The Abdominal Wall And Hernias

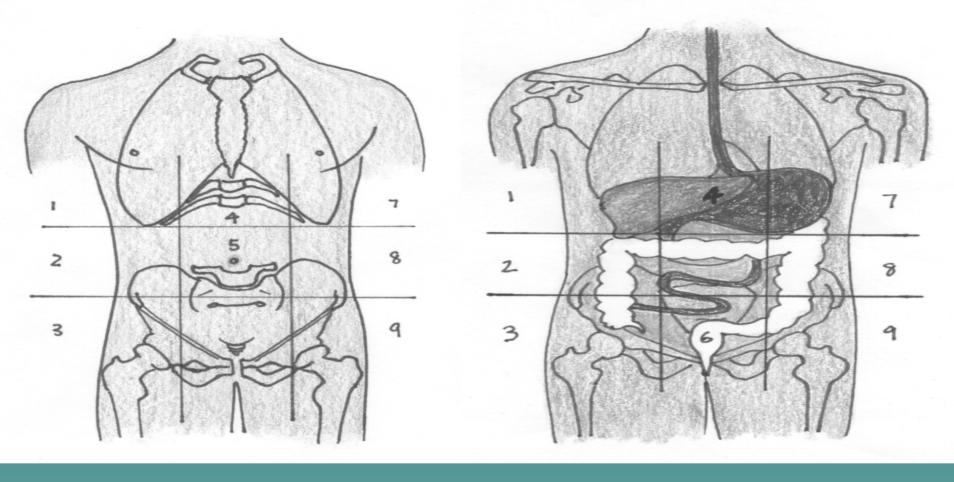
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The Abdominal Wall

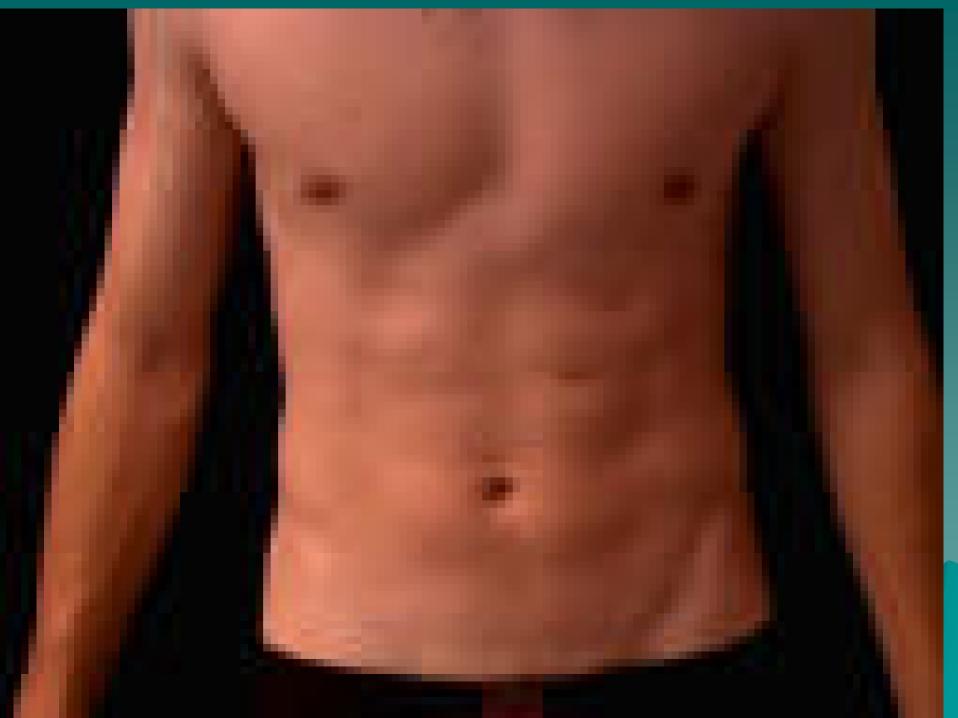
- The structure of the abdominal wall is similar in principle to the thoracic wall.
- There are three layers, an external, internal and innermost layer.
- The vessels and nerves lie between the internal and innermost layers.

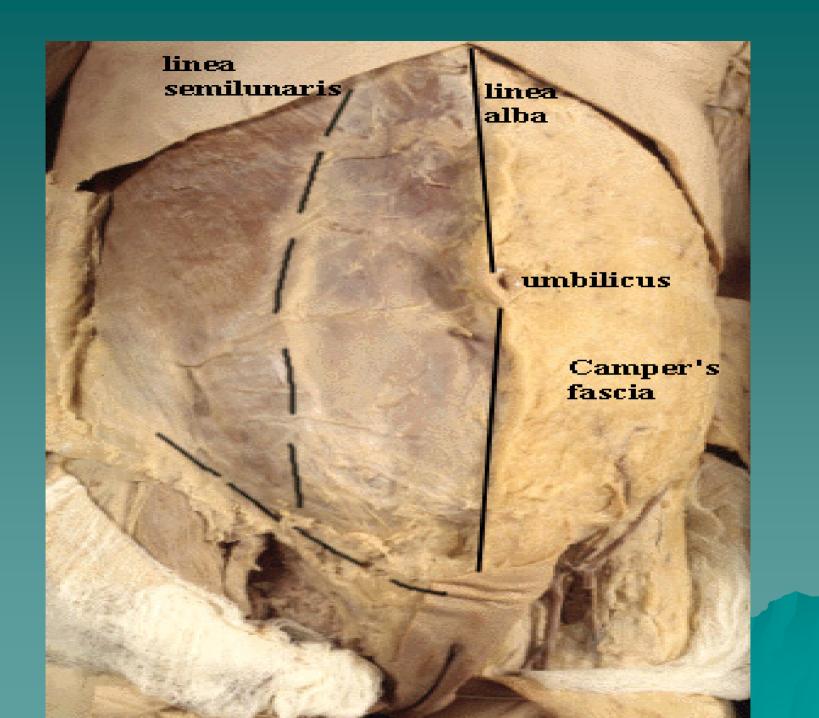
Surface anatomy

- The abdomen can be divided into quadrants or nine abdominal regions.
- Pain felt in these regions may be considered to be direct or referred.
- The midline in the sagittal plane is the linea alba.
- The lateral edge of the rectus sheath is the linea semilunaris.



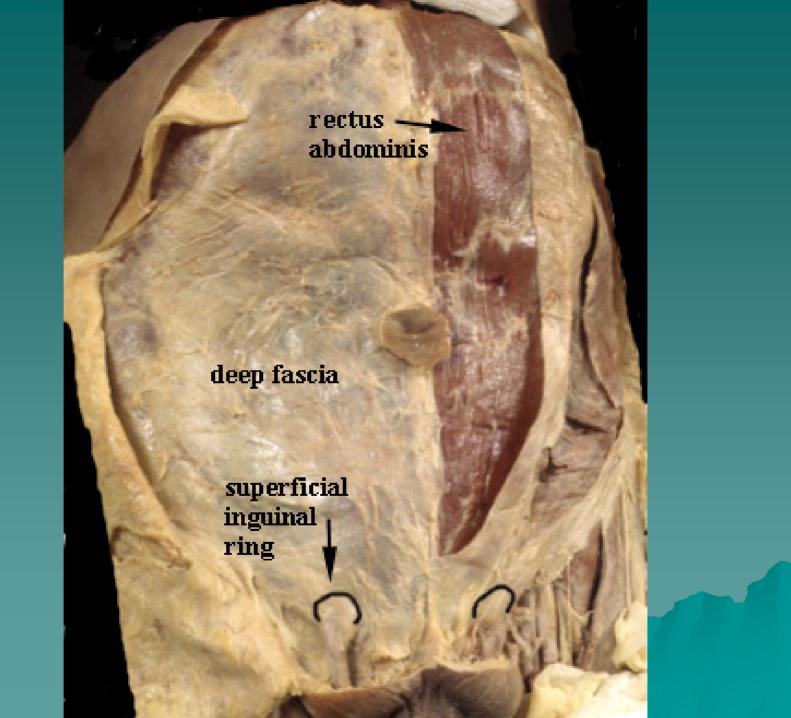
1:Right Hypochondriac Region; 2:Right Lumbar Region; 3:R. Iliac (Inguinal) Region 4:Epigastric Region; 5:Unbilical Region; 6:Hypogastric (Pubic) Region; 7:Left Hypochondriac Region; 8:Left Lumbar Region; 9:Left Iliac (Inguinal) Region





The Fascia

- Below the skin the superficial fascia is divided into a superficial fatty layer, Camper's fascia, and a deeper fibrous layer, Scarpa's fascia.
- The deep fascia lies on the abdominal muscles. Inferiorly Scarpa's fascia blends with the deep fascia of the thigh. This arrangement forms a plane between Scarpa's fascia and the deep abdominal fascia extending from the top of the thigh to the upper abdomen.
- Below the innermost layer of muscle, the transversus abdominis muscle, lies the transversalis fascia. The transversalis fascia is separated from the parietal peritoneum by a variable layer of fat.



The Rectus Abdominis and Rectus sheath

- The <u>rectus muscle</u> extends from the xiphoid process of the sternum and 5,6,7th costal cartilages to the pubic symphysis and pubic crest.
- The muscle is enclosed within the <u>rectus sheath</u> formed by the aponeuroses of the lateral abdominal muscles.
- Along the length of this strap muscle there are three fibrous intersections separating the muscle into four segments.
- The fibrous intersections are attached to the anterior surface of the rectus sheath, but not to the posterior surface. This allows the superior and inferior epigastric vessels to pass along the posterior surface of the muscle without encountering a barrier.

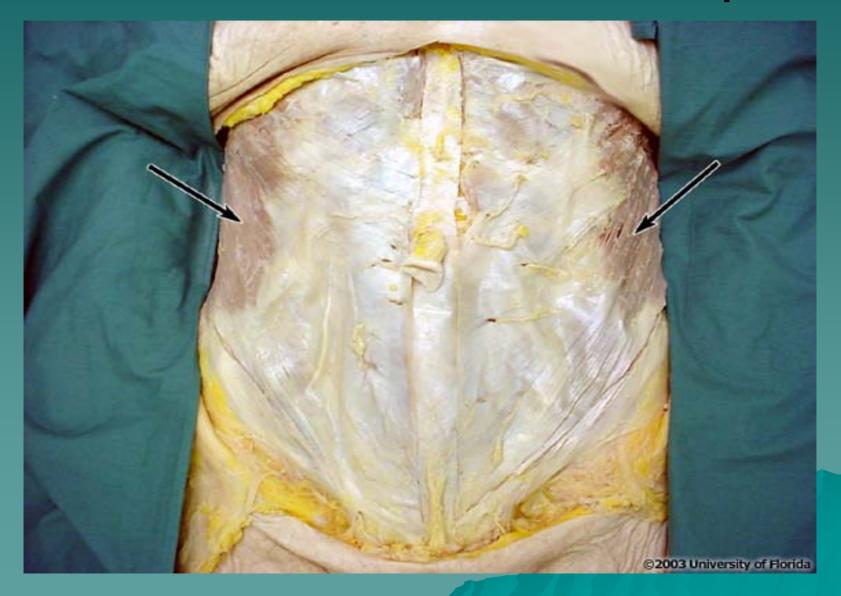
Rectus Abdominis



External Abdominal Oblique Muscle

- The <u>external oblique muscle</u> arises from the lower eight ribs.
- The fibers run downwards and forwards to form an aponeurosis anteriorly.
- ◆ The aponeurosis passes anteriorly to the rectus muscle to insert into the aponeurosis from the other side at the linea alba.
- Inferiorly the aponeurosis inserts into the anterior superior iliac spine and stretches over to the pubic tubercle, forming the <u>inquinal ligament</u>.

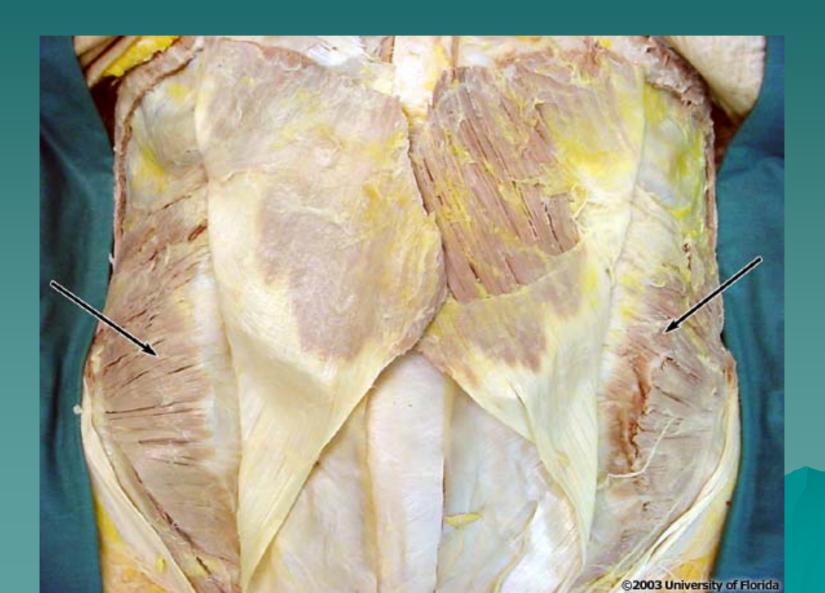
External Abdominal Oblique



Internal Oblique Muscle

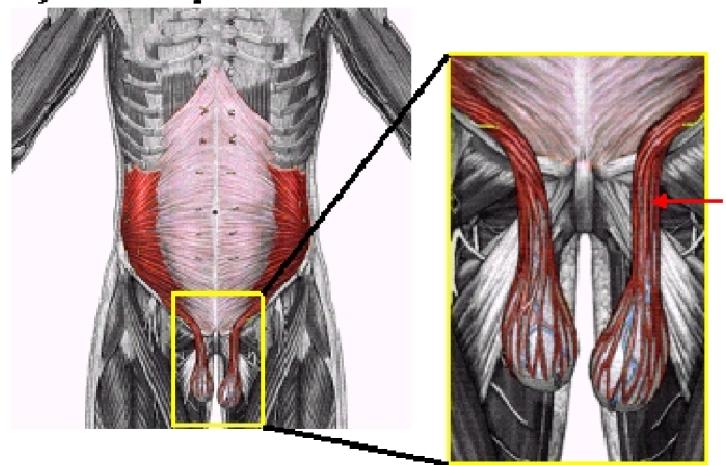
- The <u>internal oblique muscle</u> arises from the lumbar fascia, the iliac crest and the lateral two-thirds of the inguinal ligament and runs upwards and forwards to form an aponeurosis.
- Above the arcuate line the aponeurosis splits to enclose the rectus muscle.
- Below the arcuate line the aponeurosis passes anterior to the rectus muscle.
- The inferior part of the aponeurosis inserts into the symphysis pubis.
- At this insertion the aponeurosis is fused with the aponeurosis of the transversus abdominis muscle to form the <u>conjoint tendon</u>.

Internal Abdominal Oblique



INTERNAL ABDOMINAL OBLIQUE

Along with forming part of the support for the abdominal wall, strands from the internal oblique muscle envelop the spermatic cord and testicle. The cremaster functions to raise or lower the testis to adjust its temperature.

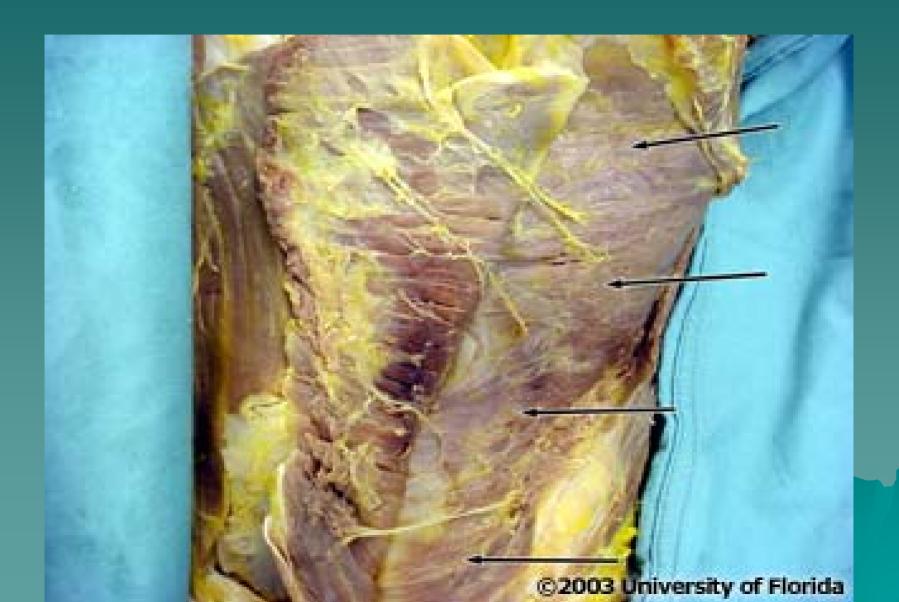


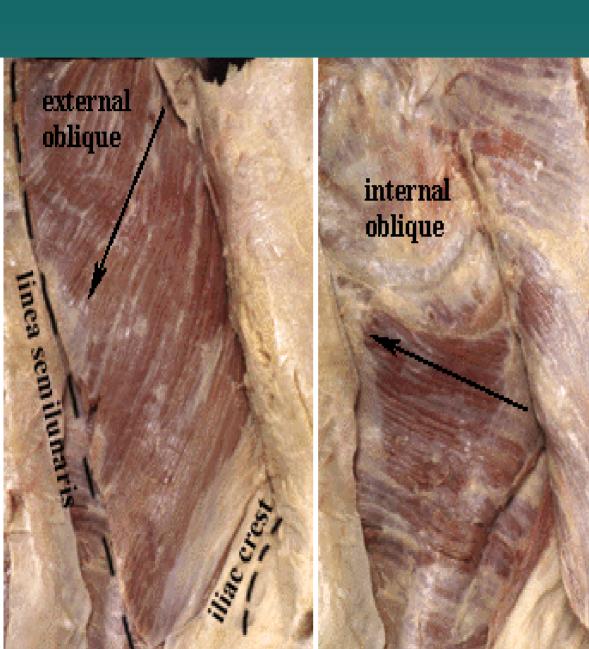
Cremaster muscle

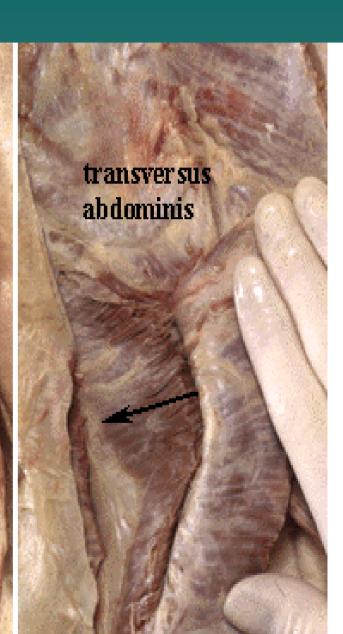
Transversus Abdominis

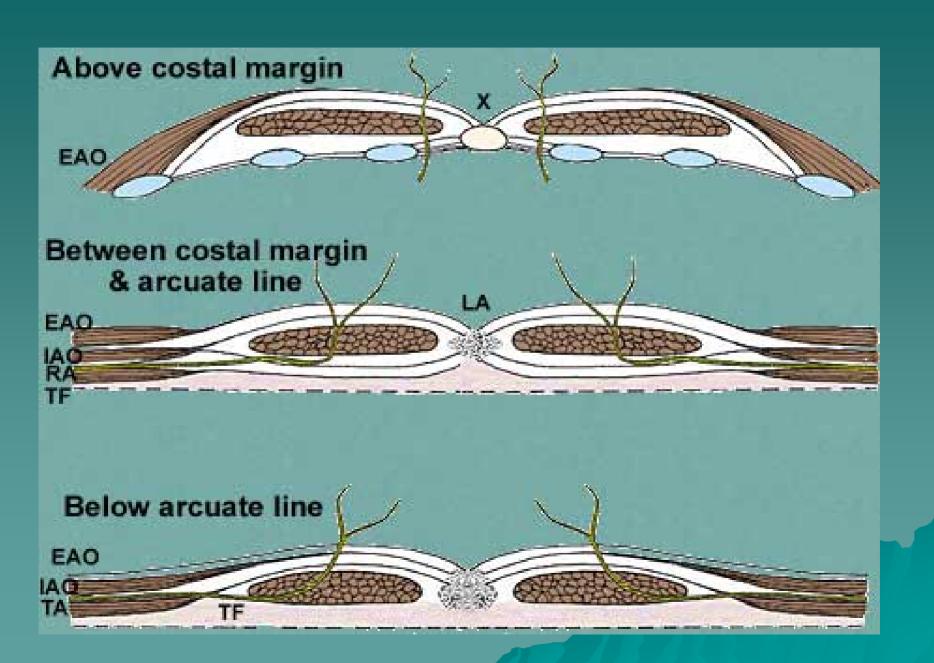
◆ The transversus abdominis muscle arises from the lower six costal cartilages, the lumbar fascia and the iliac crest.

Tranversus Abdominis







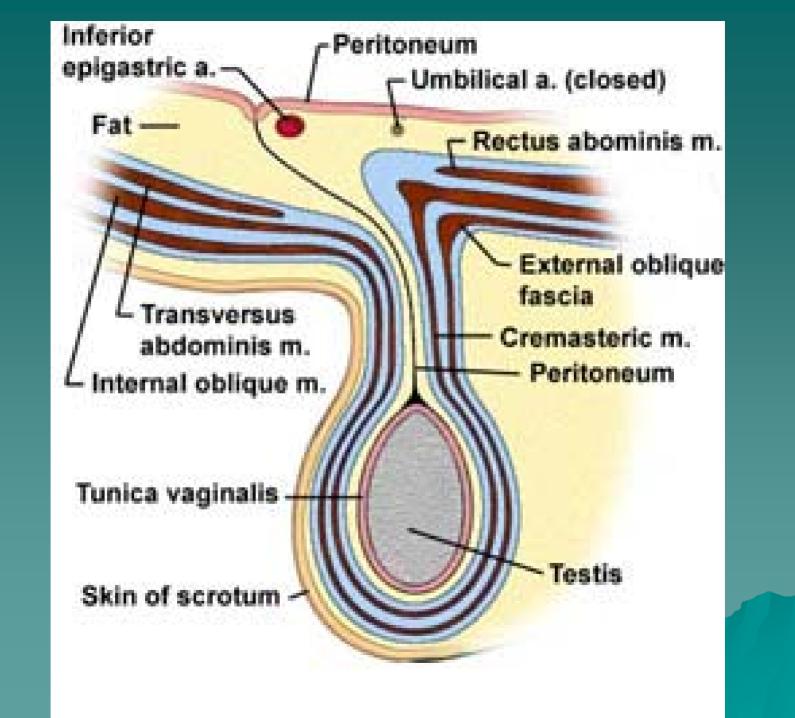


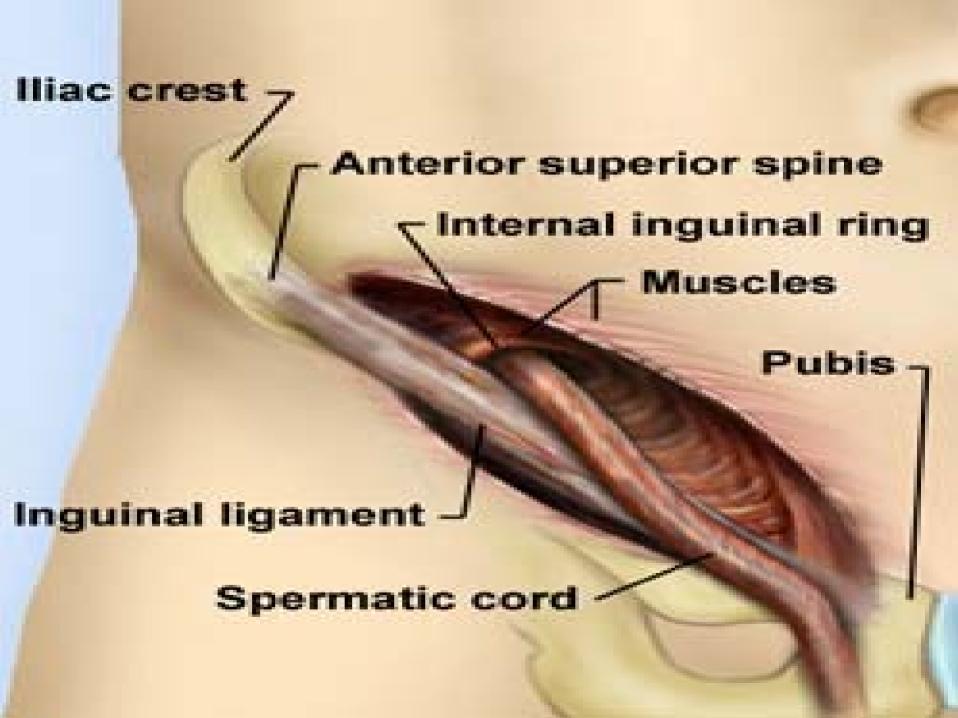
Inguinal Ligament

- The inguinal ligament is formed by the aponeurotic fibers of the external oblique muscle.
- The ligament stretches from the anterior superior iliac spine (ASIS) to the pubic tubercle.
- At the medial end of the inguinal ligament, fibers are reflected backwards to insert into the superior ramus of the pubis, forming the lacunar ligament.

The Inguinal Canal

- The inguinal canal transmits the vas deferens in the male and the round ligament in the female.
- The deep ring is the entrance to the inguinal canal on the inside of the abdominal wall.
- The deep ring is formed in the transversalis fascia. As the canal passes through the abdominal wall it receives a layer of muscle from the internal oblique, the cremaster muscle.
- At the superficial ring the inguinal canal passes through the external oblique aponeurosis and receives a layer from the aponeurosis, the external spermatic fascia in the male.
- The deep inguinal ring lies lateral to the inferior epigastric vessels. The superficial ring lies above and medial to the pubic tubercle.





BOUNDARIES OF THE INGUINAL CANAL

- The inguinal canal is the communication between the deep and superficial ring
- Anterior wall: EAO
- Inferior wall: Inguinal Ligament
- Superior wall: IAO and TA (conjoined tendon)
- Posterior wall (floor): Transversalis Fascia

The Spermatic Cord

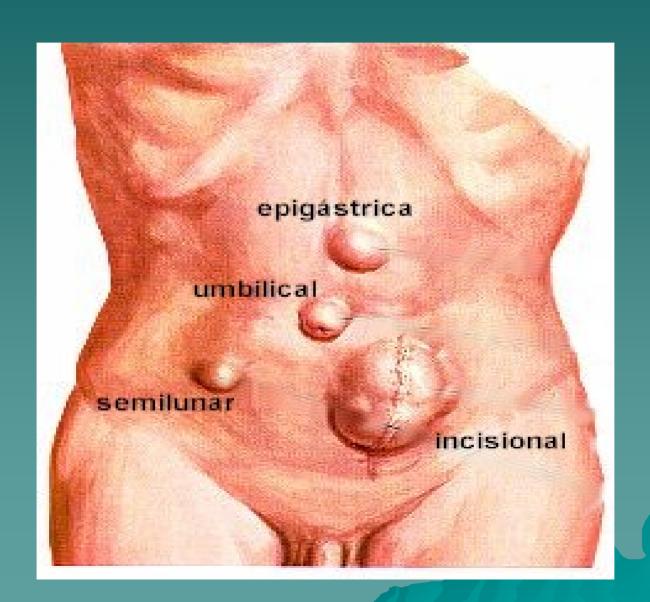
- The spermatic cord passes through the inguinal canal to the testis.
- THE SPERMATIC CORD CONTAINS
 vas deferens
 testicular artery and veins
 lymph vessels
 autonomic nerves
 cremasteric artery
 artery of the vas
 genital branch of the femoral nerve
- The fascial covering of the spermatic cord is formed by the external spermatic fascia derived from the aponeurosis of the external oblique, the cremasteric fascia derived from the internal oblique and the internal spermatic fascia derived from the transversalis fascia.

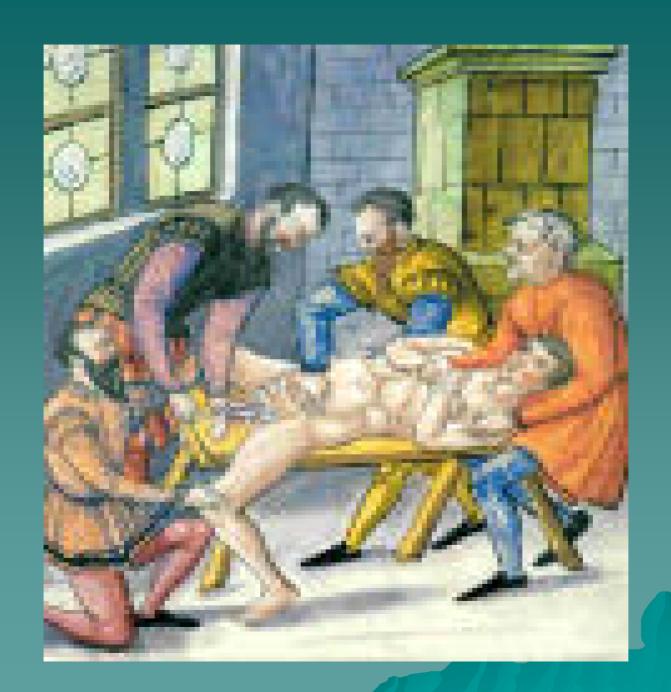
The Femoral Canal

- ◆ The femoral canal lies below the inguinal ligament medially and lies medial to the femoral vessels.
- The femoral sheath is formed by the transversalis fascia and encloses the femoral vessels and the femoral canal.
- The lacunar ligament forms the medial border of the femoral canal. The femoral vein lies lateral to the femoral canal.



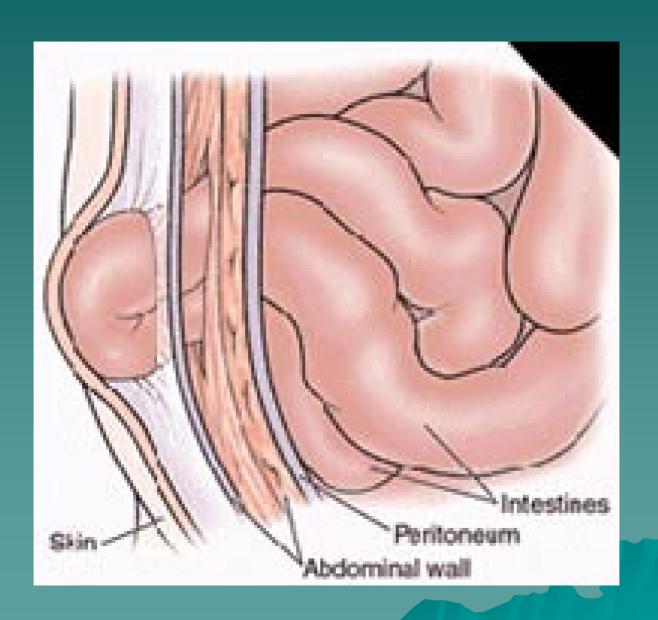
HERNIAS





Hernias

- What is a Hernia?
- Abnormal protrusion of intraabdominal contents throuh a defect in the abdominal wall



OVERVIEW OF HERNIAS

- Hernias occur:
- → 75 80 % in Inguinal Region
- ◆8 10 % Incisional (ventral hernia)
- → 3 8 % Umbilical Hernias

DON'T FORGET INTERNAL HERNIAS!

ETIOLOGY OF HERNIAS

- Congenital defects
- Loss of tissue strength and elasticity (from aging or repetitive stress)
- Operative Trauma
- Increased Abdominal Pressure (heavy lifting, COPD, BPH, Ascities, Obesity)

Complications of Hernia

◆ PAIN

OBSTRUCTION

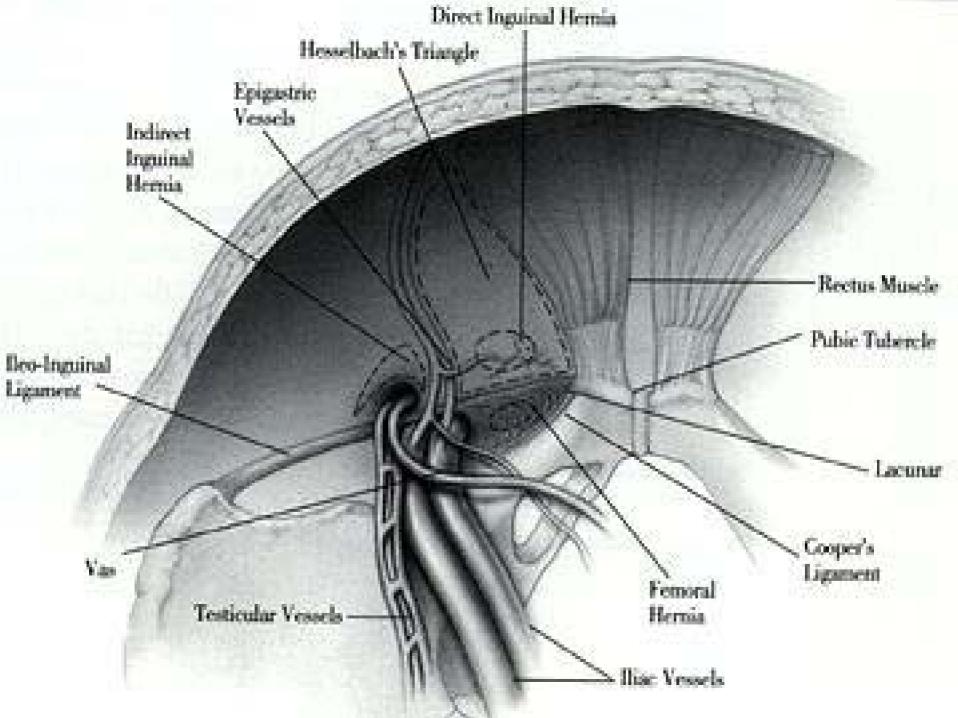
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→ BOWEL NECROSIS

◆ PERFORATION

DESCRIPTIVE TERMS

- Reducible can be pushed back into the abdomen
- Incarcerated cannot be "reduced"
- Strangulated the tissue in the hernia is ischemic and will necrose due to compromise of its blood supply
- Sliding- the wall of the hernia sac is part formed by a retroperitoneal structure
- Richter's hernia- only one side of the bowel wall involved in the hernia can necrose without signs of obstruction



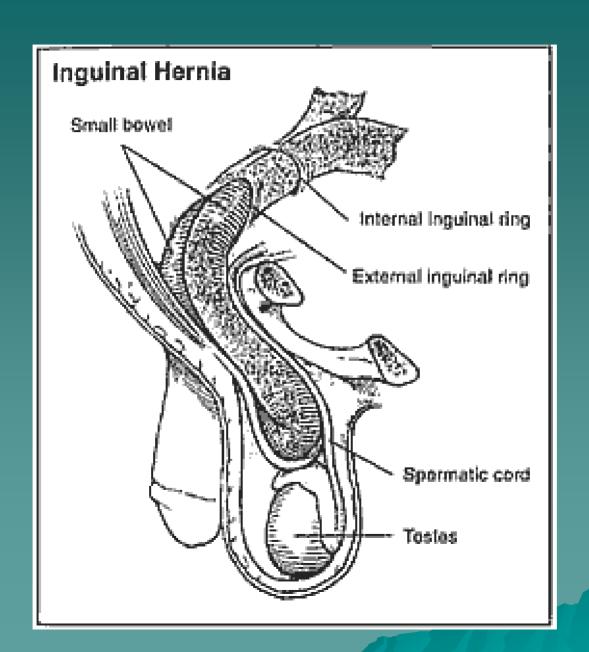
Inguinal hernias

- Inguinal hernias are classified as:
- 1) Indirect
- 2) Direct
- 3) Femoral

Indirect Hernia

- An indirect hernia occurs when a hernia sac enters the deep inguinal ring lateral to the inferior epigastric artery and passes indirectly to the superficial ring through the inguinal canal.
- Indirect hernias are the most common type of hernia in both men and women
- CAUSE: Persistence of all or part of the embryonic processus vaginalis results in various inguinal anomalies.



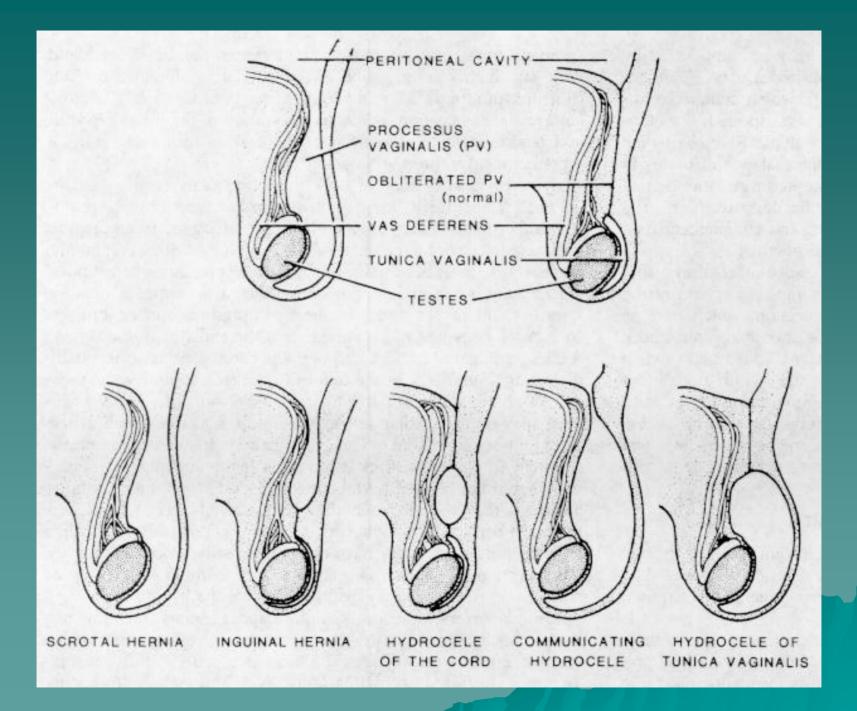


INDIRECT HERNIAS

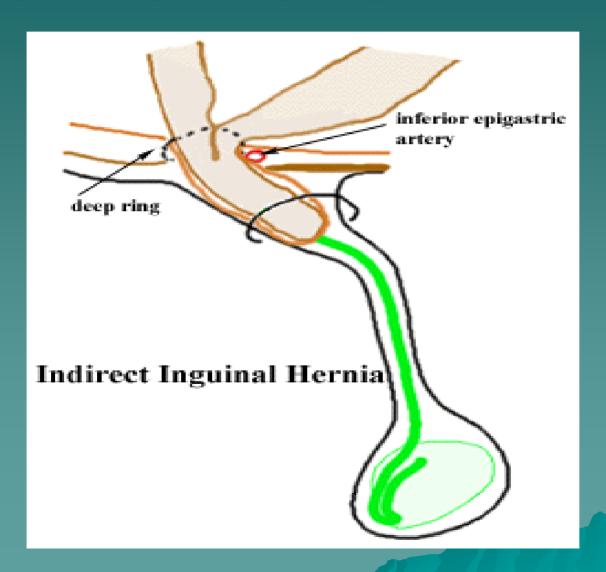
- **♦ INCIDENCE:**
- ◆ In children, varies with gestational age and ranges from 9 to 11% in preterm infants to 3.5 to 5% in full-term babies.
- 5 to 10 times more common in men than women
- more frequently on the right side as a result of later descent of the right testis and delayed obliteration of the processus vaginalis.
- Approximately 5% of men develop an inguinal hernia in their lifetime

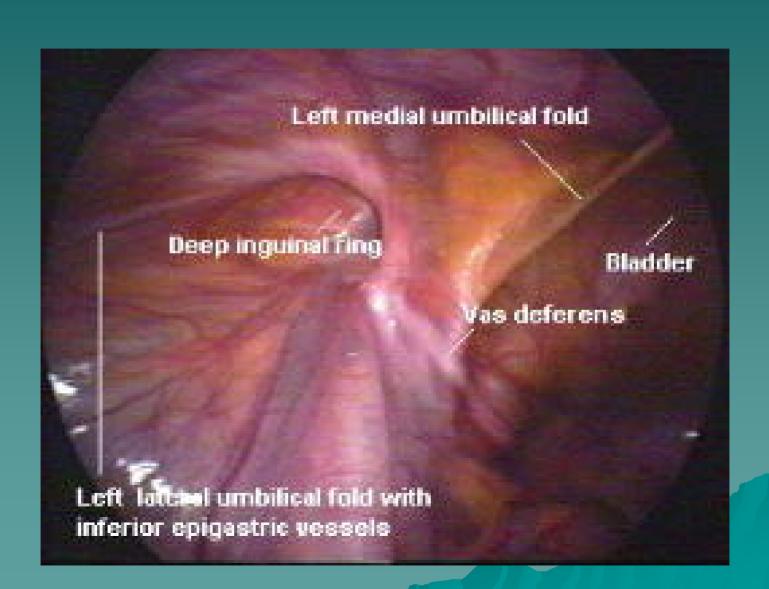
CLINICAL PRESENTATION

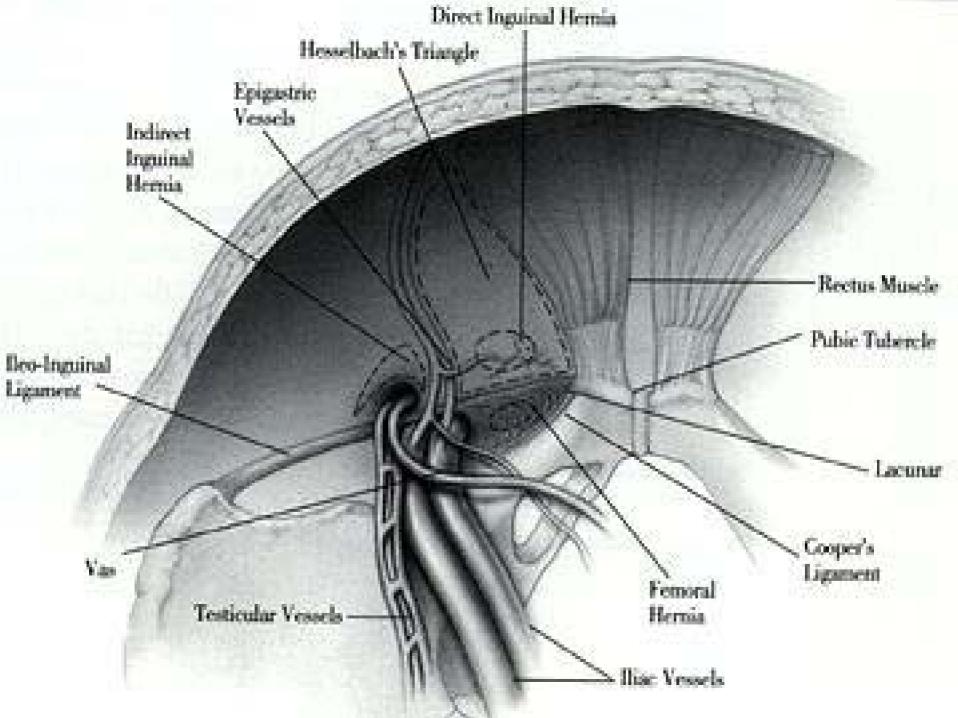
- can vary from vague pain to large bulge
- right side in 60% of cases
- left side in 30%
- bilateral in 10%.
- Bilateral inguinal hernias are more common in preterm infants.
- The major risk factor in cases of inguinal hernia is the occurrence of bowel incarceration and possible strangulation.



SURGICAL REPAIR INCLUDES HIGH LIGATION OF HERNIA SAC







Direct Inguinal Hernia

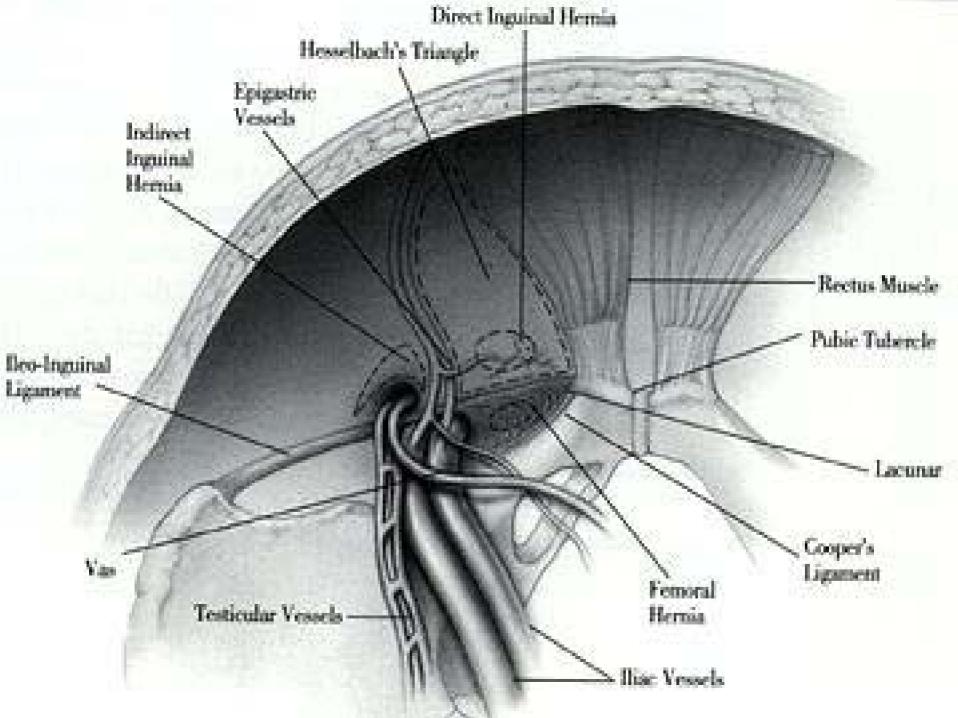
- A direct hernia occurs when a hernial sac is pushed through the conjoint tendon directly towards the superficial ring.
- Direct hernias occur medial to the inferior epigastric vessels in Hasselbach's Triangle through the floor of the inguinal canal



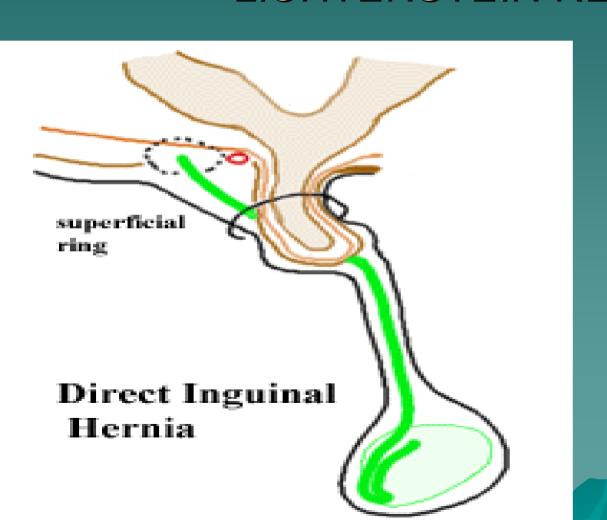
Boundaries of Hasselbach's Triangle

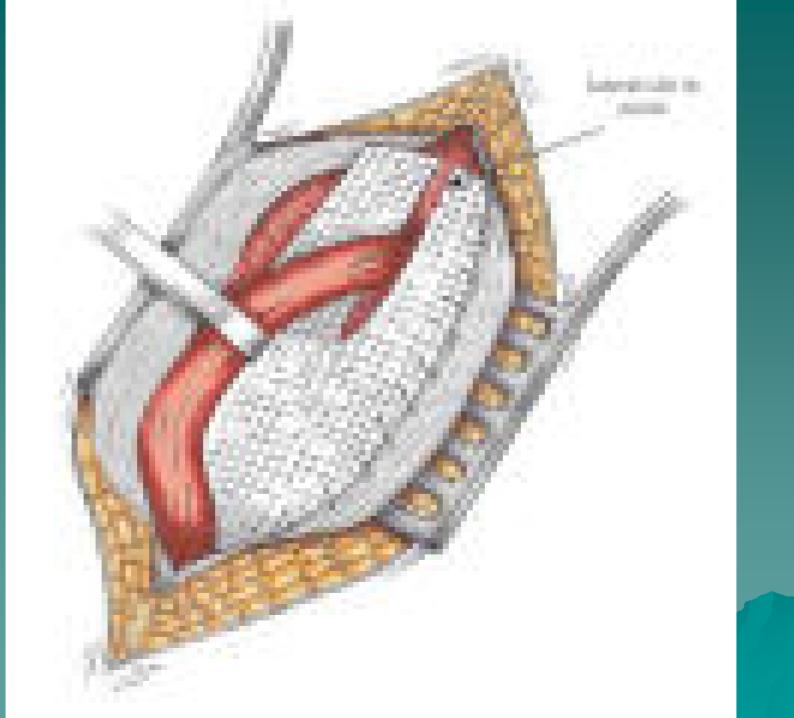
- Medial boundary: Rectus abdominis
- Lateral boundary: Inferior epigastric vessels
- Inferior boundary: Inguinal ligament

→ MARKS THE AREA FOR DIRECT HERNIAS



SURGICAL REPAIR INCLUDES RE-ENFORCEMENT OF FLOOR WITH MESH "LICHTENSTEIN REPAIR"

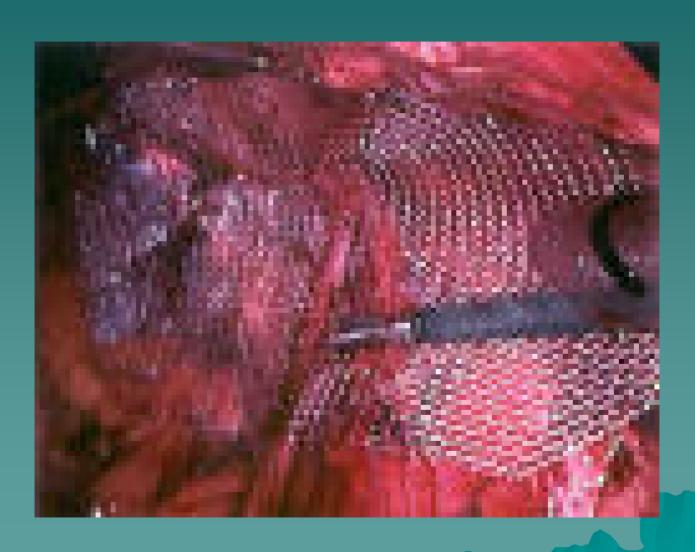




Open Lichtenstein Repair

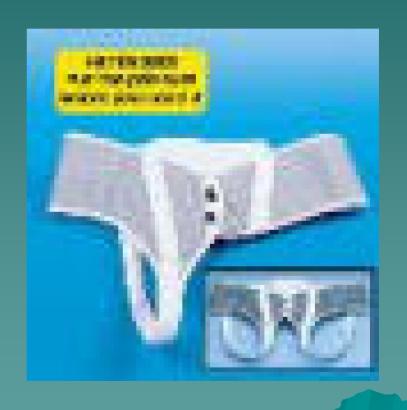


Laparoscopic repair



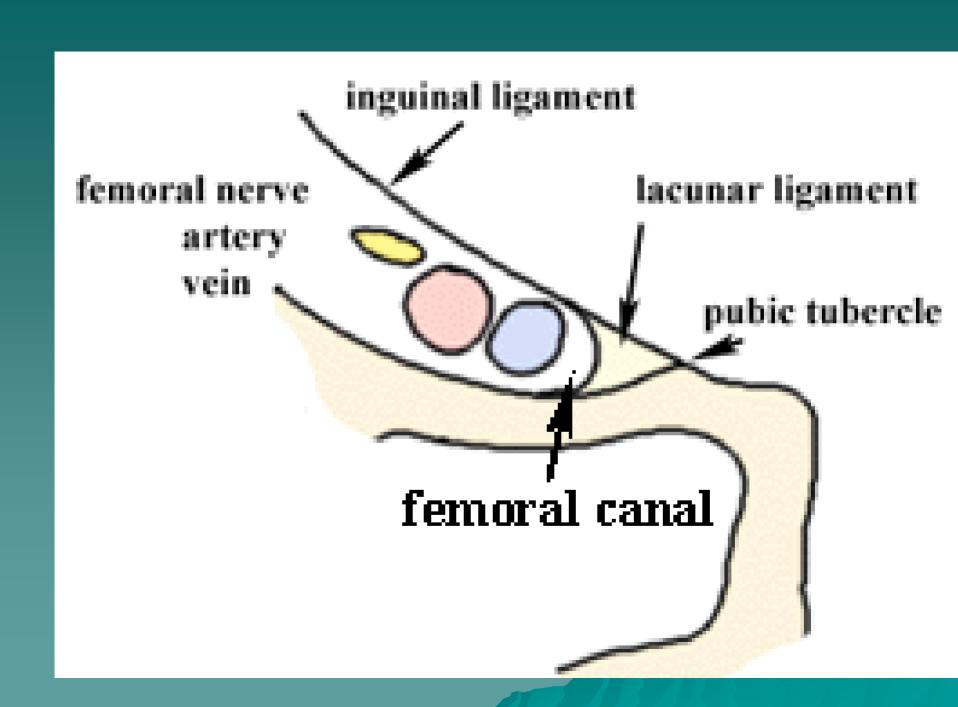
NONOPERATIVE MANAGEMENT





Femoral Hernia

- In a femoral hernia the hernia sac is pushed into the femoral canal, below the inguinal ligament and between the lacunar ligament and the femoral vein.
- The hernia sac thus lies inferior and lateral to the pubic tubercle and anterior to the superior pubicramus periosteum (COOPER'S LIGAMENT)



FEMORAL HERNIA

- 30 40% of femoral hernias become incarcerated or strangulated
- Femoral hernias are more common in women than men.....
- McVay Repair TF and Conjoined tendon to Cooper's Ligament

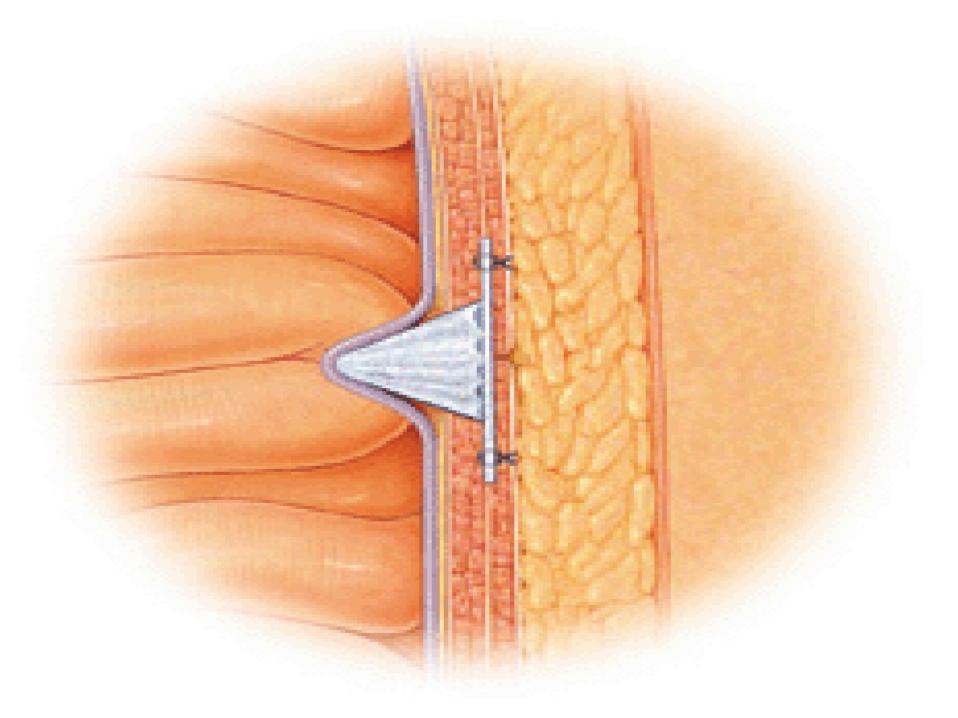
Umbilical Hernia

◆ At the umbilicus hernias can develop due to developmental deficiencies, congenital umbilical hernia, or may occur due to a weakness in the linea alba in the area of the umbilicus, an acquired umbilical hernia.



UMBILICAL HERNIA

- 10 times more common in women
- Common in children but usually closes by age 2, fix at age 5
- Fewer than 5% of umbilical hernias persist into later childhood and adult life



VENTRAL HERNIA

 Ventral Hernia- generic term given to hernias in areas other than the inguinal region

◆ Incisional Hernia – most common type of ventral hernia, results from poor wound healing in a previous surgical incision (infection, tension, malnutrition, intraabdominal pressure, etc) and occurs in 5 – 10 % of abdominal incisions



Problems and Presentation

- Bowel obstruction (N/V, pain, Distention, Obstipation)
- PERFORATION after strangulation

HOW TO FIX

Laparotomy : primary vs mesh closure

Laparoscopy with mesh

Abdominal binder