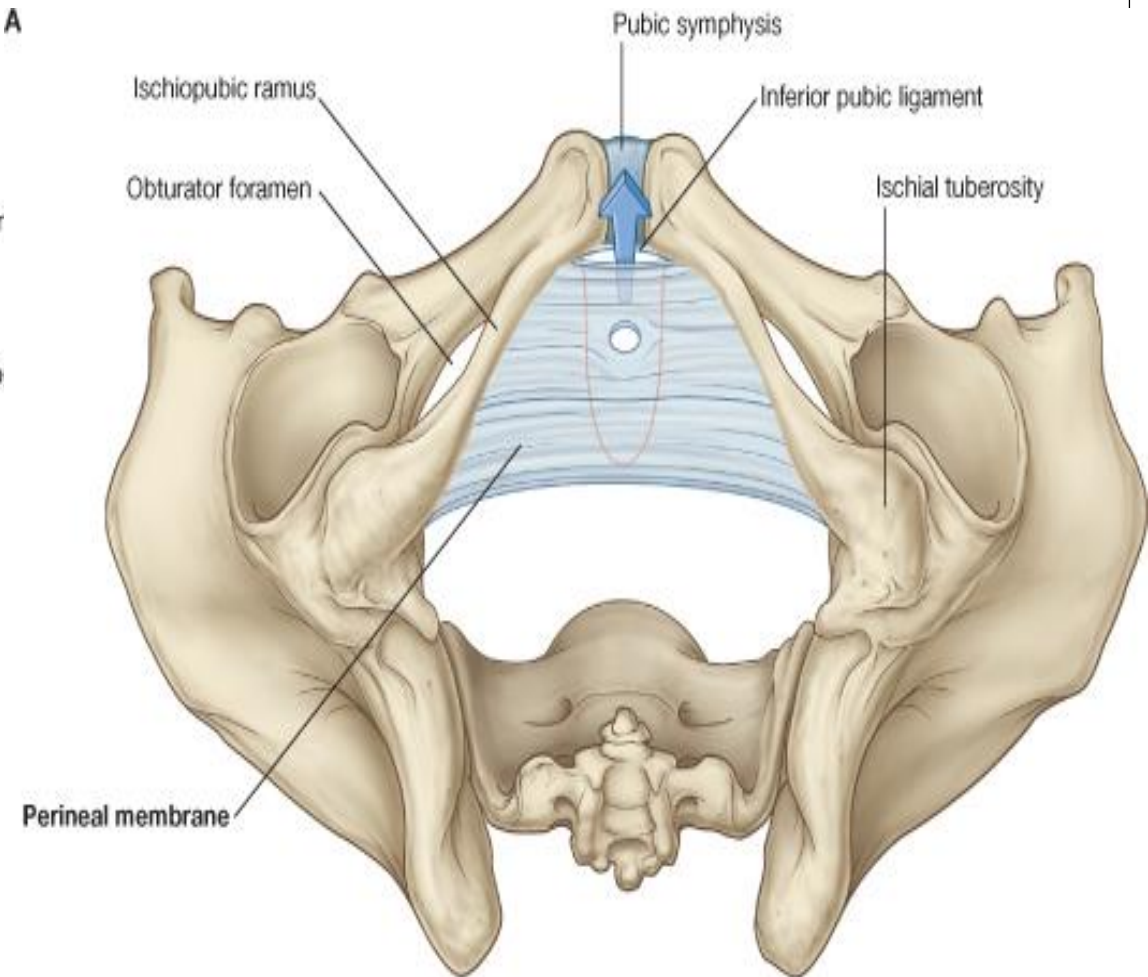


# Perineal pouches

B

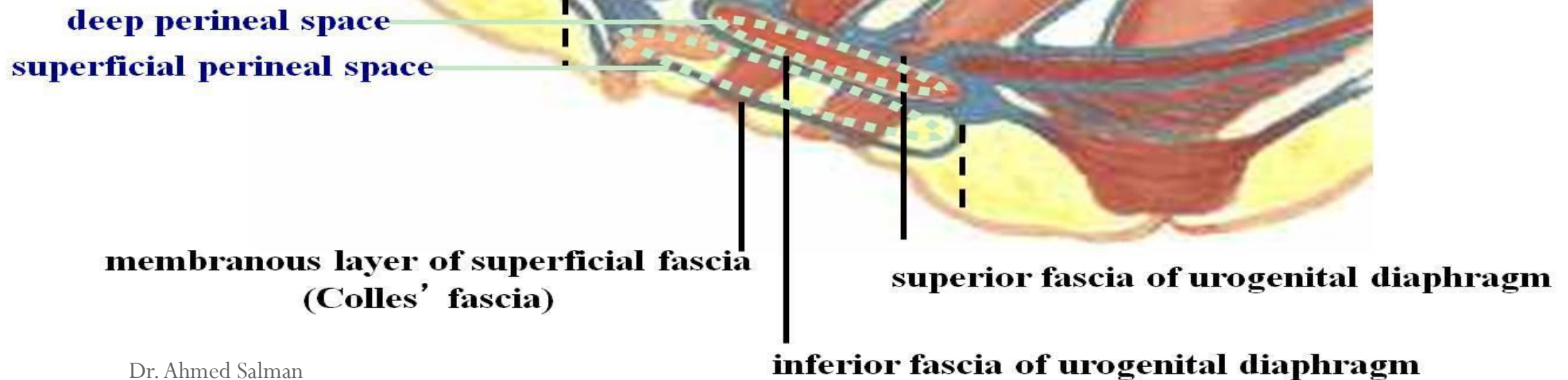


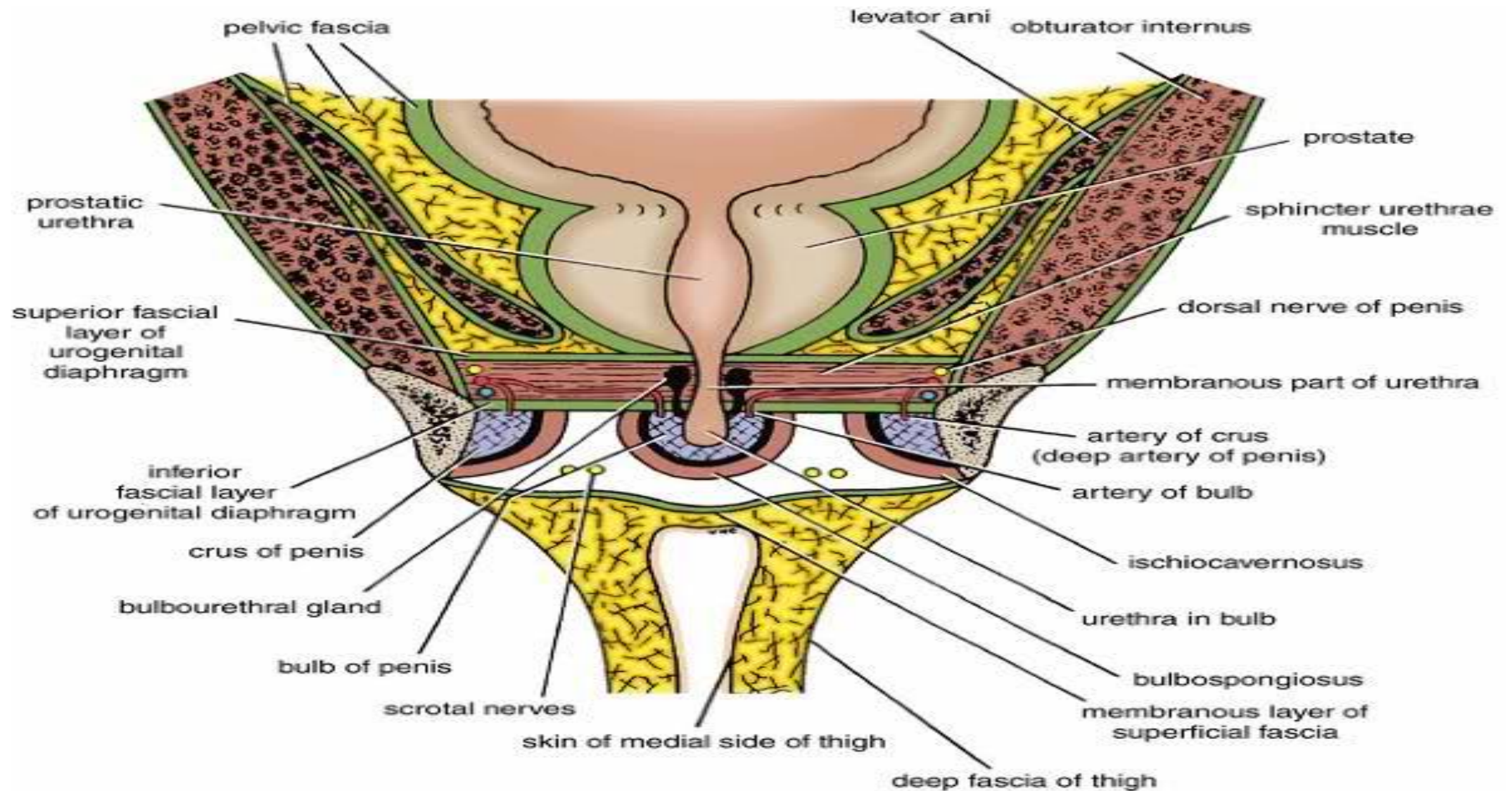
A





**Superficial perineal space - between Colle's fascia and the inferior fascia of the urogenital diaphragm**  
**Deep perineal space - between the superior and inferior fascia of the urogenital diaphragm**





## Deep Perineal pouch :

### Boundaries :

**Floor :** Perineal membrane (inferior fascia of urogenital diaphragm)

**Roof:** Inferior fascia of pelvic diaphragm (levator ani)

**On either side :** related to obturator fascia.

**Posteriorly :** the pouch is closed by union of roof and floor.

**Anteriorly :** The pouch is closed by union of roof and floor below symphysis pubis to form the transverse perineal ligament.

### The transverse perineal ligament

Is separated from the symphysis pubis by an oval opening. Through this opening

**In male** the deep dorsal vein of penis enters the pelvis to join the prostatic venous plexus.

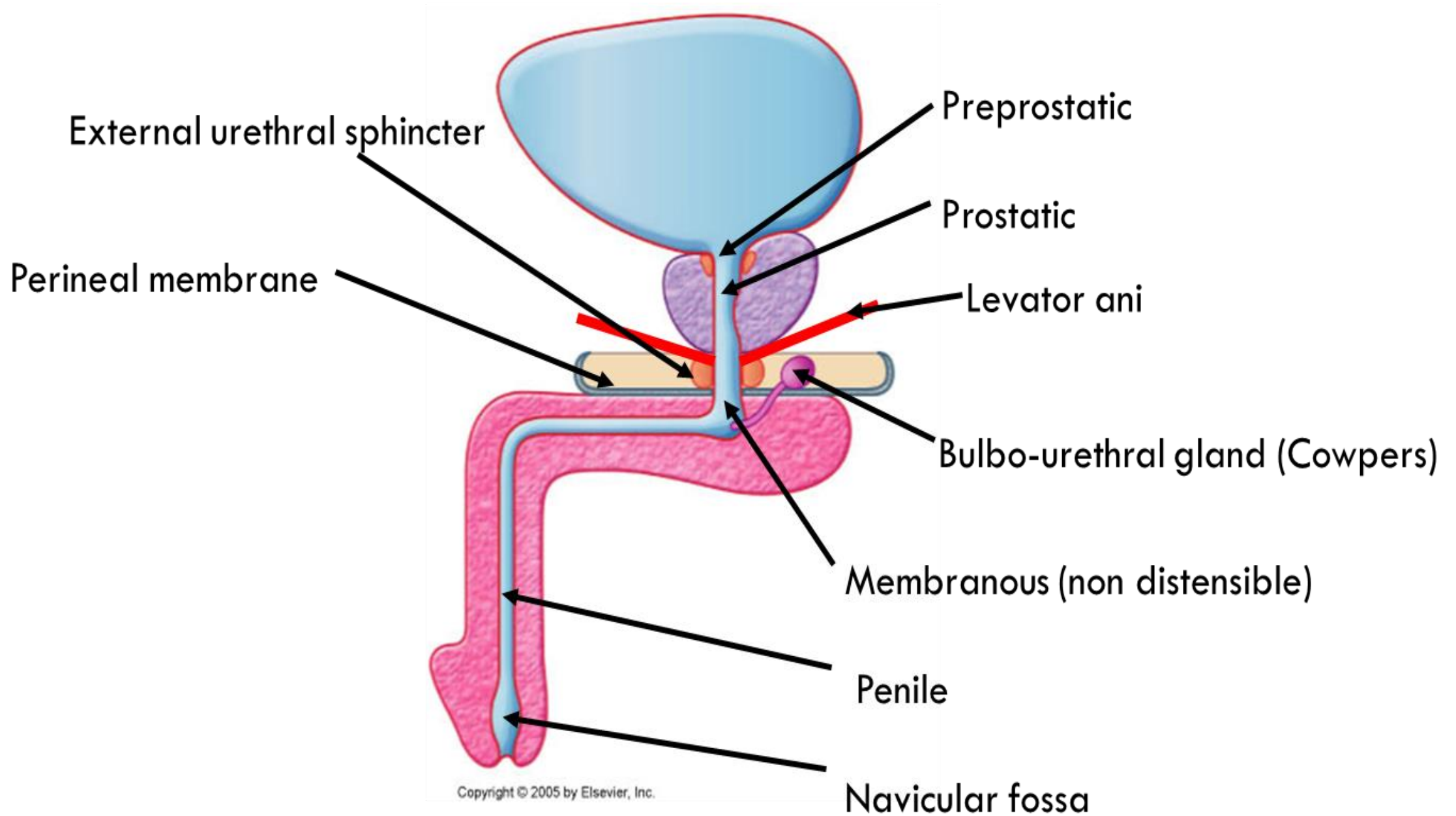
**In female,** the deep dorsal vein of clitoris joins the vesical venous plexus



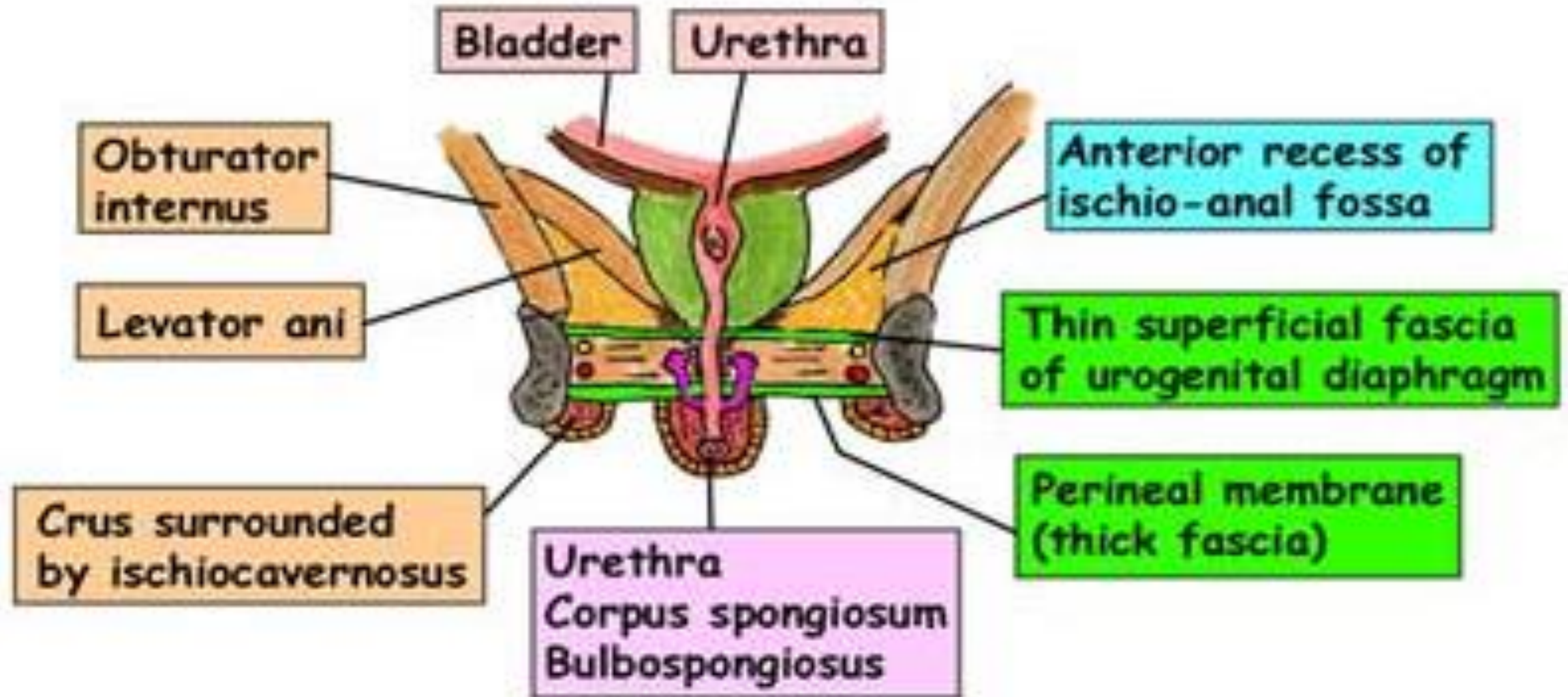
# Contents

	Male	Female
<b>Urogenital Structures</b>	<ul style="list-style-type: none"> <li>• Membranous urethra.</li> <li>• Bulbourethral glands,</li> </ul>	<ul style="list-style-type: none"> <li>• Part of the urethra.</li> <li>• Part of vagina</li> </ul>
<b>Muscles</b>	<ul style="list-style-type: none"> <li>• Sphincter urethrae.</li> <li>• Deep transversus perinei muscles (These two muscles form the <i>urogenital diaphragm</i>.)</li> </ul>	<ul style="list-style-type: none"> <li>• Sphincter urethrae.</li> <li>• Deep transversus perinei muscles. (These two muscles form the <i>urogenital diaphragm</i>)</li> </ul>
<b>Vessels</b>	<ul style="list-style-type: none"> <li>• Internal pudendal A.</li> <li>• Artery of bulb.</li> <li>• Urethral A.</li> </ul>	<ul style="list-style-type: none"> <li>• Internal pudendal A.</li> <li>• Artery of bulb of vestibule.</li> </ul>
<b>Nerves</b>	<ul style="list-style-type: none"> <li>• Dorsal N. of penis.</li> </ul>	<ul style="list-style-type: none"> <li>• Dorsal N. of clitoris.</li> </ul>

**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**



## Deep perineal pouch in male



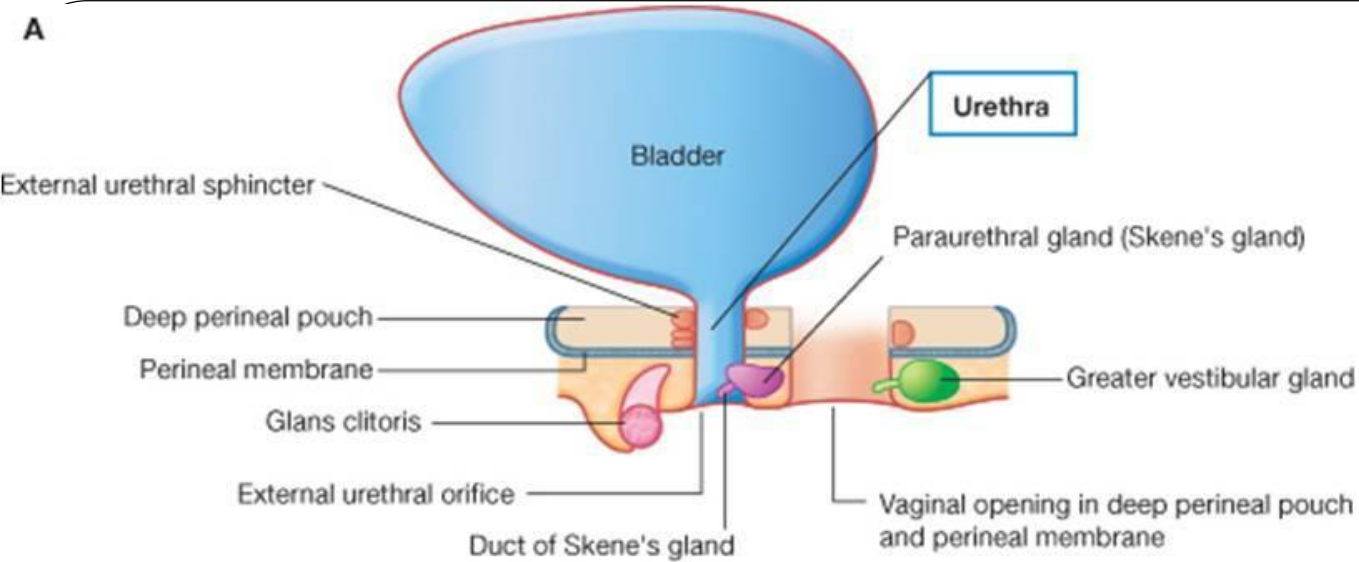
## Deep perineal pouch in female



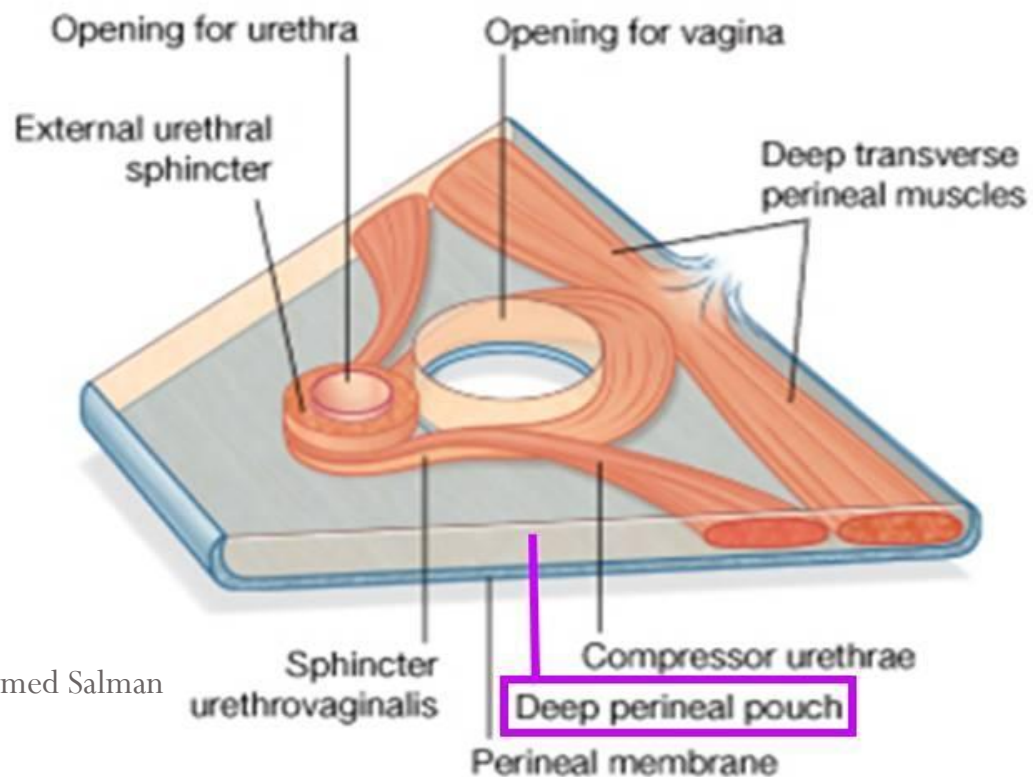
Coronal section  
through urogenital  
diaphragm at level  
of vagina



A

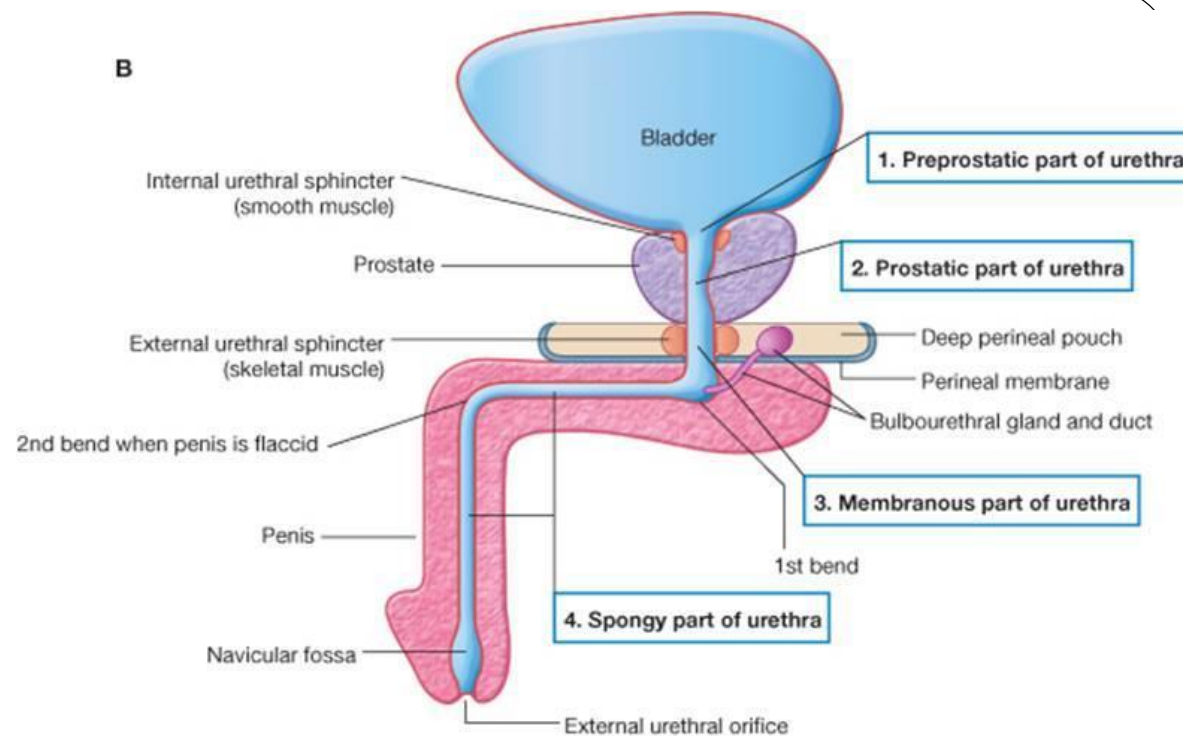


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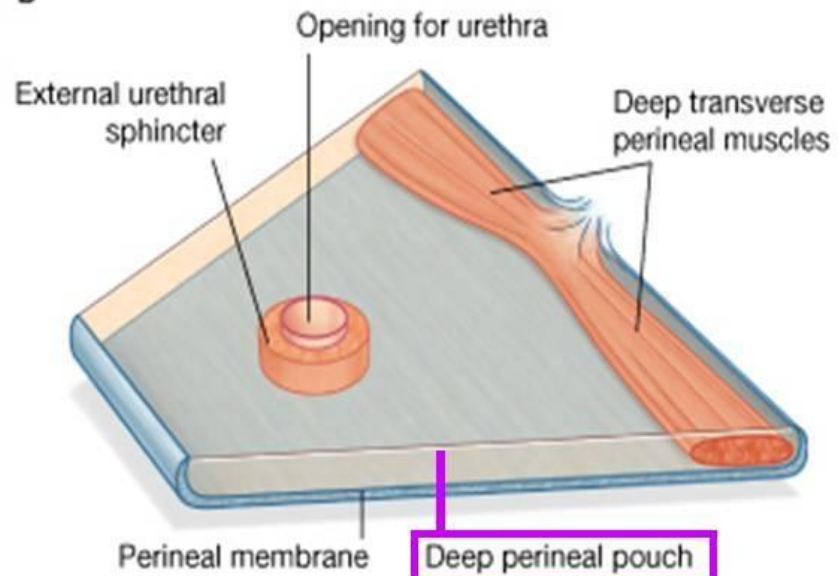


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B



B



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# Superficial Perineal Pouch:

## Boundaries :

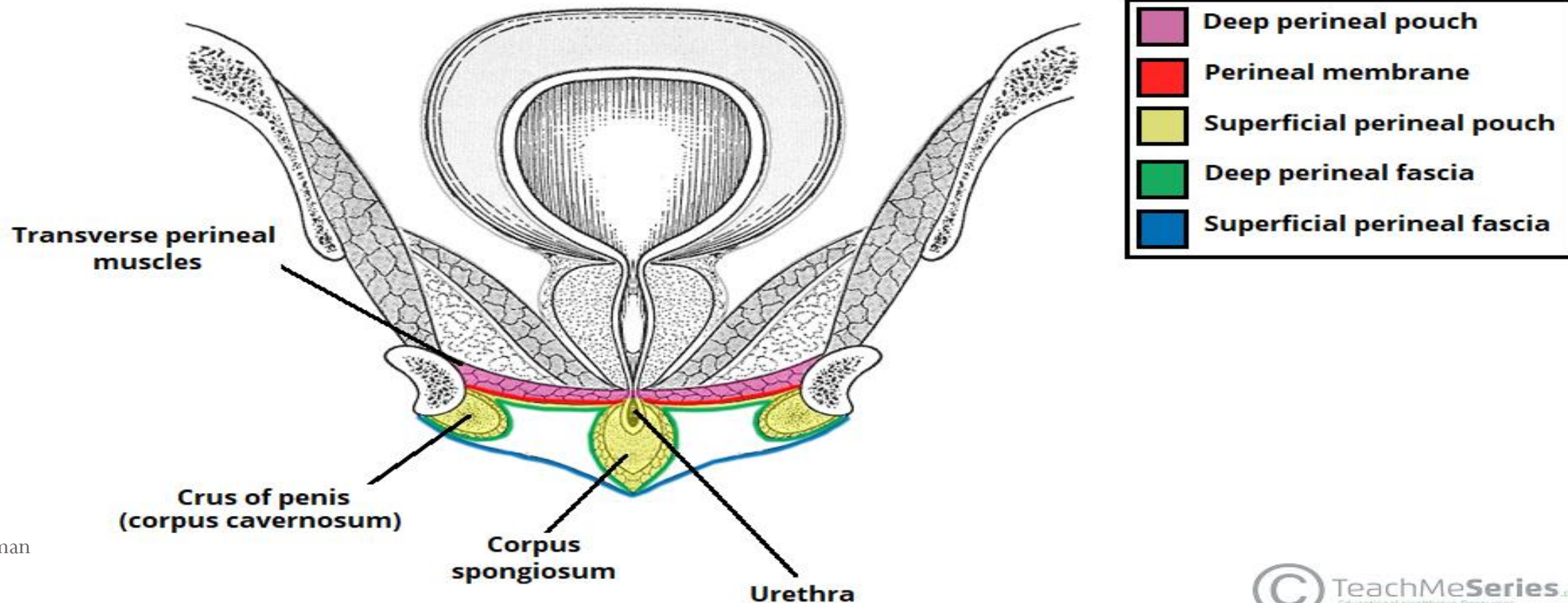
**Floor** : membranous layer of the superficial fascia of the perineum (Colles fascia).

**Roof** : perineal membrane.

**On either side** : both roof and floor are attached to the side of the pubic arch .

**Posteriorly** : the pouch is closed by union of the roof and floor.

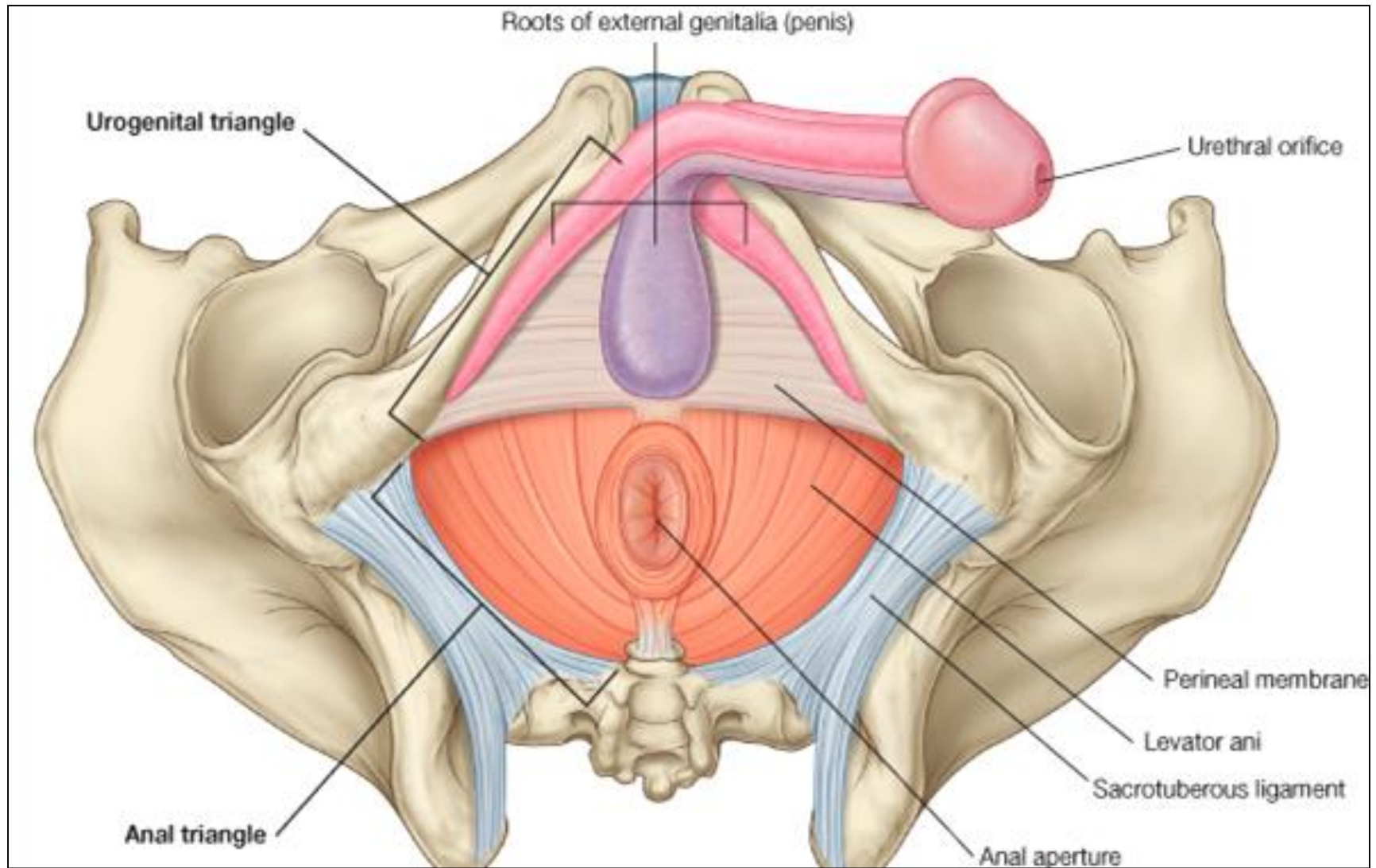
**Anteriorly** : the pouch is opened and continuous with the interval between the membranous layer of anterior abdominal wall and the external oblique aponeurosis



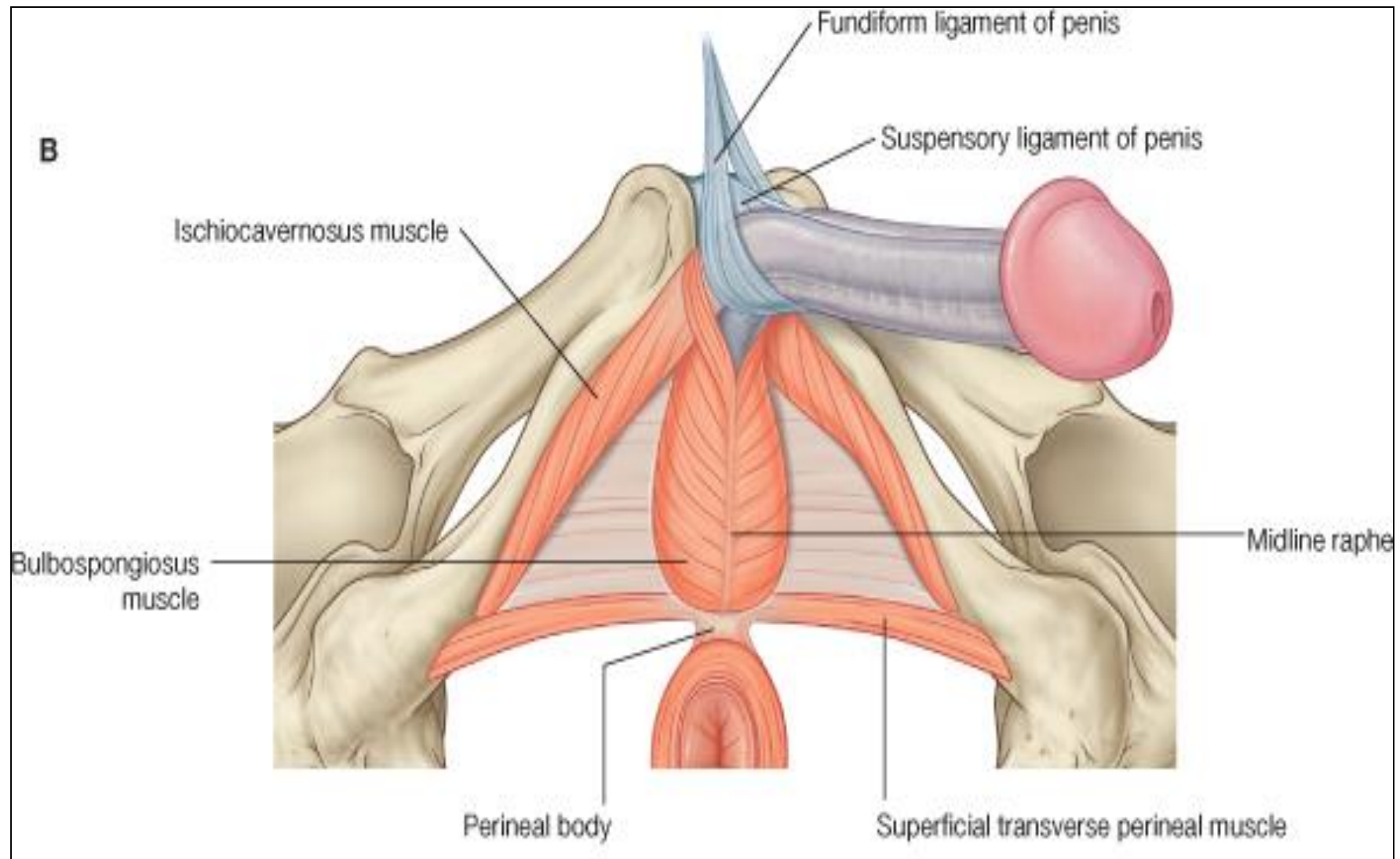
# Contents

	Male	Female
<b>Urogenital Structures</b>	<ul style="list-style-type: none"> <li>• Root of penis (2 crura)</li> <li>• Penile urethra in corpus spongiosum</li> </ul>	<ul style="list-style-type: none"> <li>• Root of clitoris (2 crura)</li> <li>• Two bulbs of vestibule</li> <li>• Greater vestibular glands.</li> </ul>
<b>Muscles</b>	<ul style="list-style-type: none"> <li>• Two ischiocavernosus muscles cover the 2 crura</li> <li>• Bulbospongiosus muscle covers bulb of penis.</li> <li>• Two superficial transversus perinei muscles.</li> </ul>	<ul style="list-style-type: none"> <li>• Two ischiocavernosus</li> <li>• Bulbospongiosus muscle</li> <li>• Two superficial transversus perinei muscles.</li> </ul>
<b>Vessels</b>	<ul style="list-style-type: none"> <li>• Dorsal A. of penis.</li> <li>• Deep A. of penis.</li> <li>• Two scrotal arteries</li> </ul>	<ul style="list-style-type: none"> <li>• Dorsal A. of clitoris.</li> <li>• Deep A. of clitoris.</li> <li>• Two labial arteries.</li> </ul>
<b>Nerves</b>	<ul style="list-style-type: none"> <li>• Dorsal N. of clitoris.</li> <li>• Two labial nerves</li> </ul>	Dorsal N. of penis. Two scrotal nerves

# Superficial perineal pouch in male

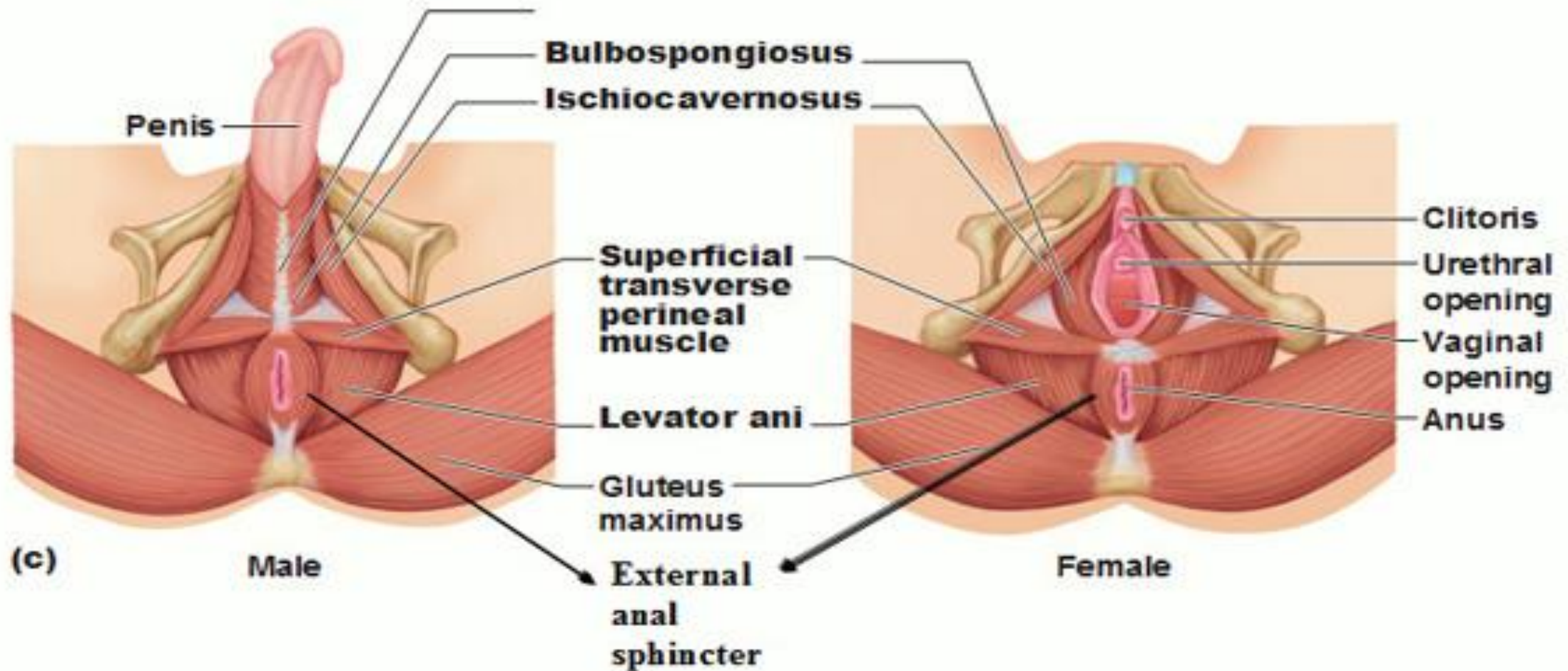


## Superficial perineal pouch in male (muscles)

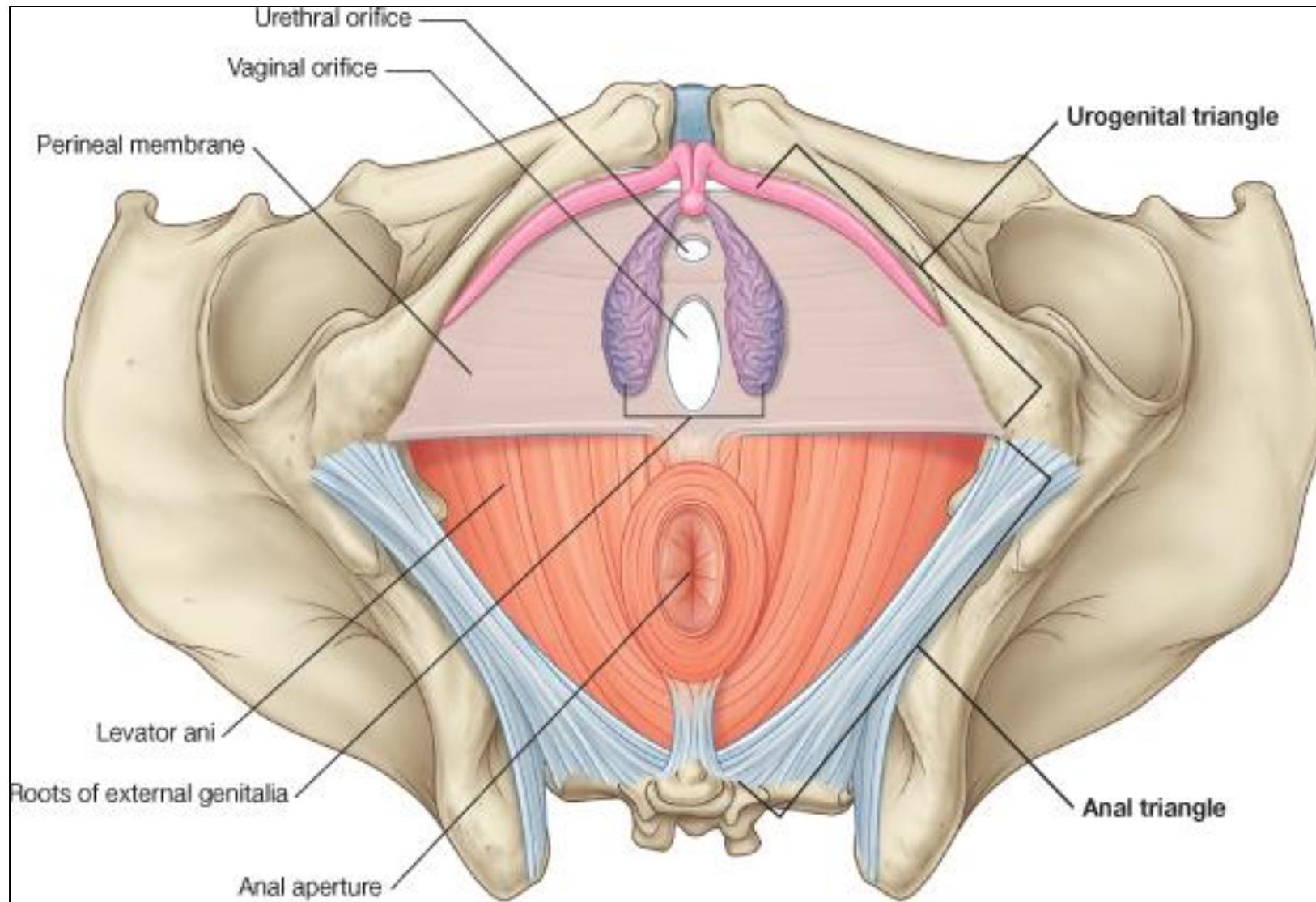




# The Superficial Perineal Space = the most superficial muscle layer

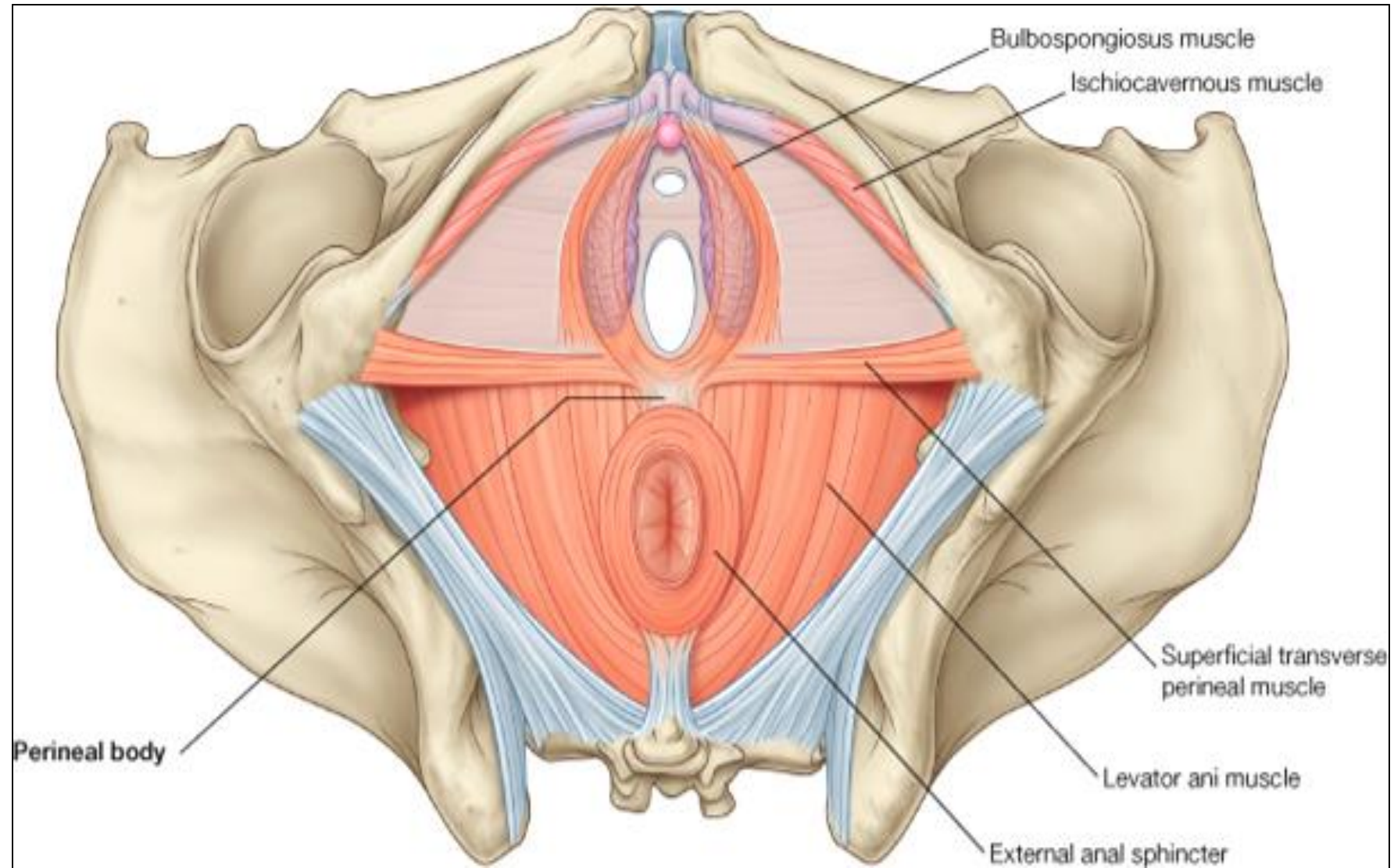


## Superficial perineal pouch in female





# Superficial perineal pouch in female (muscles)



## ❑ **Muscles of Superficial Perineal Pouch :**

**Nerve Supply** : All muscles in superficial and deep perineal pouches are supplied by perineal branch of pudendal nerve

### **1- Ischiocavernosus :**

**Site** : Each covers the crus penis.

**Origin** : Arise from medial side of ischial ramus.

**Insertion** : into sides and inferior surface of crus penis.

**Action** : it compresses crus penis to maintain erection of penis.

### **2- Bulbospongiosus :**

**Site** : covers bulb of penis. In female, it is splitted into two parts to cover bulbs of vestibule.

**Origin** : from perineal body.

**Insertion** : the muscle fibres encircle the bulb and corpus spongiosum to be inserted on the upper surface of the penis.

**Action** : Assist in erection of penis and eject last drops of urine during micturition.



### **3- Superficial transverse perineal:**

**Site :** on posterior edge of perineal membrane in front of anus.

**Origin :** from medial surface of ischial tuberosity.

**Insertion :** into the perineal body.

**Action :** both muscles fix the perineal body.

❑ **Muscles of the Deep perineal Pouch :** *These muscles form the urogenital diaphragm.*

#### **1- Sphincter urethrae :**

**Site :** it surrounds membranous urethra.

**Attachments :** it is formed of two parts :

- **Inferior (or superficial) part** : its muscle fibres extend from the transverse perineal ligament and pass backwards encircling the urethra to converge on the perineal body.
- **Superior (or deep) part** : its muscle fibres arise from the medial side of pubic ramus and pass medially to surround the membranous urethra.

**Action :** It represents the voluntary control of urethra.

## 2- Deep transverse perineal

**Site :** on deep surface of posterior border of the perineal membrane.

**Origin :** from medial side of ischial ramus.

**Insertion :** into perineal body.

**Action :** fixation of perineal body.

### **Applied Anatomy :**

- Rupture of the membranous urethra leads to accumulation of urine in the deep perineal pouch which is closed all around.
- Rupture of penile urethra leads to escape of urine into the superficial perineal pouch.
- ✓ Urine escapes into the scrotum, penis and ascends into the interval between membranous layer of superficial fascia of anterior abdominal wall and external oblique aponeurosis.
- ✓ Urine does not descend into the thigh due to fusion of Scarpa's fascia of the anterior abdominal wall to the fascia lata of the thigh below the inguinal ligament.

# **Anal triangle**

## **Ischiorectal fossa**

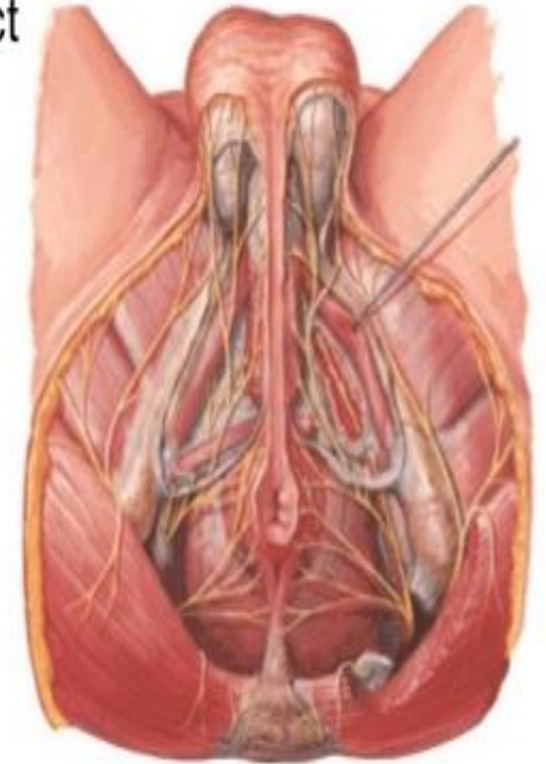
Location : It is wedge shaped space on either side of the anal canal

Anterior: posterior border  
perineal membrane  
Posterior: sacrotuberous  
ligament, gluteus maximus



**Ischiorectal in Female**

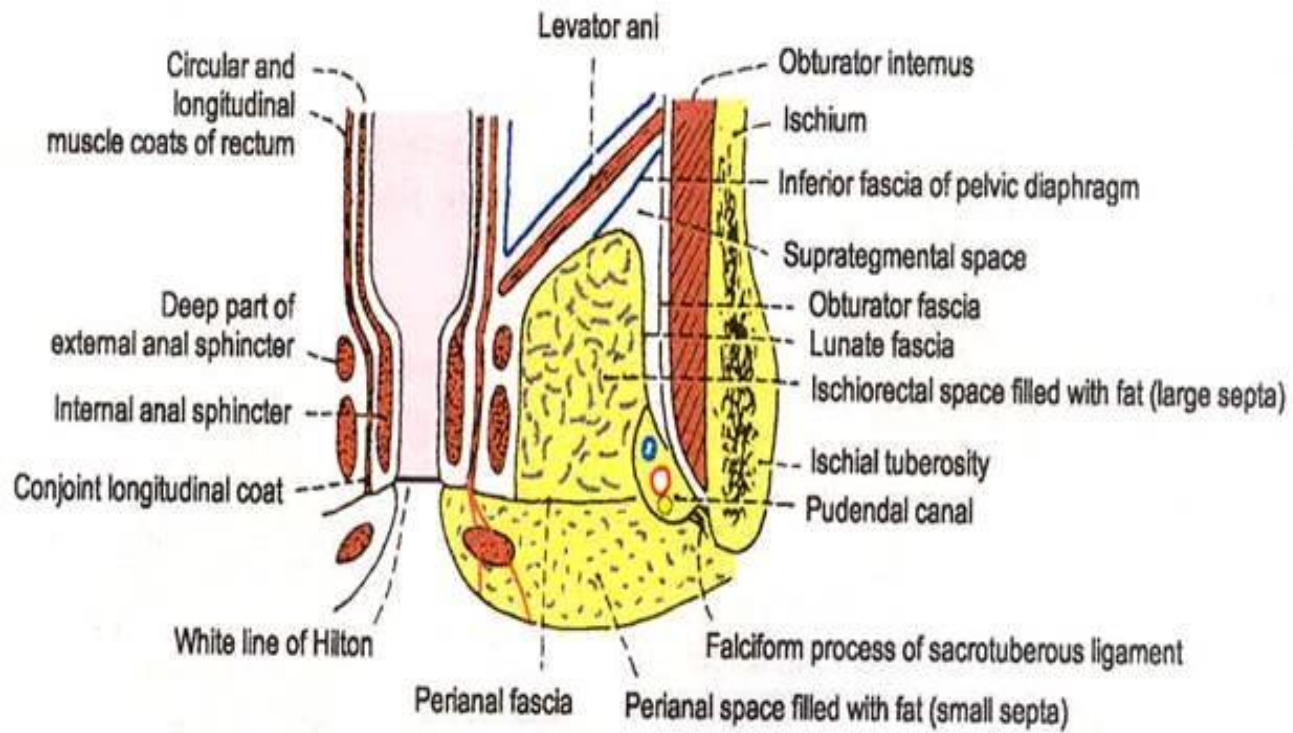
Lateral: fascia on medial aspect  
of obturator internus ani  
Pudendal canal  
Ischial tuberosity



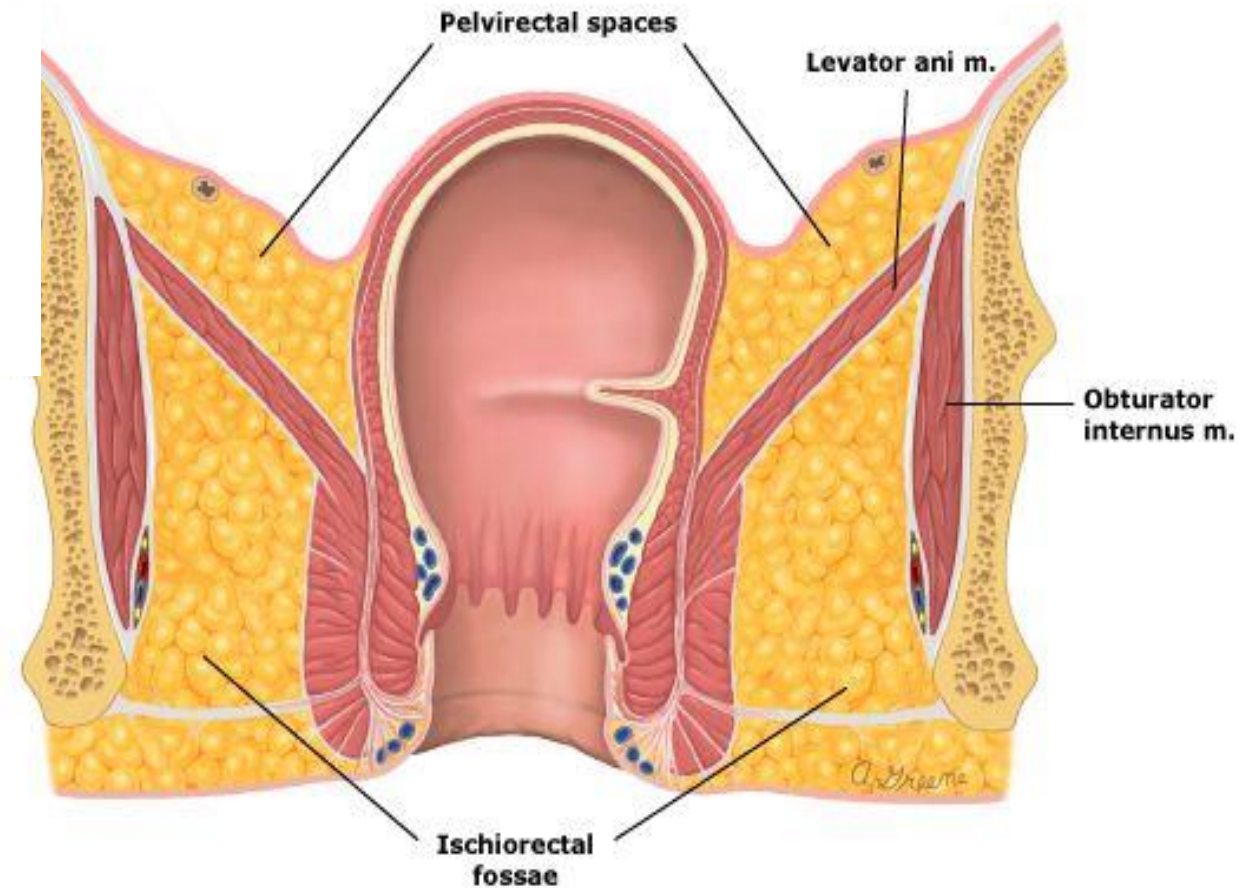
**Ischiorectal in Male**

**Boundaries :** It has

- 1. Apex :** it is the origin of levator ani from the lateral pelvic wall
- 2. Base :** skin on either side of the anal orifice (skin of the base is supplied by inferior rectal N.).
- 3. Anteriorly :** the posterior border of the perineal membrane
- 4. Posteriorly :** sacrotuberous ligament covered by lower border of gluteus maximus muscle.
- 5. Lateral wall :** is vertical formed by :
  - Lower part of obturator internus muscle and lower part of obturator fascia splitting to form pudendal canal.
  - Medial surface of ischial tuberosity.
- 6. Medial wall :** formed by :
  - Levator ani muscle (lower surface).
  - External anal sphincter.



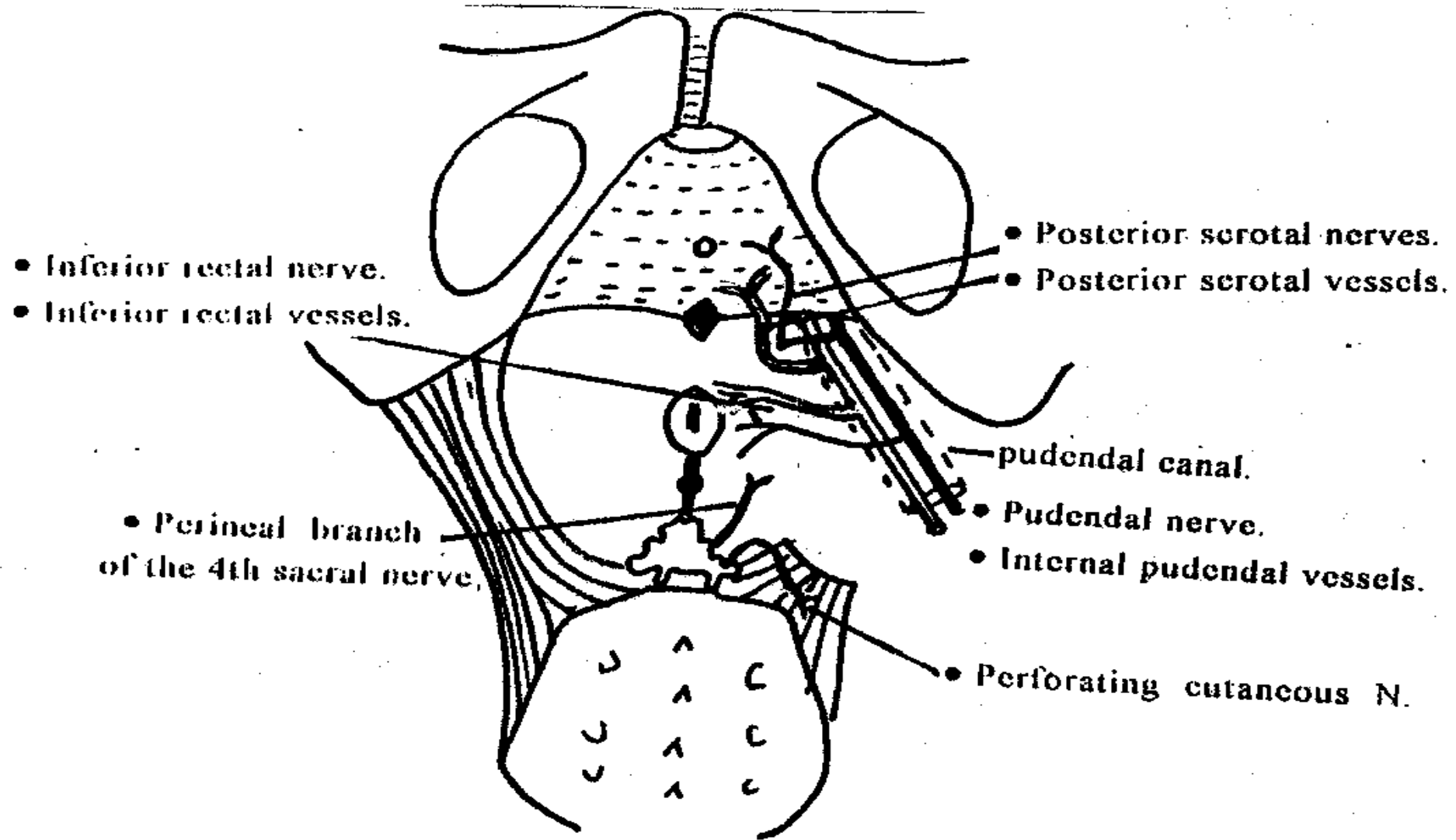
**Fig. 28.7:** Coronal section through the ischioanal fossa.





## Contents of Ischiorectal fossa :

1. Pudendal nerve.
2. Internal pudendal vessels.
3. Inferior rectal nerve.
4. Inferior rectal vessels.
5. Posterior scrotal nerves.
6. Posterior scrotal vessels.
7. Perineal branch of the 4th sacral nerve.
8. Perforating cutaneous N. (S2, S3) .
9. 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.

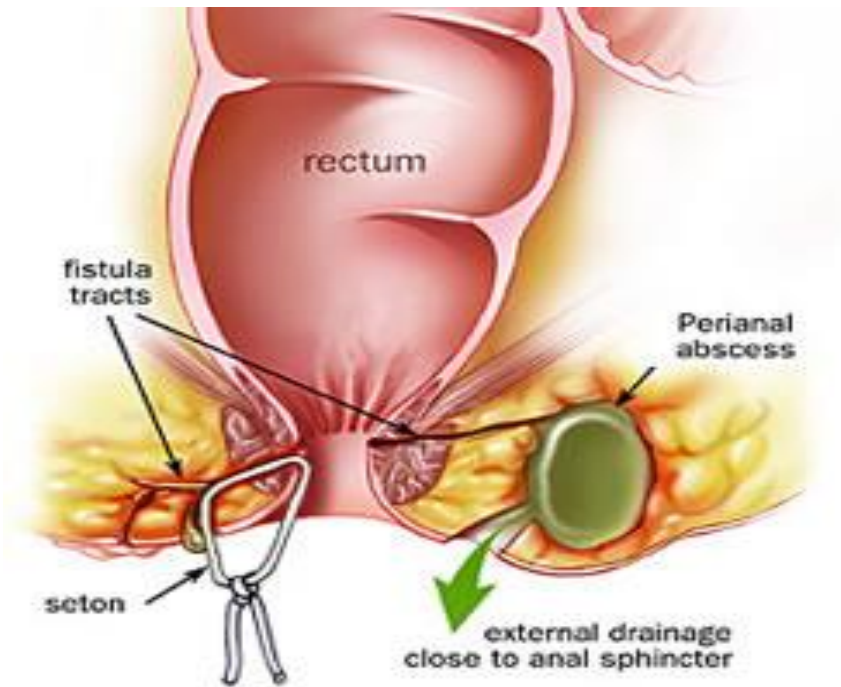


**Fig. 58; Contents of ischiorectal fossa.**

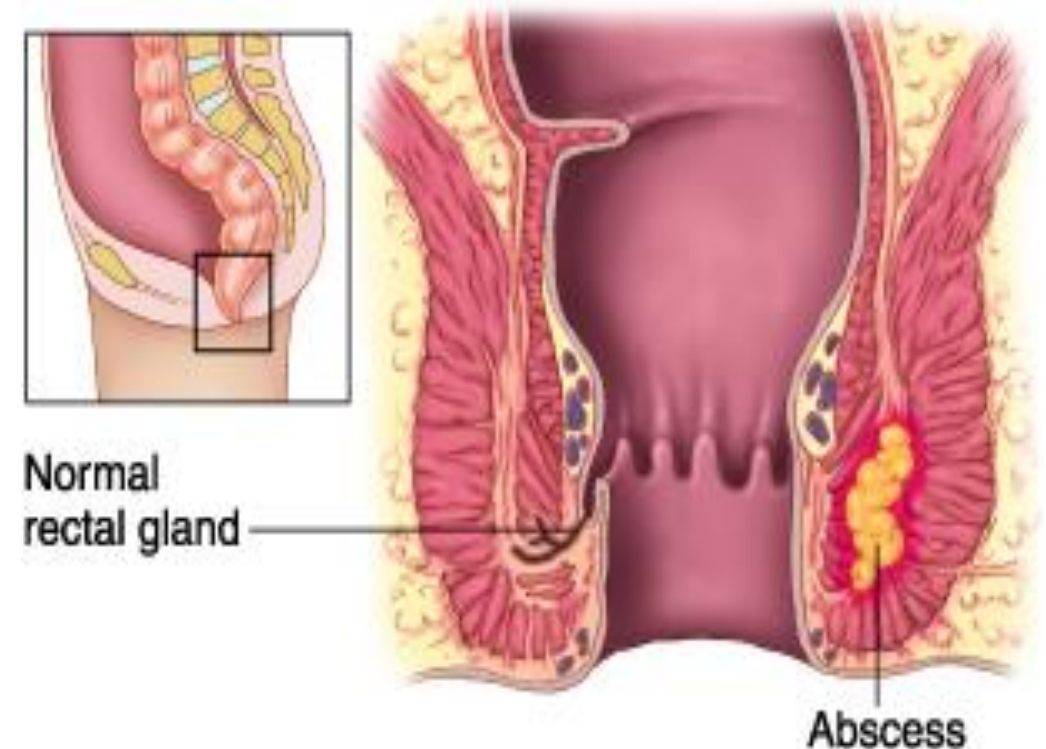
## Applied Anatomy:

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 leads to anal fistula



Anal Fistula



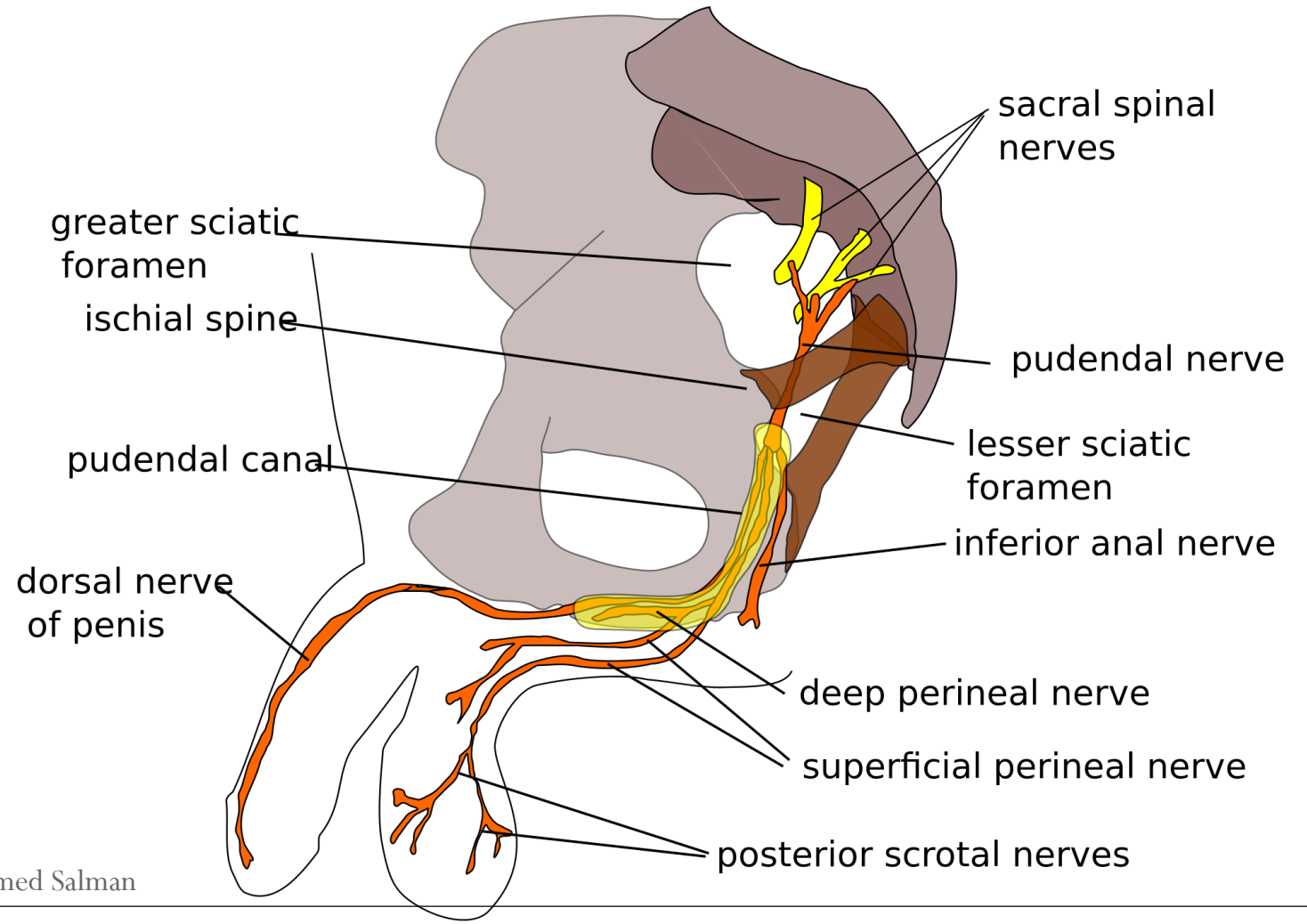
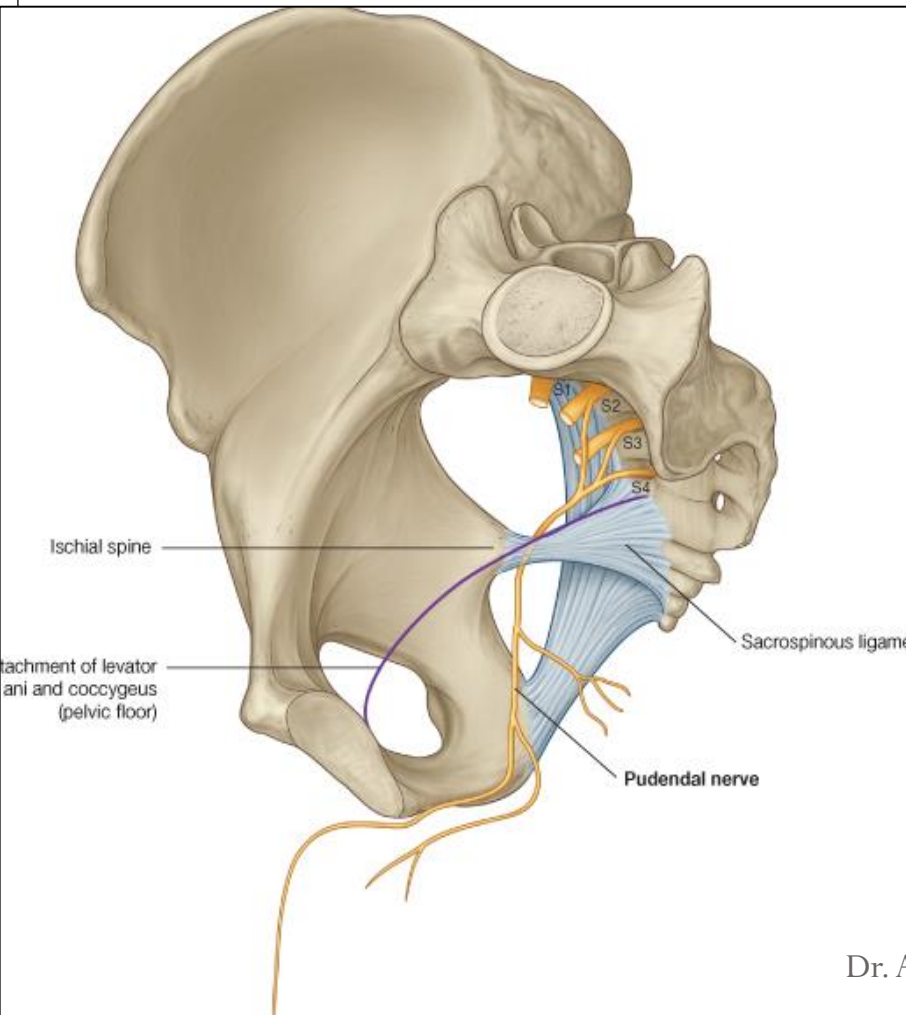


## Pudendal canal:

**Location :** Fascial canal in lower part of the lateral wall of ischiorectal fossa

**Extend:** from the lesser sciatic foramen to the posterior border of the perineal membrane.

**contents:** 1- pudendal nerve      2- internal pudendal vessels



## Pudendal Nerve :

It is the *somatic* nerve of the *perineum* and external genitalia.

It arises from the sacral plexus; S2,3,4

### Course and Relations :

- The nerve leaves the pelvis through the greater sciatic foramen *below* the piriformis to enter the gluteal region.
- In the gluteal region, the nerve crosses the sacrospinous ligament ***medial*** to the internal pudendal vessels which cross the ischial spine.
- The nerve and the vessels pass through the lesser sciatic foramen to enter the pudendal canal in side wall of ischiorectal fossa.
- In the posterior part of pudendal canal, the nerve gives inferior rectal N. and then divides into 2 terminal branches which are the perineal N. and dorsal nerve of penis (or clitoris).

## Branches and Distribution :

### 1- Inferior rectal N. (mixed nerve)

- **Motor** to external canal sphincter and levator ani.
- **Sensory** to anal canal *below* pectinate line, skin around the *anus and lower inch of vagina*.

### 2- Perineal nerve (mixed) : it gives :

- **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 majus).

### 3- Dorsal nerve of penis or clitoris (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.

## Internal Pudenda Artery:

It is the artery of perineum and external genital organs.

It is one of the two terminal branches of anterior division of internal iliac artery.

### Course and Relations :

- **In the pelvis :** it descends in front of sacral plexus and piriformis and leaves the pelvis (with pudendal N.) below the piriformis to enter the gluteal region.
- In gluteal region: The artery crosses the tip of the ischial spine and passes through the lesser sciatic foramen to enter the pudendal canal in side wall of ischiorectal fossa.
- **In the pudendal canal and perineum :**

At the end of the pudendal canal, it enters the deep perineal pouch then pierces the perineal membrane to enter the superficial pouch to run close to the side of pubic arch

It ends by dividing into dorsal and deep arteries of the penis

## **Branches and Distribution :**

*two* in the pudendal canal, *two* in the deep perineal pouch and *two* terminal in the superficial perineal pouch.

### **A. In the pudendal canal :**

1-Inferior rectal A. : It supplies anal canal *below* the pectinate line.

2-Perineal A. : it gives

- Two scrotal (or labial) arteries to scrotum (or labium majus)
- Transverse perineal A. which anastomoses with its corresponding one .

### **B- In the deep perineal pouch :**

3-Artery of bulb : supplies bulbourethral glands and pierces perineal membrane to supply bulb of root of penis (or bulb of vestibule).

4-urethral A. : pierces perineal membrane to enter superficial perineal pouch to supply corpus spongiosum and urethra.

### **C-Superficial perineal pouch :**

5-Dorsal A. of penis : runs on dorsum of penis, supplying its skin, fascia and glans of penis.

6-Deep A. of penis : runs in corpus cavernosum, supplying its cavernous tissue.



