

وسهلا

أهلا



الأستاذ الدكتور يوسف حسين

أستاذ التشريح وعلم الأجنة - كلية الطب - جامعة الزقازيق - مصر

رئيس قسم التشريح و الأنسجة و الأجنة - كلية الطب - جامعة مؤتة - الأردن

مساعد العميد لشؤون الطلاب والامتحانات - كلية الطب - جامعة مؤتة - الأردن

دكتورة من جامعة كولونيا المانيا

Prof. Dr. Youssef Hussein Anatomy اليوتيوب

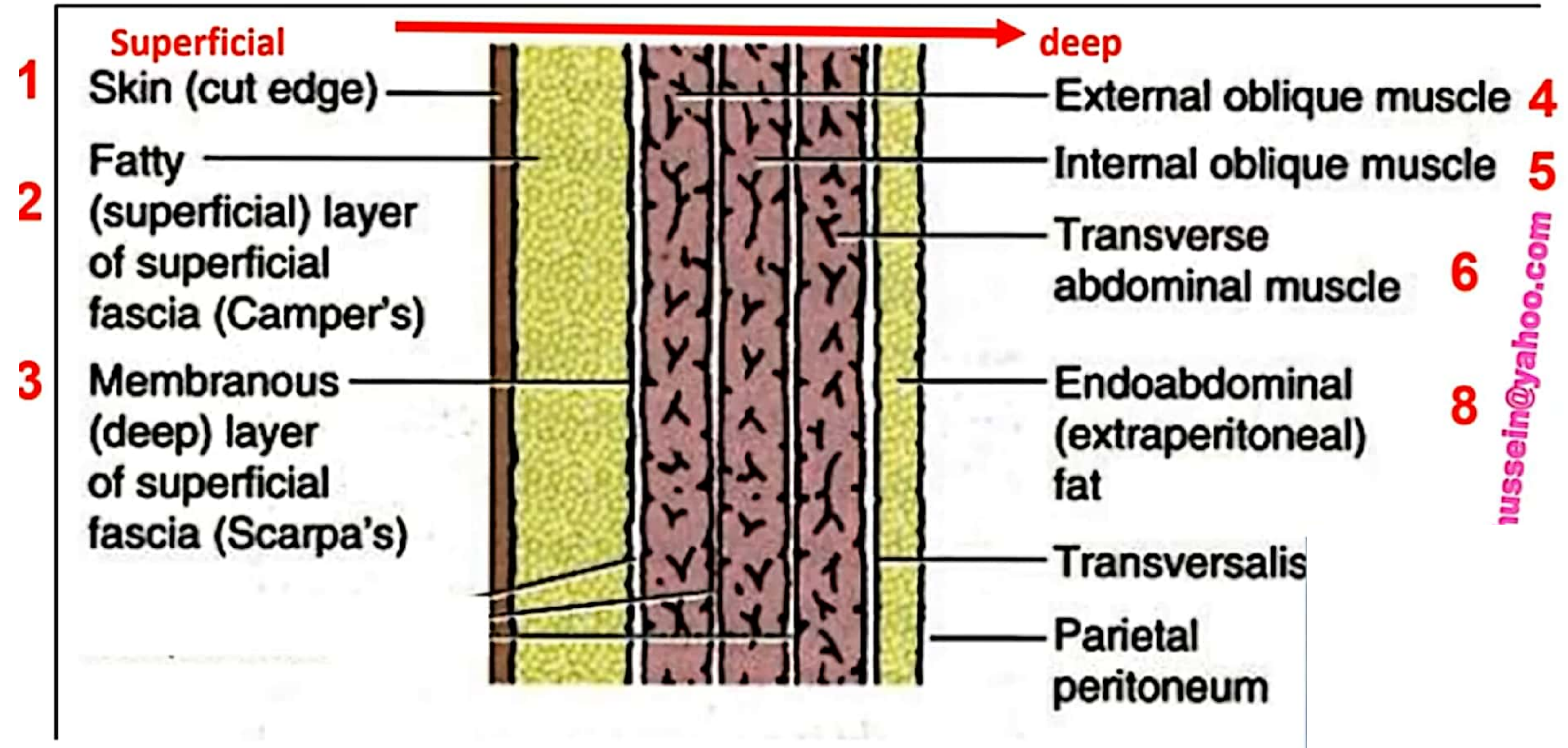
جروب الفيس د. يوسف حسين (استاذ التشريح)

dr_youssefhussein@yahoo.com

**Anterior abdominal
wall**



Layers of the anterior abdominal wall



Umbilicus

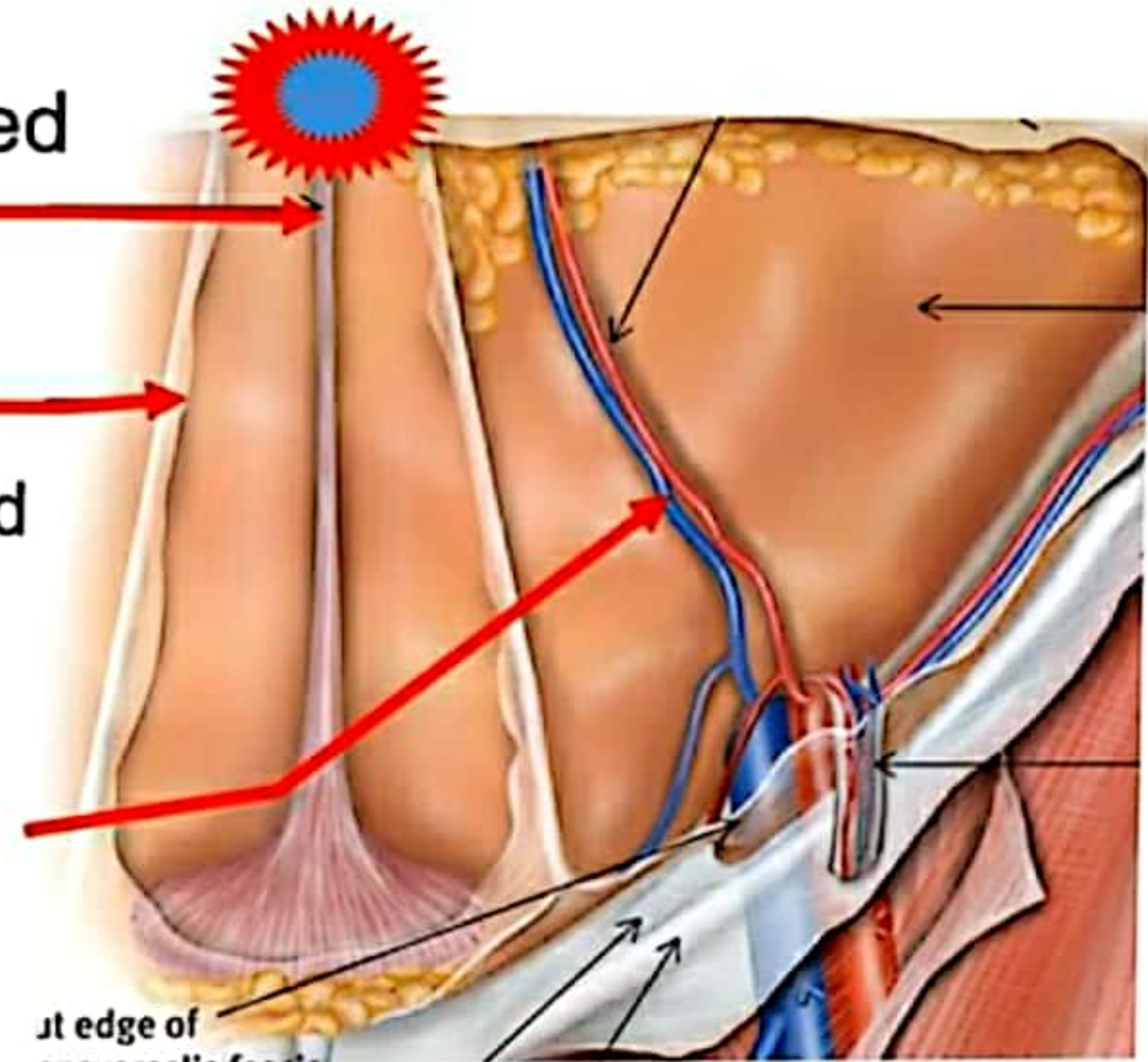
- It is a depressed wrinkled scar formed by the separation of the umbilical cord.
- **Position**, in the linea alba.
- **Nerve supply T 10**

Ligamentum teres of liver
obliterated left umbilical vein

Median umbilical ligament obliterated urachus

Medial umbilical ligaments obliterated 2 umbilical arteries

Lateral umbilical ligaments on the inferior epigastric vessels



❖ Superficial fascia

Below umbilicus, it is differentiated into;

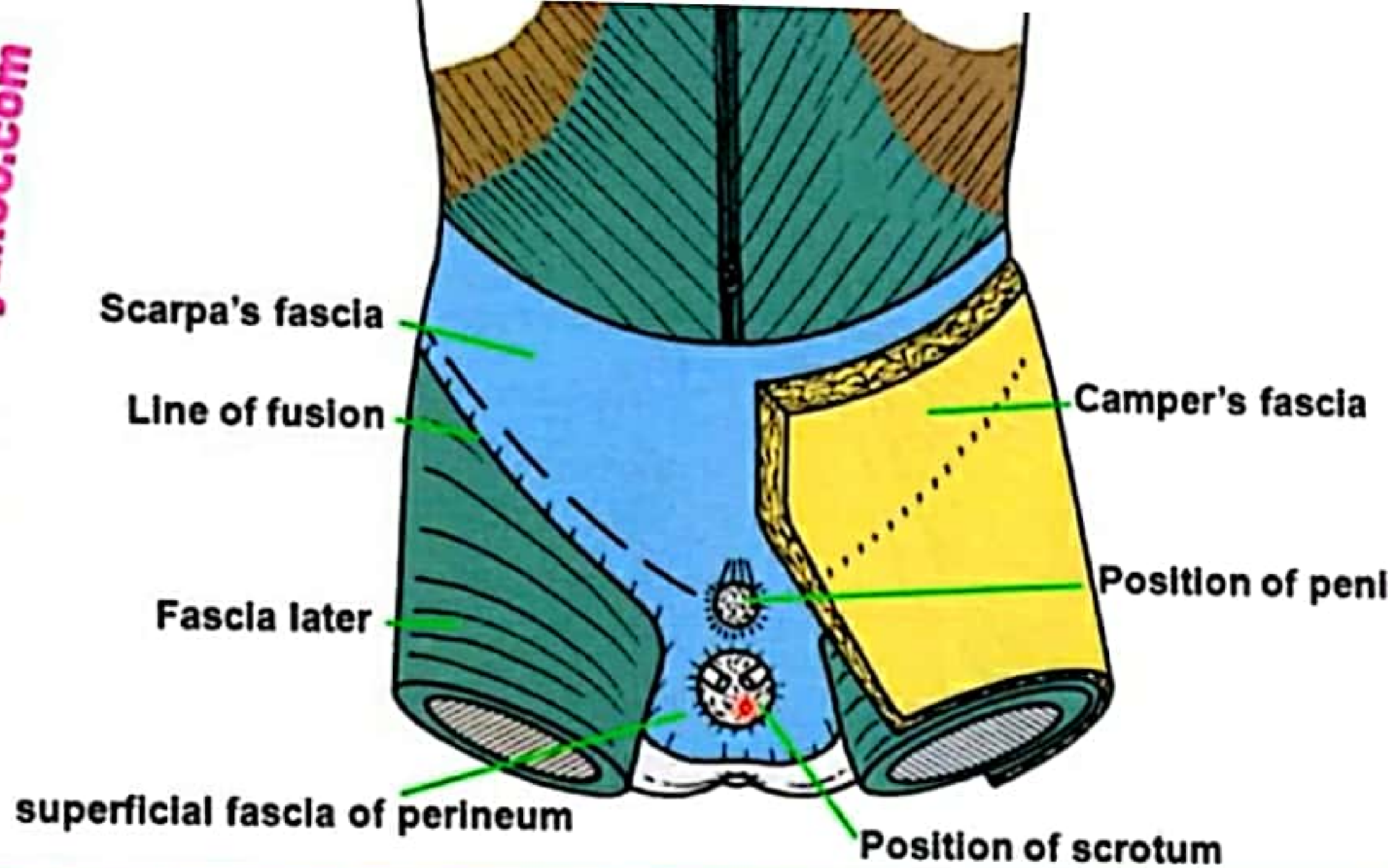
1- **Superficial fatty layer** (Camper's fascia) continuous with superficial fascia of thigh.

2- **Deep membranous layer** (Scarpa's fascia) fuses with deep fascia of thigh along a horizontal line **below** inguinal ligament.

- **In male:** continuous over dorsum of **penis** and scrotum.

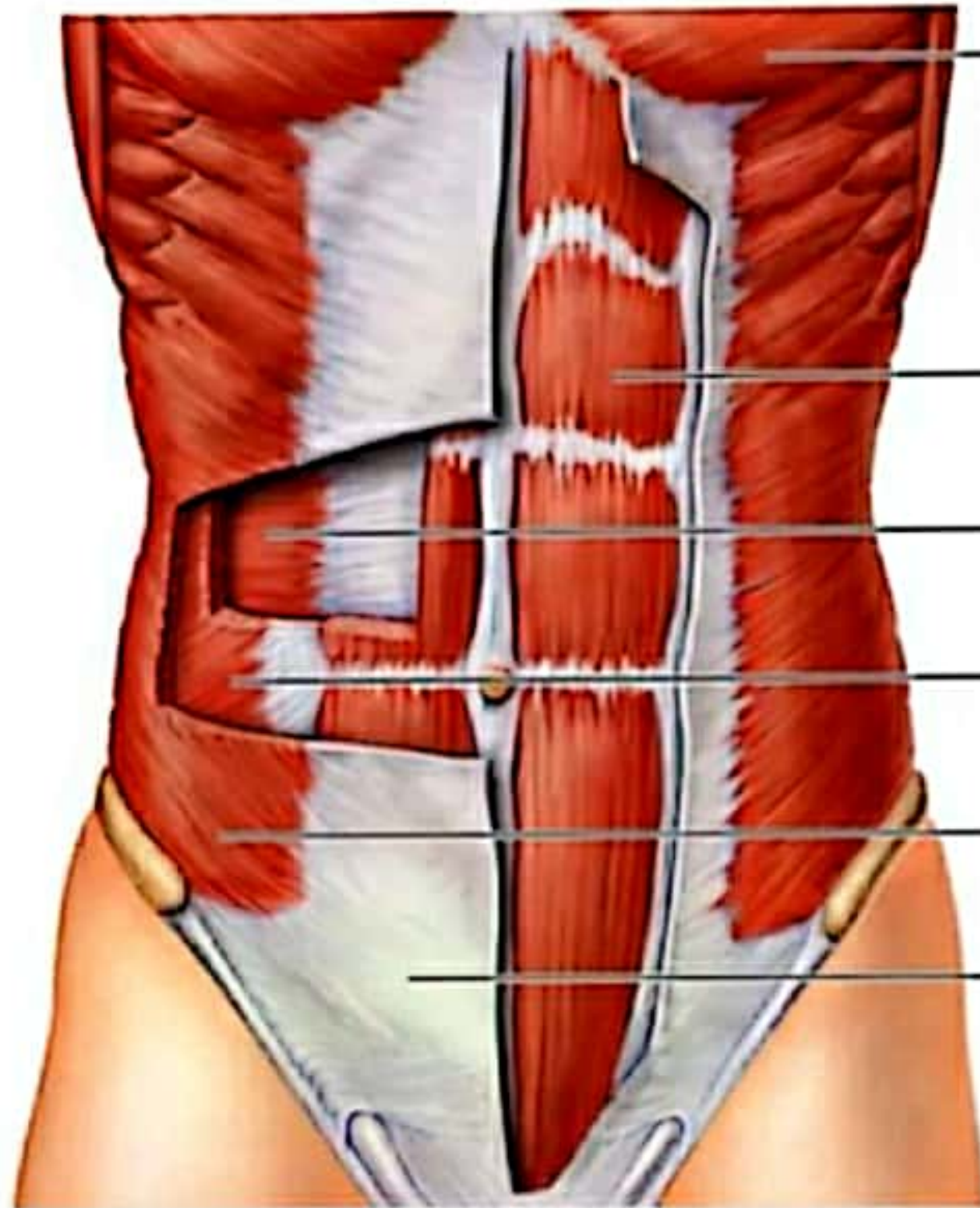
- **In female,** continuous into the **labia majora** .

dr_youssefhussein@yahoo.com



❖ No fatty layer in the penis and scrotum,

It is replaced by **dartos muscle** that responsible for wrinkling of scrotum to maintain correct spermatogenesis, it is innervated by **sym** genital branch of genitofemoral nerve



Pectoralis major

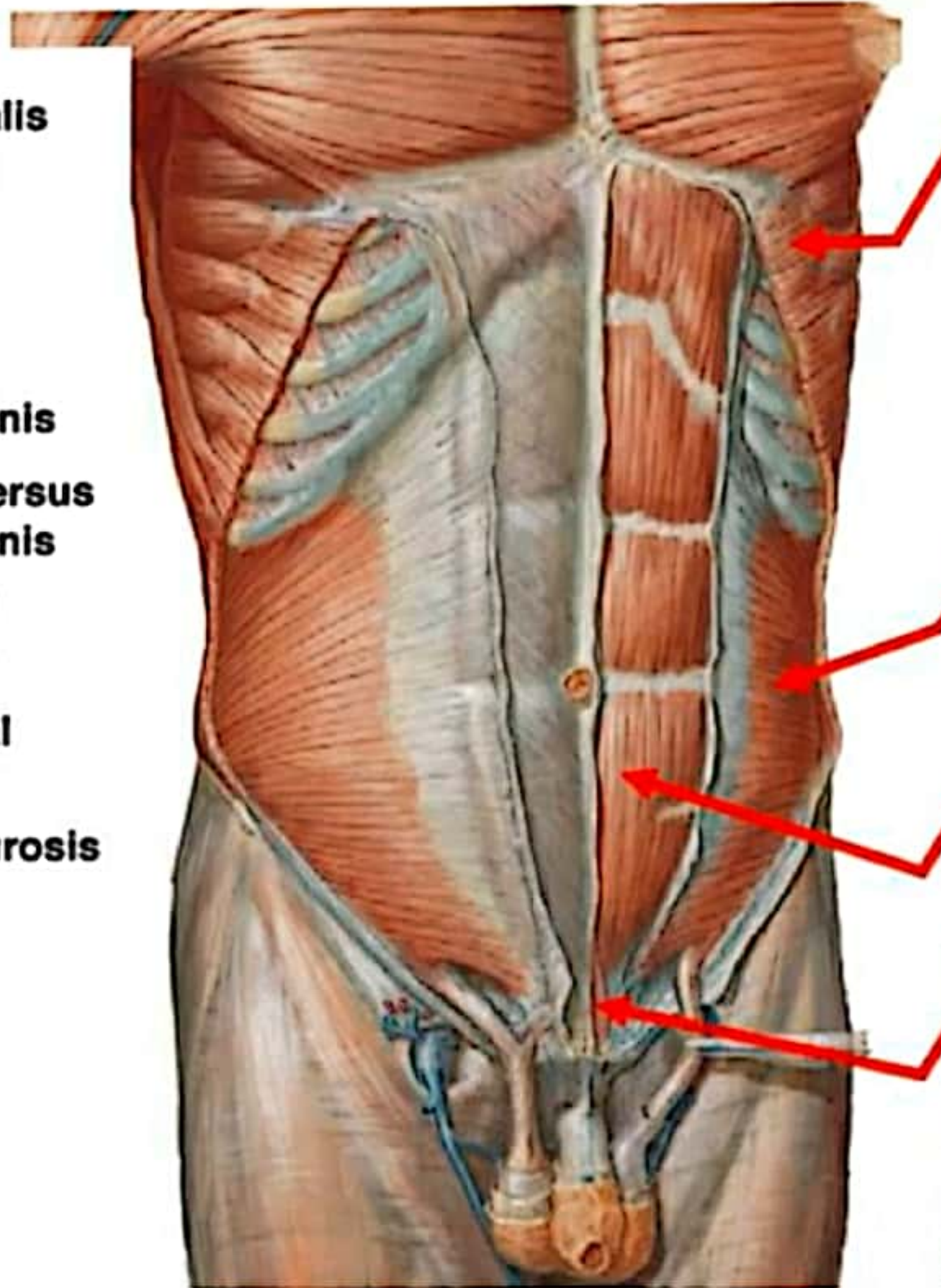
Rectus abdominis

Transversus abdominis

Internal oblique

External oblique

Aponeurosis



External abdominal oblique

Internal abdominal oblique

Rectus abdominis

Pyramidalis

❖ External abdominal oblique

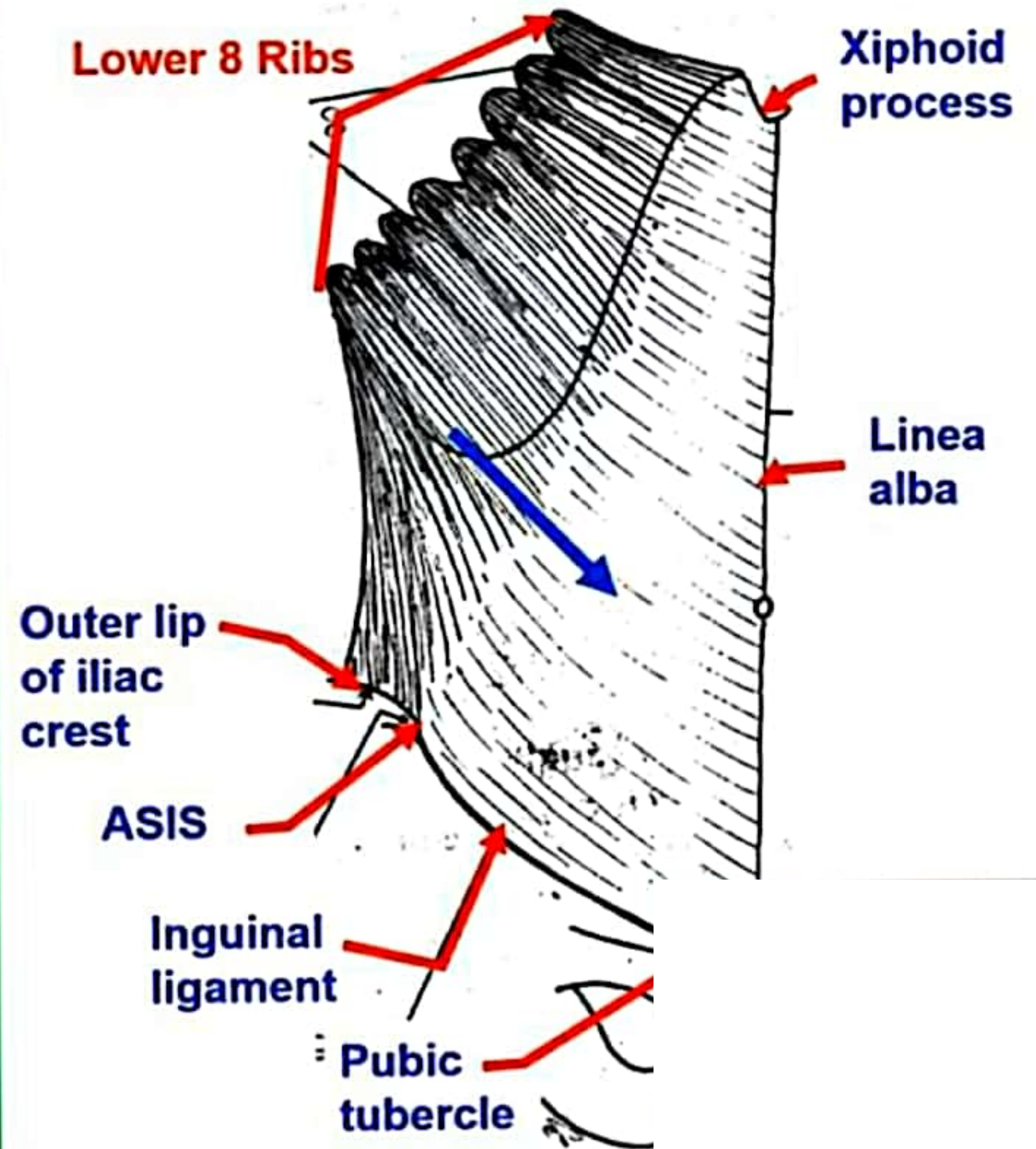
**** Origin**, by fleshy digitations from lower 8 ribs.

- The upper interdigitate with serratus anterior while the lower interdigitate with latissimus dorsi

**** Insertion;**

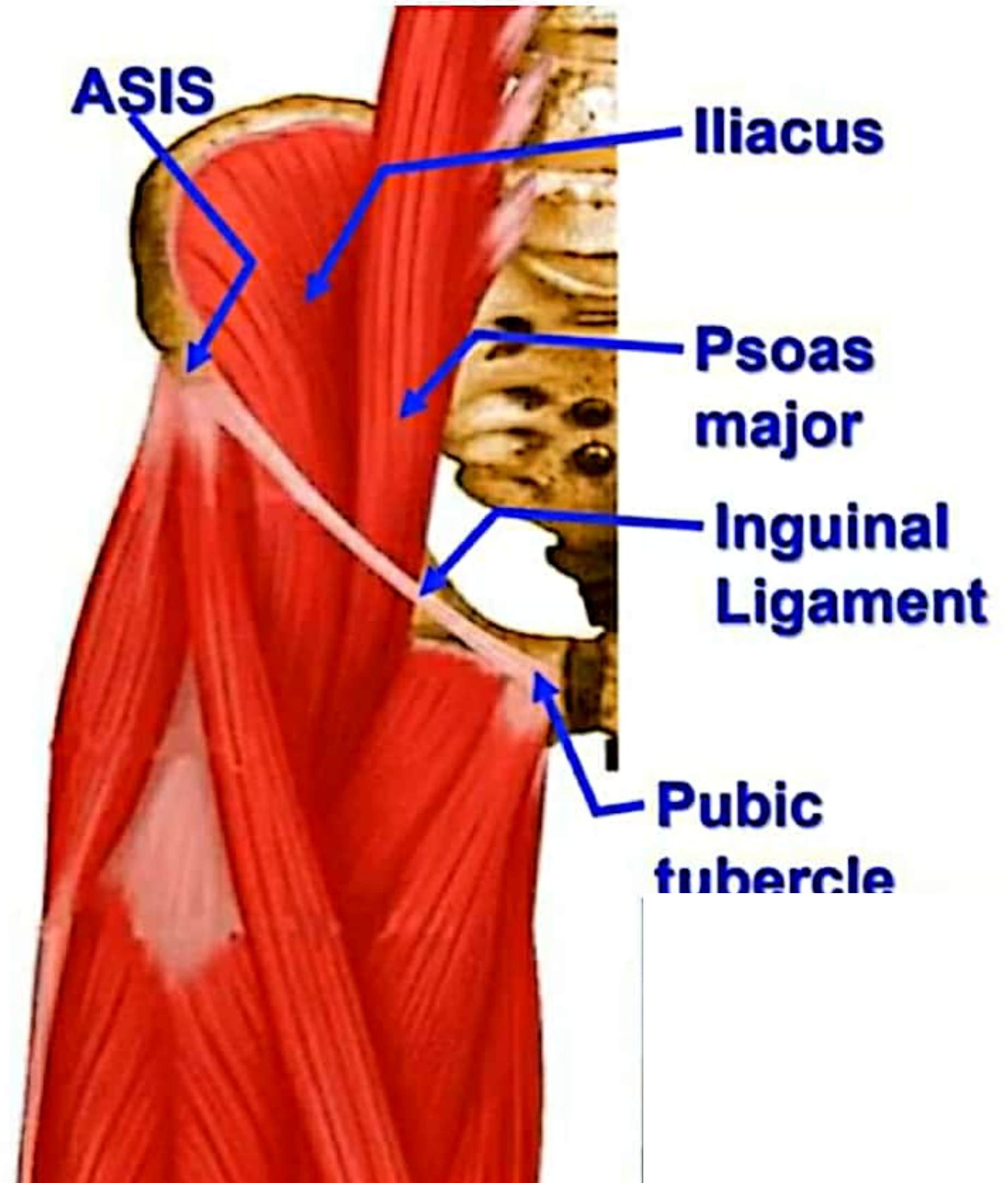
- 1) Xiphoid process.
- 2) Linea Alba
- 3) Pubic crest.
- 4) Pubic tubercle.
- 5) Anterior superior iliac spine
- 6) Anterior 1/2 of outer lip of iliac crest.

**** Direction of fibers**, downward, forward and medially.



- **Inguinal (Poupart's) Ligament**

- This is the lower border of the external abdominal oblique aponeurosis.
- The muscle folded upward backwards upon itself.
- It is convex downward due to traction by the deep fascia.
- **Attachments,**
 - **Medially:** pubic tubercle.
 - **Laterally:** anterior superior iliac spine.



**** Midpoint of inguinal ligament:** midway between anterior superior iliac spine and pubic tubercle.

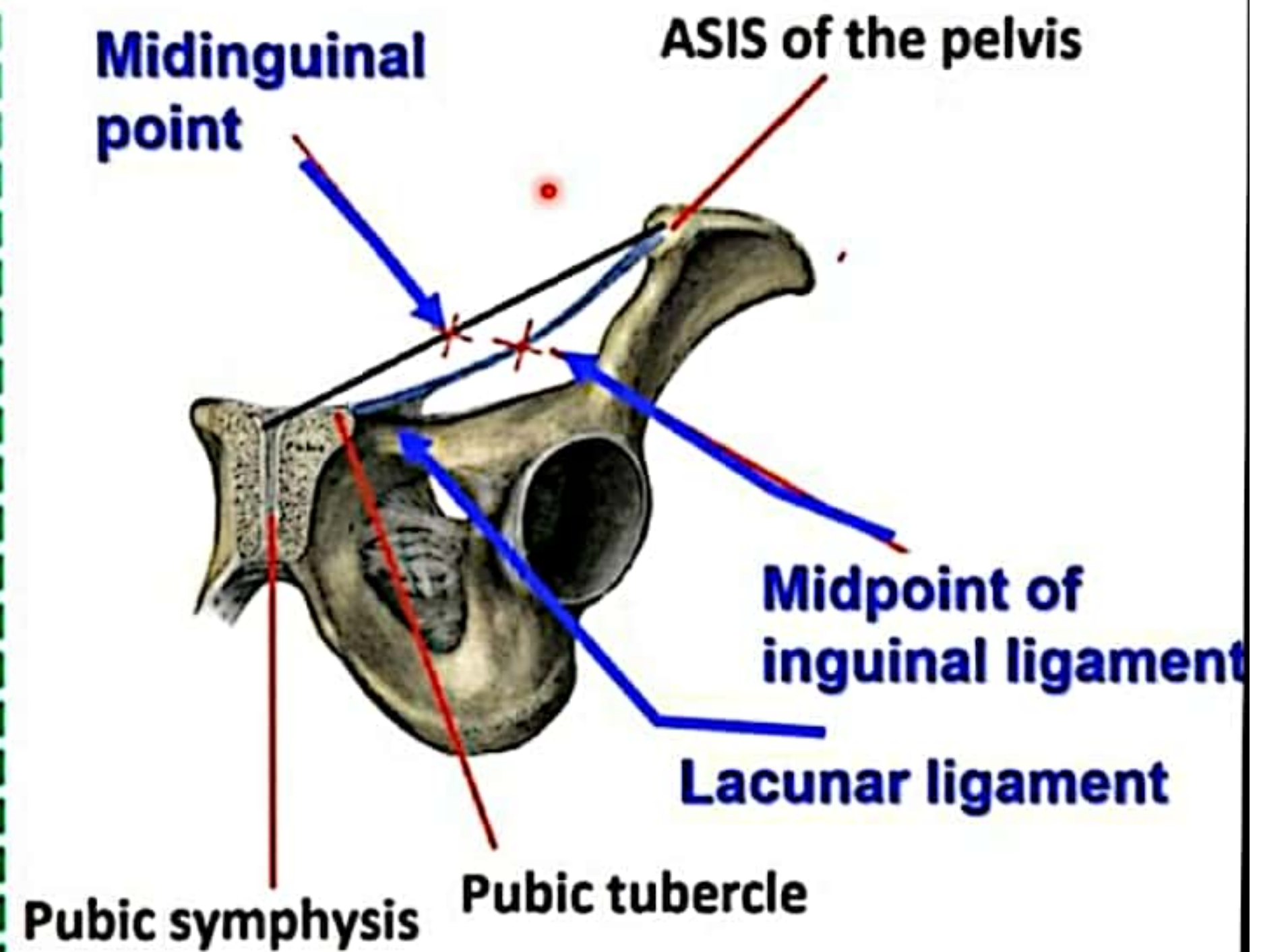
N.B: we detect **pubic tubercle** by adducting the thigh against resistance and follow tendon of adductor longus muscle.

**** Midinguinal point:** midway between anterior superior iliac spine and symphysis pubis.

- **Lacunar ligament**, triangular medial part of the inguinal ligament.

a- **Apex** attached to the pubic tubercle.

b- **Base** is a sharp free and forms medial boundary of the femoral ring



❖ Internal abdominal oblique muscle

**** Origin;** a linear origin from the

1) Lateral 2/3 of the upper surface of the inguinal ligament.

2) Anterior 2/3 of the intermediate line of the iliac crest.

3) Thoraco-lumbar fascia.

**** Insertion;** into the

1) Lower 6 costal cartilage.

2) Xiphoid process.

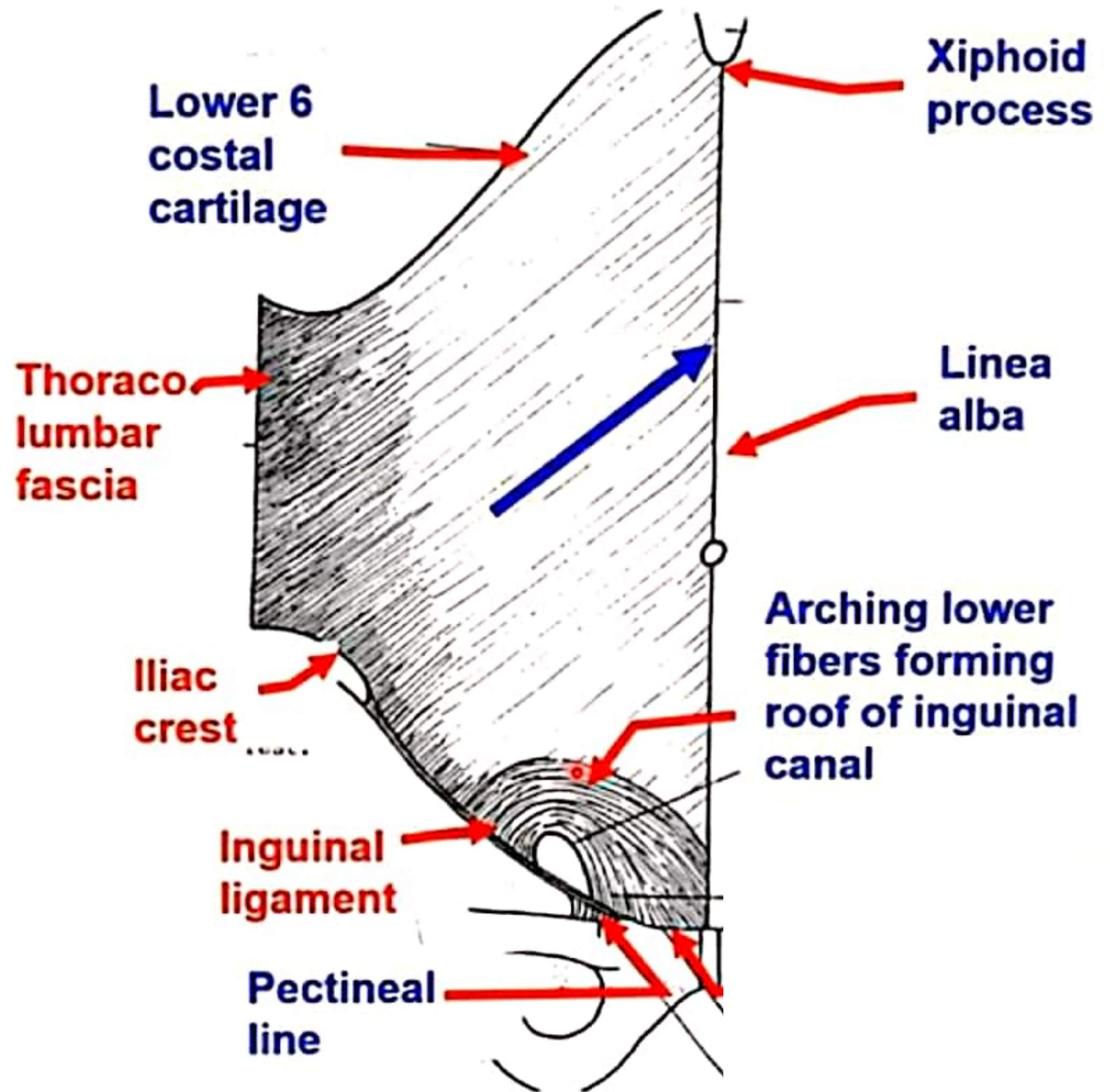
3) Linea Alba.

4) Pubic crest.

5) Pectineal line.

**** Direction of the fibers;** upward, forward and medially.

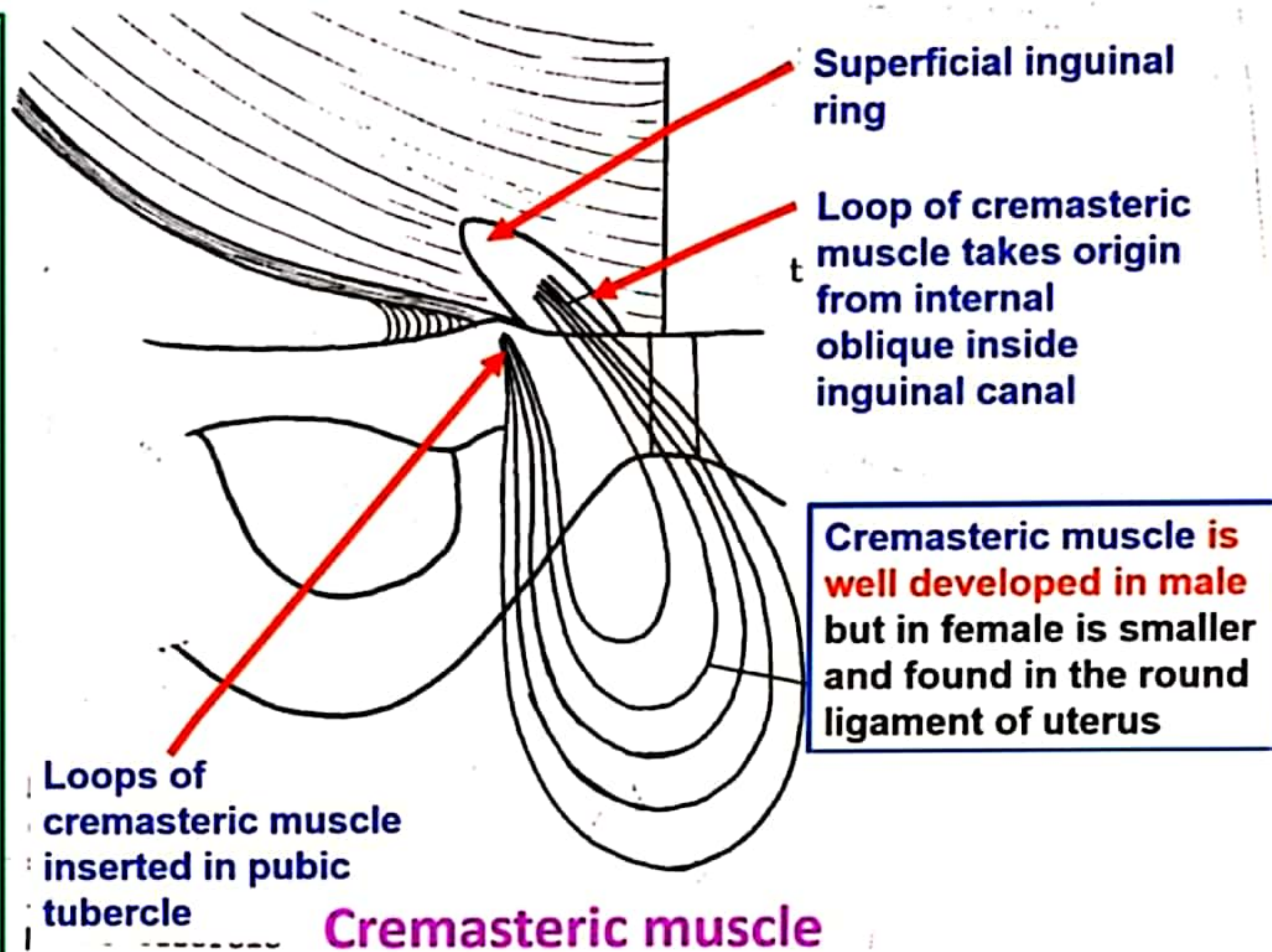
- The lower fibers arch to form the roof of the inguinal canal.



**** Nerve supply; genital branch of genitofemoral nerve.**

**** Action; raises testes** to bring them closer to warmer groin region acting in environment with **a colder temperature** Involuntary but can also contracted voluntarily

**** Cremasteric reflex;**
• Scratching of upper part of medial side of thigh (**femoral branch of genitofemoral N**) leads to upward retraction of the testis.



❖ Transversus abdominus muscle

**** Origin;** a linear origin from the

- 1) Lateral 1/3 of the upper surface of inguinal ligament.
- 2) Anterior 2/3 of the inner lip of the iliac crest.
- 3) Thoraco-lumbar fascia.
- 4) Lower 6 costal cartilages.

**** Insertion;** into the

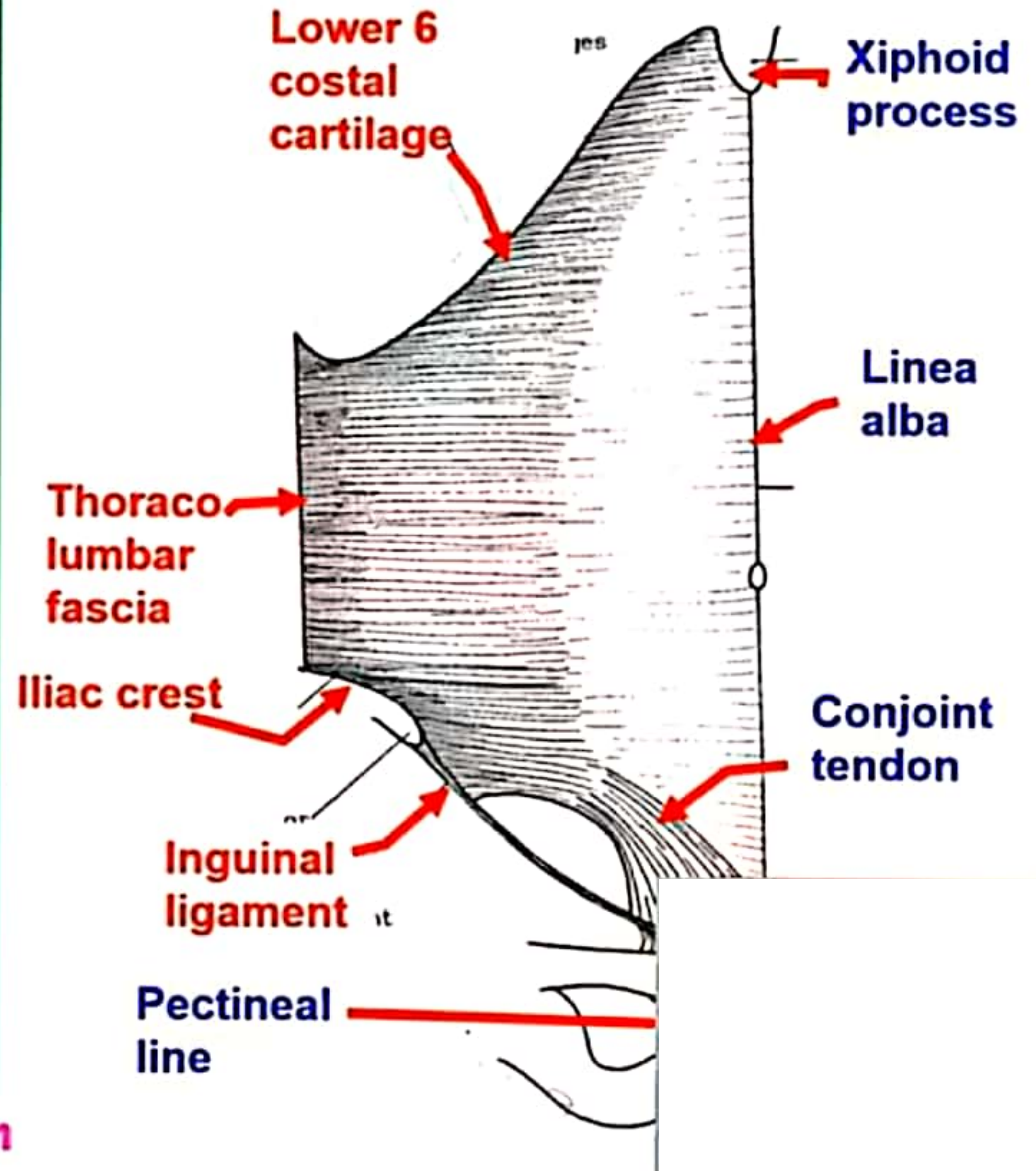
- 1) Xiphoid process.
- 2) Linea alba.
- 3) Pubic crest.
- 4) Pectineal line.

**** Direction of fibers;** horizontal direction.

**** Conjoint Tendon (falx inguinalis):**

- It is formed by the fusion of the lower arched fibers of the internal oblique and transversus abdominus.

dr_youssefhusseini@yahoo.com



** Nerve supply;

- Lower 5 intercostal and subcostal nerves, Iliohypogastric and ilioinguinal nerves.

** Actions

- 1- **Protection** of the abdominal viscera against external trauma.
- 2- **Increase** intra-abdominal pressure during defecation, vomiting, labor.
- 3- **Keep** abdominal viscera in position.
- 4- **Forced expiration** as in cough.

dr_youssefhusseini@yahoo.com



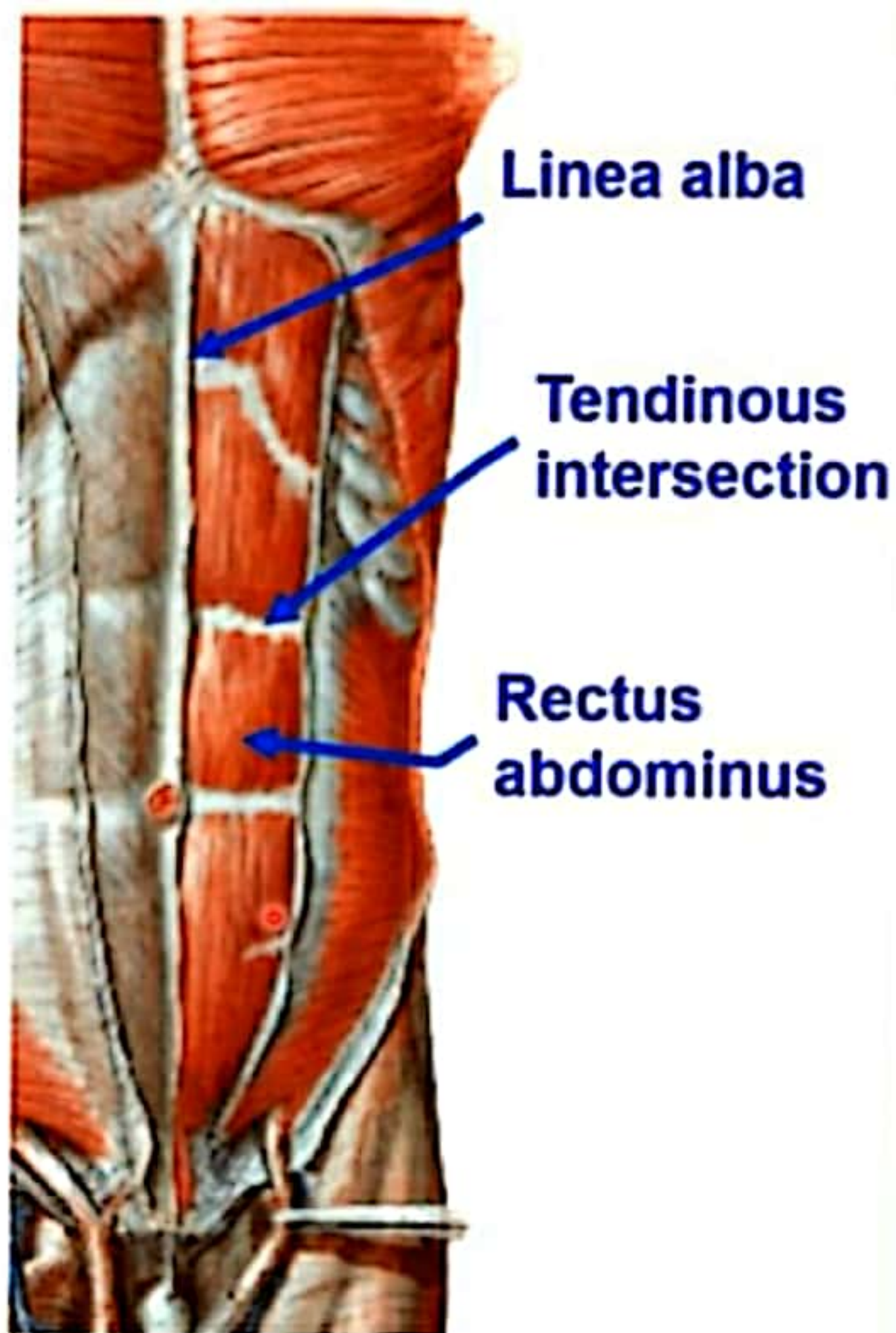
intercostal
nerve

Ilioinguinal
nerve

Ilic

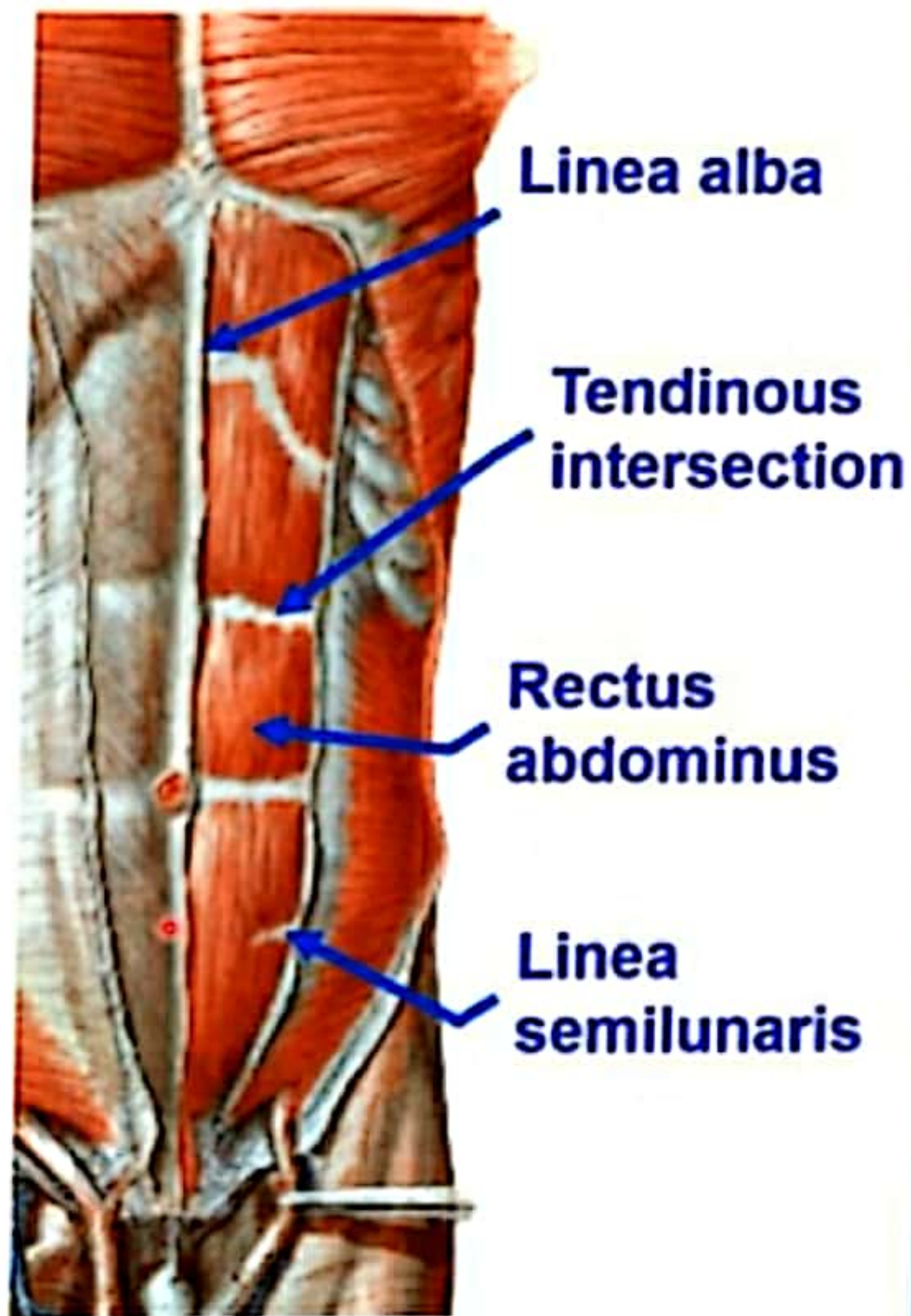
ar_youssefnusseini@yahoo.com

Rectus abdominus muscles



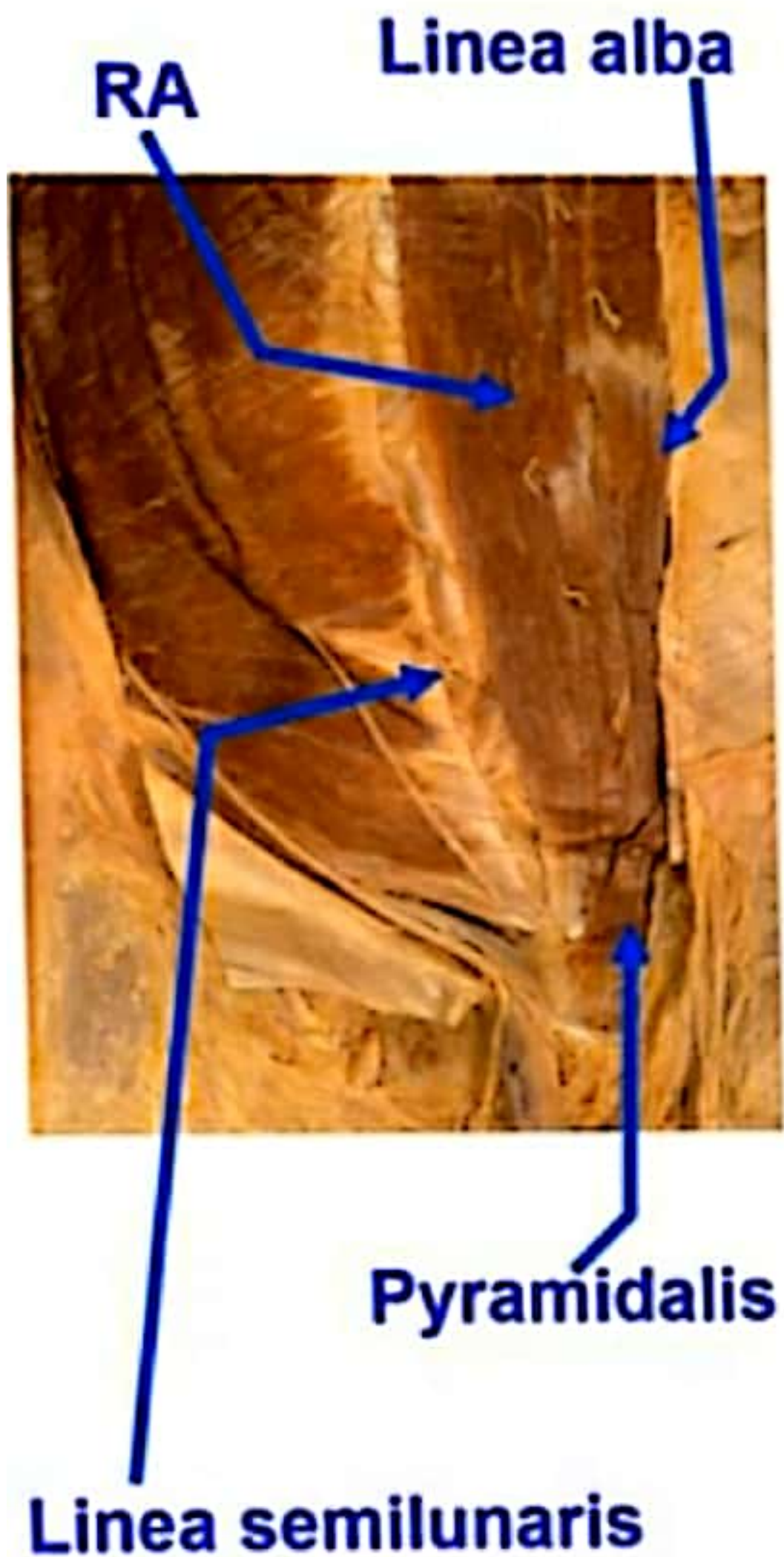
• Rectus Abdominus

- **Origin:** pubic crest and pubic tubercle
- **Insertion:** 5,6 and 7 costal cartilages and xiphoid process
- **Nerve supply:** lower 5 intercostal and subcostal nerves
- **Actions;** Flexion of the trunk
- **Tendinous intersections**
 - Transverse tendinous bands in the muscle at;
 - a- Tip of the xiphoid process.
 - b- Midway between umbilicus and xiphoid process.
 - c- At the umbilicus.
 - d- Midway between umbilicus and symphysis pubis.
 - They are seen **only on anterior surface**
- **The tendinous intersection** limit fluid beneath the anterior rectus sheath, pre-rupture, and aid in the biomechanics of



• Rectus Abdominus

- **Origin:** pubic crest and pubic tubercle
- **Insertion:** 5,6 and 7 costal cartilages and xiphoid process
- **Nerve supply:** lower 5 intercostal and subcostal nerves
- **Actions;** Flexion of the trunk
- **Tendinous intersections**
 - Transverse tendinous bands in the muscle at;
 - a- Tip of the xiphoid process.
 - b- Midway between umbilicus and xiphoid process.
 - c- At the umbilicus.
 - d- Midway between umbilicus and symphysis pubis.
 - They are seen **only on anterior surface**
- **The tendinous intersection** limit fluid beneath the anterior rectus sheath, pre-rupture, and aid in the biomechanics of



- **Pyramidalis muscle**

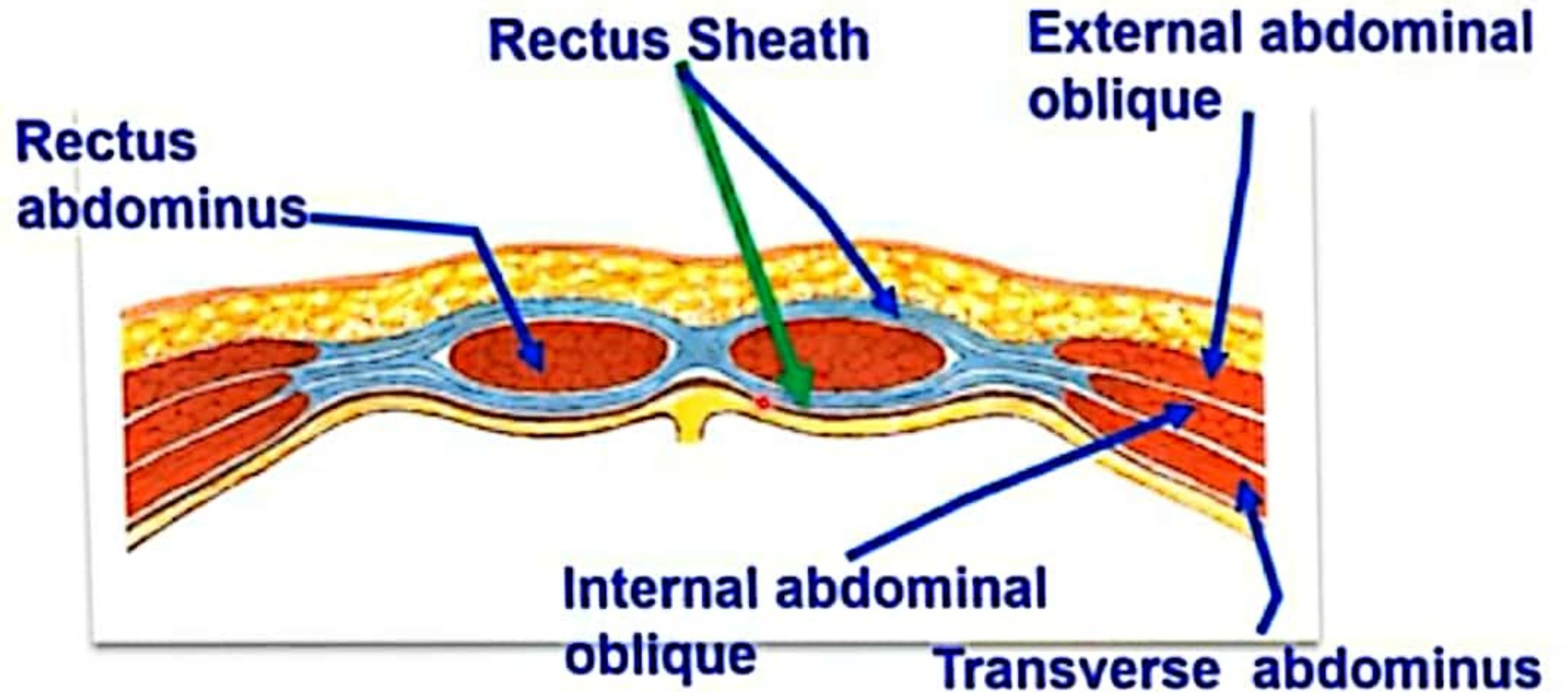
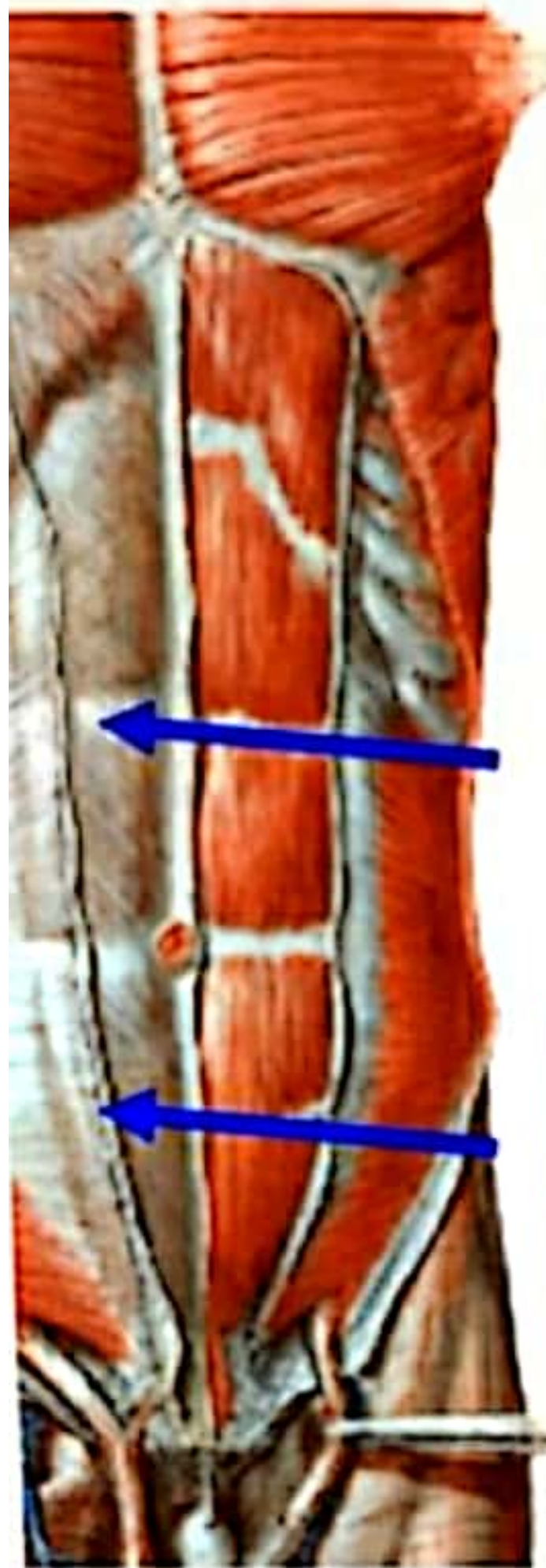
- This is a small triangular muscle inside the rectus sheath and in front of the rectus abdominis muscle.
- It may be absent.
- **Origin**; from the pubic crest.
- **Insertion**; into the linea alba.
- **Action**: It tenses the linea alba
- **Nerve supply**: subcostal nerve
- It is used to determine the midline and location of the linea alba during caesarean section
- **Linea Alba (bloodless)** strong tendinous band in the middle extending from the xiphoid process to the symphysis pubica
- **Linea semilunaris**; shallow curved groove on the lateral border of the rectus abdominis.

Dr. Jyoti Chavhan
www.jyotichavhan.com

dr_youssefhussein@yahoo.com

Rectus Sheath

dr_youssefhussein

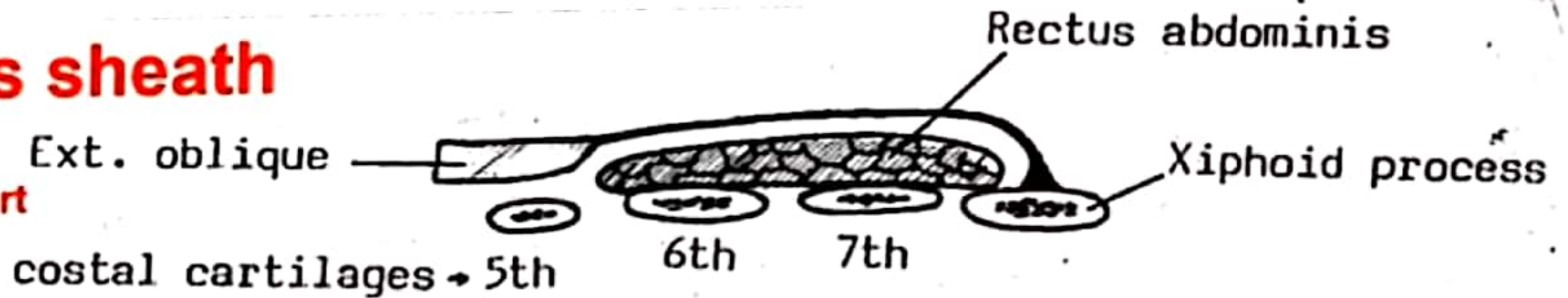


- This is a sheath surrounding the rectus abdominus muscle.
- **Formation of the rectus sheath**
 - The walls are divided into 3 parts (upper, middle and lower) by 2
 - a- At the level of the costal margin.
 - b- Midway between the umbilicus and symphysis pubis.

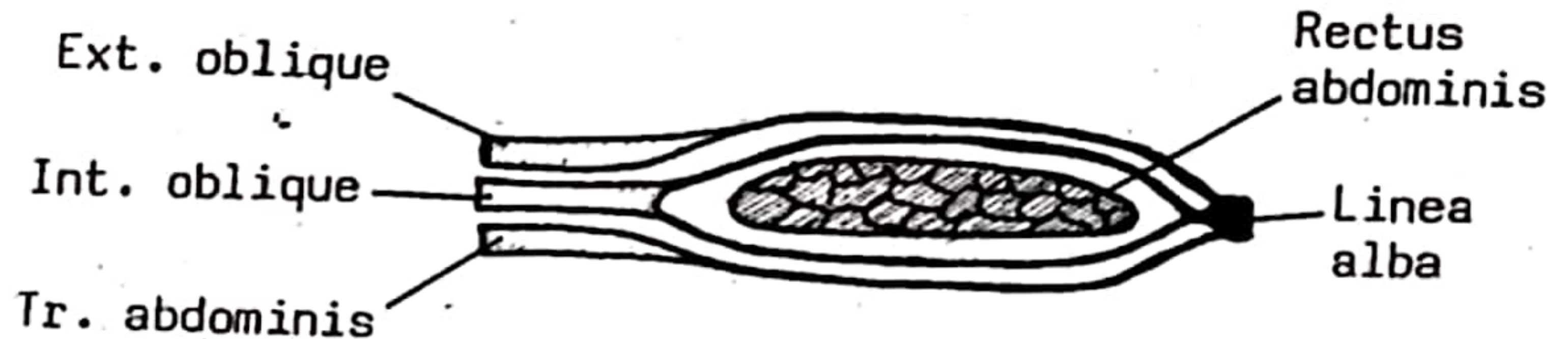
dr_youssefhusseini@yahoo.com

Rectus sheath

T.S. upper part



T.S. middle part



T.S. lower part



- **Rectus sheath**

1- Upper part;

a- Anterior wall is formed by aponeurosis of the external abdominal oblique muscle.

b- Posterior wall is formed by the 5th, 6th, and 7th costal cartilages.

2- Middle part;

a- Anterior wall is formed by is formed by:

1- Aponeurosis of the external abdominal oblique muscle.

2- Anterior lamina of the internal abdominal oblique muscle.

b- Posterior wall is formed by

1- Posterior lamina of the internal abdominal oblique muscle.

2- Aponeurosis of the transverse abdominus muscle.

- The posterior wall has an arched lower border called arcuate line, site of entry of inferior epigastric artery to sheath.

3- Lower part;

a- Anterior wall is formed by is formed by the aponeurosis of:

1) External abdominal oblique.

2) Internal abdominal oblique.

3) Transversus abdominus muscles.

b- Posterior wall is formed only by the fascia transversalis

dr_youssefhussein@yahoo.com

- **Contents of the rectus sheath**

A- Muscles; 1- Rectus abdominus.

2- Pyramidalis.

B- Vessels; 1- Superior epigastric vessels.

2- Inferior epigastric vessels.

C- Nerves; 1- Lower 5 intercostal nerves.

2- Subcostal nerve.

D- Lymphatic vessels and lymph nodes.

- **** Function of the rectus sheath:**

1. It supports and maintains strength of the anterior abdominal wall.

2. It checks bowing of the muscles during contraction.

- **N.B: Weakness of muscles of anterior abdominal wall leading to Paraumbilical hernia between the medial borders of the 2 recti muscles**

dr_youssefhussain@yahoo.com

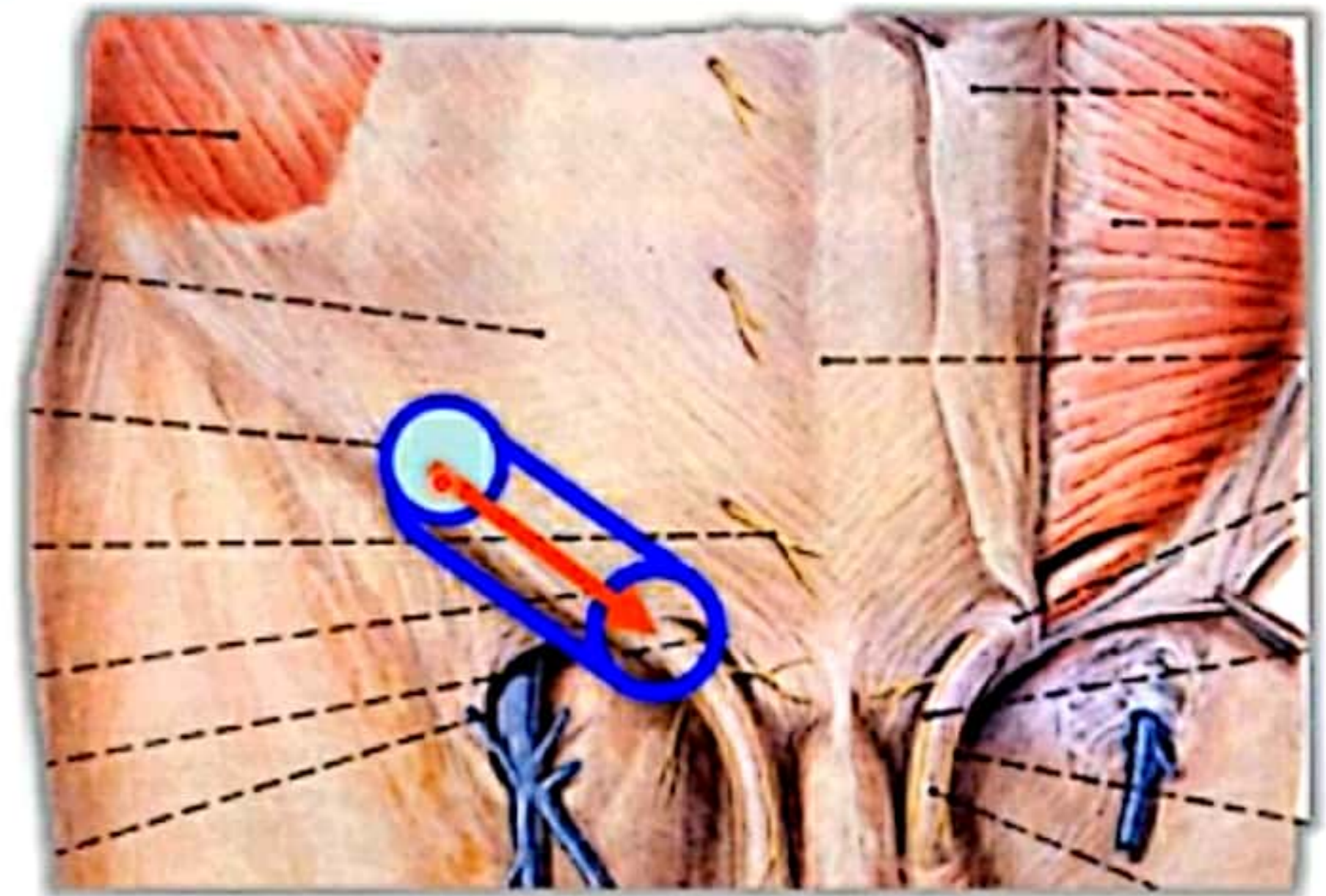
dr_youssefhussain@yahoo.com

dr_youssefnusseini@yahoo.com



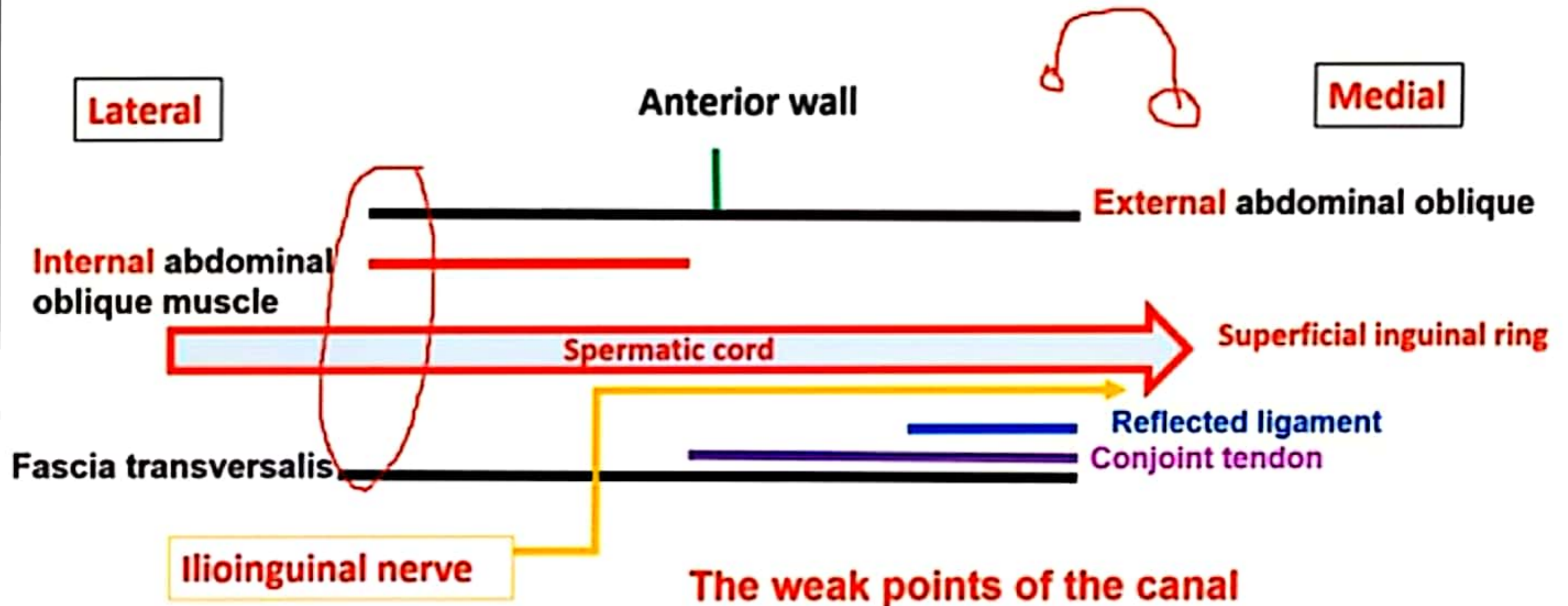
dr_youssefnhus

- **Definition;** It is an oblique intermuscular passage in the lower part of the anterior abdominal wall.
- **Site;** above the medial 1/2 of the inguinal ligament.
- **Length,** about 4 cm long
- **Direction;** downward, forward and medially with the direction of external abdominal oblique muscle.



- **Beginning: Deep inguinal ring,** in the fascia transversalis 1/2 inch above the midinguinal point.
- **End: Superficial inguinal ring,** in aponeurosis of the external oblique just above and lateral to the pubic tubercle.

• Boundaries of the inguinal canal



The weak points of the canal

- 1- The medial part of the anterior wall.
- 2- The lateral part of the posterior wall.
- 3- The cavity of the canal itself.

**** Boundaries of the inguinal canal**

1- Anterior wall is formed by

- a-** Aponeurosis of **external** abdominal oblique along **whole length** of the canal.
- b-** **Internal** abdominal oblique muscle along the **lateral half** of the canal.

2- Posterior wall: is formed by:

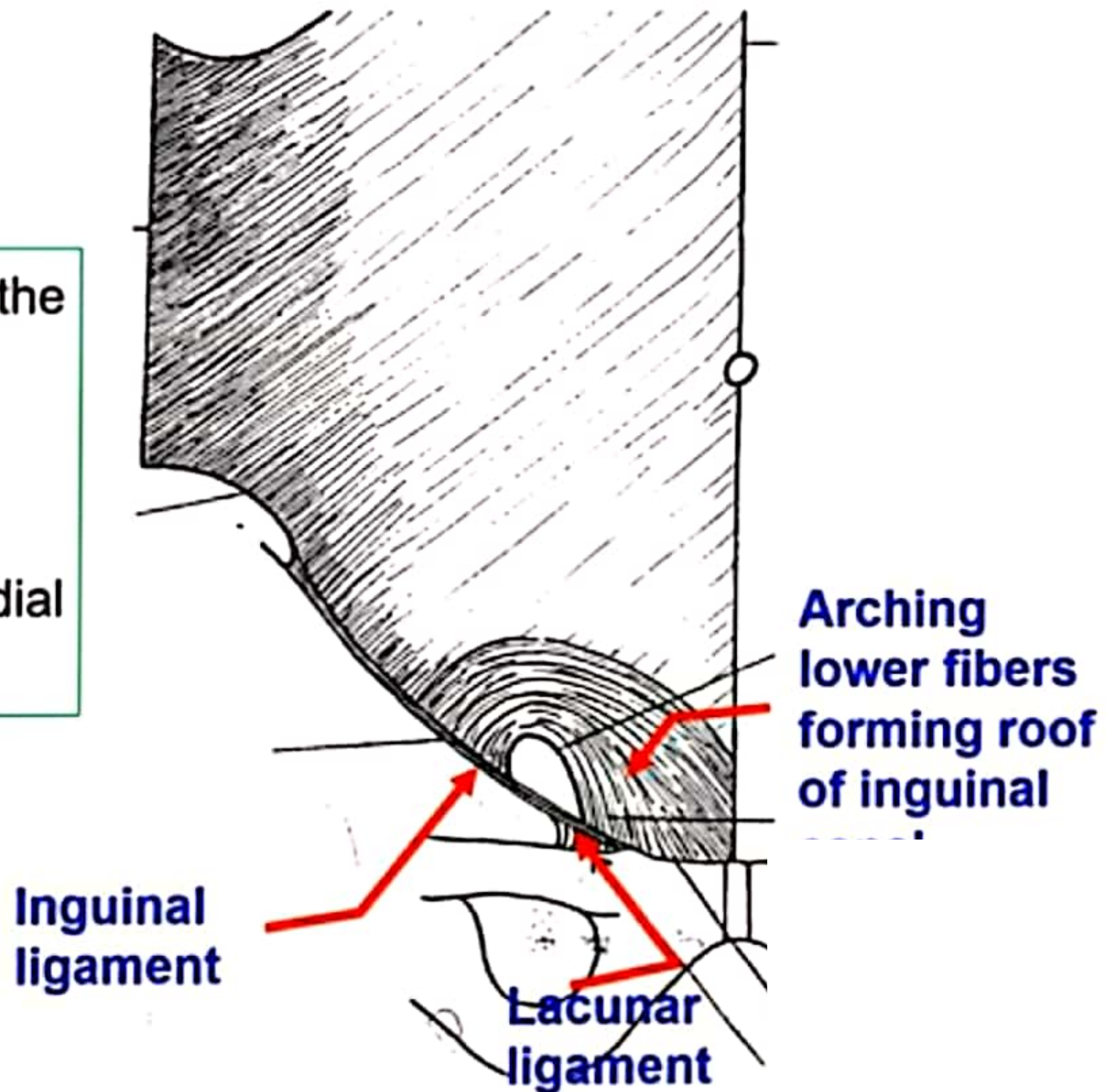
- a-** **Fascia transversalis** along the **whole length** of the canal.
- b-** **Conjoint tendon** along the **medial half** of the canal.
- c-** **Reflected ligament** along the **medial fourth** of the canal.

**** Contents of the canal**

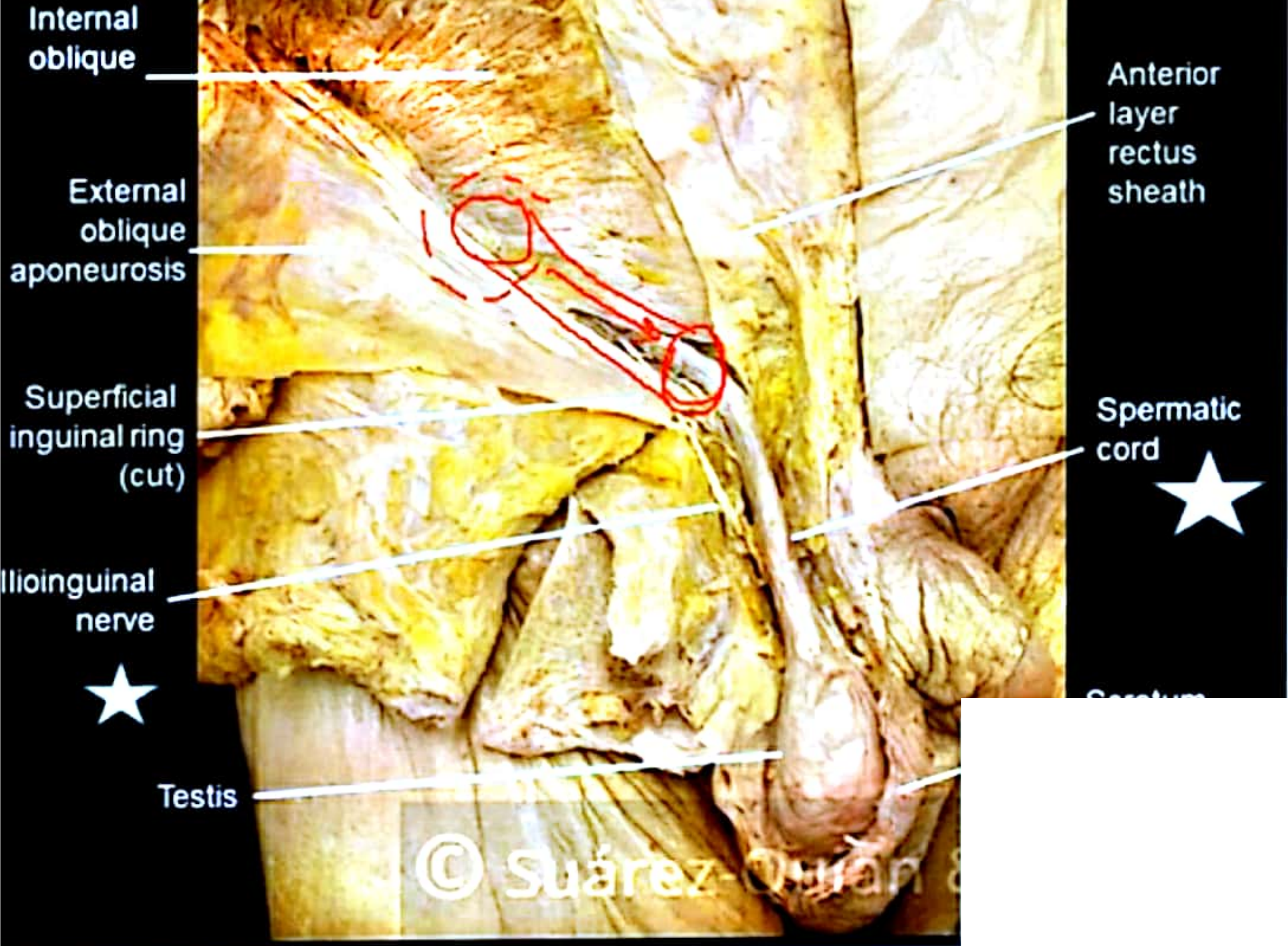
- a-** **In the male,** 1) Spermatic cord and its covering. 2) Ilioinguinal nerve.
- b-** **In the Female,** 1) Round ligament of the uterus. 2) Ilioinguinal nerve.

N.B; The ilioinguinal nerve pierces the posterior wall of the canal.

- **Roof:** lower arched fibers of the internal abdominal oblique muscle.
- **Floor:** is formed by
 - a. Inguinal ligament.
 - b. Lacunar ligament along the medial part.



dr_youssefhussein@yahoo.com



© Suárez-Du...

Compensatory mechanisms of the inguinal canal

1- **Superficial ring** is supported **posteriorly** by the conjoint tendon and reflected ligament.

2- **Deep ring** is supported **anteriorly** by the internal oblique muscle.



3- **Shutter mechanism**, contraction of lower arched fibers of internal oblique and transverse abdominus approximates the **roof** to the **floor** to close the canal.

4- **Ball valve mechanism**, contraction of the **cremasteric muscle** helps spermatic cord to plug and close the canal.

5- **Flap valve mechanism**, increase of intra-abdominal pressure the **posterior** wall to the **anterior** wall.

• **Surgical importance**; The deep ring is a site of **indirect** inguina

• Inguinal (Hesselbach's) Triangle

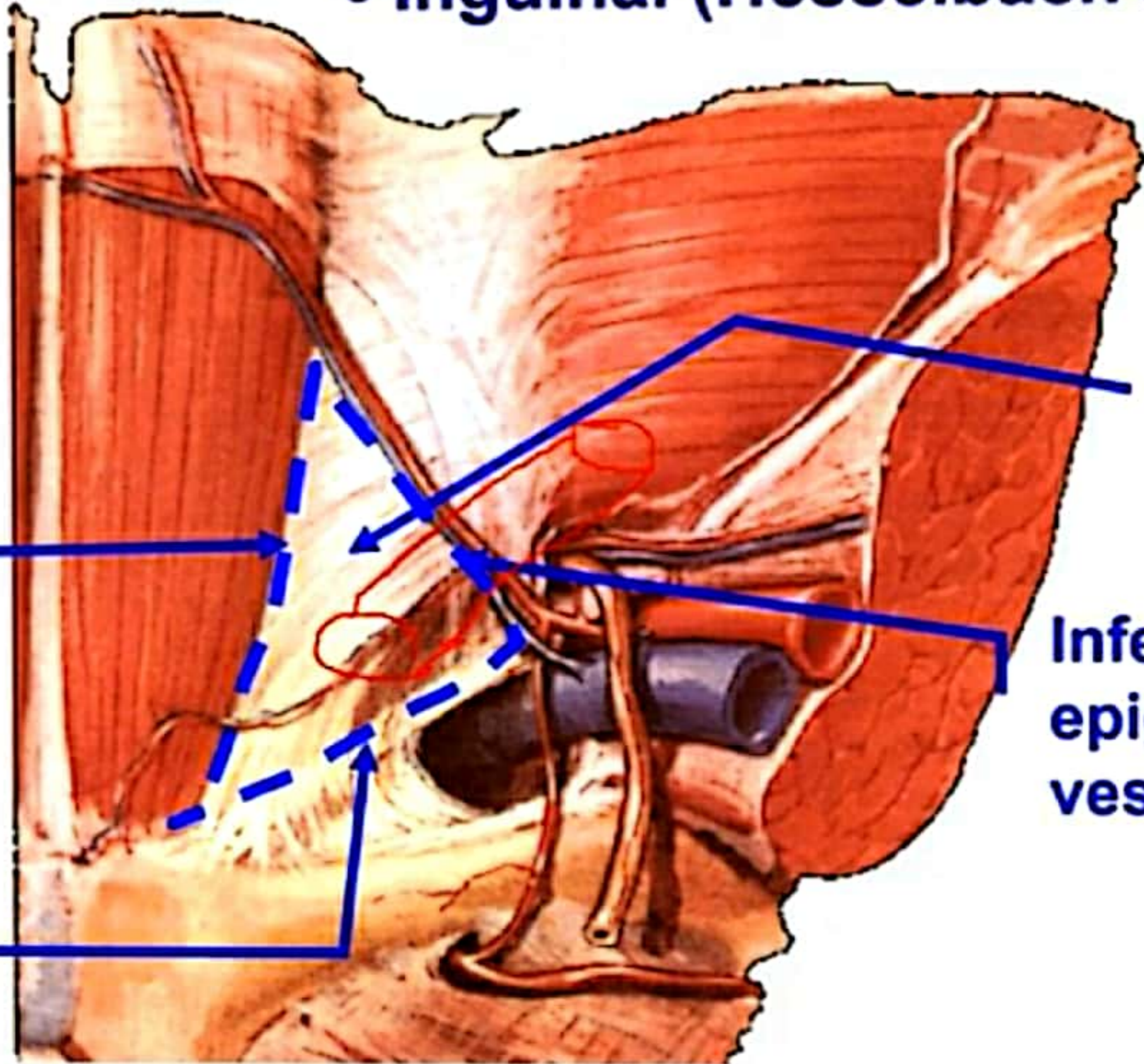
dr_youssefmusseln@yahoo.com

Rectus abdominus

Fascia transversals

Inferior epigastric vessels

Inguinal ligament



• Inguinal (Hassel Bach's) Triangle

**** Site**, the inner aspect of lower part of anterior abdominal wall

**** Boundaries**

1- Medially, lateral border of the rectus abdominis muscle.

2- Laterally, inferior epigastric artery.

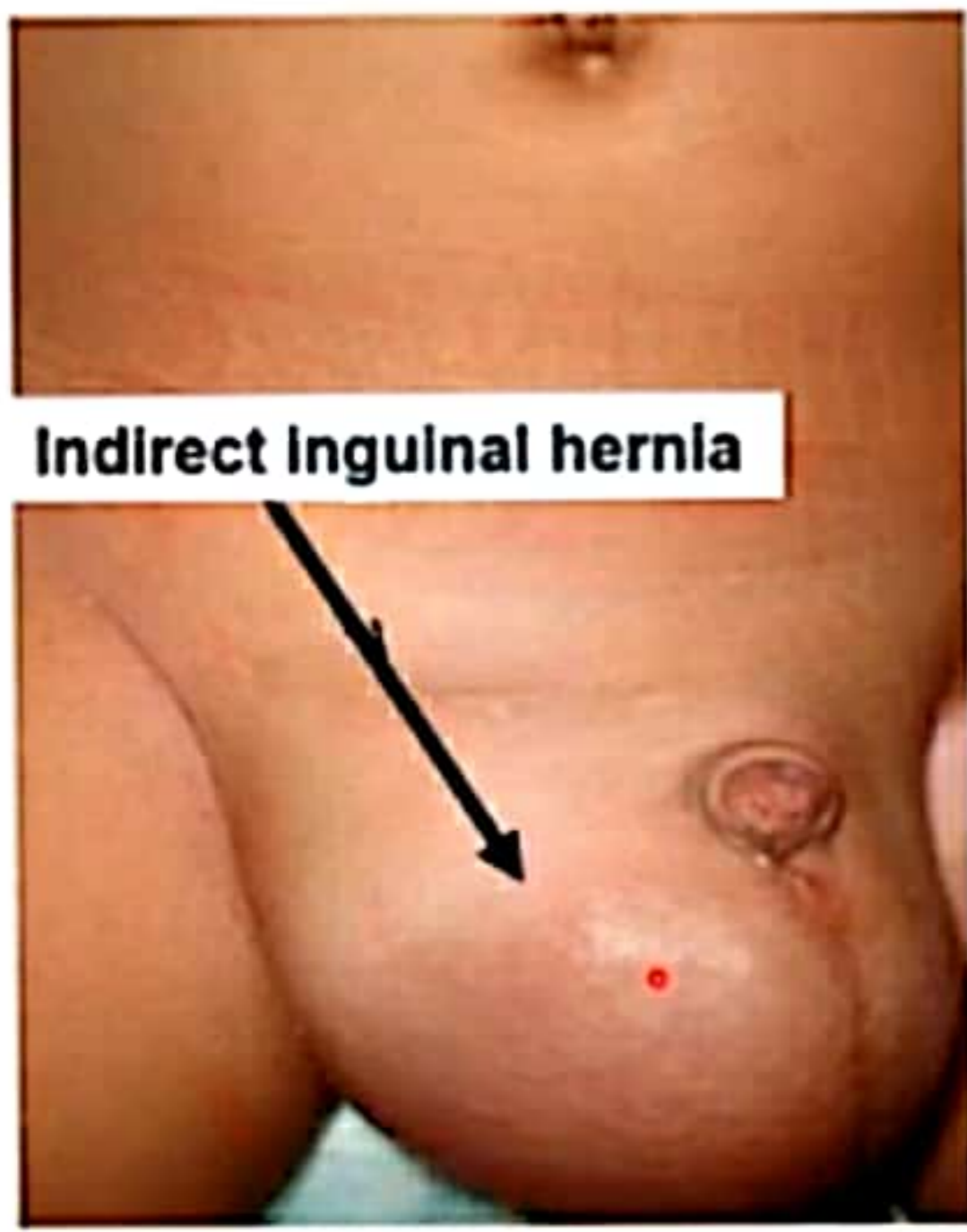
3- Inferiorly, inguinal ligament.

dr_youssefhussein@yahoo.com

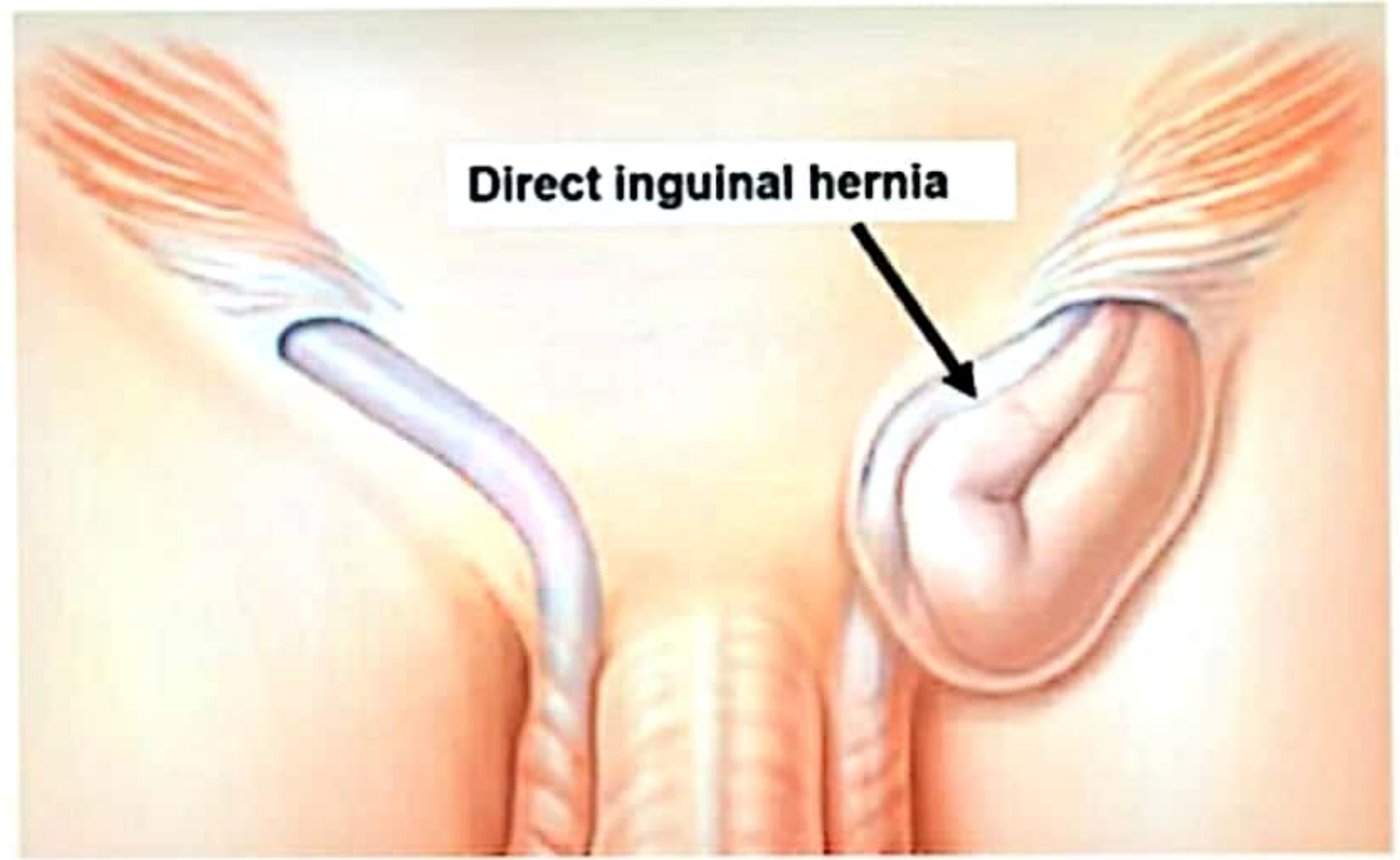
4- The floor, fascia transversalis.

**** Subdivisions**, it is divided into medial and lateral parts by medial umbilical ligament.

**** Clinical importance**, It is the site of **direct** inguinal hernia

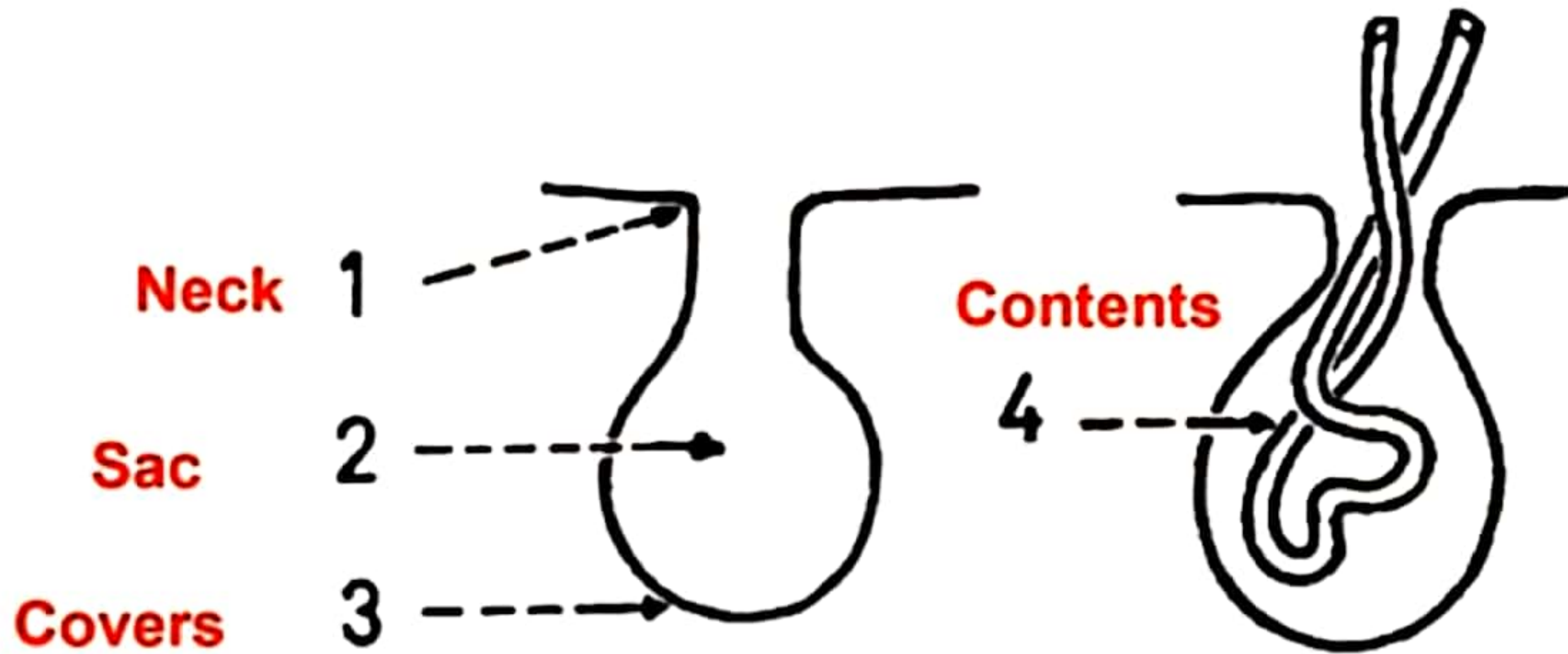


dr_youssefhussein@yahoo.com



- **Definition;** protrusion of peritoneum and small intestine through
- Deep inguinal ring (**indirect, oblique inguinal hernia**)
- Inguinal triangle (**direct inguinal hernia**).

Anatomy of hernia



dr_youssefhussein@yahoo.com

❖ Differences between indirect and direct inguinal hernia

	Indirect (Oblique) hernia	Direct hernia
1- Frequency	More frequent	Less frequent
2- Age	Infant (congenital)	Old age (acquired)
3- Size	Large	Small
4- Shape	Elongated	Globular
5- Exit and passage	Deep inguinal ring → inguinal canal → superficial ring → scrotum.	Inguinal triangle → inguinal canal → superficial ring. Do not reach the scrotum.
6- Line of descend	Downward, forward & medially through inguinal canal	Forward through the inguinal triangle.

❖ Differences between indirect and direct inguinal hernia

	Indirect (Oblique) hernia	Direct hernia
7- Neck	<u>L</u>ateral to inferior epigastric vessels	<u>M</u>edial to inferior epigastric vessels
8- Relation to spermatic cord	In front	Behind
9- Complications	Common	Less common
10- Deep ring test	Positive	Negative

Deep ring test

- If you reduce the hernia and close the **deep inguinal ring (1/2 inch above the midinguinal point)** by the thumb and then ask the patient cough to increase intraabdominal pressure

a- Positive in indirect (oblique) inguinal hernia: the hernia **cannot bulge** out.

b- Negative in direct inguinal hernia : the hernia **bulges** out medial to your thumb through the superficial ring in the inguinal triangle.

dr_youssefhussein@yahoo.com