Abdominal Wall Hernias

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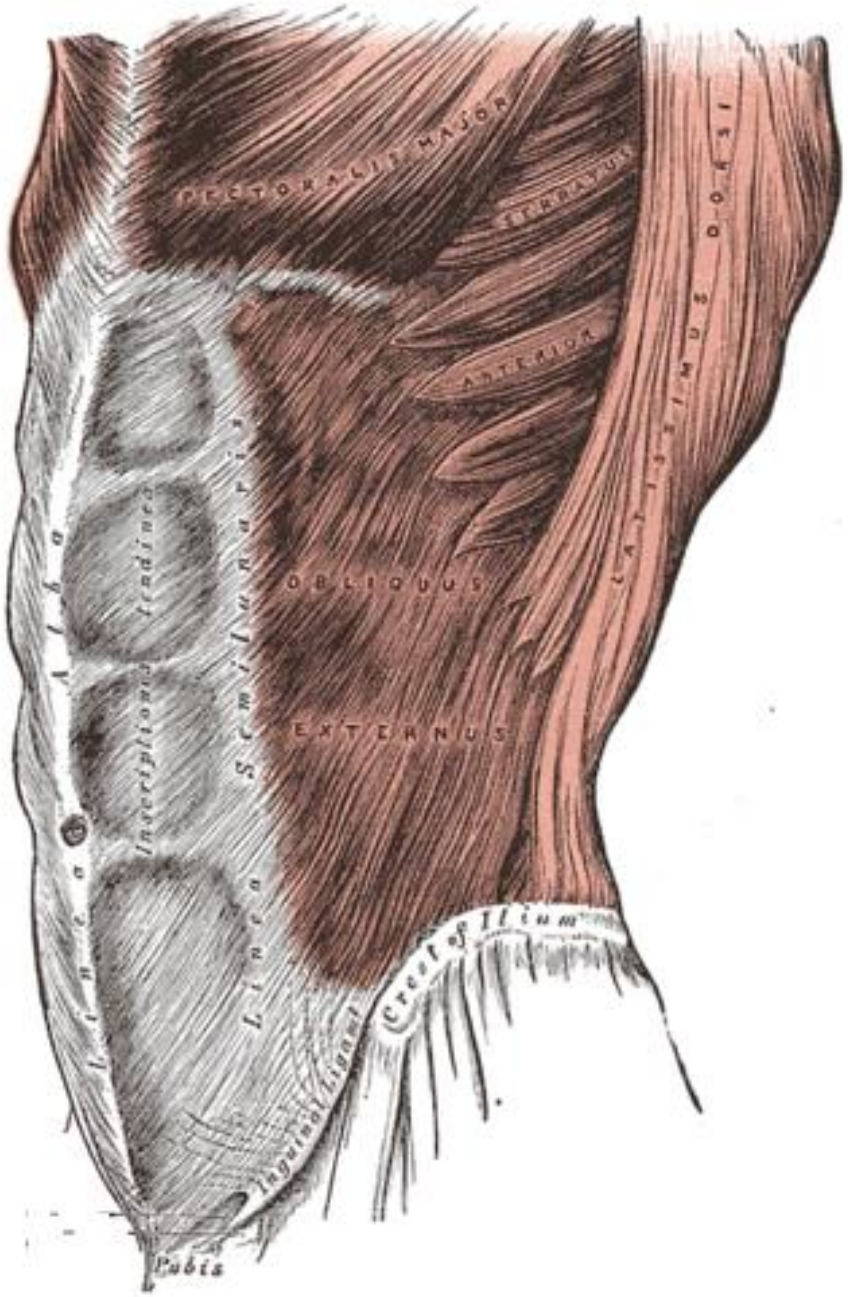
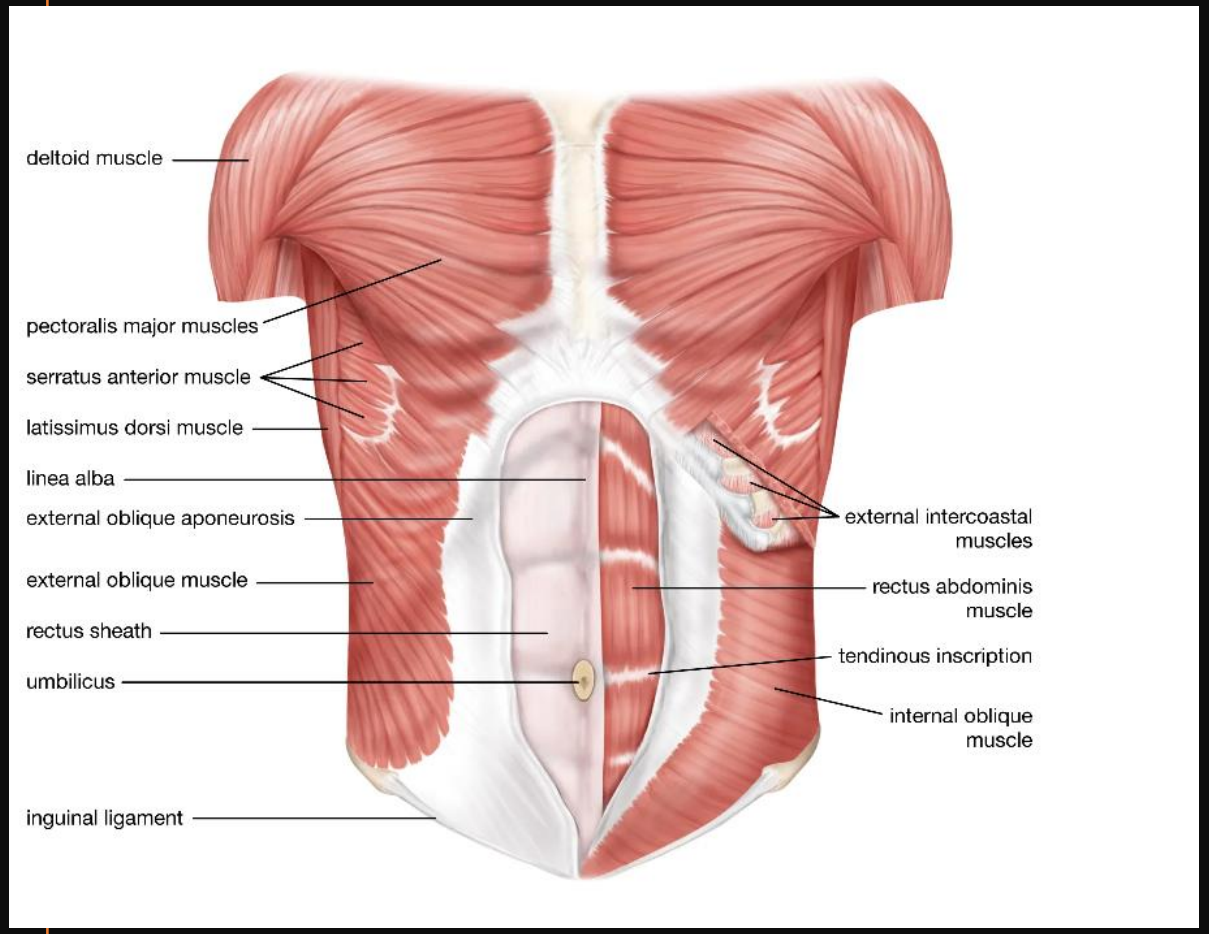
Functions of the Abdominal Wall

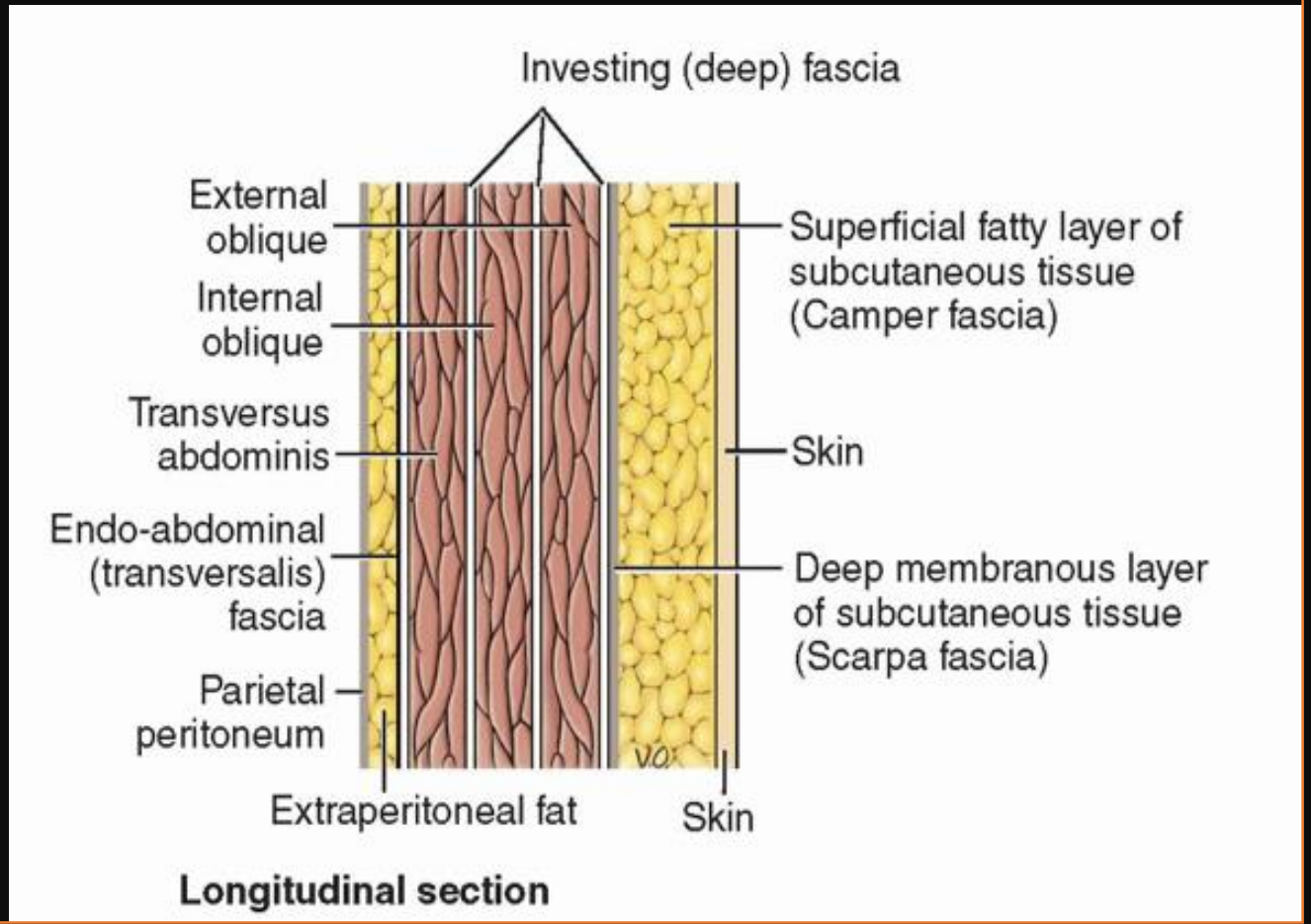
1. **Protects** the abdominal viscera from injury.
2. **Supports** and moves the trunk.
3. **Compresses** the abdominal viscera to maintain or increase intra-abdominal pressure (expiration, coughing, urination, defecation, childbirth)





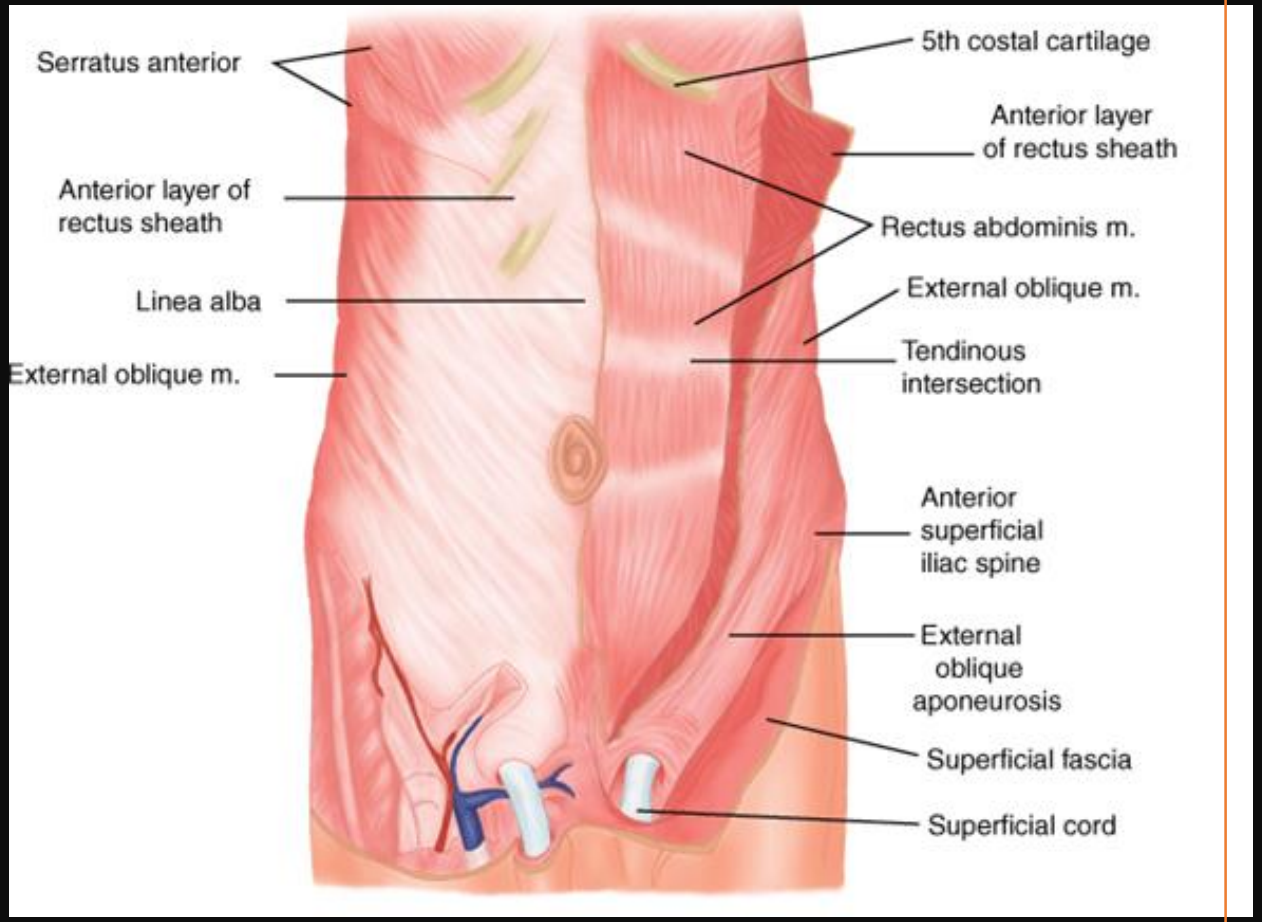
Anatomy of the abdominal wall

- 1. Skin
- 2. Subcutaneous tissue
- 3. External oblique muscle
- 4. Internal oblique muscle
- 5. Transversus abdominus muscle
- 6. Transversalis Fascia
- 7. Peritoneum

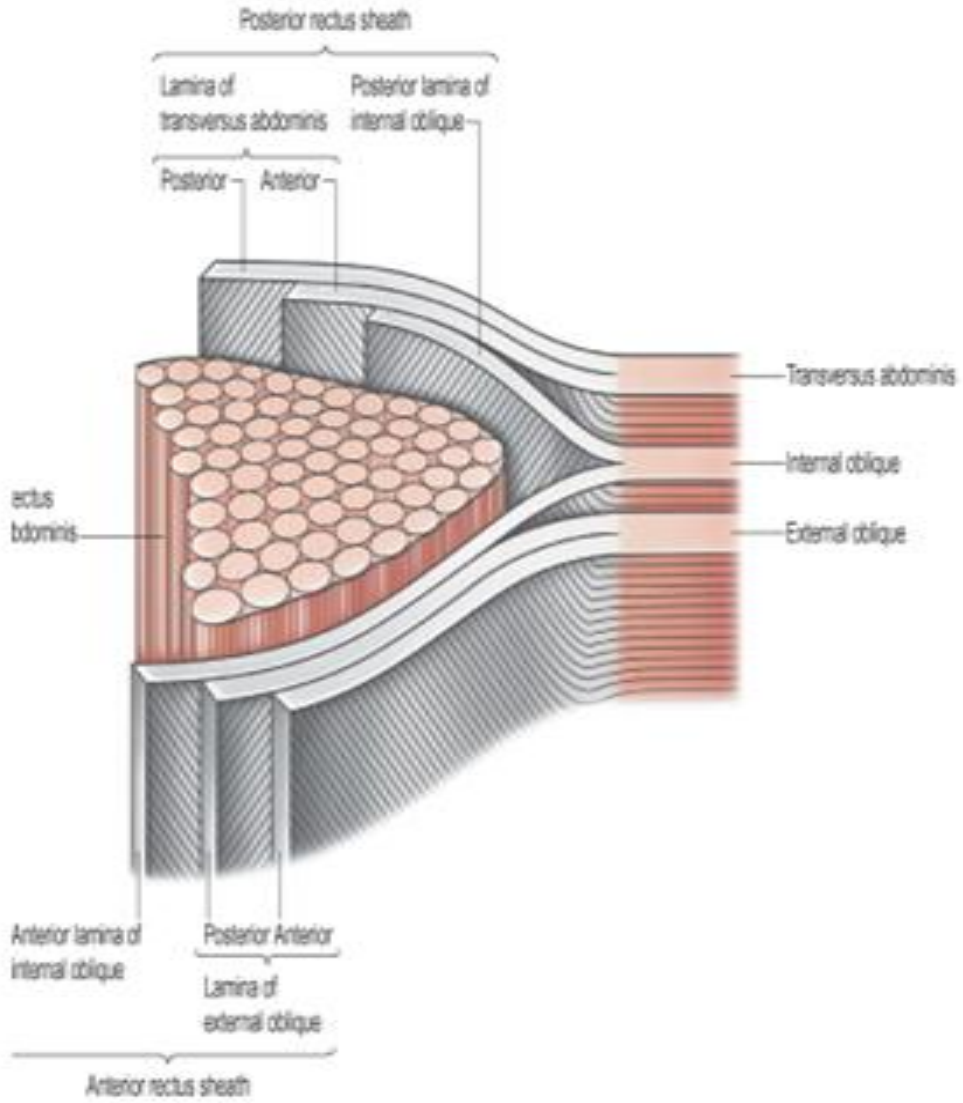


External Oblique Muscle

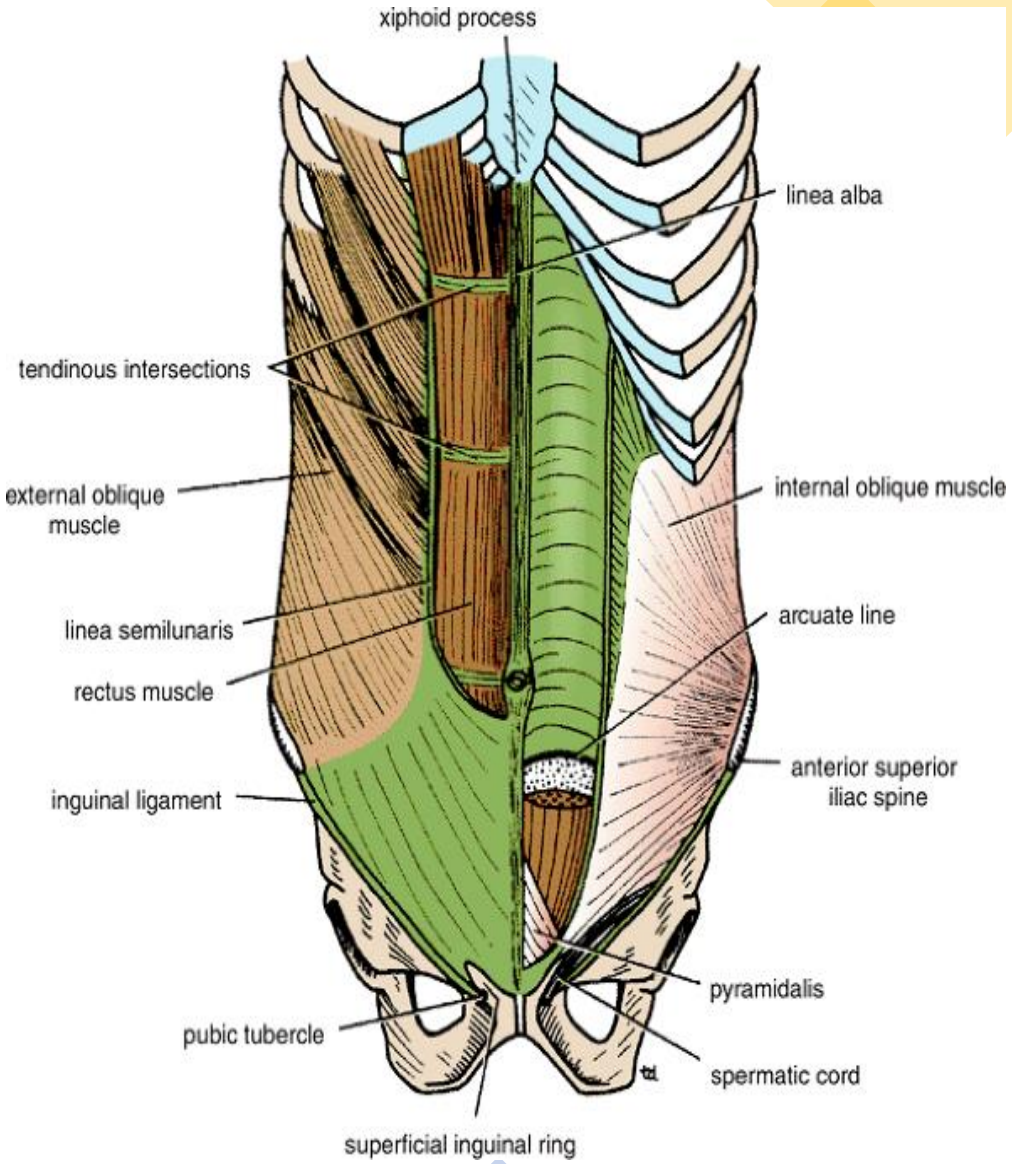
The most superficial muscle.



- In the upper abdomen, its aponeurosis fuses with half of the aponeurosis of the internal oblique muscle at the lateral margin of the rectus abdominus to form the anterior rectus sheath

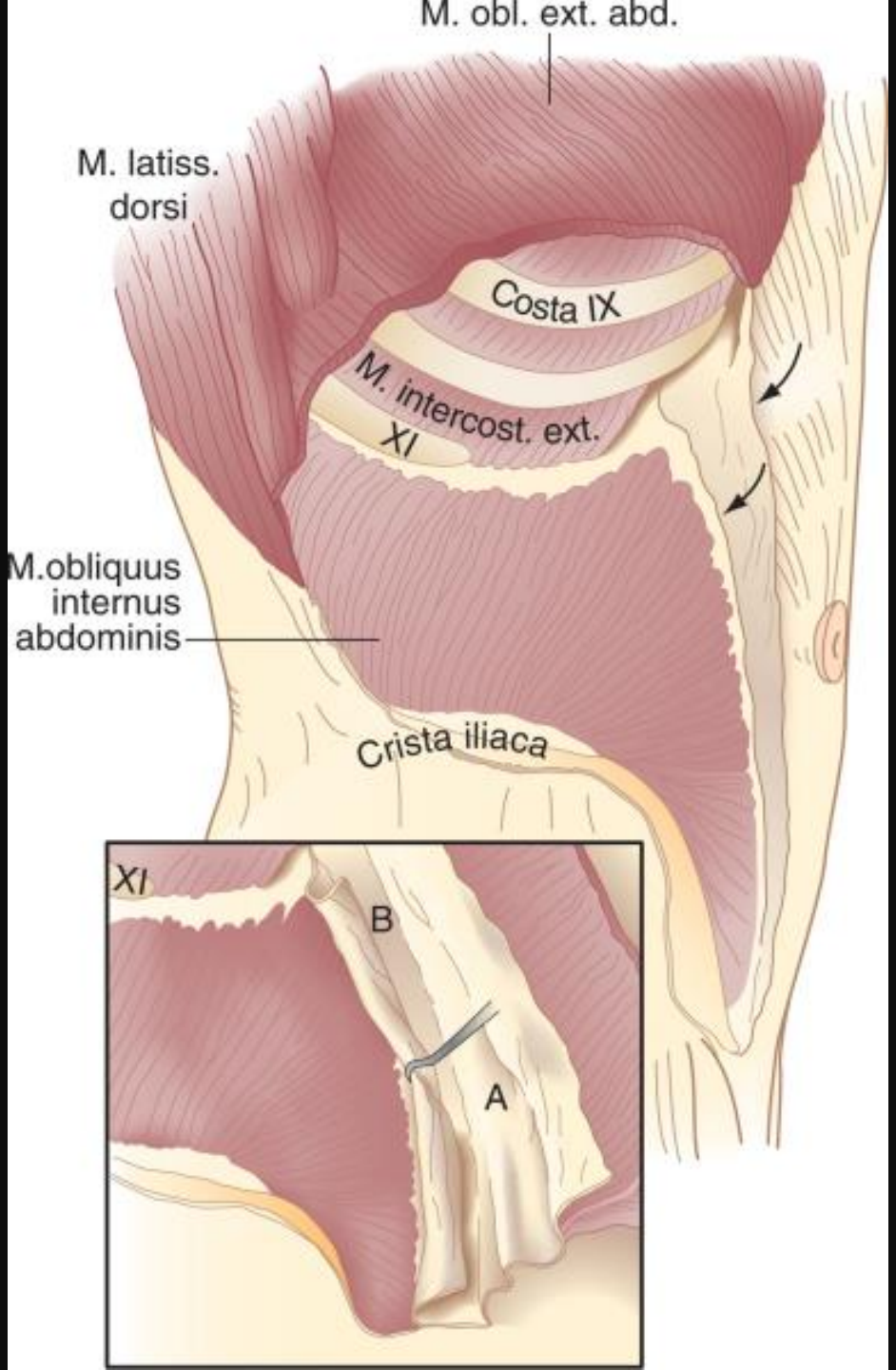


- Lower in the abdomen, this fusion occurs near the midline.

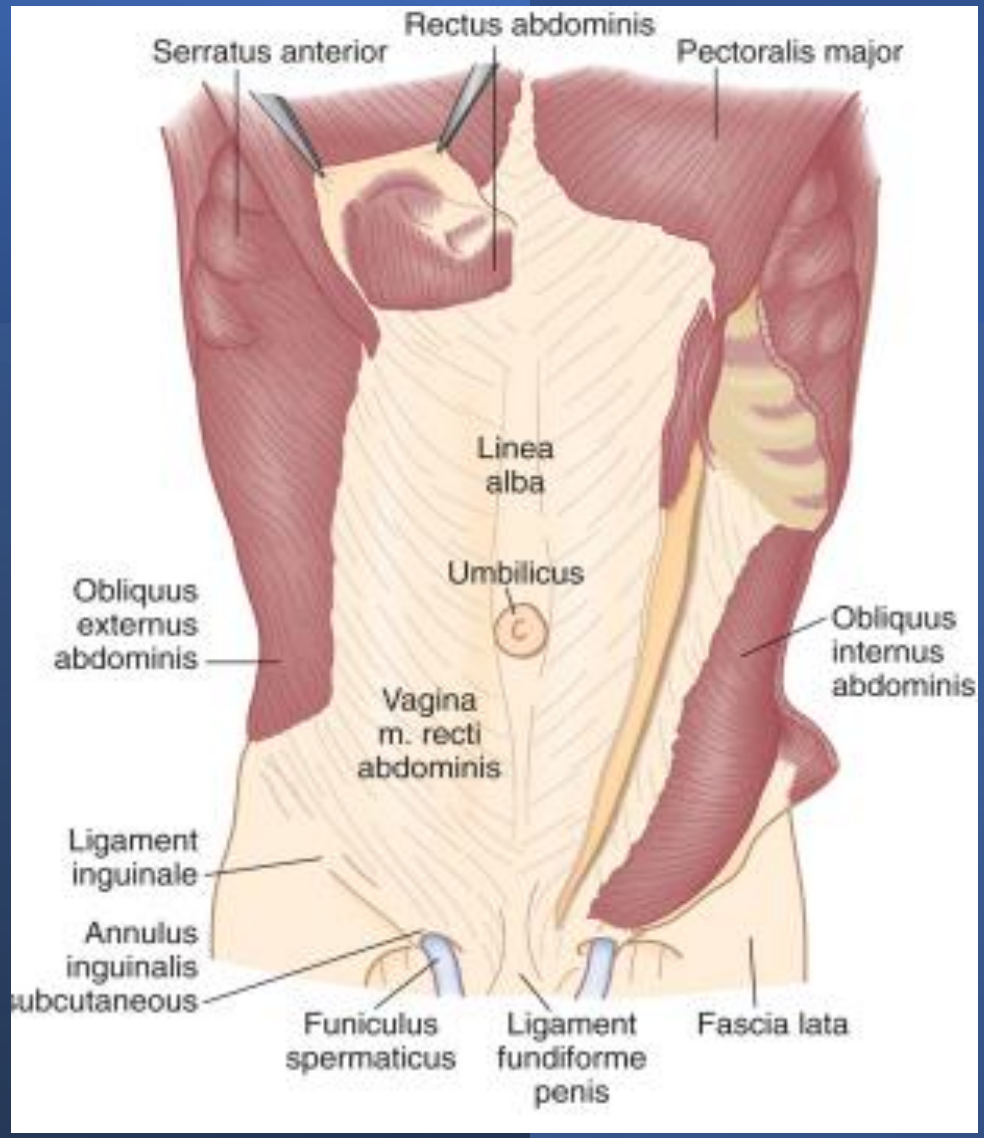


Internal Oblique Muscle

- **Forms a broad aponeurosis that fuses in the midline and contributes to the anterior rectus sheath throughout the abdomen and the posterior rectus sheath in the upper abdomen.**

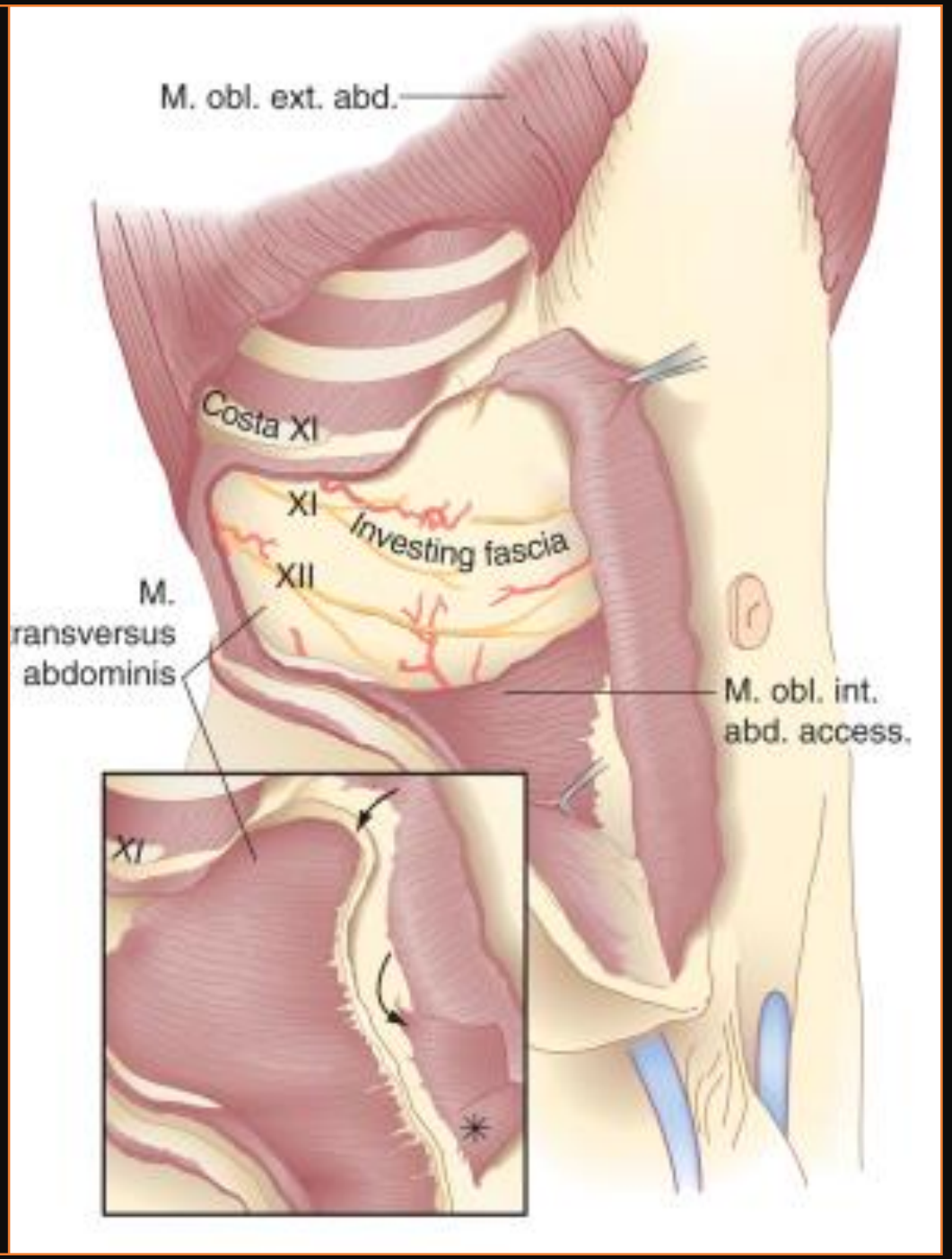


- It remains muscular in the groin, where it has no attachment, and its fibers continue onto the spermatic cord as the cremasteric muscle.



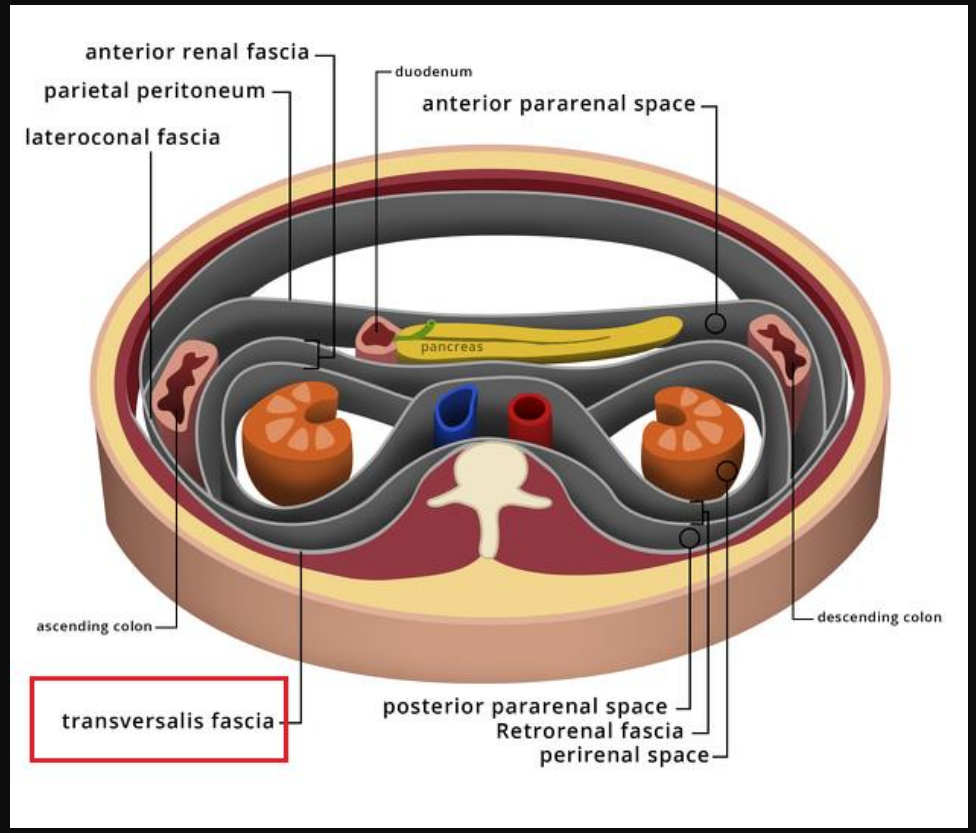
Transversus Abdominus Muscle

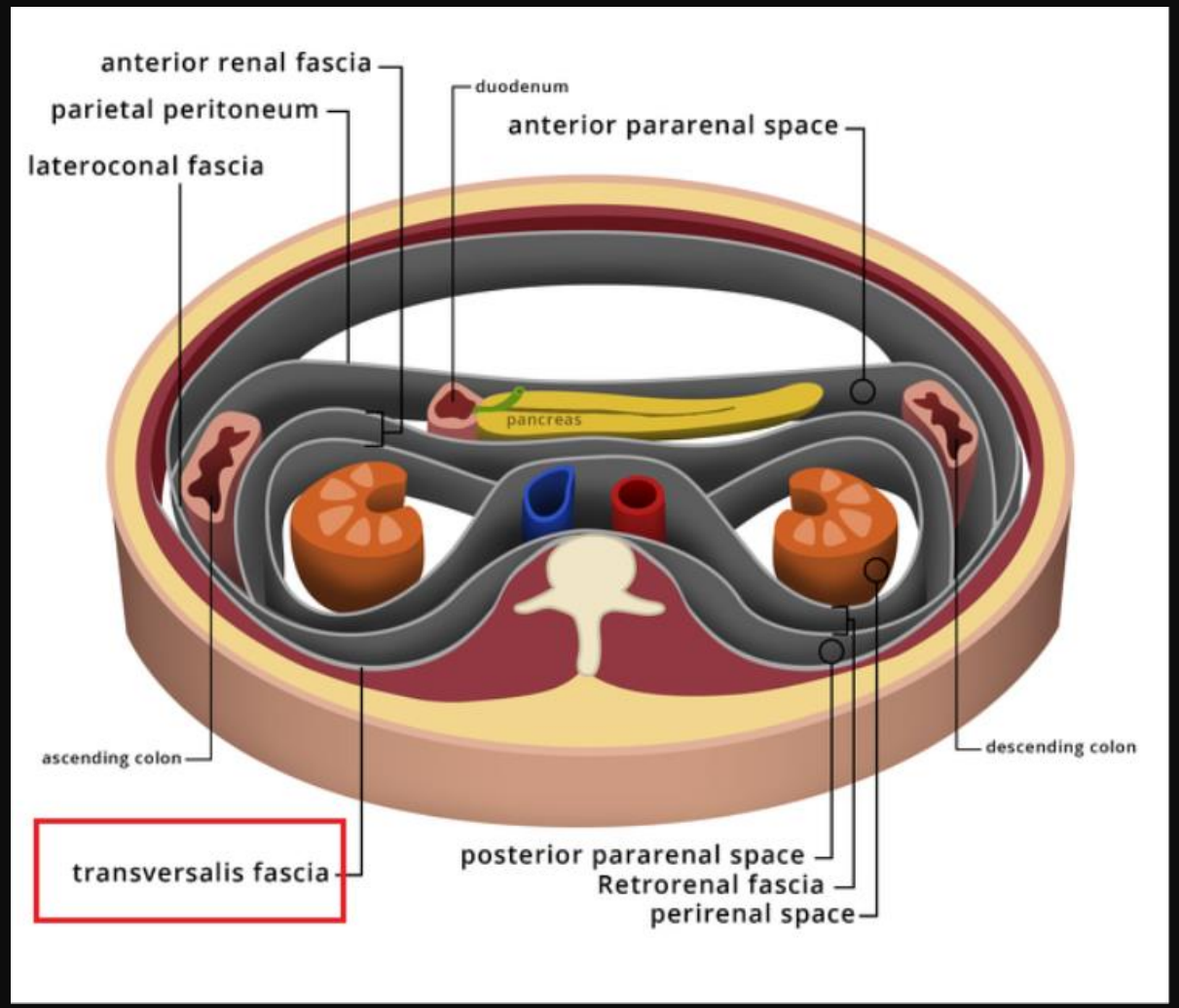
Fuses medially to form the rectus sheath and linea alba



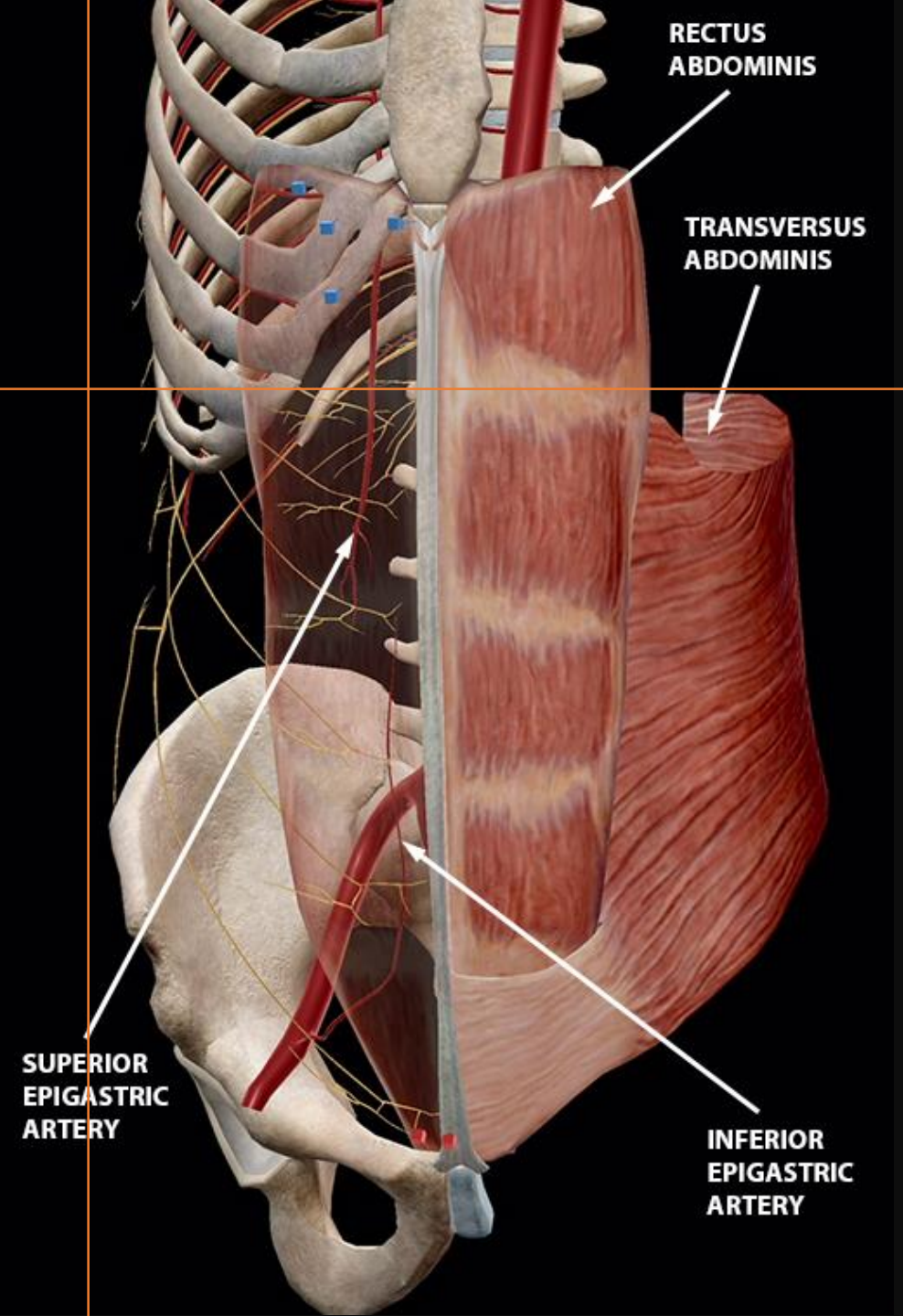
Transversalis Fascia

- It is through this layer that all groin hernia pathology develops
- It forms a complete continuous envelope of fascia around the interior of the abdominal wall



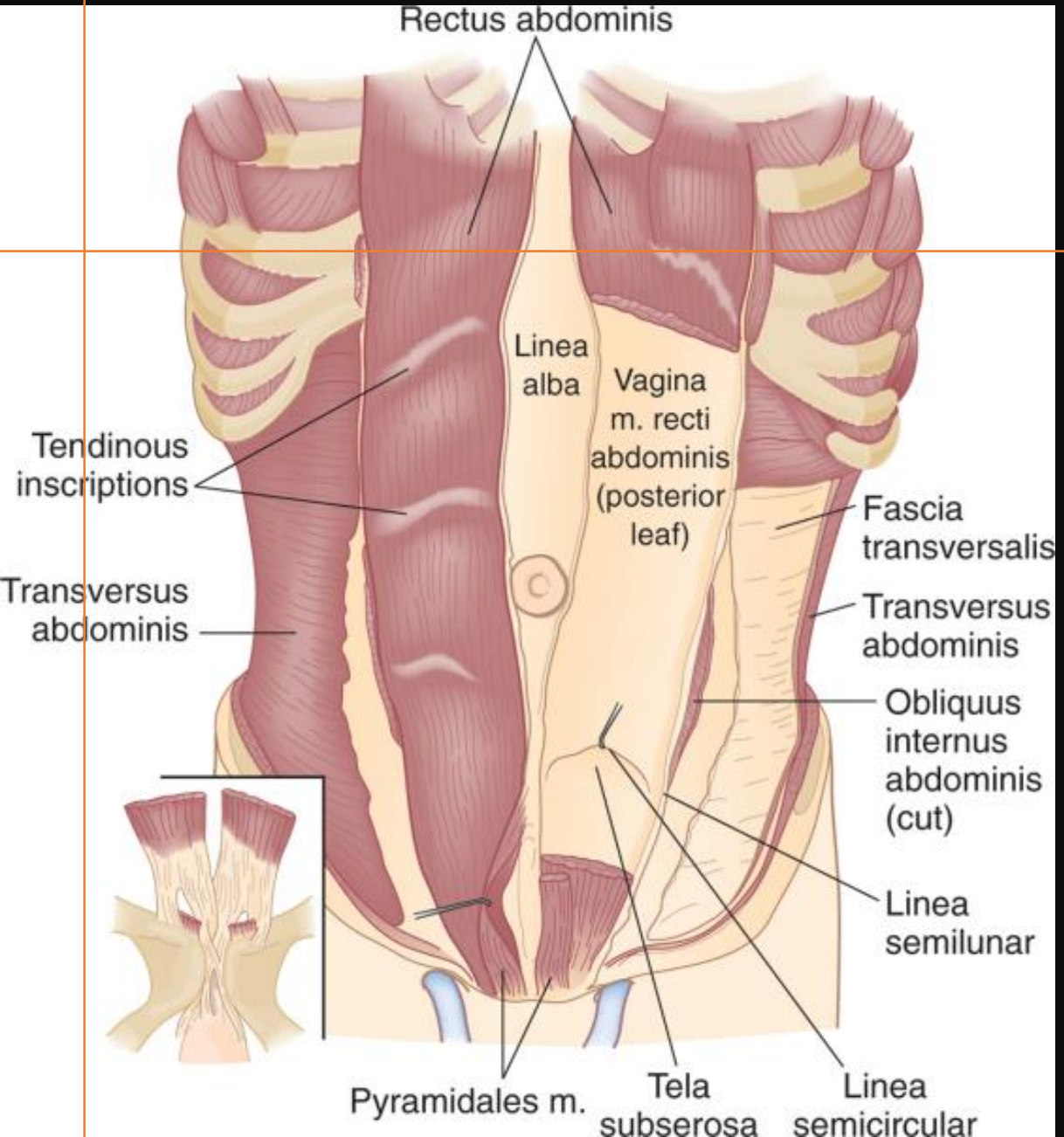


- It is a true fascial layer, so it has little intrinsic strength
- Through its fusion to aponeurotic layers, it establishes continuity among such seemingly unrelated areas.



Midline structures

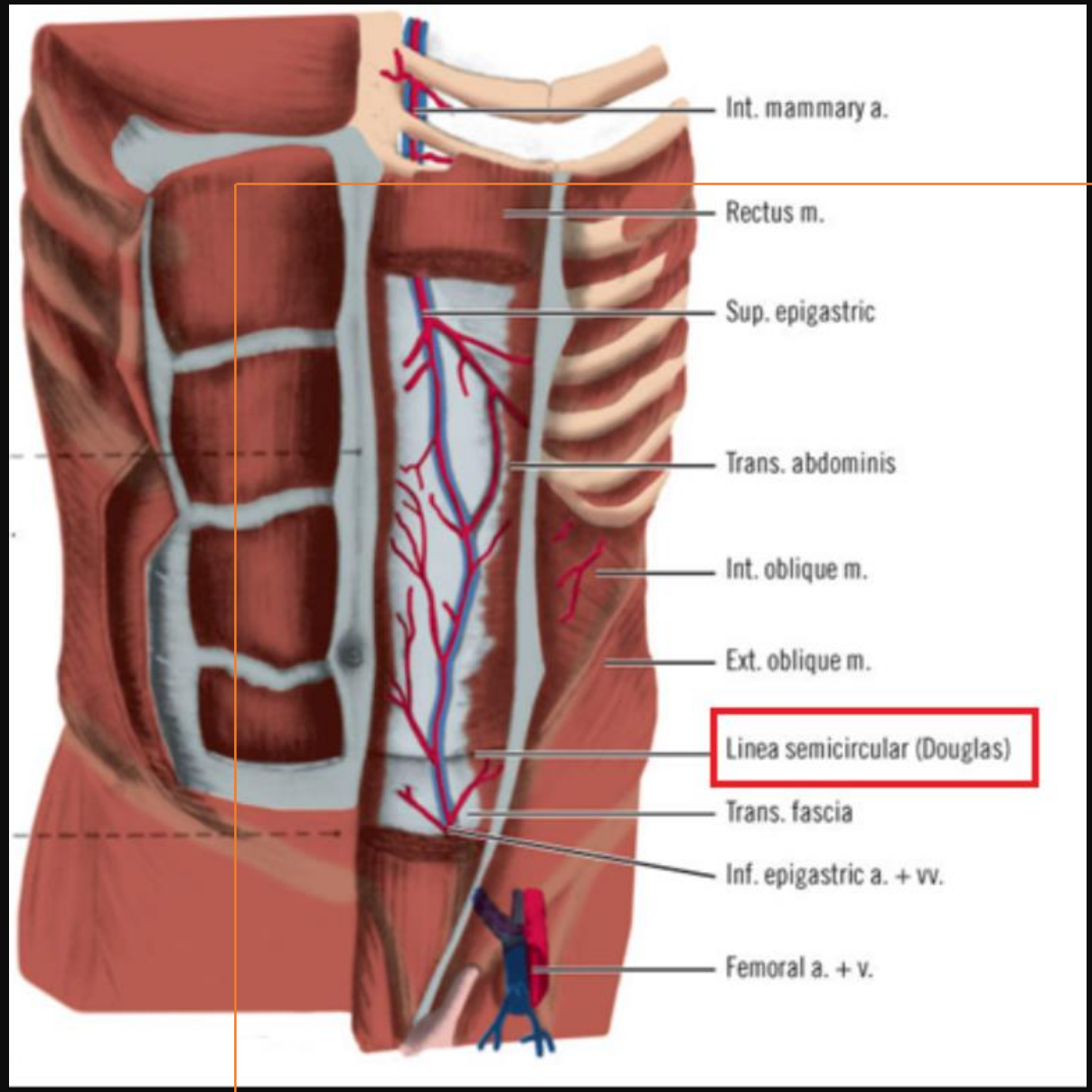
1. Rectus abdominus muscle
2. Umbilicus
3. Umbilical cord remnants



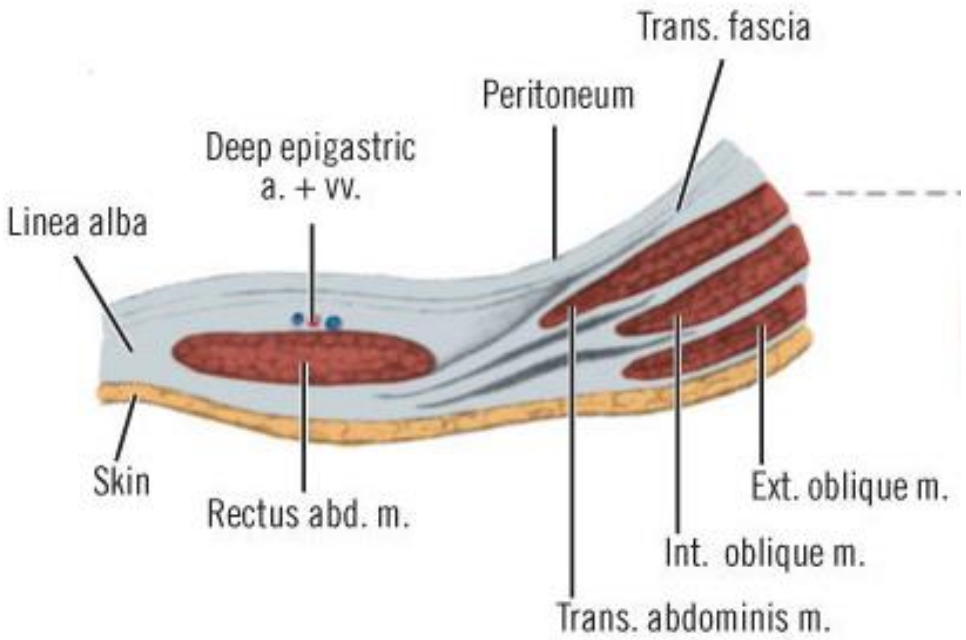
Rectus Abdominus Muscle

- **Consists of narrow, thick bands of muscle that parallel the midline from the costal cartilages to the pubic symphysis.**
- **Above the umbilicus, they are separated in the midline the linea alba.**

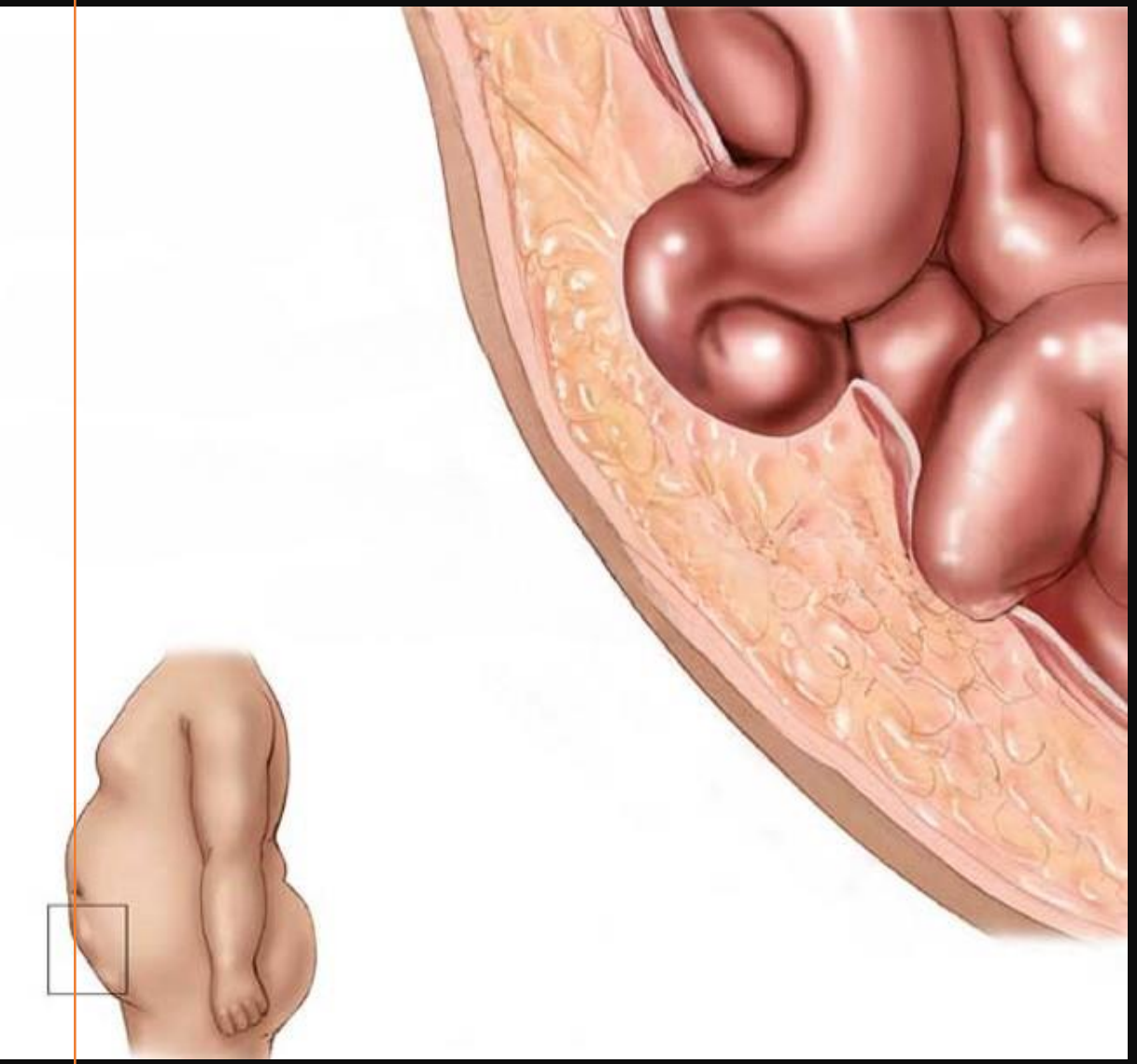
- **Midway between the umbilicus and the symphysis pubis is the semicircular line of Douglas**



- **Below the semicircular line, all three aponeuroses cross anterior to the rectus muscle, leaving only the peritoneum and the transversalis fascia between the rectus muscle and abdominal contents.**



- No fusion of these aponeuroses occurs along the inguinal canal; therefore, the conjoined tendon normally (95% of cases) does not exist.



Definition

- Hernia (L)= rupture
- A hernia is a **protrusion** of a viscus or part of a viscus through an abnormal **opening** in the **walls** of its containing cavity.

Types of Abdominal Wall Hernias

Groin	Ventral	Pelvic	Posterior
• 1.Inguinal • Indirect • Direct • Combined • 2.Femoral	• 1.Umbilical • 2. Epigastric • 3.Spigelian • 4.Incisional	• 1.Obturator • 2.Sciatic • 3.Perineal	• 1.Lumbar • A. Superior triangle • B. Inferior triangle

Frequency

Abdominal wall hernias are common, affecting 1.7% of people of all ages and 4% of those over 45.

- **Inguinal: 75- 80%**
- Incisional : 8-10%
- Umbilical: 3-8%

Etiology

A. Congenital defects: as in the indirect inguinal hernia.

B. Loss of tissue **strength** and **elasticity**:

1. aging

2. Debilitating illness

3. repetitive stress as in hiatal hernia.

4. matrix metalloproteinase (MMP) abnormalities

5. Collagen vascular disease (a diminished collagen type I/III ratio).

C. **Trauma**:

1. Operative trauma

2. Accidental trauma

3. Wound infection

D. Increased intra-abdominal pressure (Controversial):

1. Heavy lifting
2. Coughing, asthma, and COPD
3. Bladder outlet obstruction (BPH)
4. Prior pregnancy
5. Ascites and abdominal distention
6. Obesity
7. Peritoneal dialysis

E. Metabolic factors: Defective collagen ultrastructure:

- Increased age
- Diabetes
- Smoking
- Lower body-mass index
- Hiatus hernia
- Sleep apnea

Hernia Composition

1. The **sac**.
2. The **coverings** of the sac.
3. The **contents** of the sac.

The Sac

- The sac is a **diverticulum** of peritoneum
- Parts of the sac:

1) Mouth
2) Neck
3) Body
4) Fundus

Neck

- Usually well defined
- In some direct inguinal hernias and in many incisional hernias there is no actual neck
- **Strangulation** of bowel is a likely complication when the neck is **narrow**, as in femoral and paraumbilical hernias

Body

- Varies in size
- Not necessarily occupied

The coverings

- Derived from the **layers of the abdominal wall** through which the sac passes
- In longstanding cases they become atrophied from stretching and so amalgamated that they are indistinguishable from each other

The Contents

These can be:

- Omentum = omentocele (synonym: epiplocele);
- Intestine = enterocele
- A portion of the circumference of the intestine = Richter's hernia

- A portion of the bladder
- An ovary with or without the corresponding fallopian tube
- A Meckel’s diverticulum = a Littre’s hernia
- Fluid, as part of ascites

Descriptive Classification

According to physical or operative findings:

1. Reducible
2. Irreducible
3. Obstructed
4. Strangulated
5. Inflamed
6. Sliding
7. Richter's hernia

Reducible Hernias

- Imparts an **expansile impulse** on coughing.
- Either reduces itself when the patient lies down or can be reduced by the patient or the surgeon.
- The intestine usually **gurgles** on reduction and the first portion is more difficult to reduce than the last
- Omentum is described as doughy, and the last portion is more difficult to reduce than the first.

Irreducible Hernia

- The **contents cannot be returned** to the abdomen but there is no evidence of other complications
- Usually due to adhesions or overcrowding
- The other used term is **Incarcerated hernia**

- Irreducibility without other symptoms is almost diagnostic of an omentocele, especially in femoral and umbilical hernias.
- **Any degree** of irreducibility predisposes to **strangulation**.

Obstructed Hernia

- It is an **irreducible hernia** containing **intestine** that is **obstructed** from without or within, but there is **no interference to the blood supply** to the bowel.

- The symptoms (colicky abdominal pain and tenderness over the hernia site) are less severe and the onset more gradual than in strangulated hernias
- No clear clinical distinction
- The safe course is to assume that strangulation is imminent and treat accordingly

Strangulated Hernia

- The **blood supply** of the **contents** is **seriously impaired**, rendering the contents **ischemic**.
- **Gangrene** may occur as early as 5–6 hours after the onset of the first symptoms.
- A femoral hernia is more likely to strangulate because of the narrowness of the neck and its rigid surrounds

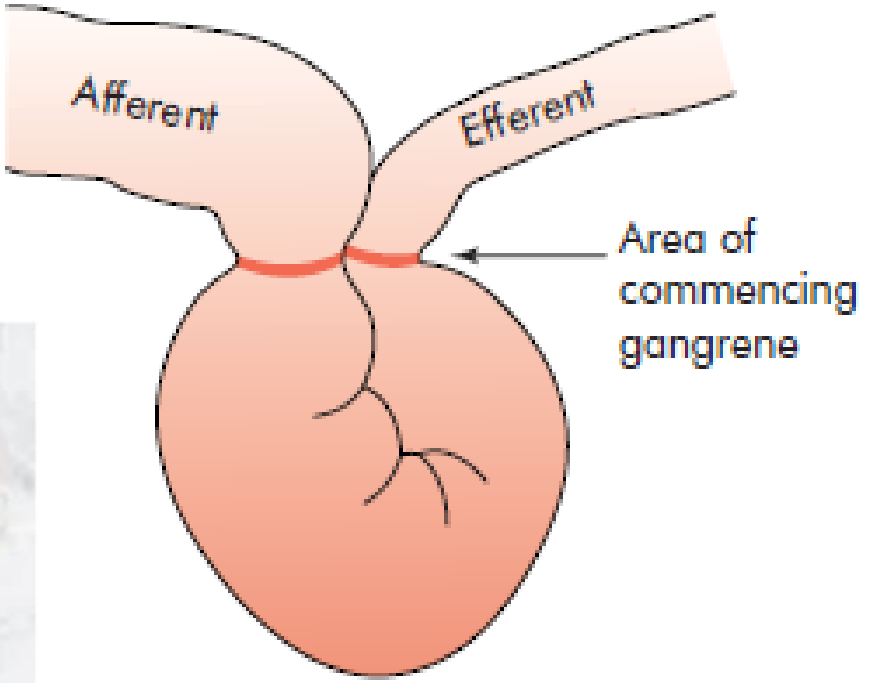
Pathology

- The intestine is obstructed and its blood supply impaired.
- The venous return is impeded.
- The wall of the intestine becomes congested and bright red with the transudation of **serous fluid** into the sac.

- As congestion increases the wall of the intestine becomes **purple** in color.
- As venous stasis increases, the arterial supply becomes more and more impaired.
- Blood is **extravasated** under the serosa and is effused into the lumen.

- The fluid in the sac becomes **blood-stained** and the shining serosa dull because of a fibrinous, sticky exudate.
- The walls of the intestine lose tone and become friable.
- Bacterial transudation occurs secondary to the lowered intestinal viability and the sac fluid becomes infected.

- **Gangrene appears at the rings of constriction which become deeply indented and grey in color.**



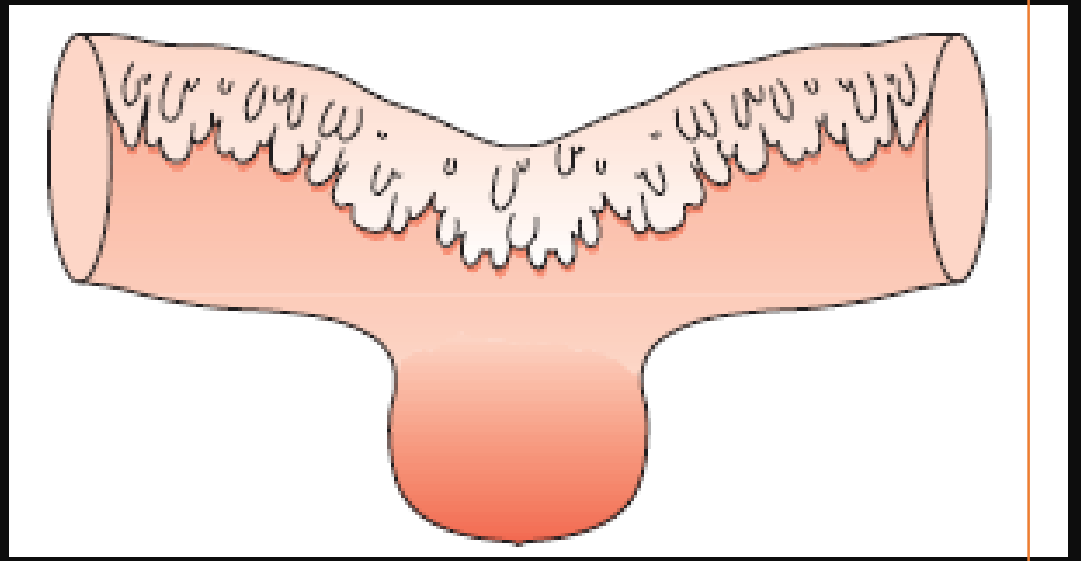
- The **gangrene** then develops in the anti-mesenteric border, the color varying from black to **green** depending on the decomposition of blood in the subserosa.
- If the strangulation is unrelieved, **perforation** of the wall of the intestine occurs.
- **Peritonitis** spreads from the sac to the peritoneal cavity.

Clinical features

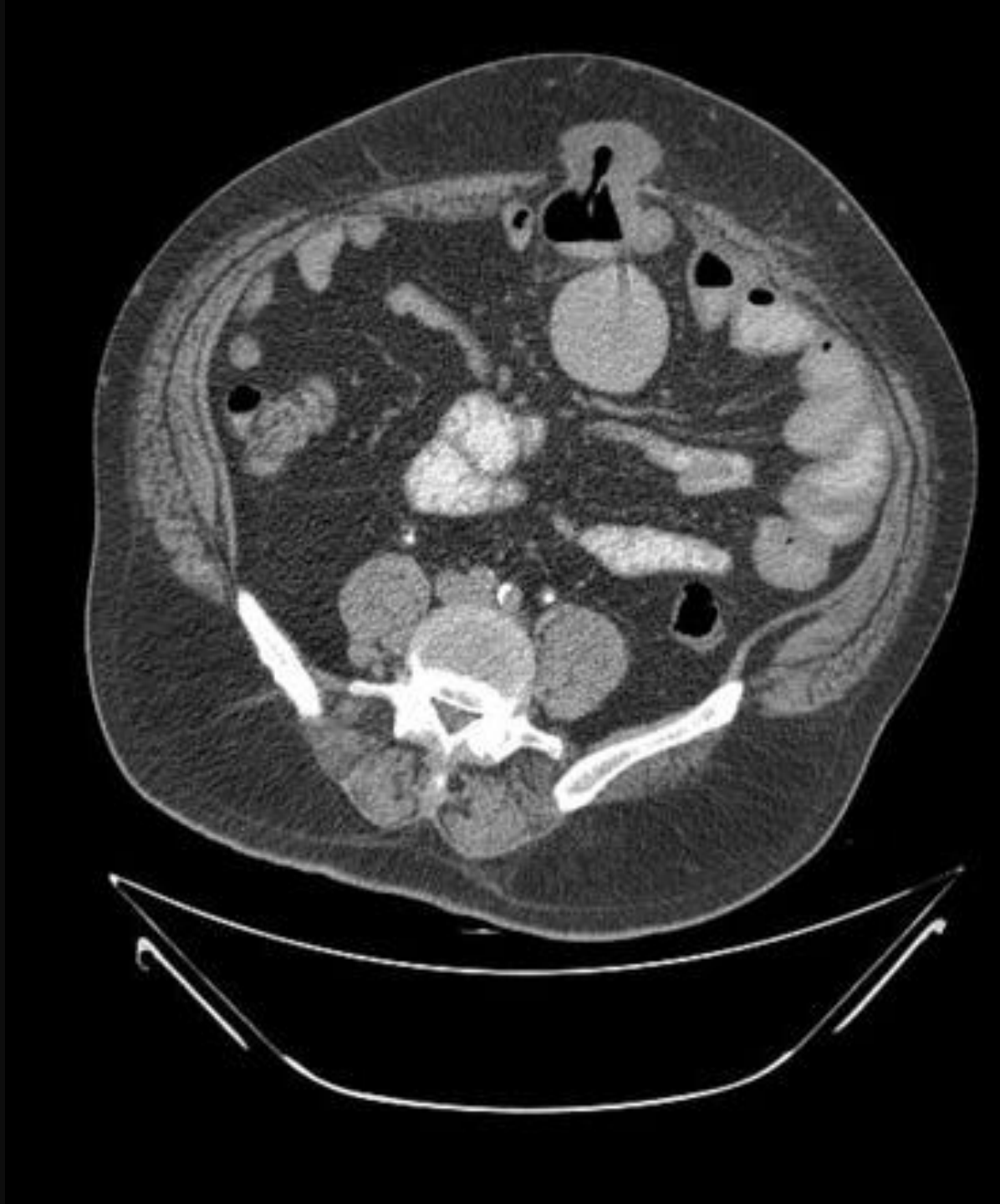
- **Sudden pain over the hernia**
- **Then generalized colicky abdominal pain**
- **Nausea and vomiting**
- **On examination the hernia is tense, extremely tender and irreducible, and there is no expansile cough impulse.**

Richter’s hernia

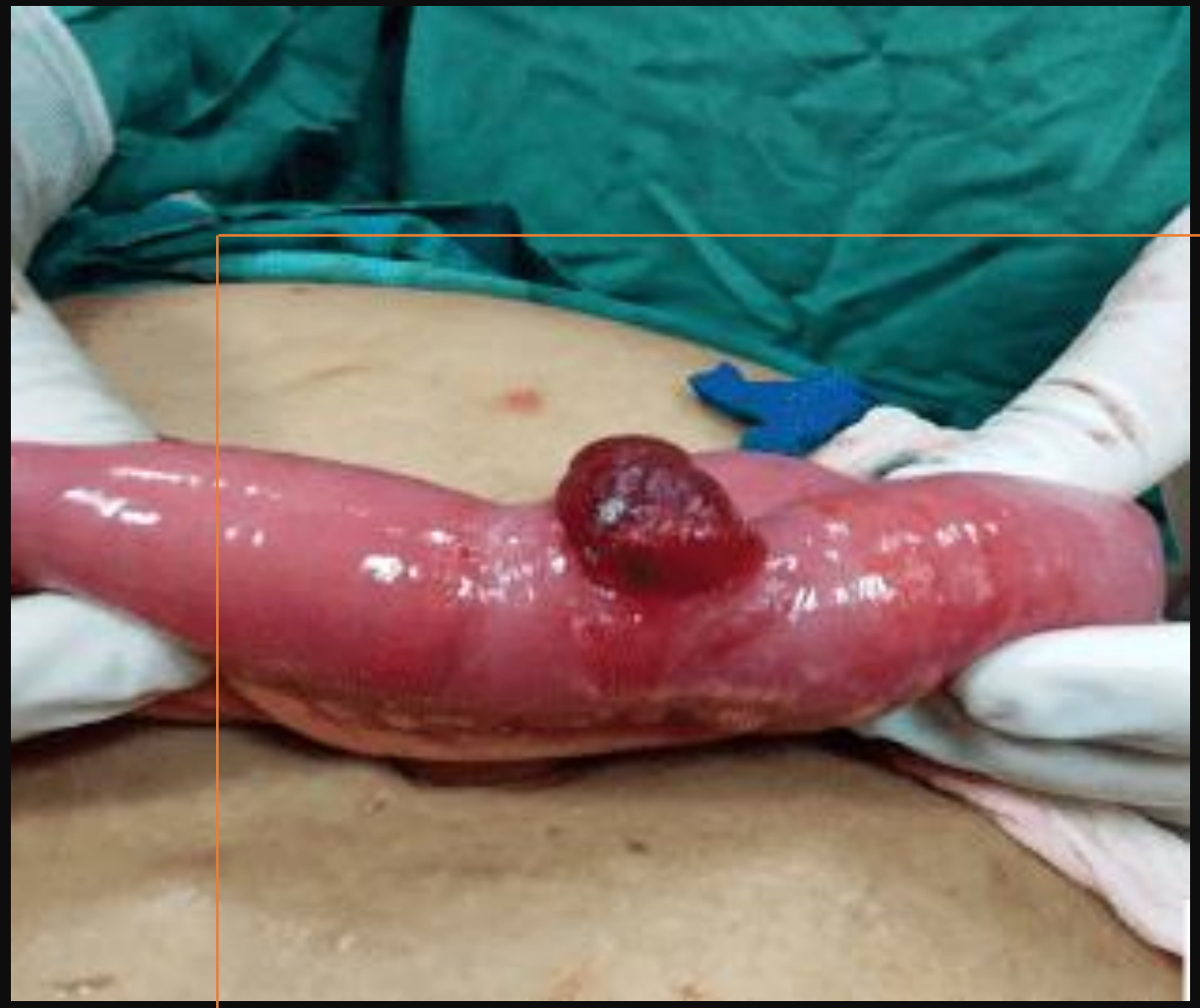
- **Is a hernia in which the sac contains only a portion of the circumference of the intestine (usually small intestine)**
- **It usually complicates femoral and, rarely, obturator hernias.**



- The local signs of strangulation are often not obvious, the patient may not vomit and, although colicky pain is present, the bowels are often opened normally or there may be diarrhea;

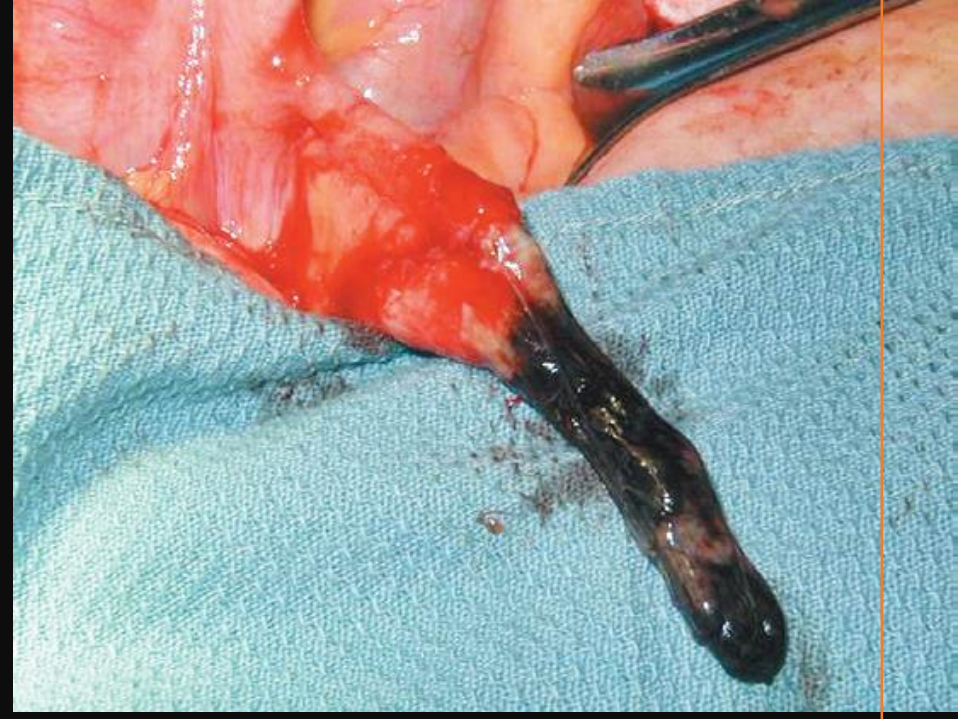


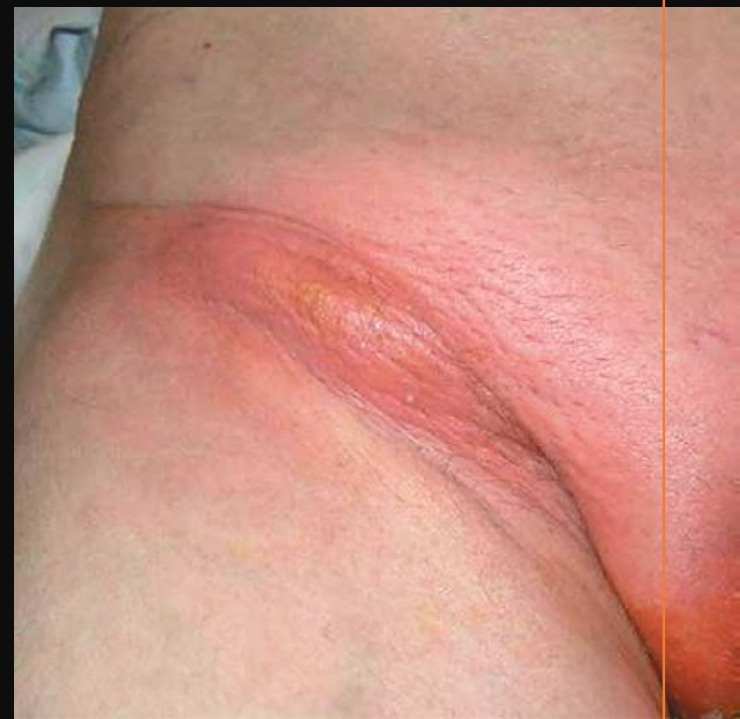
- Absolute constipation is delayed until paralytic ileus supervenes.
- For these reasons, gangrene of the knuckle of bowel and perforation have often occurred before operation is undertaken.



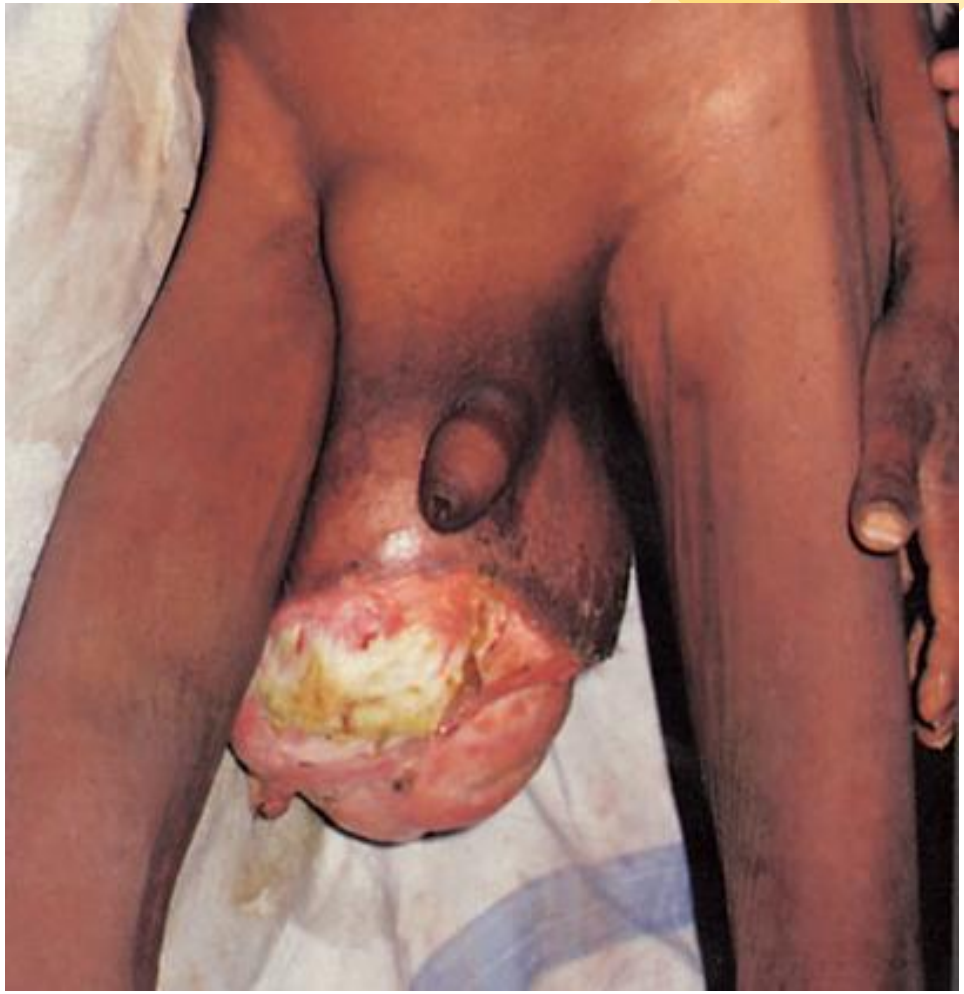
Inflamed Hernia

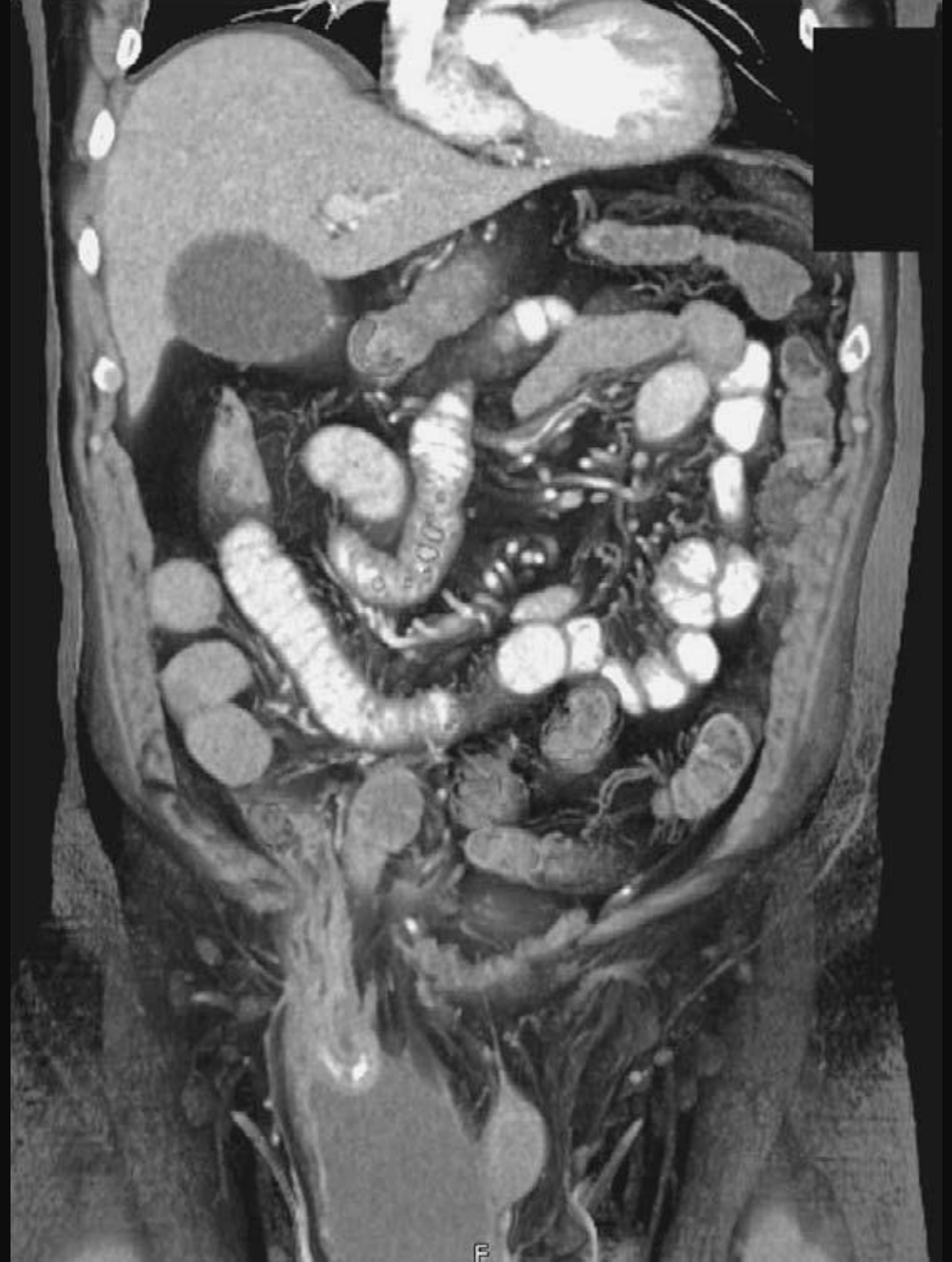
- From inflammation of **the contents** of the sac, e.g., acute appendicitis or salpingitis,
- **De Garengeot's** Hernia is an indirect inguinal hernia containing inflamed appendix





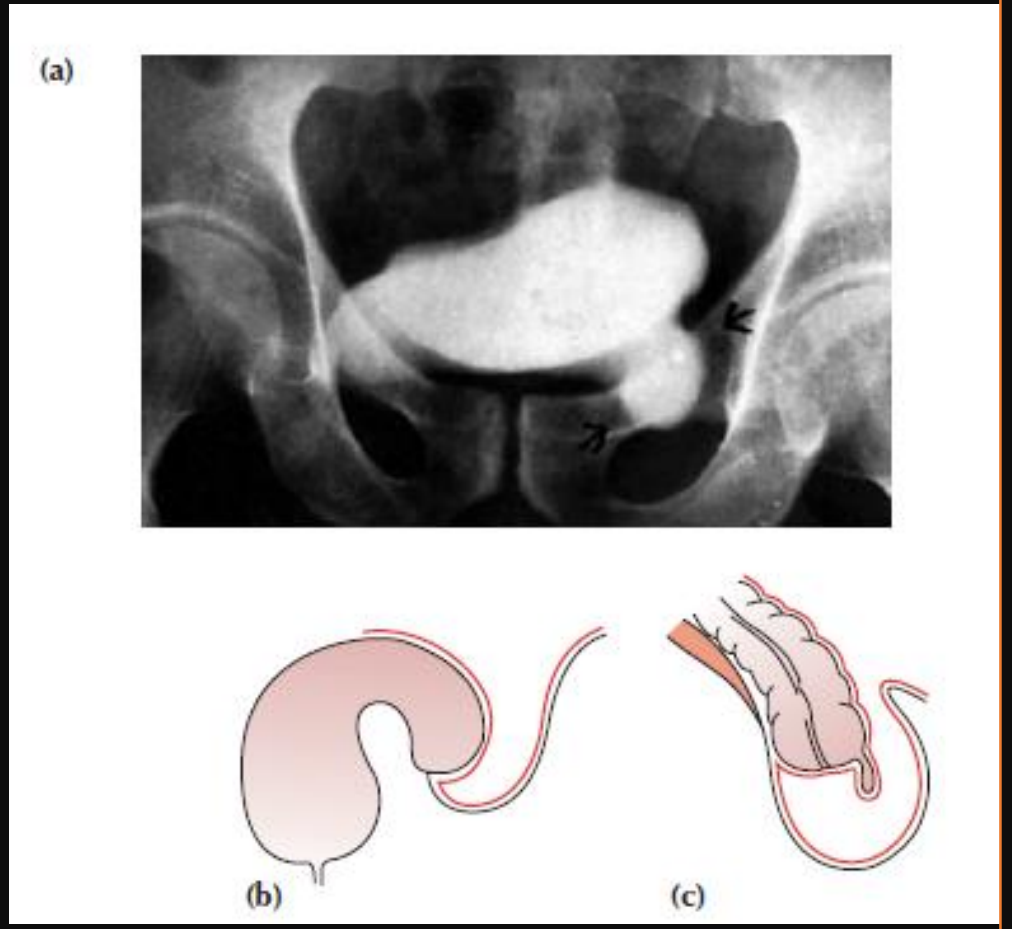
- Or from **external causes**, e.g., the trophic ulcers that develop in the dependent areas of large umbilical or incisional hernias.
- Tender but not tense and the overlying skin red and edematous.





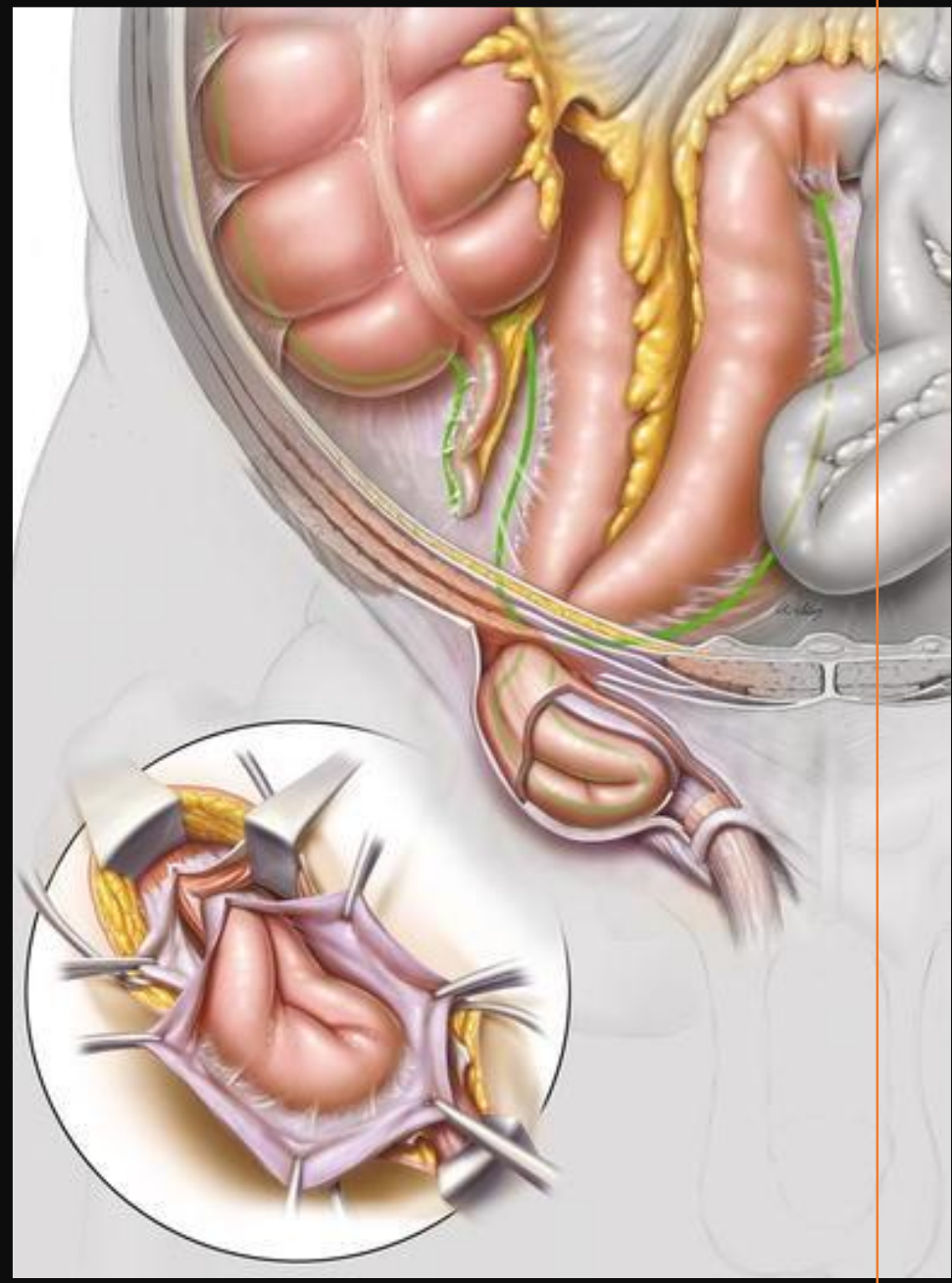
- **Amyand's** Hernia is an indirect inguinal hernia containing appendix

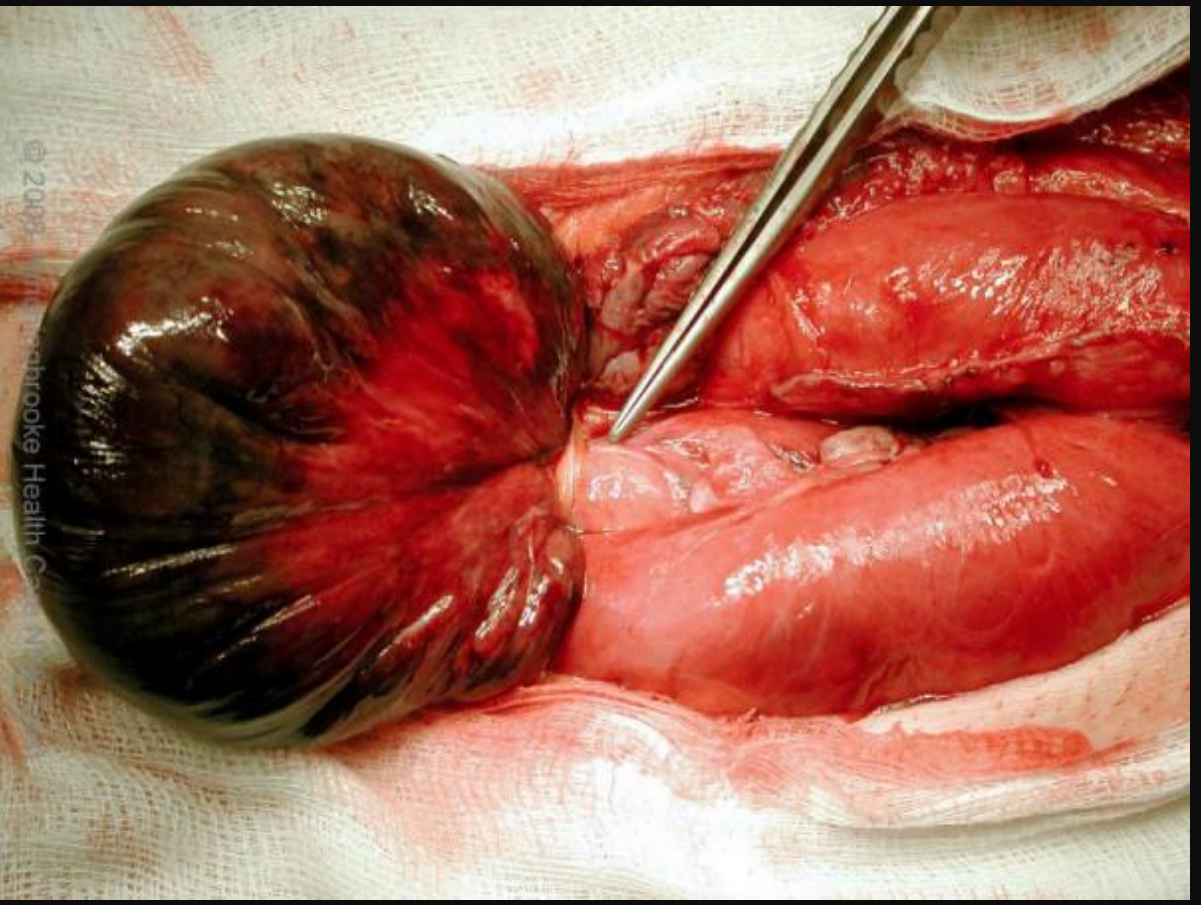
Sliding Hernia (synonym: hernia-en-glissade)



Sliding Hernia

- The wall of the hernia sac, rather than being formed completely by peritoneum, is in part formed by a retroperitoneal structure, such as the colon or the bladder.

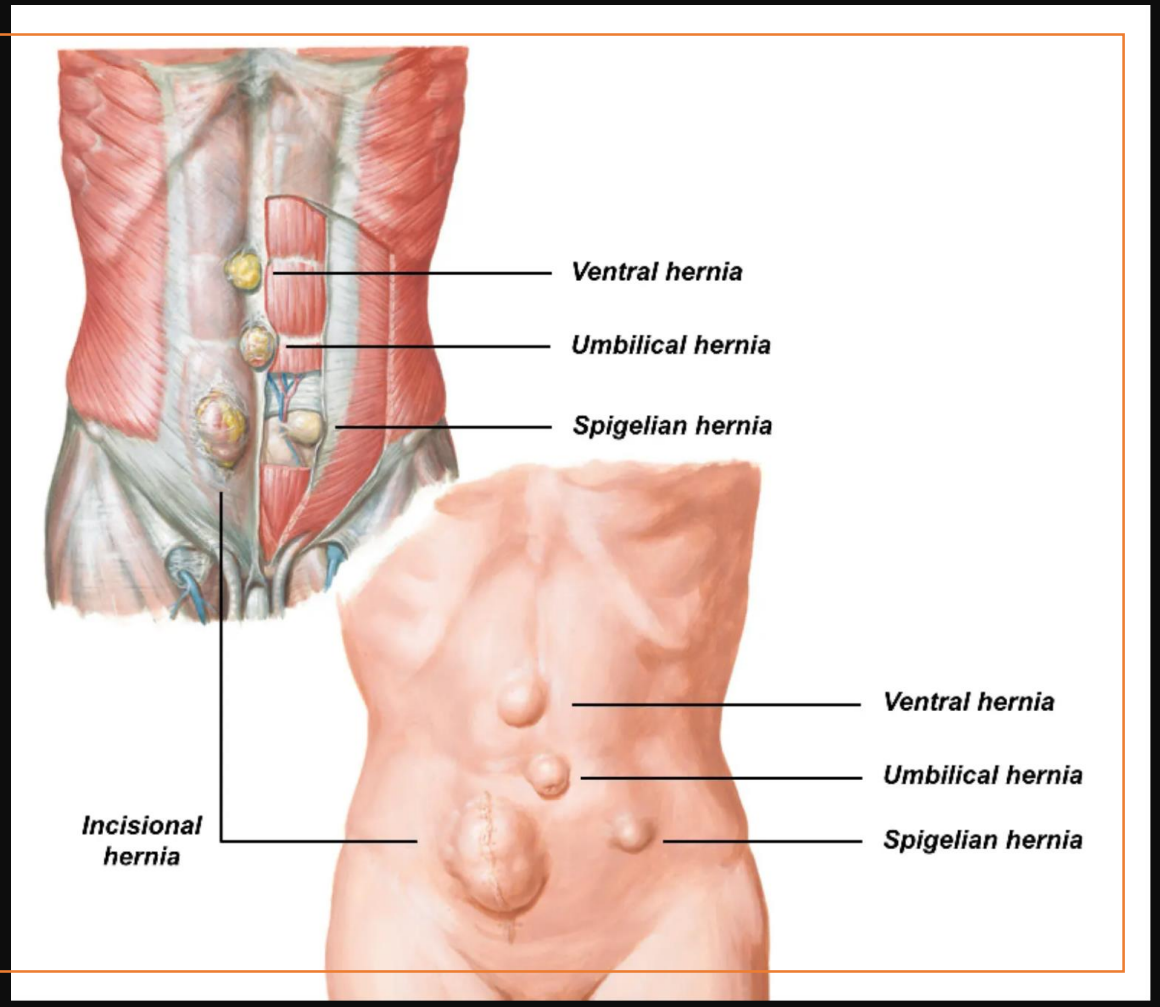


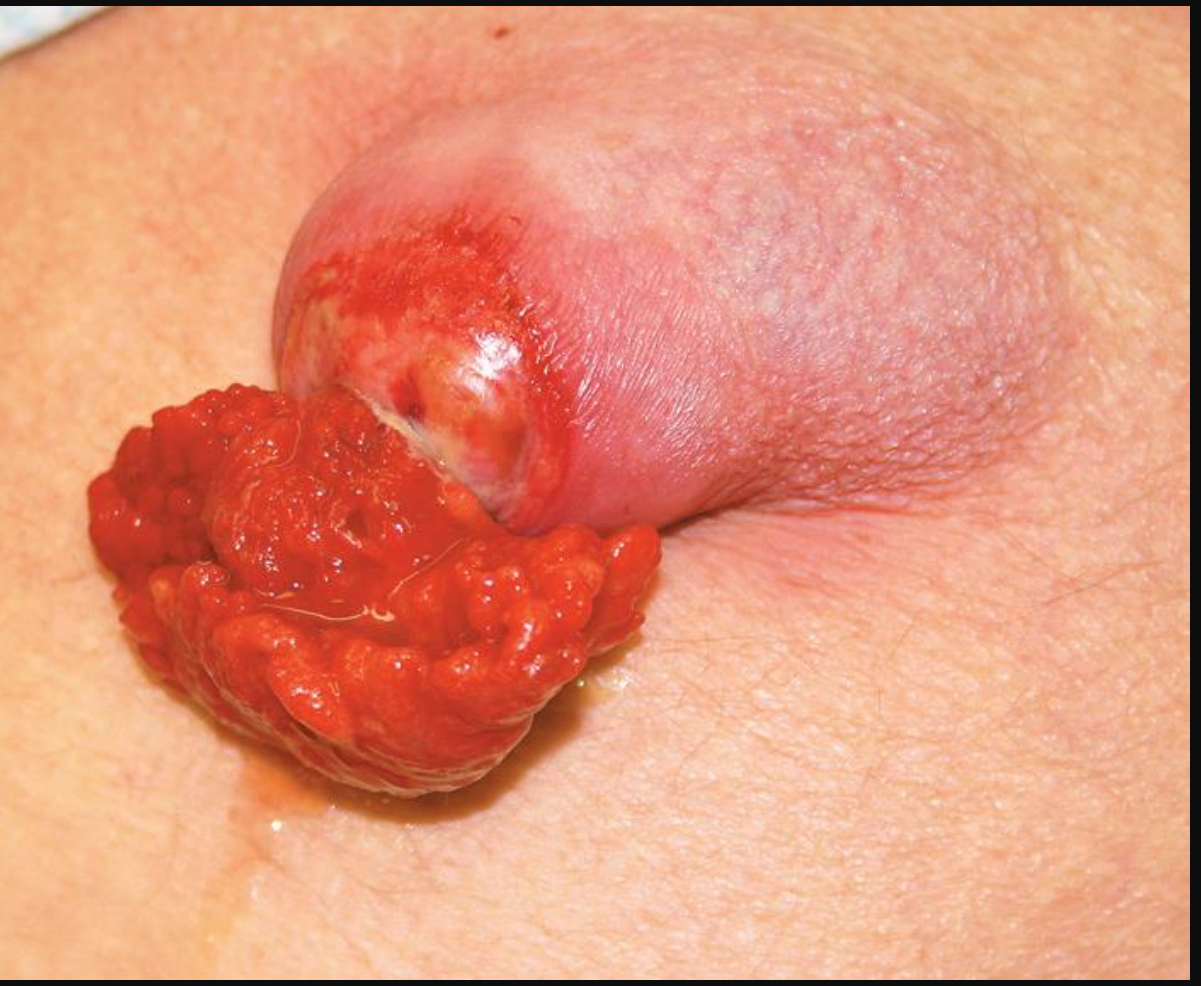


Complications

- Hernias **should be repaired** electively to prevent the development of major complications.
  1. Intestinal **obstruction**.
  2. Intestinal **strangulation** with bowel **perforation**

Specific types of abdominal wall hernias

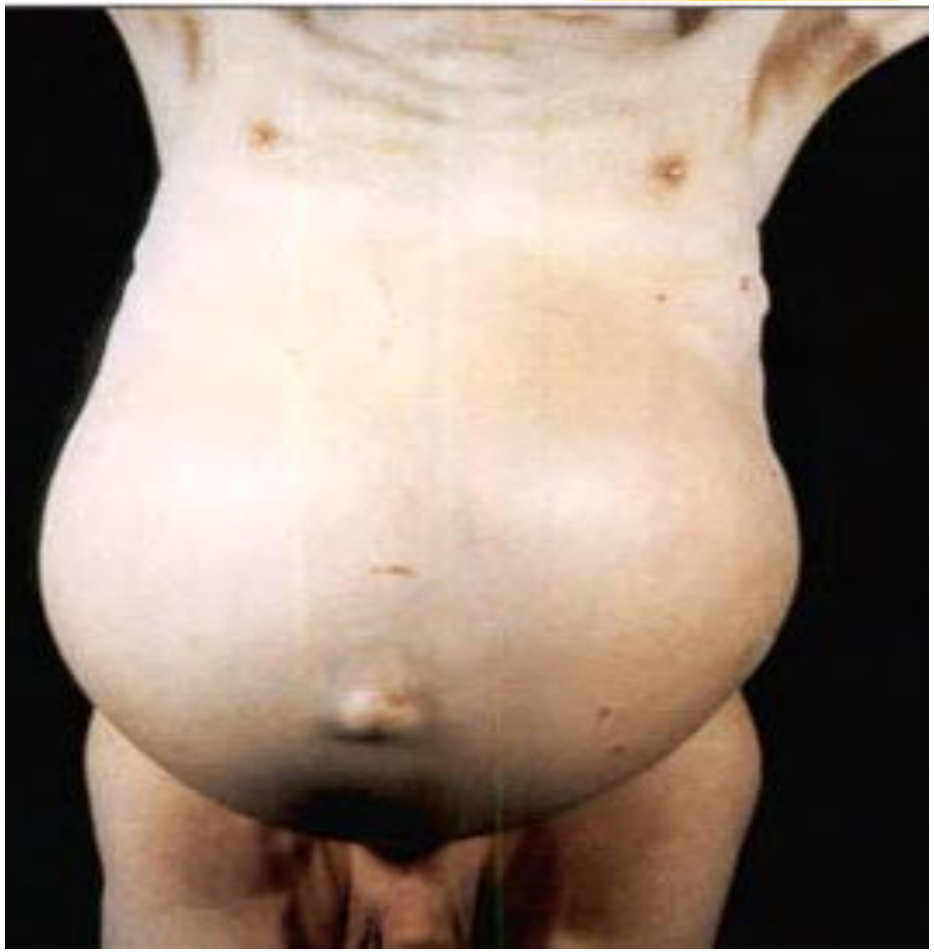




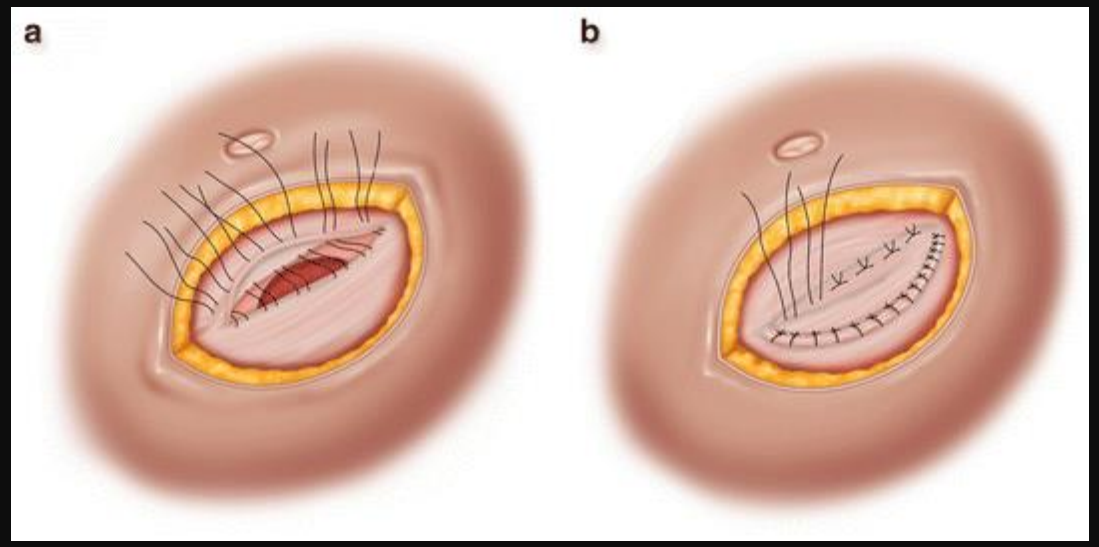
Umbilical Hernias

- Occur through the defect where the umbilical structures passed through the abdominal wall
- Occur 10 times more often in women than in men

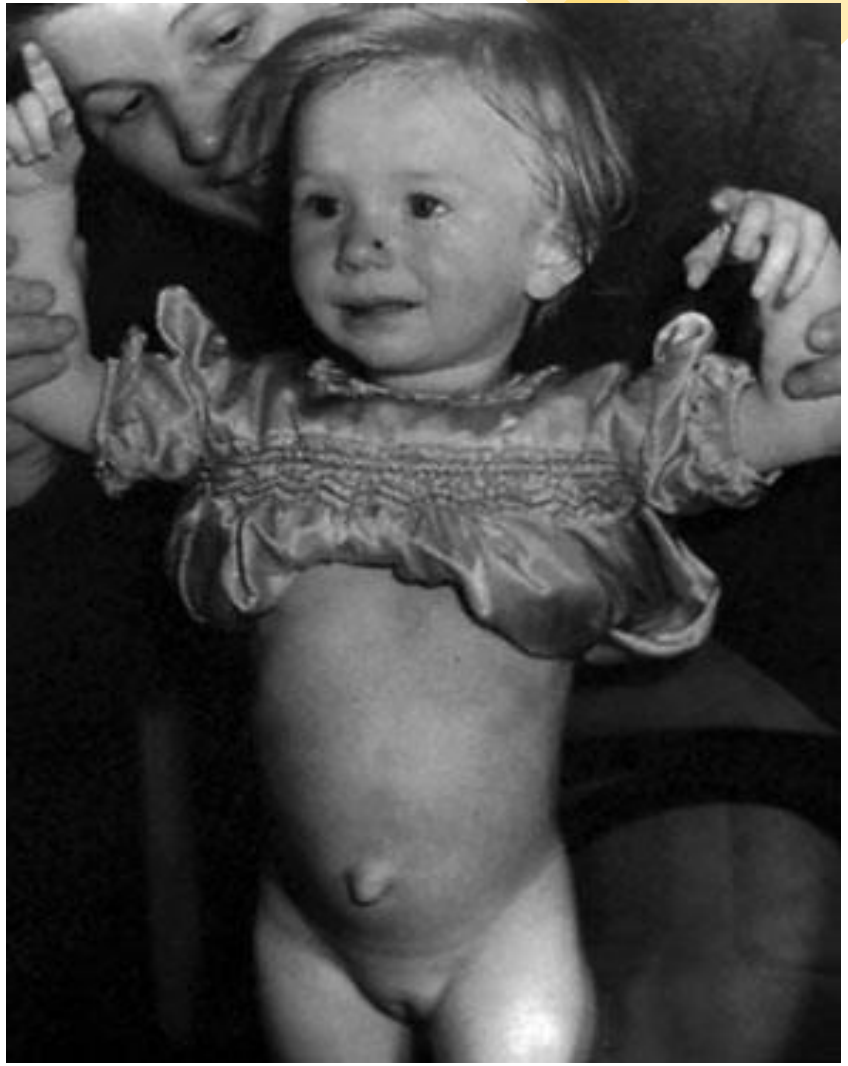
- In adults, umbilical hernias are often associated with increased intra-abdominal pressure, as with ascites or pregnancy



- Repair of an umbilical hernia consists of a simple transverse repair of the fascial defect

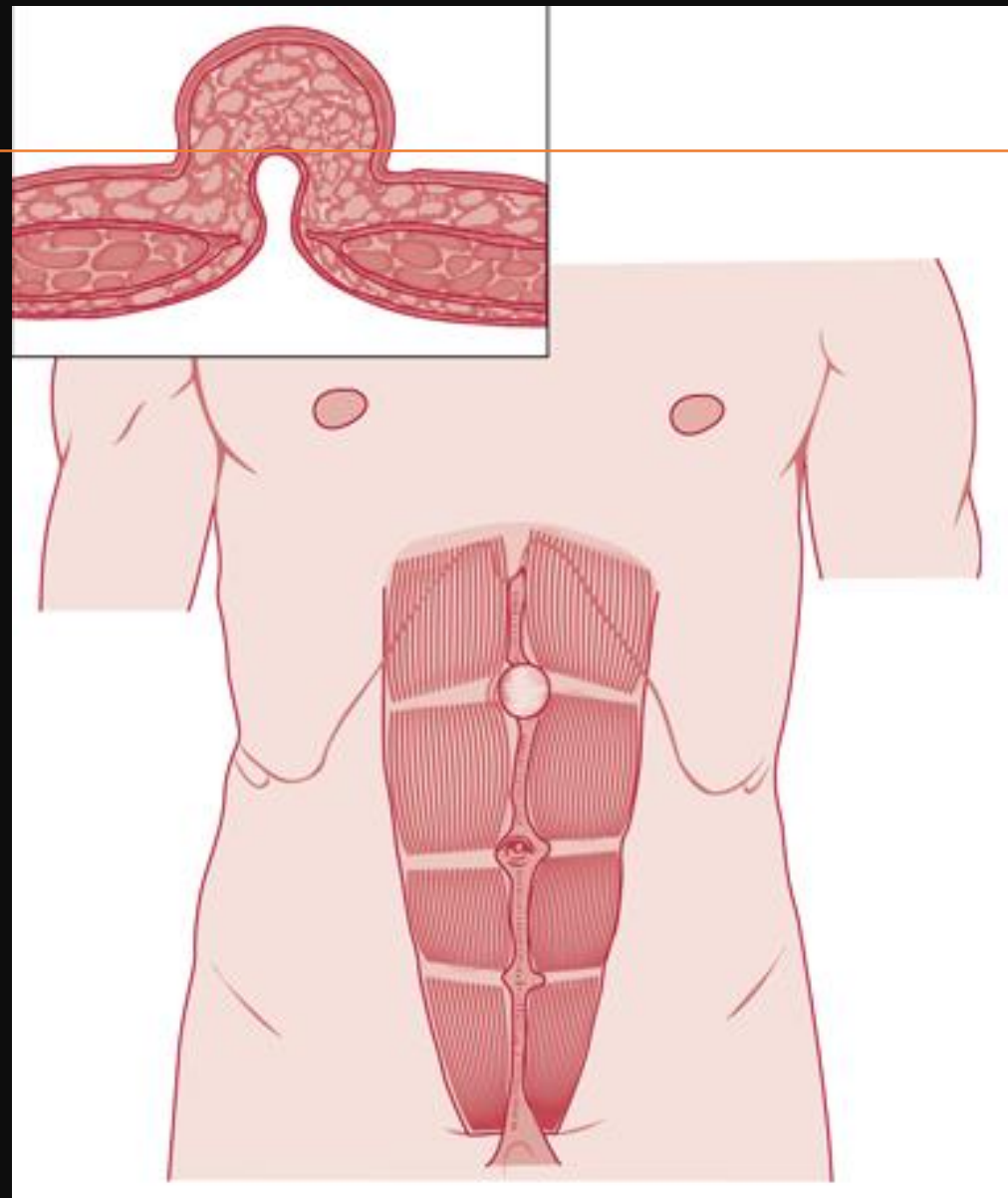


- **The defect is common in children but usually closes by age 2 years, and fewer than 5% of umbilical hernias persist into later childhood and adult life**



Epigastric Hernias

- **Result from a defect in the linea alba above the umbilicus**
- **They occur more commonly in men (in a 3:1 ratio)**



- 20% of epigastric hernias are multiple at the time of repair
- Repair (simple suturing) is associated with a recurrence rate as high as 10%

Ventral Hernias

- **Occur in the abdominal wall in areas other than the inguinal region**

Incisional Hernia

- The most common type of ventral hernia
- Results from poor wound healing in a previous surgical incision and occurs in 5%-10% of abdominal incisions

Risk factors

1. **Wound infection or hematoma**
2. **Midline incision**
3. **Advanced age**
4. **Obesity**
5. **General debilitation or malnutrition**
6. **Surgical technique**
7. **A postoperative increase in abdominal pressure, as occurs with paralytic ileus, ascites, or pulmonary complications after surgery**

- Incisional hernias are repaired after the patient has recovered from the prior surgery trauma

- Repair requires:

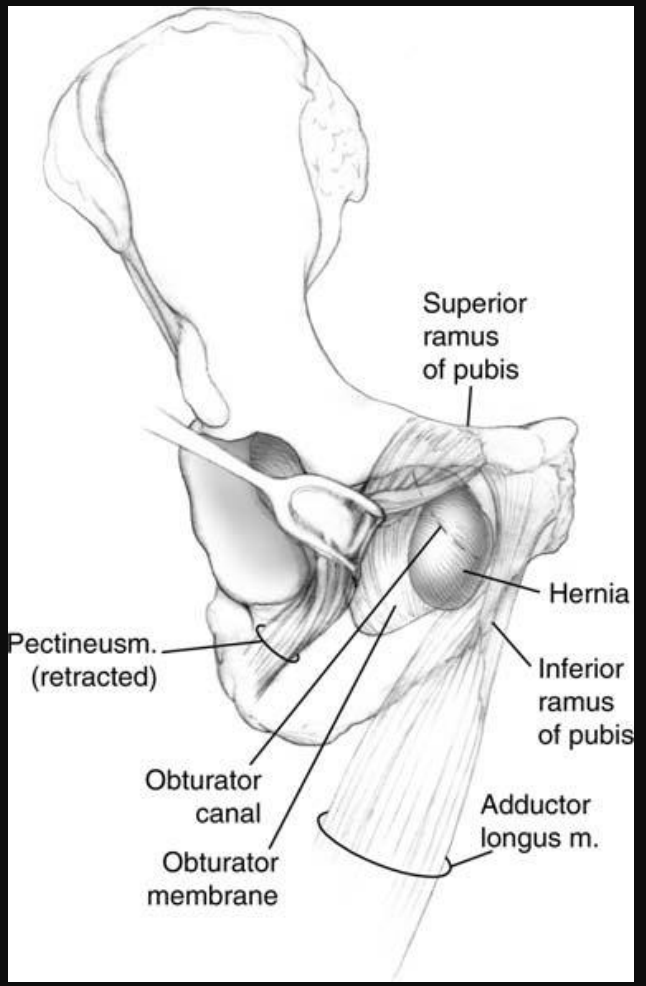
1. Definition of the adequate fascial edges surrounding the defect,
2. Closure with nonabsorbable sutures, and use of prosthetic mesh when the defect is too large to be closed primarily

Spigelian Hernias

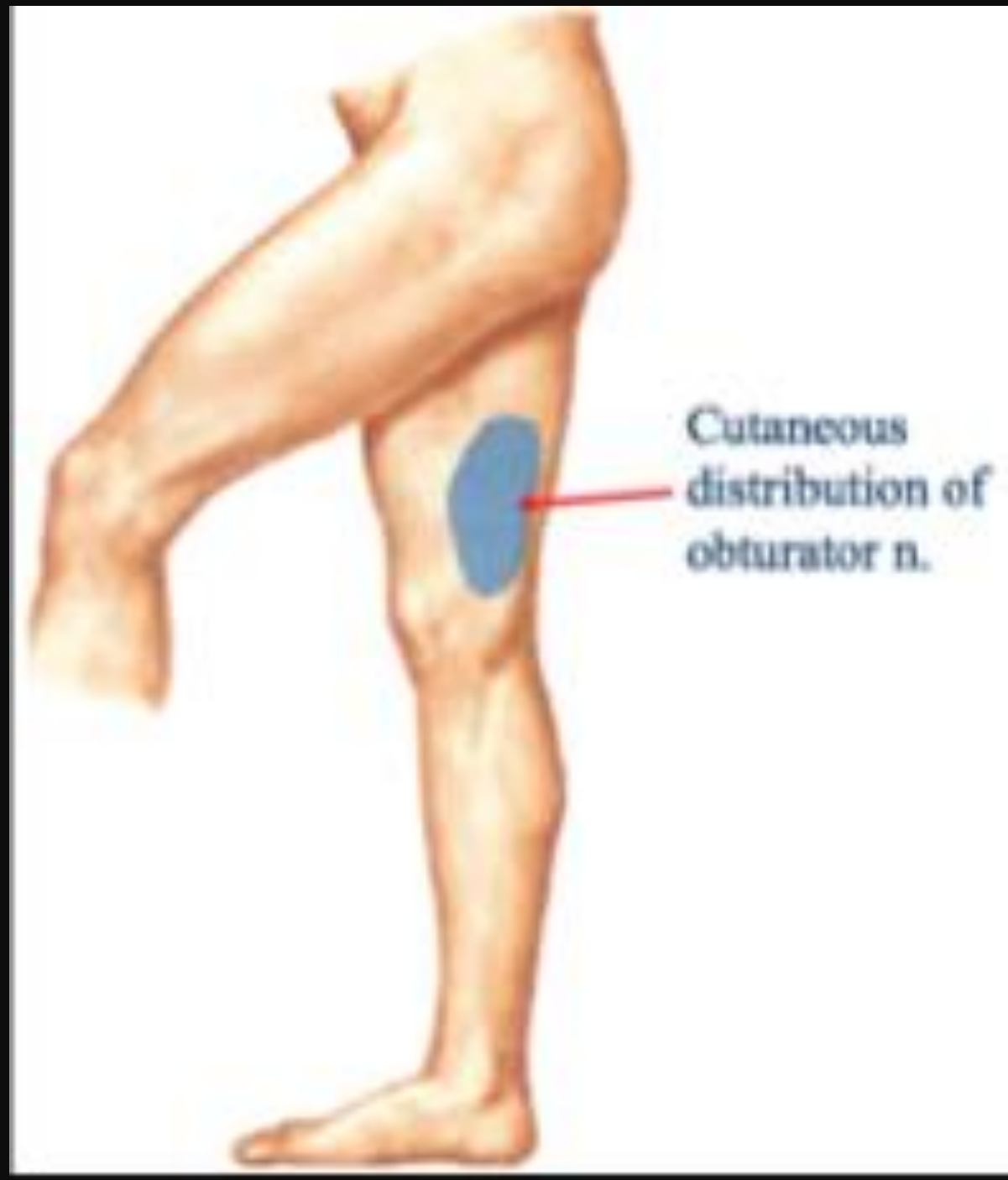
- **Protrude through the abdominal wall along the semilunar line at the semicircular line of Douglas.**

Obturator Hernias

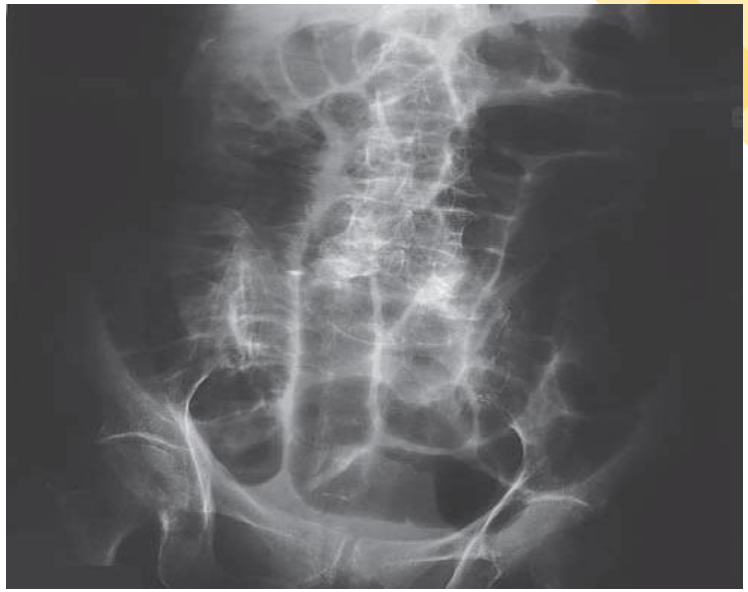
Occur in the pelvis through the obturator foramen



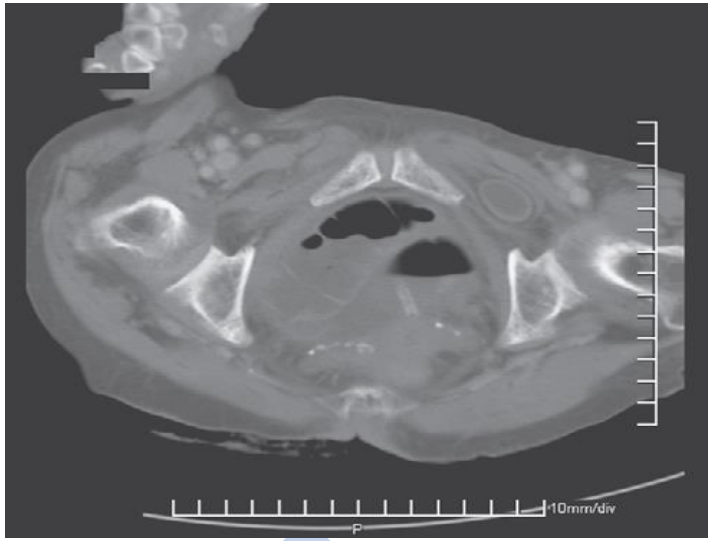
- The hernia can cause pain along the obturator nerve (mid-anterior thigh), referred to as Howship-Romberg sign.



Usually in elderly debilitated females



It presents as an intestinal obstruction for evaluation

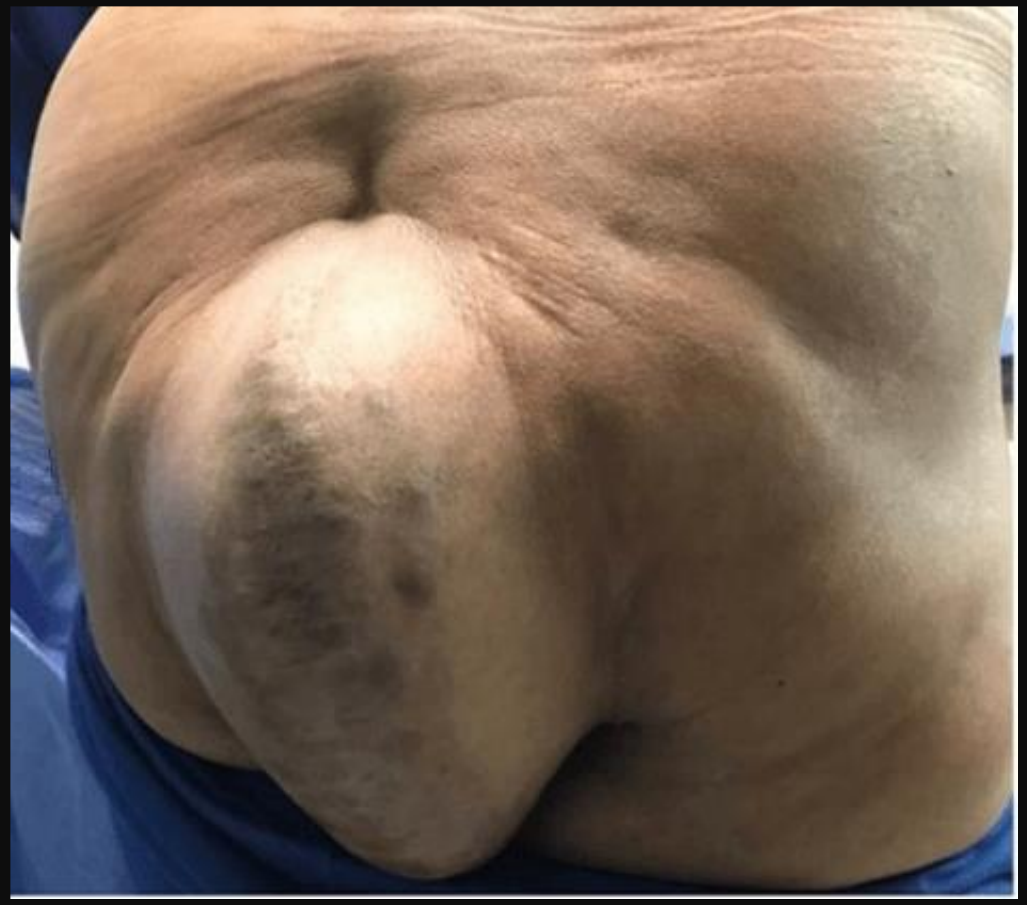


Lumbar Hernias

Occur on the flank and are seen in the superior (Grynfeltt's) and inferior (Petit's) triangles

Perineal Hernias

Occur in the pelvic floor usually after surgical procedures such as an abdominoperineal resection



Peristomal Hernias

Develop adjacent to an intestinal ostomy

THANK YOU !