



GI ANATOMY

4



WRITER:
Tasneem
Alremawi

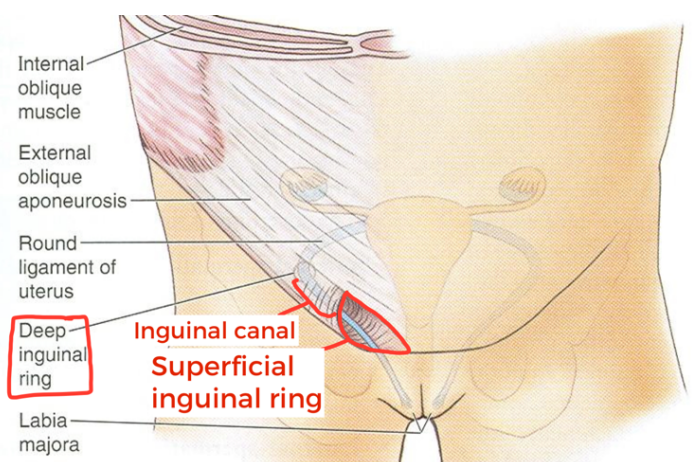
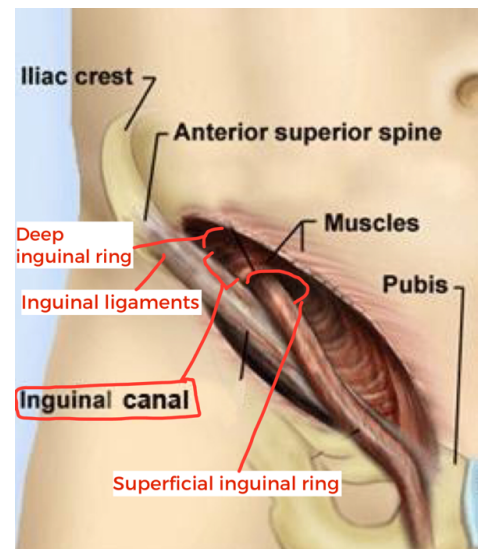
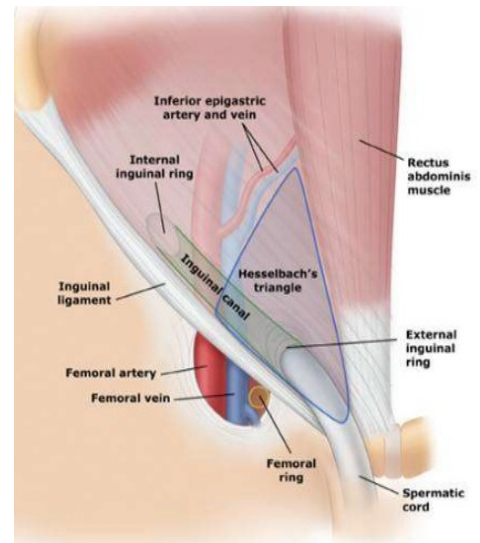
CORRECTOR:

DOCTOR:
Almuhtaseb

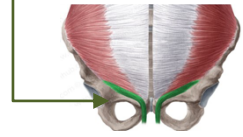
Notes that the doctor focused on will be in this color, you should focus on them too ◡◡◡.

INGUINAL CANAL

- It is about 1 ½ inches or 4cm long in the adults.
- It lies above and medial to inguinal ligament and extends from the deep inguinal ring downward and medially to the superficial inguinal ring.
- **It is an oblique passage through the lower part of the anterior abdominal wall** (between the muscles of the anterior abdominal wall).
- **Present in both sexes**, with some differences in the contents between the two:
 - In males: spermatic cord passes through the inguinal canal to enter the testis in the scrotum.
 - In females: the round ligament of uterus passes through the inguinal canal and then enters the labia majora.
- Transmits ilioinguinal nerve in both sexes and it supplies the genitalia in males and females.
- Extends from the deep inguinal ring downward and medially to the superficial inguinal ring.
- Lies parallel to the medial side of inguinal ligament and immediately above the inguinal ligament.
- In the newborn child, the deep ring lies almost directly posterior to the superficial ring; the two rings are opposite each other (the inguinal canal is very short there, but with growth it elongates till it becomes 4cm).

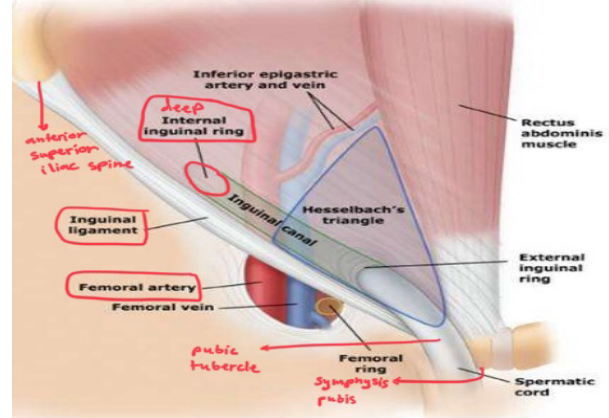
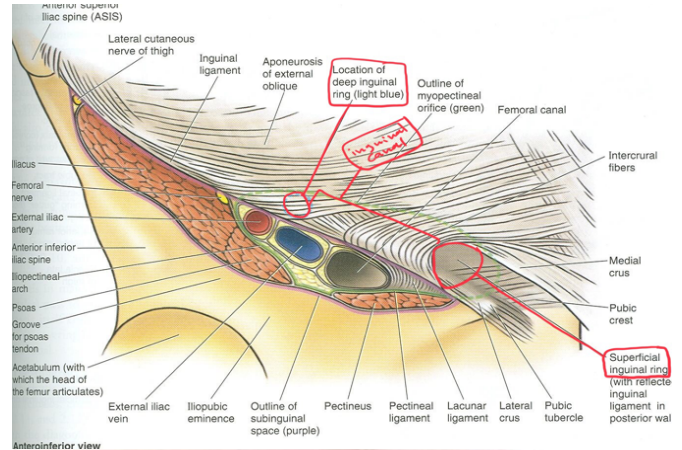


- The wall of Inguinal canal gives rise to cremasteric muscle and fascia from internal oblique muscle.



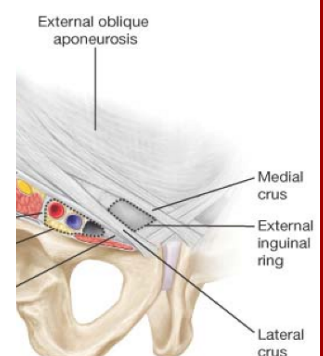
DEEP INGUINAL RING

- Is an oval weak opening point in the fascia transversalis and covered by the peritoneum of the abdomen (it is closed).
- Passes through it the genital branch of genitofemoral nerve and in males the spermatic cord, in females the round ligament.
- Lies about ½ inch (1.3cm) above the inguinal ligament midway between the anterosuperior iliac spine and the symphysis pubis (inguinal ligament).
- Another way to find the deep inguinal ring is by going 1.5cm (google says it's more) above the pulsation of the femoral artery.
- Margins (the edge) of the deep inguinal ring, from the transversalis fascia, give attachment to the internal spermatic fascia.



SUPERFICIAL INGUINAL RING

- Triangular in shape.
- Defect in the aponeurosis of the external oblique muscle (external abdominis muscle).
- Lies immediately above and medial to the pubic tubercle.
- It transmits spermatic cord or round ligament of uterus, genital branch of genitofemoral nerve and ilioinguinal nerve all going to the testis in the scrotum or to labia majora.
- It's margins some times called crura (medial and lateral crus).



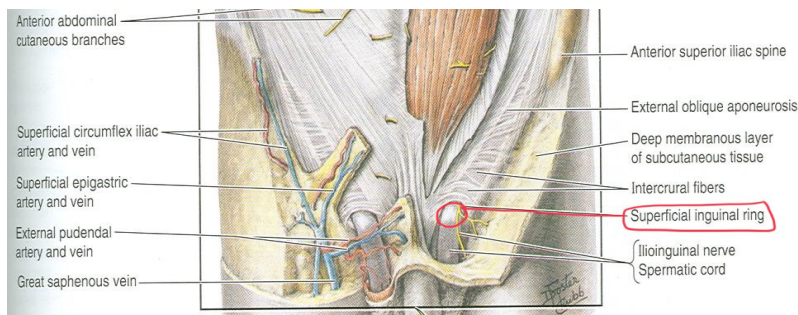
- Superficial inguinal ring edges give attachment to the external or superficial spermatic fascia from the external oblique muscle.

- The spermatic cord is covered by three layers (covering of the spermatic cord):

- 1- Cremasteric muscle and fascia, from internal oblique muscle and inguinal canal.

- 2- External spermatic fascia, from external oblique muscle and superficial inguinal ring.

- 3- Internal spermatic fascia, from transversalis fascia and deep inguinal ring.



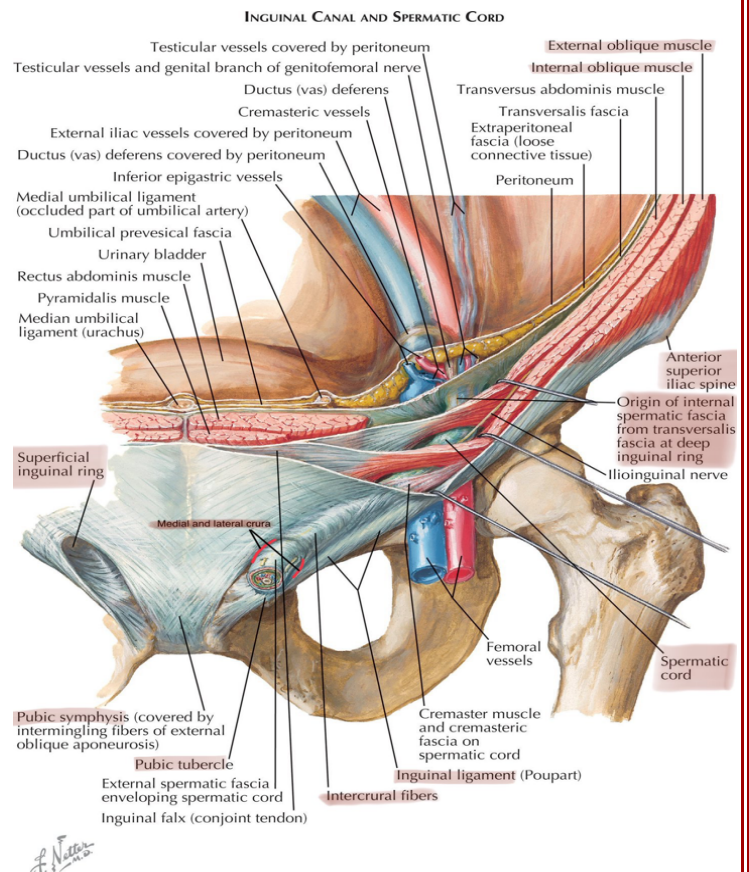
- The inguinal canal is surrounded by four walls anterior, posterior, superior and inferior.

• ANTERIOR WALL OF INGUINAL CANAL:

It is formed along its entire length by aponeurosis of the external oblique muscle. Also it is reinforced in its lateral third by the origin of the internal oblique from the inguinal ligament.

The anterior wall is strongest where it lies opposite the weakest part of posterior wall, that is deep inguinal ring.

The fleshy origin of the internal oblique muscle from the inguinal ligament supports the anterior wall of the inguinal canal which supports the deep inguinal ring in the posterior wall.



• POSTERIOR WALL OF INGUINAL CANAL:

It is formed along its entire length by the fascia transversalis. Also it is reinforced in its medial third by conjoint tendon, the common tendon of insertion of internal oblique and transversus abdominis (their fused fibers), attached to the pubic crest (superior ramus of pubis) and pectineal line, stitches can be taken from this tendon because it's so strong.

Conjoint tendon is formed by fusion of internal oblique and transversus abdominis in the posterior wall of inguinal canal, it reinforces the superficial inguinal ring in the anterior wall of inguinal canal.

- The superficial inguinal ring is reinforced by conjoint tendon.
- The deep inguinal ring is reinforced by lacunar ligament.

This wall is strongest where it lies opposite the weakest part of the anterior wall, that is superficial inguinal ring.

• INFERIOR WALL OF INGUINAL CANAL = FLOOR:

It is formed by the rolled-under inferior edge of the aponeurosis of the external oblique muscle called inguinal ligament and at its medial end, the lacunar ligament.

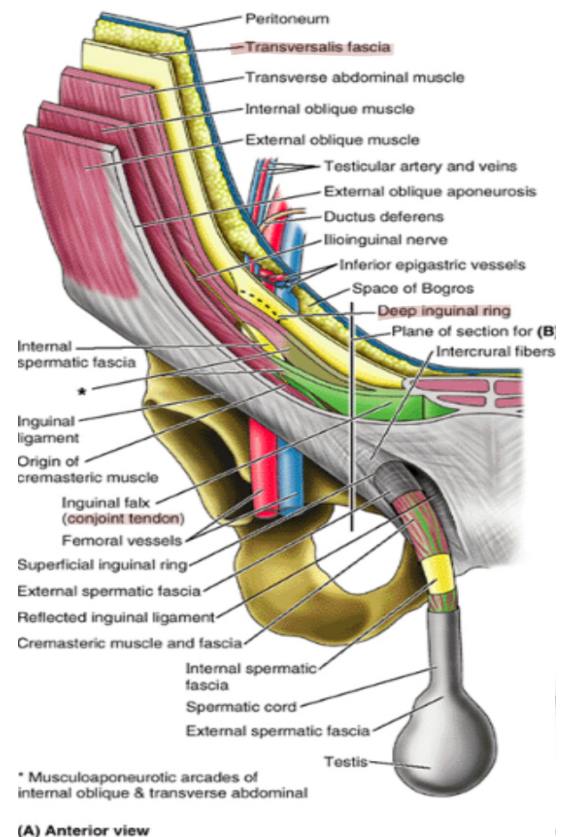
• SUPERIOR WALL OF INGUINAL CANAL = ROOF:

It is formed by the arching lowest fibers of the internal oblique (that forms the anterior lateral wall) and transversus abdominis muscles.

FUNCTIONS OF INGUINAL CANAL:

It allows structures of spermatic cord and other structures to pass to and from the testis to the abdomen in male

And permits the passage of round ligament of uterus and other structures from the uterus to the labium majus in female.

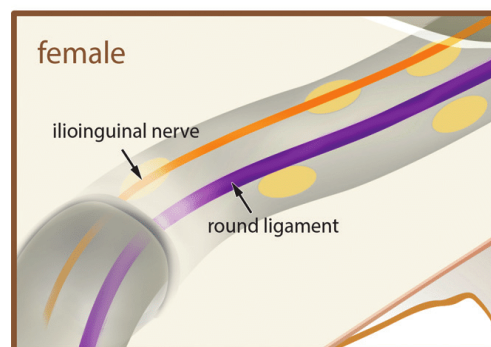
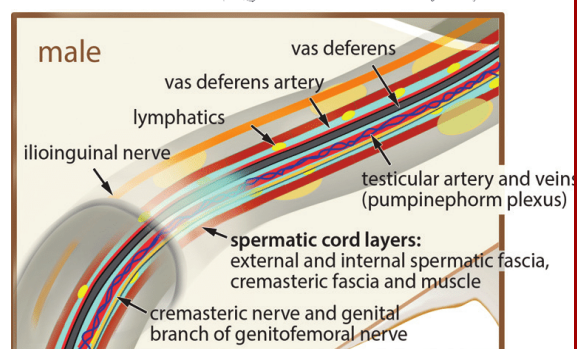
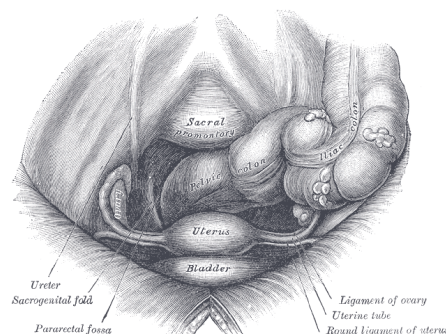


CONTENTS OF INGUINAL CANAL:

- 1- Spermatic cord & its contents in male. Or round ligament in female.
- 2- Genital branch of genitofemoral nerve coming from the abdomen the it enters the deep ring and gets out from the superficial ring to reach the scrotum or labia majora..
- 3- Ilioinguinal nerve: Enters the canal through the posterior wall from L1 in the abdomen, but it doesn't go through the deep ring; it runs in the anterior abdominal wall lateral to psoas major muscle, and it doesn't pierce the inguinal canal, rather it runs between the abdominal wall muscles between the internal oblique and transversus abdominis.

All intercostal nerves and blood vessels in the abdomen are present between the internal oblique and transversus abdominis:)

- Ilioinguinal nerve is one of the contents of the inguinal canal but doesn't enter it from the deep inguinal ring, it rather runs between internal oblique and transversus.
- The type of hernia that happens in the inguinal canal is called an indirect inguinal hernia.



INGUINAL TRIANGLE

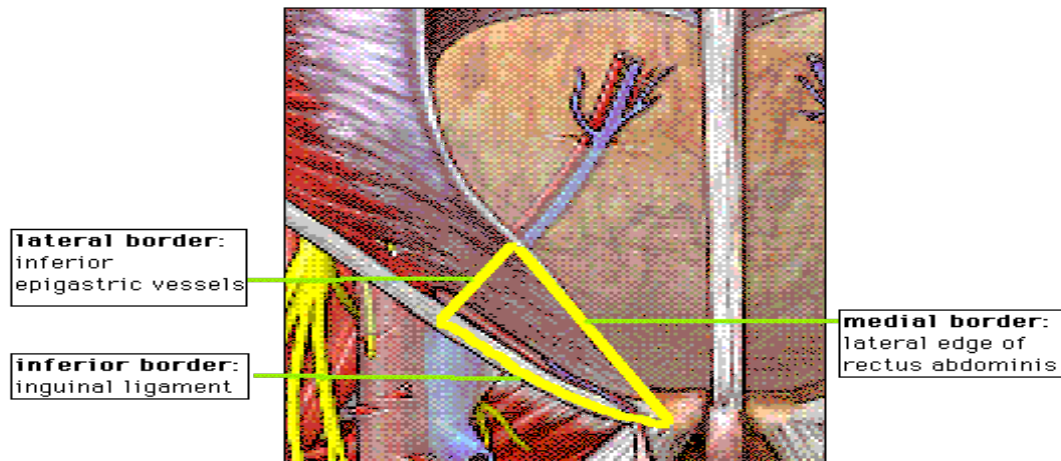
Inguinal triangle is also called Hesselbach triangle.

Region of abdominal wall.

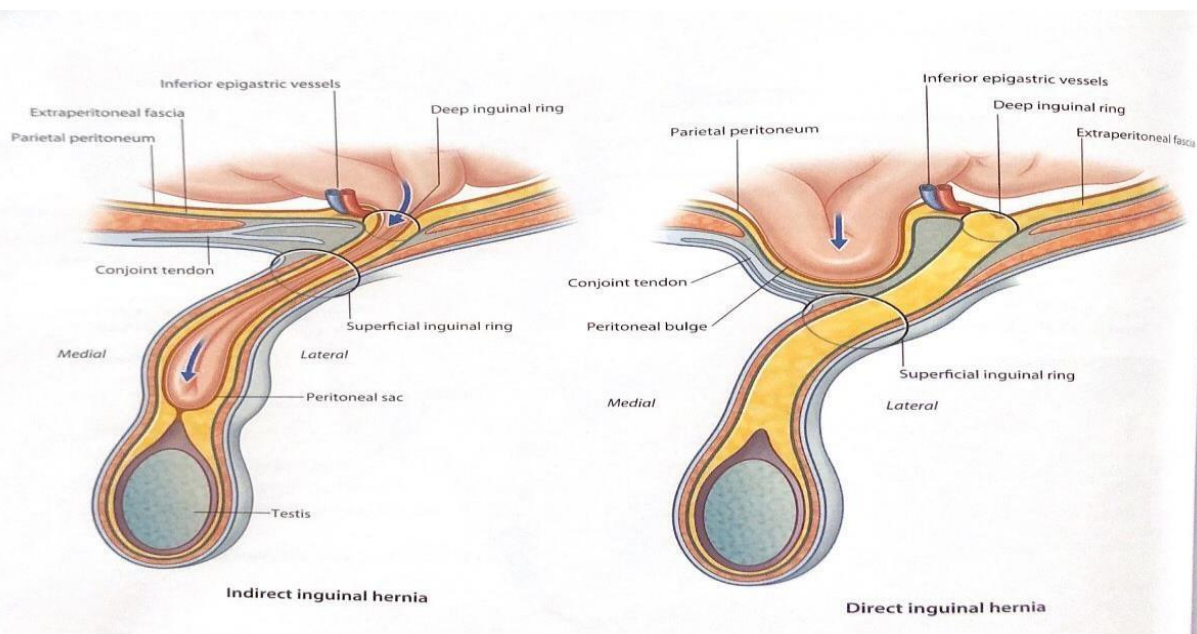
Borders:

- **Above and medial border: Lateral margin of the rectus sheath** (lateral edge of rectus abdominis), also called linea semilunaris.

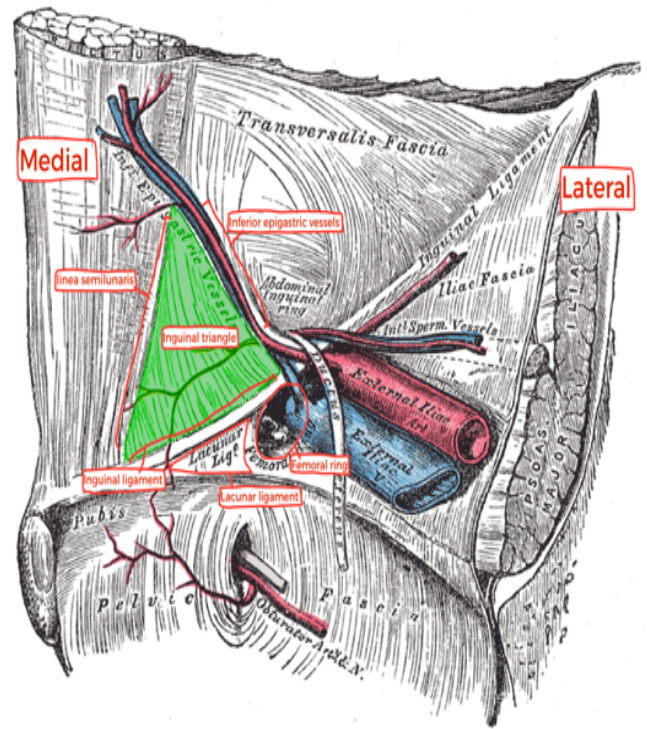
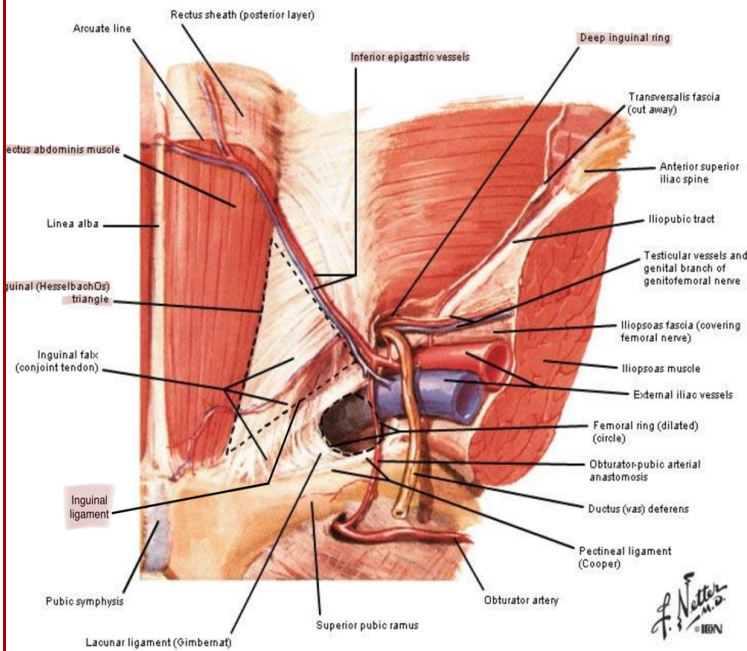
- **Superolateral border: Inferior epigastric vessels** (artery+vein, one of the contents of rectus sheath, a branch of external iliac artery).
- **Inferior border (floor): Inguinal ligament with lacunar ligament medially that forms the medial boundary of the femoral ring** (see the pic on the next page).
- **The importance of the inguinal triangle is that the type of hernia that happens in it is direct inguinal hernia.** It mostly happens to elderly people when the abdominal muscles become weaker, especially if they are smokers with chronic coughs.



- **Indirect inguinal hernia** ⇒ in the inguinal canal.
- **Direct inguinal hernia** ⇒ in the inguinal triangle.
- **In the next picture, you can see that the deep inguinal ring is lateral to the inferior epigastric vessels.**
- **By the inferior epigastric vessels, we can distinguish between the direct and indirect inguinal hernia.**
- **Direct inguinal hernia** ⇒ medial to epigastric vessels.
- **Indirect inguinal hernia** ⇒ lateral to epigastric vessels.



Inguinal Region Dissection - Posterior (Internal) View



SPERMATIC CORD

- It is a collection of structures that pass through the inguinal canal to and from the testis.

The testis function is to form sperm, which then go to the **epididymis** to help in their maturation. From the tail of the epididymis, a structure called "**vas deferens**" or vasa efferentia (Google says they aren't the same thing) starts and runs with the spermatic cord, then **pierces the superficial inguinal ring** and continues in through the **inguinal canal**, then pierces the **deep inguinal ring**; after that, it goes **behind the urinary bladder**, and finally ends as a **seminal vesicle** with an **ejaculatory duct** coming out of it, and it opens into the **prostatic urethra** that excretes the sperm outside the body.

- It is covered with three concentric layers of fascia derived from the layers of anterior abdominal wall.
- It begins at the deep inguinal ring lateral to the inferior epigastric artery and ends at the testis.

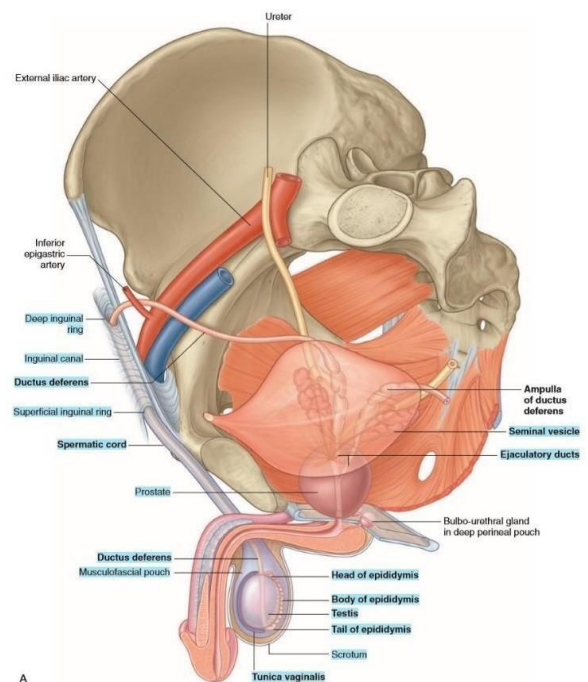


Fig. 5.47 Reproductive system in men. A. Overview.

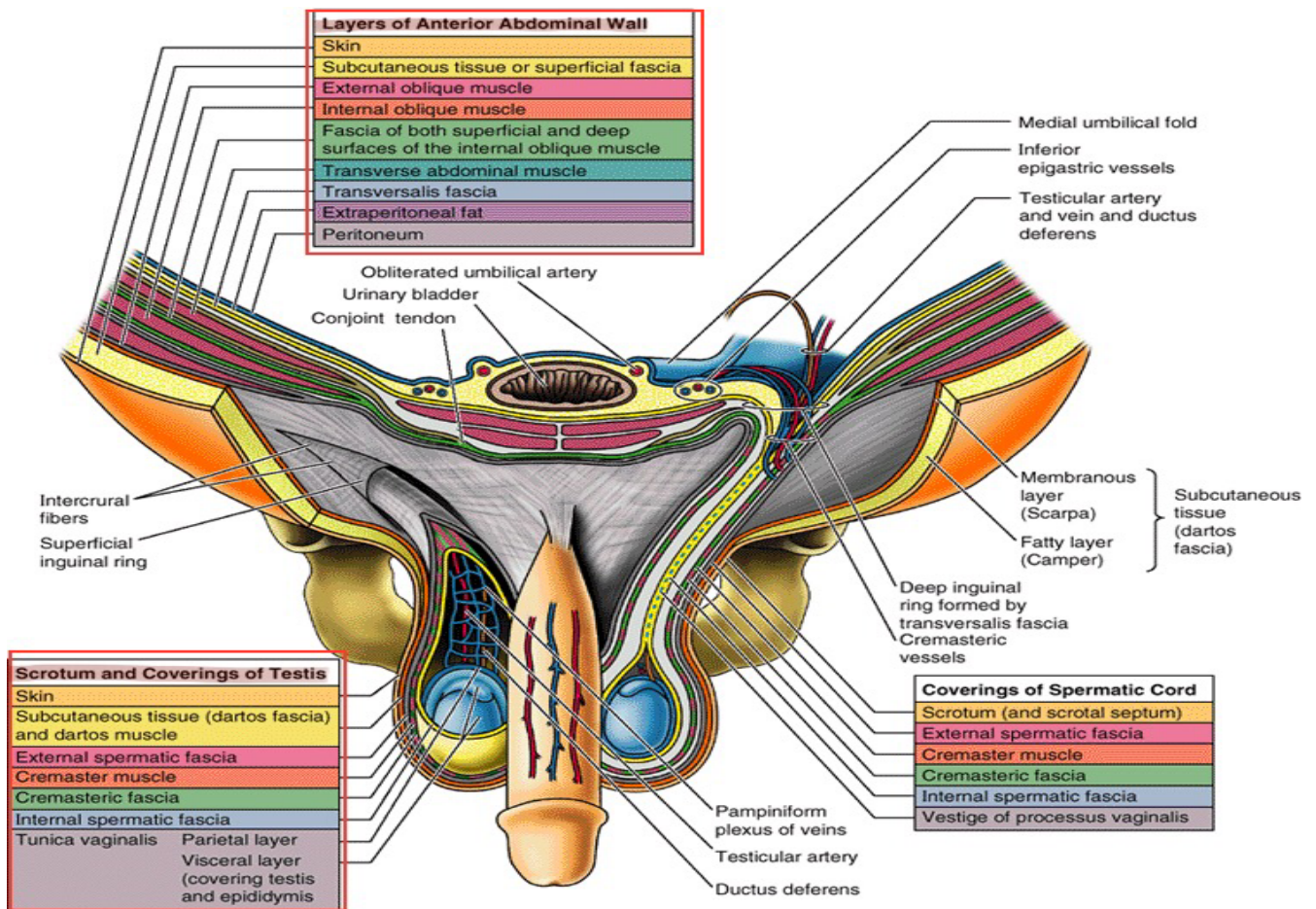
COVERING OF THE SPERMATIC CORD

- The covering of the spermatic cord are three concentric layers of fascia derived from the layers of the anterior abdominal wall.
- Each covering is acquired as the processus vaginalis descends into the scrotum through the layers of the abdominal wall.

1-External Spermatic fascia: Is derived from the external oblique aponeurosis at and attached to the margins of the superficial inguinal ring.

2-Cremasteric Fascia and muscle: Is derived from the internal oblique muscle inside the inguinal canal.

3-Internal Spermatic Fascia: Is derived from the fascia transversalis and attached to the margins of deep inguinal ring.



- **Layers of anterior abdominal wall:**

- Skin, superficial fascia, above the umbilicus it is fatty, below the umbilicus it's membranous (scarp's facia).

When those layers reach the scrotum they cover it forming:

- Scrotum and coverings of testis:

- **Skin.**

- **Dartos fascia and Dartos muscle** formed by the previous fatty layer. Dartos muscle is responsible for wrinkling of the skin of scrotum.

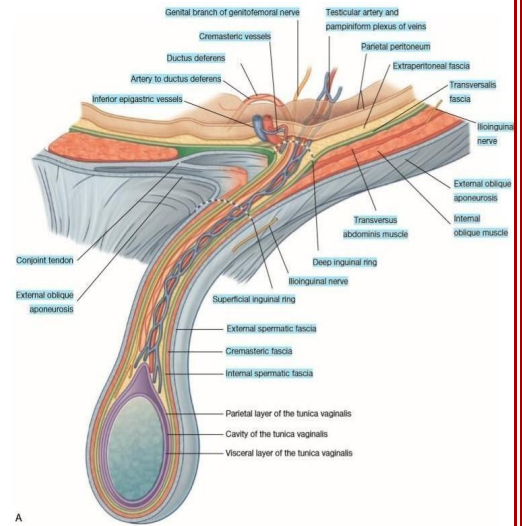
- **Colle's fascia** formed by the previous membranous layer (scarpa's fascia).

- **External spermatic fascia.**

- **Cremasteric muscle and fascia.**

- **Internal spermatic fascia.**

- **Tunica vaginalis.** Remnants of processus vaginalis after it gets obliterated in the deep ring. It forms around the testis and epididymis two layers, parietal and visceral tunica vaginalis.



STRUCTURES OF SPERMATIC CORD:

- **Vas deferens.**

- **Testicular artery.**

- **Testicular vein**

- **Testicular lymph vessels.**

- **Autonomic nerves.**

- **Processus vaginalis.**

- **Cremasteric artery** (blood supply to cremasteric muscle).

- **Artery of the vas deference.**

- **Genital branch of genitofemoral nerve** (nerve supply to cremasteric muscle).

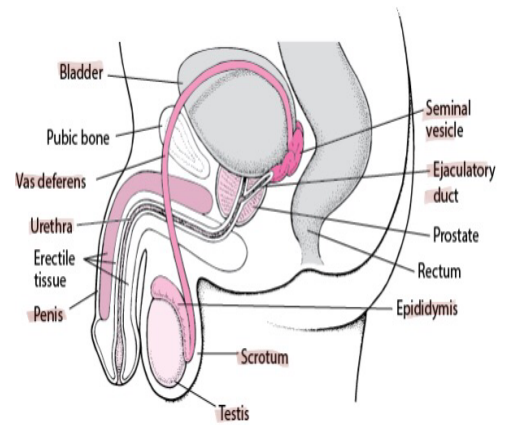
(Now we will talk about each one in details):

- **VAS DEFERENS**

It is a cord like structure, 45cm long. It starts from the tail of epididymis in the scrotum and ends in the prostatic urethra, surrounded by artery, vein and lymphatics.

Can be palpated between finger and thumb in the upper part of the scrotum.

It is a thick walled muscular duct that transport spermatozoa -mature ones- from the epididymis to the seminal vesicles (behind the urinary bladder in males only). **Seminal vesicles** give nutrition to the sperms then contracts to send them away through right and left **ejaculatory ducts** until they reach **prostatic urethra** (composed of three parts: prostatic part in prostate in males, membranous part between the two membranes, penile part in the penis).



After that they pass through membranous urethra, penile urethra (penis), and finally outside the body.

• TESTICULAR ARTERY

It is long and slender. And it's a branch of abdominal aorta at level of L2. It descends on the posterior of the anterior abdominal wall (through deep ring) and goes through inguinal canal to supply the epididymis and testis.

• TESTICULAR VEINS

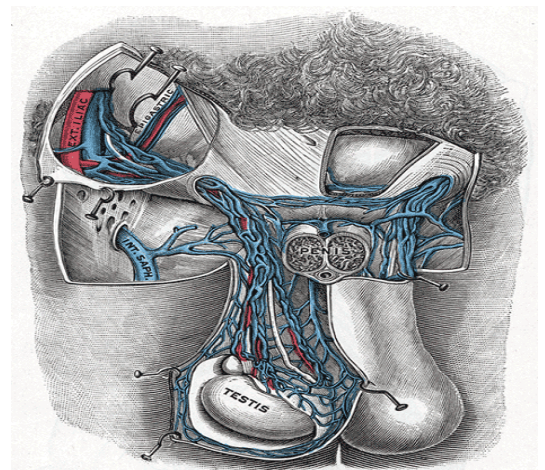
These are the extensive venous plexus, the pampiniform plexus. Leaves the posterior border of the testis.

(Opposite to the testicular artery) it starts from the testis and epididymis and forms pampiniform plexus; a net or spider web around the testis, continues through the inguinal canal (it becomes a singular testicular vein at the level of deep ring).

The right testicular vein goes to inferior vena cava (obliquely), and the left one goes straight up (perpendicular) and ends in the left renal vein.

-Remember: Varices are engorged, dilated, and tortuous veins.

Because the left testis is lower, its vein goes straight upward, and has a higher pressure, which can cause varices on the left side.



- **Varicocele of the testis is more common on the left side more than the right one for two reasons: the left testicular vein is lower and perpendicular upwards to left renal vein.**
- Varicocele of the testis leads to infertility because they increase temperature of the testis. Sperm production occurs at 2-3 degrees below body temperature, that's why testis are located in the scrotum outside the body. Removal of varicocele returns the testis to their optimum temperature and the patient is fertile again.



• **AUTONOMIC NERVES**

Are mainly sympathetic fibers that go with the testicular artery. They contain both vasomotor nerves as well as afferent sensory nerve from the testis. So, if a patient has orchitis (inflammation of the testis), the severe pain sensation is carried through these sympathetic fibers.

• **GENITAL BRANCH OF THE GENITOFEMORAL NERVE**

It is a branch of L1 and L2 that divides in the abdomen into genital and femoral, the genital one enters the deep ring and runs in the inguinal canal along with the spermatic cord, **and it supplies the cremasteric muscle.**

The cremasteric muscle pulls the testis upwards towards the body in cold weather to maintain the temperature needed for sperm production.

- Itching of the upper medial side of the thighs leads to contraction of the cremasteric muscle, which is called **cremasteric reflex**, HOW?

This reflex happens from the stimulation of femoral branch of the genitofemoral nerve then it goes to the spinal cord and returns in the genital branch leading to contraction of the cremasteric muscle.

• **TESTICULAR LYMPHATIC VESSELS**

Lymphatic drainage of the testis and epididymis (skin inside the scrotum), that then ascends through the inguinal canal and passes up over the posterior abdominal wall **to pour into the para-aortic lymph nodes at level of L1.**

While the lymphatic drainage of the **scrotum** (skin) goes to the **inguinal lymph nodes in the inguinal triangle.**

• PROCESSUS VAGINALIS

An out pouching of peritoneum that in the fetus is responsible for the formation of the inguinal canal.

The remains of the processus vaginalis causes the indirect hernia.

Part of peritoneum that takes the testis from the abdomen down to the scrotum. Testis and ovaries originally develop in the posterior abdominal wall at the level of L1 in the back.

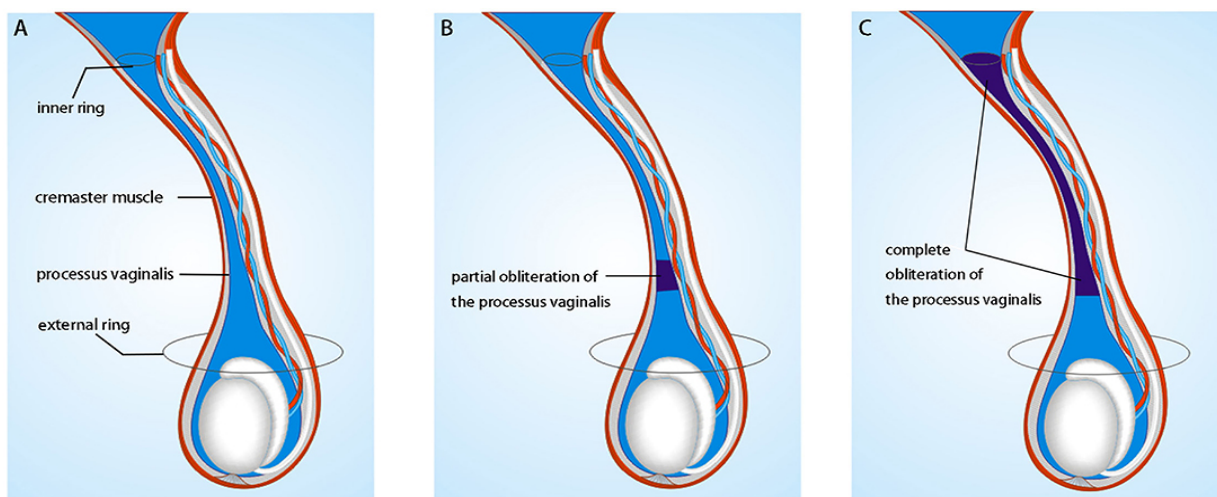
In the 8th month of pregnancy, processus vaginalis along with the gubernaculum are responsible to:

In males: pull the testis downwards from L1 in the abdomen to the deep ring → inguinal canal → superficial ring → Scrotum.

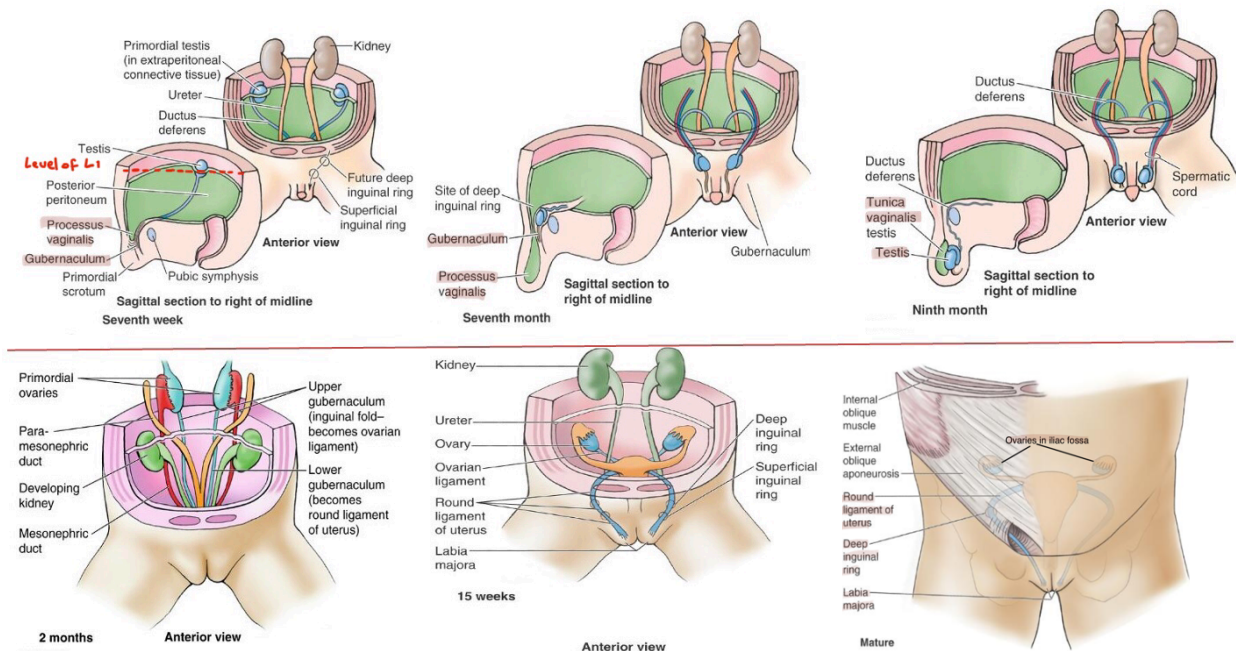
In females: pull the ovaries from L1 downwards in the same way until they reach the ovarian or iliac fossa in the pelvis.

- If the testis were not in place after birth (in the scrotum) this condition is called **cryptorchidism or maldescending testis**, a surgical intervention has to be done.
- **After the 8th month, when the testis are finally in the scrotum, processus vaginalis undergoes obliteration and fibrosis reaching the testis forming tunica vaginalis around the testis (parietal and visceral layers), sealing the deep inguinal ring completely.**

A defect in this process, if it didn't close and remained open, will lead to congenital indirect inguinal hernia.



DEVELOPING OF PROCESS VAGINALIS:



INGUINAL HERNIA

A hernia is the protrusion of part of the abdominal contents beyond the normal confines of the abdominal wall.

Due to two reasons: A weak point in the anterior abdominal wall (for ex. deep inguinal ring that is supposed to be sealed by processus vaginalis with the spermatic cord and its contents passing through).

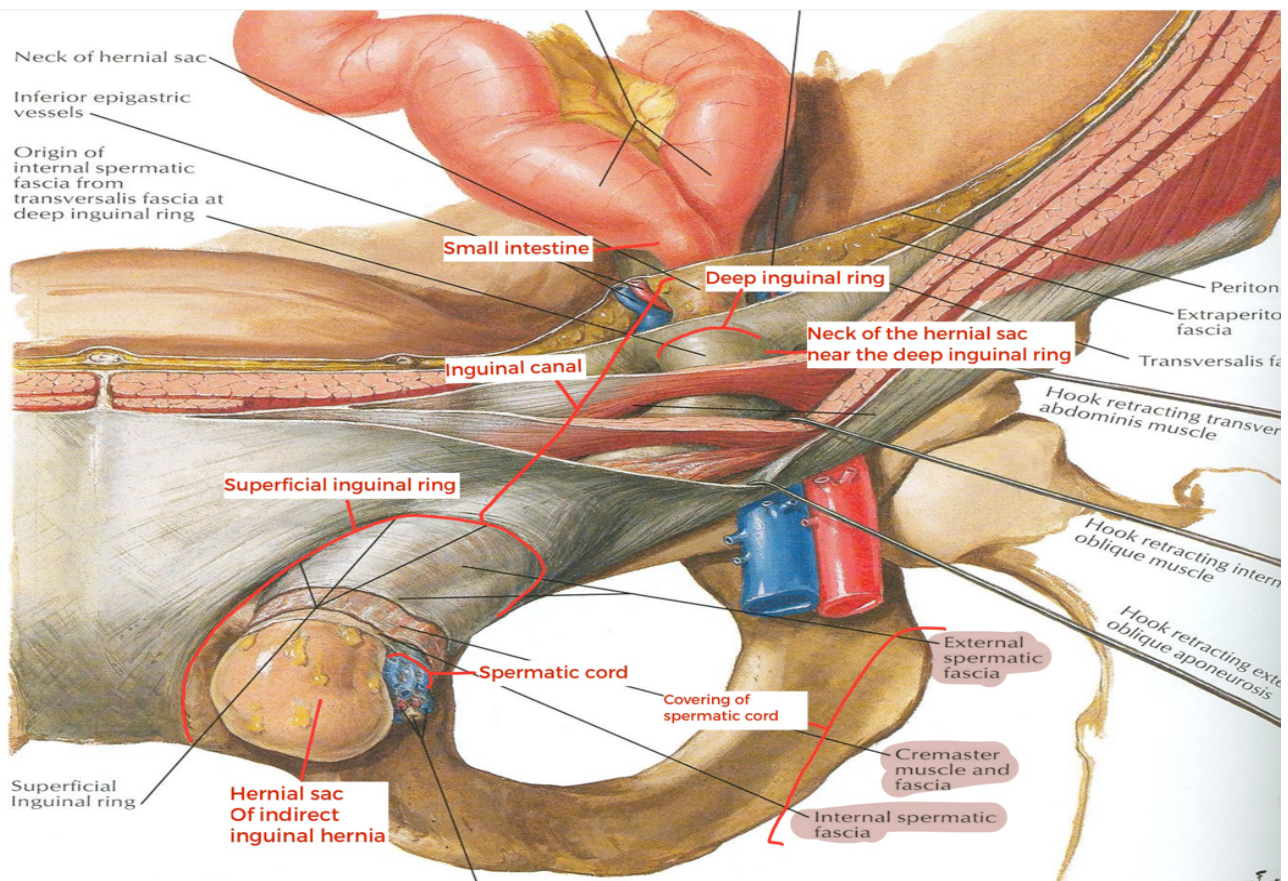
Along with increased intra abdominal pressure (upon chronic cough or chronic constipation), causing the peritoneum with the abdominal viscera to apply pressure on the deep ring. With time the ring opens and small intestine with the peritoneum or greater omentum pass through.

This hernia keeps getting bigger and bigger then goes through the inguinal canal and reaches the superficial inguinal ring to descend down to the scrotum in males (as in indirect inguinal hernia).

In females it's very rare to happen, but if it did it goes to labia majora.

Hernia consists of 3 parts:

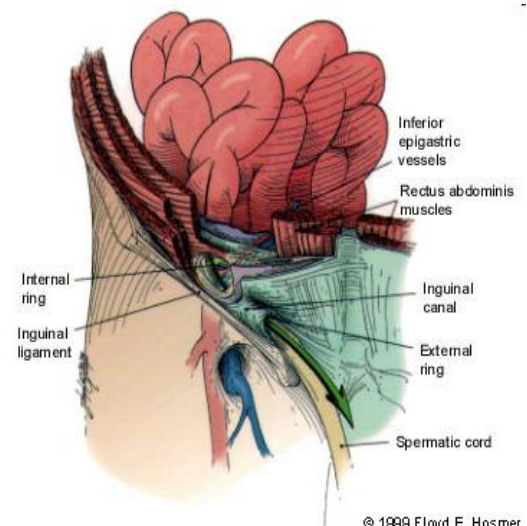
- **The Sac:** (fundus) Pouch of peritoneum, and it has a neck near the deep inguinal ring.
- **Contents of the Sac:** Small intestine or greater omentum (a fold of visceral peritoneum that hangs down from stomach).
- **Covering of the Sac:** Derived from layers of anterior abdominal wall which the hernial sac passes.



- Types of hernia that can be seen in the anterior abdominal wall: Indirect inguinal hernia (in the inguinal canal and it's the most common type), direct inguinal hernia (in the inguinal triangle), incisional hernia (in incisions from surgeries), umbilical hernia (in the umbilicus), para-umbilical hernia (around the umbilicus).

INDIRECT INGUINAL HERNIA:

- **The most common form of hernia, it is of congenital origin (and can be acquired)**, also it's more common at right side than left side; Because of delayed descent of the right testicle.
- **The Hernia moves through deep inguinal ring lateral to the inferior epigastric vessels - > Inguinal canal -> may stay along inguinal canal or extend as far as the superficial inguinal ring.**
- **Oval in shape.**

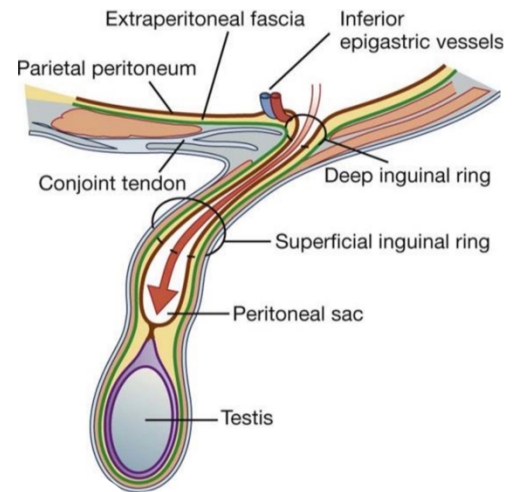


The hernia of this type after it comes out of the deep inguinal ring has two routes either moves down at sides of spermatic cord, OR enters between structures (contents) of spermatic cord.

Causes:

1- Congenital :

Failure in the obliteration and fibrosis of Processus Vaginalis (that is responsible for the descending of testis or ovaries and it is supposed to be obliterated after delivery sealing the deep ring)-> **bilateral congenital Indirect inguinal hernia**, and it's usually bilateral because it's congenital; the cause is present on both sides.



2- Acquired:

Increased intra abdominal pressure like in **chronic cough in smokers or chronic constipation** -> Deep inguinal Ring opens because peritoneum and abdominal viscera put pressure on it -> then small intestine pass through then deep ring, enters the inguinal canal and can reach the superficial inguinal ring. **It's usually unilateral.**

In males: it then go to the **scrotum** and this hernia will continue to grow if untreated.

In females: it's very rare to happen, but if it did then the sac will go to **Labia majora**.

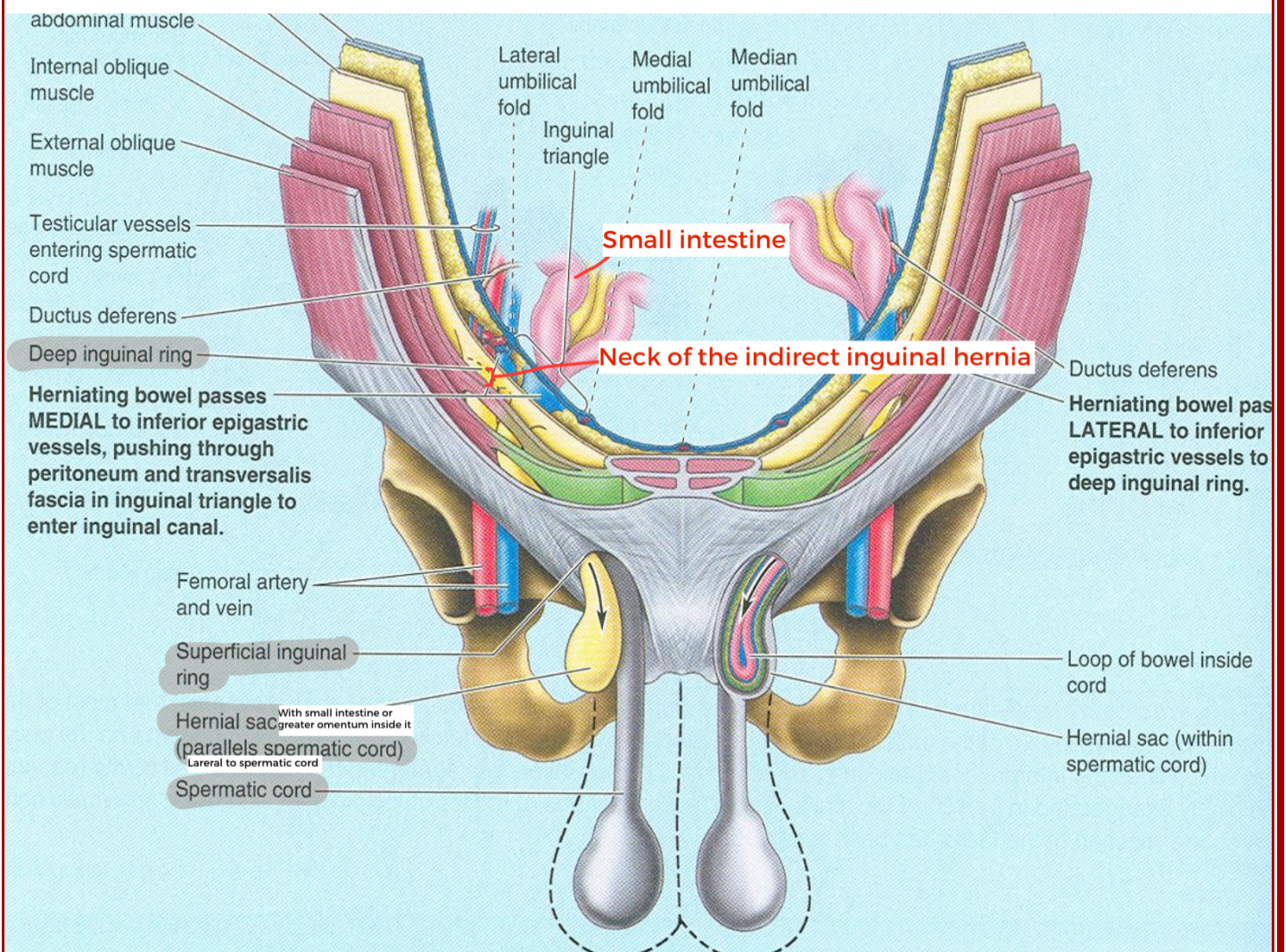
- If surgery was done to treat indirect inguinal hernia, surgeons have to be careful not to damage Vas Deference in males, because it's responsible for transporting sperm, so any ligation can cause infertility especially if it was bilateral ligation.

Some people do this in purpose for male sterilisation or permanent contraception in a process called Vasectomy, in which Vas deferens is cut and tied to prevent sperms transportation to urethra.

- **Note: in indirect inguinal hernia, the hernia sac passes outside the boundaries of Hesselbach's triangle (inguinal triangle) and follows the course of the spermatic cord.**
- **It is 20 times more common in young males than females.**

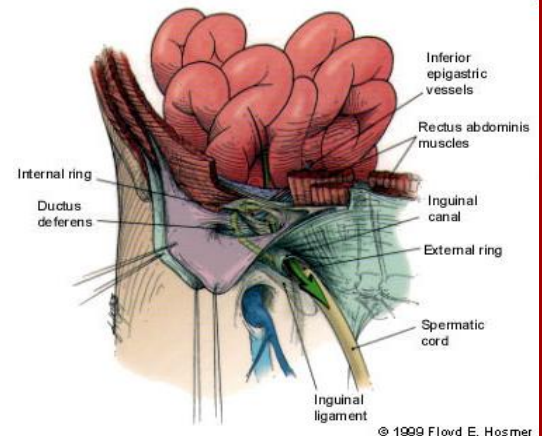
- Is more common on the right side (the right testis descends later than the left one).
- Indirect Hernia passes laterally to inferior epigastric artery.
- Direction of indirect inguinal hernia: it descends downward, forward, Medially, and it can be pushed back to its place (reduction) by moving it upward, backward, laterally towards the deep ring to enter back the abdomen and it's best done by the patient himself.
- In this type of hernia if you put your finger on the deep ring closing it and asked the patient to cough, you will see that the hernia won't come out, opposite to what would've happened if you didn't close the deep ring by your finger. (This is called deep ring test).

This patient is an old age male having **indirect inguinal hernia**, who had a surgery on the right side for it, and left one is still present reaching the scrotum and enlarging it till it reached his knee.



DIRECT INGUINAL HERNIA:

- It composes about 15% of all inguinal hernias. Common in old men with weak abdominal muscles and rare in women.
- Hernial sac bulges forward through the posterior wall of the inguinal canal, opposite to the superficial inguinal ring, medial to the inferior epigastric artery. The neck of the hernial sac is wide, because it happens in the inguinal triangle which is wide.
- **Hemispherical in shape.**

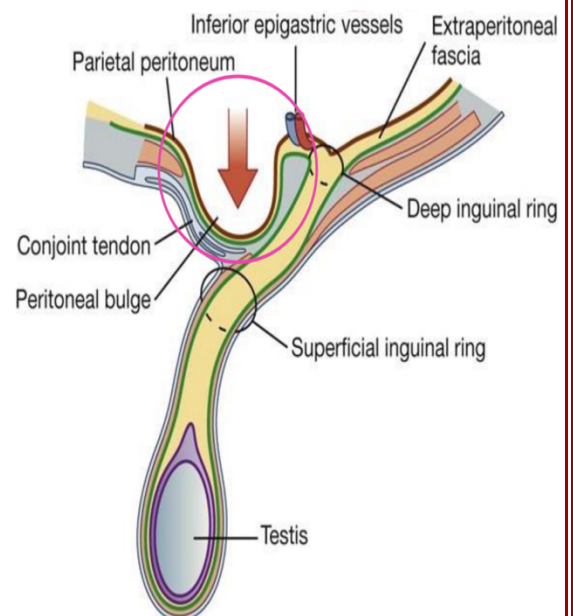


Happens in **Inguinal Triangle**, its boundaries are:

Above and medial: linea semilunaris.

Superolateral: Inferio epigastric vessels.

Inferior: Inguinal ligament.



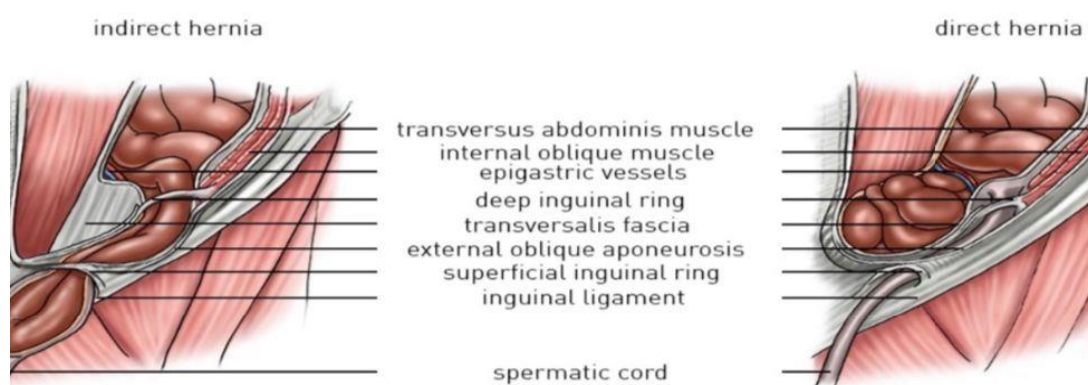
it reaches the level of superficial Inguinal ring without passing through deep inguinal ring, the peritoneum enters the triangle with some small intestine or greater omentum.

Common scenario:

Old male patient (rare in women) ->his abdominal muscles are weak due to old age -> he also has chronic constipation -> Increased intra abdominal pressure -> direct inguinal hernia.

- Neck of Direct hernia is wider than neck of Indirect form; Because the neck of indirect hernia is at level of the deep ring, which is narrow. While the neck of direct hernia is at the inguinal triangle which is wide.
- **Direction of the direct inguinal hernia is forward only, so reduction is only backward.**

- It doesn't go through the inguinal canal and never reaches the scrotum, unlike the indirect one.
- Direct inguinal hernia lies posterior to superficial inguinal ring, it's bulge is coming out forwards. (Doctors use this to differentiate between the direct and indirect inguinal hernia).
Bulge forwards -> Direct.
- Direct inguinal hernia passes posterior to inguinal canal, and medial to inferior epigastric artery.
- Note: in direct inguinal hernia, The hernia sac passes directly through inguinal triangle and may disrupt the floor of the inguinal canal.



We have two tests to differentiate between direct and indirect inguinal hernia: superficial and deep ring tests.

- **Superficial ring test:**

When you **reduce the Direct hernia backward** (toward the superficial inguinal ring) you will feel the pulse of the inferior epigastric artery at the lateral side of your index.

But when you **reduce the Indirect hernia upwards, backwards, laterally** you will feel the pulse at the tip of your index.

- **Deep ring test:**

This test is **more specific**, depends on the fact that indirect hernia pass through the deep ring while Direct hernia doesn't.

It is made by reduction of the hernia back to the abdomen (the easiest way is to ask the patient himself to make the reduction because he is used to it).

After reduction of hernia put pressure using your finger on the deep ring to close it [**1 finger (thumb) above the pulse of femoral artery**], then ask the patient to cough.

- If the **hernia occurred again by coughing** → this indicates that hernia originates from another opening and the pressure you exerted on deep ring is useless → **Direct hernia.**
- If patient **coughs and Hernia doesn't appear** → **Indirect hernia.**

	Direct	Indirect
Age	Common on old	young
Bilaterally	Usually bilateral	unilateral
Shape	Hemispherical	Oval <small>Except for congenital indirect hernia -> Bilateral</small>
Reaches scrotum	never	Can reach the scrotum
Direction of descent	Forwards	Downwards , forwards medially
Reduction <small>How to get the hernia back in its place</small>	backward	Upward, backward laterally
Relation to inf. epigastric art.	Medially	Laterally
Superficial inguinal ring test	Feel impulse on the side finger	Feel an impulse on the tip of the finger
Deep ring test Reduction of hernia, put thumb over deep ring, ask patient to cough	Hernia appears	Hernia does not appear
Coverings	Lateral to lateral umbilical ligament Same as indirection	Skin, superficial fascia, external spermatic fascia, cremasteric muscle, and fascia internal spermatic fascia

BLOOD SUPPLY OF TESTES AND EPIDIDYMIS

- **Artery:**

- **Testicular artery** (goes through the deep ring and joins the spermatic cord to the testis and epididymis) -> **Abdominal aorta at the level of L2** (from it's anterior surface).

- **Vein:**

- **Pampiniform plexus** around the testis-> ascend with the spermatic cord -> when it reaches the deep ring **it is reduced to a single vein (testicular vein)** -> **ascend through inguinal canal -> right testicular vein drains into inferior vena cava and left testicular vein drains into left renal vein.**

That's why varicocele is common on the left side.

- **Lymphatic drainage:**

Ascend in the spermatic cord. End in the lymph nodes on the side of aorta (Lumbar or Para- aortic lymph nodes) at level L1.

-Testis + epididymis -> drainage follows testicular arteries and ends in the lymph nodes on the sides of the aorta at the level of L1 (para-aortic nodes).

-**Scrotum +it's skin** -> **inguinal canal lymphatic nodes** in the femoral triangle.

If there was a tumour in the testis (inside the scrotum), enlargement will be seen in the para-aortic lymph nodes.

If there was a tumour in the skin of the scrotum (outside the scrotum), the enlargement will be seen in the inguinal lymph nodes of the femoral triangle .

• **Nerve supply:**

Autonomic nerves

- Sympathetic fibres run with testicular artery from renal or aortic sympathetic plexuses for the testis and epididymis.

- Afferent sensory nerve through the sympathetic fibres.

Genital branch of the genitofemoral nerve

- Supply the cremastic muscle, that is important for the cremasteric reflex (pulling the testis upward in cold or itching the upper medial side of the thigh).

Scrotum or labia majora -> By the above nerves + ilioinguinal nerve (that originates from L1 and pierces the inguinal canal posteriorly).

VARICOCELE:

• The veins of the pampiniform plexus elongated tortuous and dilated. The left side is more common because venous pressure is higher.

• **Common in young and adult.**

• Varicocele causes infertility because it raises the temperature of scrotum more than 3 degrees which kills the sperm, this can be fixed by surgery and things go back to normal.

• **Vasectomy** (ligation of vas deferens by surgery) **leads to Infertility.**

• **Processus vaginalis** (that is obliterated after birth closing the deep ring): **Upper part -> obliterated just before birth** (if this didn't happen, it causes congenital indirect inguinal hernia).

Lower part -> Tunica vaginalis.

• **Congenital anomalies of processus vaginalis:**

1- If processus vaginalis persists open after birth -> causes congenital indirect inguinal hernia.

2- If processus vaginalis was Narrowed -> congenital hydrocele.

Hydrocele: Accumulation of fluid within the tunica vaginalis of the testis.

The hydrocele may be between the two layers of tunica vaginalis or encysted in a small part of the processus vaginalis pathway (cyst filled with fluids).

Hydrocele causes could be: Inflammation, Idiopathic or Congenital.

Tapping or suction for a **hydrocele** should be done, by doing that **Structures we will cross by the needle are (skin, all layers covering the testis, tunica vaginalis) traversed by cannula.**

3- If processus vaginalis upper and lower part were obliterated -> encysted hydrocele of the cord in the middle.

• **Congenital anomalies of the testes:**

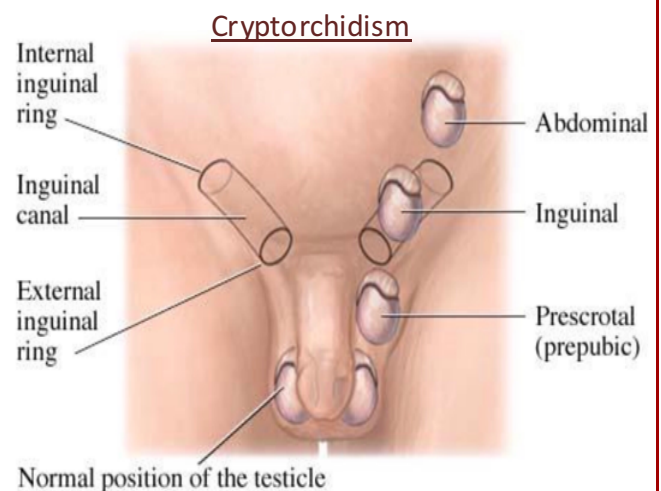
1- Cryptorchidism:

Incomplete descent of the testis, although it travels down the normal pathway (deep ring, inguinal canal, superficial inguinal canal and scrotum)

it may be found in the:

Abdominal cavity, inguinal canal, superficial inguinal ring or upper part of the scrotum (above the scrotum).

The more it descends, the easier it is to connect it to the scrotum.



2- Maldescent:

Testes travel down an abnormal pathway (outside the normal pathway). it may be found in the:

Superficial fascia, the root of the penis, perineum, the thigh.

It is more serious than Cryptorchidism requiring an immediate operation after birth.

If the testis remains in an abnormal position beyond 6 years, this will impair the production of testosterone and sperm.

PAST PAPERS:

Wrong about indirect hernia:

- a. sac from superficial inguinal ring will be below and lateral to pubic tubercle.
- b. It is 20 times more common in young males than females.

Wrong about spermatic cord:

- a. inner spermatic fascia is from internal oblique.
- b. External Spermatic fascia is derived from the external oblique aponeurosis.

Wrong about direct hernia:

- a. bulges from superficial inguinal ring.
- b. medial to inferior epigastric artery.

What is the type of hernia that exits from this triangle (inguinal triangle):

- a. indirect inguinal hernia.
- b. direct inguinal hernia
- c. hiatal hernia.

Direct inguinal hernia, all are correct except:

- a. hernial sac lies medial to the inferior epigastric artery.
- b. common in the old.
- c. usually bilateral.
- d. the hernial sac never reaches the scrotum.
- e. in superficial inguinal ring test, you feel impulse on the tip of your index.

About indirect inguinal hernia , which is wrong :

- a. Commonly unilateral.
- b. Common in young.
- c. Hernial sac is found lateral to inferior epigastric artery.
- d. Caused by injury to ilioinguinal nerve.

An injury to the ilio-inguinal nerve, might be associated with one of these types of hernia:

- a. direct hernia.
- b. indirect hernia.
- c. lumbar hernia.
- d. internal hernia.
- e. incisional hernia.

V2

In page 18, the paragraph in this color were added instead of the original one cuz there were some mistakes in it.

V3

In page 12 the last line: inguinal triangle not femoral.