

# INGUINAL HERNIAS

CLASSIFICATION AND ANATOMY

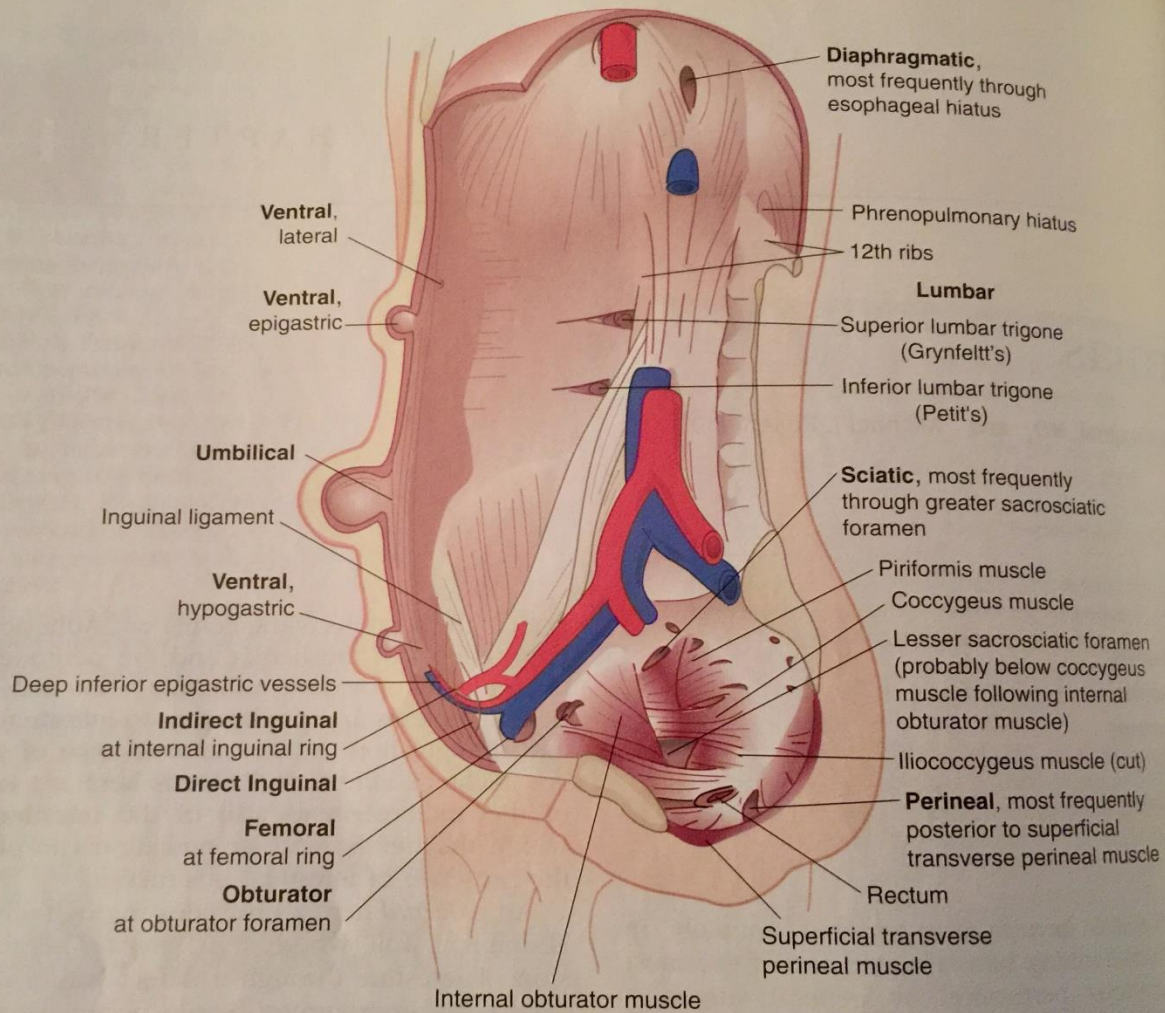
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# DEFINITION

- Hernia is an abnormal protrusion of an organ or tissue through a defect in its surrounding walls. Abdominal wall hernias occur only at sites where the aponeurosis and fascia are not covered by straight muscle.



**Figure 44-1** Types of abdominal wall hernias. (From Dorland's Illustrated Medical Dictionary, 26th ed, Philadelphia, WB Saunders, 1985, plate XXI.)

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# Types of abdominal wall hernias

## Groin Hernias

- Inguinal Hernias
  - >Indirect inguinal hernia
  - >Direct inguinal hernia
  - >Combined{pantaloon} hernia

# Anterior Abdominal Wall Hernias

- Umbilical Hernia
- Para umbilical Hernia
- Epigastric Hernia
- Spigelian Hernia

# Pelvic Hernias

- Obturator Hernia
- Sciatic Hernia
- Gluteal Hernia

# Posterior Abdominal Wall Hernias

- Superior Lumbar Hernia
- Inferior Lumbar Hernia



# Etiologies

- 1- Increased abdominal pressure
  - Cough    -urinary outflow obstruction                    - Constipation
  - Straining   -Ascites            Intraabdominal malignancies and pregnancy
- 2- Weakness of abdominal wall
  - Congenital / Patent processes vaginalis , and patent canal of Nuck in females.
  - Aquired /Excess fat (obesity)
    - /post pregnancy
    - /surgical incisions
    - /connective tissue disorders like Marfan,s syndrome

# Composition of a hernia

- .A hernia consist of three parts
- the sac
- the coverings of the sac
- the contents of the sac
- The sac is a diverticulum of peritonium, consisting of
  - Mouth
  - Neck
  - 
  - Body
  - Fundus
- The coverings are derived from the layars of the abdominal wall through which the sac passes.

## Contents

- **omentum** = omentocele;
- **intestine** = enterocele; more commonly small bowel but may be large intestine or appendix;
- a portion of the circumference of the intestine = **Richter's hernia**;
- a portion of **the bladder** (or a diverticulum);
- **ovary** with or without the corresponding **fallopian tube**;
- a **Meckel's diverticulum** = a **Littre's hernia**;
- **fluid**, as part of ascites or peritoneal fluid.

# Classification of Hernia

*Reducible* – if contents can be returned to abdomen

*Irreducible* – if contents cannot be returned but there are no other complications

*Obstructed* – if bowel in the hernia has good blood supply but bowel is obstructed

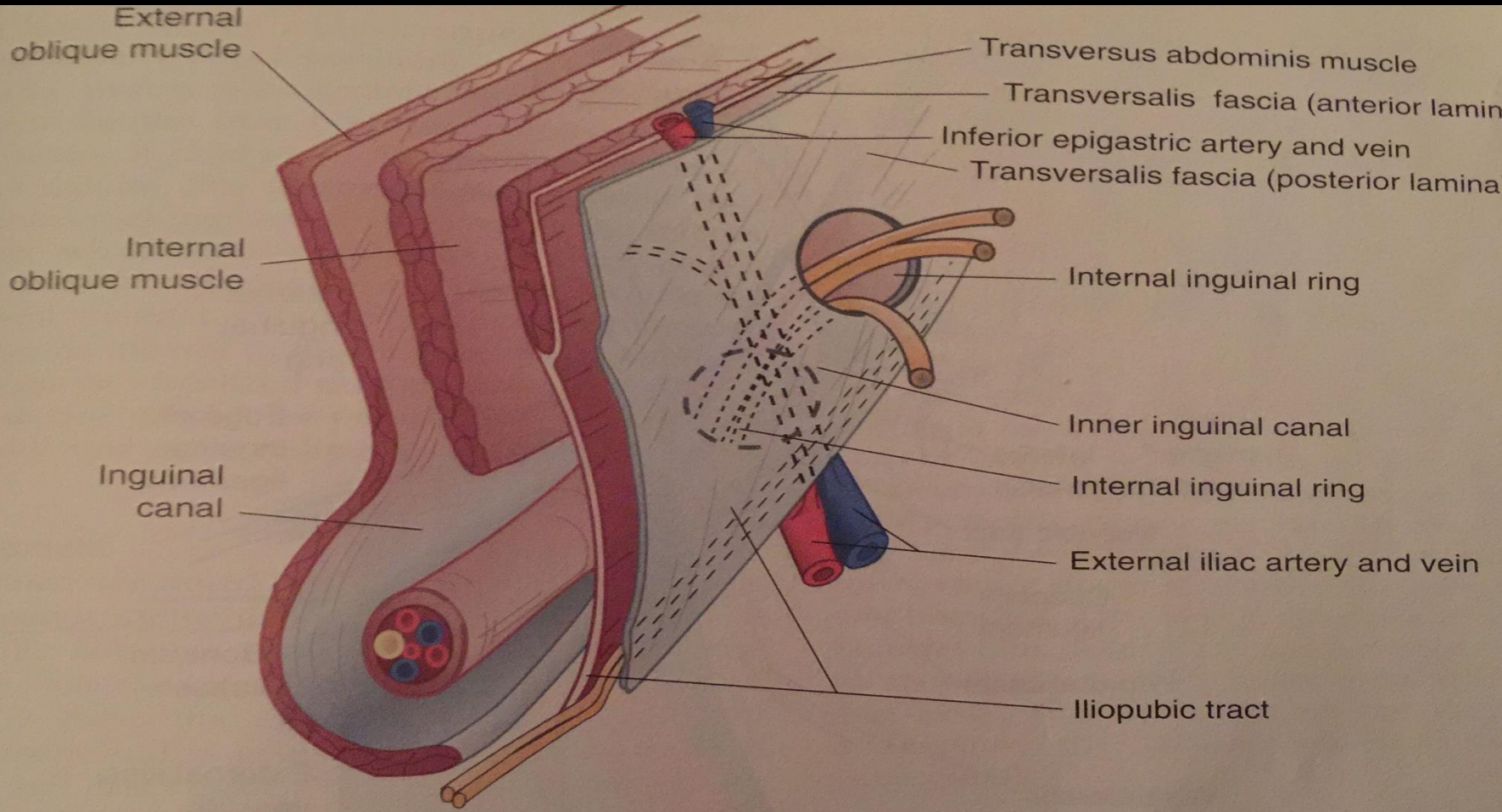
*Strangulated* – if blood supply of bowel is obstructed

*Inflamed* – if contents of sac have become inflamed

*Incarcerated* – if the portion of the colon occupying a hernial sac is blocked with faeces

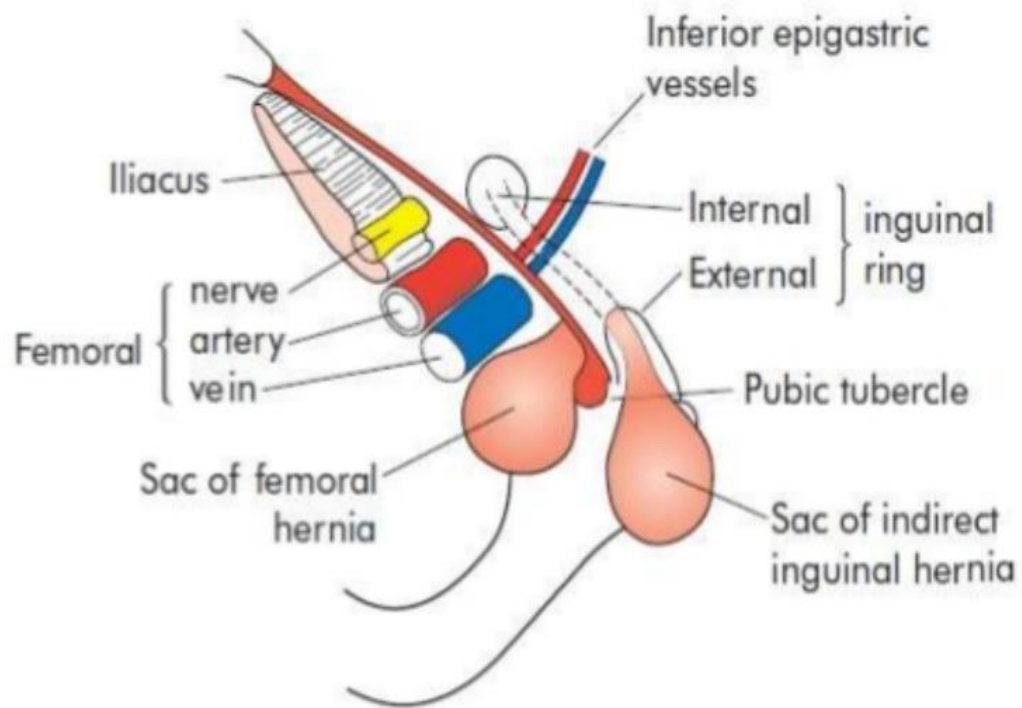
# Nyhus Classification of Groin Hernia

- **Type I:** Indirect inguinal hernia with internal inguinal ring normal
- **Type II:** Indirect inguinal hernia with internal inguinal ring dilated but posterior wall intact, inferior epigastric vessels not displaced
- **Type III:** Posterior wall defect
  - A:** Direct inguinal hernia
  - B:** Indirect inguinal hernia with internal inguinal ring dilated, medially encroaching on or destroying the transversalis fascia of hesselbach's triangle.
  - C:** Femoral hernia
- **Type IV:** Recurrent hernia
  - A:** Direct      **B:** Indirect      **C:** Femoral      **D:** Combined



**Figure 44-2** Nyhus's classic parasagittal diagram of the right midinguinal region illustrating the muscular and fasciatic layers separated into anterior and posterior walls. The posterior laminae of the transversalis fascia have been added, with the inferior epigastric vessels coursing through the abdominal wall medially to the inner inguinal canal. (From Read RC: The transversalis and preperitoneal fasciae: A re-evaluation. In Nyhus LM, Corcos J [eds]: *Hernia*. 4th ed. Philadelphia, JB Lippincott, 1995, pp 57-63.)

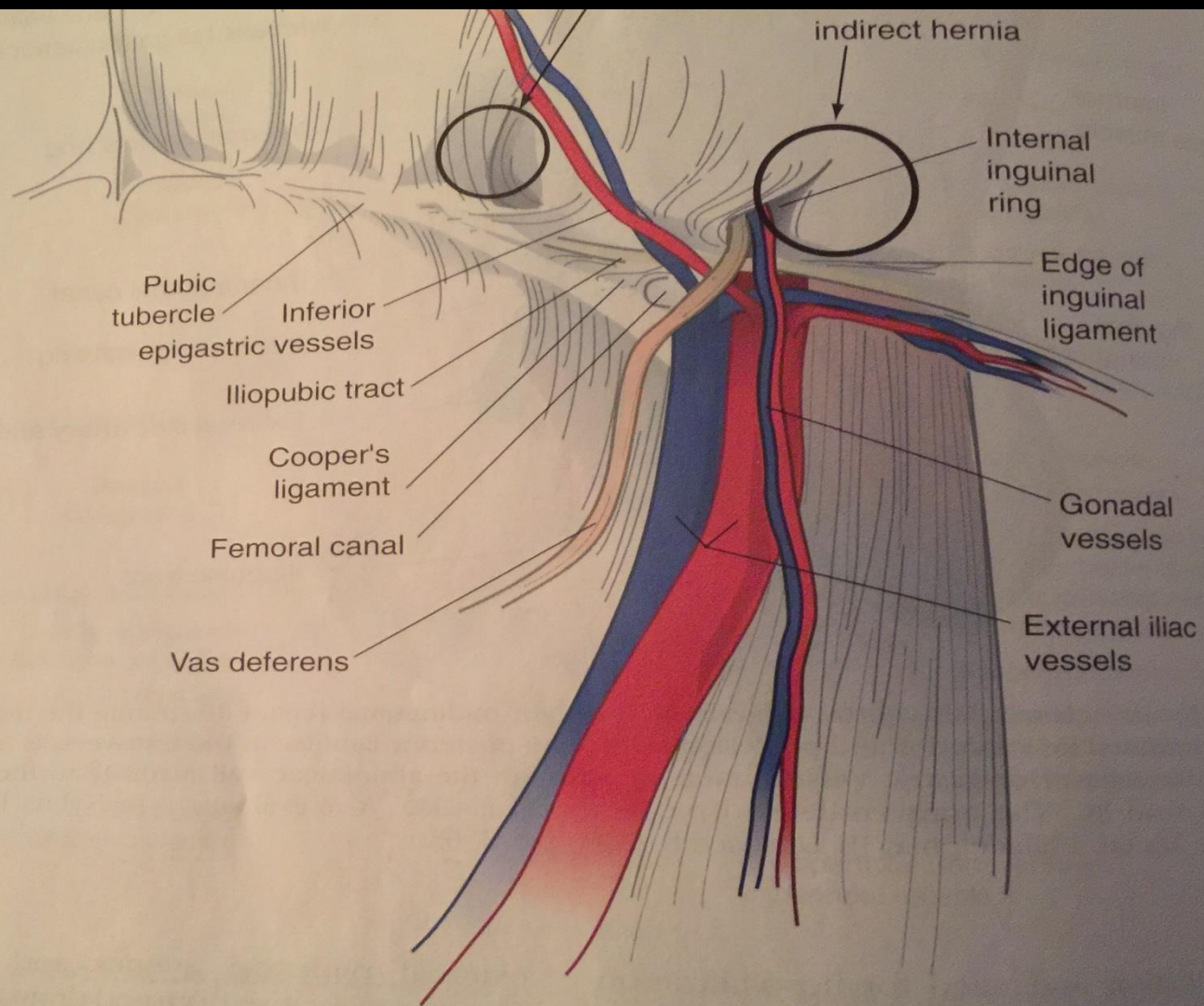
# Groin Hernias



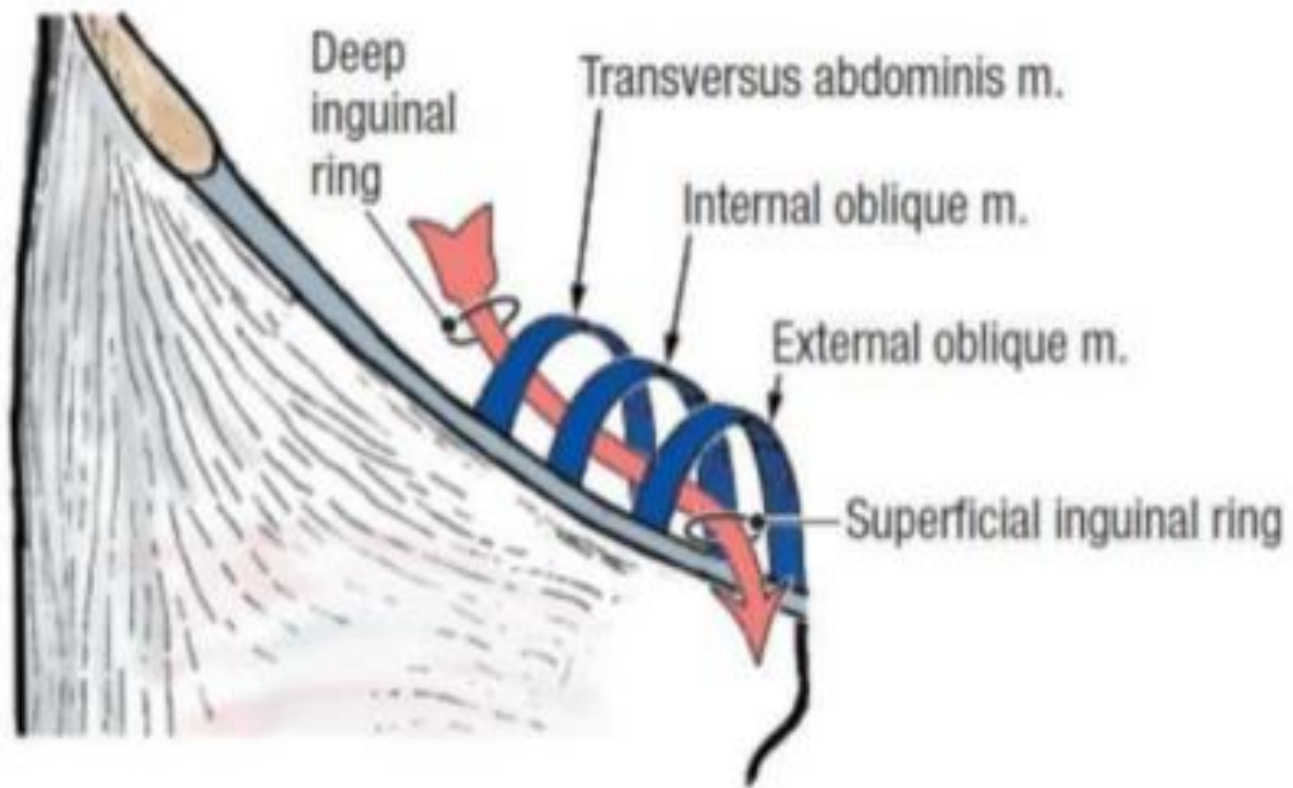
# Anatomy of inguinal canal

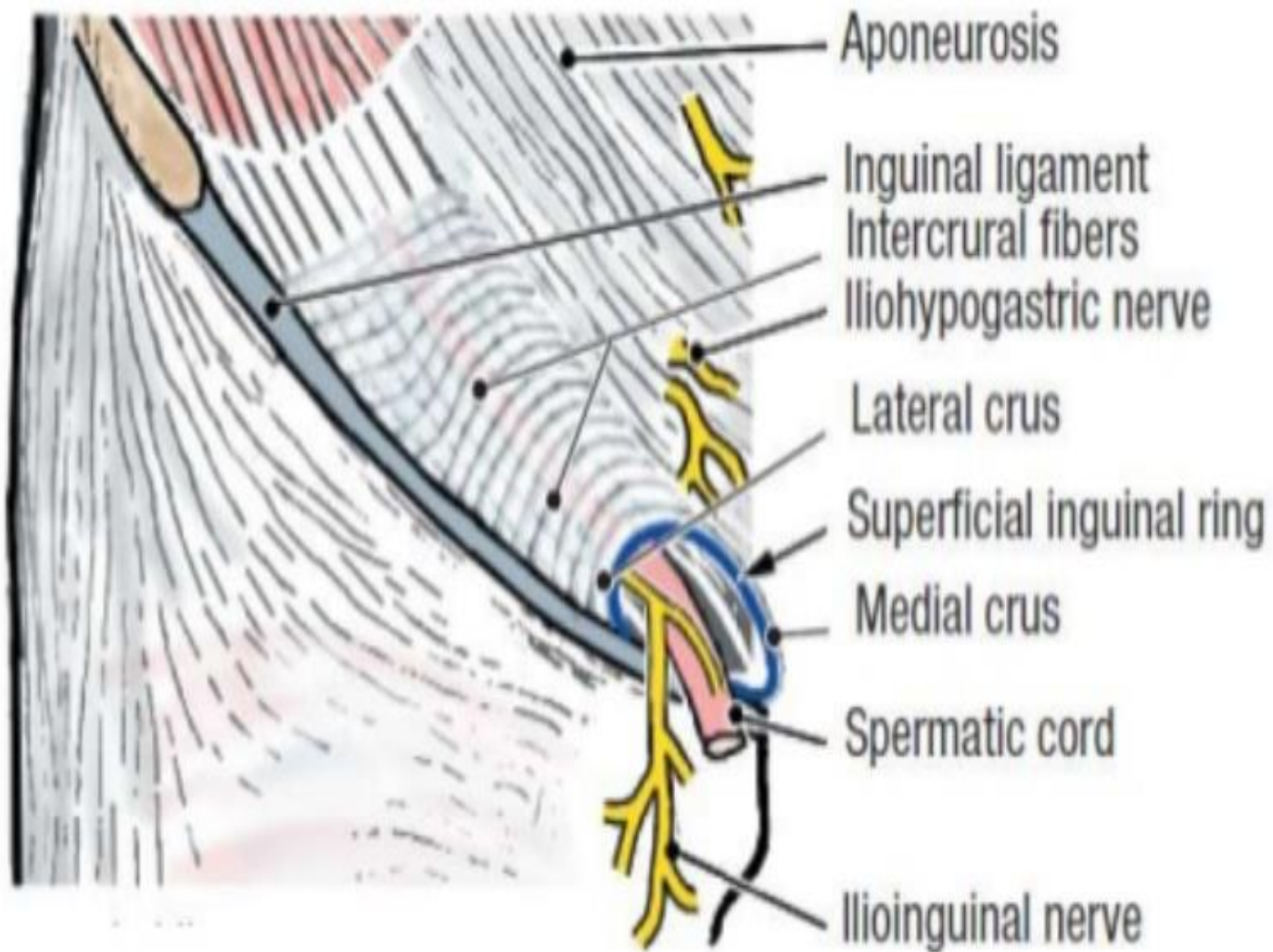
- 4 cm in length passing downward and medially from deep to superficial ring
- Deep/internal ring is 'U' shaped in fascia transversalis which lies 1.25 cm above the mid inguinal point.
- Superficial/External ring is in external oblique aponeurosis situated just above and lateral to the pubic crest.

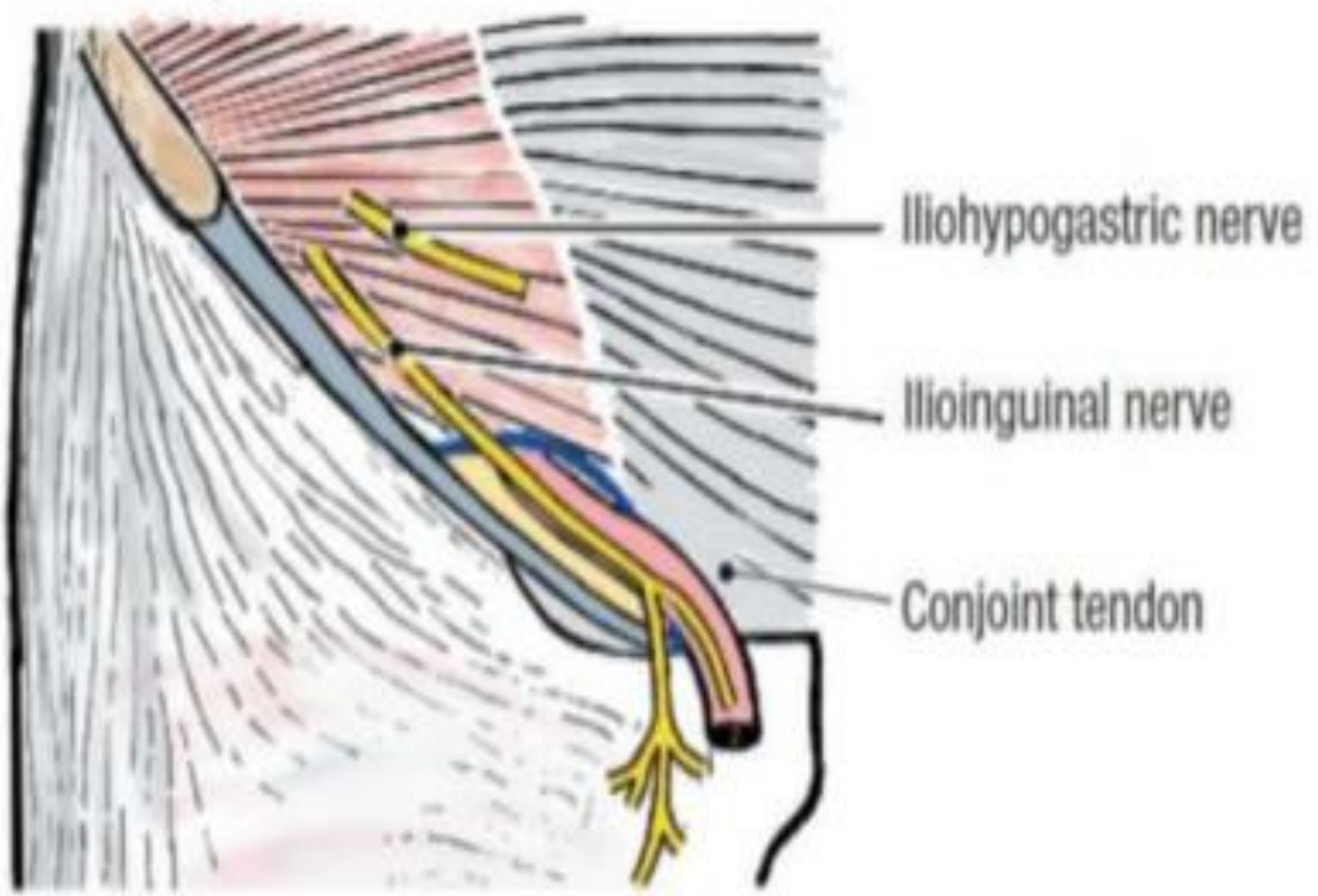




**Figure 44-3** Anatomy of the important preperitoneal structures in the right inguinal space. (From Talamini MA, Are C: Laparoscopic hernia repair. In Zuidema GD, Yeo CJ [eds]: Shackelford's Surgery of the Alimentary Tract, 5th ed. Philadelphia, WB Saunders, 2002, vol 5, p 146.)



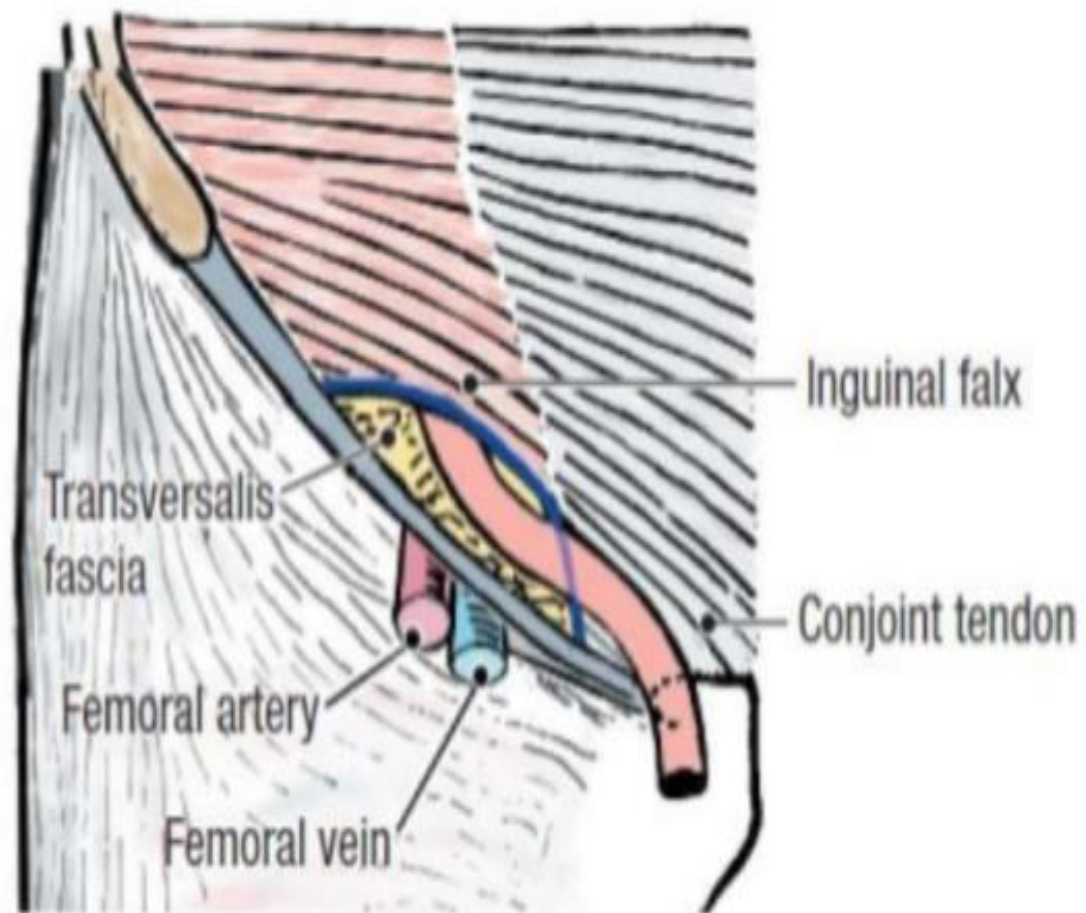




Iliohypogastric nerve

Ilioinguinal nerve

Conjoint tendon



# Boundaries of the inguinal canal

**Anterior** – aponeurosis of the external oblique muscle

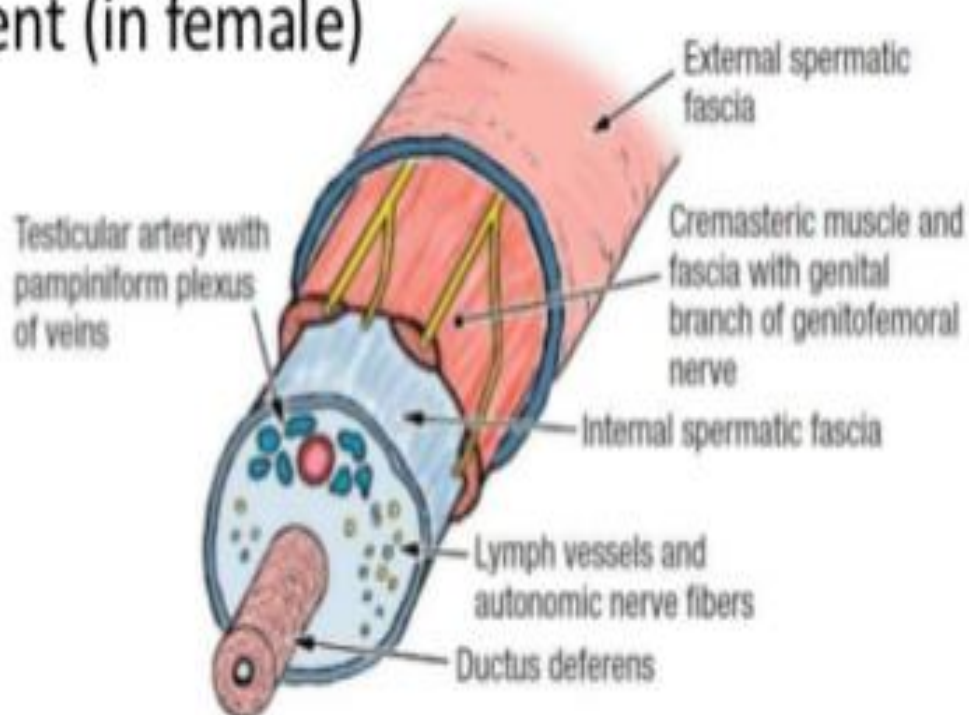
**Inferior** (floor) – inguinal ligament and lacunar ligament on medial side

**Superior** (roof) – the arching fibers of the internal oblique and the transversus abdominis muscles

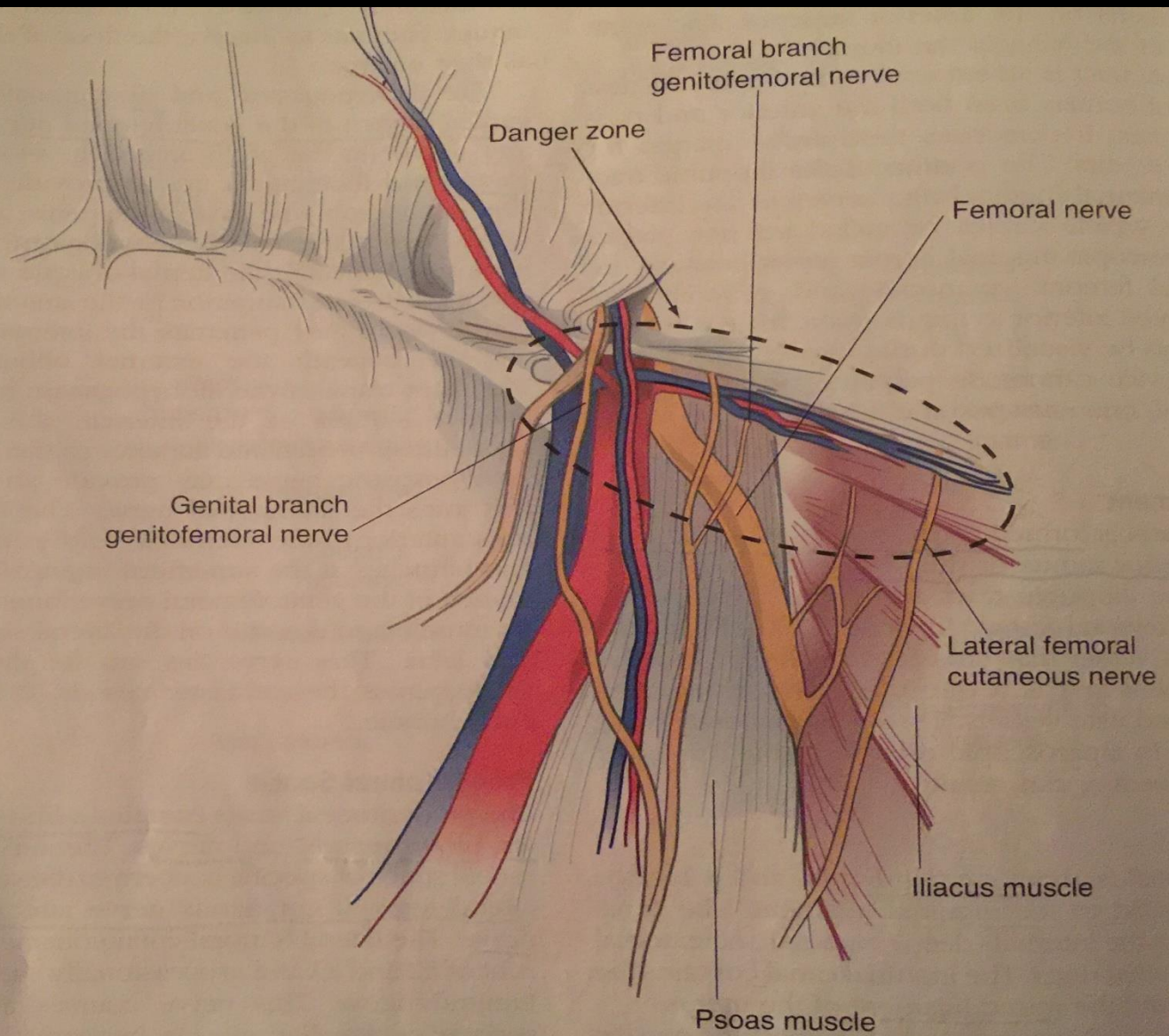
**Posterior** – transversalis fascia, reinforced medially by the conjoint tendon

# Contents of Inguinal Canal

- Ilioinguinal Nerve
- Spermatic Cord (in male)-
- Round ligament (in female)



Transverse section through the spermatic cord.

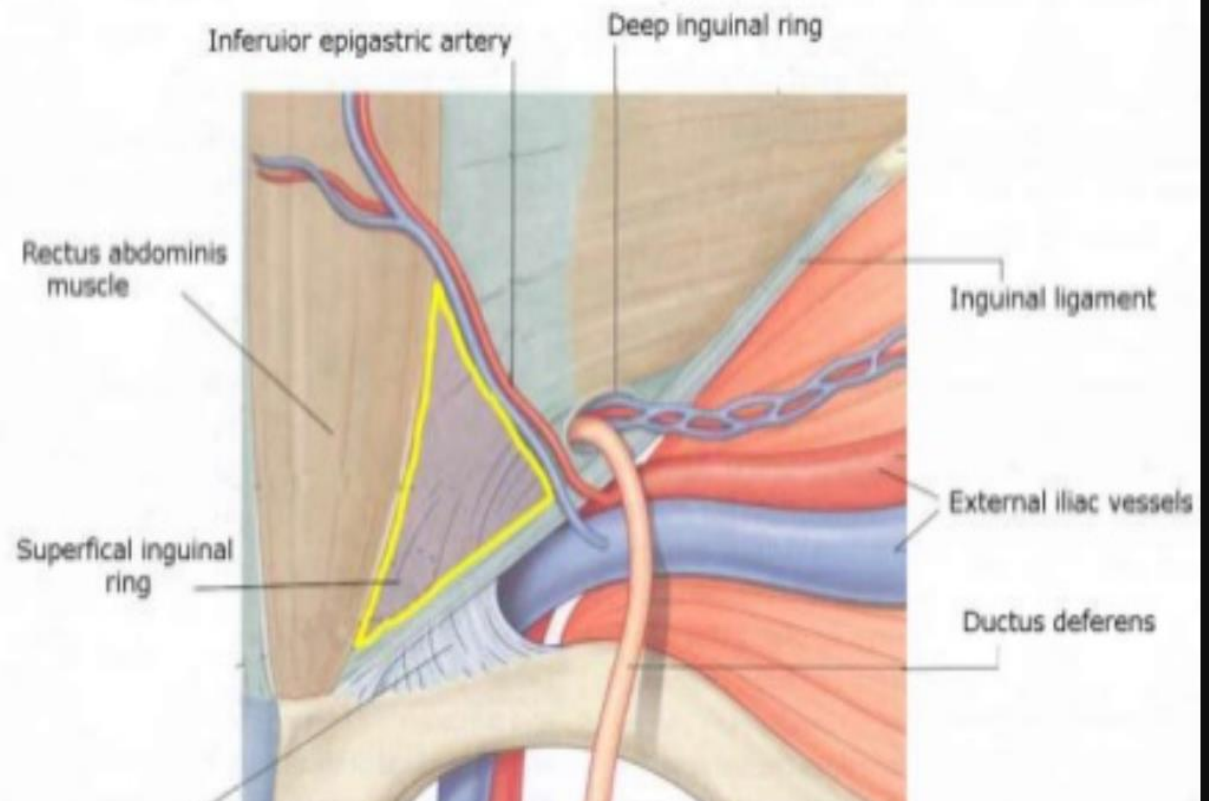


**Figure 44-4** Important nerves and their relationship to inguinal structures (right side is illustrated). (From Talamini MA, Are C: Laparoscopic hernia repair. In Zuidema GD, Yeo CJ [eds]: Shackelford's Surgery of the Alimentary Tract, 5th ed. Philadelphia, W.B. Saunders, 2002, vol 5, p 140.)



# Boundries of Hesselbach Triangle

- **Laterally** inferior epigastric artery
- **Medially** lateral border or rectus abdominis
- **Inferiorly** (Base) Inguinal ligament



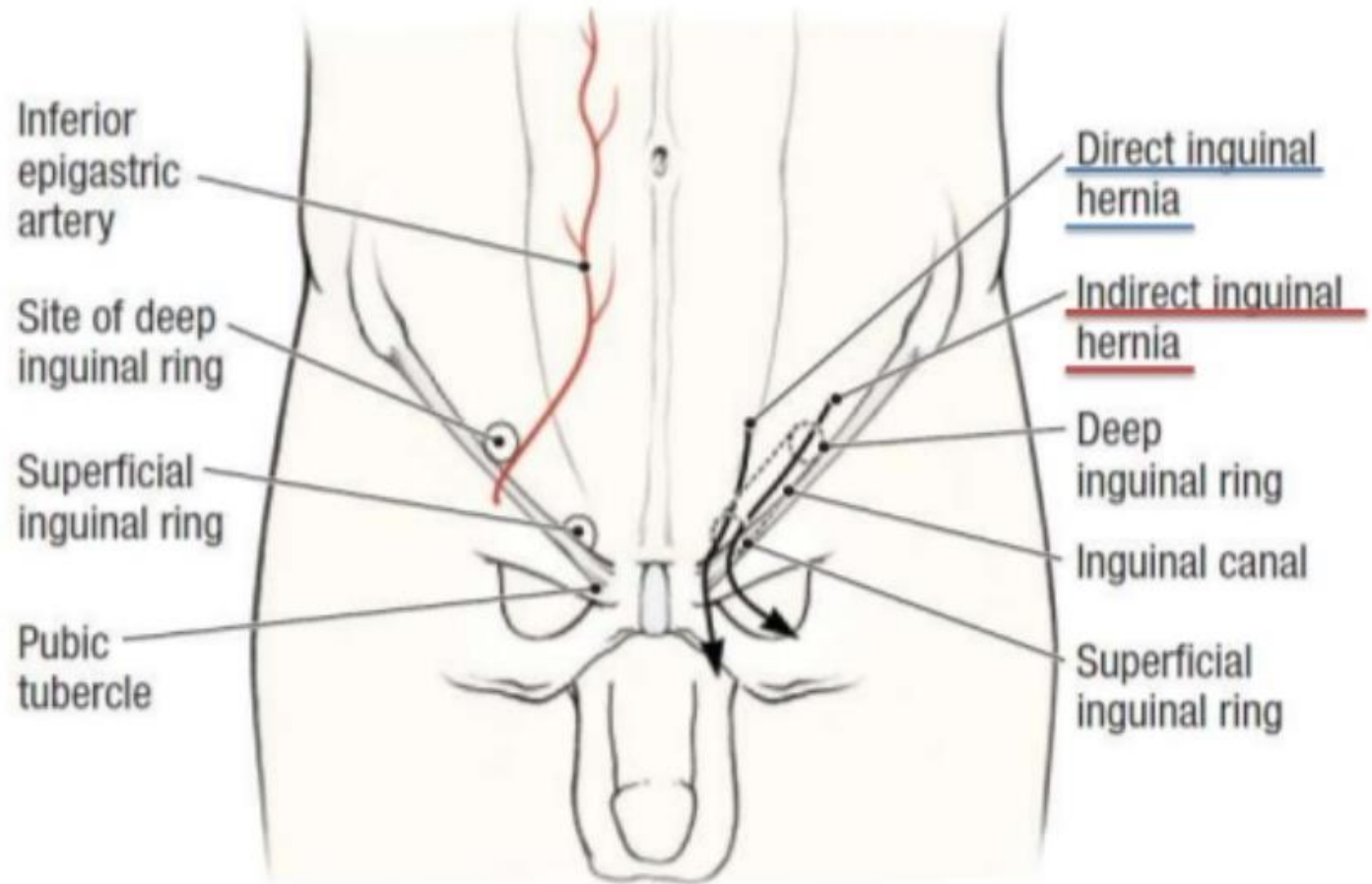
# Inferior epigastric vessels

- Branches of external iliac vessels and are important landmarks for laparoscopic hernia repair. These vessels course medial to the internal inguinal ring and eventually lie beneath the rectus abdominis muscle immediately beneath the the transversalis fascia.

## Natural mechanism of preventing inguinal hernia

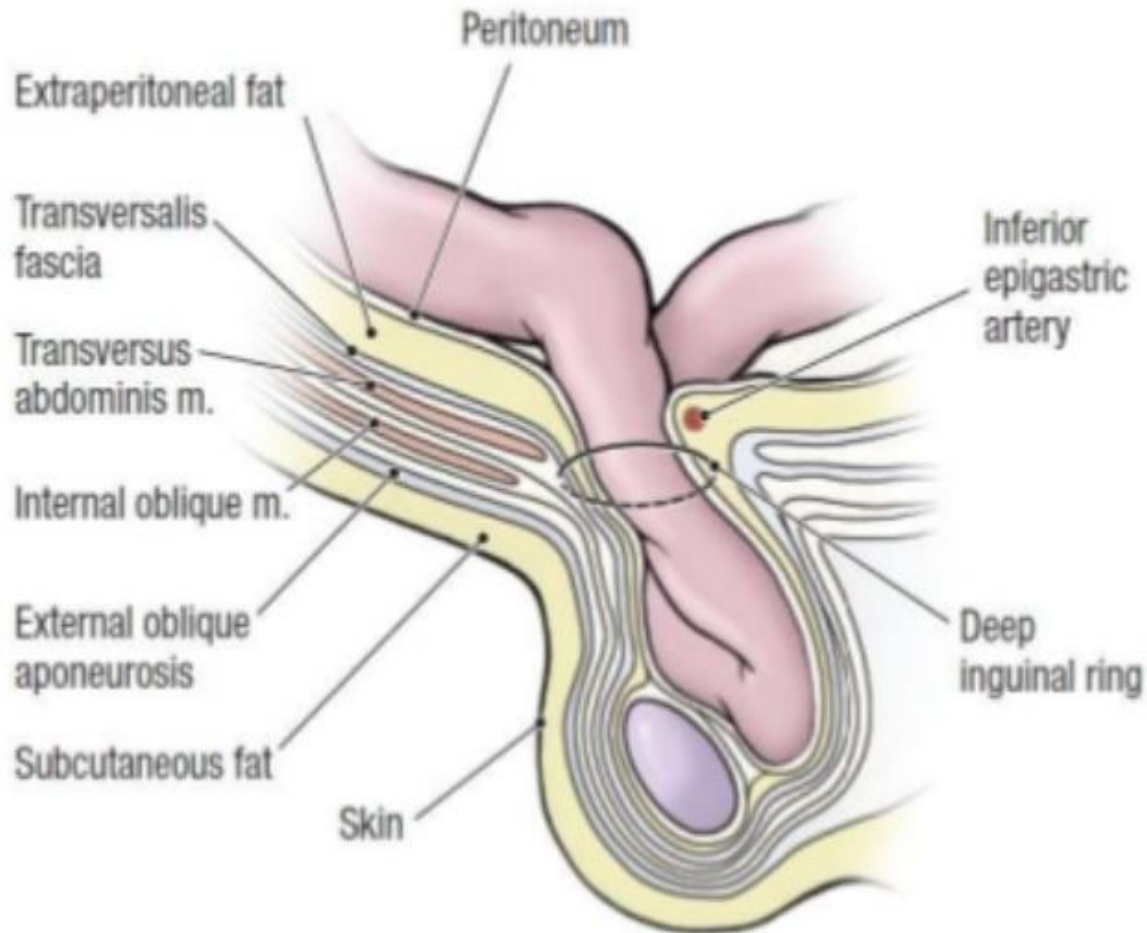
- Obliquity of canal.
- Shutter action of arched fibers of internal oblique and transverse abdominis.
- Plugging action of spermatic cord due to contraction of cremasteric muscles.

# Types of Inguinal Hernia

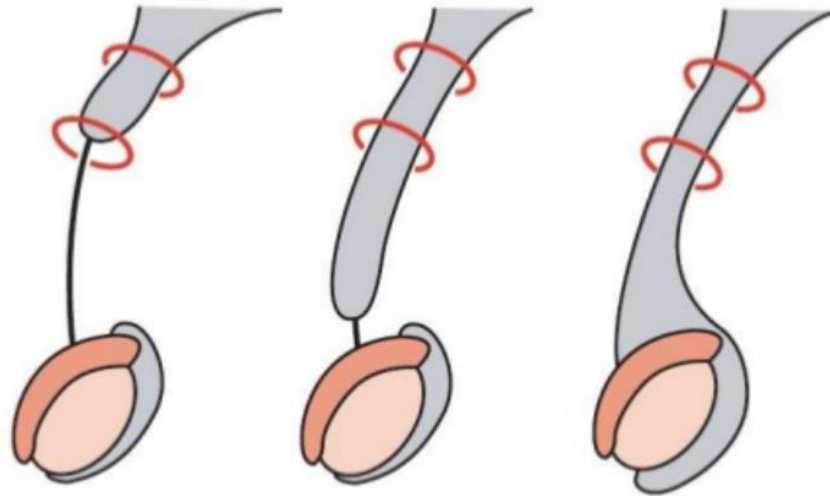


# Indirect Inguinal Hernia

- From the internal to external ring.
- Usually due to processus vaginalis.



## Types of Indirect Inguinal Hernia



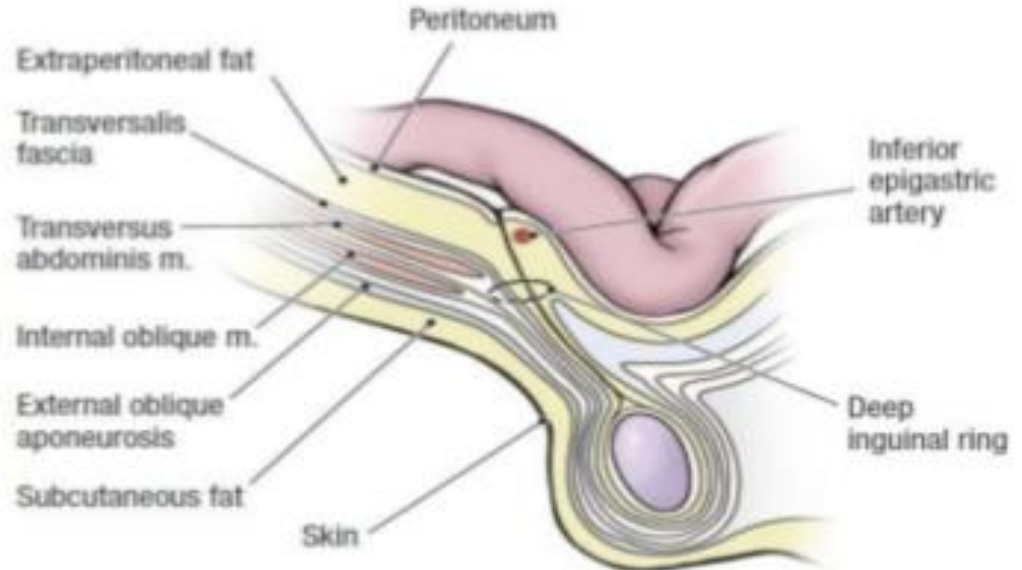
Bubonocele

Funicular

Complete

# Direct Inguinal Hernia

- A direct inguinal hernia is always acquired.
- The sac passes through a weakness or defect of the transversalis fascia in the posterior wall of the inguinal canal.



# Clinical Features

- **Symptoms**

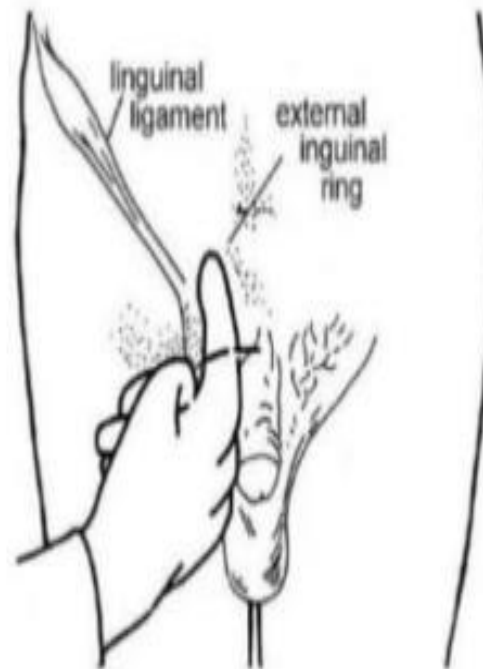
- Swelling
- Dragging pain
- h/o suggesting increased abdominal pressure
- Symptomless
- Accidental finding

- **Signs**

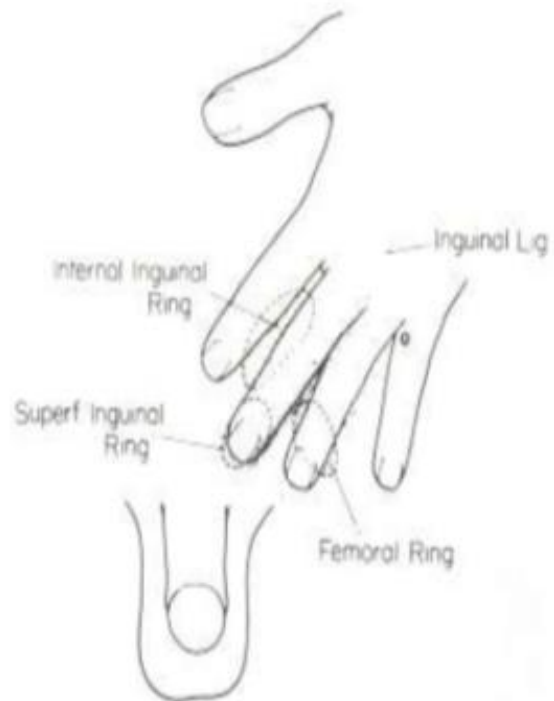
- Inguino-scrotal swelling
- Expansile cough
- Cannot get above the swelling
- Reducibility
- Finger invagination test
- Deep ring occlusion test
- Ziemer test (Three finger test)



# Finger invagination test



## Ziemen test (Three finger test)



## DIRECT VS INDIRECT

<b>AGE</b>	ELDERLY	ANY AGE GROUP
<b>AETIOLOGY</b>	WEAKNESS OF POSTERIOR WALL OF INGUINAL CANAL	PREFORMED SAC
<b>PRECIPITATING FACTOR</b>	CHRONIC BRONCHITIS, ENLARGED PROSTATE	-----
<b>ON STANDING</b>	POPS OUT	DOES NOT POPS OUT
<b>SIDE</b>	USUALLY BILATERAL	UNILATERAL (30% BILATERAL)
<b>INTERNAL RING OCCLUSION TEST</b>	SWELLING IS SEEN	SWELLING NOT SEEN
<b>COMPLICATION'S</b>	NOT COMMEN BECAUSE NECK IS WIDE	COMMON , NECK IS NARROW OBSTRUCTION OR STRANGULATION
<b>RELATIONSHIP OF THE SAC TO THE CORD</b>	SAC IS POSTERIOR TO THE CORD	ANTEROLATERAL TO THE CORD
<b>DIRECTION OF THE SAC</b>	COMES OUT OF HESSELBACH'S TRINAGLE	SAC COMES THROUGH THE DEEP RING

# Surgical Treatment

- **Herniotomy** (excision of hernia sac)
  - Usually done in children
- **Herniorrhaphy** (herniotomy with strengthening of the posterior wall)
  - Bassini repair
  - Shouldice repair
  - McVay repair
- **Hernioplasty** (herniorrhaphy with application of prosthesis)
  - Lichtenstein repair
  - Plug and patch repair
- **Laparoscopic repair**
  - TEP (Total Extra Peritoneal)
  - TAPP (Trans Abdominal PrePeritoneal)

# Treatment

- Conservative treatment
- Surgical treatment

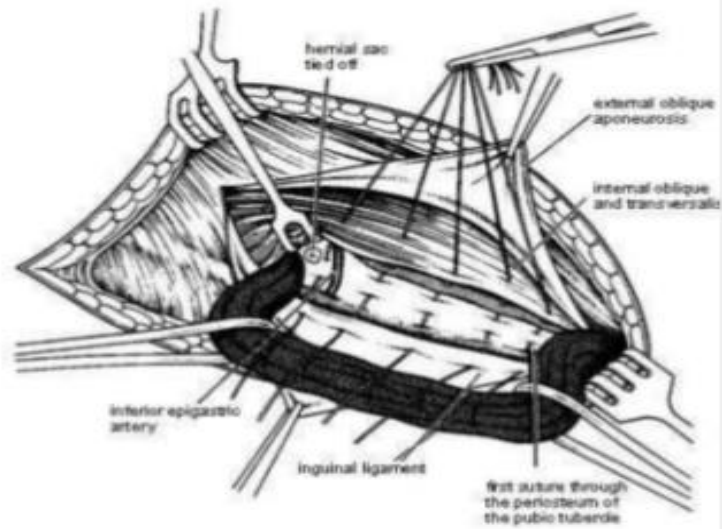


Applying Truss as a conservative management of inguinal hernias.

# Bassini Repair

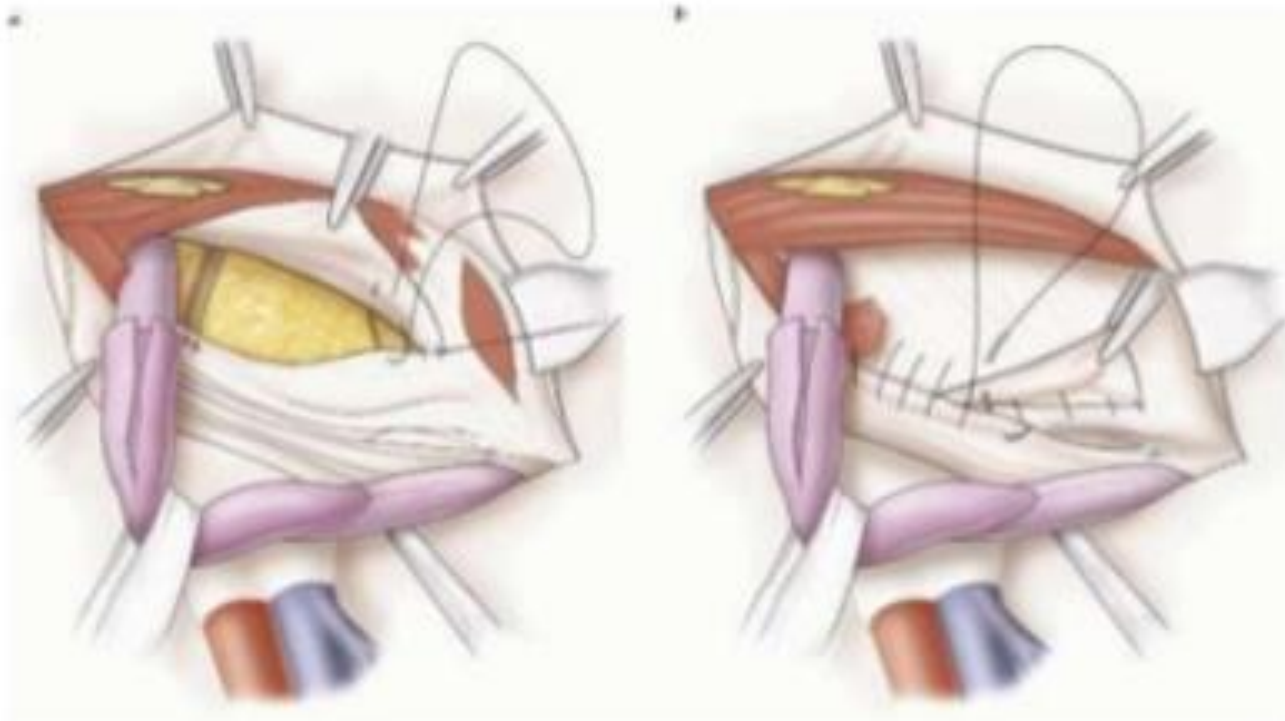
- Conjoined tendon to the inguinal ligament.

A BASSINI REPAIR



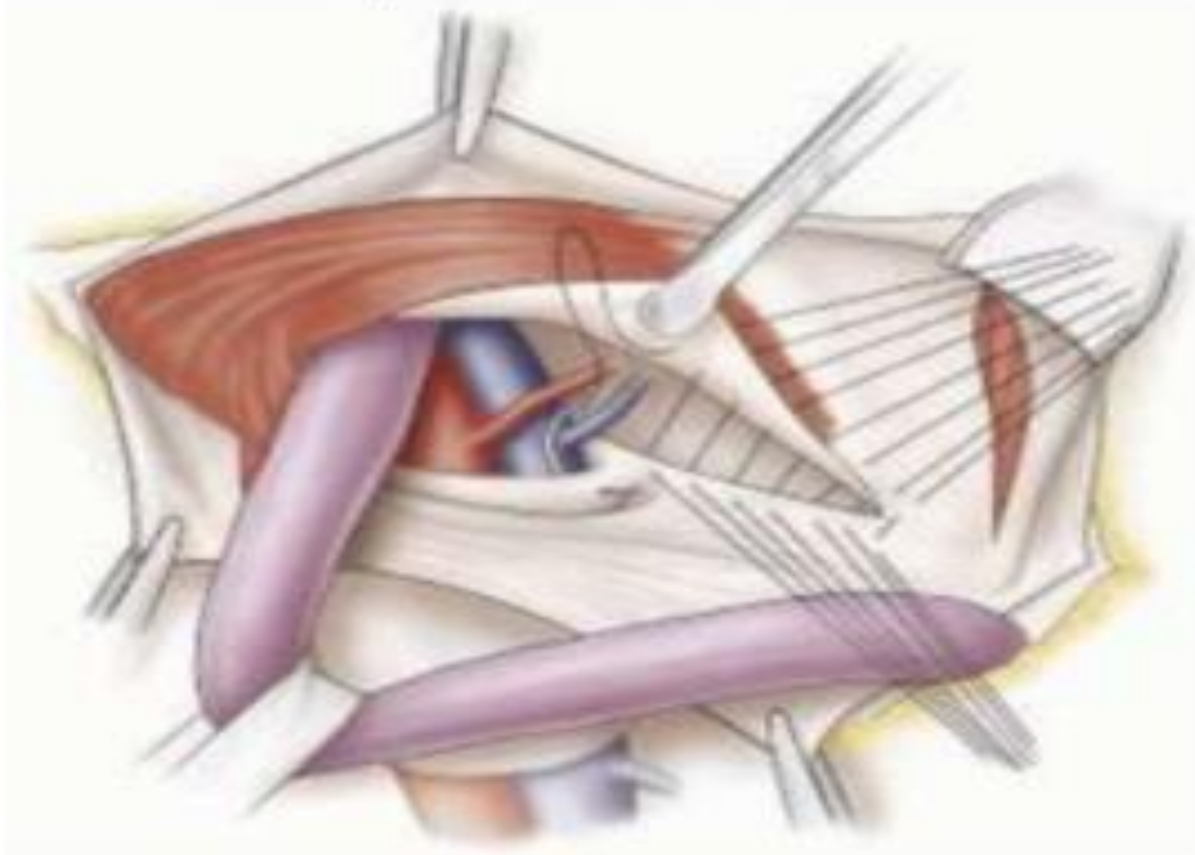
# Shouldice Repair

- Multilayer repair of the posterior wall of the inguinal canal
- Double breasting of transversalis fascia
- Transverse abdominis aponeurotic arch to the iliopubic tract and Conjoined tendon to the inguinal ligament



# McVay Repair

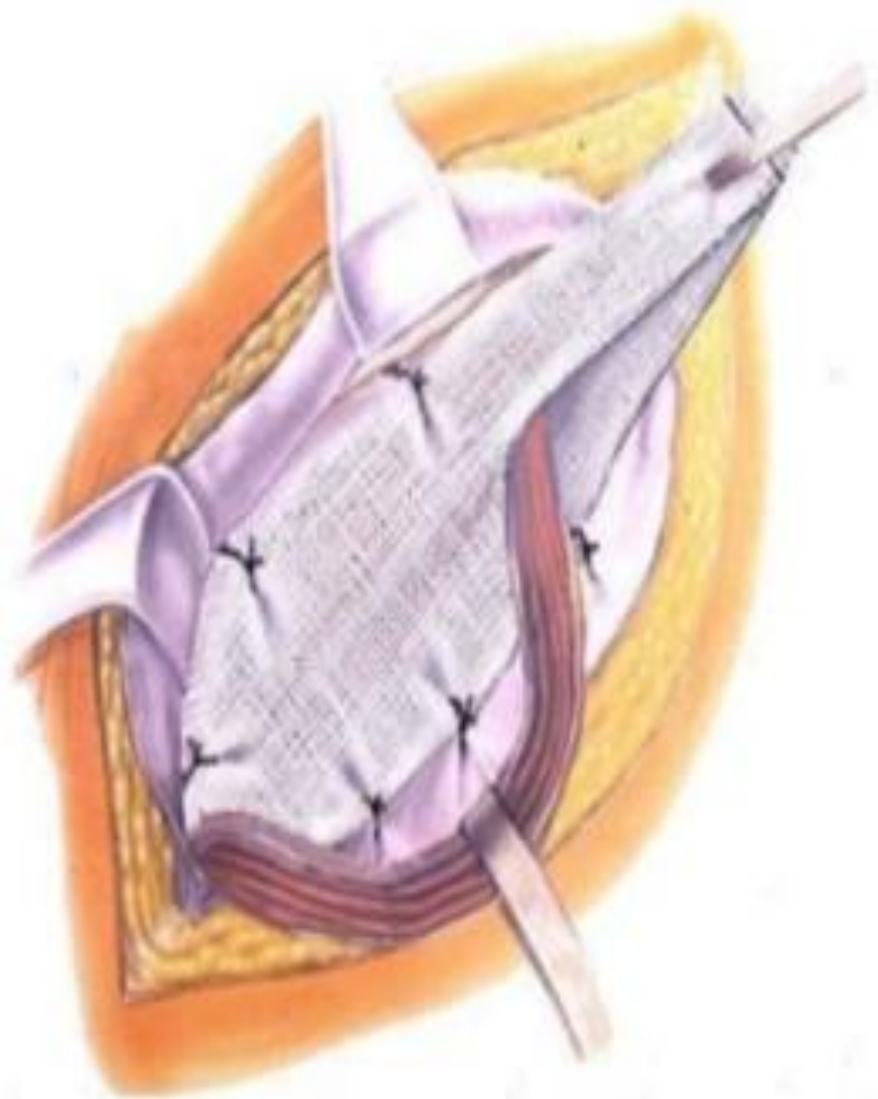
Transverse abdominis aponeurosis to Cooper's ligament and iliopubic tract

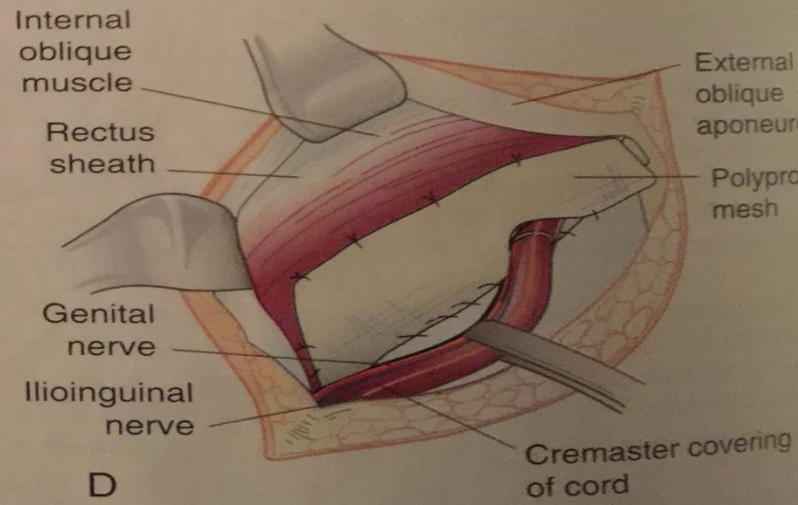
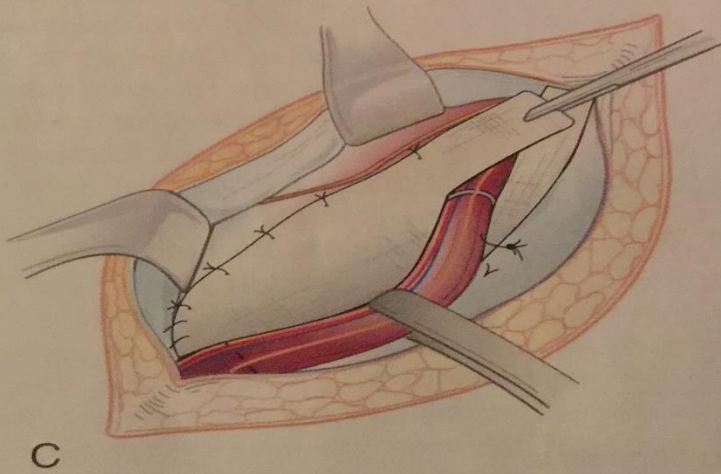
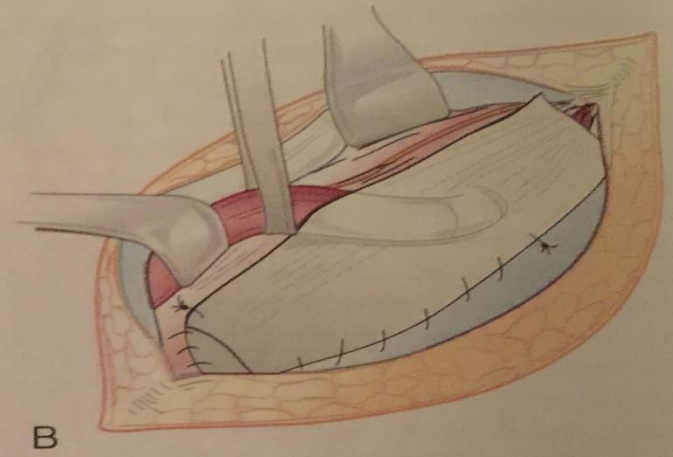
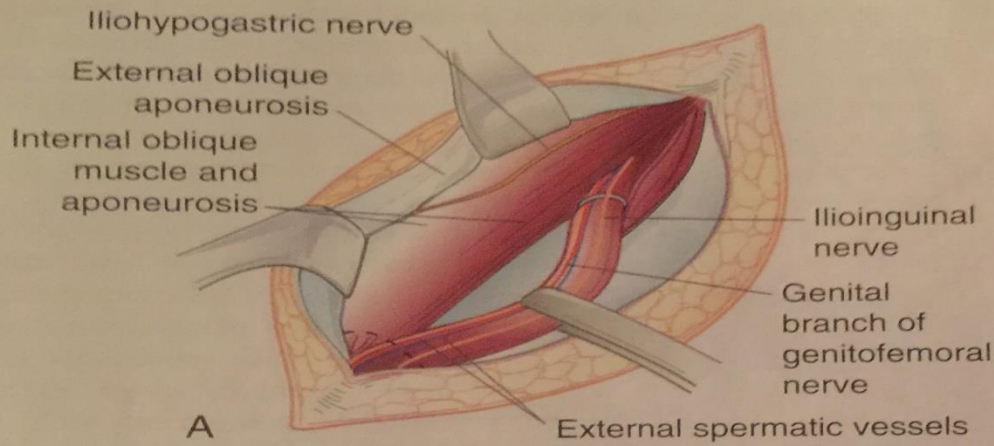




# Lichtenstein Repair

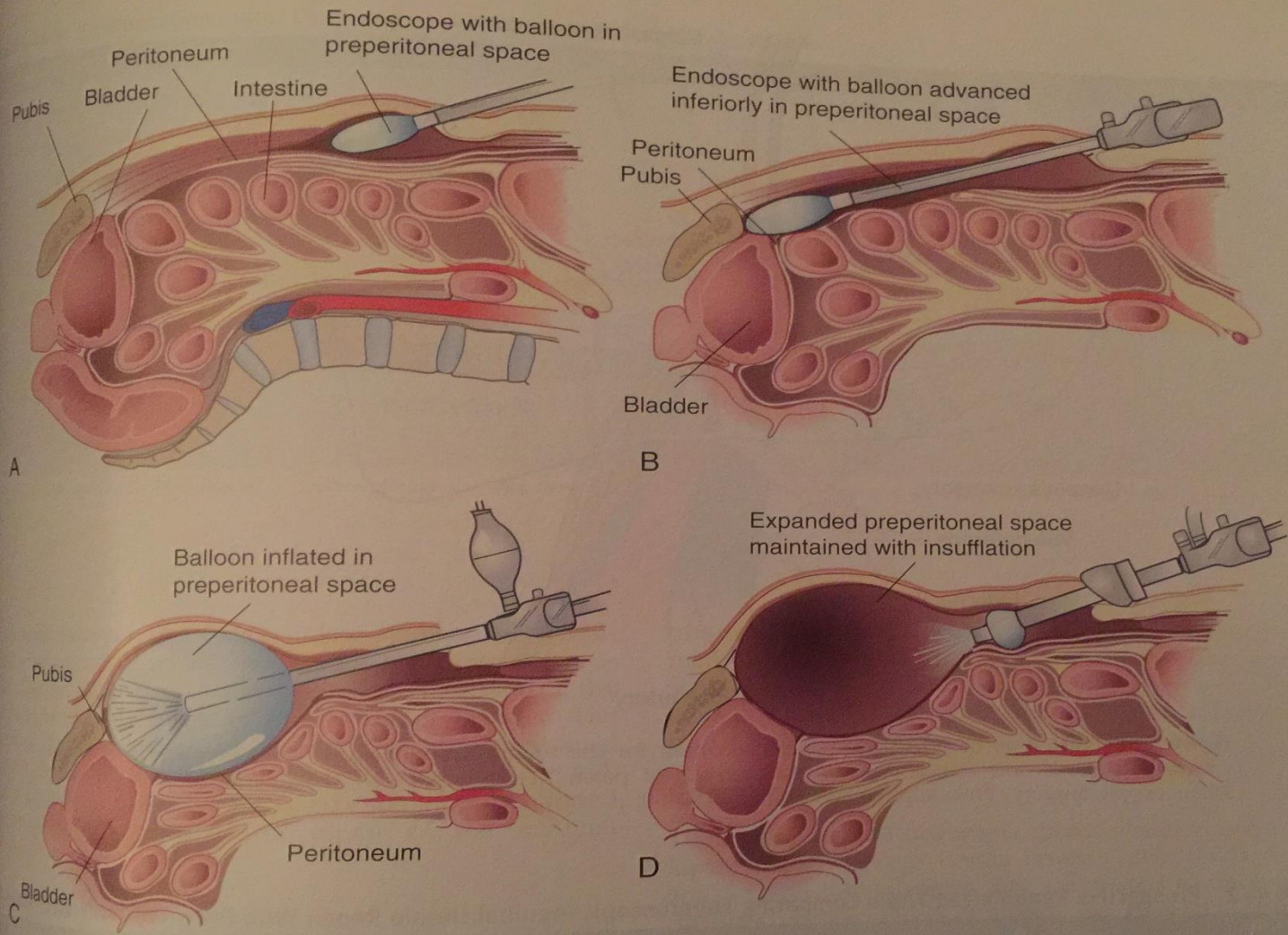
- A piece of prosthetic non-absorbable mesh is placed to fit the canal
- The mesh is sutured to the aponeurotic tissue overlying the pubic bone medially, continuing superiorly along the transversus abdominis or conjoined tendon.
- The inferolateral edge of the mesh is sutured to the inguinal ligament



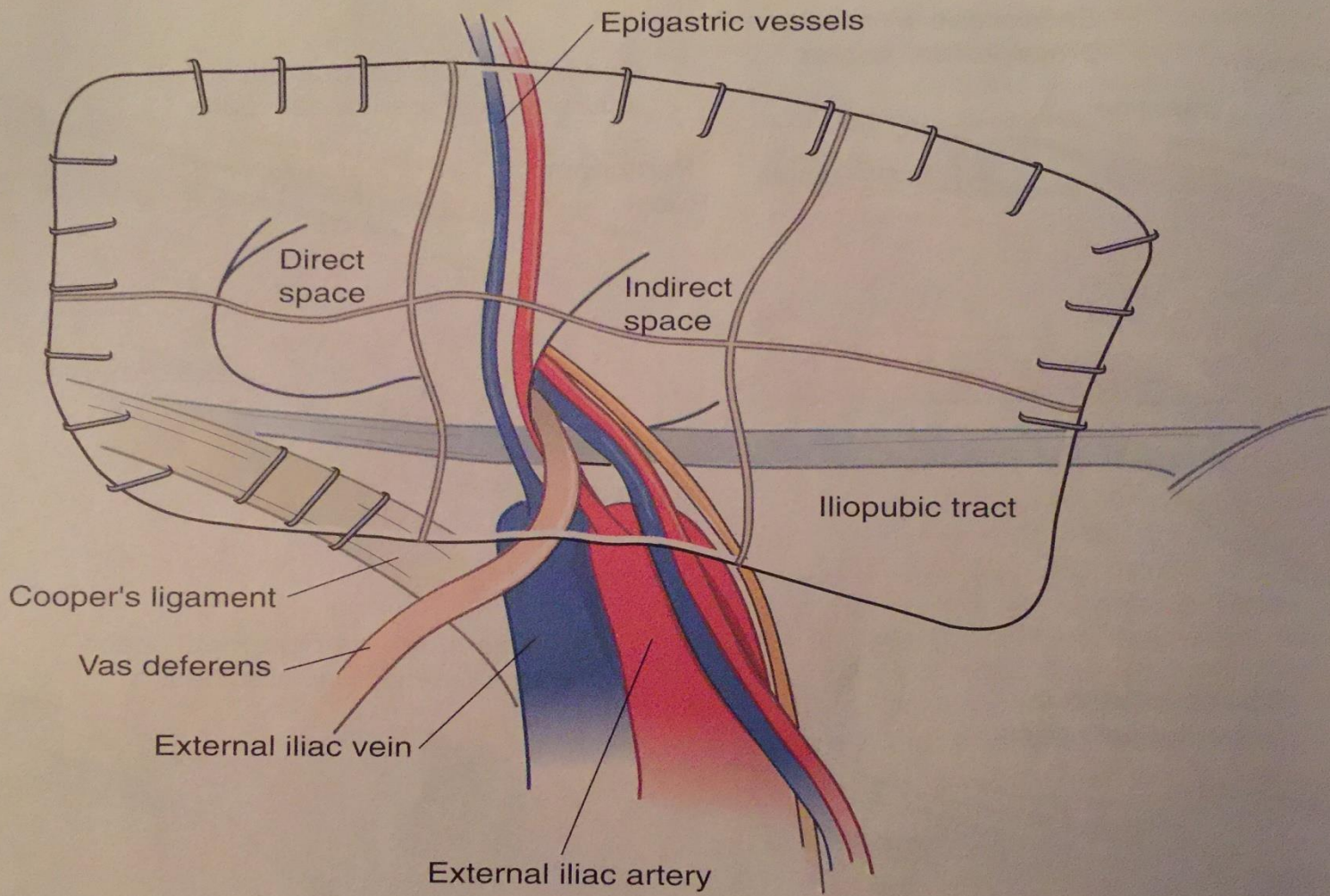


**Figure 44-6** The Lichtenstein tension-free hernia repair. **A**, This procedure is performed by careful dissection of the inguinal canal. High ligation of an indirect hernia sac is performed, and the spermatic cord structures are





**Figure 44-7** The total extraperitoneal (TEP) laparoscopic hernia repair. **A**, The TEP approach for laparoscopic hernia repair is demonstrated. Access to the posterior rectus sheath is gained in the periumbilical region. A balloon dissector is placed on the anterior surface of the posterior rectus sheath. **B**, The balloon dissector is advanced to the posterior surface of the pubis in the preperitoneal space. **C**, The balloon is inflated, thereby creating an optical cavity. **D**, The optical cavity is insufflated by carbon dioxide, and the posterior surface of the inguinal floor is dissected. (From Shadduck PP, Schwartz LB, Eubanks WS: Laparoscopic inguinal herniorrhaphy. In Pappas TN, Schwartz LB, eds. *Laparoscopic Surgery*. Philadelphia, Current Medicine, 1996. Copyright 1996 by Current Contents, Inc.)



**Figure 44-8** Illustration of prosthetic mesh placement for the total extraperitoneal (TEP) hernia repair. (From Corbitt J: Laparoscopic transabdominal transperitoneal patch hernia repair. In Ballantyne GH [ed]: Atlas of Laparoscopic Surgery. Philadelphia, WB Saunders, 2000, p 511.)

