

Hernias

By

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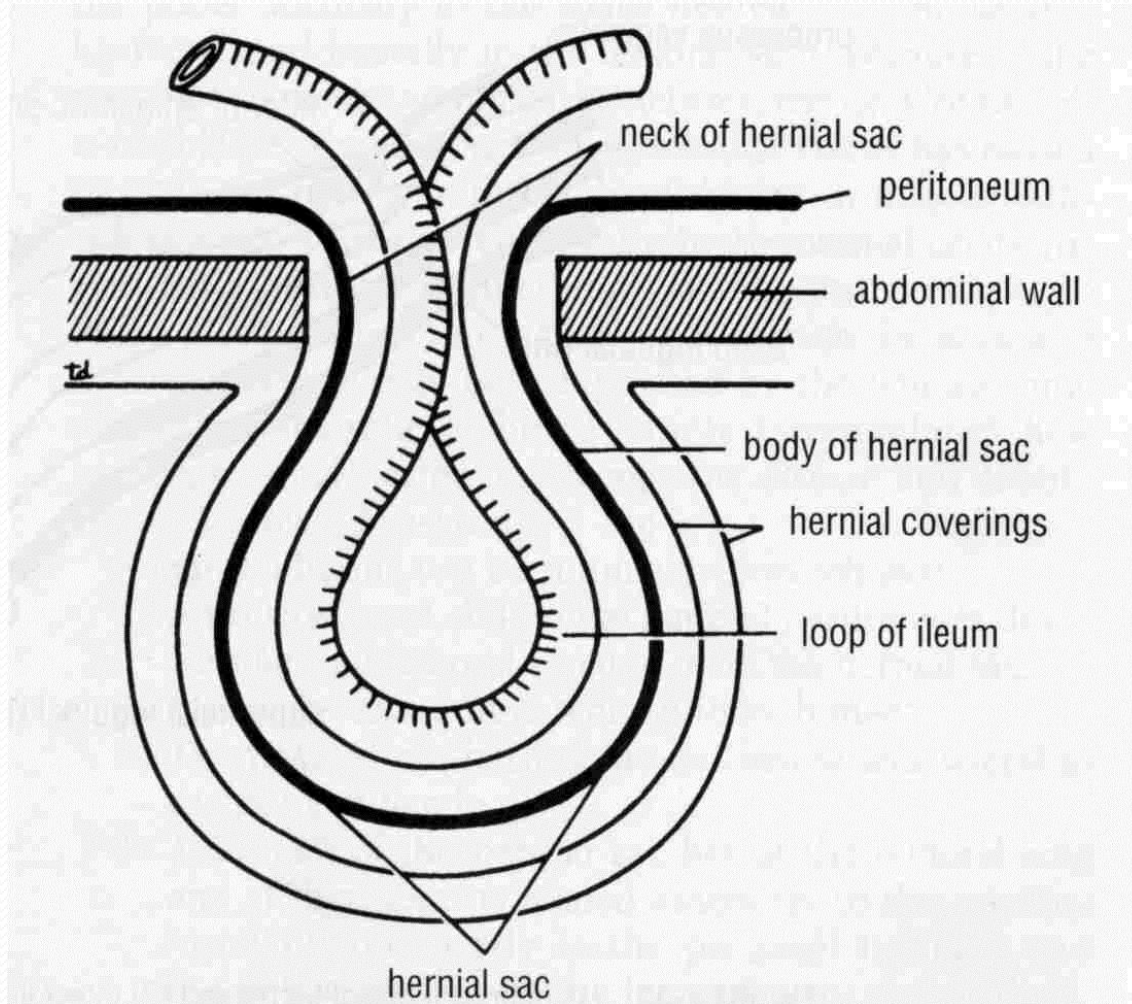
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Definition

- Hernia is the protrusion of the viscera from its normal cavity through an acquired or congenital opening.
- The typical hernia is formed of hernia ring and hernia swelling. The hernia swelling is formed of hernia sac and hernia contents.

Structure of hernia



Structure of hernia

- **Hernia ring (Hernia opening):**
 - It may be an accidental opening in the abdominal wall, persistent prenatal orifice (umbilicus) or normal passage (inguinal canal).
 - Its size varies from one finger to more than hand size.
 - Its shape may be round, oval or irregular.

Structure of hernia

- **Hernia swelling:**

- It has various sizes and shapes

- It is composed of:

- 1- Hernia sac which is formed of skin + s/c tissues + few muscle fibers + parietal peritoneum (if not ruptured).

- 2- Hernia content which is usually small intestine (called enterocele), omentum (epiplocele), stomach (gastrocele) and urinary bladder (vesicocoele).

Classification of hernias

- **According to the cause:**

- 1-Congenital hernia**

- Hernia presents at birth, such as umbilical hernia

- 2- Acquired hernia**

- Hernia occurs in later life, such as incisional hernia (a complication of laparotomy) and perineal hernia

- **According to the hernia content:**

- Such as gastrocele, enterocele, epiplocele...etc

Classification of hernias

- **According to nature of hernia:**

- 1- Reducible hernia:**

- In which, the hernia content return to the abdomen spontaneously when the animal is recumbent or with manual pressure.

- 2- Irreducible hernia:**

- In which, the hernia content can not be returned to the abdomen due to incarceration, strangulation and adhesions

Causes of irreducible hernias

- **Incarceration**

- Too large hernia contents to pass through the hernia ring.

- **Strangulation**

- Due to compression obstruction of the blood supply to the incarcerated content which may lead to gangrene of the strangulated part.

- **Adhesions**

- Due to local inflammation of the hernia parts which leads to fibrinous adhesions between the hernia sac and contents.

Classification of hernias

- **According to the site:**

1- External hernia

- Protrusion of the viscera outside the abdominal cavity
- Such as umbilical, inguinal, scrotal, abdominal hernias

2- Internal hernia

- Protrusion of the viscera through a normal or pathological opening within the abdominal cavity (no hernia sac).
- Such as diaphragmatic hernias (DHs) as follows:

Classification of hernias

- Both congenital and acquired DHs have been recorded.
- Most congenital DHs and all acquired DHs have no hernia sac, so they should be called ‘false hernias’, diaphragmatic ruptures or rents.
- True DH has a hernia sac composed of peritoneum and pleura and it is generally found on the right side of the diaphragm. This type of DH is called Morgagni hernia (Retrosternal hernia).

Classification of hernias

- **Hiatal hernia (HH):**

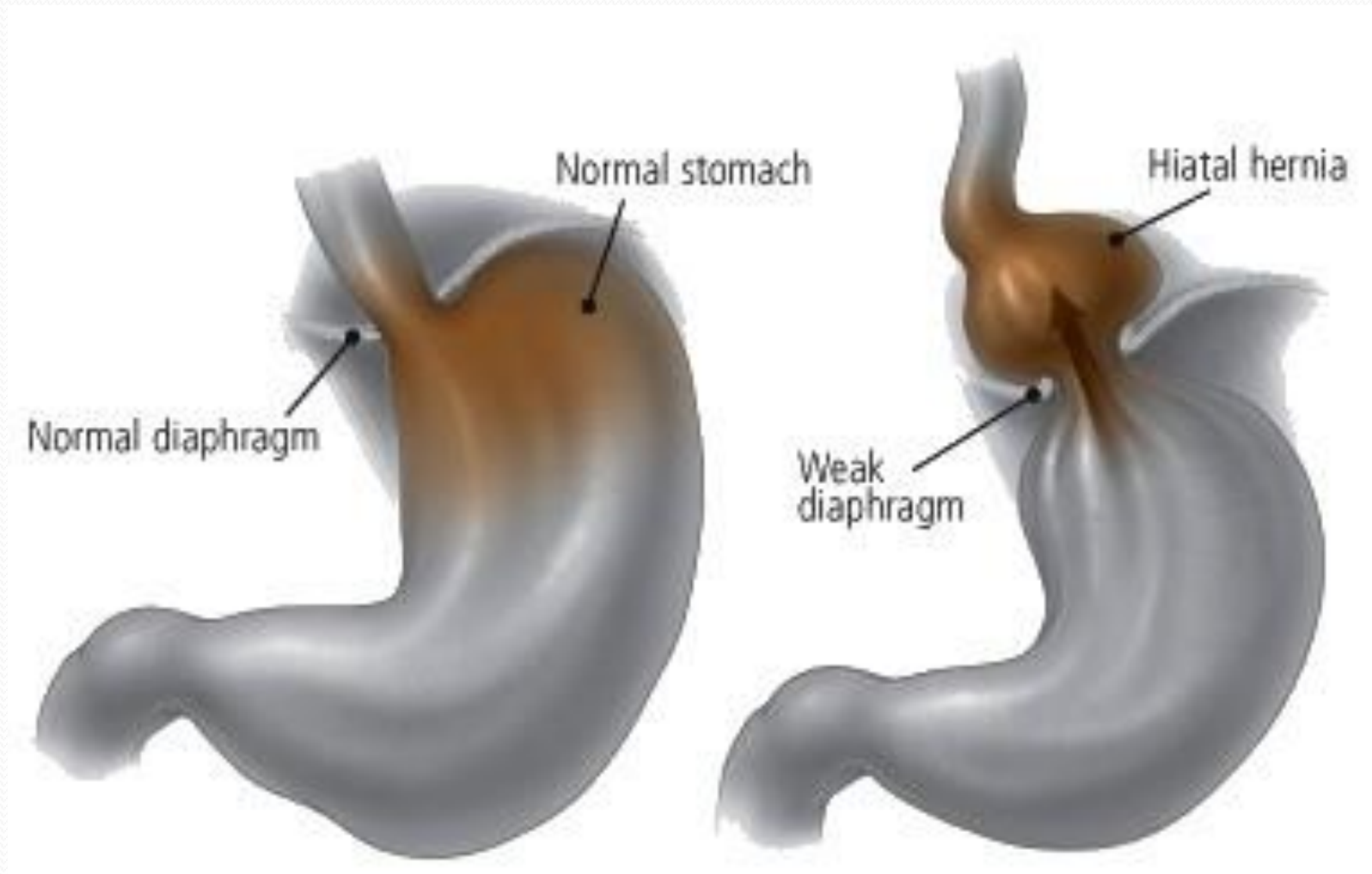
- It is one of the congenital diaphragmatic hernias (CDHs) in which a bulging of the upper part of the stomach occurs through the diaphragm.
- Unlike a typical DH, the HH maintains the barrier between the thoracic and abdominal cavities thus loss of pleural pressure and respiratory distress are not present

Classification of hernias

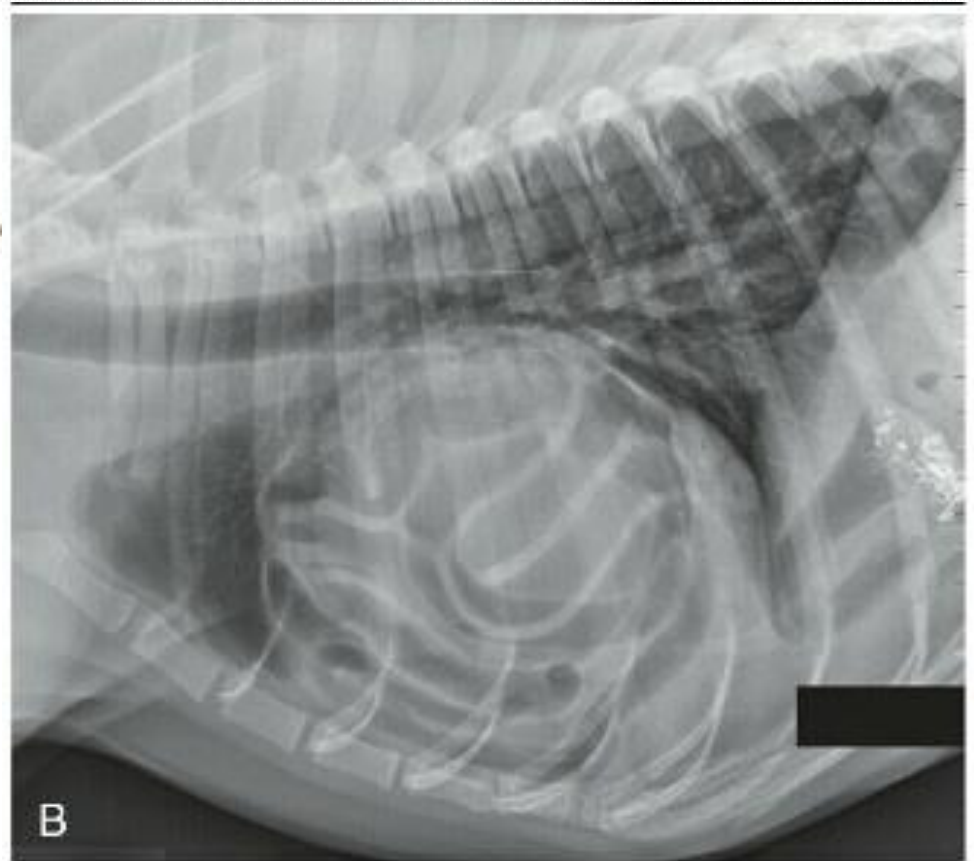
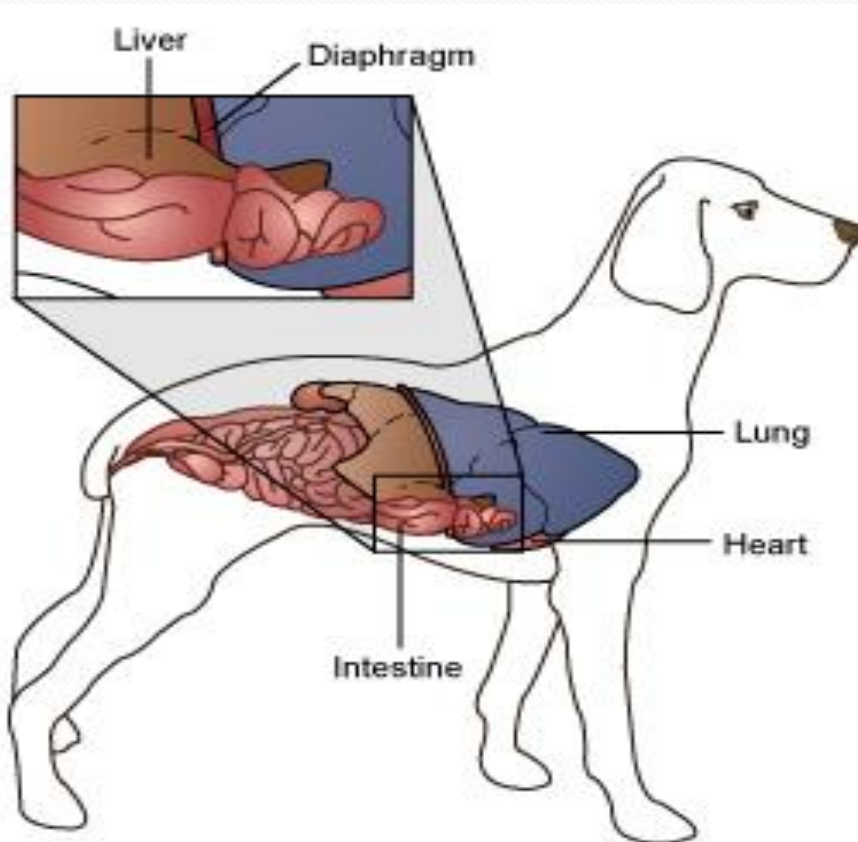
- **Morgagni hernia:**

- It is one of the CDHs.
- It is characterized by herniation through the foramen of Morgagni.
- Both unilateral (usually the right side) and bilateral Morgagni hernias have been recorded.
- It is usually associated with signs of abdominal pain due to the herniated bowel and with or without dyspnea.

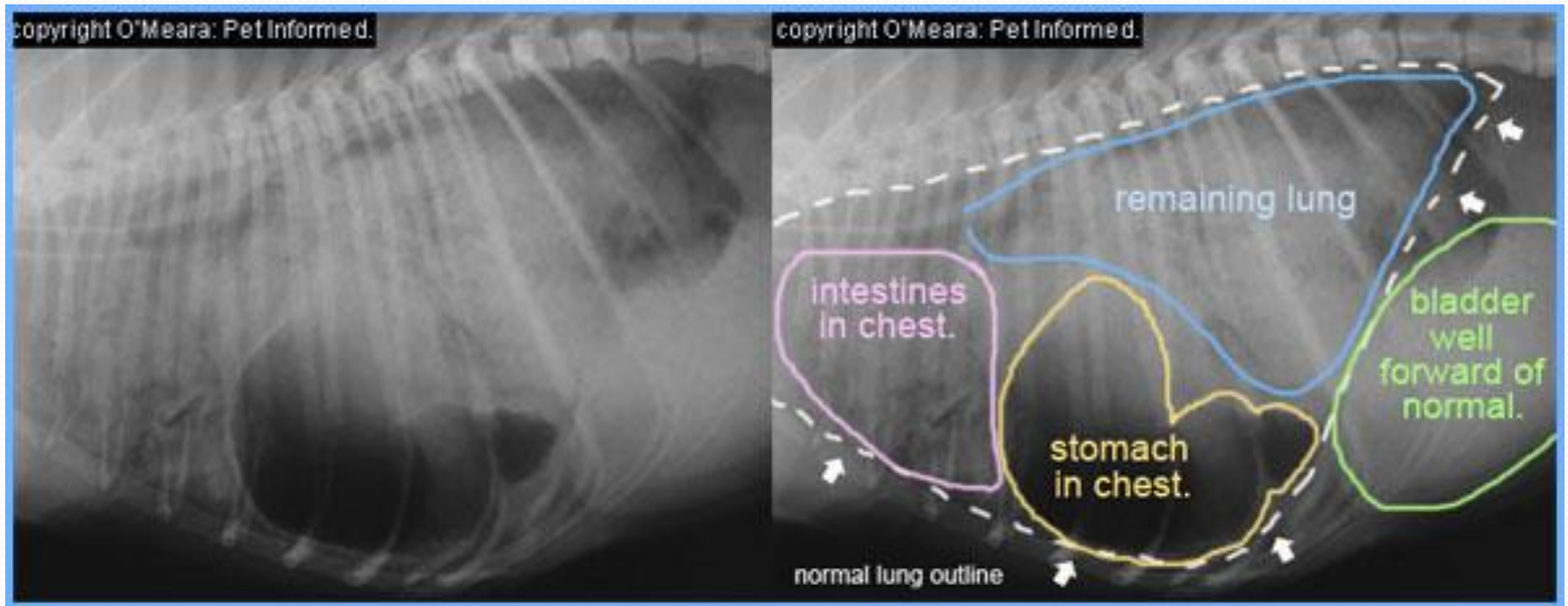
Hiatal hernia



Diaphragmatic rupture in a dog



Diaphragmatic hernia in a dog



Umbilical hernia in a calf



Ventral abdominal hernia in a dog



Scrotal hernia in a lamb



Inguinal hernia in a female dog

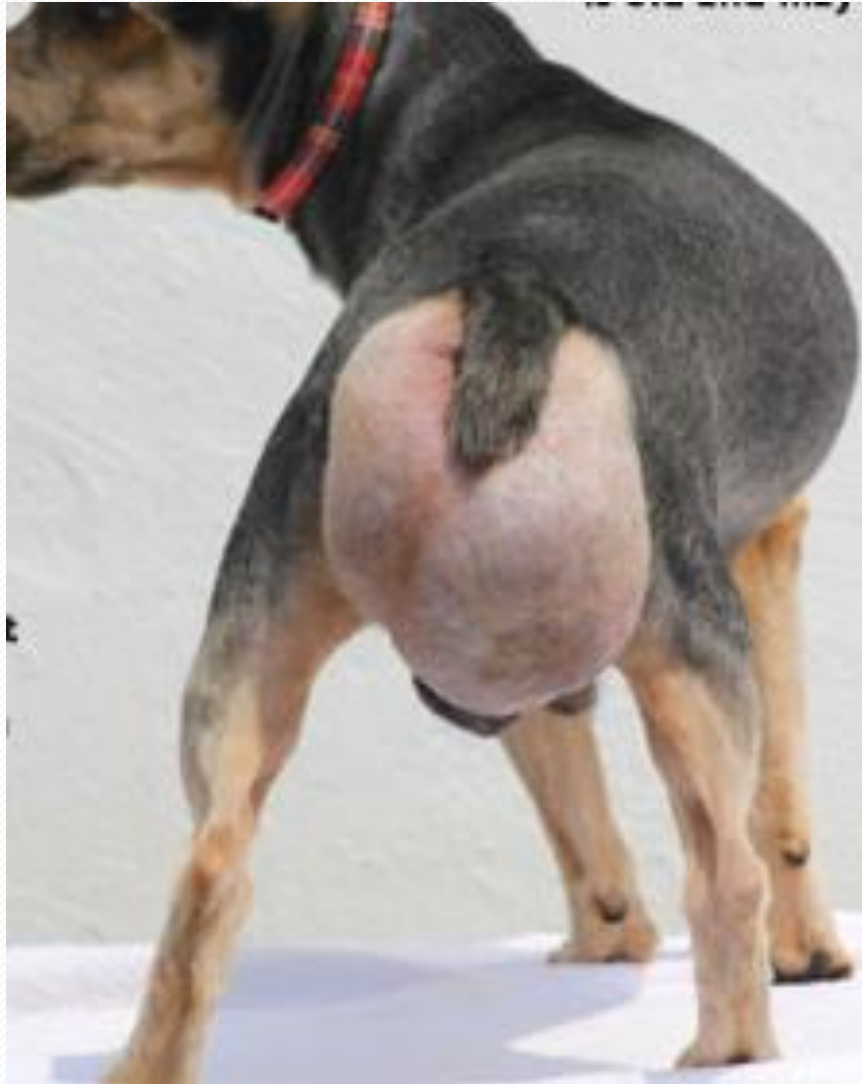
**Strangulated swollen uterus
inside an inguinal hernia**



Right perineal hernia in a dog



Bilateral perineal hernias in a dog



Causes of hernias

- **Congenital causes:**

- Inherited weakness of the muscles.
- Congenital opening in the linea alba
- Imperfect developed umbilicus
- Genetic disturbance

- **Predisposing causes:**

- Muscular weakness due to abscess or wounds
- Increased intra-abdominal pressure due to chronic cough, diarrhea, constipation and late pregnancy.

Causes of hernias

- **Existing causes:**
 - Imperfect repair of the abdominal wall after laparotomy (Incisional hernia).
 - Blunt trauma such as kicks, blows, falling down and horn thrust

Clinical Symptoms

- **Local Symptoms:**

- Abdominal or scrotal swelling (External hernia)
- Hernia ring
- Soft homogenous (epiplocele) or tympanic (enterocele) hernia swelling
- Reducible or irreducible hernia swelling.
- Slight pain in recent hernia.

Clinical Symptoms

- **General Symptoms:**

- In non complicated hernia, slight colic and indigestion
- In complicated hernia, severe abdominal pain, colic, vomiting and depression.

Diagnosis

- Case history
- Clinical symptoms
- Physical examination
- Ultrasonography
- Exploratory laparotomy
- Differential diagnosis from other swellings such as abscess, hematoma, neoplasm and cyst.

General Treatment

- Small congenital hernia ($5 < \text{cm}$), spontaneous healing usually occurs at 6 months of age.
- **Conservative treatment:**
 - **Trass:** A belt with a pad to support the hernia.
 - **Skewers:** A too long pin to hold the ruptured muscles.

General Treatment

- **Hernial clamp:** After reduction of the hernia contents, a plastic or wooden clamp is applied to induce strangulation and necrosis of the hernia sac within 10-21 days and the wound heals by secondary intention.
- **Injection of irritant material** around the hernia ring to induce fibrosis

General Treatment



Trass

Hernial clamp



General Treatment

- **Surgical treatment:**
- ***Indications:***
 - Persistent congenital hernia
 - Large hernia (>10cm)
 - Irreducible hernia

General Treatment

- *Principle lines of treatment*
 - Reduction of the hernia contents
 - Closure of the hernia ring (herniorrhaphy) by either:
 - Sutures (Suture herniorrhaphy) or
 - Prosthetic mesh (prosthetic herniorrhaphy)

General Treatment

- **Surgical herniorrhaphy:**
- ***Anesthesia:***
 - General anesthesia
 - Tranquilizer + local infiltration ring block
- ***Control:***
 - Dorsal recumbency (Mostly)
- ***Preoperative technique:*** As usual

General Treatment

- **Surgical technique:**
 - Elliptical incision to open the hernia swelling.
 - Blunt dissection to excise the excessive skin from the peritoneal sac.
 - Careful dissection of peritoneal sac from the underlying tissue.
 - Reduction of the hernia content intra-abdominally.

General Treatment

- Widening of the hernia ring in incarcerated hernia
- Careful manipulation of the strangulated bowel and excision of the necrosed parts.
- Cutting of adhesions and if not possible, reduction of the adhered parts together.
- Excision of the adhered part of the omentum (if present).
- Refreshment and closure of the hernia ring
- by one of the following:

General Treatment

- **Suture herniorrhaphy:**
 - In case of small hernia ring (Easily co-optation)
 - By using horizontal mattress, simple interrupted or purse string sutures
 - Using synthetic absorbable (As Vicryl®) or non absorbable suture materials (As nylon or prolene).

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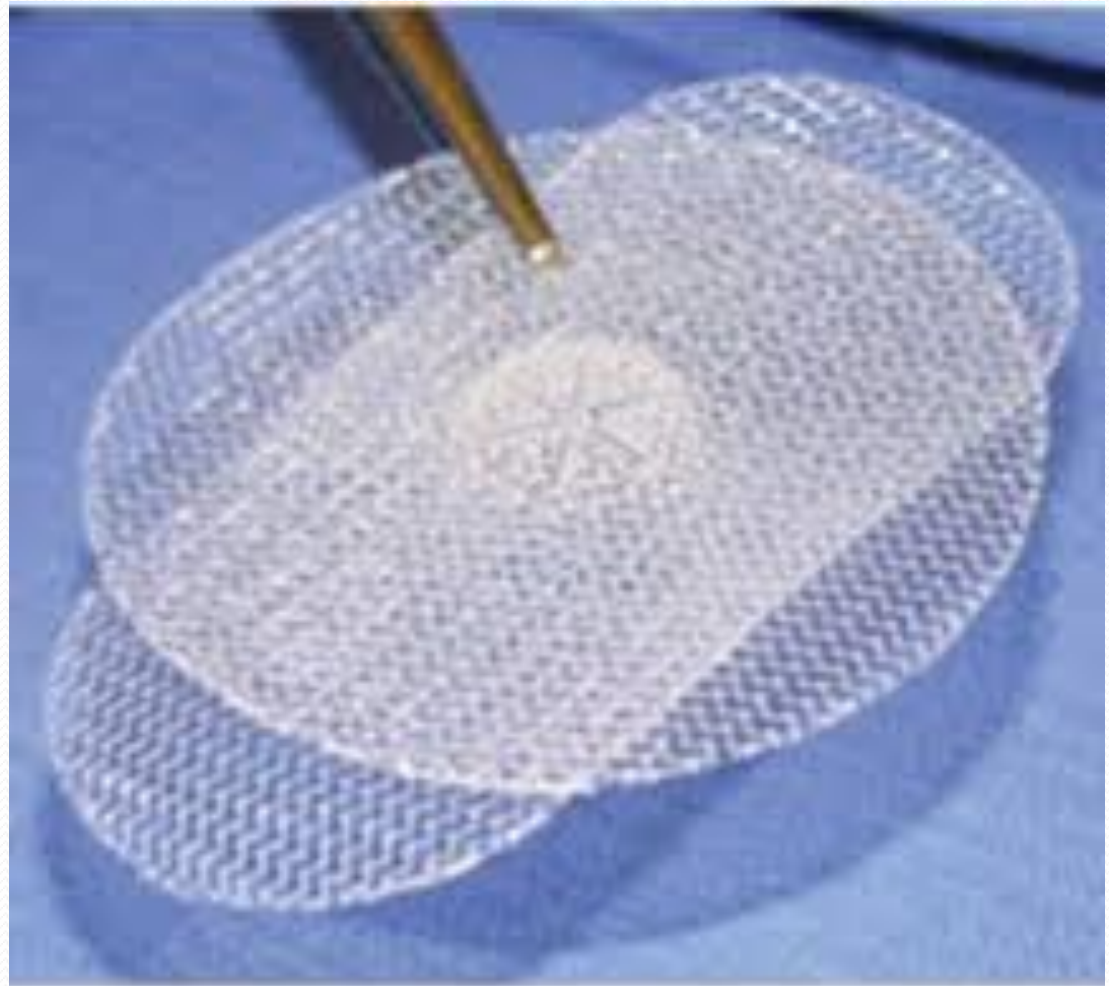
General Treatment

- **Prosthetic herniorrhaphy (By using prosthetic mesh):**
- ***Indications:***
 - Attenuated muscles
 - Too large hernia ring
 - Hernia presents nearby bony attachment (as costal arch and pubis).
 - Long standing recurrent hernia.

General Treatment

Characters of a good prosthetic mesh:

- Simple material
- Durable
- Elastic
- Have graining texture
- Easily sterilized
- Induce rapid fibroplastic response



General Treatment

- ***Aims of the mesh:***
 - To bridge the tissue gap that can not be sutured.
 - To support the newly developed granulation tissues and blood capillaries.
- ***Techniques of prosthetic herniorrhaphy:***
 - Retroperitoneal Technique
 - Intraperitoneal Technique
 - Double Sandwich Technique

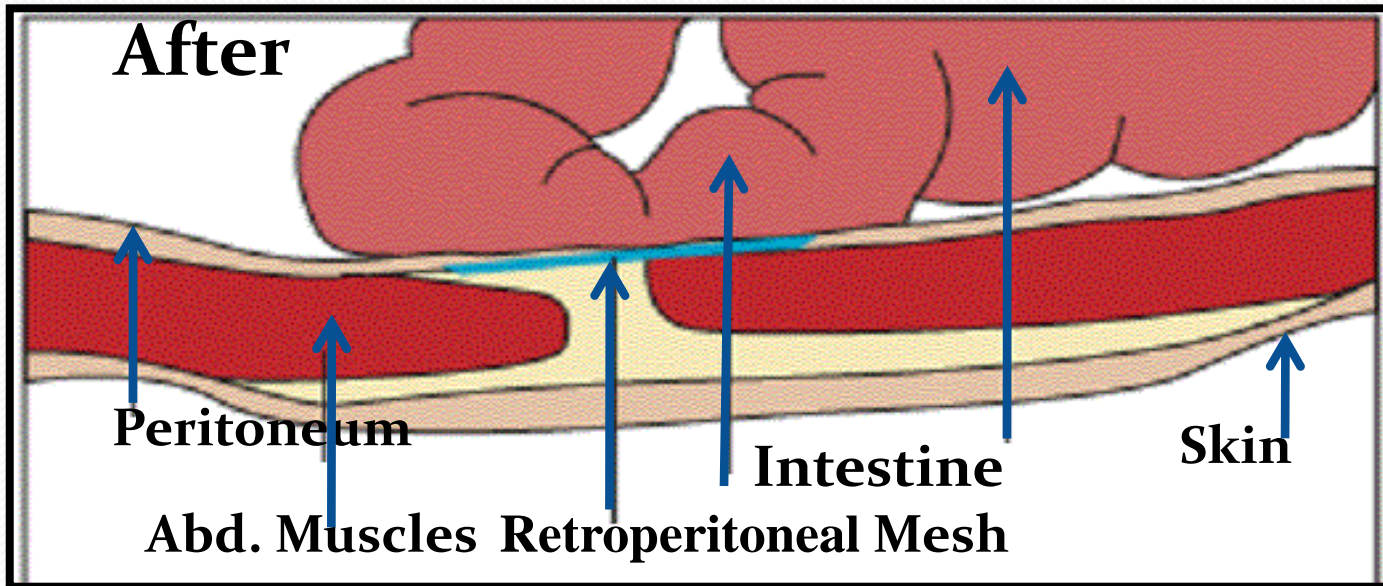
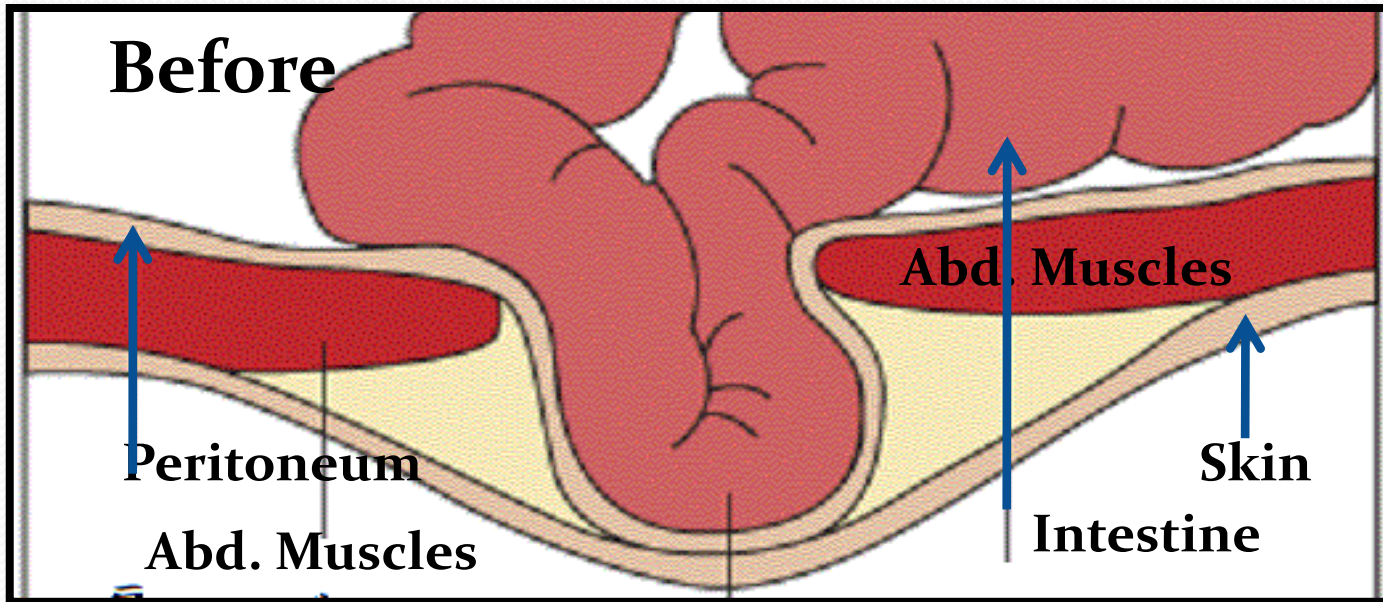
General Treatment

- **Retroperitoneal Technique:**

The prosthetic mesh is implanted either between the internal rectal sheath and peritoneum OR between fascia transversalis and peritoneum

- **Intraperitoneal Technique:**

The prosthetic mesh is implanted in the peritoneal cavity with or without omentalization (Poor results due to adhesion).



General Treatment

- **Double Sandwich Technique:**

Double layers of meshes are implanted, one between the internal rectal sheath and peritoneum and the second over the external rectal sheath.

- The prosthetic mesh is fixed in position with non absorbable suture materials as prolene or nylon using simple interrupted or horizontal mattress sutures.

General Treatment

- Closure of S/C tissues with absorbable suture materials as Vicryl[®] using simple continuous pattern.
- Closure of the skin with non absorbable suture materials such as silk, nylon or prolene using simple interrupted or horizontal mattress patterns.

Postoperative Care

- Using abdominal bandage
- Daily dressing of the wound with antiseptic solution
- Injection of systemic antibiotics
- Injection of antitetanic serum in equine
- Reduction of food for a week
- Removal of the stitches after 10 days of the operation

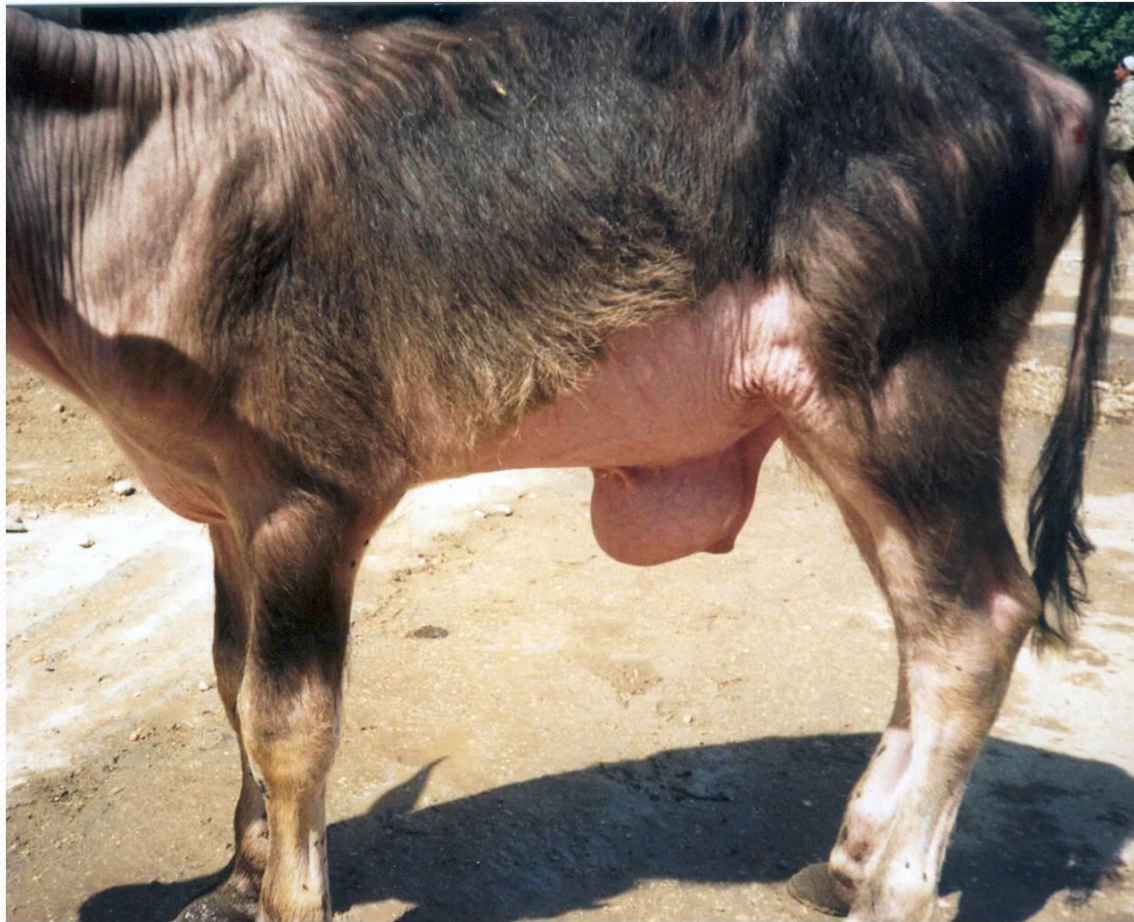
Umbilical Hernia (Omphalocele)

- It is common in foals, calves and less in kids, lambs, puppies and kitten.
- It is common in Friesian calves.
- It is more common in females than males
- It is common in animals less than 6 months old
- Spontaneous recovery usually occurs in small umbilical hernias
- The common hernia contents are omentum, abomasum and intestines.

Umbilical Hernia (Omphalocele)

- **Causes:**
- **Congenital causes:**
 - Developmental defect in the umbilical opening
 - Genetic factors
- **Acquired causes:**
 - Chronic omphalitis
 - Weakness of abdominal muscles.
 - Mechanical failure for natural closure of umbilicus
 - Severe straining - Trauma
 - Excessive traction of umbilicus during birth.

Umbilical Hernia (Omphalocele)



Umbilical Hernia in a 5-month-old Buffalo calf

Umbilical Hernia (Omphalocele)

- **Clinical symptoms:**

- General signs of hernia
- It may be alone or with omphalitis.

- **Diagnosis:**

- Case history - Clinical signs - Physical examination
- Ultrasonography to differentiate between omphalocele and omphalitis.
- Exploratory laparotomy
- Differential diagnosis from omphalitis, cysts, hematoma and tumors.

- **Treatment:** As mentioned before.

Inguinal/ Scrotal Hernia

- It is the protrusion of viscera through the inguinal canal into the inguinal region (Inguinal hernia) or into the scrotum (scrotal hernia).
- The hernia ring is the inguinal ring
- The hernia sac is the tunica vaginalis.
- The hernia contents are usually loop of small intestine or omentum (rarely large intestine and urinary bladder).

Inguinal/ Scrotal Hernia

- **Causes:**

- Hereditary defects in lambs and foals
- Congenital defect results in too large inguinal ring.
- Abdominal trauma
- Hard work
- Increased intra-abdominal pressure during exercise, severe straining, chronic cough or breeding.
- Hind limb slipping around and backward

Inguinal/ Scrotal Hernia

- **Clinical Symptoms:**

- Abdominal pain and colic
- Enlarged firm testicle in acute cases
- The hernia may reach the ground
- In chronic cases, the testicle suffers from pressure atrophy.
- The hernia contents can be palpated at the anteroexternal aspect of spermatic cord.
- Abducted lameness (mechanical lameness).

A large scrotal hernia in a kid



Inguinal/ Scrotal Hernia

- **Diagnosis:**

- Case history
- Clinical signs
- Physical examination
- Ultrasonography to differentiate scrotal hernia from hydrocele, hematocele, testicular tumors, cysts, orchitis and scirrhous cord.

Inguinal/ Scrotal Hernia

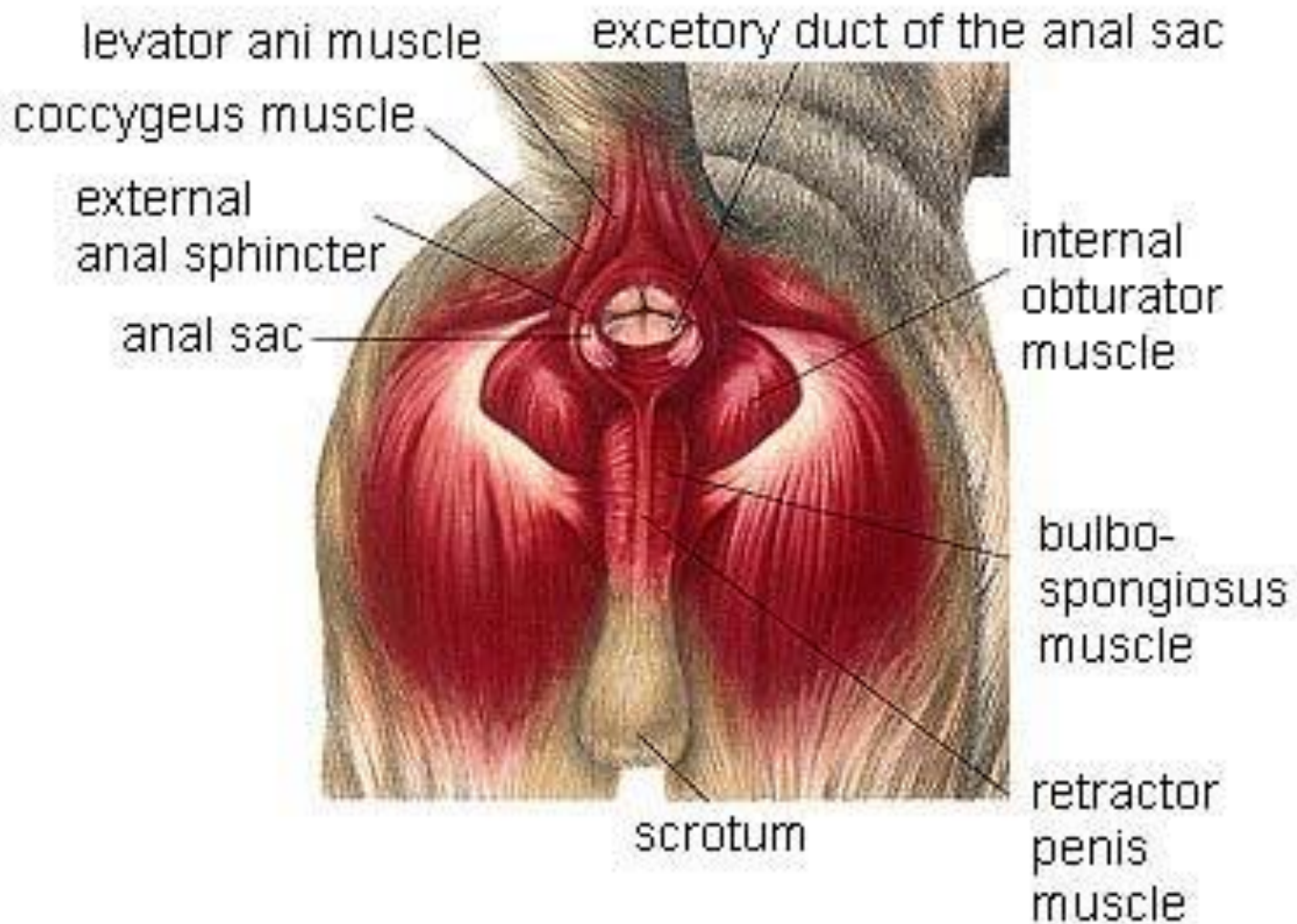
- **Treatment:**

- In congenital hernia, daily manual reduction of the hernia may lead to recovery by time.
- Surgical treatment including reduction of the hernia contents, castration and closure of the inguinal ring.

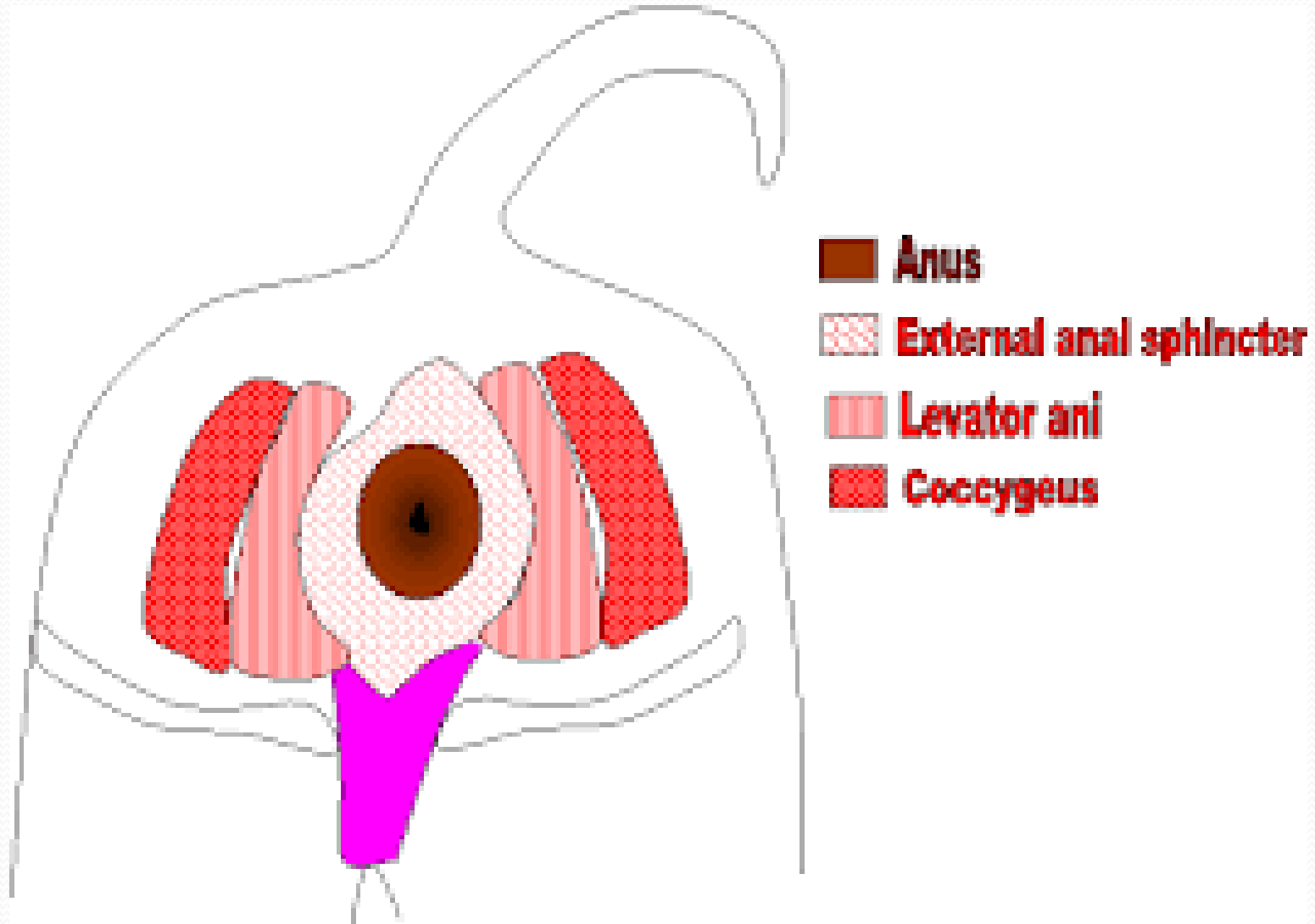
Perineal Hernia

- It is a protrusion of retroperitoneal fat, abdominal and/or pelvic viscera (UB, prostate and/or intestines) through the pelvic diaphragm into the ischio-rectal fossa.
- Pelvic diaphragm is composed of the levator ani and coccyggeus muscles medially, the sacrotuberous ligament laterally and the internal obturator and external anal sphincter muscles caudomedially...

Perineal Hernia



Perineal Hernia



Perineal Hernia

- **Incidence:**

- It is common in old dogs (6-14 years)
- It is common in sexually intact dogs (97% of the cases).
- It is not common in females due to strong levator ani muscle and good adhesion to the rectal wall over a long distance
- It may be unilateral (2/3 of the cases) or bilateral (1/3 of the cases)

Perineal Hernia

- **Causes:**

- Congenital weakness of pelvic diaphragm in some breeds as Boxer and Pekingese
- Testosterone imbalance
- Prostatic enlargement
- Chronic constipation
- Muscle atrophy especially levator ani muscle
- Concurrent rectal diseases as rectal deviation and dilatation.

Perineal Hernia

- **Symptoms:**

- Ventro-lateral, to the anus, painless swelling between the levator ani muscle and external anal sphincter.
- May be reducible or irreducible
- May be unilateral or bilateral.
- Change in tail carriage.

Perineal Hernia

- In chronic cases, overlying skin necrosis may be seen.
- Frequent straining to defecate with little or no feces.
- Dysuria or anuria if the urinary bladder is herniated
- Abdominal pain
- Lethargy and depression

Unilateral Perineal Hernia in a dog



Perineal Hernia

- **Diagnosis:**
 - Case history
 - Clinical signs
 - Physical examination
 - Rectal examination >>> To detect the impacted rectum & to assess the hernia ring.
 - Ultrasonography >>> To image the hernia contents

Perineal Hernia

- Radiographic examination:
- Plain Radiography >>> To detect the rectal dilatation and hernia contents
- Contrast Radiography of either rectum >>> to discover rectal deviation or rectal diverticulum OR urinary bladder (Cystography) >>> to discover the herniated UB.

Perineal Hernia



Plain radiography of bilateral perineal hernia in a dog

Perineal Hernia

Contrast radiography of perineal hernia in dogs



**Herniated rectum in a
perineal hernia in a dog**

**Herniated UB in a
perineal hernia in
a dog**



Perineal Hernia

- **Treatment**
- ***Conservative treatment:***
 - Using laxatives.
 - Periodic rectal enemas
 - Fibers rich diets.
 - Urinary catheterization to decompress the urinary bladder.
 - Digital removal of the impacted feces.

Perineal Hernia

- ***Surgical treatment:***

- Castration >>> decrease testosterone >>> decrease the size of prostates
- Suture herniorrhaphy (in small herina ring)
- OR
- Prosthetic herniorrhaphy (in large hernia ring or very weak muscles)
- OR
- Muscle transposition perineal hernioplasty (in severe or bilateral hernias and to avoid recurrence)

Perineal Hernia

- ***Conventional or suture herniorrhaphy:***
 - Fasting of the animal for 24 hours
 - Rectal enema
 - Purse string suture around the anus or inserting a piece of gauze inside the anus to avoid defecation during surgery.
 - Sternal recumbency with tying the tail over the back
 - Elevation of the hind quarter

Perineal Hernia

- Aseptic preparation of the perineum.
- General anesthesia + Epidural analgesia
- Opening the hernia swelling
- Exposure of the hernia contents
- Reduction of the hernia contents intra-abdominally.
- Colopexy may be done to fix the colon and rectum to the left abdominal wall

Perineal Hernia

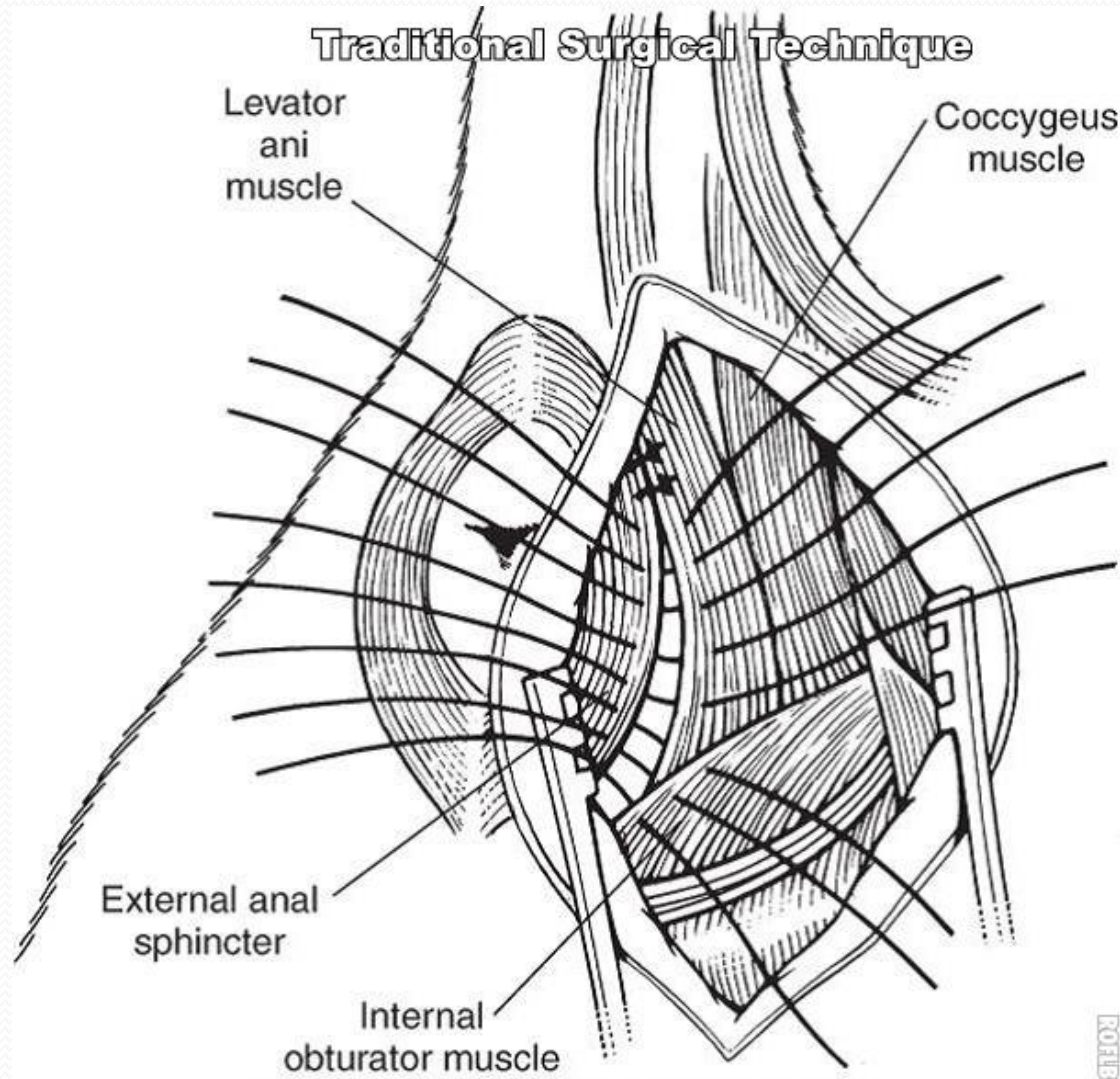
- Cystopexy may be done to fix the urinary bladder to the right abdominal wall
- Ductus deferensopexy can be done to fix the prostates to the abdominal wall.

Closure of the herina ring with 4 layers of horizontal mattress or simple interrupted sutures using synthetic absorbable suture material as follows:

Perineal Hernia

- 1- First layer sutures the coccygeus muscle and external anal sphincter muscle.
- 2-Second layer sutures the levator ani muscle and external anal sphincter muscle.
- 3-Third layer sutures the internal obturator muscle to the external anal sphincter and to the levator ani and coccygeus muscles to finish closing the hernia defect
- 4- Fourth layer sutures the subcutaneous tissue and external anal sphincter muscle.

Perineal Hernia



Perineal Hernia

- Suturing S/C tissue with synthetic suture material and simple continuous pattern
- Suturing of the skin with non absorbable suture material and simple interrupted pattern.
- Removal of purse string suture or gauze from the anus.

Perineal Hernia

- **Post operative care:**
 - Reduce diet for 3 days post operative
 - Soft easily digested food for 7 days post operative.
 - Daily dressing of the wound with antiseptic solution
 - Systemic antibiotics
 - Removal of the stitches after 7-10 days

