



SUNMARY
ANATOMY
M.E.G.A

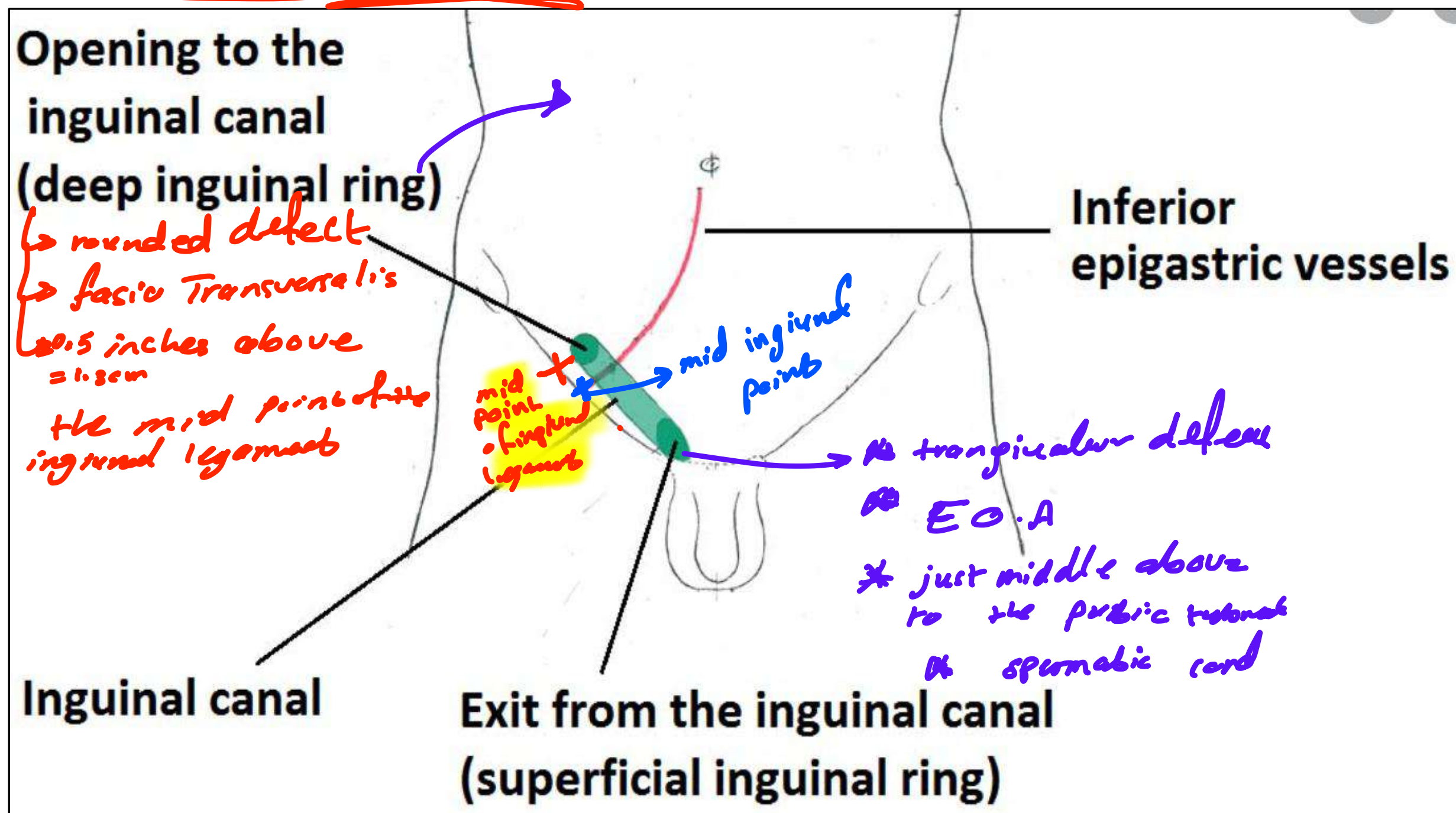
محمد أيمن أبو مشايخ

INGUINAL CANAL

(4cm)

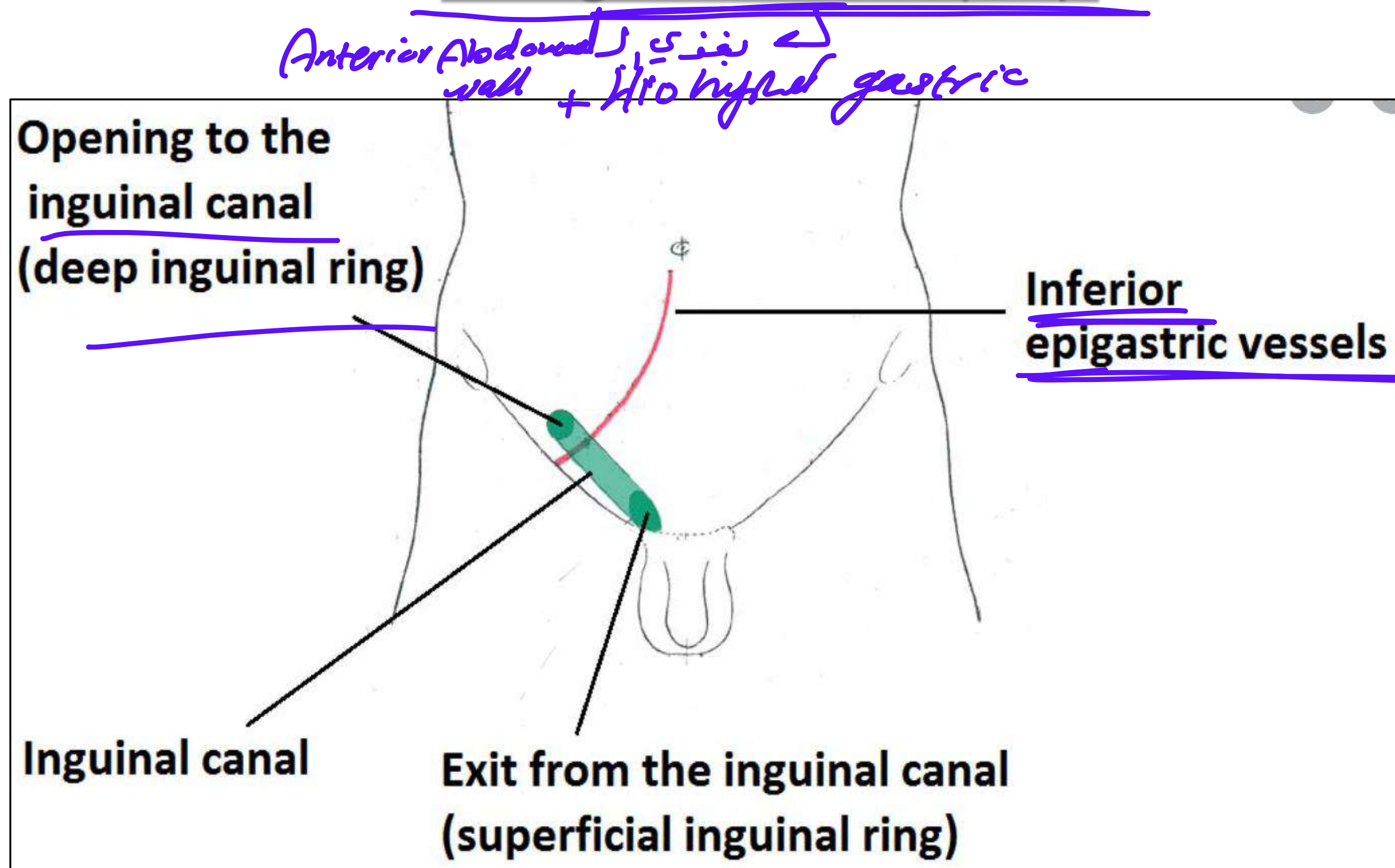
شعيرات لگامنتو ۛ ۛ ۛ
parallel and
above

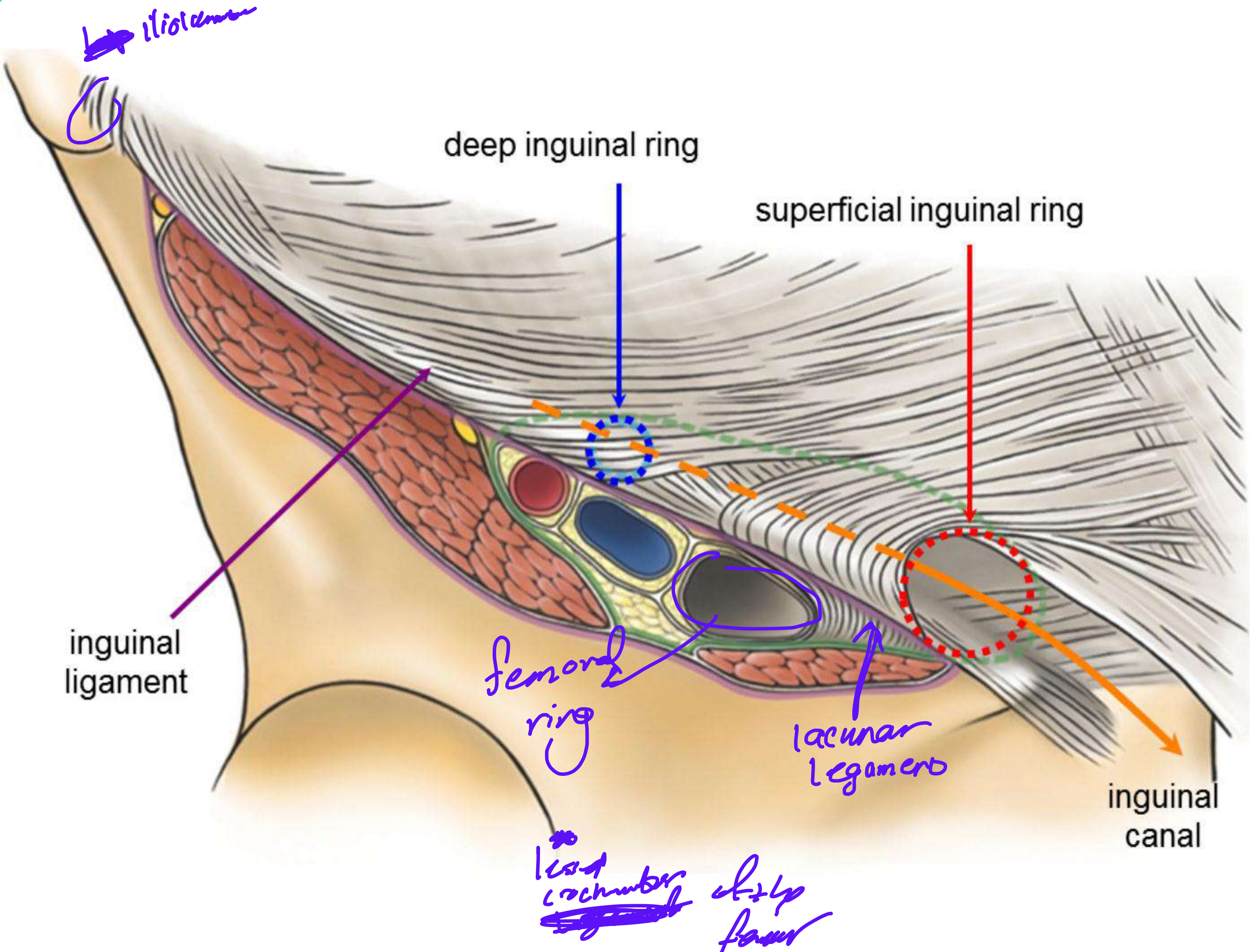
- Is an Oblique passage through the lower part of the anterior abdominal wall and is present in both sexes. male female
- It allows structures to pass to and from the testis to the abdomen in males.



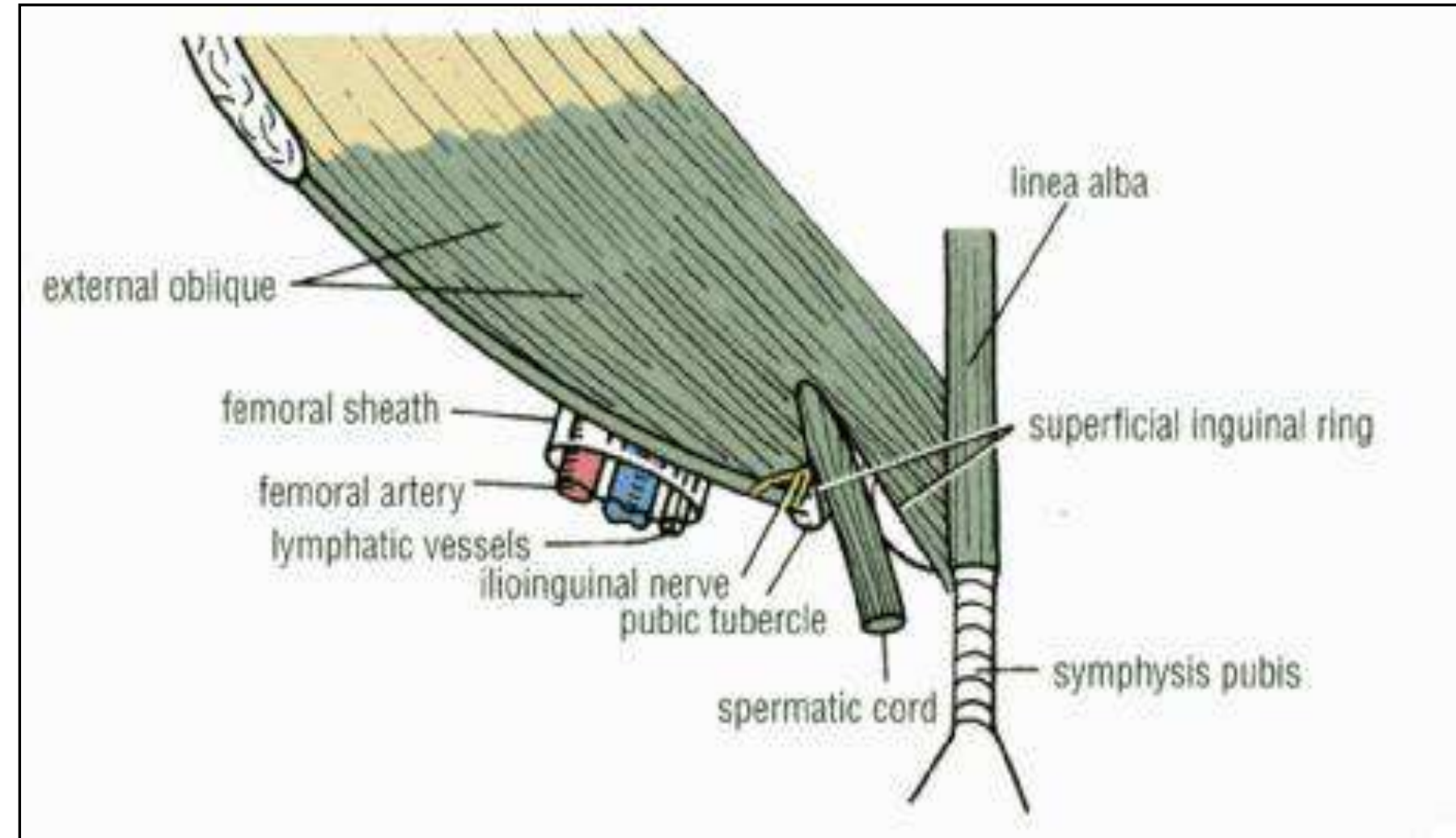
INGUINAL CANAL

- In females it permits the passage of the Round Ligament of Uterus (from uterus to labia majora).
- It transmits the ilioinguinal nerve (L1) in both sexes.

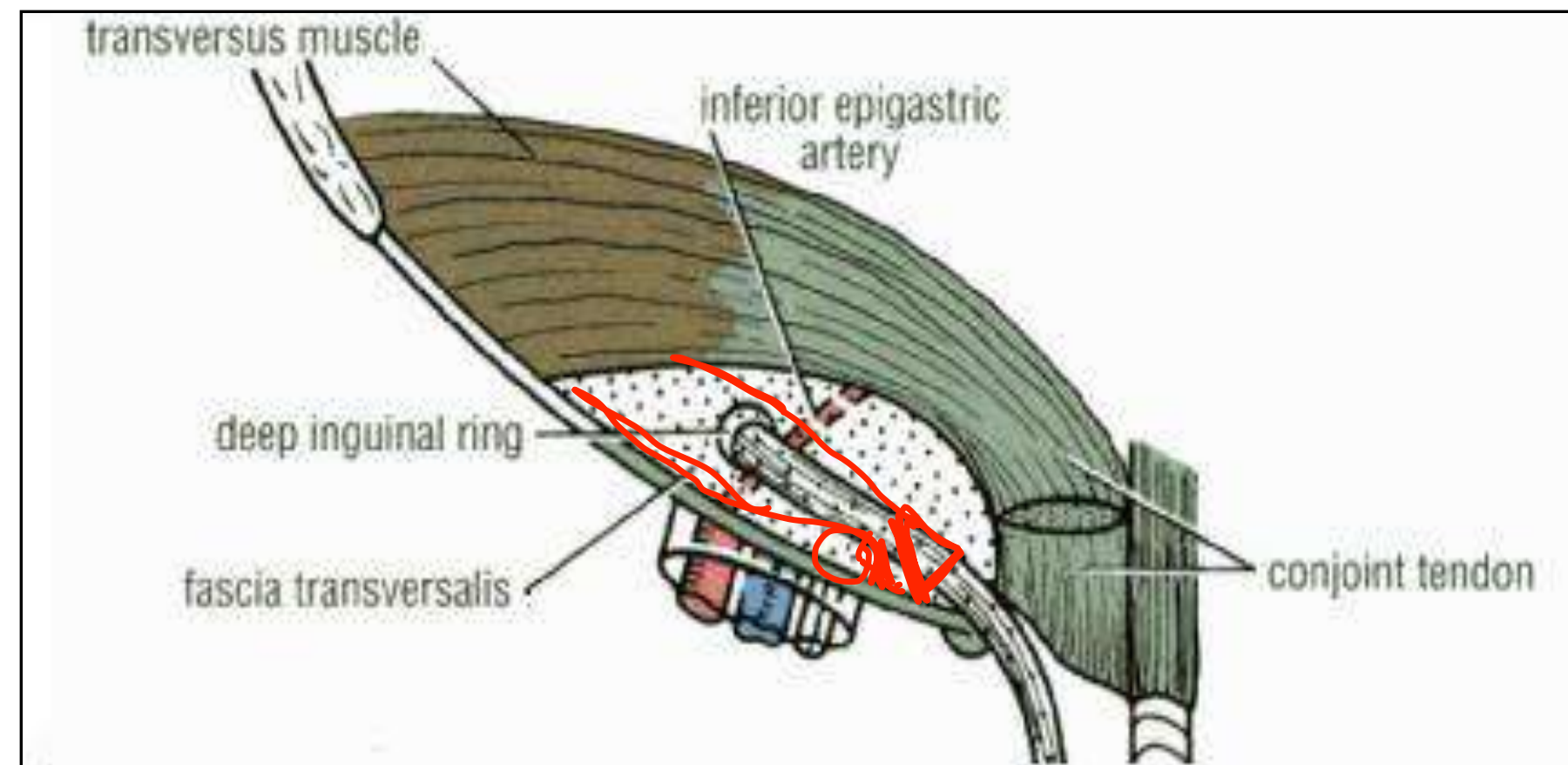




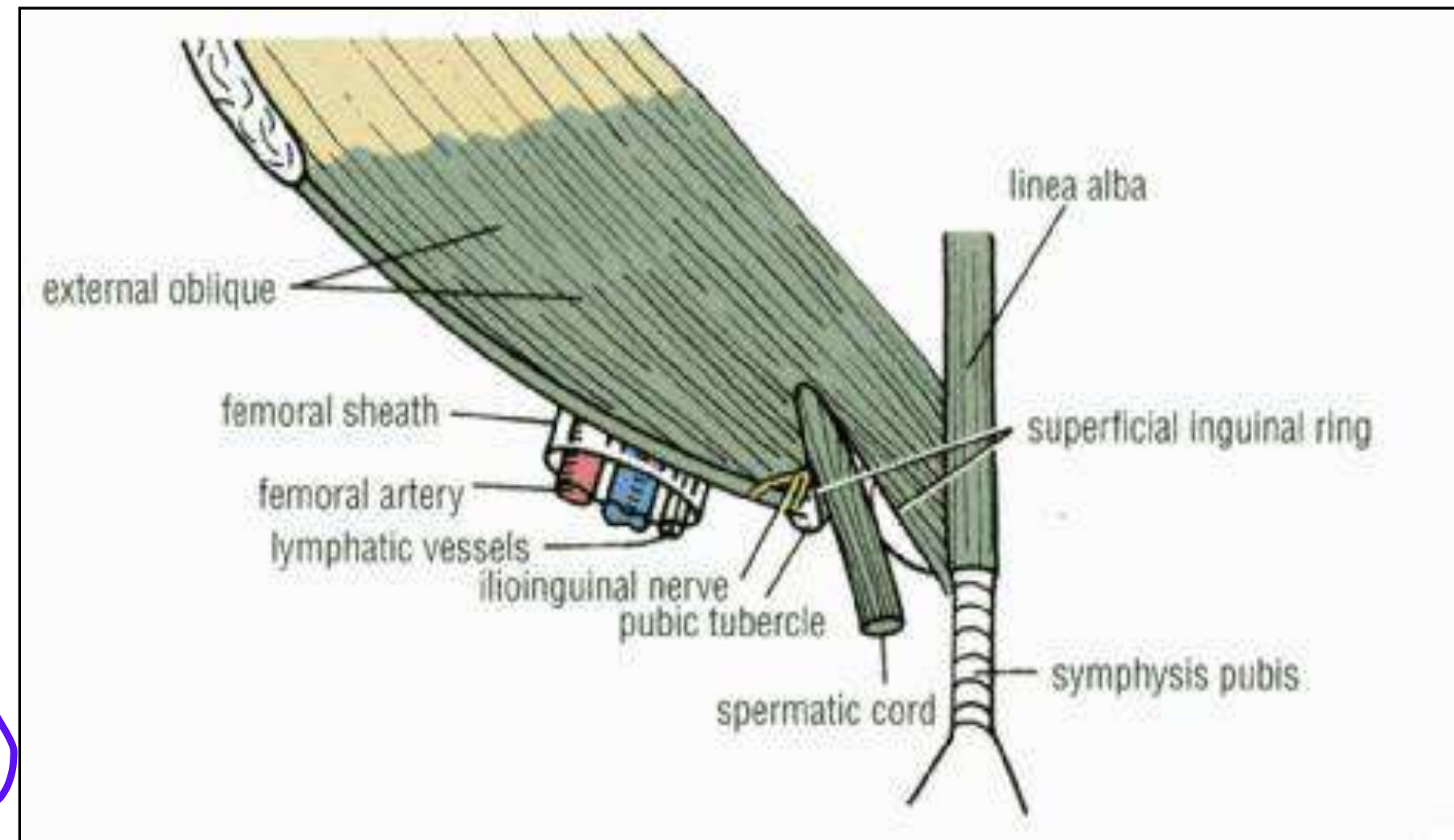
■ The canal is about (4 cm) long in adult and extends from Deep Inguinal Ring downward and medially to the Superficial Inguinal Ring.



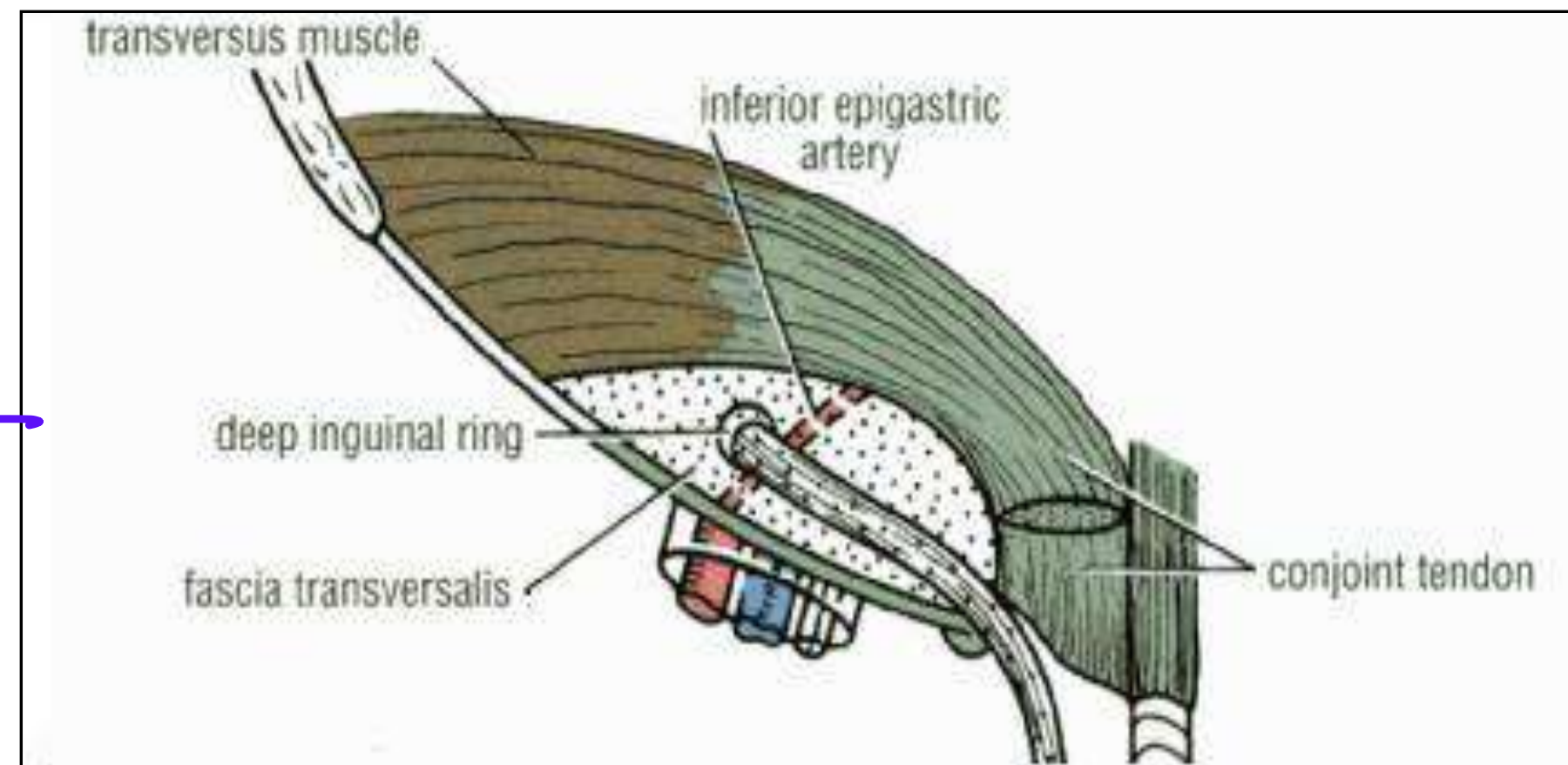
① ■ It lies parallel to and immediately above the inguinal ligament.

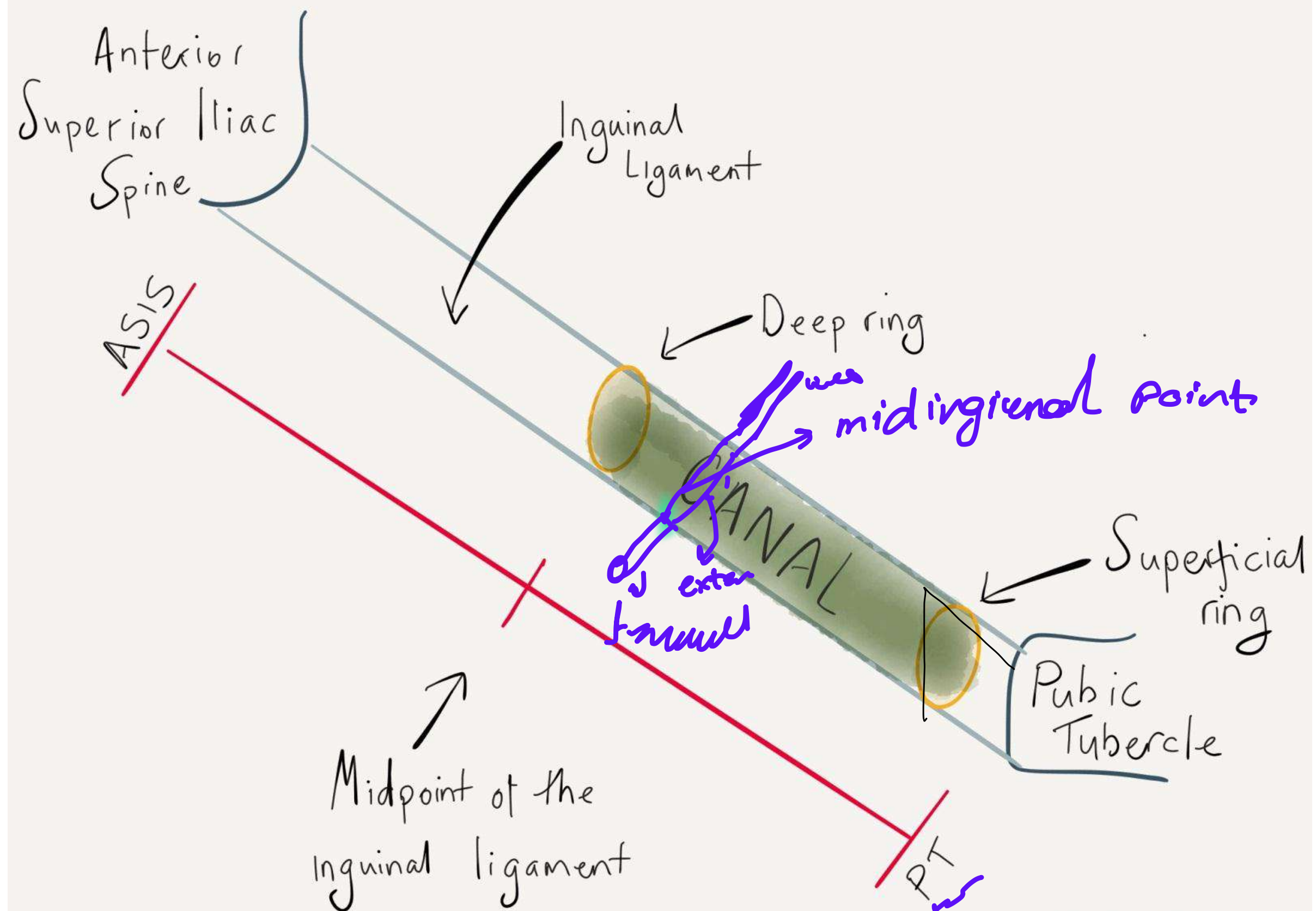


■ In the newborn child, the deep ring lies almost directly posterior to the superficial ring, so that the canal is considerably shorter at this age.



■ Later, as the result of growth, the deep ring moves laterally.



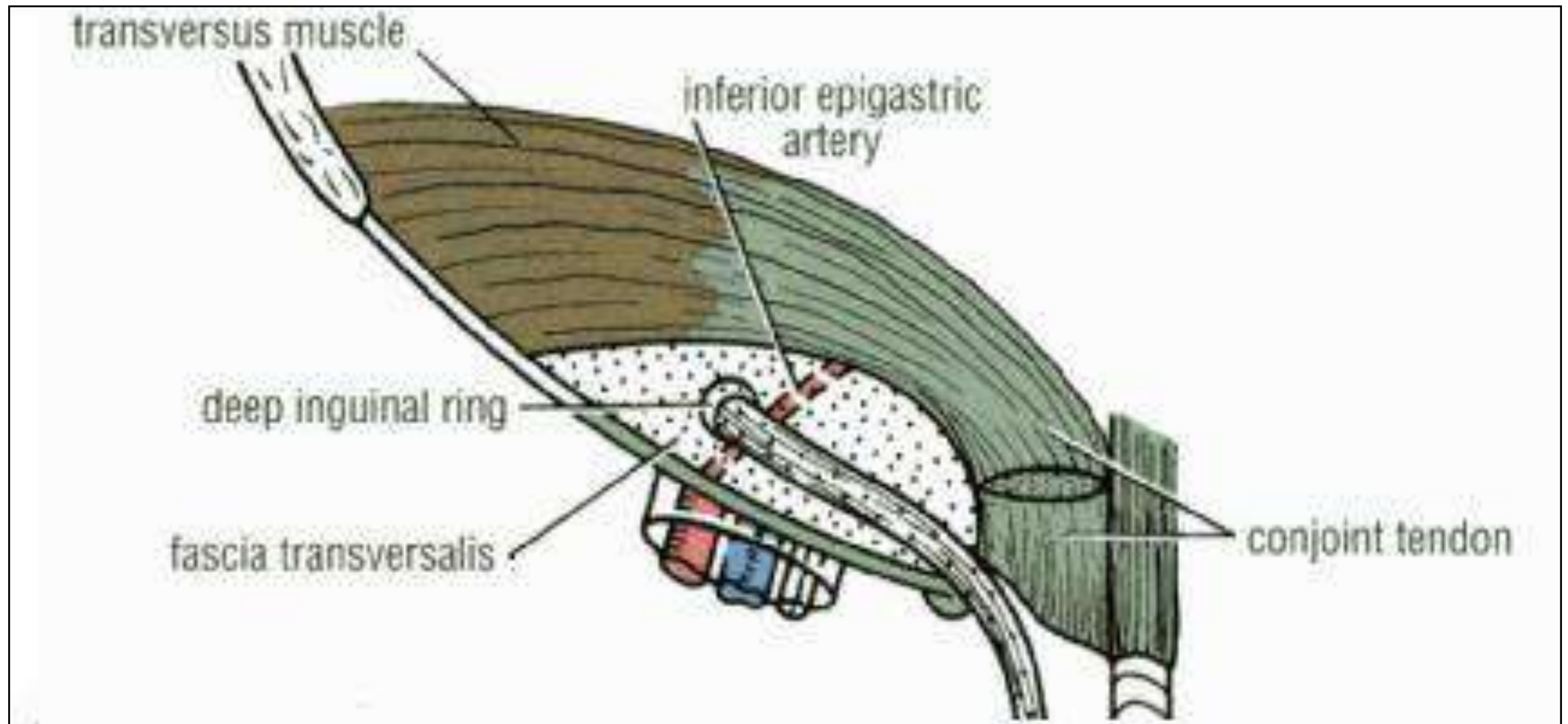


- The deep inguinal ring, an oval opening in the Fascia Transversalis, lies about (1.3 cm) **0.5 inch** above the inguinal ligament midway between the anterior superior iliac spine and the pubic tubercle.

mid point of inguinal

(ligaments)

- Medial to deep ring are Inferior Epigastric Vessels, which pass upward from the external iliac vessels.
- The margins of the ring give attachment to the internal spermatic fascia.

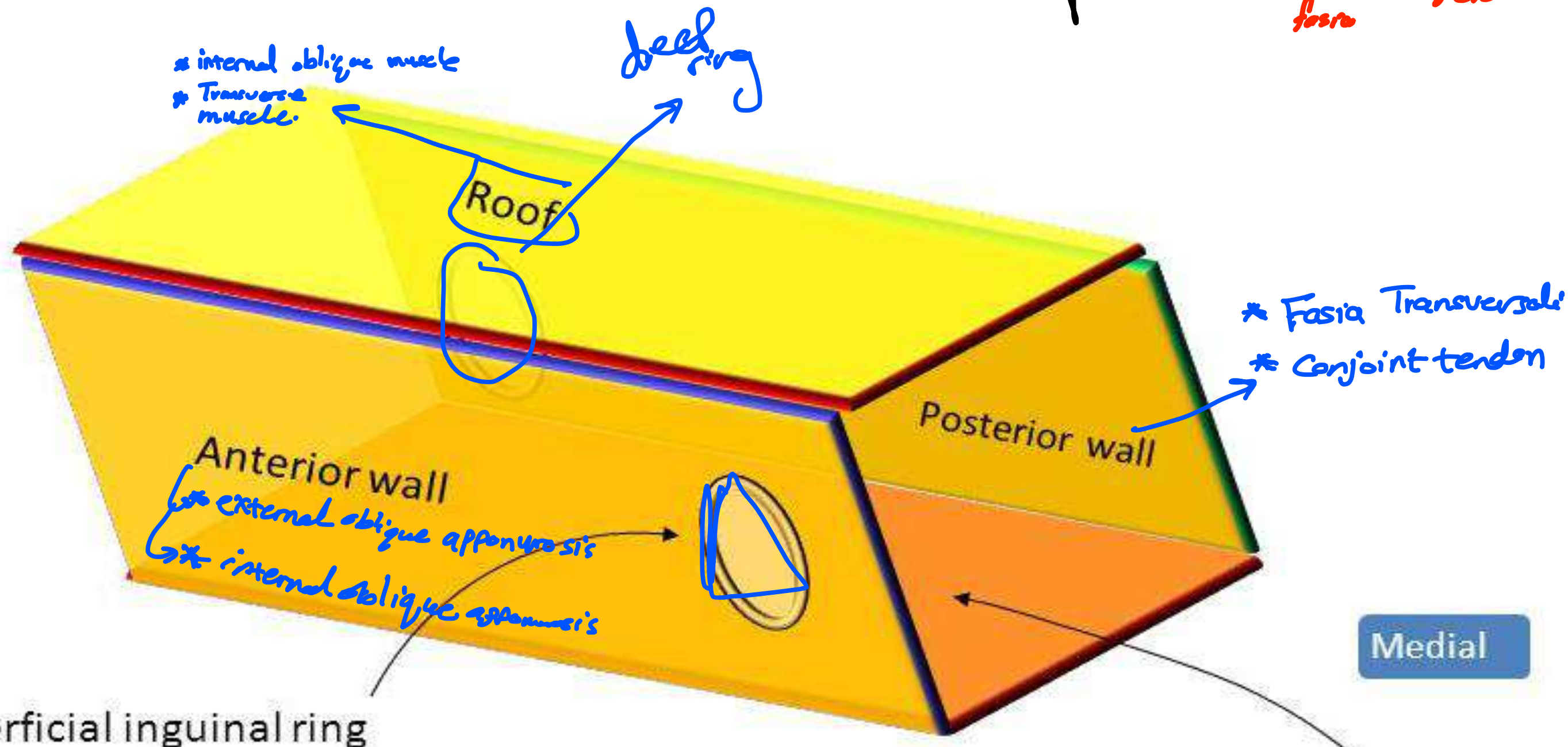


2 MALT

Inguinal canal

the canal

S	2 Ms	Int ^o + Tr.A
A	2 A	Ex. & In. o
I	2 L	Lacunar + inguinal ligaments
P	2 T	T.f + Conjoint fascia Tendon.



Superficial inguinal ring

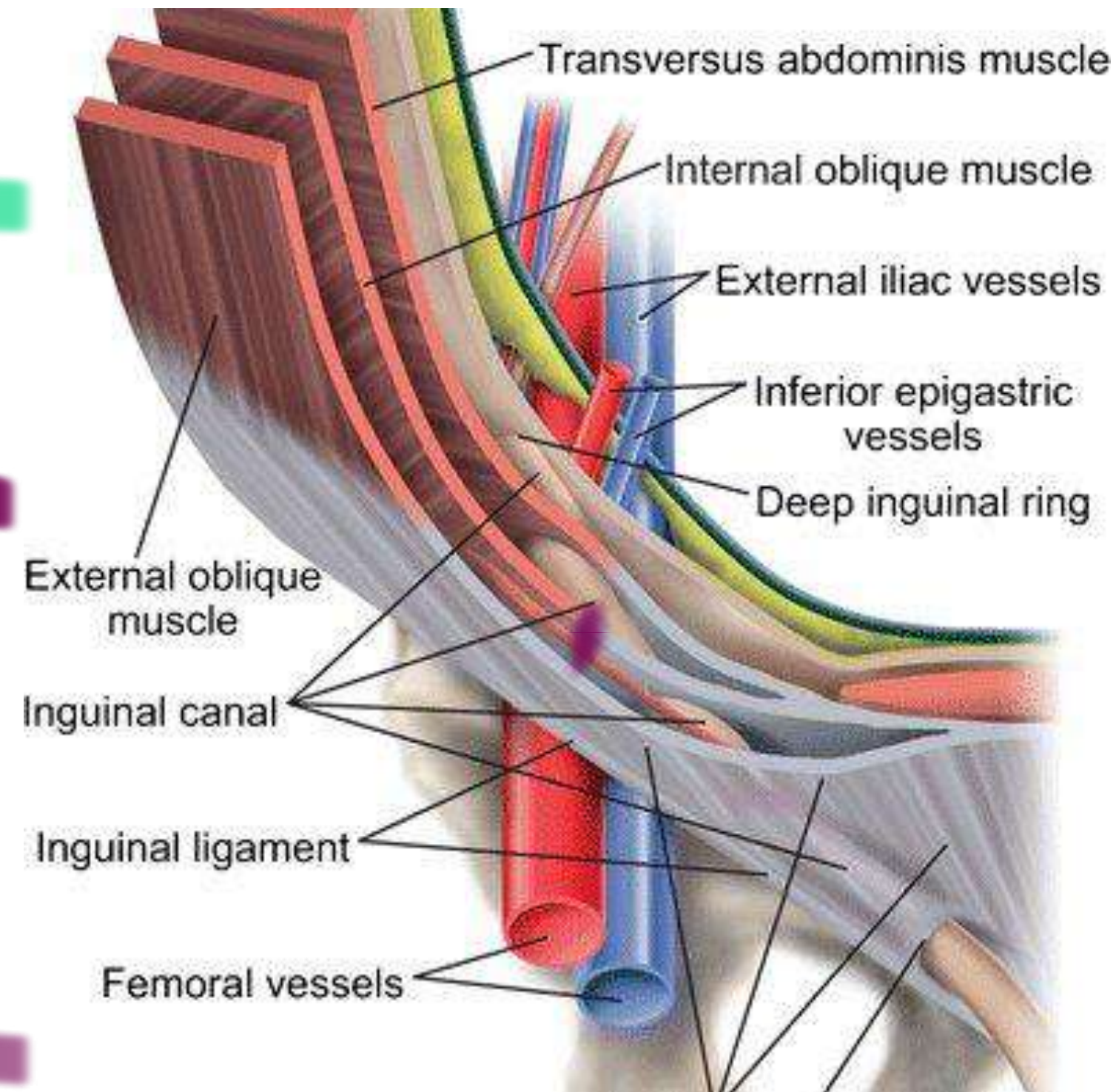
Here are the anterior wall (which has the SUPERFICIAL inguinal ring situated medially), and the roof.

Floor
 ↳ Inguinal Ligament
 ↳ Lacunar Ligament

Walls of inguinal Canal

Anterior wall of canal

- Is formed along its entire length by the aponeurosis of *External Oblique Muscle*.
- It is reinforced in its middle third by the origin of the *Internal Oblique* from the *inguinal ligament*.
- This wall is therefore strongest where it lies opposite the weakest part of the posterior wall, namely, the *deep inguinal ring*.



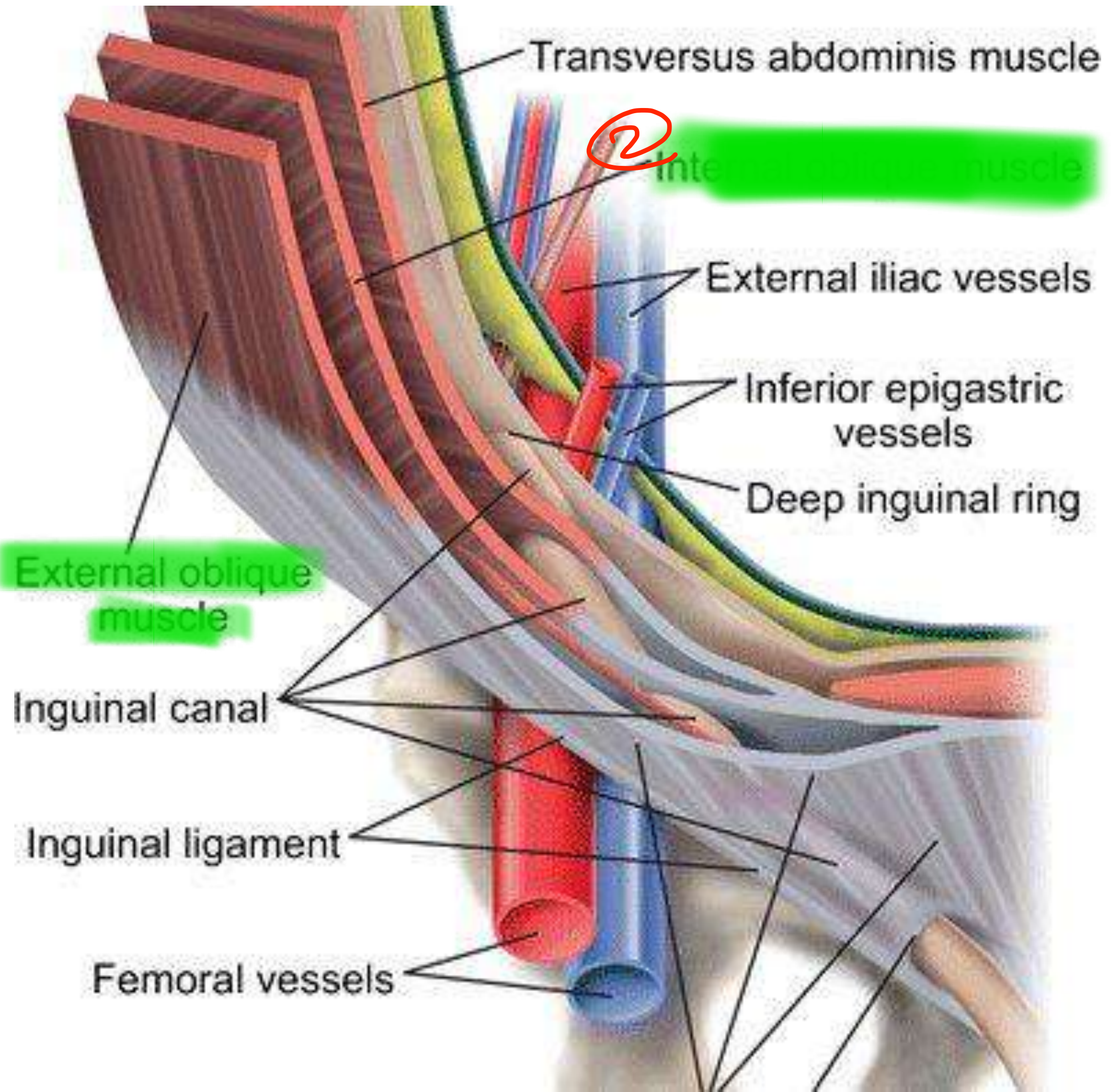
Walls of inguinal Canal

Anterior

wall of

canal

external
apponerisi
internal
apponerisi



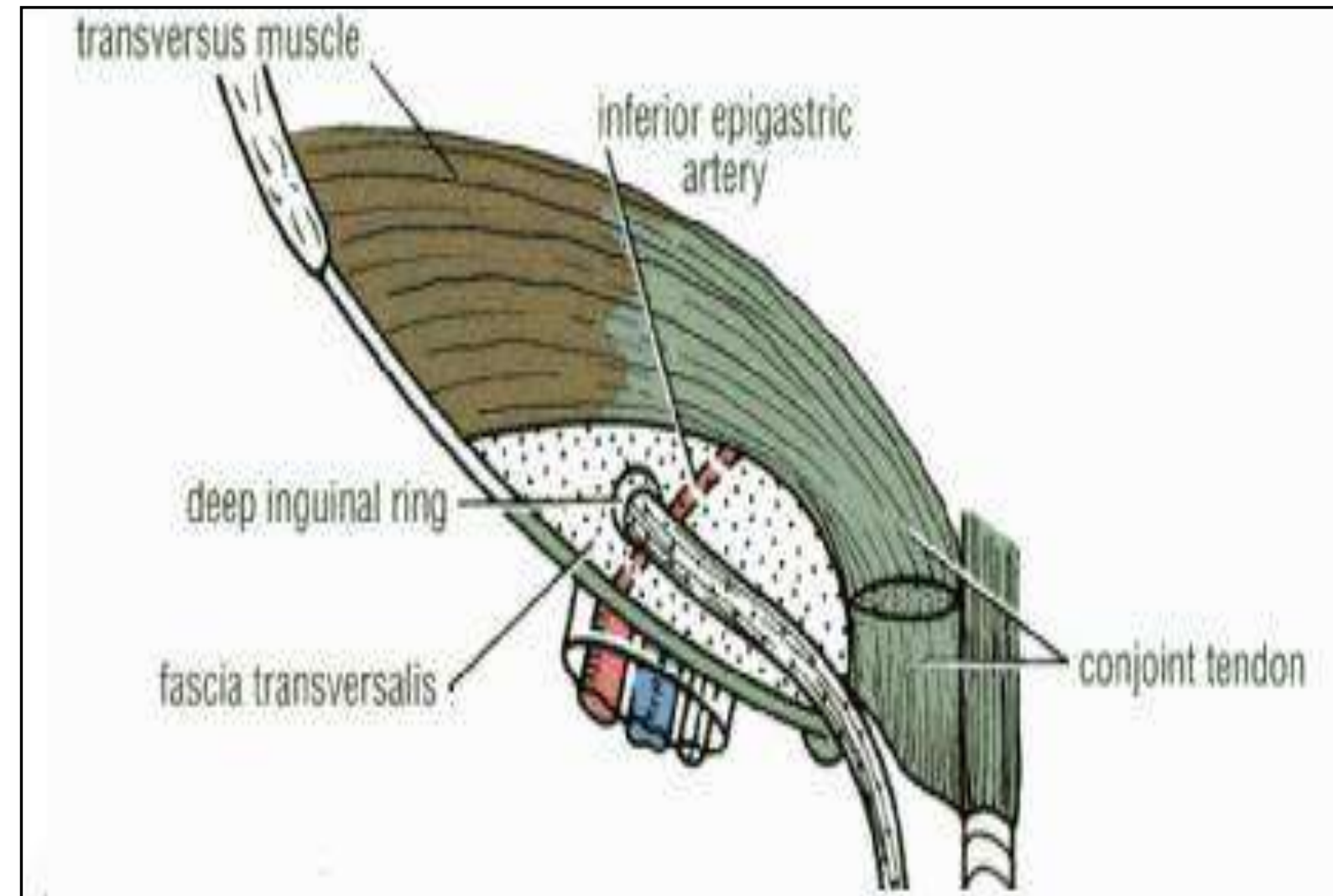
Walls of inguinal Canal

* Posterior wall of canal

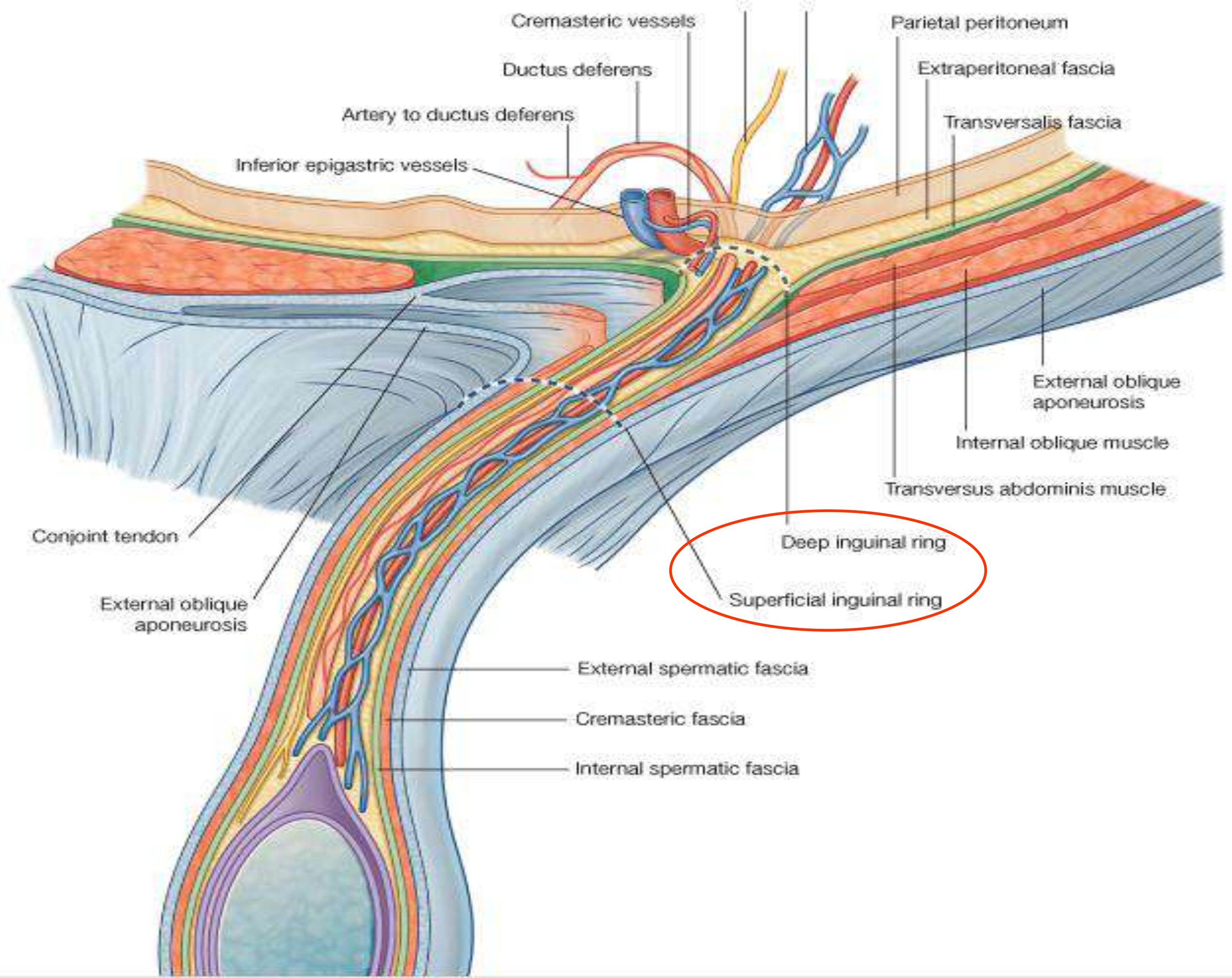
■ Is formed along its entire length by Fascia

Transversalis

■ It is reinforced in its medial third by Conjoint
Tendon.



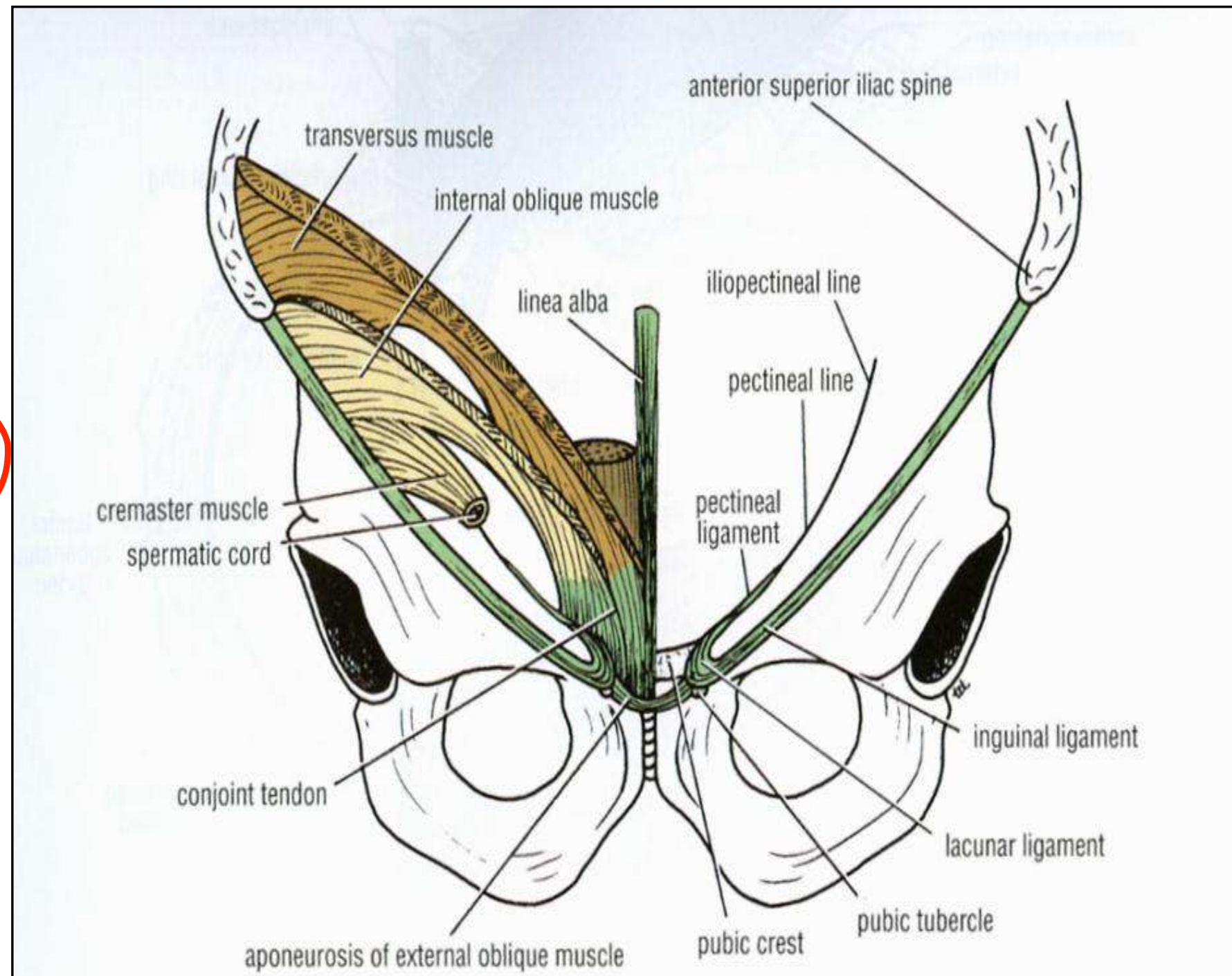
■ This wall is therefore strongest where lies opposite the weakest part of the anterior wall, namely, the superficial inguinal ring.



Walls of inguinal Canal

Inferior wall of cana (Floor)

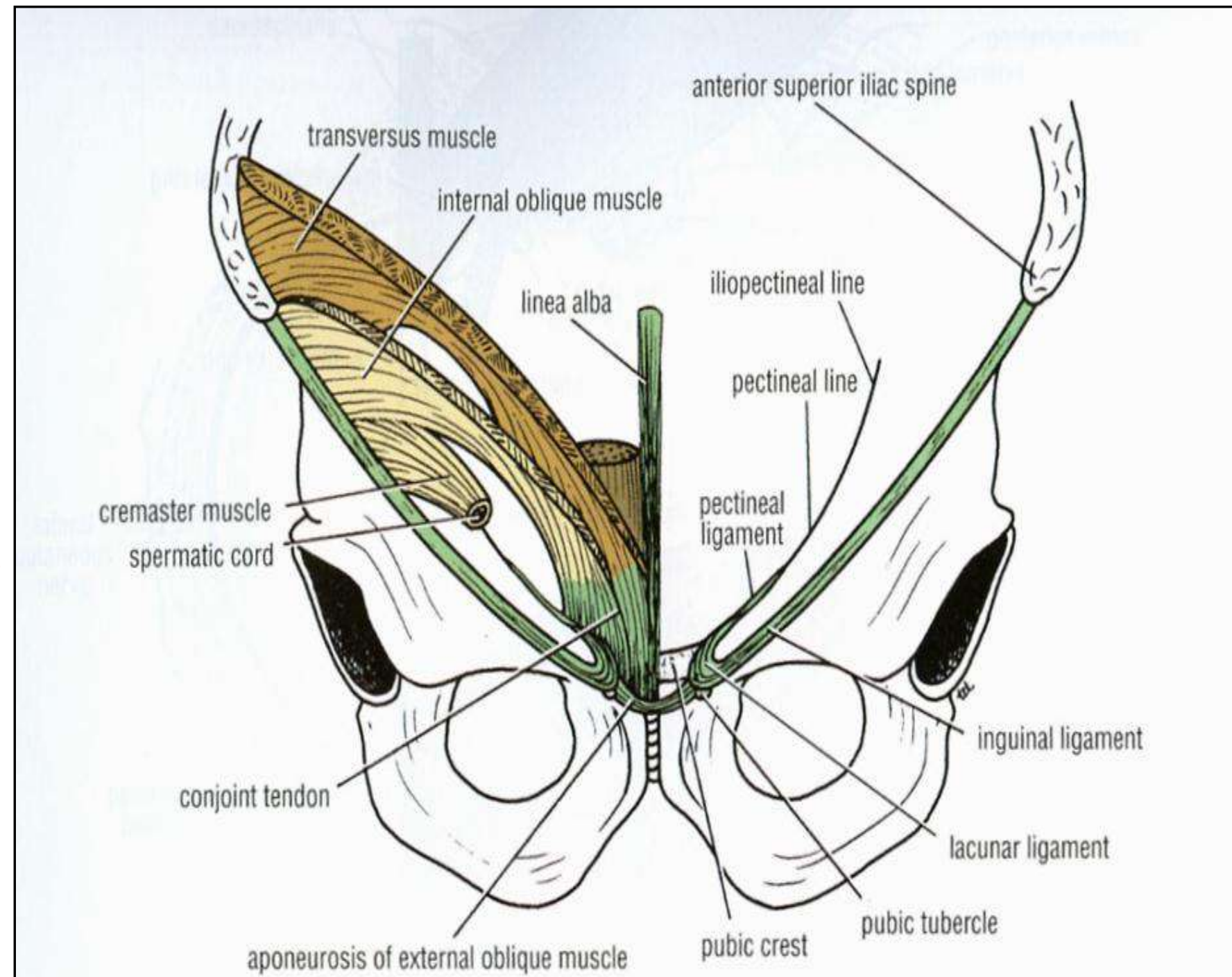
✚ Is formed by the Inguinal ligament and, at its medial end, the lacunar ligament.



Walls of inguinal Canal

Superior wall of canal (Roof)

✚ Is formed by the arching lowest fibers of the internal oblique and transversus abdominis muscles.



Walls of inguinal Canal/SUMMARY

- **Superior wall (Roof):** Arching lowest fibers of the internal oblique and transversus abdominis muscles.
- **Anterior wall:** External oblique aponeurosis, origin of the internal oblique, inguinal ligament.
- **Inferior wall (floor):** Upturned lower edge of the inguinal ligament and, at its medial end, the lacunar ligament.
- **Posterior wall:** Conjoint tendon medially, fascia transversalis laterally.

Function of inguinal Canal

- The inguinal canal allows structures of the Spermatic Cord to pass to and from the testis to the abdomen in the male.
- Normal spermatogenesis takes place only if the testis leaves the abdominal cavity to enter a cooler environment in the scrotum.
- In the female, the smaller canal permits the passage of the Round Ligament of the uterus from the uterus to the labium majus.
- In both sexes, the canal transmits Ilioinguinal Nerve.

ingrinal conal ← بوا ال
spermatic cord برا ال

ملاحظة

Mechanics of Inguinal Canal

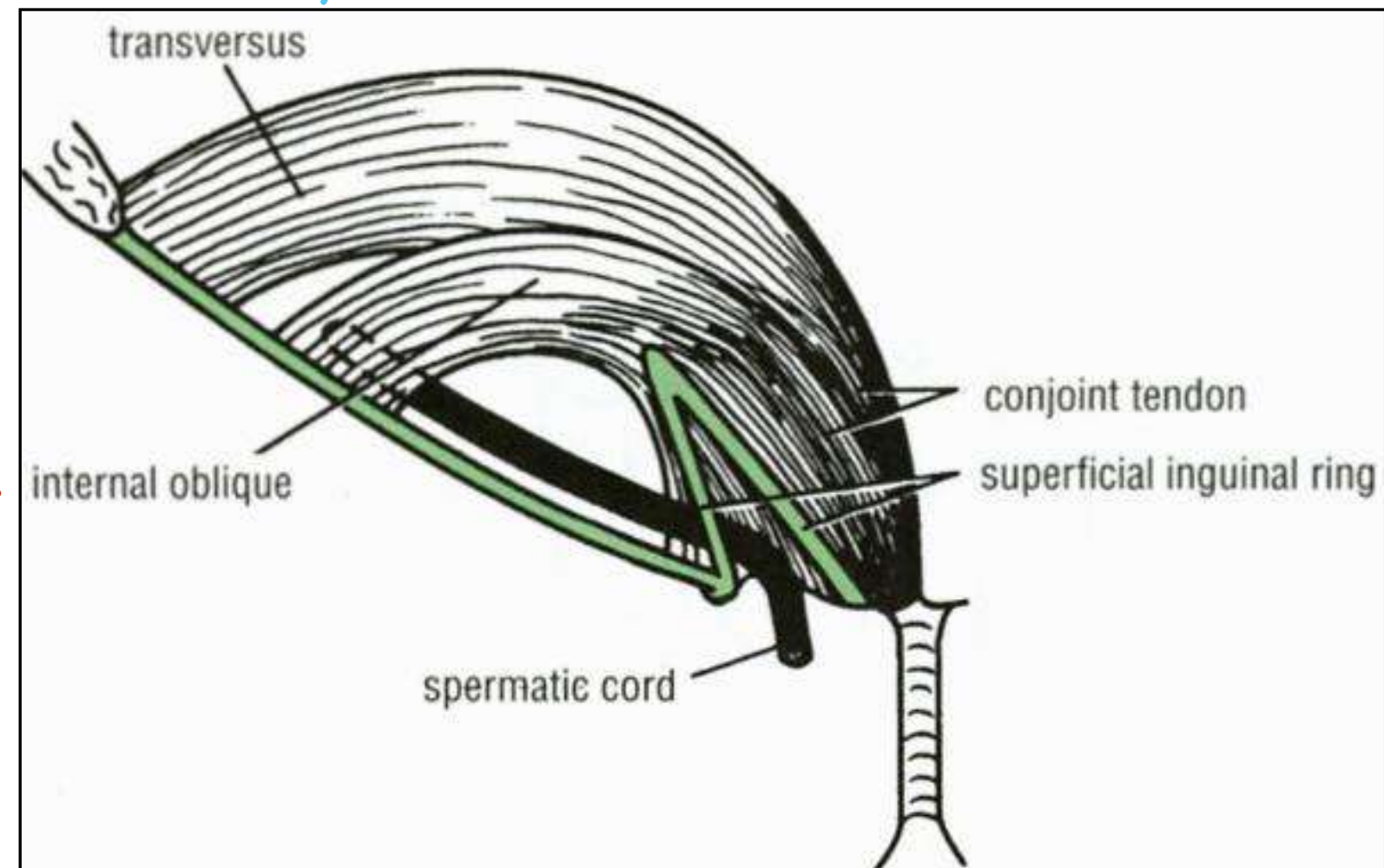
The presence of the inguinal canal in the lower part of the anterior abdominal wall in both sexes constitutes a potential weakness, It is interesting to consider how the design of this canal attempts to decrease this weakness.

defect من عباة deep ring
 superficial inguinal ring
 يعني منطقة ضعيفة

■ Except in the Newborn infant, the canal is an oblique passage with the weakest areas, namely, the superficial and deep rings, lying some distance apart.

■ The anterior wall of the canal is reinforced by the fibers of the internal oblique muscle immediately in front of the deep ring.

(posterior wall Conjoint Tendon Fascia Transversalis) : يعني دالحا : superficial inguinal ring
 (Anterior wall external apertures internal apertures) : يعني هتي : deep ring



arch

يسير
 straight

أحيانا تآ بزيء ال intra abdominal pressure
 hernia

hernia على الرغصه - نقطة معينة؟
mechanism بصير

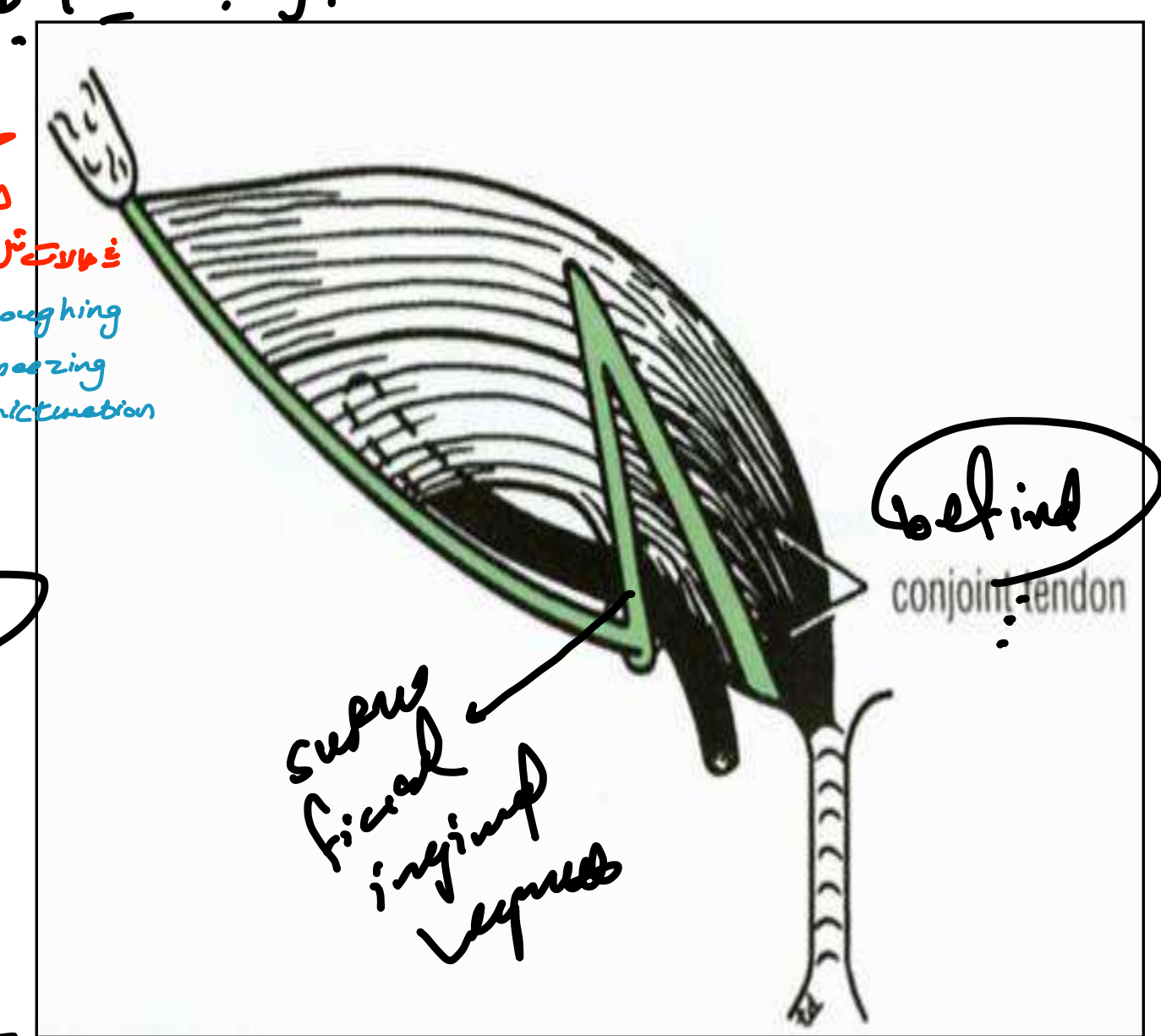
ليش ما بصير معنا
له عشان

في arch ← superior
منه لما تطلع منه تمشي بصير؟
له زانه عنده ال muscle بتعمل contracting
ال . arch .
فلاش بده ي لقائ

The posterior wall of the canal is reinforced by the Strong Conjoint Tendon immediately behind the superficial ring.

On coughing and straining, the arching lowest fibers of the internal oblique and transversus abdominis muscles contract, flattening out the arched roof so that it is lowered toward the floor, The roof may actually compress the contents of the canal against the floor so that the canal is virtually closed.

- شرا على
ماله
في حالات مثل
- ① coughing
 - ② sneezing
 - ③ micturition



الشرح =
ال arch تابع ال canal ال ال ال superior wall
في حالة ال coughing ال straining
بصير straight فتبند بعضه بتغطي كل ال
يعني بتبصر ال canal ← closed

Structures Pass Through Inguinal Canal

- **In males:** spermatic cord & its coverings + ilioinguinal nerve.
- **In females:** round ligament of uterus + ilioinguinal nerve.
- **The classic description of contents of spermatic cord in males:**

Contents: artery to vas deferens, testicular artery, cremasteric artery

- **3 fascial layers:** external spermatic, cremasteric, and internal spermatic fascia

- **3 other structures:** pampiniform plexus, vas deferens (ductus deferens), testicular lymphatics;

Genitofemoral nerve: genital branch of the genitofemoral nerve (L1+2), sympathetic and visceral afferent fibers, ilioinguinal nerve (N.B. outside spermatic cord but travels next to it)

- Ilioinguinal nerve passes through the superficial ring to descend into the scrotum, does not formally run through the canal.

مع ال cord
دليل جوار ال cord
هو ال inguinal canal

superior for the cord
canal

ل vas deferens
ل testis
ل spermatic cord

external oblique aponeurosis
internal oblique aponeurosis

Transversus abdominis
Scrotum

veins
testis
varicocele

separated females
separated males
spermatic cord

superficial inguinal ligament

Genito femoral
thigh (femoral)
branch of genital
nerve
canal
femoral
nerve

بطح ال

al ilioinguinal nerve
deep ring
roof of the canal.

Important surface anatomy

- Mid point of inguinal ligament:

- Midway between ASIS and pubic tubercle.
- It is an important surgical landmark of the deep inguinal ring, that lies 0.5 inches above it.
 $\approx 1.3 \text{ cm}$

- Mid-inguinal point: $\rightarrow$ medial to the midpoint of inguinal ligament

- This is half way between ASIS and symphysis pubis
- It is the landmark for the femoral artery.

← بقدر أقصر نبض
← بقدر آخذ عينة من
← تدفق شريان
femoral artery
femoral artery

Internal ring

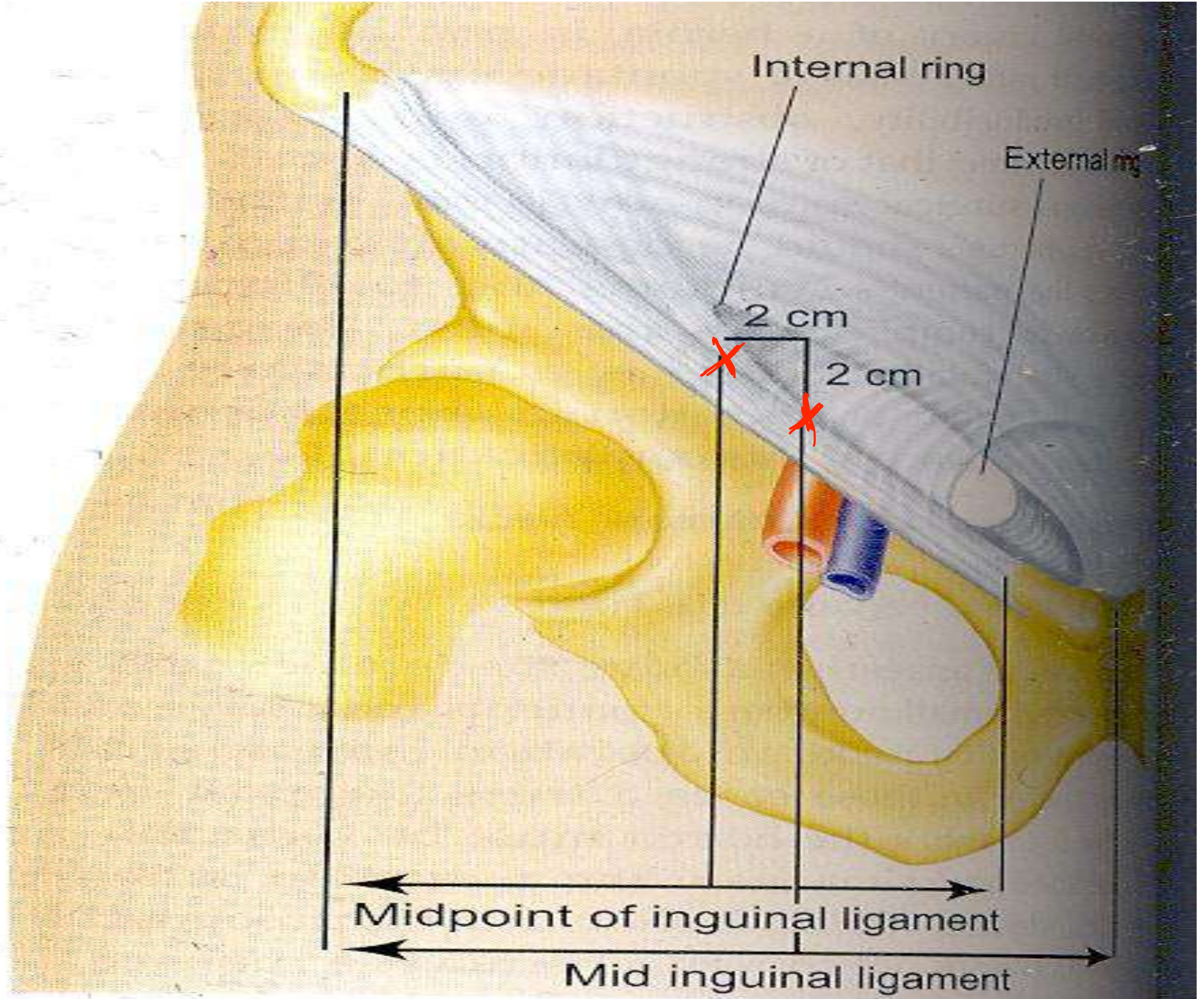
External ring

2 cm

2 cm

Midpoint of inguinal ligament

Mid inguinal ligament



linea semilunaris
= lateral border
of rectus abdominis

بطن مباشر وغير مباشر
direct - indirect

بطن عميق
deep ring

indirect

Inferior
epigastric
artery

direct

لبث خط منقطة في
الغشاء المحيطي
arcuate line
منها في
الغشاء المحيطي
transversalis
sheath
arcuate line

external
common
iliac

Hesselbach's
triangle

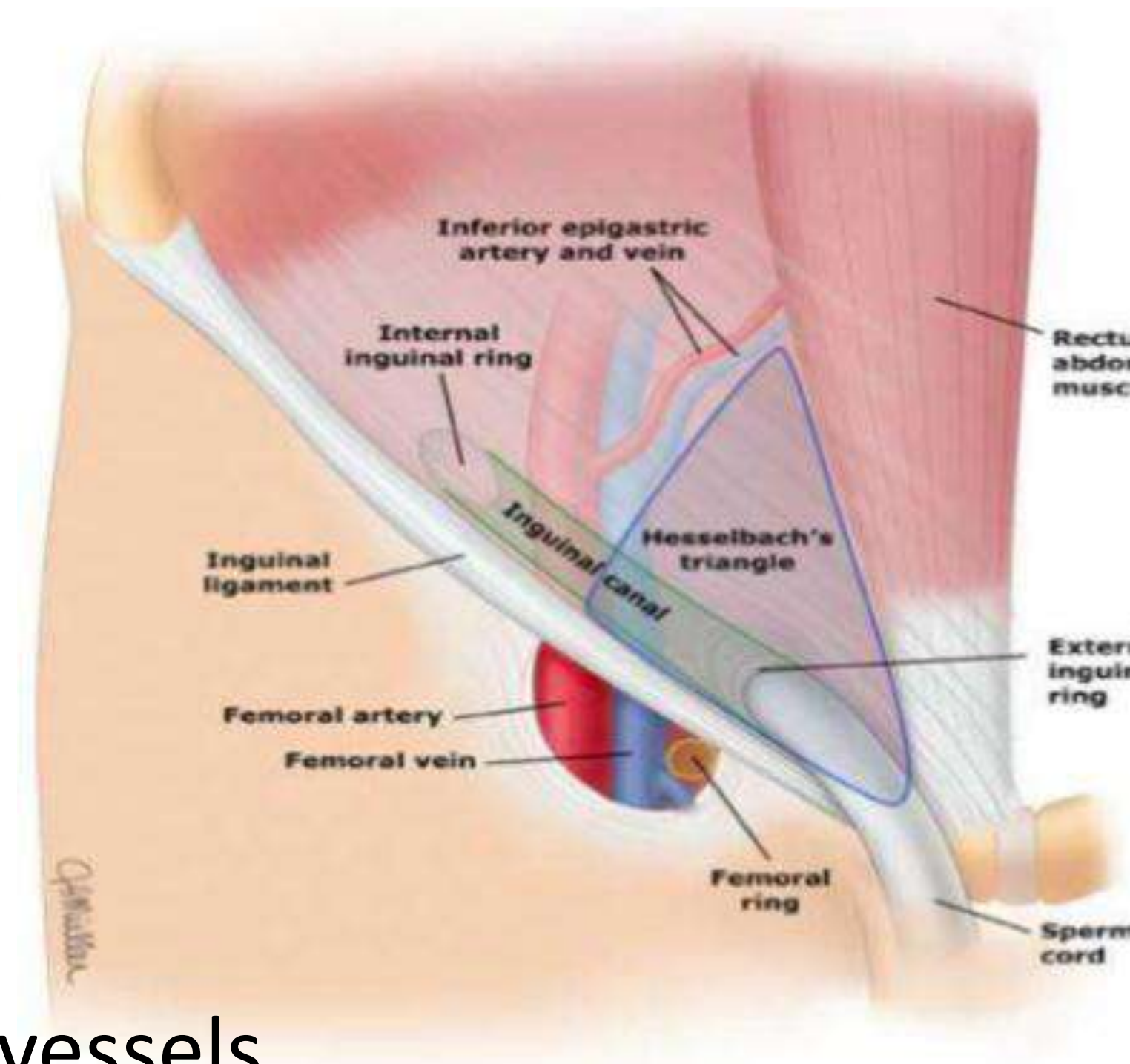
بطن مباشر
direct inguinal canal

بطن عميق
triangle

- lateral: Inferior epigastric artery
- medial: lateral border of rectus abdominis (linea semilunaris)
- inferior: half medial of inguinal ligament

Hesselbach's Triangle

- It is a part of the posterior wall of the inguinal canal.
- It is the triangle through which direct inguinal hernia passes.
- It is bounded by:
 - Laterally: inferior epigastric vessels.
 - Medially: Lateral border of rectus sheath. (*linea semilunaris*)
 - Inferior: inguinal ligament (only medial ½)



ABDOMINAL HERNIA


 A Hernia is the ^{نتوء} protrusion of part of the abdominal contents beyond the normal confines of the abdominal wall.

organs
 intestines
 omentum (منبطقة)
 appendix (زائدة)
 urinary bladder (مذة)
 يغني
 شئ
 سار
 وال
 مذكورة

قـاـجـ المـردـد لـحـاـريـة لـ abdomen

Parts of hernia

sac
 peritoneum
 في جـاـي سـاـك

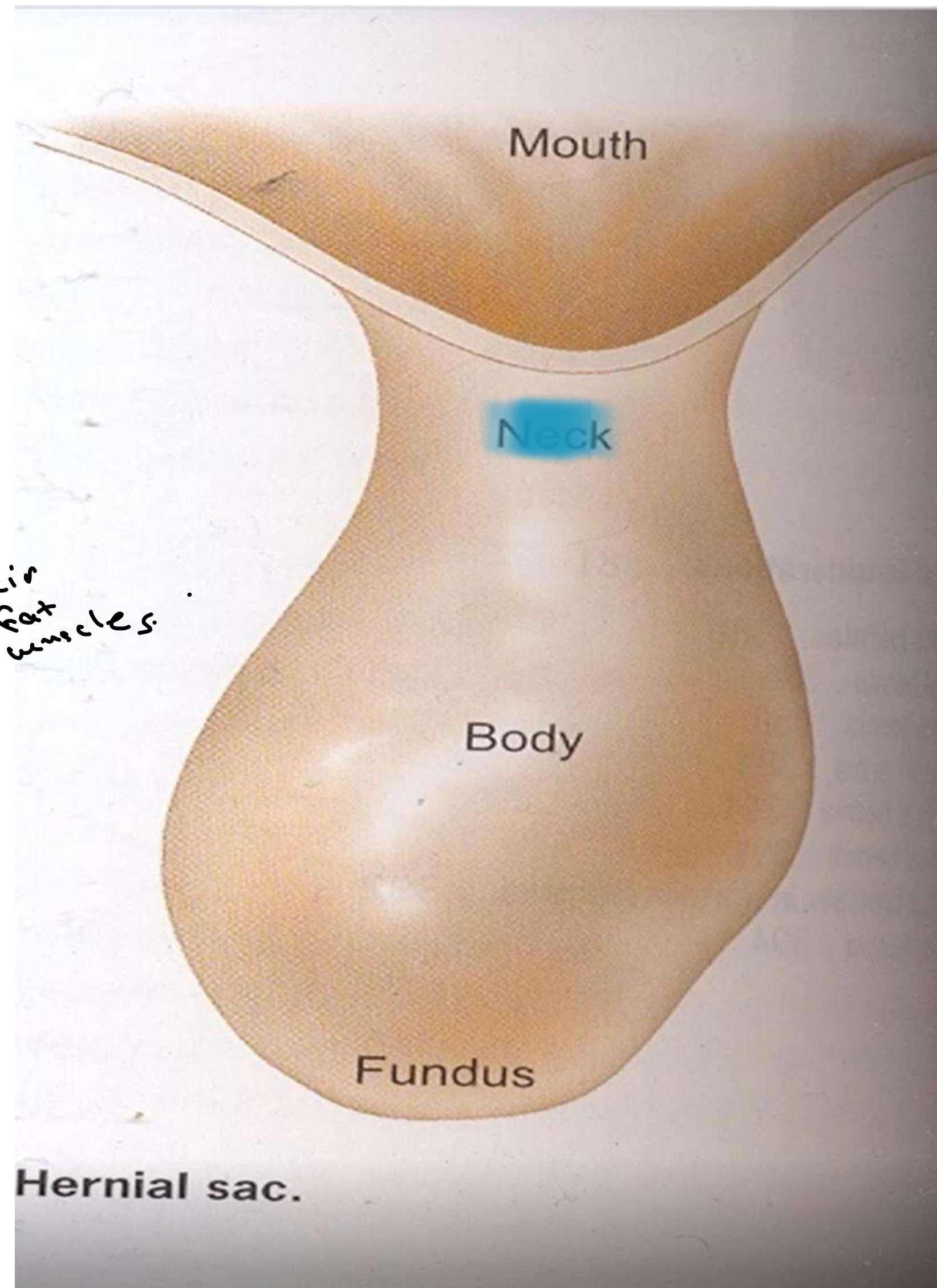
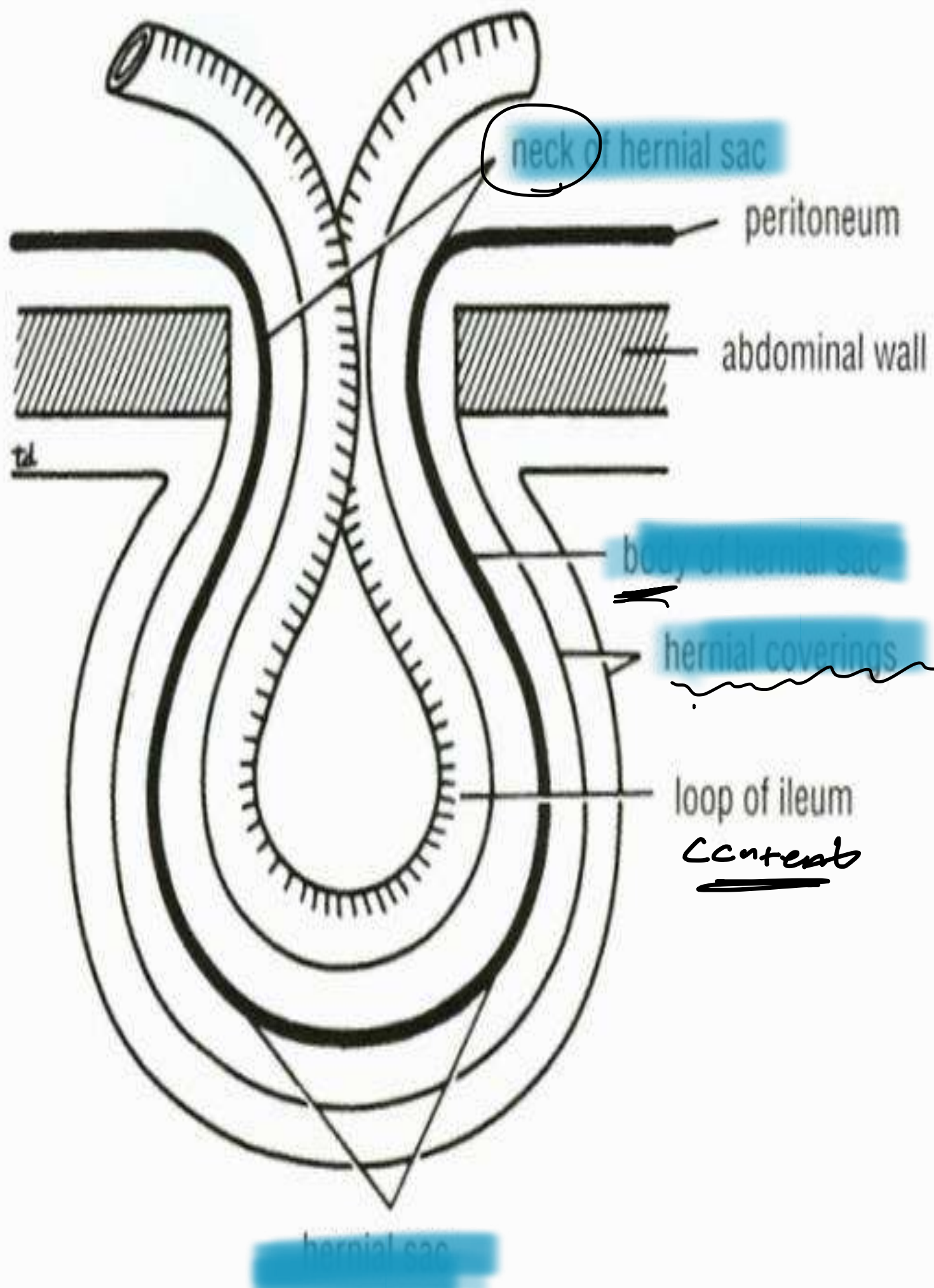
contents of
 the sac
 intestine
 omentum

coverings of
 the sac
 skin, muscles

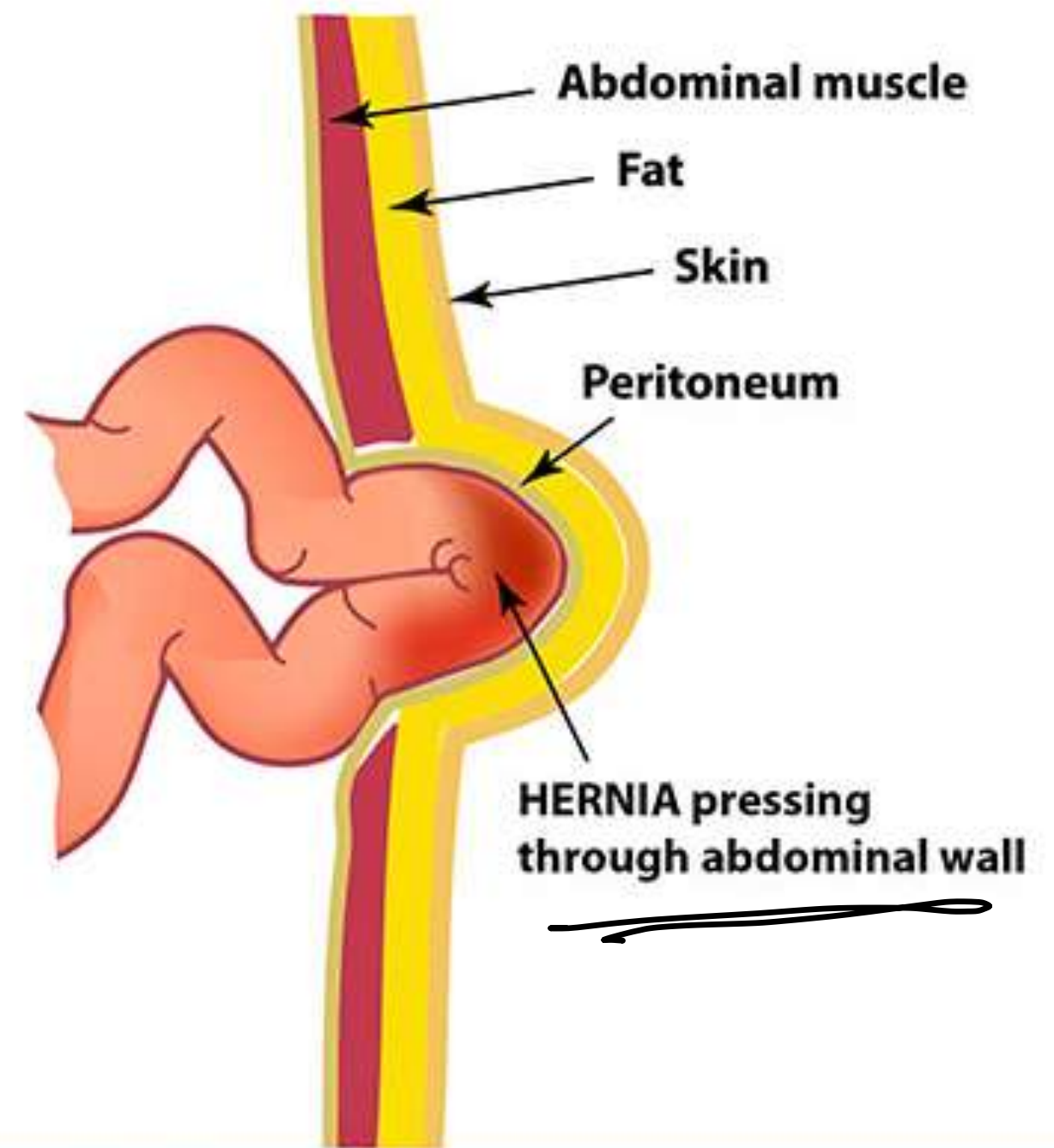
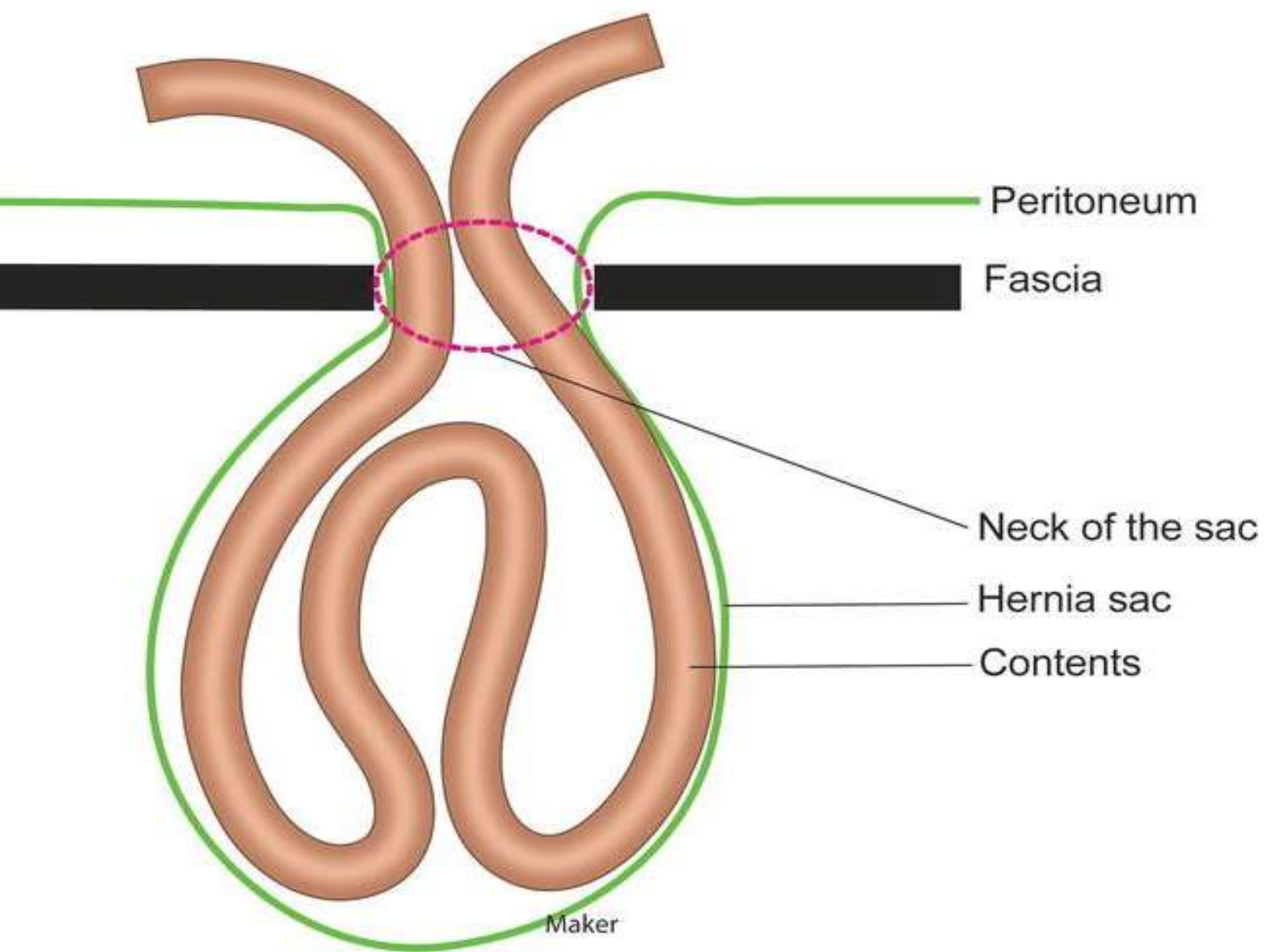
neck

body

hernia
 هو الذي يتميز انخلاع



Anatomy of a Hernia



Abdominal hernia

ABDOMINAL HERNIA

1 inch
above and below
the inguinal ligament

Groin Hernia

1 inch

① Inguinal (indirect or direct) →

فوق
inguinal
ligament

② Femoral. →

تحت
inguinal ligament

Ventral hernias

■ Umbilical (congenital or acquired).

■ Epigastric. →

فوق
umbilicus

■ Separation of the recti abdominis.

(divergence of recti)

■ Incisional hernia. →

سببه فتحة جراحية

linea
alba
على عمق البطن
منقطة

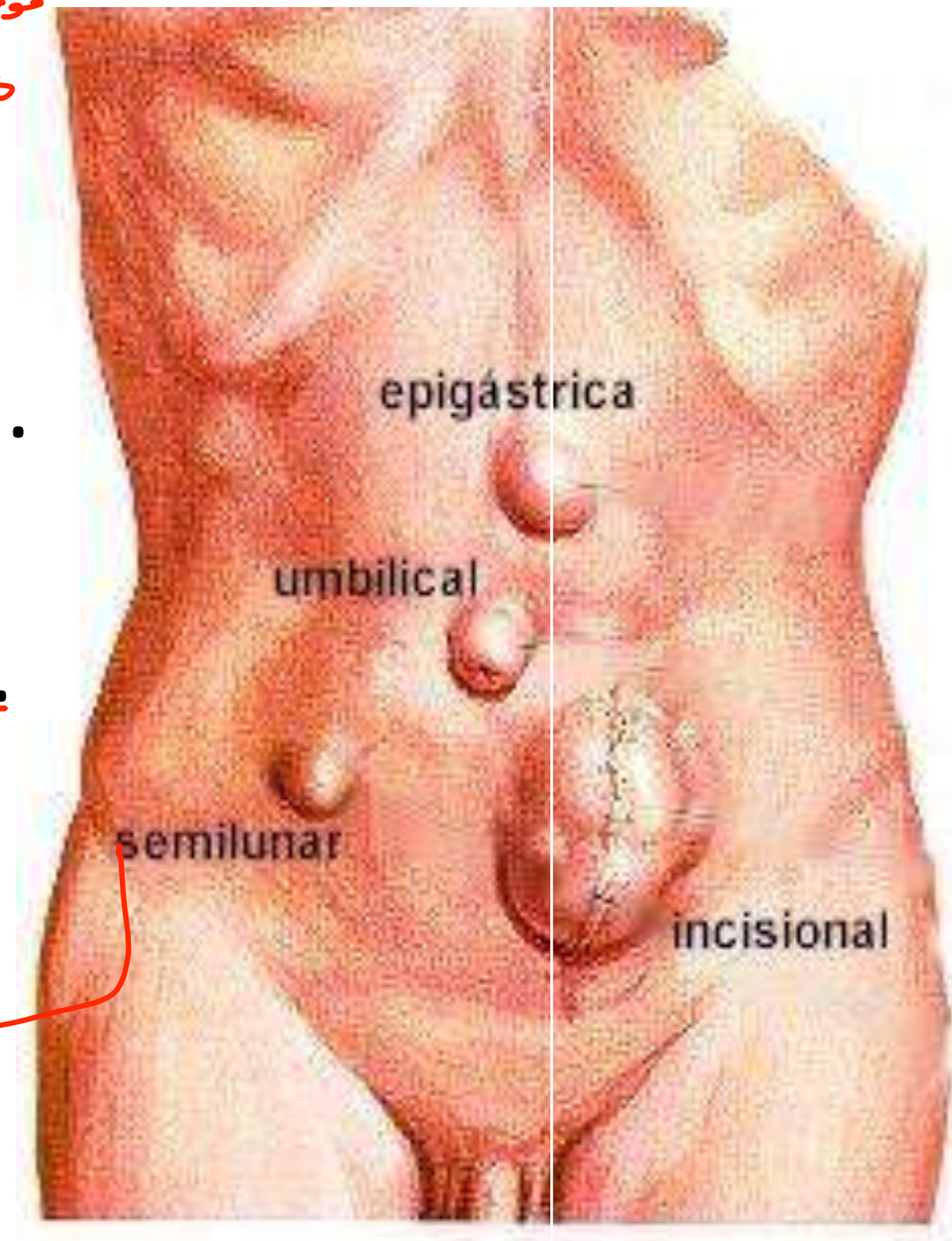
■ Hernia of the linea Semilunaris

rare

rare
جداً (Spigelian hernia) ←

Internal hernia.

■ Diaphragmatic



inguinal canal
 deep ring

INDIRECT INGUINAL HERNIA

congenital
 acquired

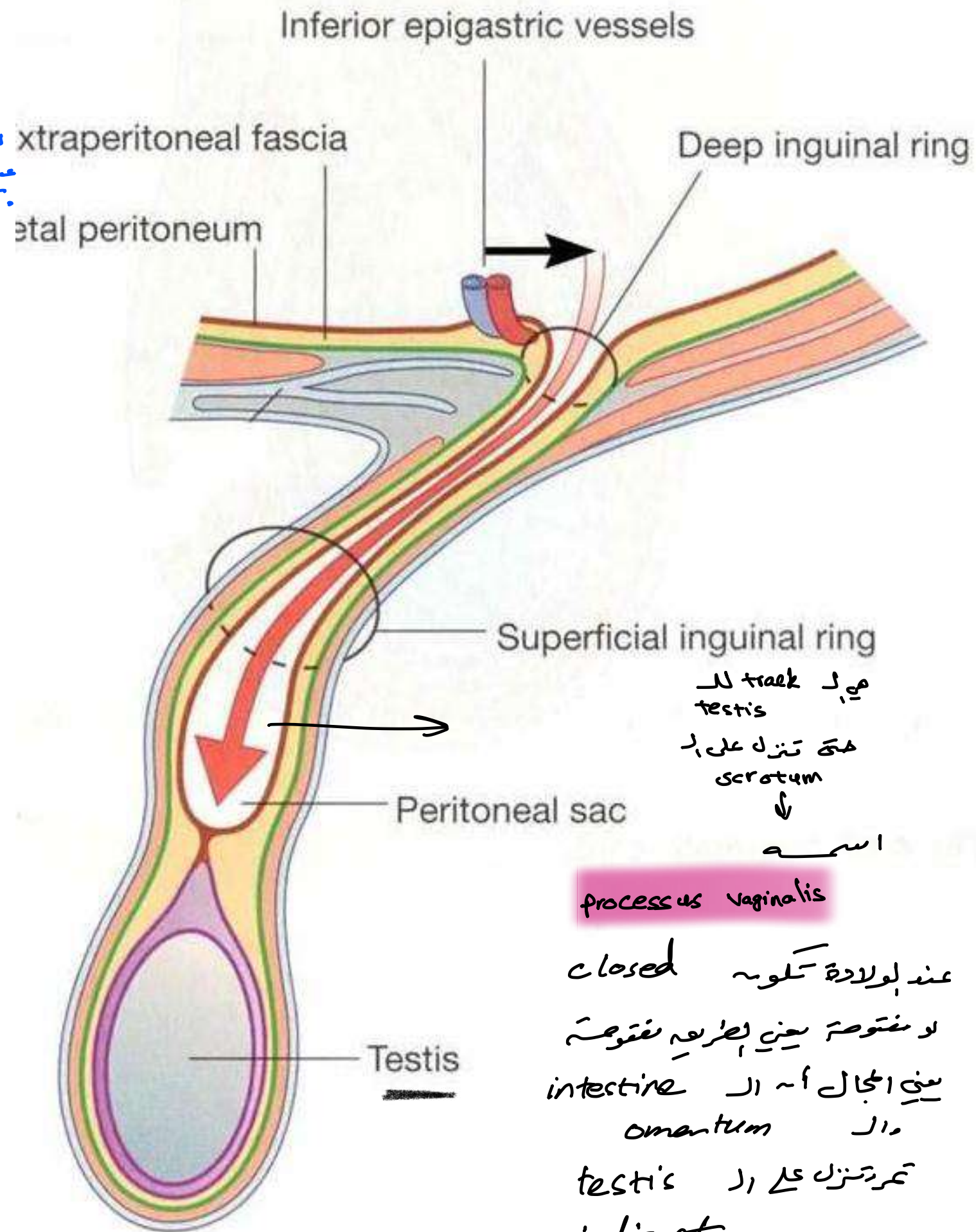
is the **most common form** of **hernia** and is believed to be **congenital** in origin.

The **Hernial sac** is the **remains of the processus vaginalis**.

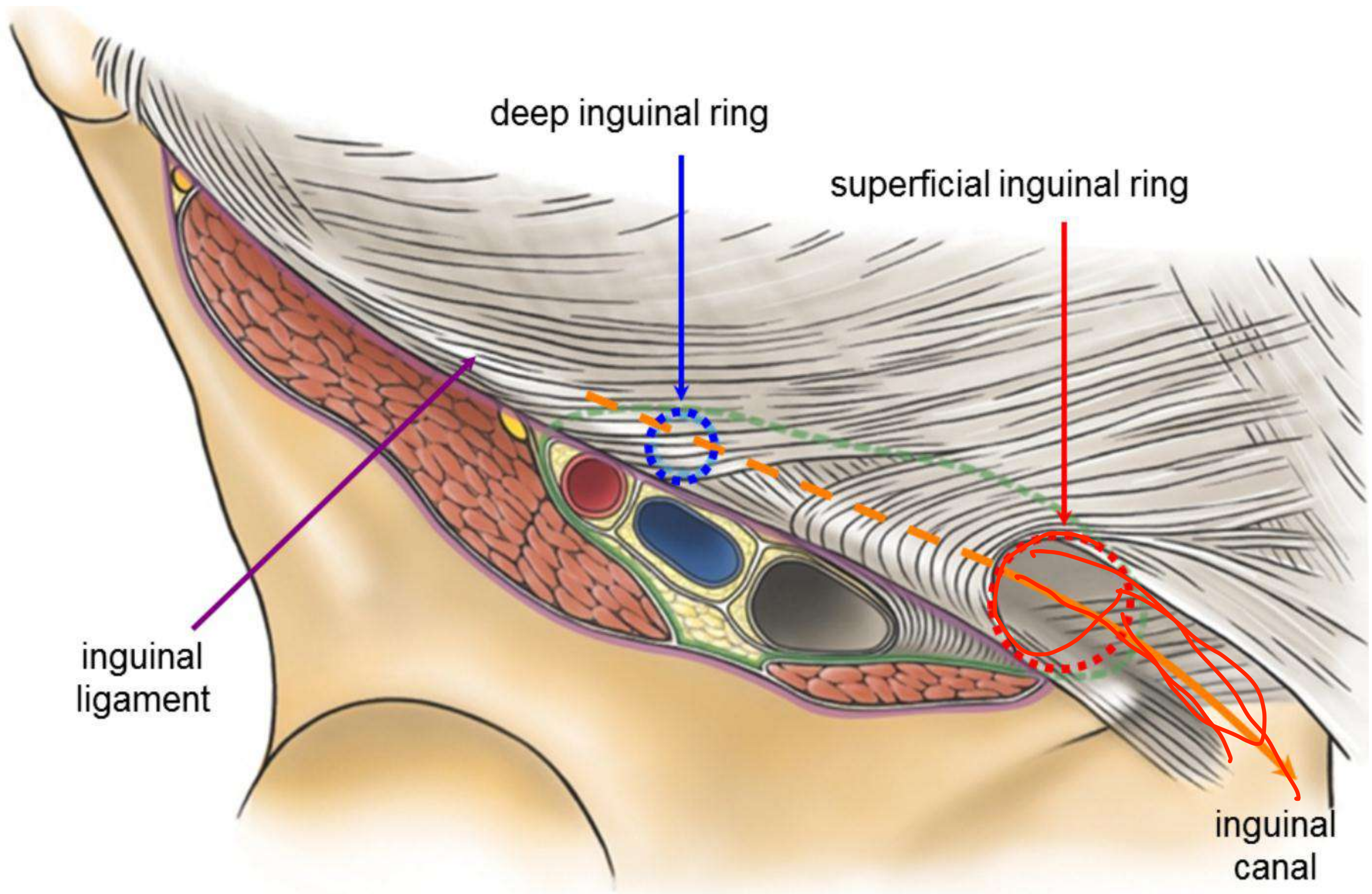
It follows that the sac enters the **inguinal canal** through the **Deep Inguinal Ring** lateral to the **Inferior epigastric vessels**.

derma
 artery

ليش؟
 لانها بيبي
 عند الصغرة
 كتبت



testis
 scrotum
 processus vaginalis
 closed
 intestine
 omentum
 testis
 indirect



INDIRECT INGUINAL HERNIA



- It may extend part of the way along the canal or the full length, as far as the superficial inguinal ring.

hernia عرب جي ڍل

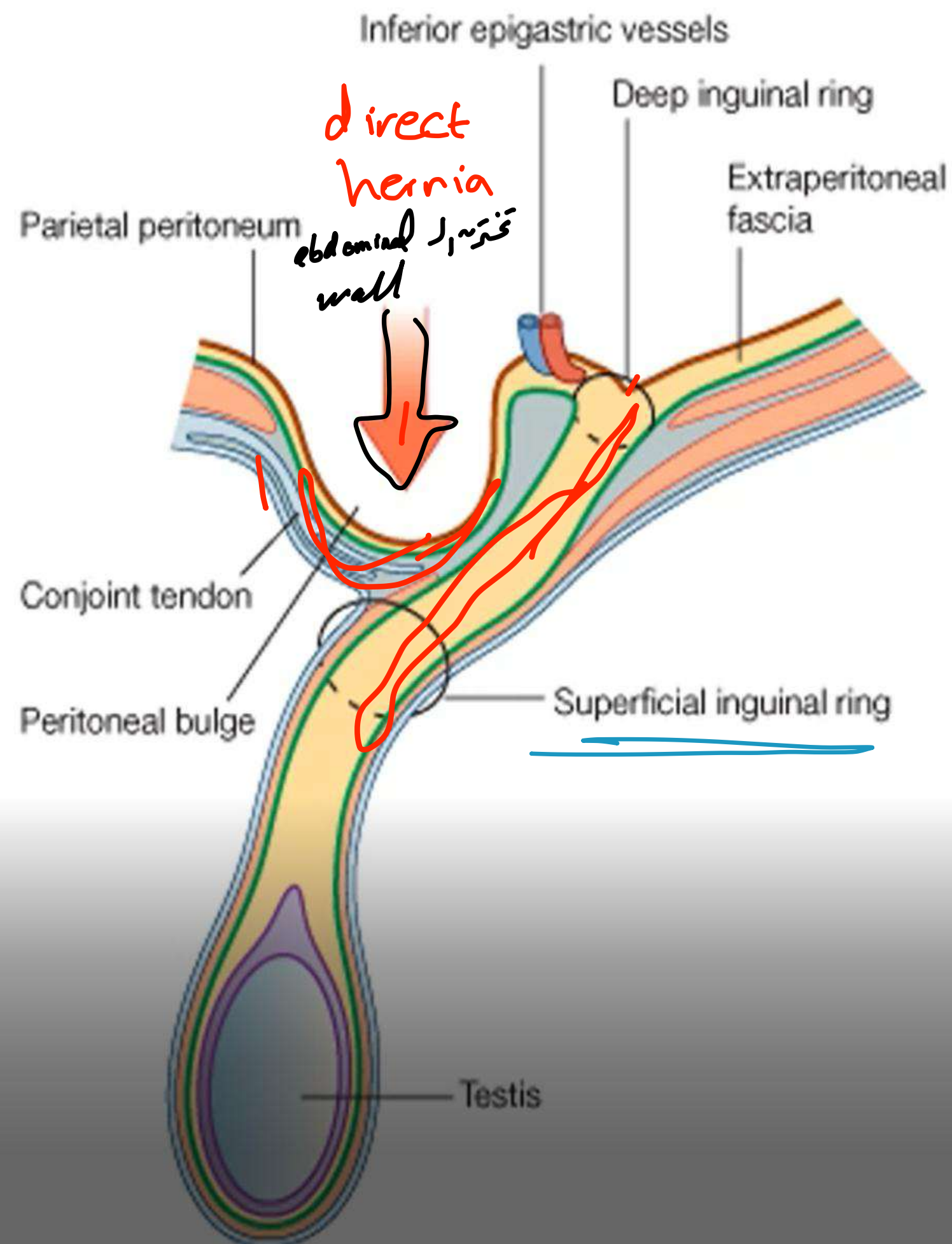
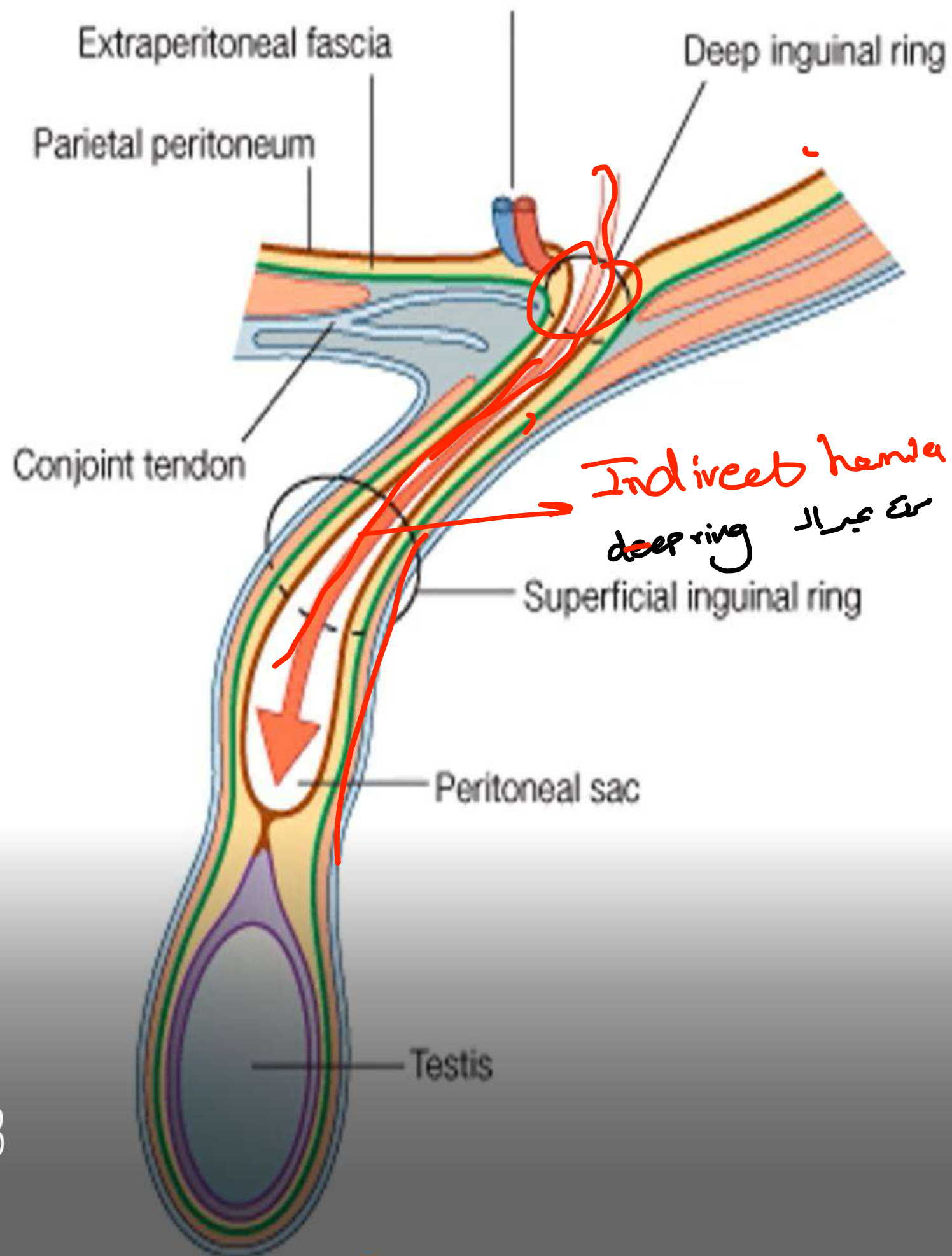
- If the processus vaginalis has undergone no obliteration, then the hernia is complete and extends through the superficial inguinal ring (*above and medial to the pubic tubercle*) down into the scrotum.

مڪمل
ديغزانه

ilio-scrotum hernia د عذما ٽڪر

طوق

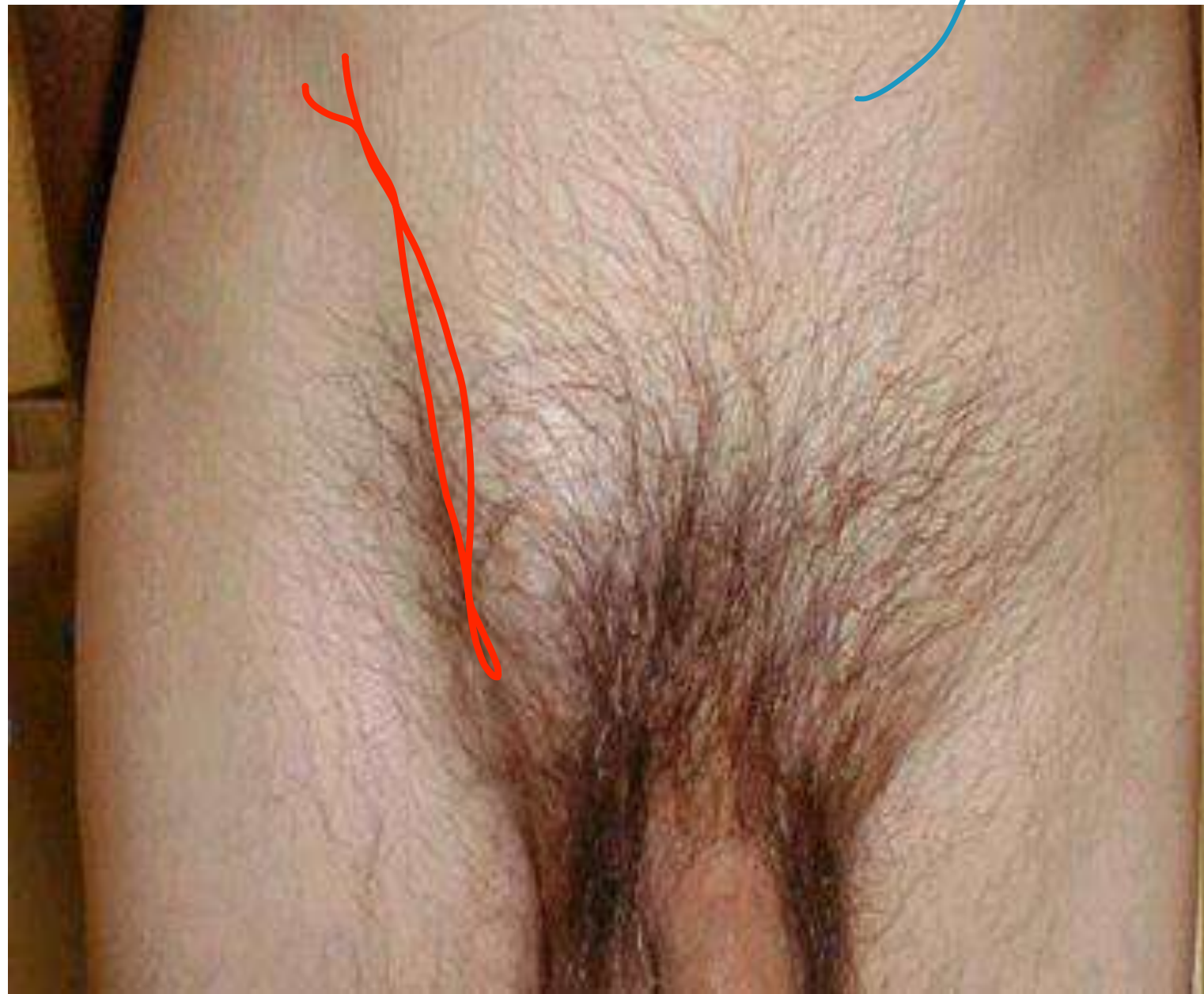
- Under these circumstances the neck of the hernial sac lies at the deep inguinal ring *lateral* to the inferior epigastric vessels.





Rt and Lt indirect Inguinal Hernia

oblique hernia ۱۱ ~ ۱۲
canal ۱۰ ~ ۱۲ cm



سابتیجی congenital ہے اسباب
 weakness of
 abdominal
 wall

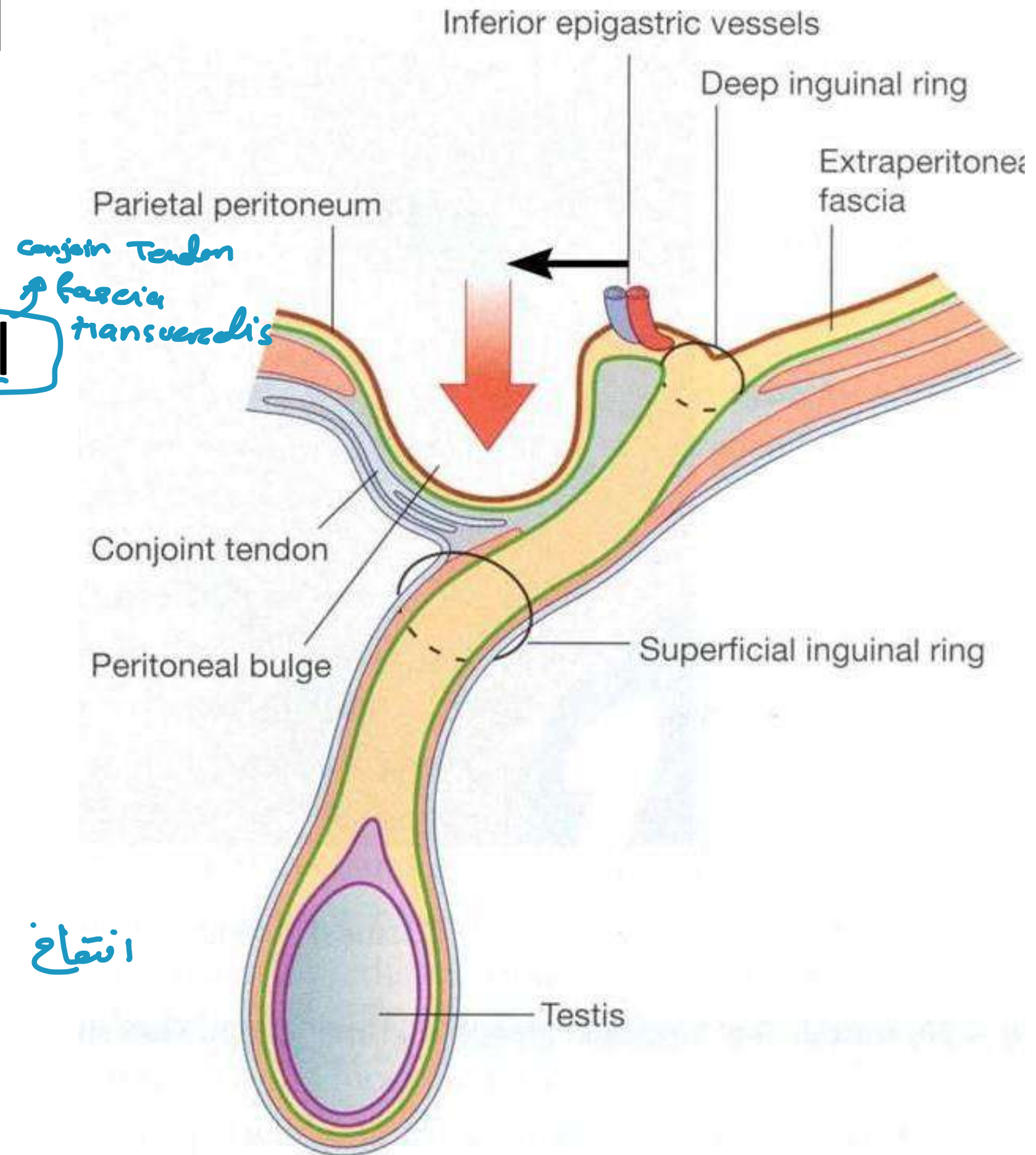
DIRECT INGUINAL HERNIA

■ About 15% of all inguinal hernias.

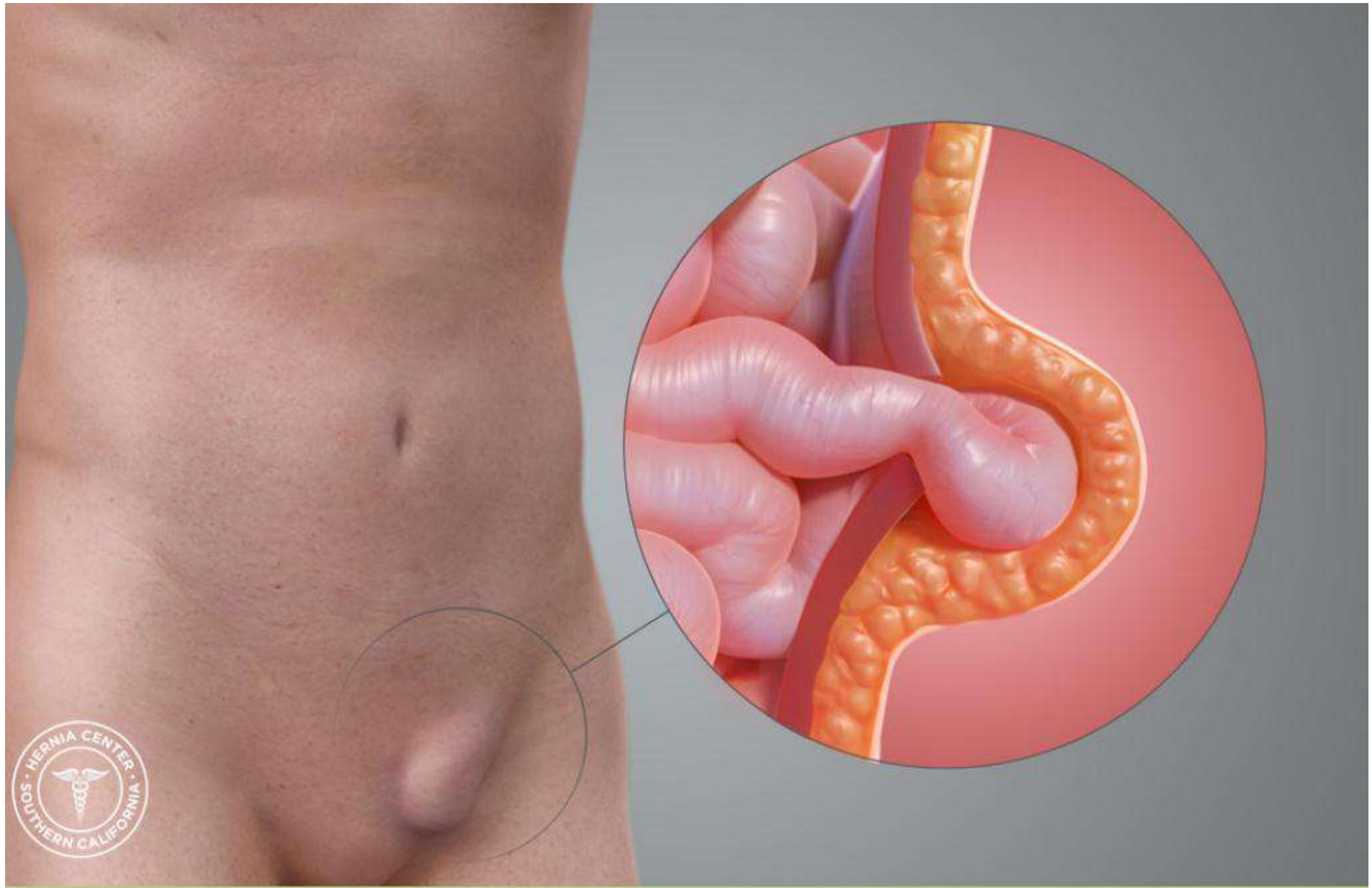
■ The sac of a direct hernia bulges directly anteriorly through the posterior wall of the inguinal canal

medial to the inferior epigastric vessels.

■ Because of the presence of the strong conjoint tendon this hernia is usually nothing more than a Generalized bulge; therefore, the Neck of the hernia sac is wide.



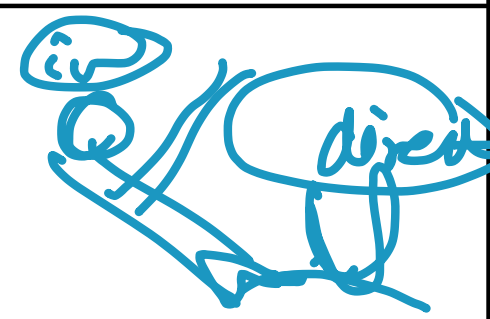
DIRECT INGUINAL HERNIA



صعب تطبع، صعب ترشح

	INDIRECT	DIRECT
Age	<u>Usually young</u>	<u>Old</u>
Cause	May be ^{لأنه ممكن يكون في} <u>congenital</u> _{acquired}	Acquired
Bilateral	20%	50% ^{لأنه منخفض} _{الضغط يبجي} _{عنه، ليوتيه}
Protrusion on cough ^{لما تبجي تطلع}	<u>oblique</u>	<u>Straight</u>
Appearance on standing _{لما تقف}	Does not reach <u>full size</u> <u>immediately</u> ^{لأنه ممكن} _{عنه} _{تطلع لذن} _{ضيقه}	Does reach <u> </u> _{عالمه بظفر}
Reduction on lying down	May not reduce	Reduce

لجرجج hernia

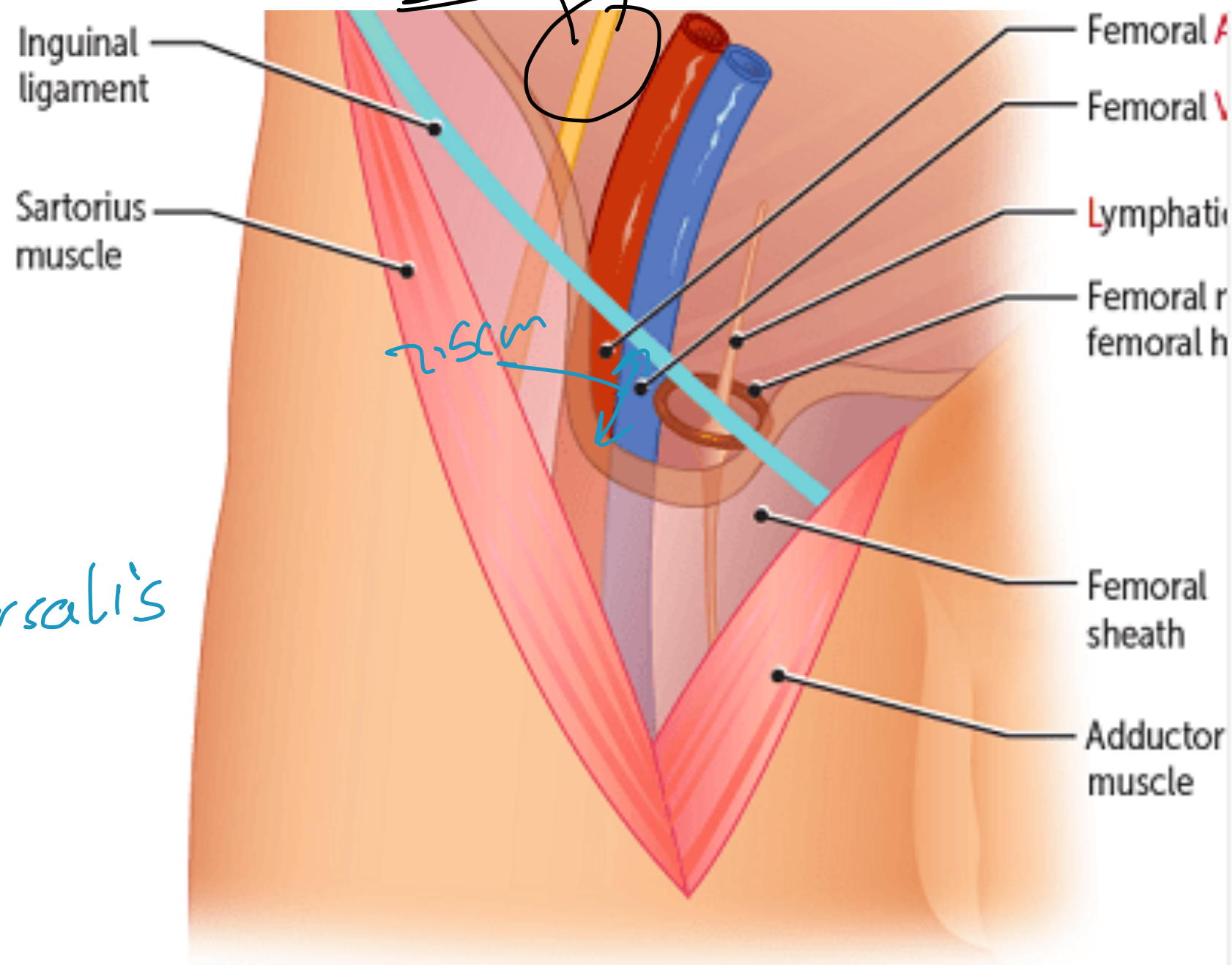
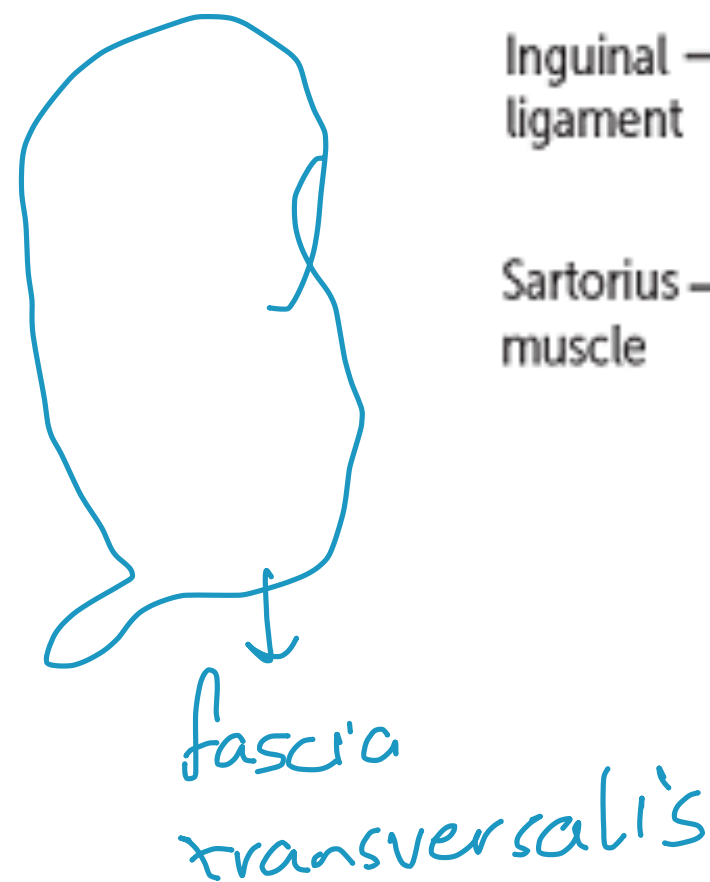
	INDIRECT	DIRECT
Neck of sac	<u>Narrow</u>	<u>Wide</u>
strangulation بطل يصل دم له content إلى hernia sac لها تخنق	Not ^(common) <u>uncommon</u>	Unusual شعيرة على
Relation to inferior epigastric	<u>lateral</u> 	<u>Medial</u>
Descent to scrotum تترى مع Scrotum	Common	Rare
<u>Internal ring test</u> هو طريقة للتمييز الـ hernia عميق؟	<u>Control</u>	<u>No control</u>

له تفرج الـ hernia مكانا بعدية مجدد الـ deep ring بعدين يقول
 للمريض كى اذا ضمت hernia ← direct يعني متقدم medial
 ما طلعت ← indirect

FEMORAL SHEATH

is a protrusion of the fascial envelope lining the abdominal walls and surrounds the femoral vessels and lymphatics for about (2.5 cm) below the inguinal ligament.

Lateral → L. nerve لکھنے والے nerves



3 compartments

Anterior superior iliac spine
Iliacus fascia
Inguinal ligament
Femoral artery
Femoral vein
Fascia lata

Femoral nerve
Iliacus muscle
Psoas tendon
Psoas minor tendon
Iliopectineal arch
Deep inguinal lymph node (Cloquet node)
Pectineal ligament
Femoral ring
Lacunar ligament
Fascia lata
Femoral sheath
Deep lymphatic vessel
Saphenous opening
Great saphenous vein

* الفتحة تسمى
femoral ring
* هي نفق
medial compartment
of the
femoral
sheath

lateral
intermedial
medial

SARTORIUS

ADD. LONGUS

FEMORAL SHEATH

حوالي ٢٠ سم

mid inguinal point

- ① • The femoral artery, as it enters the thigh below the inguinal ligament, occupies the lateral compartment of the sheath,
- ② • The femoral vein, which lies on its medial side and is separated from it by a fibrous septum, occupies the intermediate compartment.
- ③ • The lymph vessels, which are separated from the vein by a fibrous septum, occupy the most medial compartment.

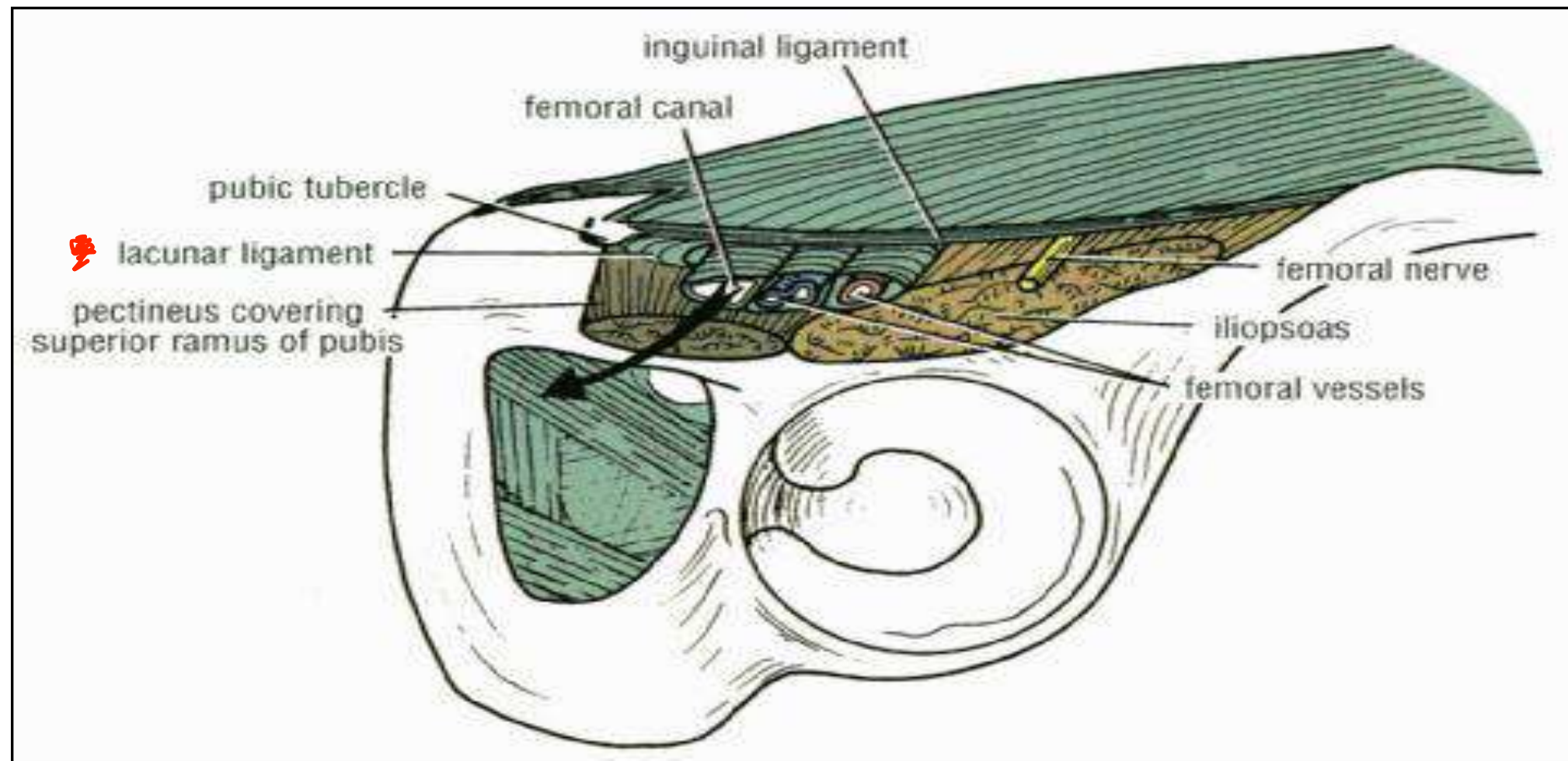
femoral artery

medial femoral

منقار

! ring

lacunar ligament



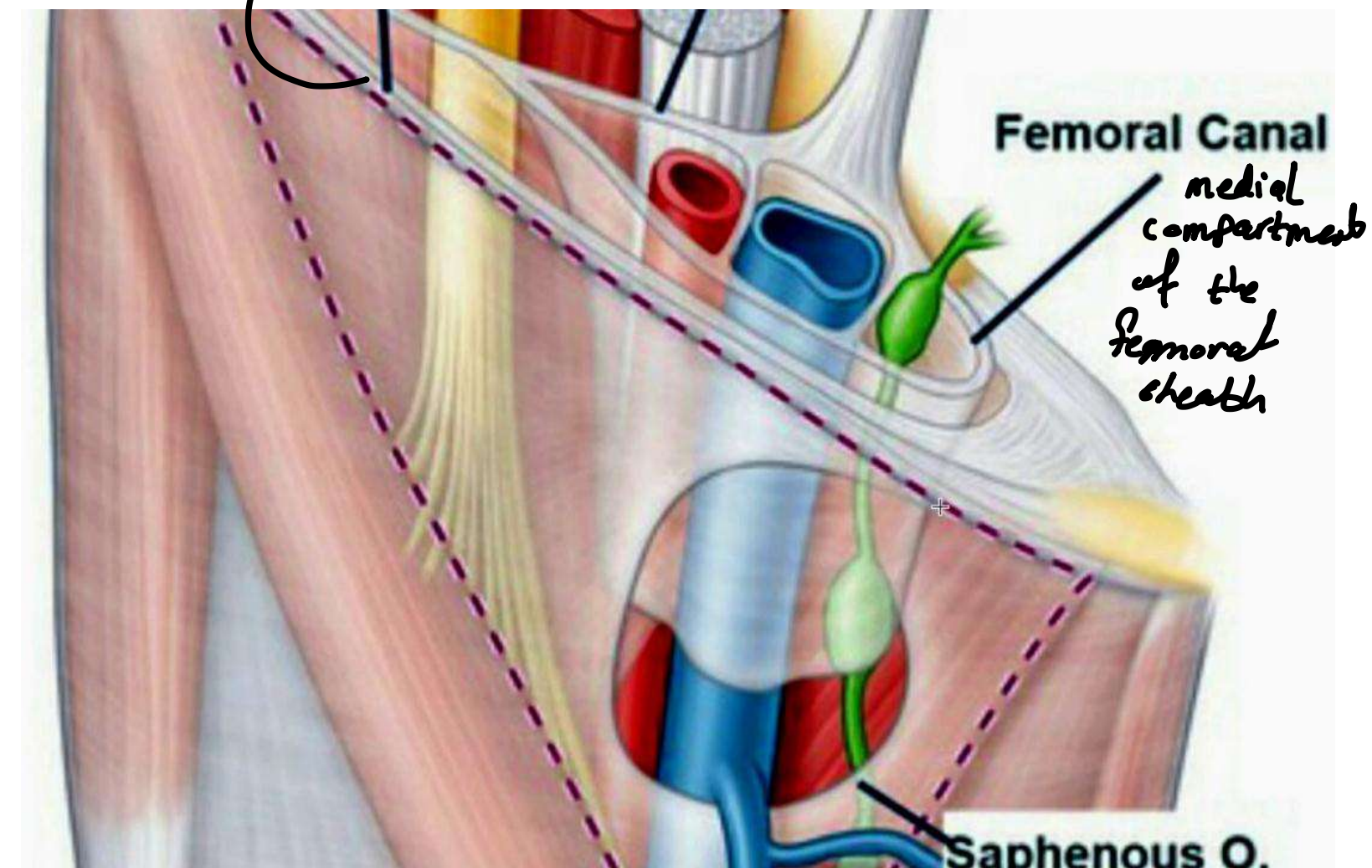
medial compartment
من نفوس
فemorol sheath
ال
lymphatics.

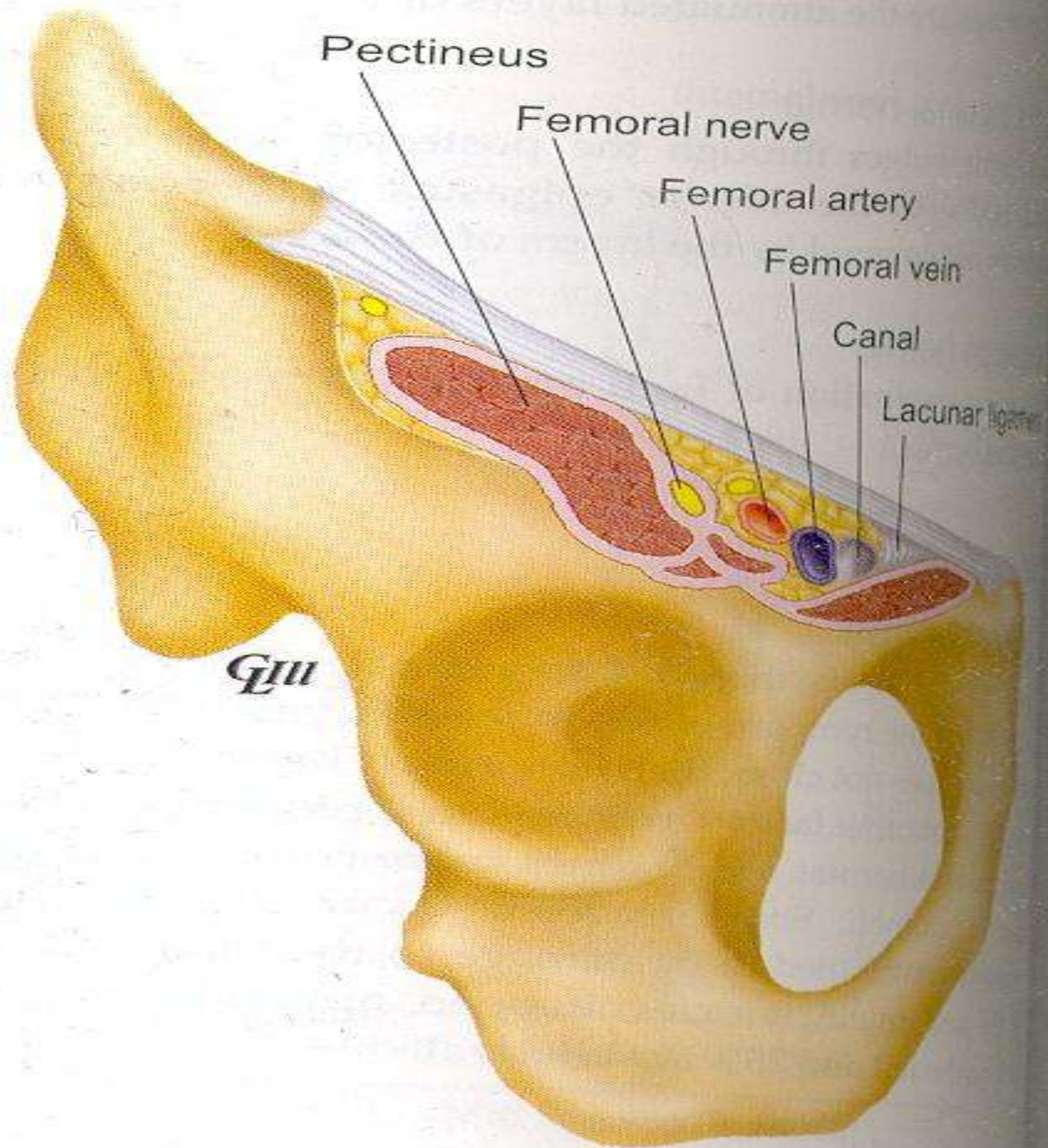
FEMORAL CANAL

- The femoral canal, the compartment for the lymphatics, occupies the medial part of the sheath.
- It is about (1.3 cm) long, and its upper opening is referred to as the Femoral Ring.

femorol
canal

inguinal Ligament

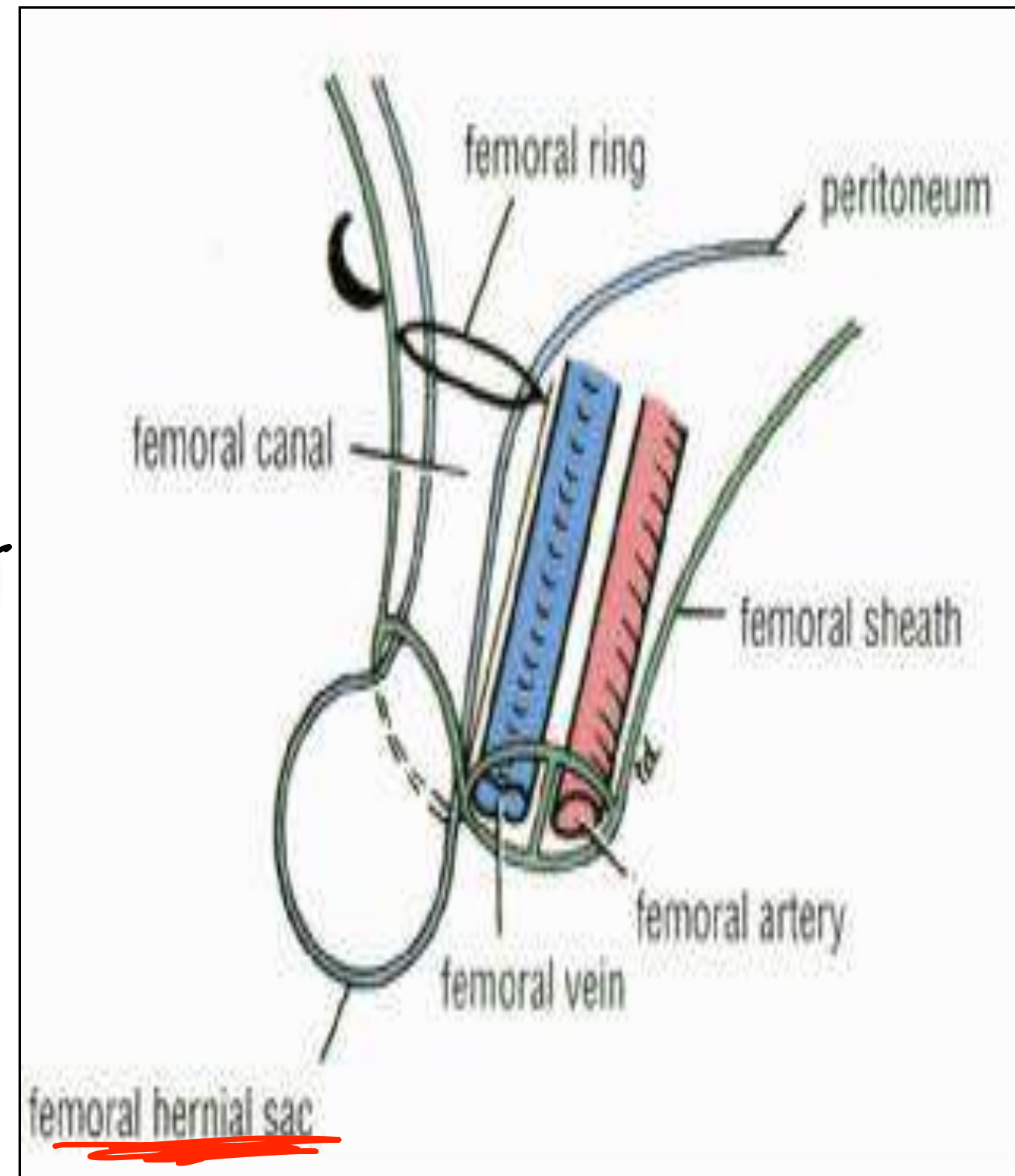


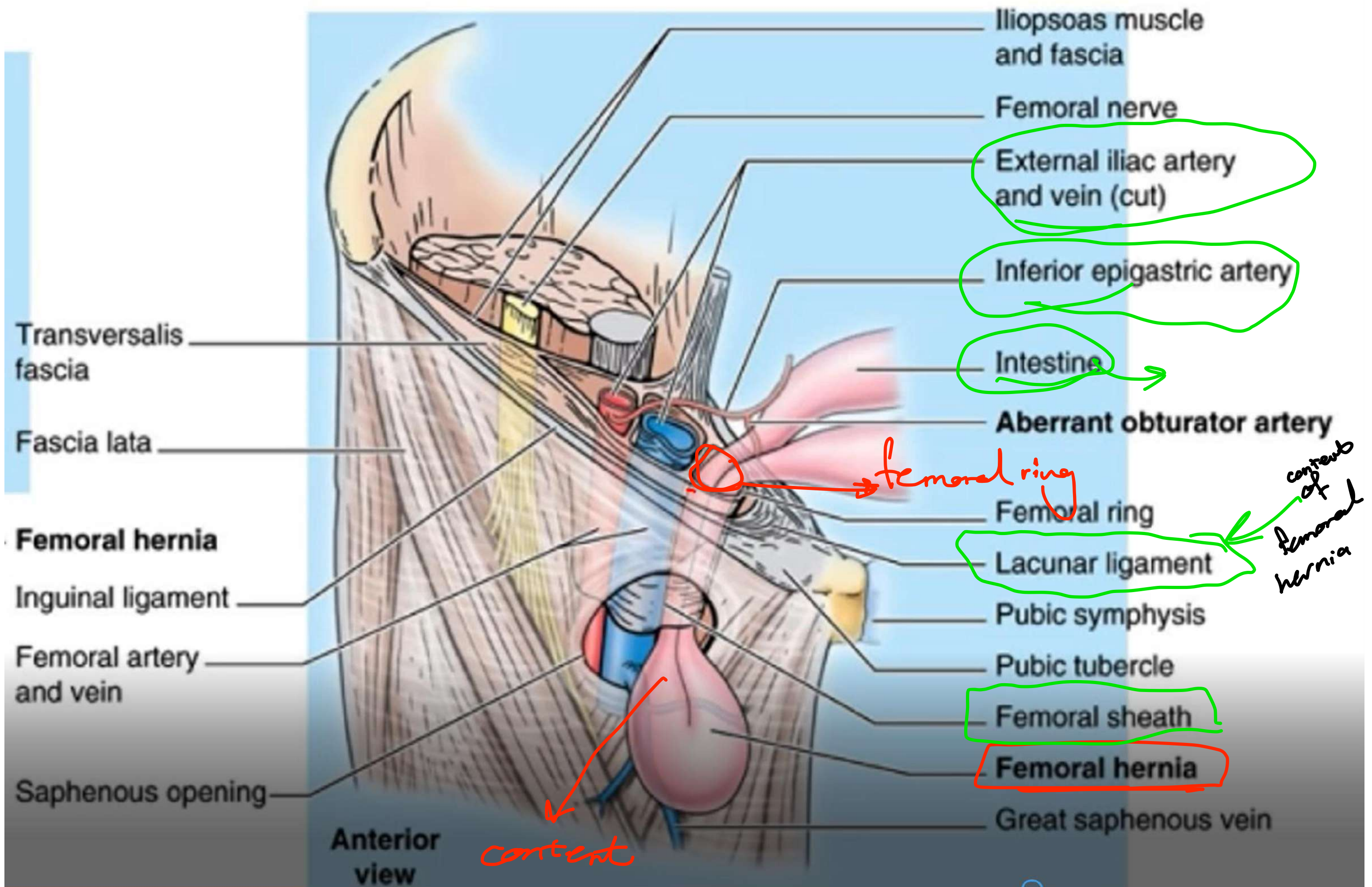


FEMORAL HERNIA

- The hernia sac descends through the femoral canal within the femoral sheath, creating a femoral hernia.
- A femoral hernia is More Common in Women than in men (possibly because of a wider pelvis and femoral canal).
- The hernial sac passes down the femoral canal, pushing the femoral septum before it.

کلمه برضوا
indirect
hernia
female
♀





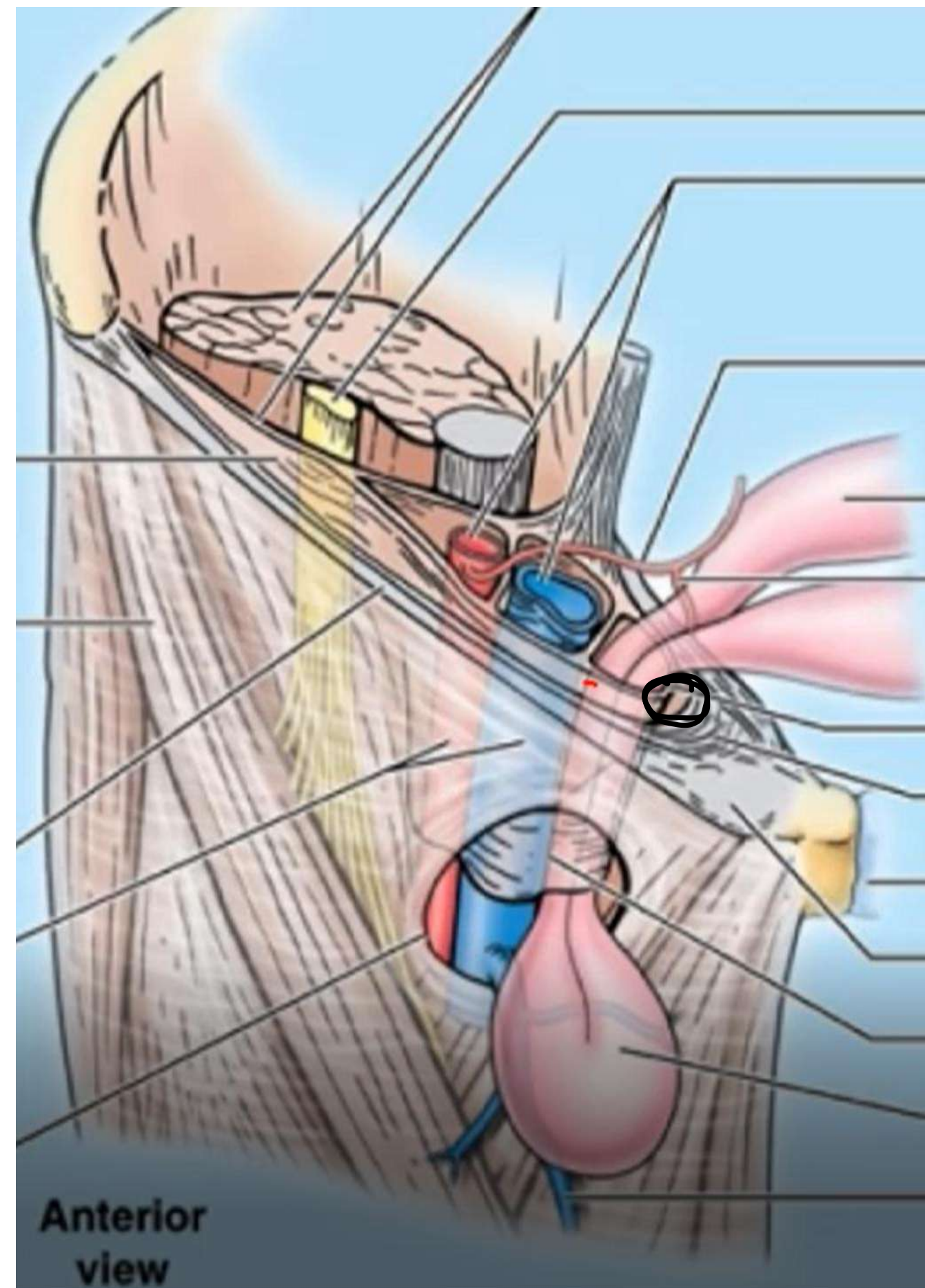
FEMORAL HERNIA

On escaping through the lower end, it expands to form a swelling in the upper part of the thigh deep to the deep fascia.

↓
المنزلة

With further expansion, the hernial sac may turn upward to cross the anterior surface of the inguinal ligament.

↑
أكبر



FEMORAL HERNIA

آی عضو خافی به داخل شکم intestines small

- The **neck** of the sac is **Narrow** and lies at femoral ring.
- Once an abdominal **viscus** has passed through the **neck** into the body of the sac, it may be difficult to push it up and return it to the abdominal cavity (**Irreducible Hernia**).
- Furthermore, after straining or coughing, a piece of bowel may be forced through the neck and its blood vessels may be compressed by the femoral ring, seriously impairing its blood supply (**Strangulated hernia**).
- A femoral hernia is a dangerous disease and **Should Always be Treated Surgically.**

صعب تر جیع (reducability)

بالکای
ع
یصر