Inguinal ligament

(Poubart's ligament)

★ **Definition:** It is the lower part of external oblique aponeurosis infolding upon itself upwards & backwards.

★ **Attachment:** It extends between A.S.I.S. laterally and pubic tubercle medially.

★ **Surfaces:**

1) **Upper concave** surface towards the abdomen:
   - It gives part of **origin of** internal abdominal oblique and transversus abdominis muscles.
   - It forms the **floor of the inguinal canal , thus related spermatic cord in males or round ligament in females**.
2) **Lower convex** surface towards the lower limb:
   - It gives attachement to fascia lata.

★ **Extensions:**

1) Lacunar ligament: (Gimbernat's ligament)

- It is a **triangular** ligament occupies the intervals between medial part of the inguinal ligament and medial part of pectineal line. It has the followings :
- **Apex** : attached in pubic tubercle.
- **Anterior border:** attached to inguinal ligament.
- **Posterior border**: attached to medial part of pectineal line.
- **A** sharp free crescentric **base** forms the medial border of femoral ring.
- **It has 2 surfaces : Upper surface** towards the abdomen and **lower surface** towards the thigh.

2) Pectineal ligament : (Cooper's ligament)

- It is a fibrous band extends laterally from the base of

lacunar ligament along the pectineal line posterior to femoral ring .

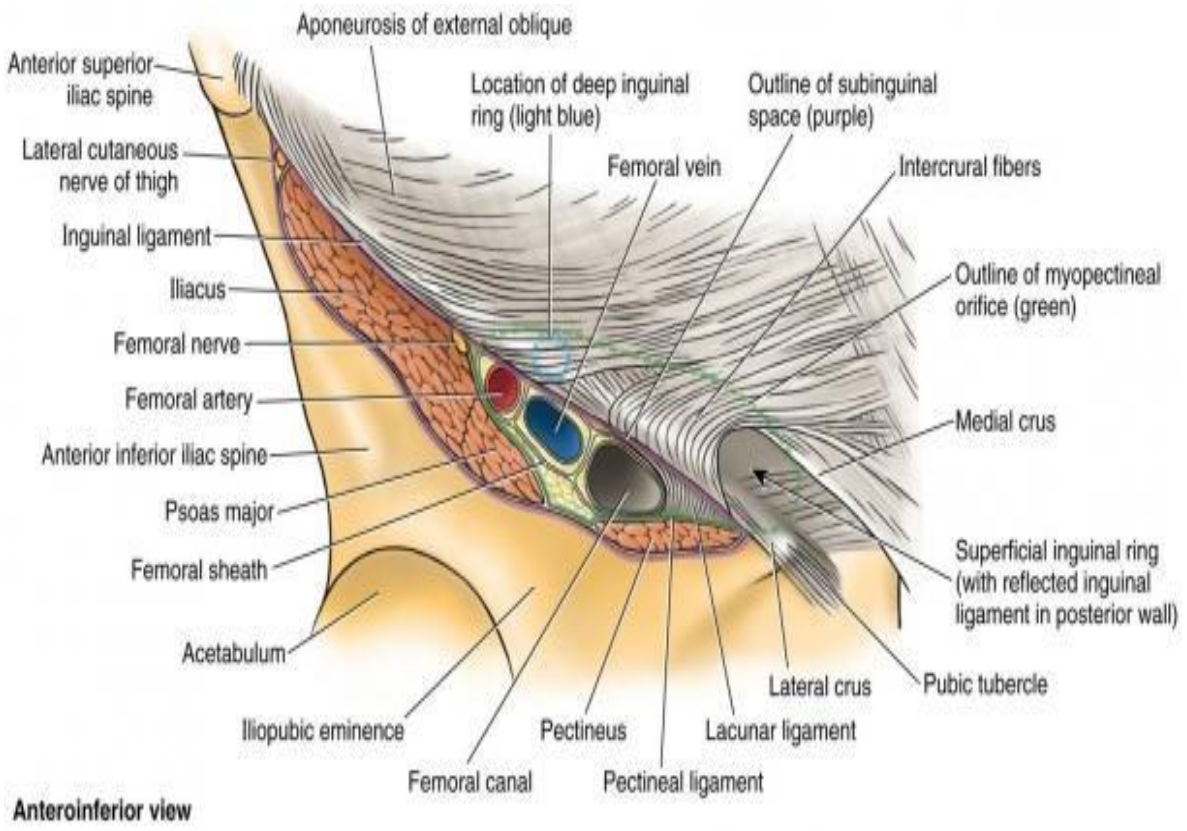
3) Reflected part:

- It runs upwards & medial behind the spermatic cord to become attached into the lower part of linea alba.
- It forces the medial 1/4 of the posterior wall of inguinal canal.

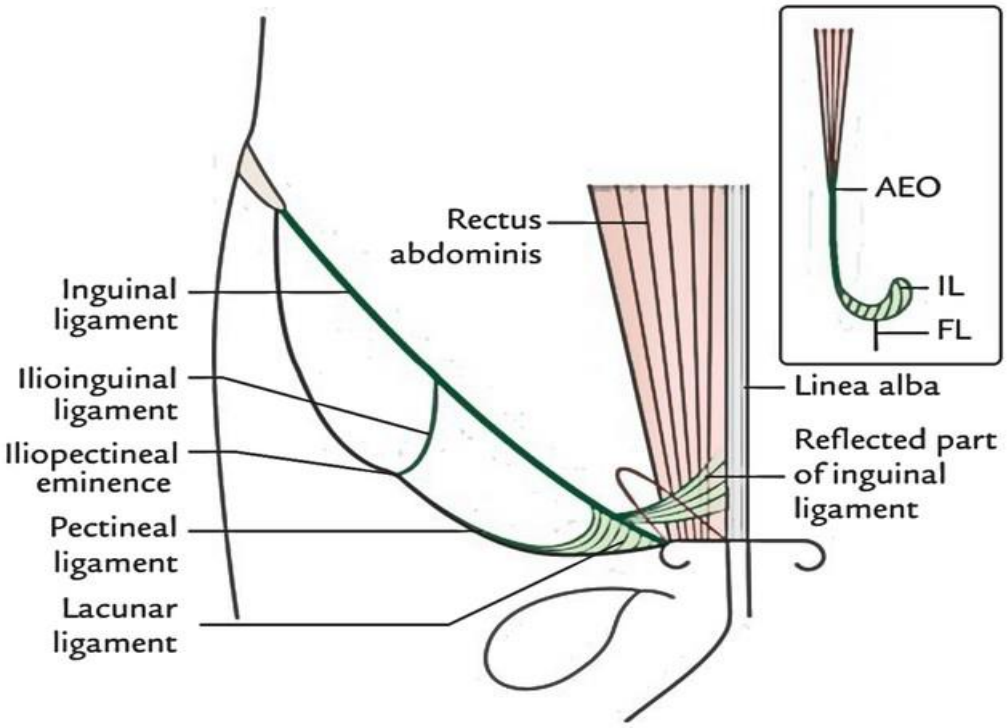
★ **Relations :**

- The following structures are arranged from lateral to medial deep to inguinal ligament : Lateral cutaneous nerve of the thigh . femoral nerve , femoral branch of genitofemoral nerve . femoral sheath , femoral artery , femoral vein , femoral canal and lacunar ligament .

★ **Function :** It is a **retinaculum** retaining the structures deep to the inguinal ligament against bone.



Inguinal ligament



Inguinal canal

★ It is an **oblique passage** in the lower part of muscles of anterior abdominal wall.

★ **Length:** 1 $^{1}/_{2}$ inches (4 cm).

★ **Direction:** Downwards, forwards & medially.

★ It lies just **above** the medial 1/2 of inguinal ligament

★ It is well developed and wider **in males**.

★ **Begins:** At the **deep (internal) inguinal ring** .

- It is oval opening in the **fascia transversalis** , 1/2 inch **above** the mid-inguinal point (midway between ASIS and symphysis pubis), just **lateral to inferior epigastric** vessels.

- It **transmits** the structures forming the spermatic cord in males or round ligament of uterus in females.
- It **sends** fascial extension ,around the structures forming the spermatic cord , called **internal spermatic fascia**.

* **Ends:** At the **superficial (external) inguinal ring**

- It is a triangular opening in the **external abdominal oblique** aponeurosis.
- It lies above and lateral to **pubic crest**.
- Its base is the pubic crest and it has a **medial crus and a lateral crus** which are attached by **intercrural fibers**.
- It **transmits** the spermatic cord in males or round ligament of uterus in females and ilioinguinal nerve in both sexes.
- It **sends** fascial extension around the spermatic cord called **external spermatic fascia.**

★ **Contents:**

1. Spermatic cord in **male** or round ligament of uterus in **female**.
2. **Ilio-inguinal nerve** which pierces the internal oblique to enter the canal passes anterior then below the spermatic cord then pass through the superficial inguinal ring to supply the adjoining skin.

★ **Boundaries:**

a. Anterior wall:

1. **External oblique aponeurosis** along the whole length of the canal.
2. **Lower fibers of internal oblique** along the lateral 1/2 of the canal.

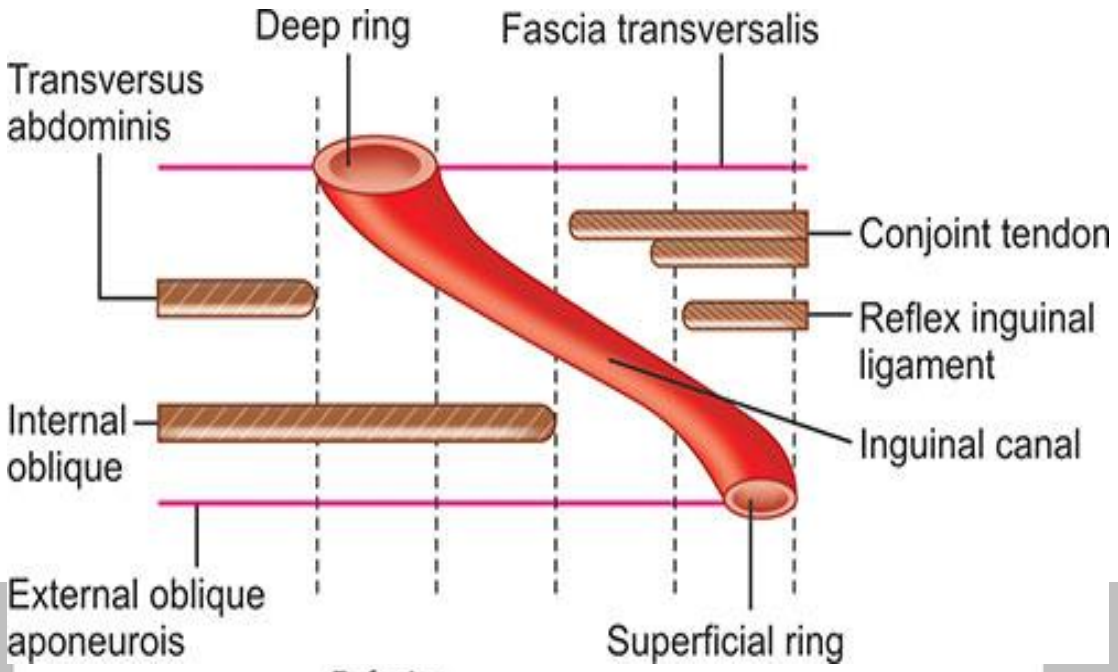
b. Posterior Wall: the followings from posterior to anterior :

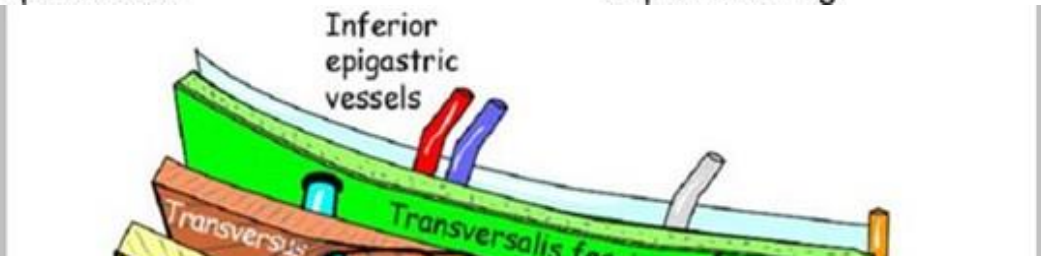
1. **Fascia transversalis**: Along the whole length.
2. **Conjoint tendon**: Along the medial 1/2 of the canal.
3. **Reflected part of inguinal** ligament: Along the medial 1/4 of the canal.

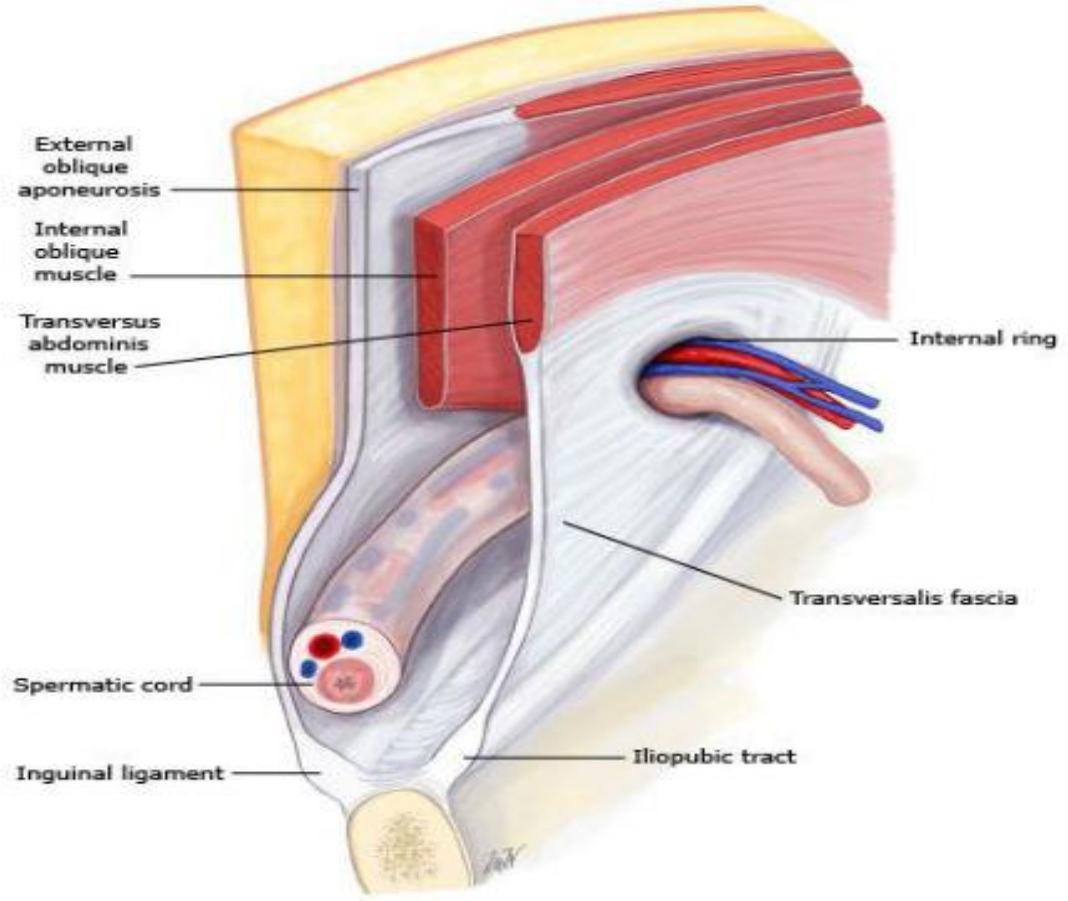
c. Floor:

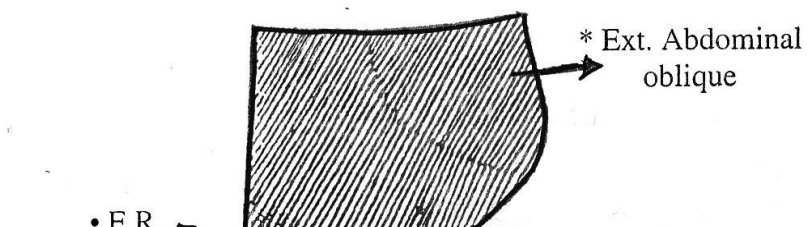
1. Upper concave surface of ***inguinal*** ligament along whole length of the canal.
2. ***Lacunar*** ligament along the medial part of the canal.

d. Roof: Arched lower fibres of internal oblique & transversus abdominis.

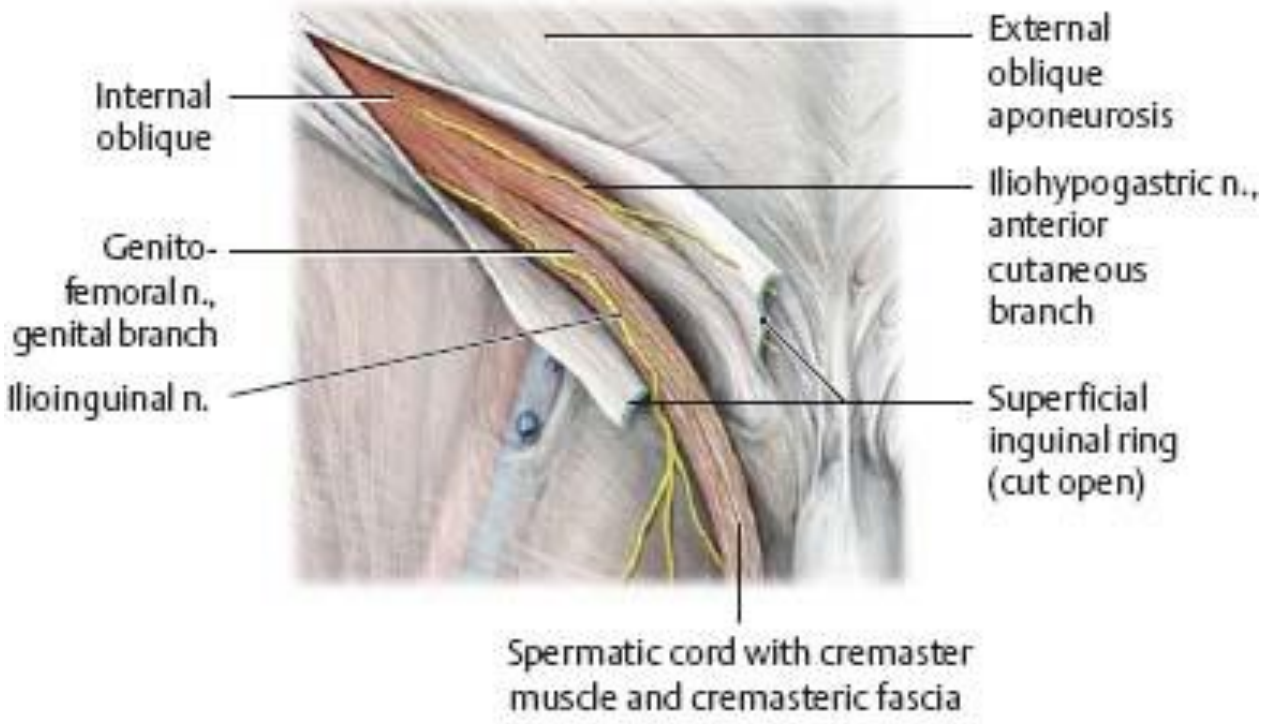




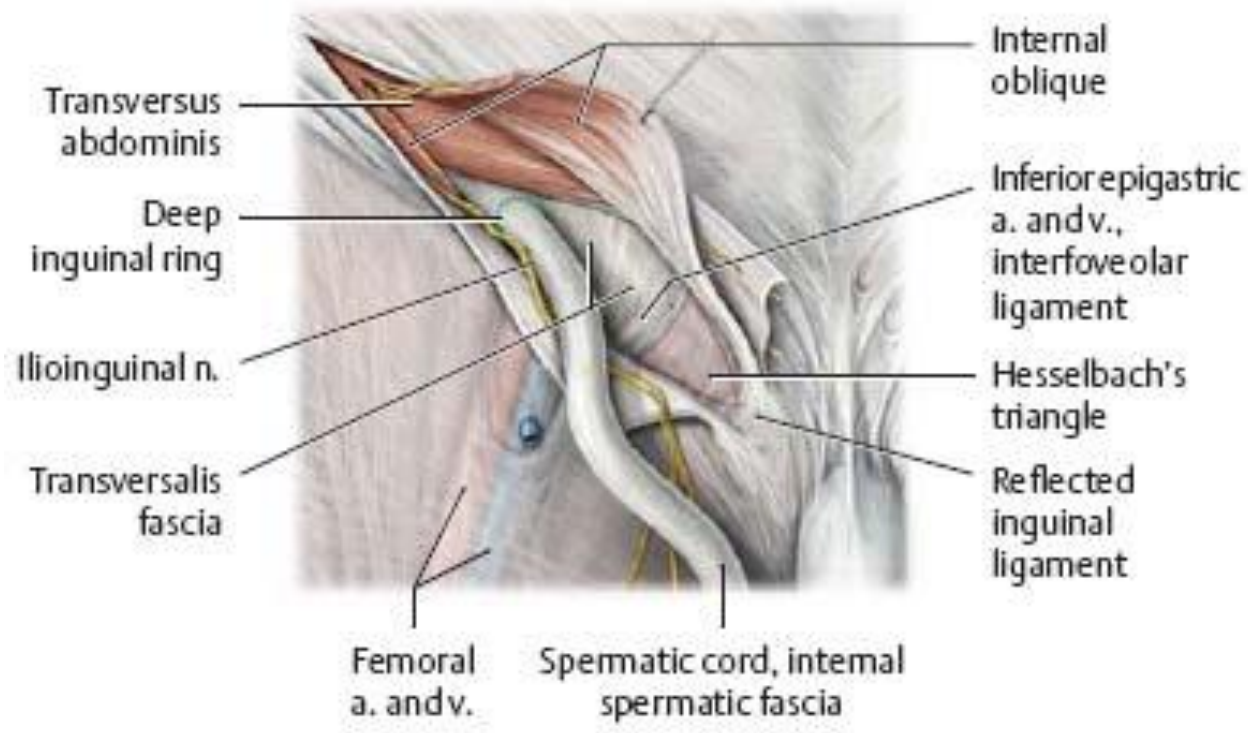

External oblique aponeurosis
Internal oblique muscle
Transversus abdominis muscle
Internal ring
Transversalis fascia
Spermatic cord
Inguinal ligament
Iliopubic tract


* Ext. Abdominal oblique

Boundaries of inguinal canal *

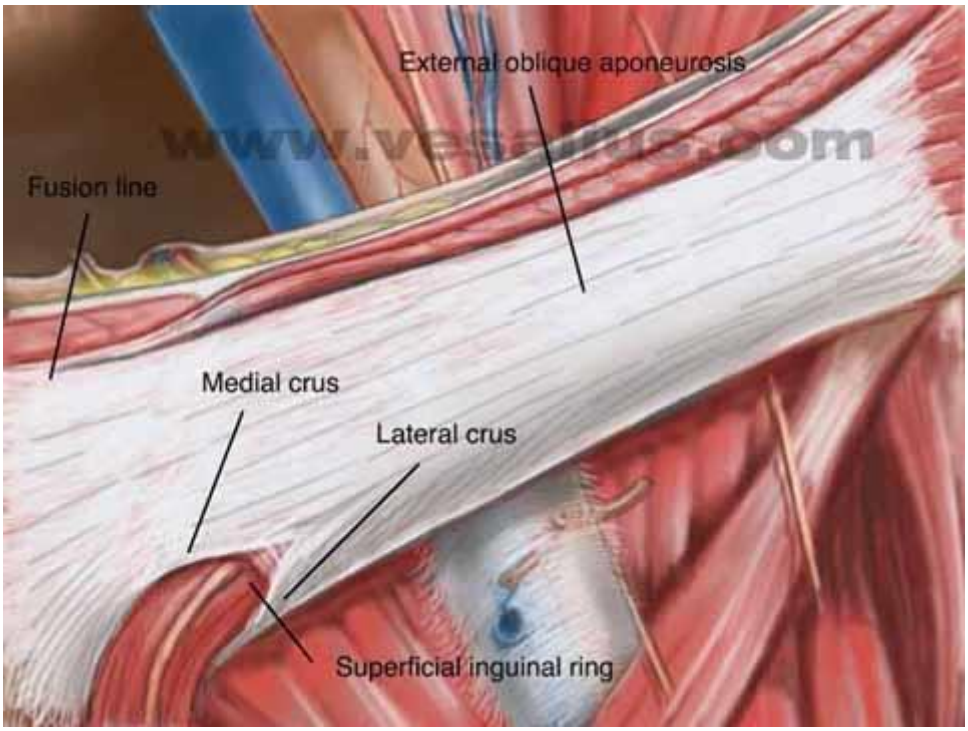


A *Divided:* External oblique aponeurosis.

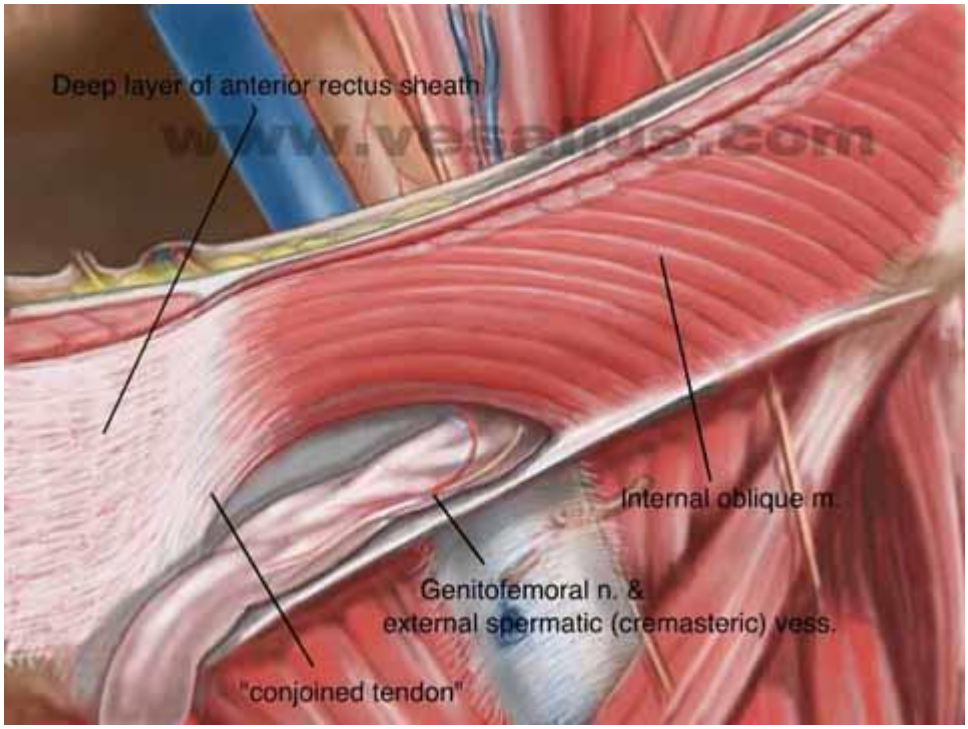


B *Divided:* Internal oblique and cremaster.

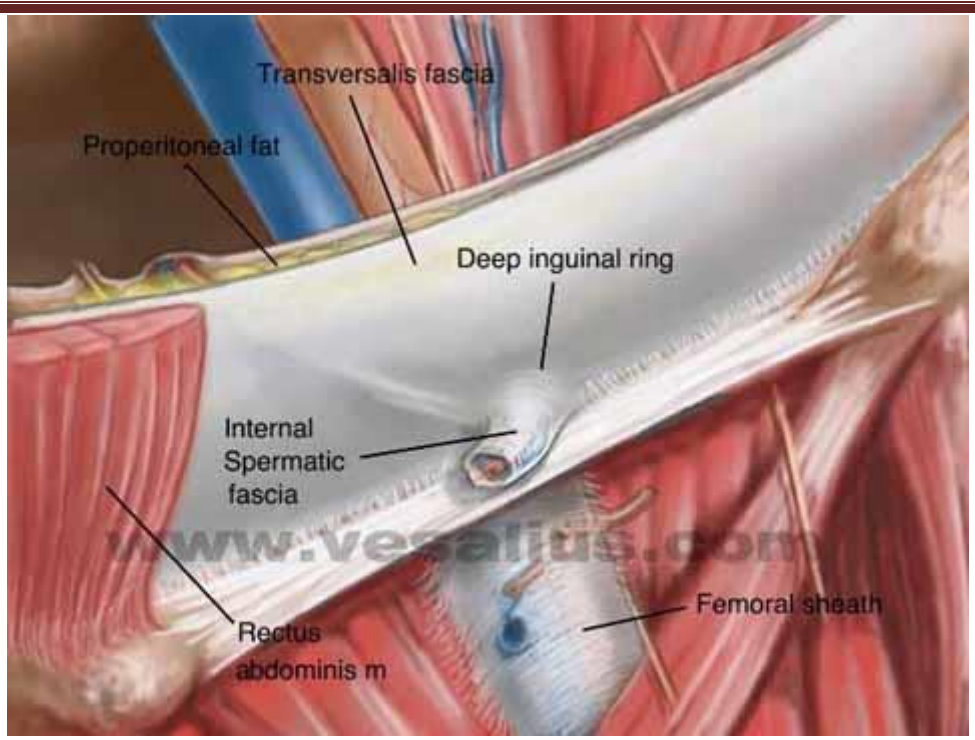
* Inguinal canal at operation *



External abdominal oblique apponeurosis & external inguinal ring



External abdominal oblique apponeurosis is removed to show inguinal canal



External abdominal oblique apponeurosis & internal abdominal oblique are removed to show fascia transversalis and internal inguinal ring

★ Applied anatomy:-

A) Inguinal canal is a weaker area in anterior abdominal wall due to:

a. The muscles are **aponeurotic** which are weaker than fleshy parts.

b. Internal oblique & transversus abdominis **arch** above the spermatic cord.

c. The **spermatic cord** passes between the layers of the abdominal wall.

d. Presence of internal inguinal & external inguinal **rings**.

B) This weakness is normally compensated by the following mechanisms:

1) **Shutter mechanism:** During standing, coughing or staining, contraction of lower fibers of internal abdominal oblique which have

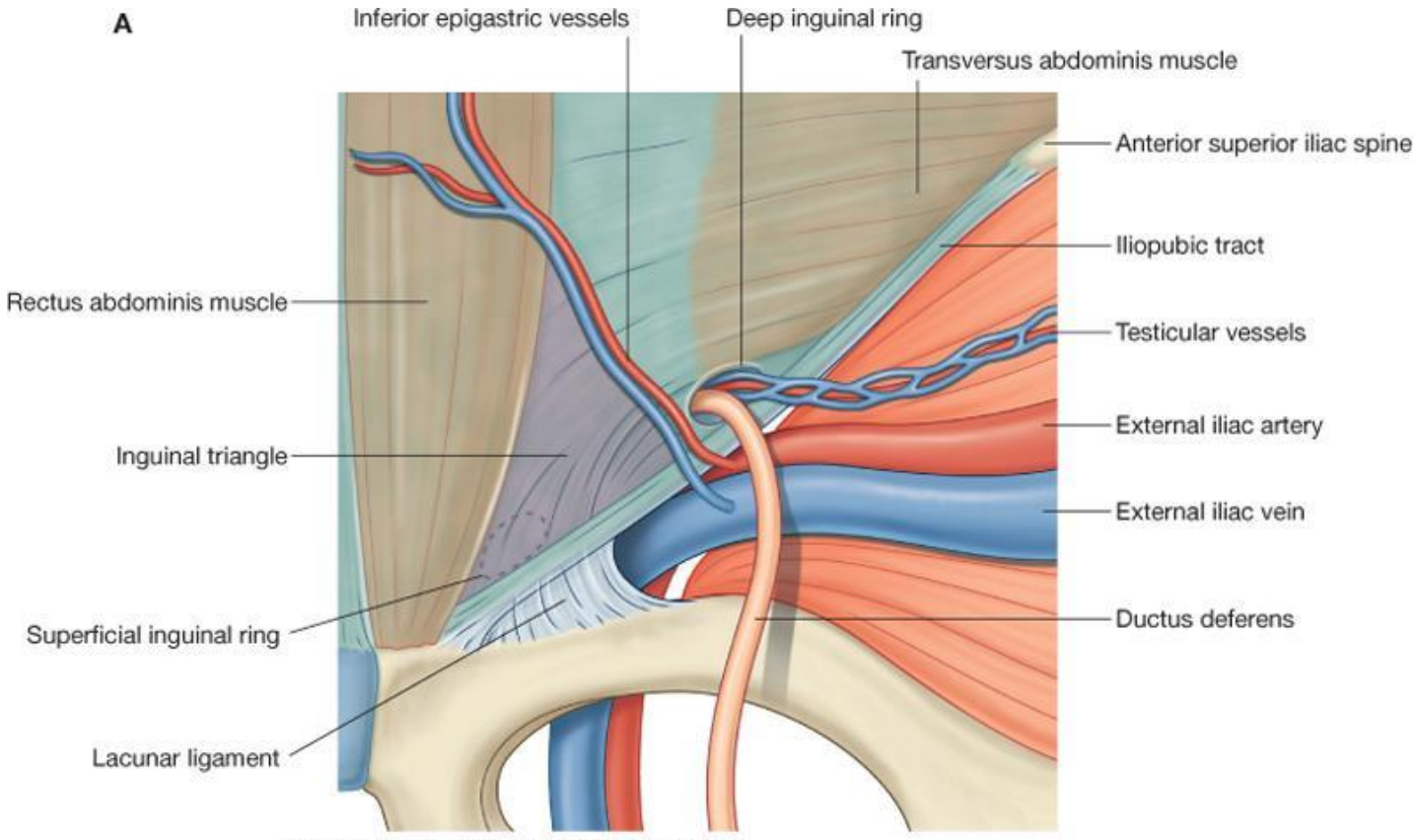
a triple relation to the spermatic cord & inguinal canal leading to closure of the inguinal canal around the spermatic cord.

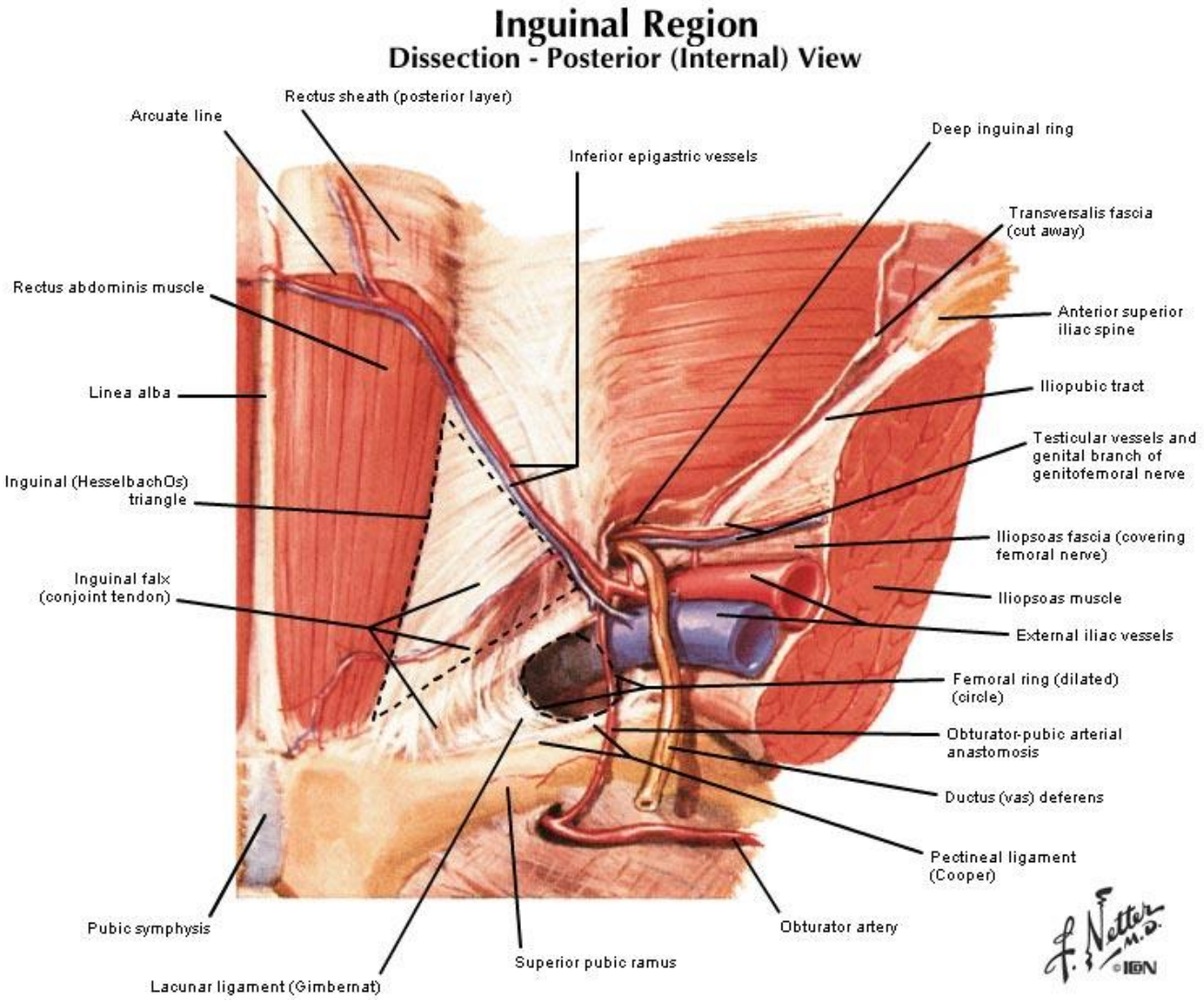
2) **Valvular mechanism:** The inguinal canal is oblique thus the internal ring and external ring are not on the same line. Consequently, increase intra-abdominal pressure forcing the posterior wall of the canal against the anterior wall.
   - At the same time, contraction of the external oblique approximates the anterior wall of the canal to the posterior wall.
3) **The superficial ring** is compensated by strong part of posterior wall which is forced by the conjoint tendon and reflected part of inguinal ligament.
4) **The deep ring** is compensated by strong part of anterior wall which is forced by the fleshy lower fibers of internal oblique.
5) Contraction of external abdominal oblique muscle during increase intra- abdominal pressure leading to **narrowing of external ring**.
6) **The intercrural fibres** prevent separation of the 2 crura of external inguinal ring.
7) **Cremasteric mechanism:** contraction of cremasteric muscle during increased intra- abdominal pressure causes bulging of the cord into the canal and external ring leading to bluging of the canal and external ring.
8) Contraction of cremasteric muscle during increased intra- abdominal pressure leading to **pull the testis upwards** in attempt to close external inguinal ring.
9) Certain muscle fibers from transversus abdominis are attached to the fascia transversalis above the internal inguinal ring and contraction of these fibers leading to **narrowing of internal ring during** coughing or straining.

C) Weakness in the inguinal canal , widening of inguinal rings and failure of compensatory mechanisms leads to inguinal hernias .

Inguinal (Haselbach's) Triangle

* It lies between **inguinal ligament** , lateral border of **rectus** abdominis and **inferior epigastric** vessels. Its **floor** is formed by fascia transversalis & forced medially by conjoint tendon & reflected part of inguinal ligament (i.e.posterior wall of inguinal canal).
* It is divided by medial umbilical ligament into 2 ***parts (medial & lateral parts).***
* ***Applied anatomy:*** Weakness of this triangle predispose to direct inguinal hernia.




Inguinal Region
Dissection - Posterior (Internal) View
Arcuate line
Rectus sheath (posterior layer)
Inferior epigastric vessels
Deep inguinal ring
Transversalis fascia (cut away)
Rectus abdominis muscle
Anterior superior iliac spine
Linea alba
Iliopubic tract
Testicular vessels and genital branch of genitofemoral nerve
Inguinal (HesselbachOs) triangle
Iliopsoas fascia (covering femoral nerve)
Inguinal falx (conjoint tendon)
Iliopsoas muscle
External iliac vessels
Femoral ring (dilated) (circle)
Obturator-pubic arterial anastomosis
Ductus (vas) deferens
Pectineal ligament (Cooper)
Pubic symphysis
Obturator artery
Superior pubic ramus
Lacunar ligament (Gimbernat)
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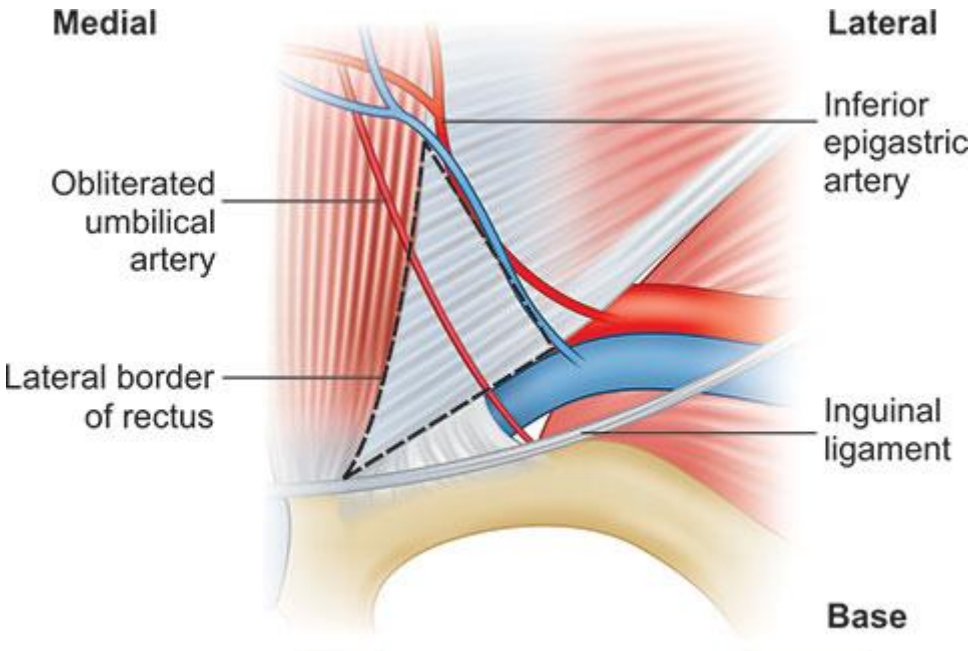
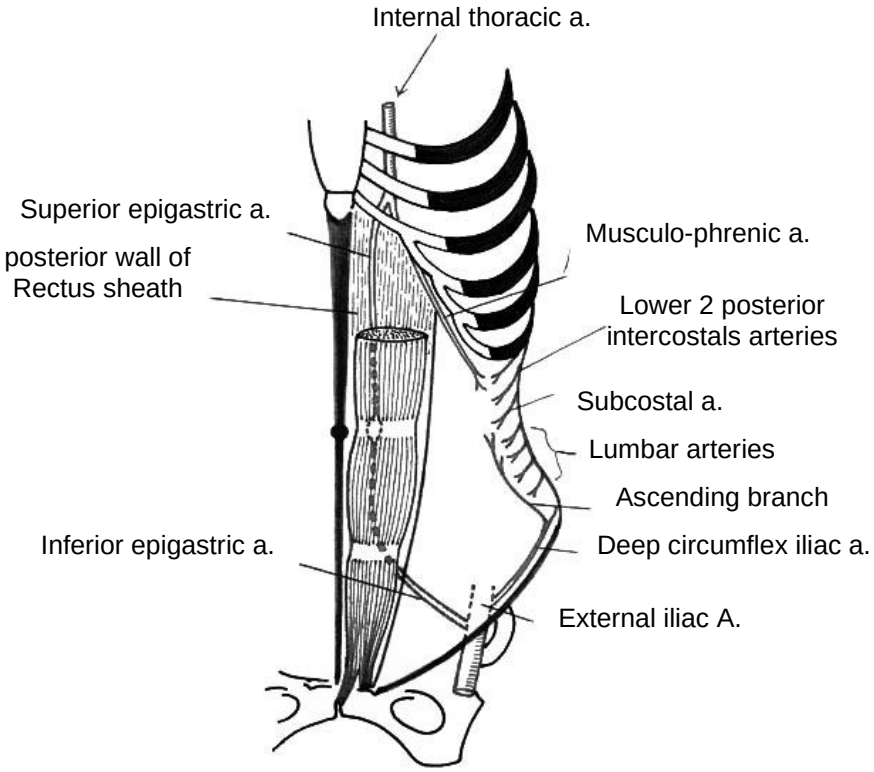
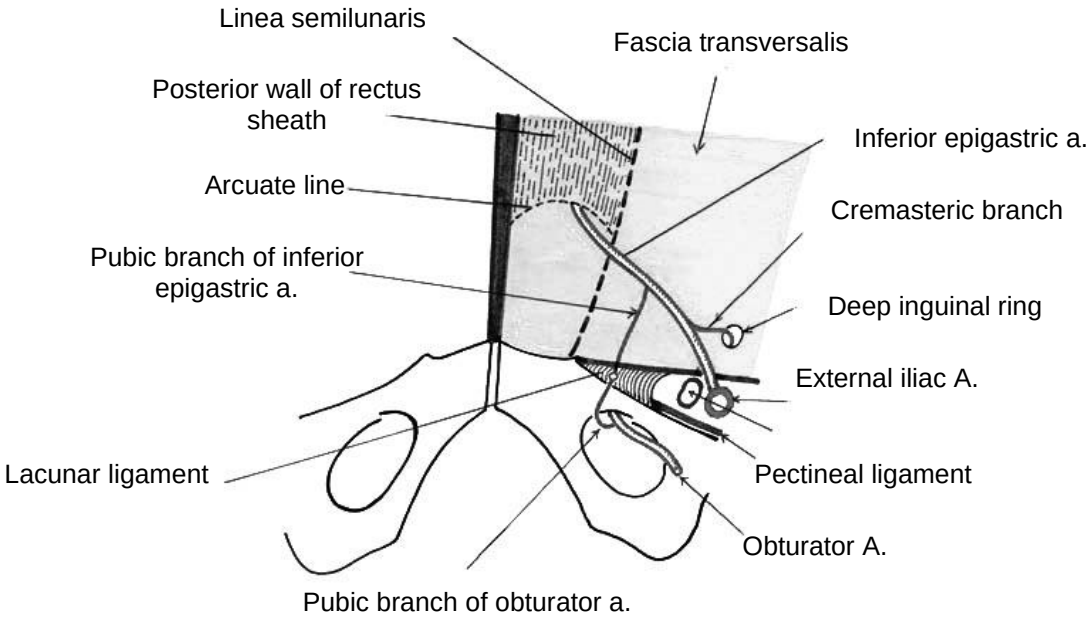

Medial
Lateral
Inferior epigastric artery
Obliterated umbilical artery
Lateral border of rectus
Inguinal ligament
Base

* Arterial supply of anterior and lateral abdominal walls *



Inferior epigastric A.



Anterior abdominal wall seen from inside the abdomen (from behind)