

Anatomy of anterior abdominal wall

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Anterior abdominal wall

- Has 8 layers before you enter the peritoneal cavity
- Skin
- Subcutaneous tissue- Camper's fascia
 - - Scarper's Fascia
- External oblique
- Internal Oblique
- Transversus Abdominis
- Transversalis fascia
- Extraperitoneal Fat
- Parietal Peritonium

Anterior abdominal wall musculature composed of 2 muscle groups

1. Flat or horizontal group
2. Vertical group

Flat or horizontal group

- External oblique
- Internal oblique
- Transversus abdominis

Vertical group :

- Rectus abdominis
- Pyramidalis

External oblique :

Largest of muscles of the anterior abdominal wall

Most superficial of the muscles of the anterior abdominal wall

The fibres run downwards, forwards, medially (like the direction your hands take when in your pockets)

Origin:

Arises from the external surface of lower 8 ribs (5th to 12th)

Insertion:

- Pubic tubercle
- Anterior half of iliac crests
- Linea alba

The external oblique has 2 free edges

- Posteriorly
- Inferiorly (the inguinal ligament)

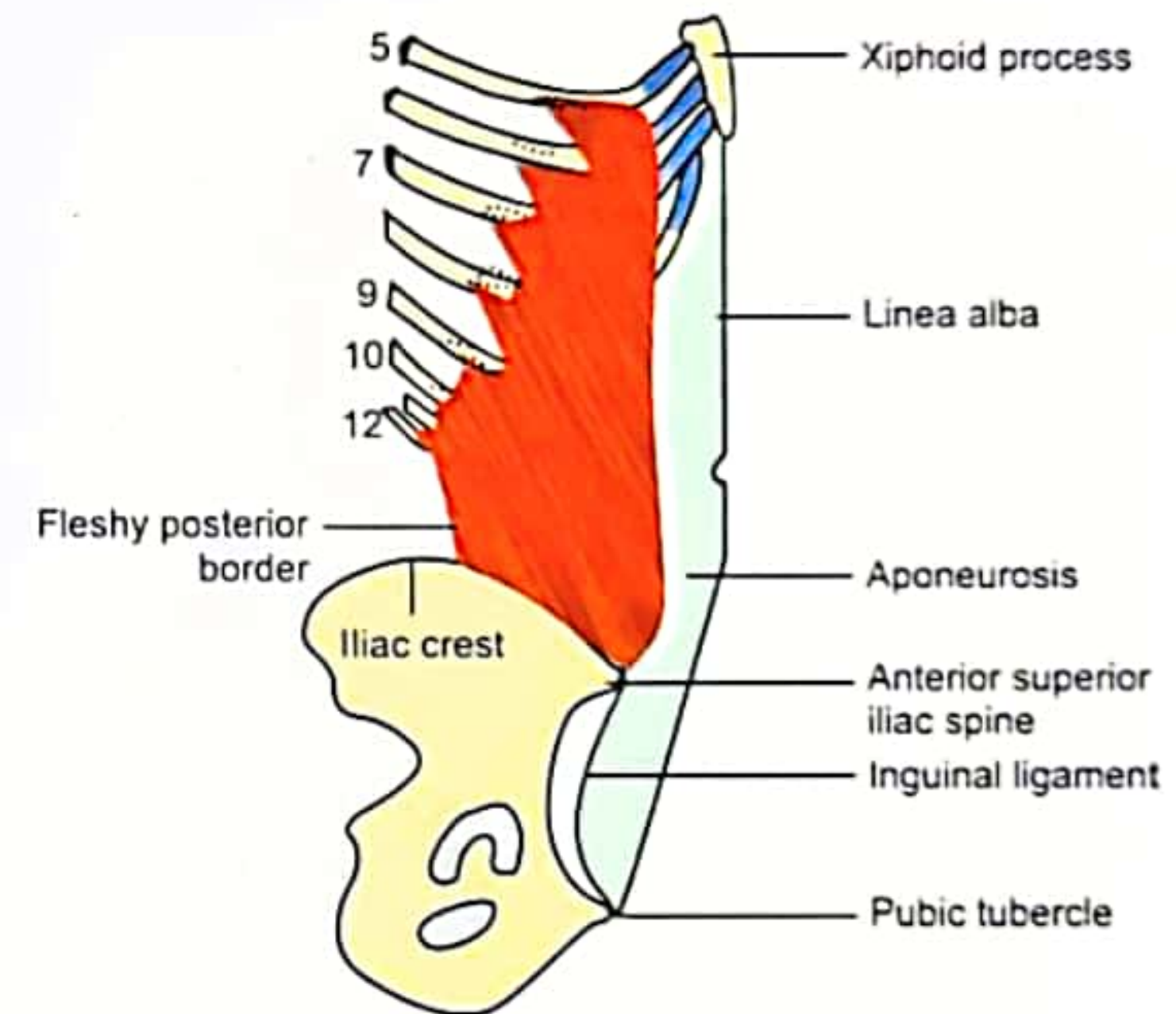


Fig. 79.6: Attachments of obliquus externus abdominis

Internal oblique muscle:

Intermediate among the 3 flat muscles of the anterior abdominal wall

Fibres run upwards, forwards and medially (90° to external oblique)

ORIGIN :

Arises from

Thoracolumbar fascia

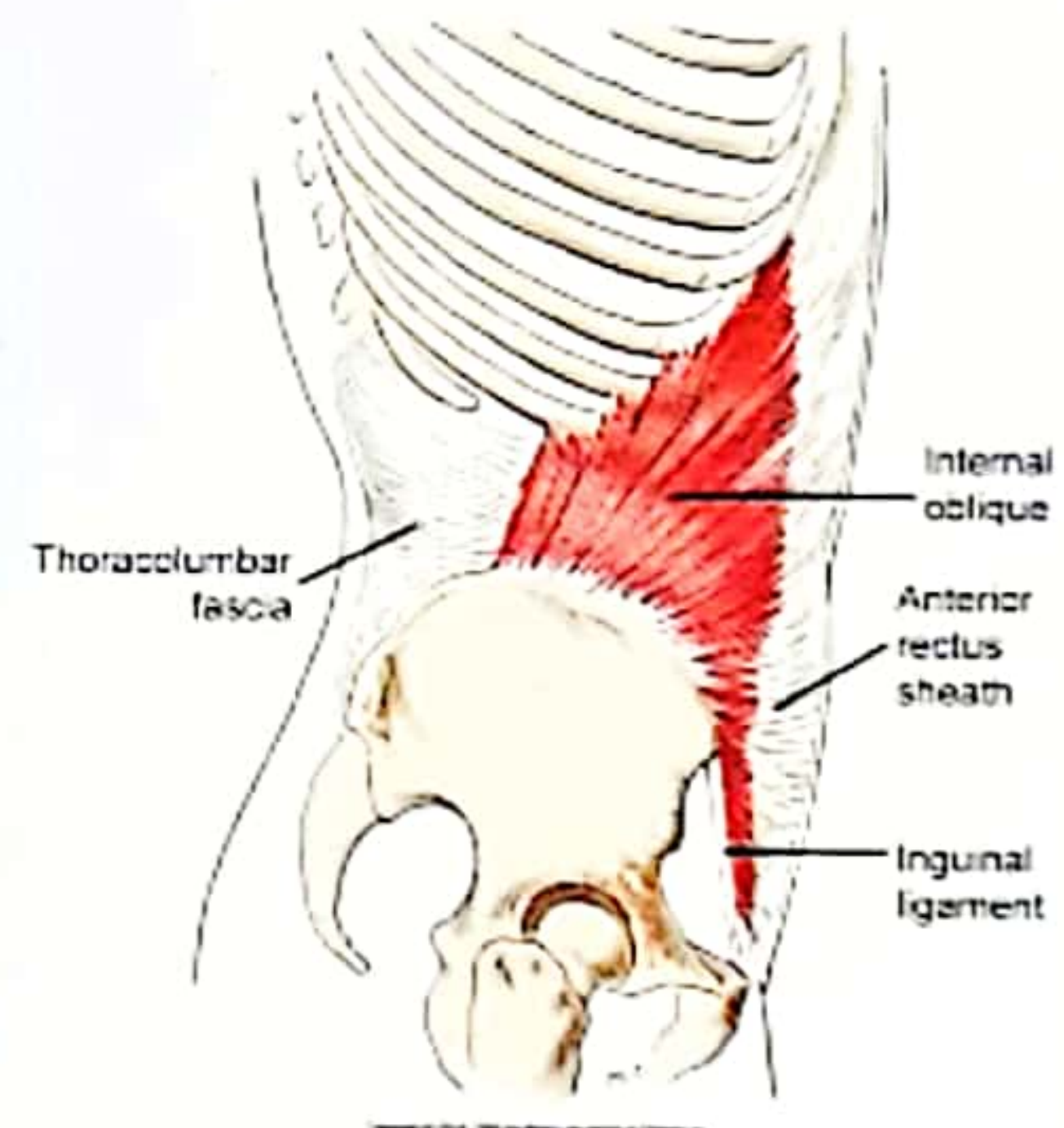
Anterior 2/3rds of iliac crest

Connective tissue deep to lateral third of inguinal ligament

INSERTION :

This muscle courses at right angles to the fibres of external oblique muscle.

Gets inserted on the inferior borders of 10th to 12 ribs, linea alba, pecten pubis via conjoint tendon.



The aponeurosis of the internal oblique muscle splits at the lateral edge of rectus muscle into anterior and posterior lamina to envelope the rectus abdominis muscle.

The anterior layer blends with aponeurosis of the external oblique.

Posterior to the rectus muscle, this aponeurosis blends with the aponeurosis of transversus abdominis to form a portion of the posterior rectus sheath.

Transversus abdominis muscle:

Innermost of the flat muscles

Fibres run more or less transversely

ORIGIN:

The muscle arises from the internal surface of 7th to 12th costal cartilages, thoracolumbar fascia, iliac crest, connective tissue deep to the lateral third of inguinal ligament.

INSERTION :

The muscle courses transversely in the midline.

Inserted into linea alba

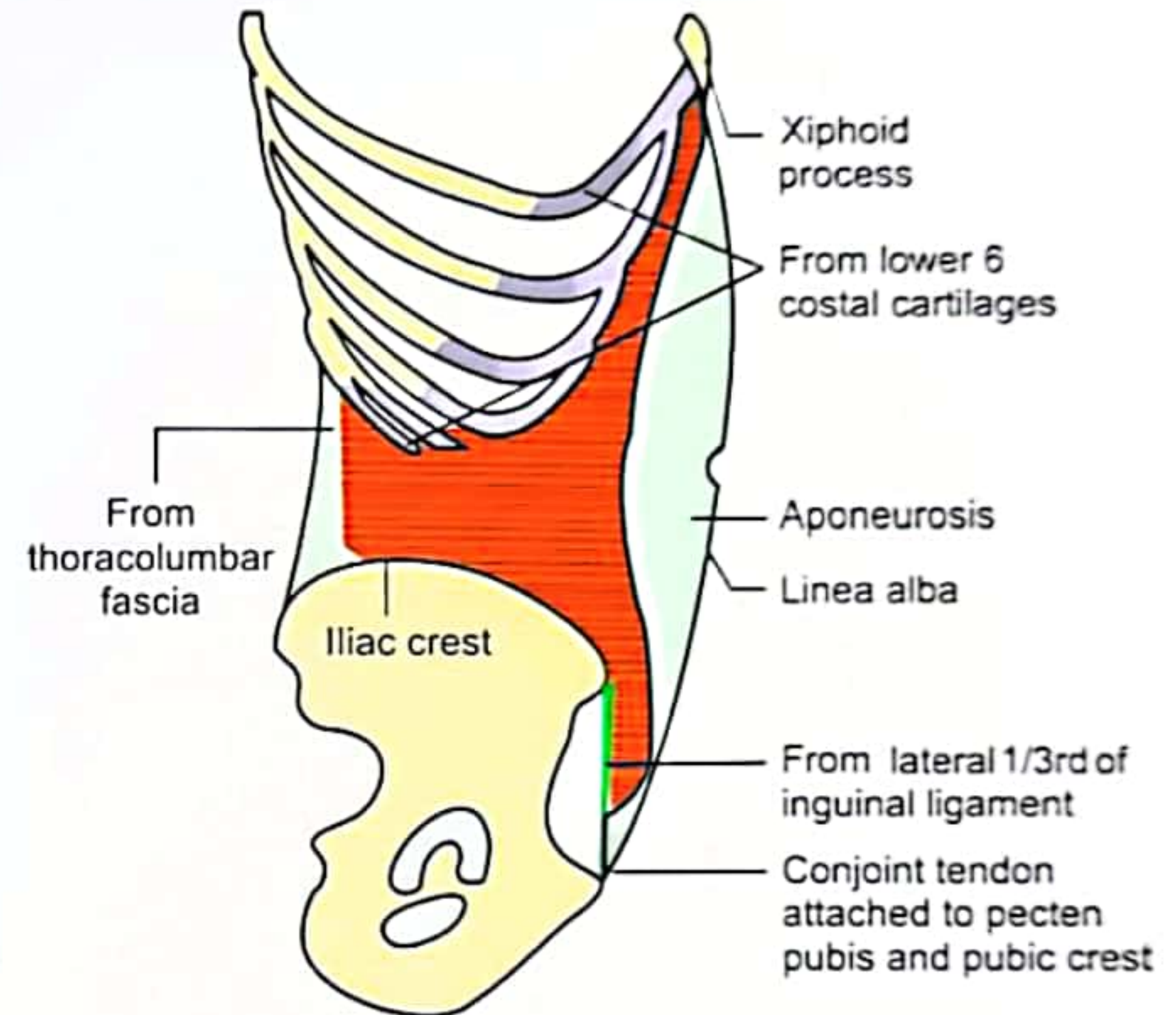


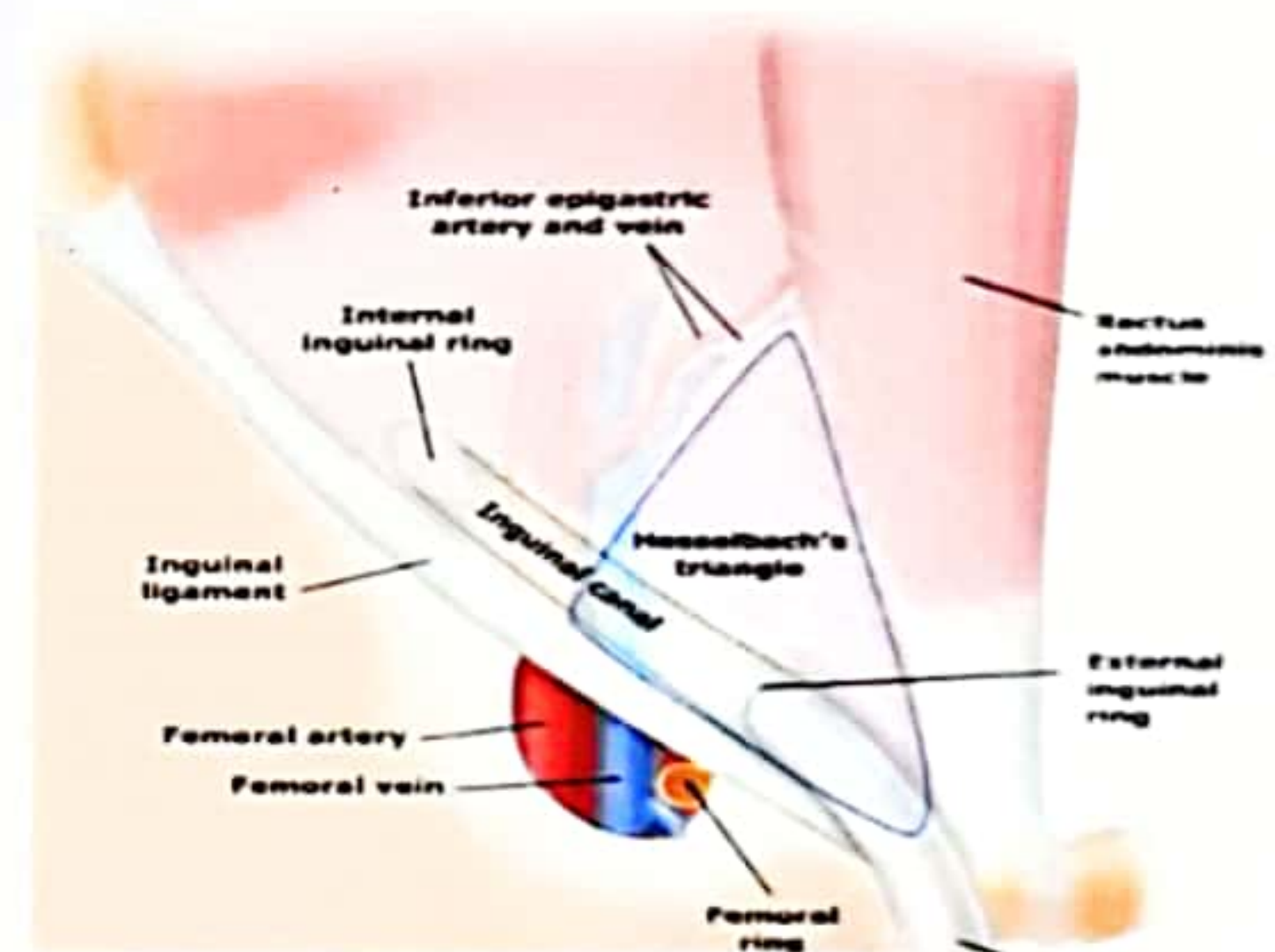
Fig. 79.9: Attachments of transversus abdominis

Conjoint tendon :

The tendon is the combined insertion of transversus abdominis and internal oblique muscles into pubic crest and pectineal line.

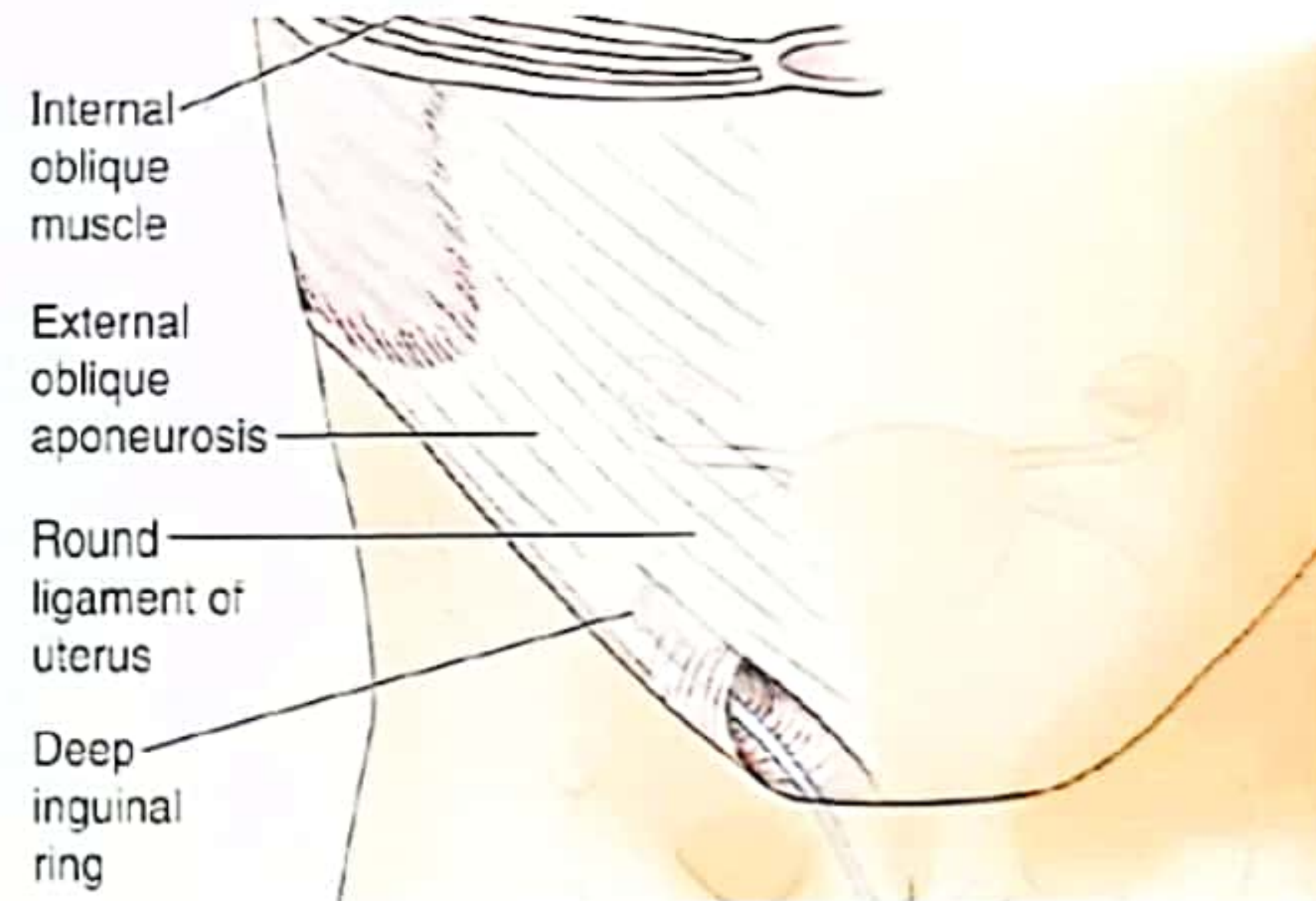
Also called falx inguinalis

Medial posterior wall of the inguinal canal is formed by the conjoint tendon



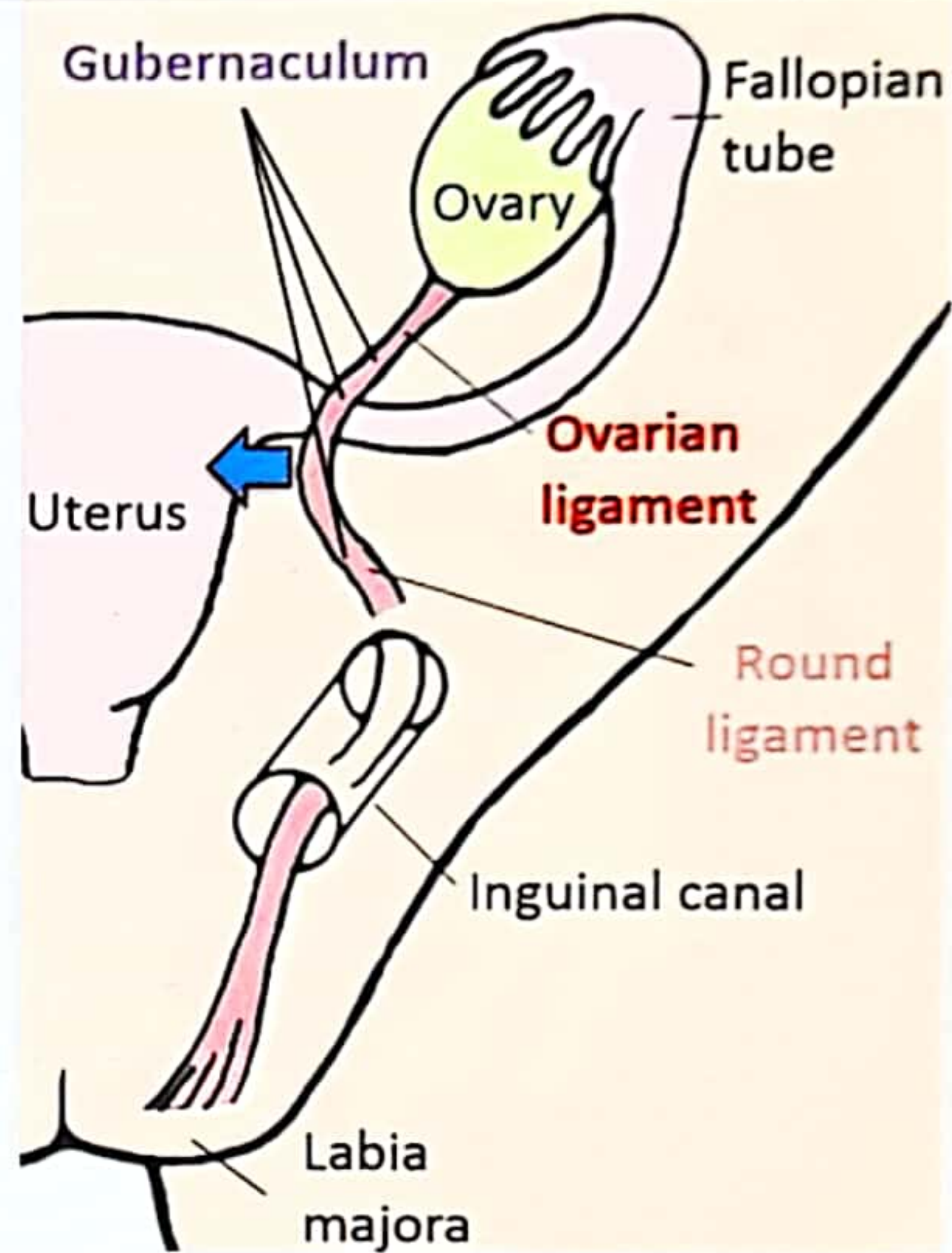
Superficial inguinal ring:

- Is an opening in the aponeurosis of the external oblique muscle just above the pubic crest.
- It is triangular in shape.
- It has 2 margins called the crura.
- The lateral crus is stronger and formed by the fibres of the inguinal ligament attached to the pubic tubercle.
- The medial crus is attached to the front of pubic symphysis.
- The intercrural fibres arch above the apex of the ring and help in holding the crura together.
- The intercrural fibres are derived from the fascial covering of the external oblique muscle and are at right angles to the fibres in the external oblique aponeurosis



Deep inguinal ring:

- Is an oval opening in the fascia transversalis
- Lies about ½ inch (1.3 cm) above the inguinal ligament between the anterior superior iliac spine and the pubic symphysis



Rectus abdominis muscle:

This muscle derives its name from its straight vertical course.

The right and left muscles are separated by the linea alba.

Origin :

The rectus abdominis arises by two tendinous heads, from the anterior surface of pubic symphysis and pubic crest.

Insertion :

It has a fleshy insertion into the xiphoid process and 5th, 6th and 7th costal cartilages.

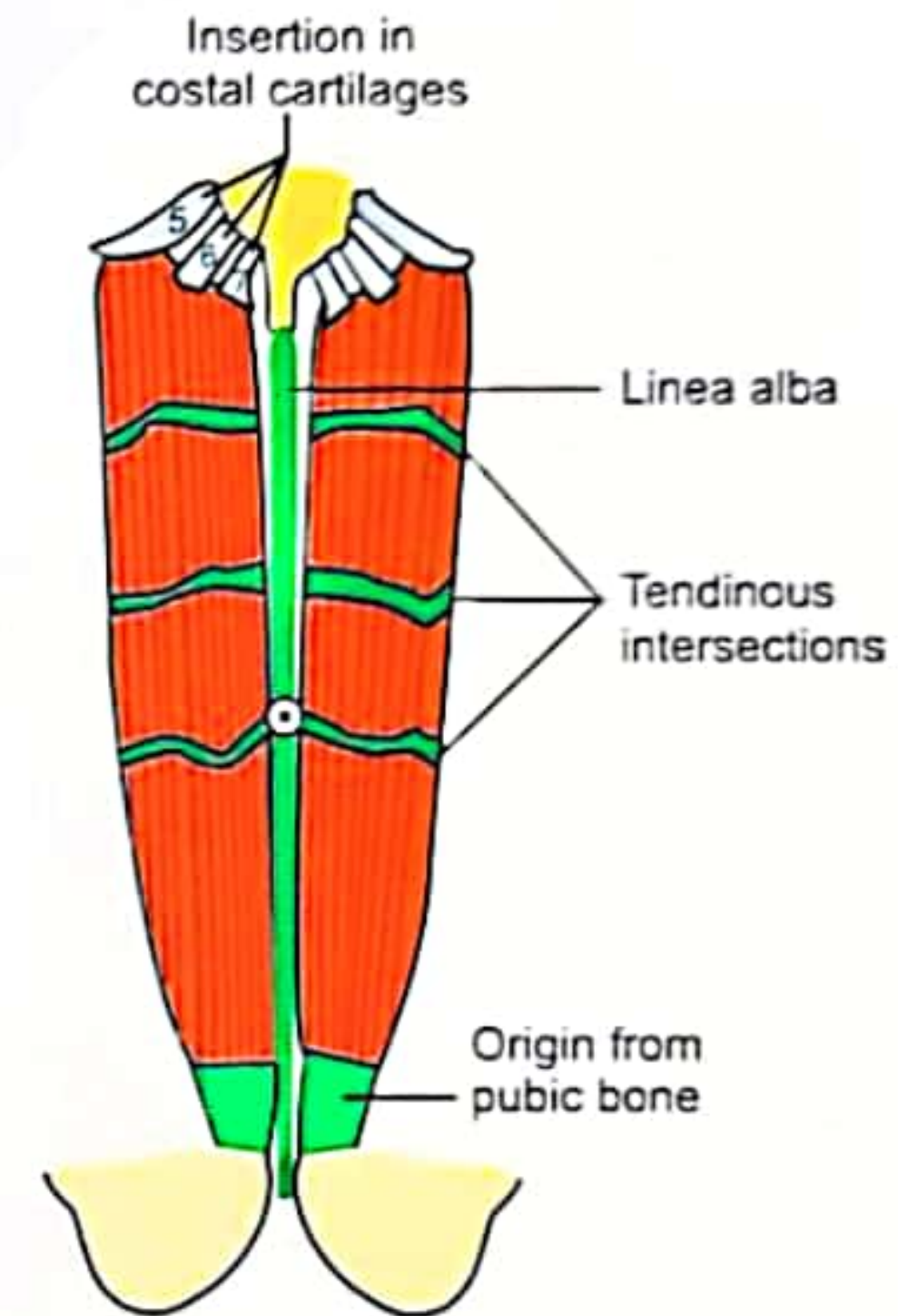


Fig. 79.11: Attachments of **rectus abdominis** muscles

Three tendinous intersections:

1. Tip of the xiphoid process
 2. At the umbilicus
 3. Midway between the previous two.
- Each intersection is attached to the anterior wall of the rectus sheath but not to the posterior wall.
 - The intersections divide the longer muscle into shorter segments for better action.

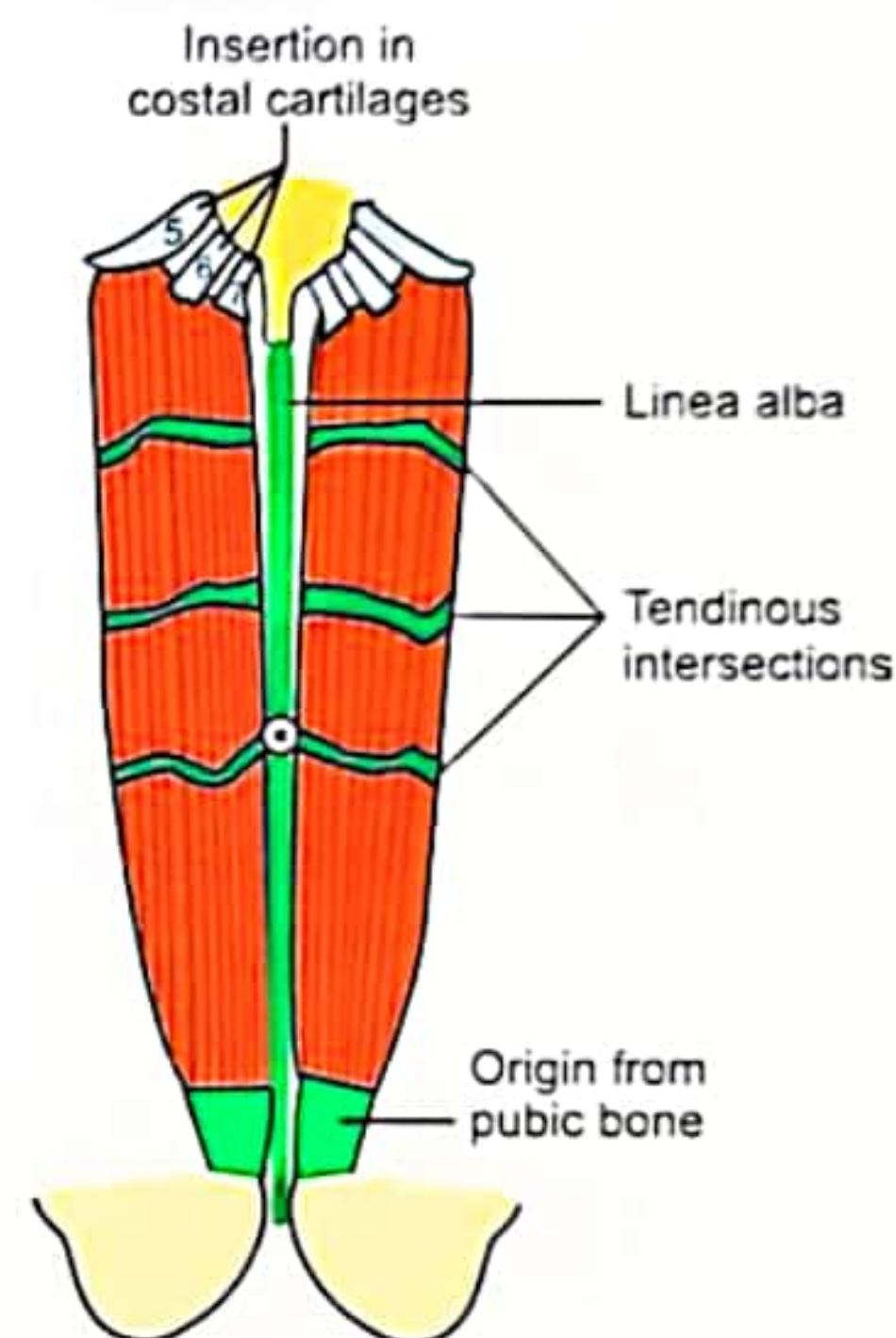


Fig. 79.11: Attachments of **rectus abdominis** muscles

Action of rectus abdominis muscle:

It is the flexor of the vertebral column.

It supports the abdominal viscera.

Testing muscle function:

For testing the function of the rectus abdominis, the subject is asked to raise the head and shoulder from the bed against resistance. The contraction of the normal muscle can be seen and felt.

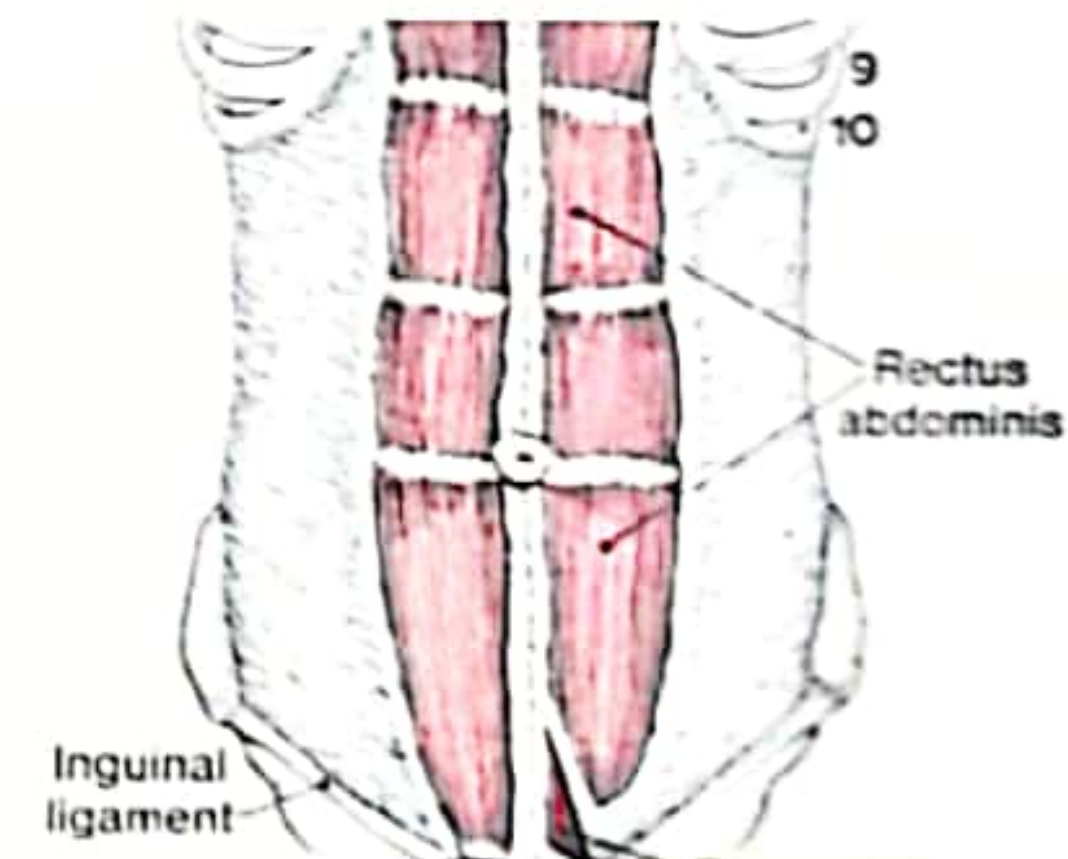
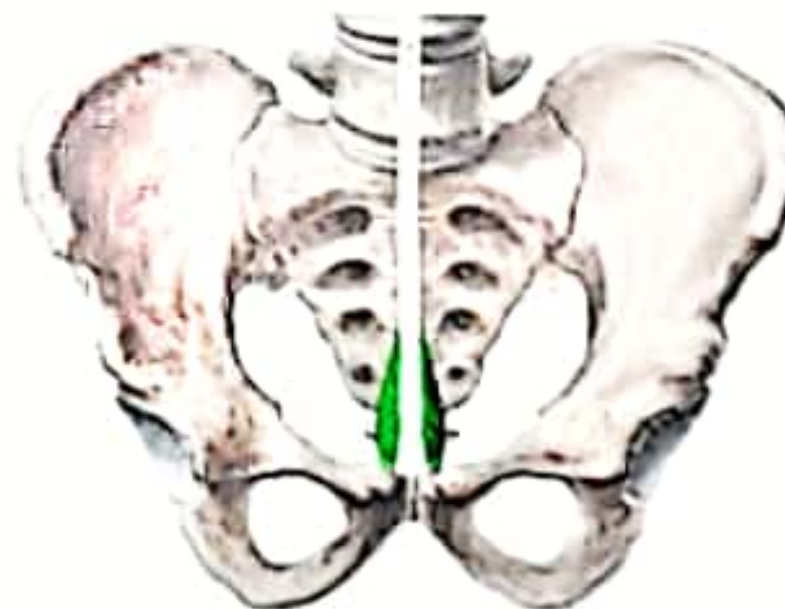
Pyramidalis :

Small muscle situated in front of the lower part of rectus abdominis muscle

Origin : from the anterior surface of the body of pubis by a rounded tendon

Insertion : into linea alba

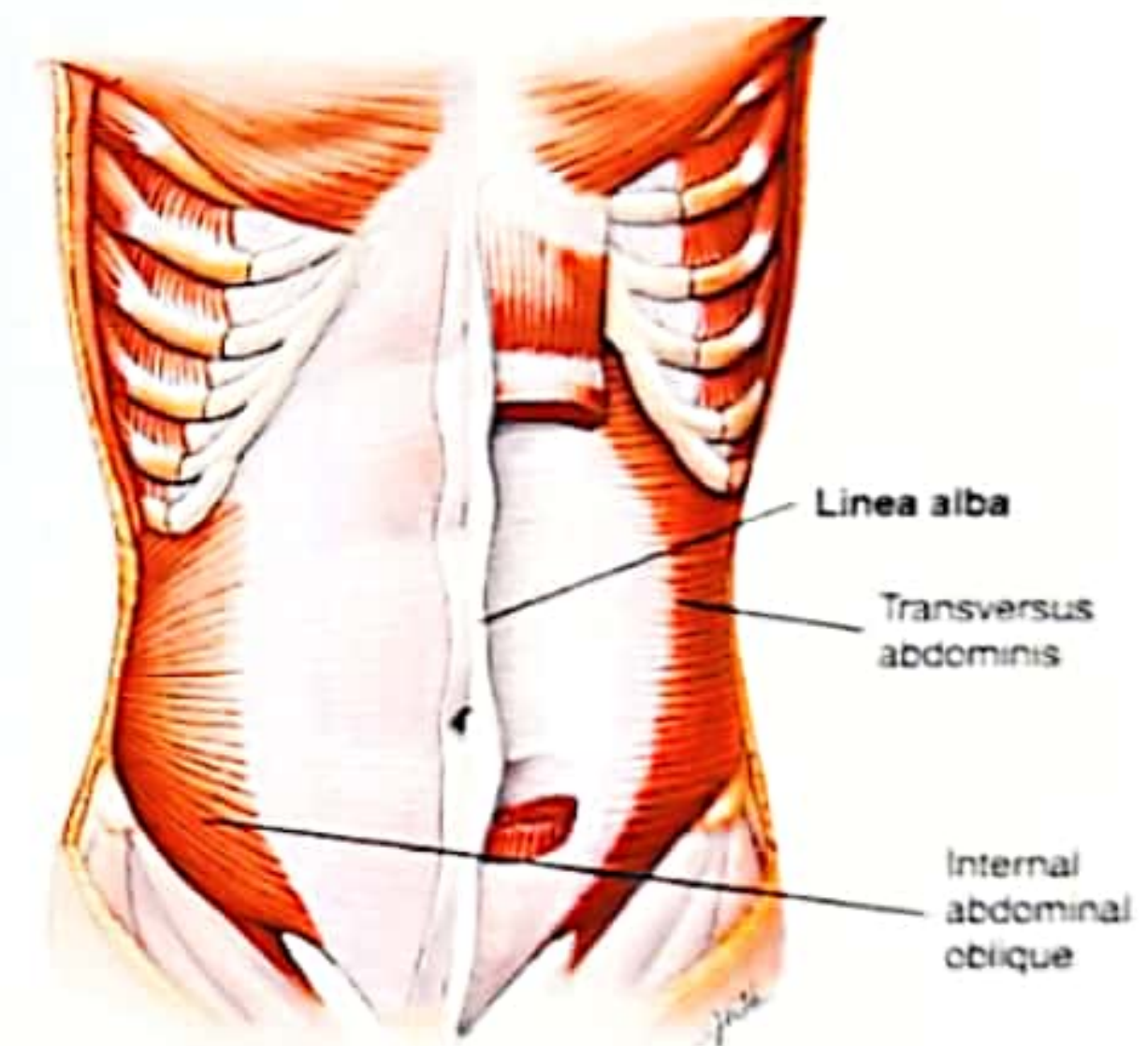
Action : it is the tensor of linea alba



Linea alba:

- Tendinous raphe extending from the xiphoid process to the pubic symphysis.
- It is formed by the decussation of the fibres in the aponeurosis of the flat muscles of the two sides.
- Therefore linea alba can be regarded as a common insertion of the right and left oblique and transversus muscles.
- The pyramidalis muscles are inserted in its lower part.

- The umbilicus is located just below its midpoint.
- Its infraumbilical part is narrower compared to supraumbilical part



A 26 yr old female presents with right iliac fossa pain and is taken up for appendicectomy. An incision is made through skin and then which muscle fibre passing inferiorly in an oblique direction?

- a) Internal oblique
- b) External oblique
- c) Rectus abdominis
- d) Pyramidalis

While examining an athletic female of 26 yrs, u notice a “six pack”.Which muscle is this?

- a) Rectus abdominis
- b) Transversus abdominis
- c) Cremaster
- d) External oblique

Inguinal canal

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Length :

4 cm oblique intermuscular passage in the lower part of the anterior abdominal wall.

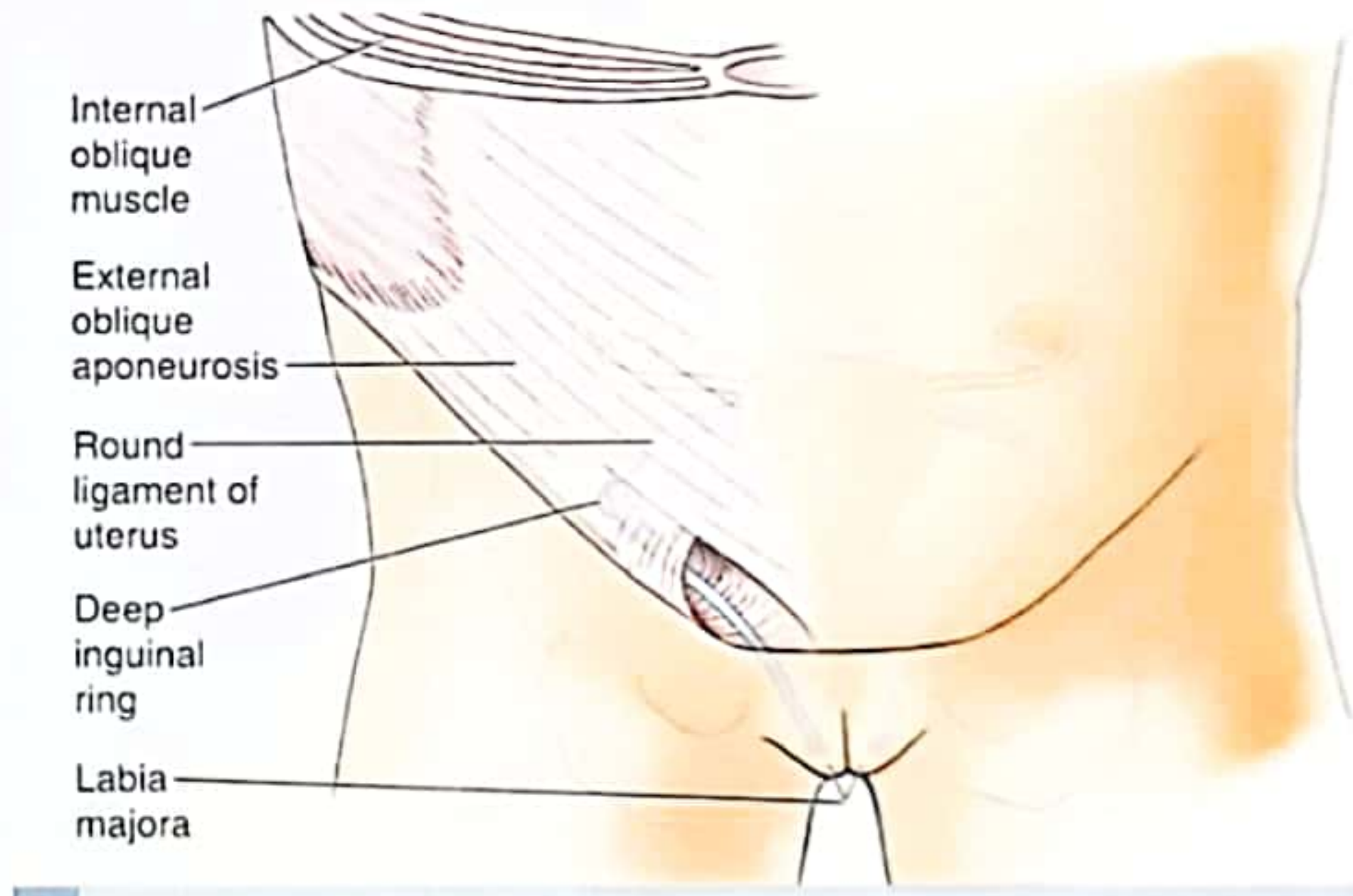
Location :

just above the medial half of inguinal ligament

Extent :

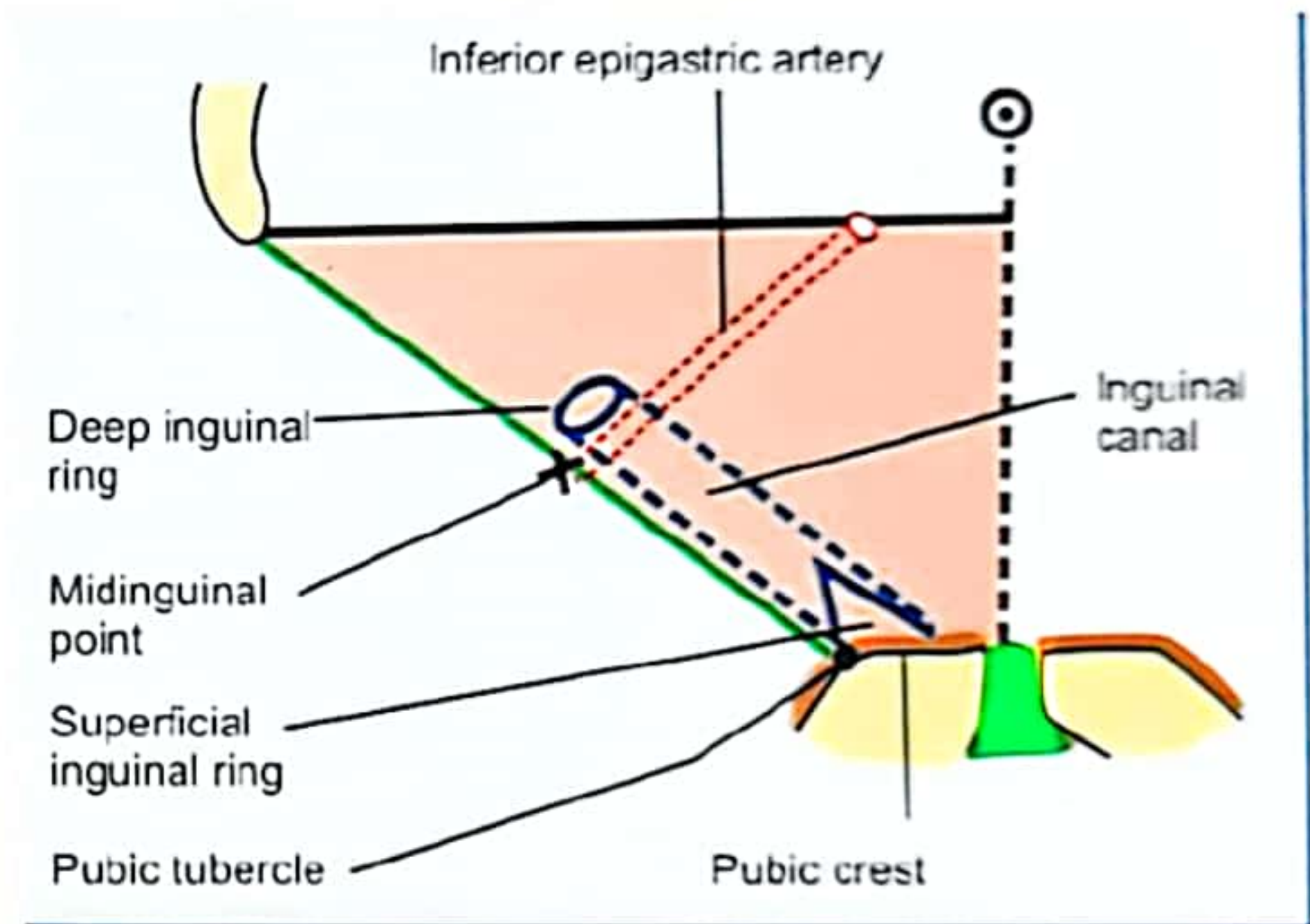
- Begins at the deep inguinal ring (deep inguinal ring is a defect in the fascia transversalis)
- Courses in the anterior, inferior and medial direction
- To end at the superficial inguinal ring (superficial inguinal ring is a defect in the external oblique aponeurosis)

Inguinal canal in females



Surface marking of the inguinal canal:

- Marked by drawing 2 parallel lines (which are 1 cm apart and 4 cm long) just above the medial half of the inguinal ligament.
- The deep ring is drawn at the lateral end of these lines 1 cm above the midinguinal point.
- The superficial ring is drawn at the medial end of the parallel lines just above the pubic tubercle.



Contents of the inguinal canal :

Male :

Spermatic cord

Ilioinguinal nerve

Spermatic cord consists of

- Vas deferens
- Testicular artery
- Pampiniform plexus of veins
- Artery to ductus deferens
- Fibrous remnant of processus vaginalis

- Lymphatics
- Genital branch of genitofemoral nerve
- Autonomic nerve plexus

The ilioinguinal nerve enters the inguinal canal by piercing its roof.