# Practical note of Special Surgery

## By Staff members

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# DEHORNING

***Definition: -***

A procedure by which the horns of the animals are removed

***Indications: -***

1-To avoid fracture of the horns

2-To reduce the risk of injury and bruising to herd mates

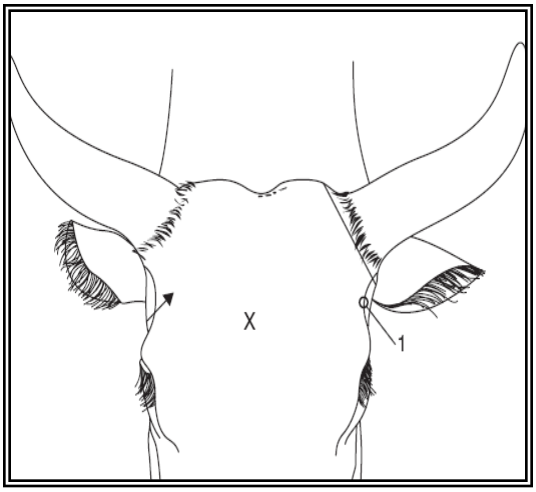
3-To prevent the financial losses from trimming damaged carcasses caused by horned feedlot cattle during transport to abattoir

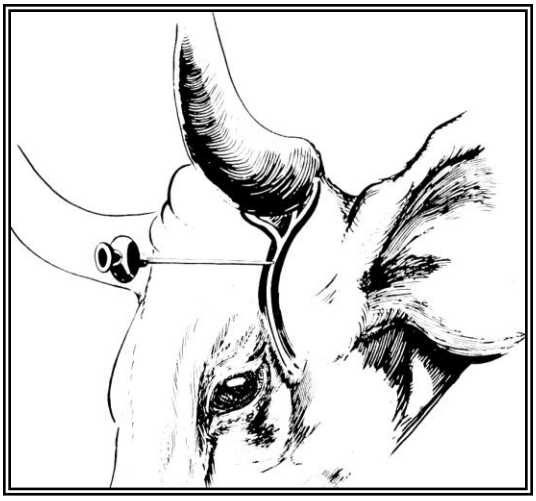
4-Produce docile cattle (easier to handle)

5-Required less space at the feed bunk and in transit

***Anesthesia: -***

**1-Cattle: -**



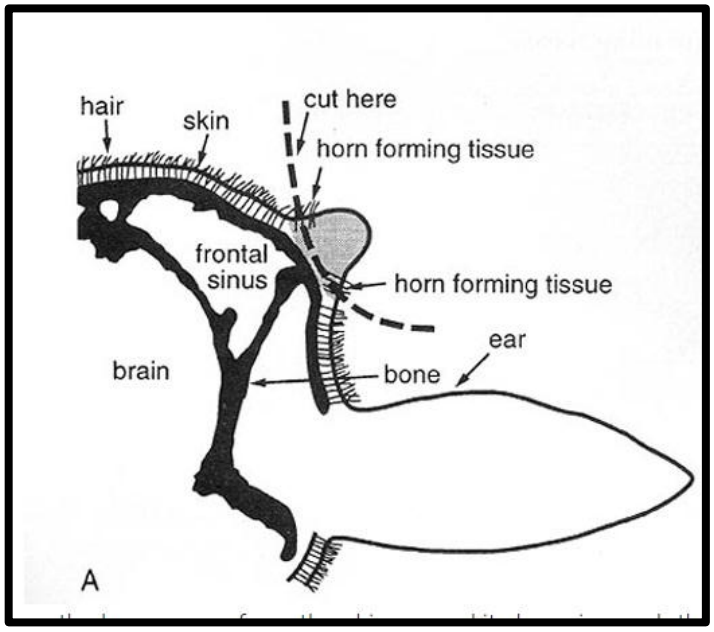
Cornual nerve block, the site for injection is the upper third of the temporal ridge, about 2.5 cm below the base of the horn. The needle is inserted immediately behind the ridge. The needle must not be inserted too deeply, otherwise injection will be made beneath the aponeurosis of the temporal muscle and the technique will fail. In large animals with well-developed horns, a second injection should be made about 1 cm behind the first one to block the posterior division of the nerve. This nerve block has been widely used for the dehorning of adult cattle but the block is not always complete. Variability in the curvature of the lateral ridge of the frontal bone makes exact determination of the site of the nerve difficult. In a struggling animal, it may be difficult to ensure that the point of the needle is at the correct depth. A third injection may be required in adult cattle with well-developed horns; it is made caudal to the horn base to block the cutaneous branches of cervical nerves.

## 2-Small ruminants: -

*Right lacrimal and left infratrochlear n. block*

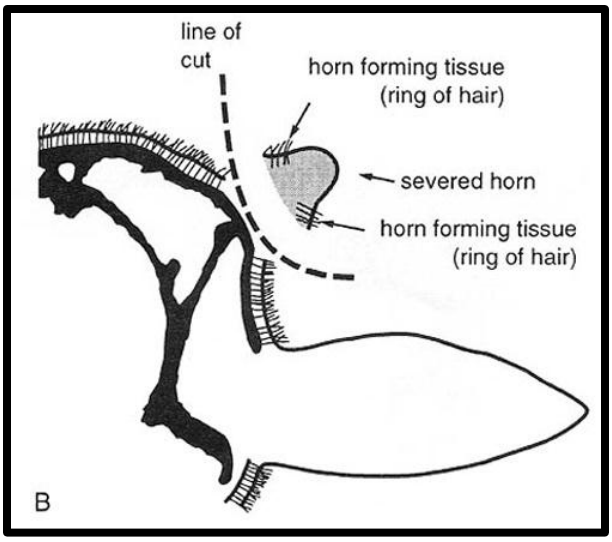
The cornual branches of the lacrimal and infratrochlear nerves provide sensory innervation to the horns. The cornual branch of the lacrimal (zygomatico-temporal) nerve emerges from the orbit behind the root of the supra-orbital process covered by thin layer of frontalis muscle and innervates the caudolateral aspect of the horn. The infra-trochlear nerve emerges from the orbit dorsomedially and divided into dorsal corneal branch that innervates thedorsomedial aspect of the horn, and medial frontal branch that innervates the caudomedial aspect of the horn. Both nerves are covered with orbicularis muscle at the lower part and with frontalis muscle at the dorsal part. The cornual branch of lacrimal nerve is injected close to caudal ridge of the root of the supra-orbital process to a depth of 1.0–1.5 cm in adult goats. The syringe plunger should be withdrawn before injection to check that the tip of the needle has not penetrated the large blood vessel located at this site. The corneal branch of the infra-trochlear nerve is injected at the dorsomedial margin of the orbit, 0.5 cm deep.

## *Technique of dehorning: -*

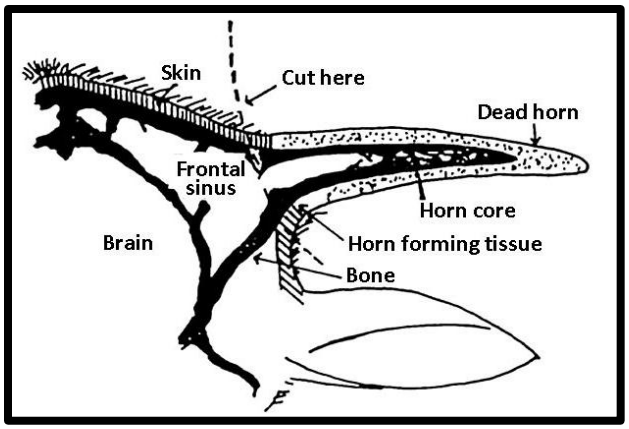



For performing successful dehorning, operators should have basic knowledge of the internal structure of the horn and how it develops. As shown in diagram (A), the horn grows from the skin around its base in the same way as the wall of the hoof grows down from the skin of the coronet of the foot. In young calves up to about *two months* of age, the horn bud is free-floating in the skin layer above the skull. As the calf grows older, the horn bud attaches to the skull and a small horn starts to grow. Dehorning should be performed before this attachment to the skull occurs. It then becomes a much

simpler exercise, and results in less bleeding. To ensure that there will be no regrowth of the horn after dehorning, the operator must remove the horn-forming tissue. This is done by removing a ring of skin at least 1 cm wide with the horn bud (see diagram B). The most common mistake when making dehorning, is to remove an incomplete ring of skin around the horn bud. This allows a scur to grow. Take care to dehorn all calves and to dehorn them carefully and accurately, remembering the '1 cm rule'. If the horn bud has an incomplete ring of hair, a second cut will be needed to remove all horn-forming tissue.




Once the horn bud attaches to the skull, the horn core becomes a bony extension of the skull and the hollow center of the core opens directly into the frontal sinuses of the skull. In this situation, the frontal sinuses are opened and the soft membranous covering of the cranium (skull) is often exposed to view. This is not the brain (as is sometimes thought) and its exposure does not harm the calf. In older calves it takes only a short time after dehorning for this opening to close, but during this period the animal is prone to fly strike and sinus infections. If dehorning is to be performed in mature animals as in case of horn fracture, the horn should be removed from the base, then antiseptic is applied to the horn, and bandage is applied (8 figure bandage).




## DISBUDDING (IN CALF)

Cattle are polled so that they can't gore one another and are less dangerous to be handled, so it is preferred to disbud calves rather than waiting until they are adult and then dehorn them. The process of disbudding should be done during the first *5-10 days* of life. This process can be performed either by injection of caustic substance (concentrated solution of calcium chloride)

subcutaneously at the budding site, by surgical removal of the horn buds, or by disbudding iron under the effect of local analgesia.

The disbudding iron is heated by gas or electricity; its head is made of copper to retain the heat; and its end is hollowed out to form a dome-shaped depression of 12 mm diameter, 8 mm depth, and 3 mm rim thickness. This method has many advantages like controllable hemorrhage, no need for post-operation dressing, and healing is completed within 10-14 days with no or minimal scar. This method is suitable for calves that didn't grow horns, but once the horn grows, disbudding is no longer possible and it can be removed by special forceps with cutting of the skin around the base of the horn.

## DEHORNING (IN CATTLE)

Dehorning of the adult cattle can be performed on standing position by using corneal nerve block and sedation, bleeding can be controlled by applying a rope around the base of the two horns. The horn can be removed by hack saw or embryotomy wire. It is essential to remove the horn with 1.5 cm of skin around the base to ensure that the corium is removed and to prevent development of any stumps of distorted horns

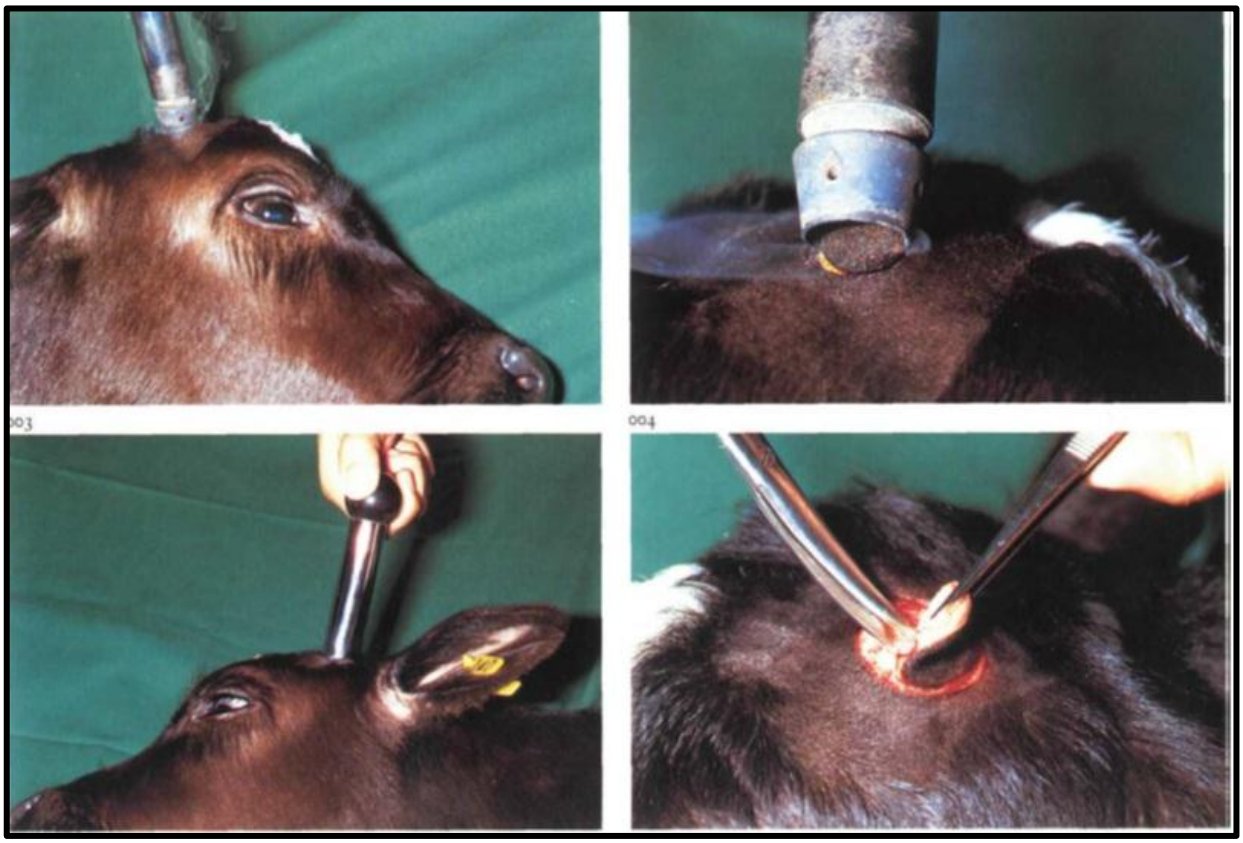
***Treatment after dehorning: -***

After the operation, animals may bleed freely for a short time. Heat cauterizing of the wound of older calves is gaining acceptance as a means of reducing blood loss and drying out the wound.

The application of a proprietary wound dressing powder (dusting powder) is often sufficient treatment; a powder that contains a fly repellent is recommended if dehorning in the warmer months when flies are a problem.

Dehorning pads are available from many rural merchants. These are placed on the wound to reduce the amount of blood loss from the site of operation. The pads are left on the wound until they drop off with the scab.

Cattle should be inspected regularly for the first 10 days and any



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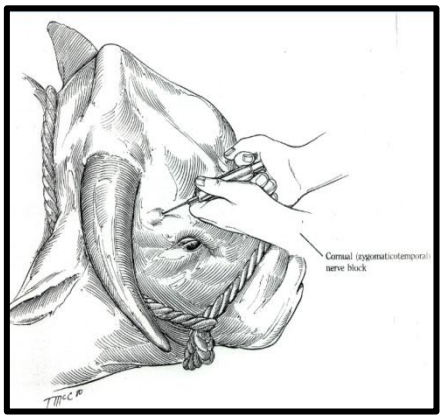
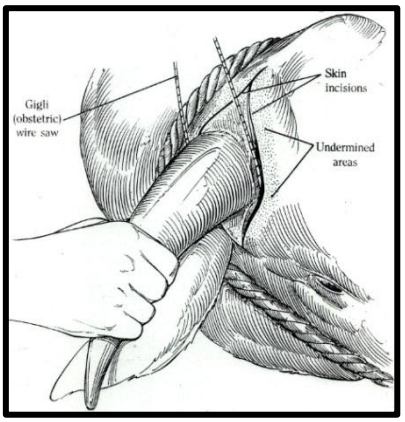
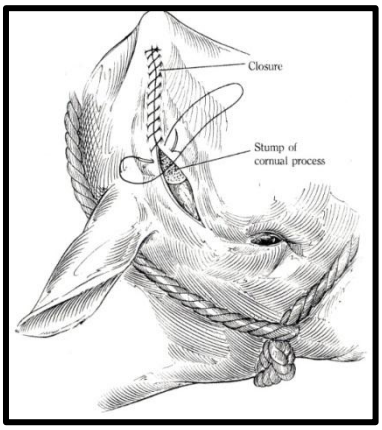
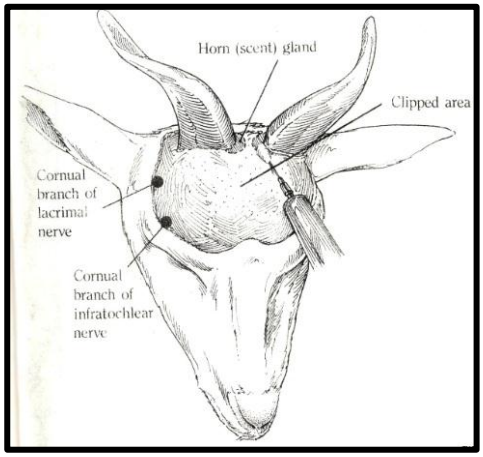
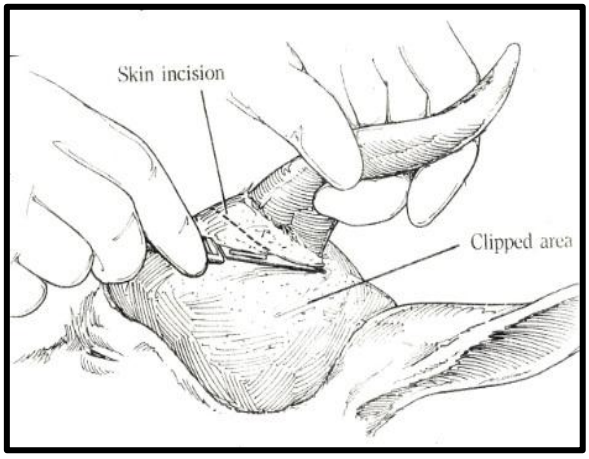
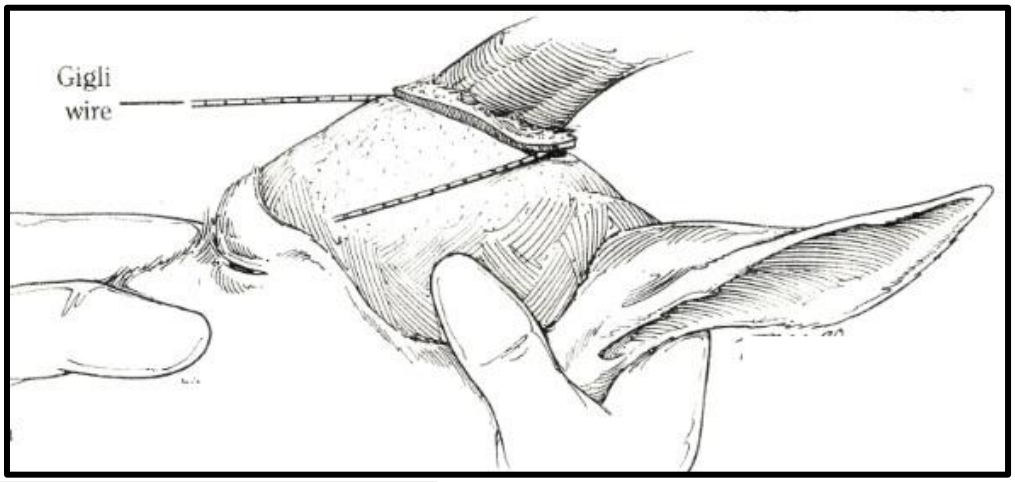

Cornual (zygomaticotemporal) nerve block

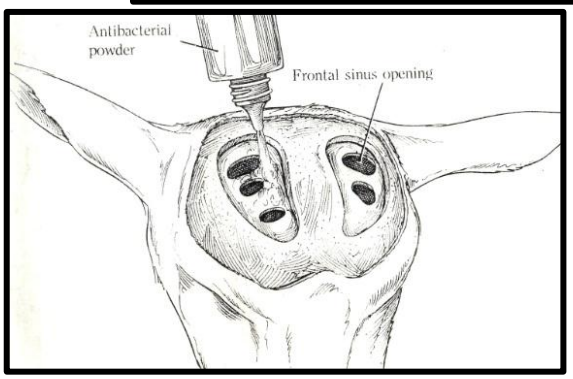

Gigli (obstetric) wire saw
Skin incisions
Undermined areas

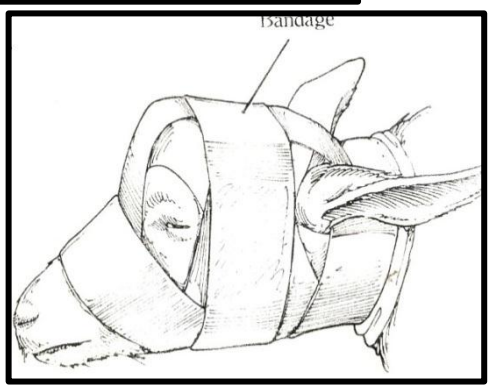

Closure
Stump of cornual process


Horn (scent) gland
Clipped area
Cornual branch of lacrimal nerve
Cornual branch of infratochlear nerve


Skin incision
Clipped area


Gigli wire


Antibacterial powder
Frontal sinus opening


Bandage

# Write short note on the disbudding in calf

**1-Indications: -**

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2-**Anesthesia: -**

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**3-Technique: -**

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# Write short note on the dehorning in buffalo

**1-Indications: -**

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2-**Anesthesia: -**

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**3-Technique: -**

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# CASTRATION

***Indications: -***

1-To eliminate the incidence of a poor- or inferior-quality bull from breeding superior females and producing less-than-ideal offspring

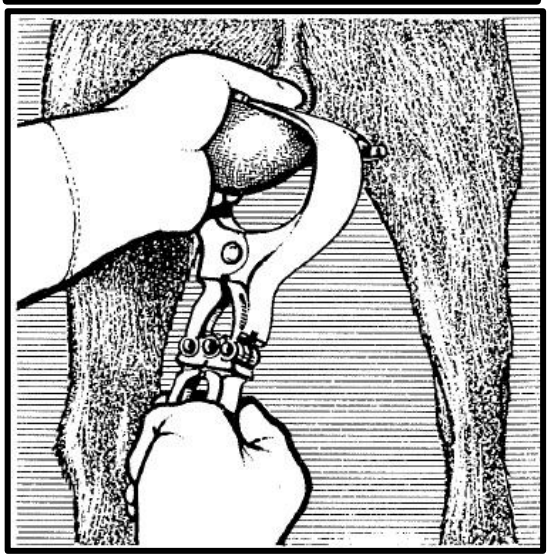
2-To make males less dangerous and rowdy towards other cattle and humans when they are being raised for beef

3-To meet market demand as far as beef quality and sales are concerned

4-Saving one testicle when the other one has pathological lesion like abscess

5-Cryptorchidism

**1-Bloodless castration by Burdizzo Pincher: -**



1-Restrain the calf

2-Work the cord to the outer side of the scrotum

3-Apply the Burdizzo about 1-1/2 to 2 inches above the testicle

4-Close the clamp and leave it in position for about a minute. Remember when closing the clamp, you need to close it so that it crushes the cord, not so that it is merely a light pressure to the area. Ensure that the penis is not included in the crushed tissues

5-Repeat with the second testicle

***Advantages: -***

1-Desirable for show steers because of the large and well-shaped cod that is formed in well-finished steers.

2-Similar advantages as described above with banding.

3-No tetanus shot required because there is no scrotal atrophy occurring

***Disadvantages: -***

1-Best done by an experienced operator or veterinarian

2-One cord can only be cut at a time, and can't slip from the clamps of the Burdizzo

3-Mistakes are likely to occur if not done properly: the cord may be incompletely crushed and the animal may develop stagginess later.

**2-Surgical castration: -**

***Advantages: -***

1-Easy to see that two testes are present

2-Quick and a highly common practice used among ranchers

***Disadvantages: -***

1-Risk of blood loss, infection and maggot infestation

2-Cannot be performed during fly season

3-Knife may not be sterilized, inducing infection

4-Cutting the cord may not be done properly increasing the chance of blood loss for the animal

5-More painful for the animal than banding, depending on the method of cutting used

6-Can cut oneself whilst castrating the animal: knives are sharp and must be handled properly and safely

**A-Covered Castration: -**

It is a process through which the scrotum is incised surgically (start with the lower testicle to lower possibility of contamination) and the gonads are removed covered with tunica tunica vaginalis. Thee testicle is pulled and the spermatic cord freed from the neck of the scrotum till appearance of the cremastric muscle, that was transfixed with two ligations. The emasculator is used to cut in between the two ligations. The other testicle is treated in the same manner. In equine the scrotum is left without suturing.

***Advantages: -***

1-low incidence of intestinal herniation through the stump of the spermatic cord as it closed with trans-fixation ligation

2-Lower incidence of peritonitis

***Disadvantages: -***

1-Higher possibility of slippage of the trans-fixation ligation and internal hemorrhage as the three structures of the spermatic cord are all ligated in the stump as one cord

**B-Uncovered Castration: -**

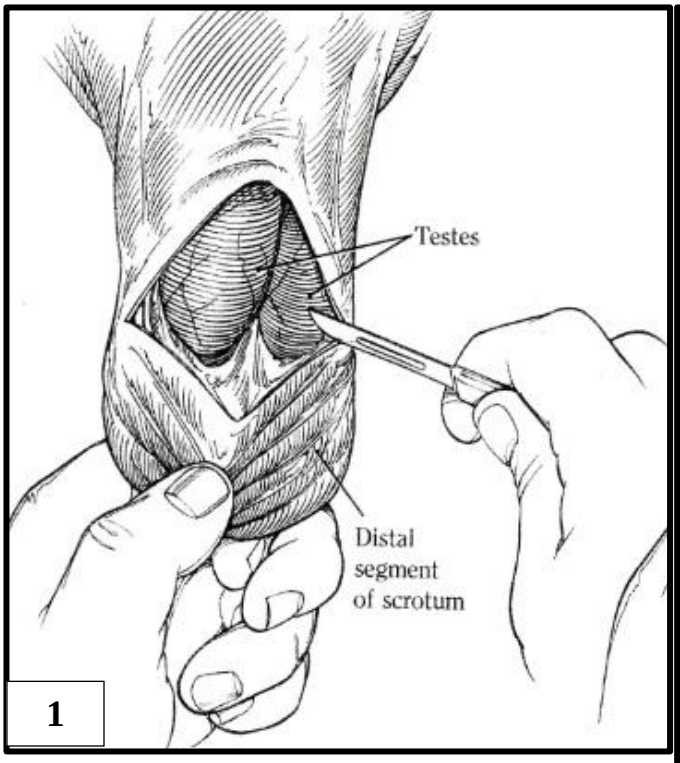
It is a process through which the scrotum is incised surgically in the same manner as covered castration, however the tunica albogenia is incised too, and the three constituents of the spermatic cord are dissected and separated, and every one of them is ligated alone, then the testicle is removed by emasculator in the same mentioned manner.

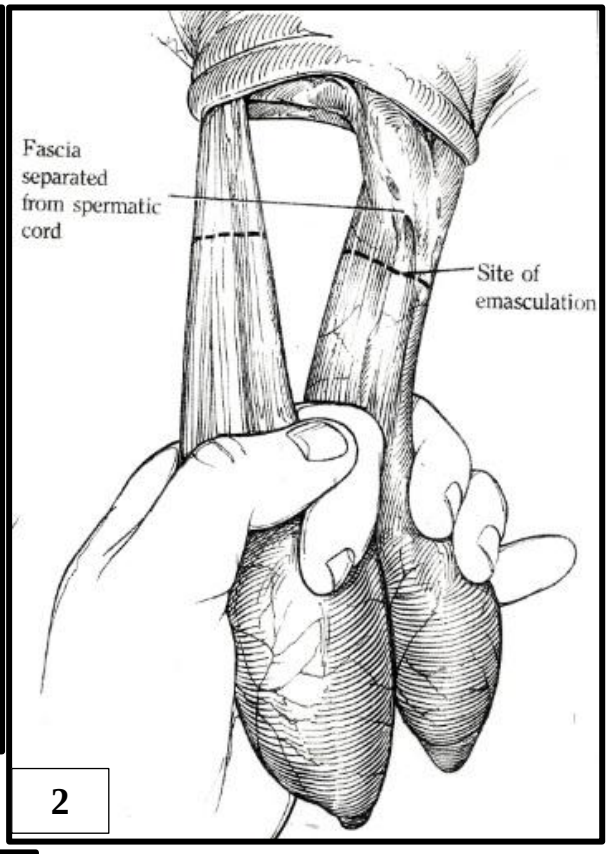
***Advantages: -***

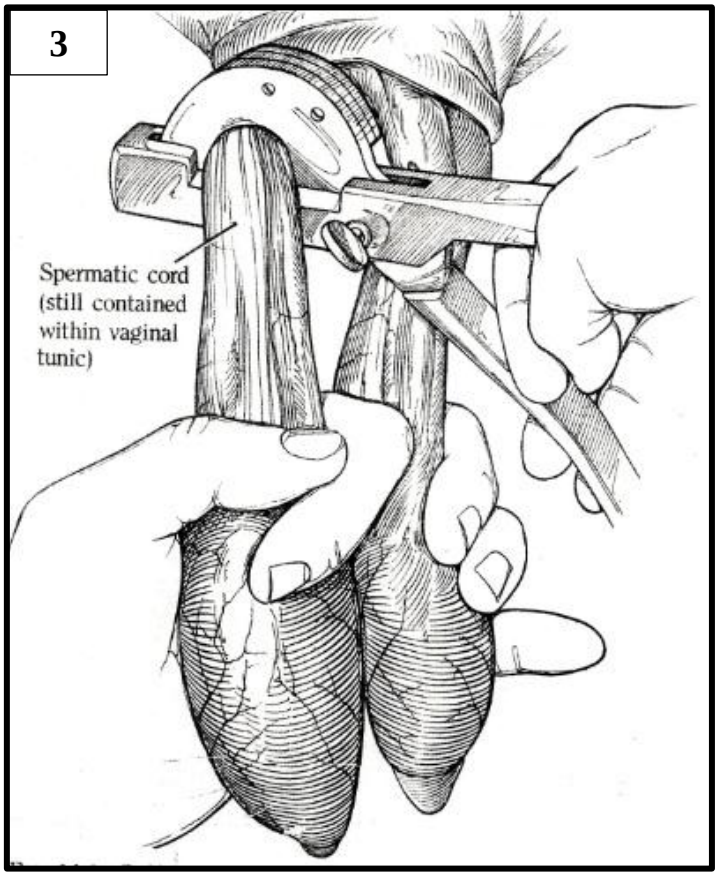
Lower incidence of internal hemorrhage as the artery itself is ligated

***Disadvantages: -***

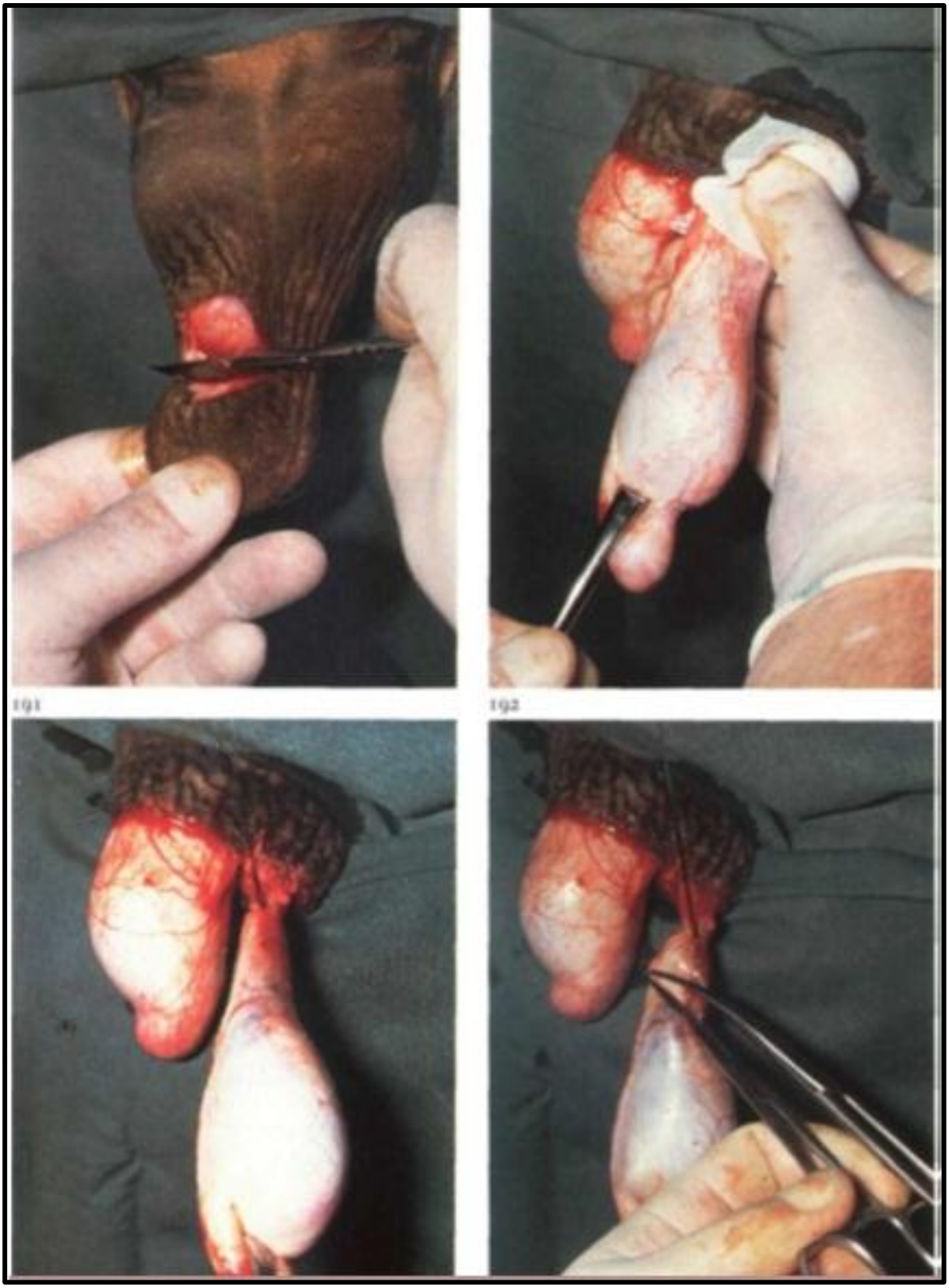
Higher incidence of intestinal prolapse through the opened spermatic cord, and higher incidence of peritonitis



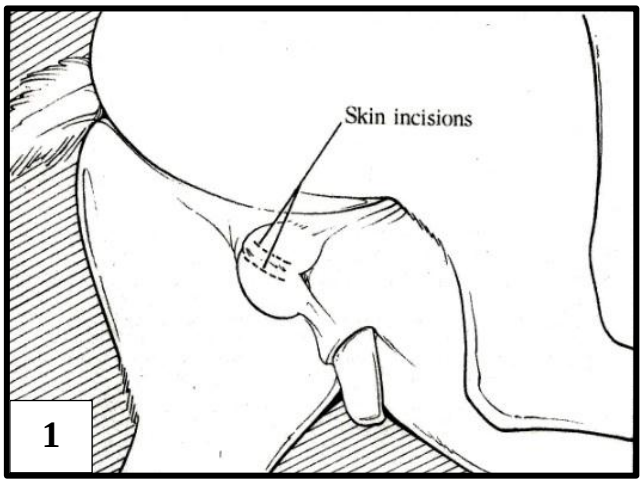



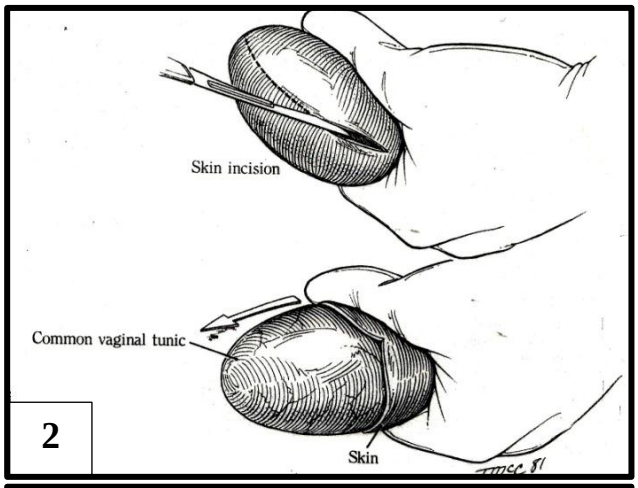




**Open castration in ruminants**

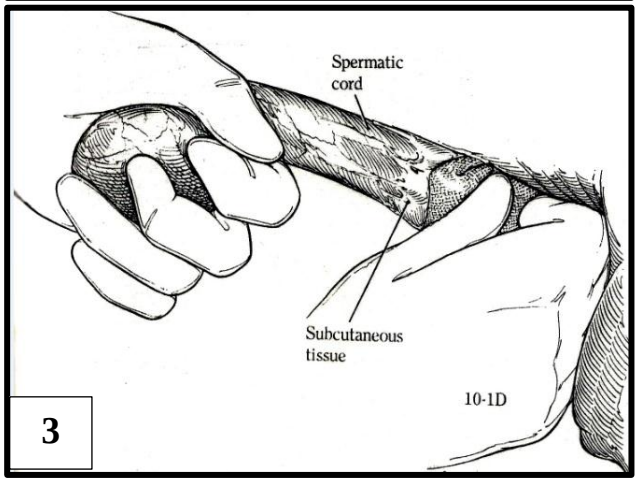


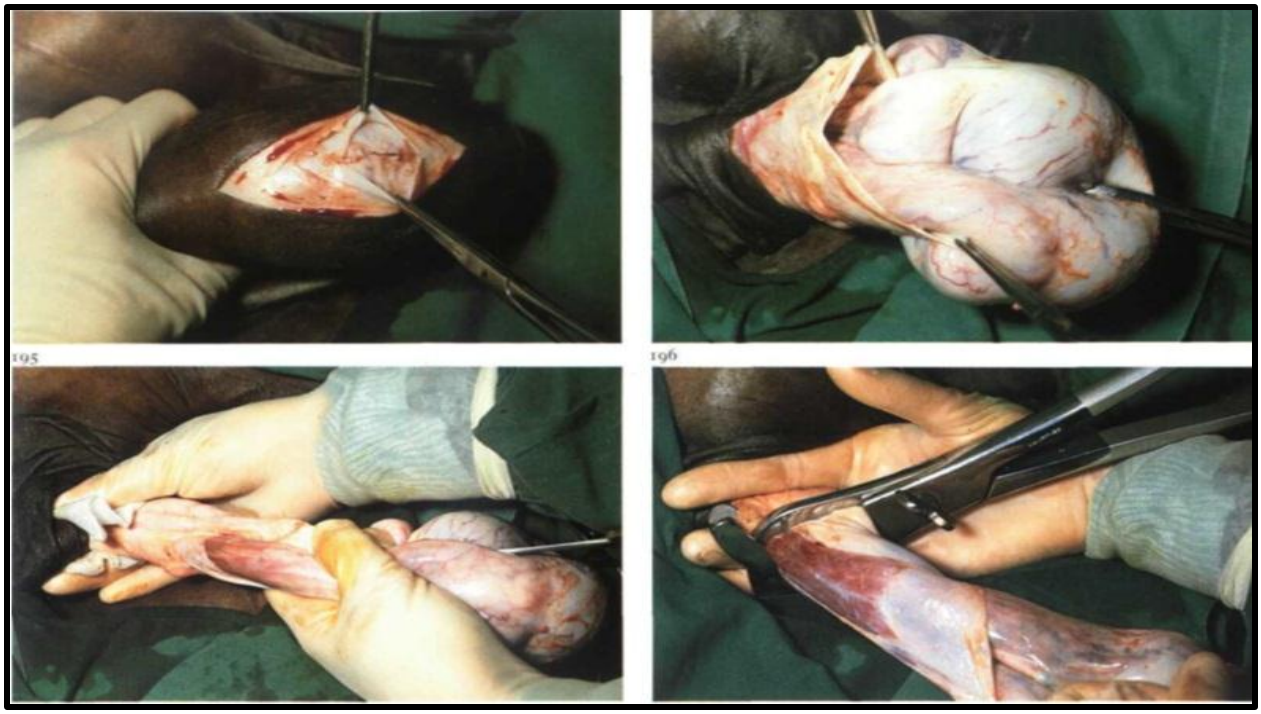
**Open castration in ruminants**

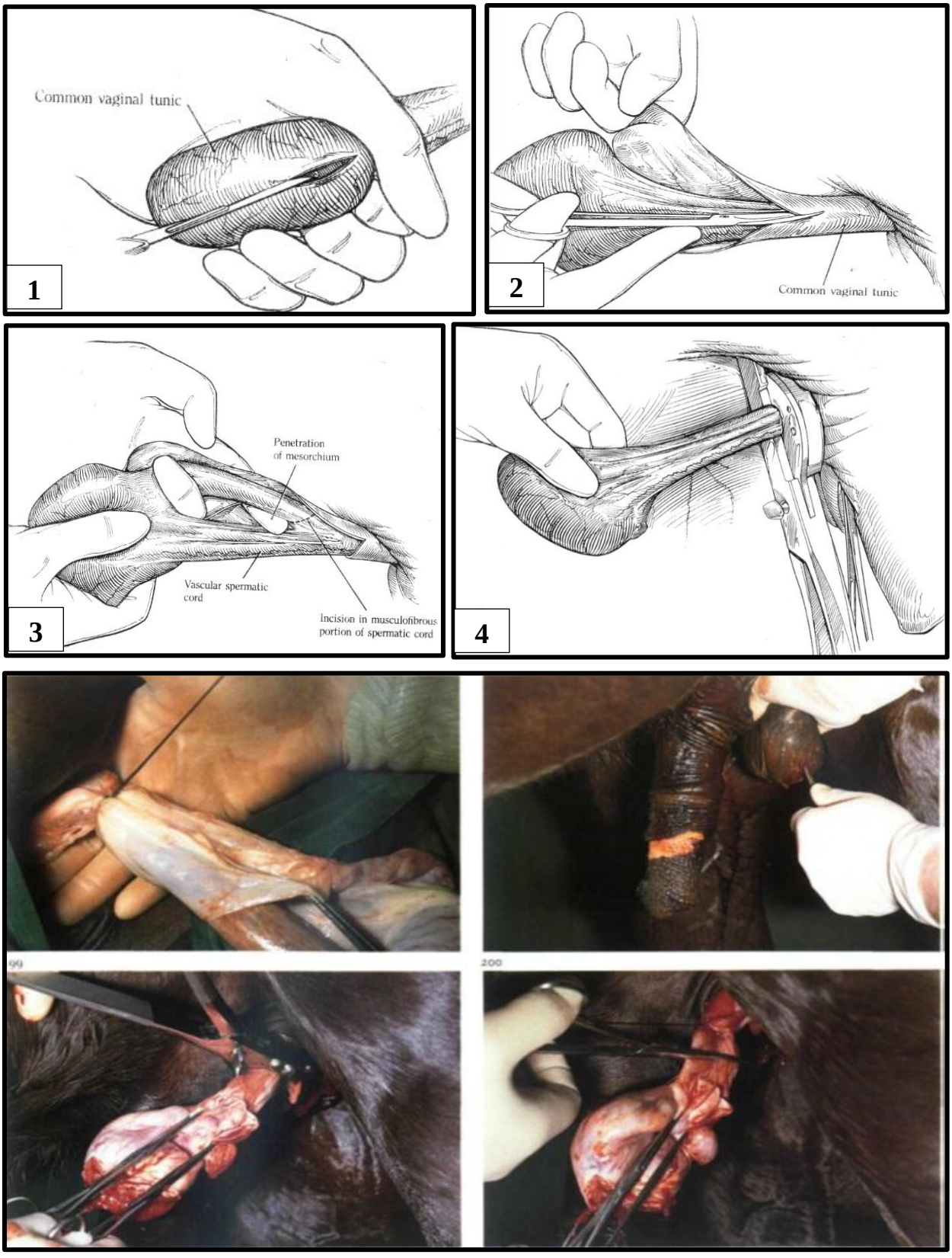



## Covered castration






**Uncovered castration**

# Write short note on bloodless castration

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## 2-Anesthesia: -

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## 3-Technique: -

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# Write short note on covered castration

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## 2-Anesthesia: -

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## 3-Technique: -

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# Write short note on uncovered castration

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## 2-Anesthesia: -

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## 3-Technique: -

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# URETHROSTOMY

This technique aims at creation of a fistula in the perineal urethra at a level higher than the seat of obstruction and animal will urinate through this opening forever unless obstruction of this fistula occurs.

***Indications: -***

Urine retention with intact bladder

***Technique: -***

Different techniques of urethrostomy can be used and they vary according to the seat of created fistula. The fistula can be created directly under the anus, dorsal to the scrotum, or pre-scrotal. Each technique has its advantages and disadvantages from different points of view like the ease of locating the penis, severity of hemorrhage, complications like urine scalds, and durability of the fistula.

1-Aseptic preparation of the perineal region

2-Anesthesia by epidural analgesia, and sedation

3-The animal is kept in lateral recumbency, and then an incision is made 10-20 cm below the anus. This incision is advanced to the perineal muscles till reaching the penis. The retractor penis muscle in large ruminants lie directly over the penis and shouldn't be mistaken for the penis itself, while in small ruminants it lies lateral to the body of the penis, the muscles are taken lateral to the penis and the penis is exteriorized by curved hemostatic forceps. An incision is made to the caudal aspect of the penis and directly over the urethra. Urine will void from the seat of urethral incision and this is an indication that the bladder is intact and the technique advances in successful manner. The wall of the urethra is fixed to the skin by silk in a simple interrupted manner for creation of a fistula.

***Advantages: -***

1-Simple and easy technique

2-The technique needs no special complicated tools, or high experience

3-The cost of the operation is low

***Disadvantages:***

1-High probability of death during surgery as a result of severe bleeding

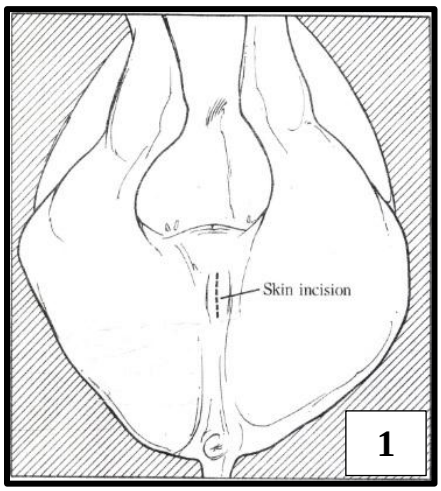
2-Scald of the skin over the scrotum and the posterior aspect of the thighs

3-The fistula narrows over time and the maximum use of the animal is 6 months after which re-widening of the fistula is needed, otherwise the animal will suffer from retention again.

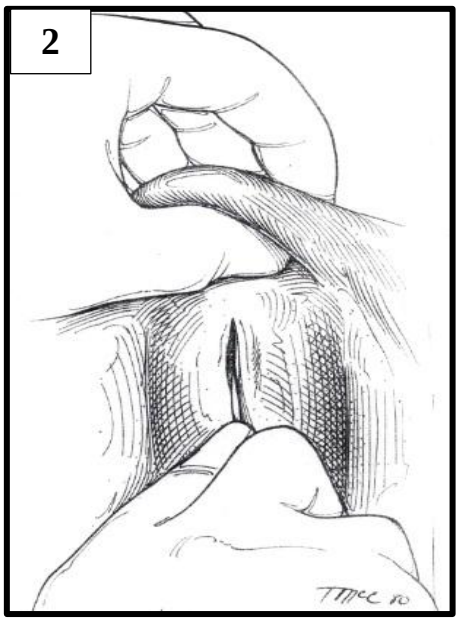
4-Higher probability of ascending cystitis

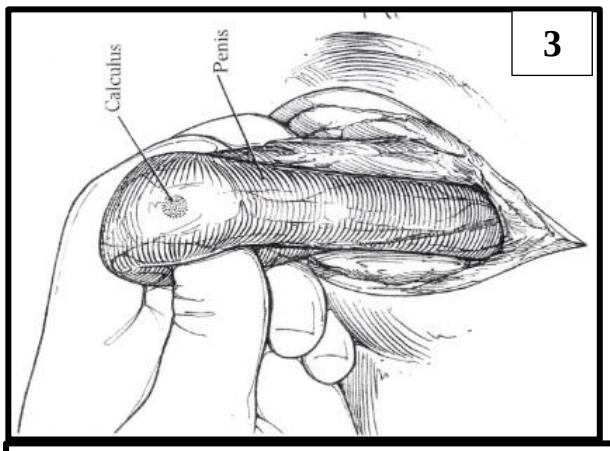
5-Animals are sold for low price

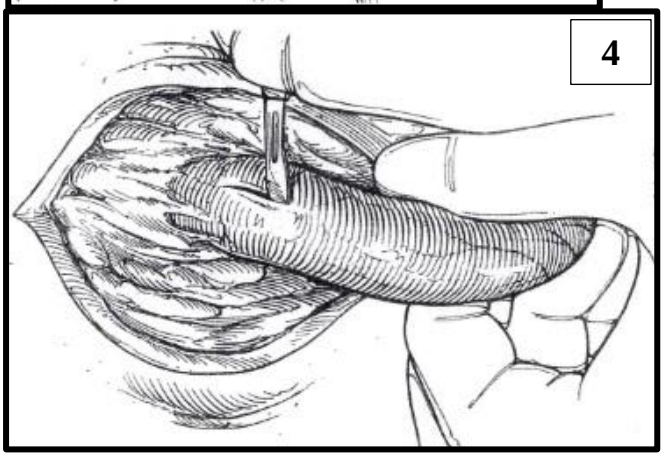
6-Animals can't be used for breeding purposes

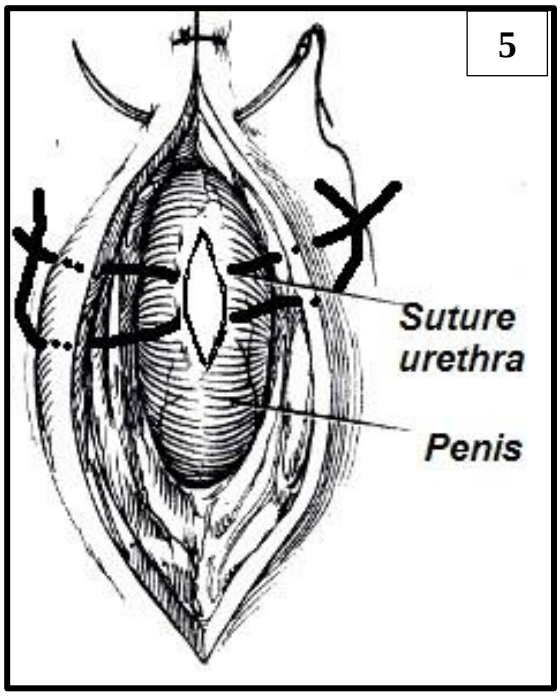



**Urethrostomy**



# Write short note on high perineal urethrostomy

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## 2-Anesthesia: -

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## 3-Technique: -

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# Write short note on low perineal urethrostomy

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## 2-Anesthesia: -

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## 3-Technique: -

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# MASTECTOMY

It is a procedure through which the affected udder is excised

***Indications: -***

Gangrenous mastitis

***Anesthesia: -***

Sedation with regional analgesia

***Technique: -***

1-Aseptic preparation

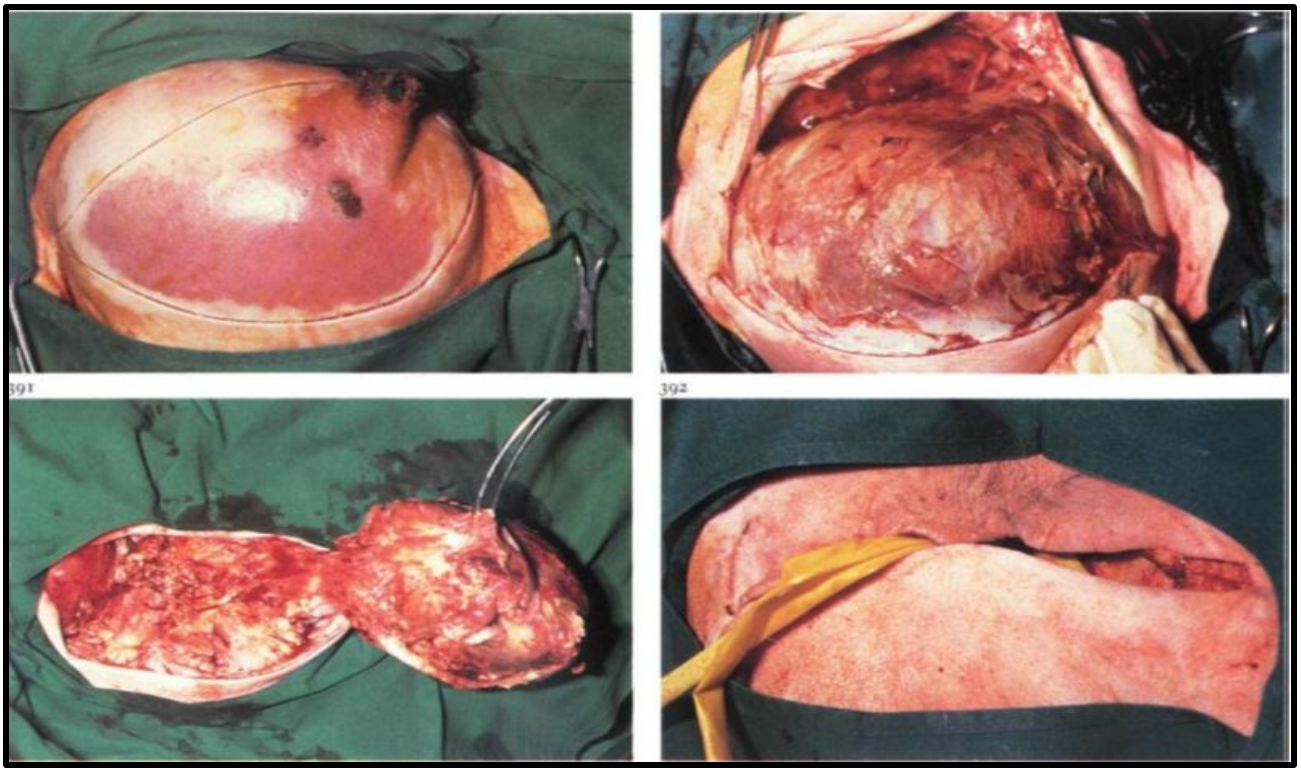
2-An elliptical incision is made, including the teat, and the skin is dissected from the affected gland

3-Vessels are ligatured, and fibro-elastic suspensory bands are then divided

4-The gangrenous udder is excised and sutures are applied

***Aftercare: -***

1-Antibiotic 2-Fluid therapy 3-Dressing the wound 4-Antitetanic serum in sheep



# Write short note on mastectomy in goat

## 1-Indications: -

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## 2-Anesthesia: -

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## 3-Technique: -

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# HERNIA

***Definition: -***

Hernia or rupture is a condition in which portions of the abdominal contents have passed through the abdominal walls, and lie under the intact skin. Should they pass through the skin, the condition is termed prolapse. The passage of abdominal organs through the diaphragm into the thorax is also described as hernia (diaphragmatic hernia).

***Causes: -***

1-Congenital like wide inguinal ring or open umbilicus

2-Increase of intra-abdominal pressure, frequent coughing, dyspnoea, pressure on the abdomen, or development of gas in the bowel

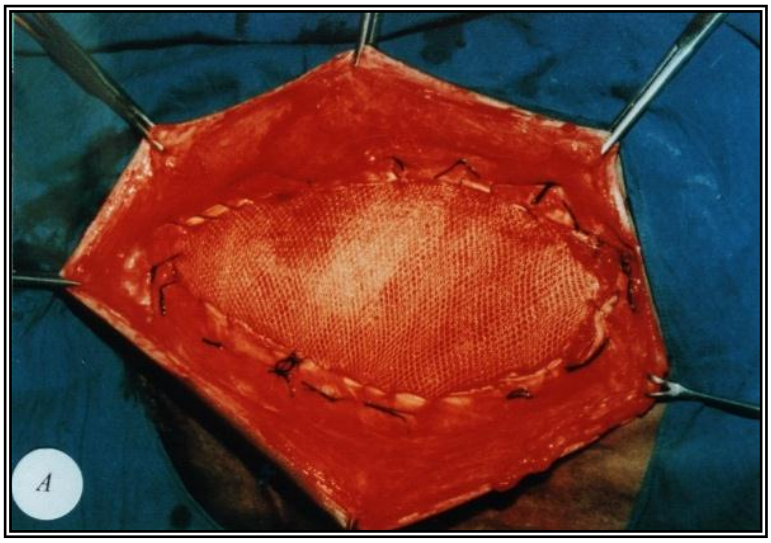
3-Rupture of the abdominal wall directly by blunt trauma

***Surgical treatment: -***

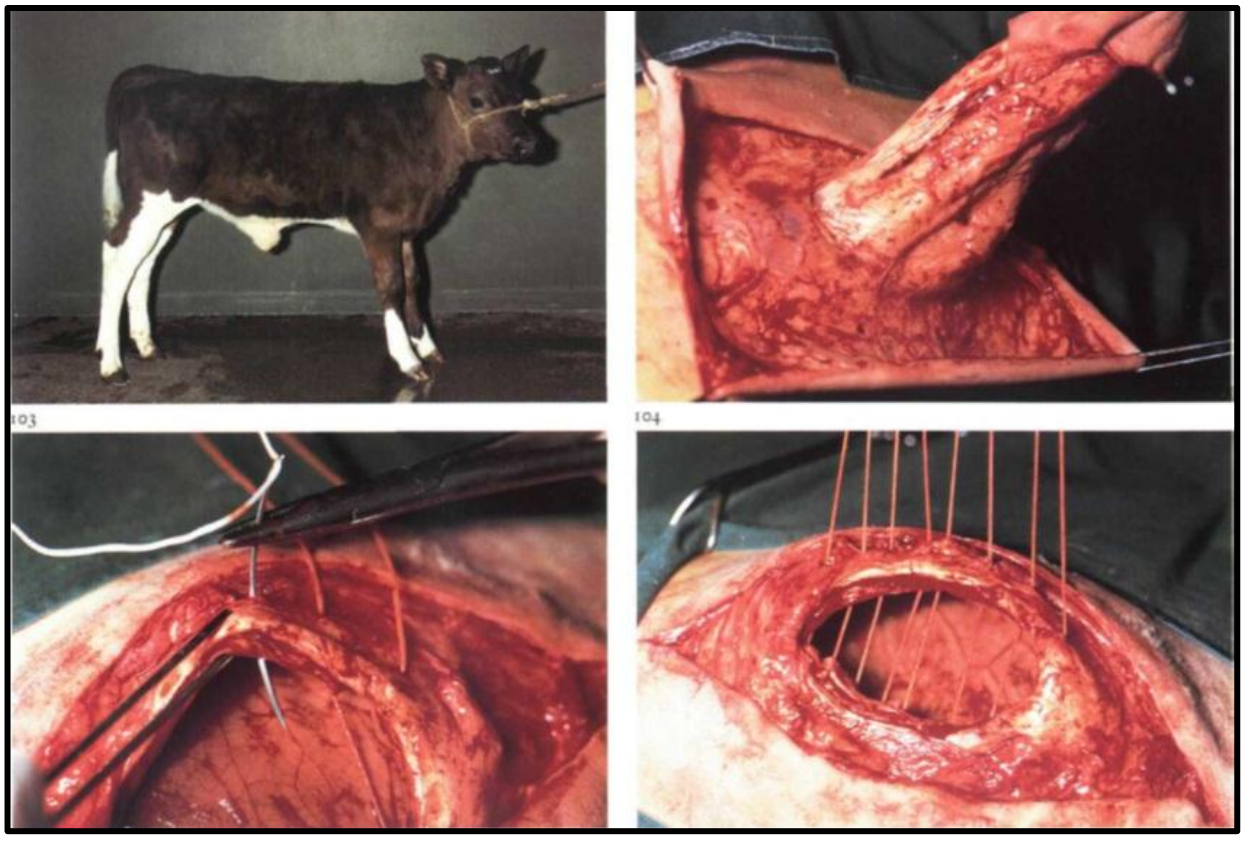
***1-Surgical reduction and suturing of the ring***

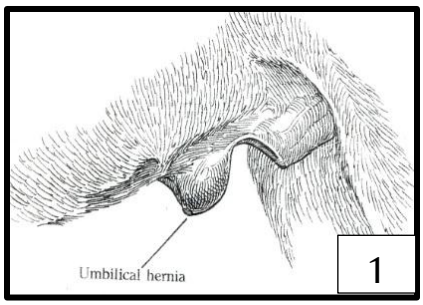
This method is performed via positioning the animal in dorsal recumbency, aseptic preparation of surgical field, application of elliptical incision, retroperitoneal blunt dissection for exposure of the ring, reduction of hernial sac with excision of the elliptical fold of skin, and suturing of the two lips of the ring by non-absorbable suture materials, and then the wound is closed in normal manner. The technique induces much straining on the lips of the hernial ring and abdominal muscles especially in large sized herniae, and the possibility of rupture of either the suture material or the hernial ring is high.

## 2-Surgical reduction and application of mesh: -




This is the most accurate and proper method for closure of the ring and associated with minimal complications. The surgical field is prepared in the same mentioned manner, elliptical incision is made, retroperitoneal blunt dissection is performed for exposure of the ring, and then a sterile mesh of suitable diameter is fixed to the ring retroperitoneal by non-absorbable suture materials, then the wound is closed in normal manner. This technique causes no straining on the abdominal muscles as there will be no need for collecting the two lips together and the muscular defect is filled with the net.




Umbilical hernia
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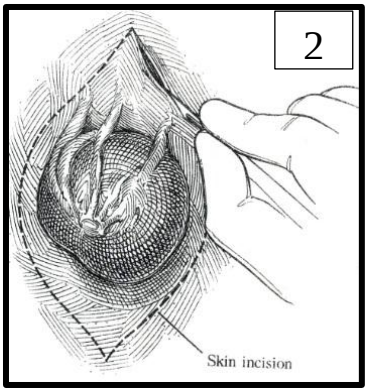
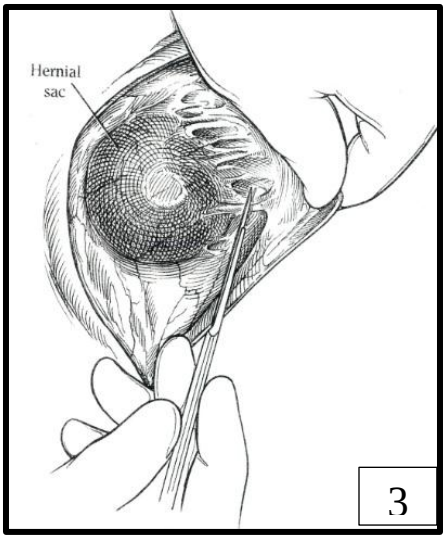
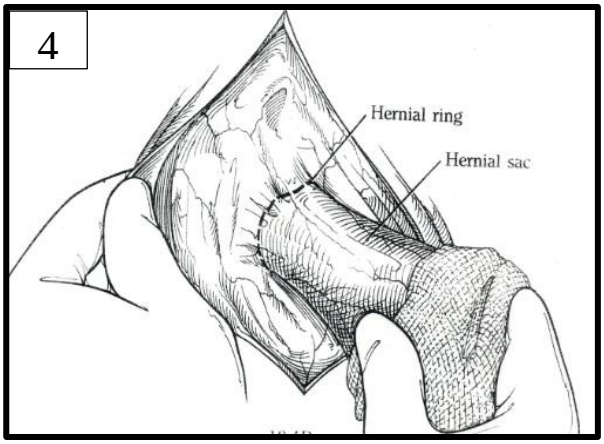

2
Skin incision


Hernial sac
3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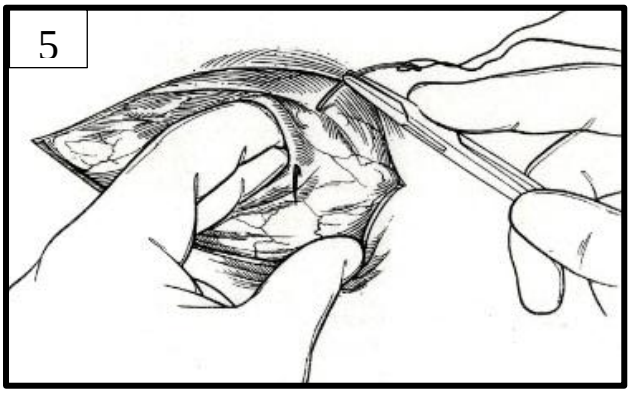
Hernial ring
Hernial sac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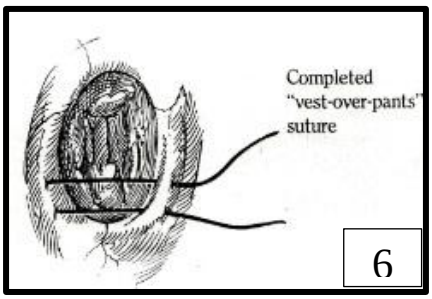
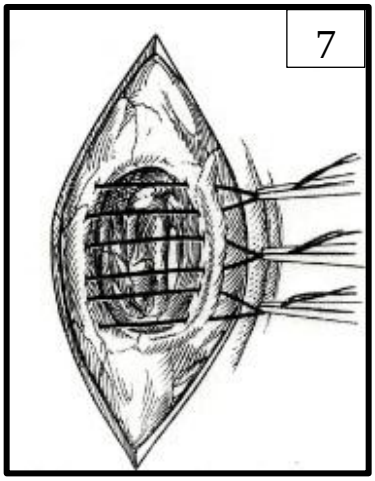

Completed
"vest-over-pants"
suture
6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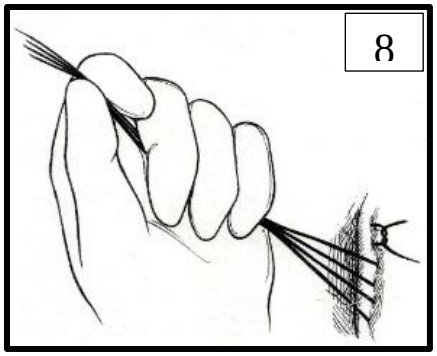
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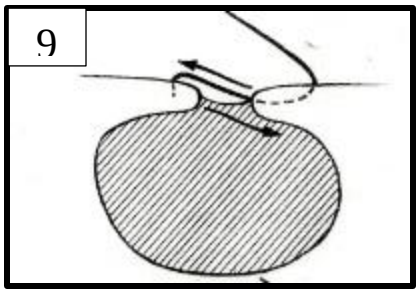
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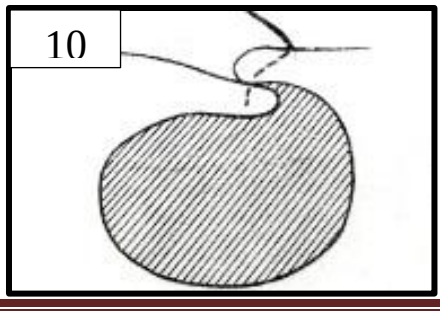
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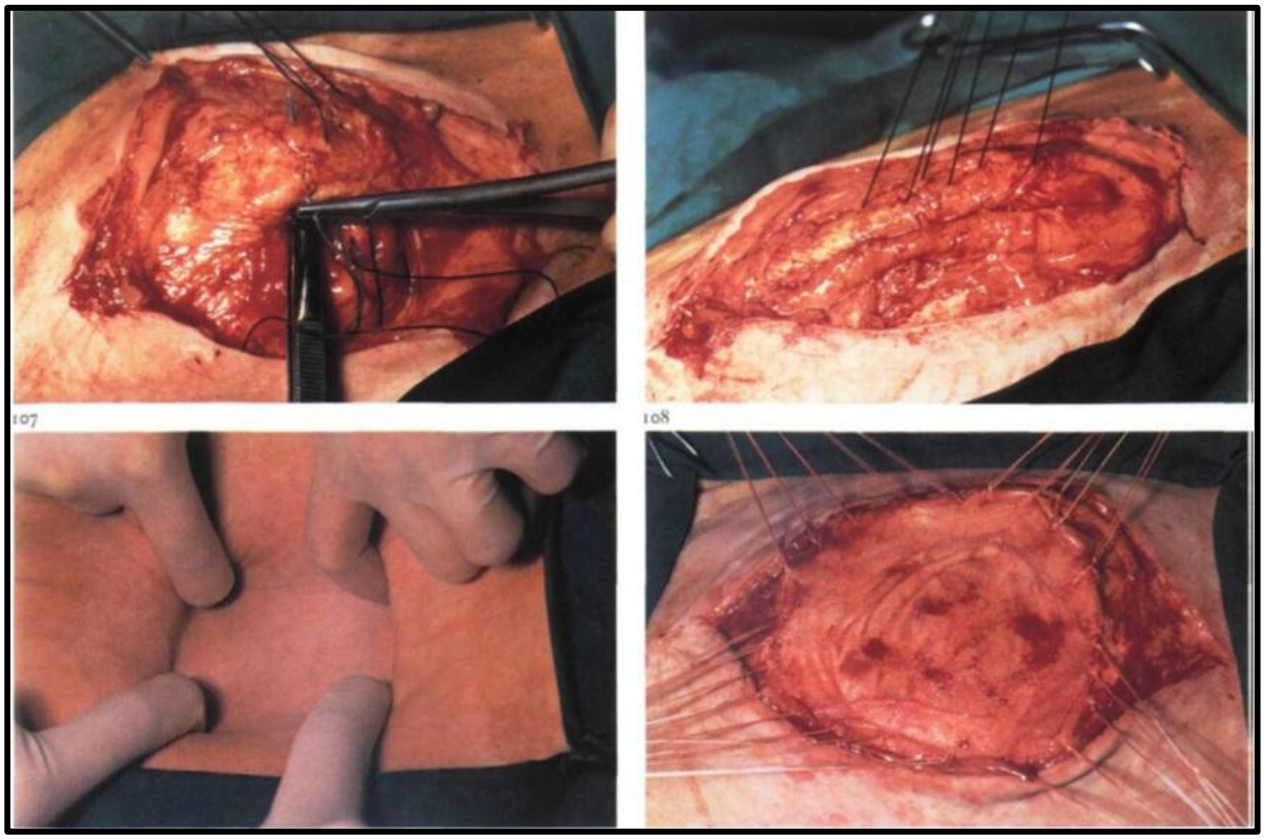

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# Write short note on surgical reduction and suturing of hernial ring

**1-Indications: -**

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**2-Anesthesia: -**

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**3-Technique: -**

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# Write short note on surgical reduction and application of mesh

**1-Indications: -**

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**2-Anesthesia: -**

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**3-Technique: -**

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# TRACHEOSTOMY

Temporary or permanent opening of the trachea to keep the air way patent

***Indications: -***

***A-Temporary tracheostomy: -***

1-Obstruction of the upper respiratory tract as in bilateral epistaxis, tracheal ring fracture or collapse, swelling as a result of snake or insect bites

2-Before operations in the nose or larynx

***B-Permanent tracheostomy: -***

1-Irreversible obstruction of the upper respiratory tract as neoplasm

***Anesthesia and control: -***

1-Either in standing or lateral recumbency

2-Either Sedation with a local infiltration analgesia or general anesthesia is needed

***Site of operation: -***

The ventral midline at the junction between the upper and middle one third of the neck region ($4^{th}$ to $6^{th}$ tracheal ring) is preferred because this area is usually free from harness and also operation in this area give a roomy place for repeating the operation if needed.

***Technique: -***

1-After surgical preparation to the site, the head and neck are extended fully by an assistant to make the trachea prominent.

2-A longitudinal midline skin incision is made through the skin between the bellies of the sternoihyodieus muscles.

3-The tracheal rings are exposed

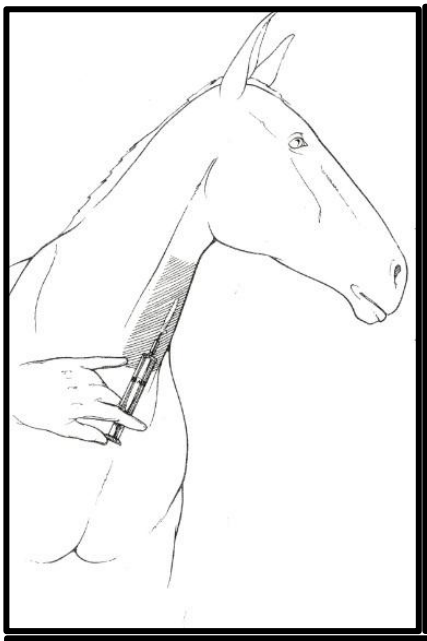
4-In dogs, the incision is extends 3-4 cm just caudal to the cricoids cartilage of the larynex while the animal in dorsal recumbency.

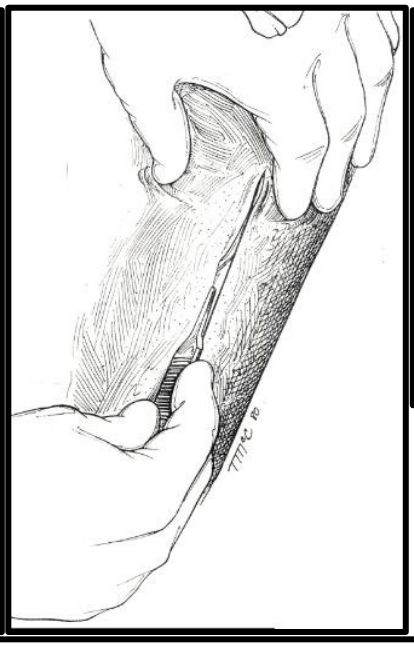
5-For temporary tracheotomy, a stab incision is made through the annular ligament connecting the two adjacent rings and a plastic, rubber or metal tracheotomy tube is introduced in the created place.

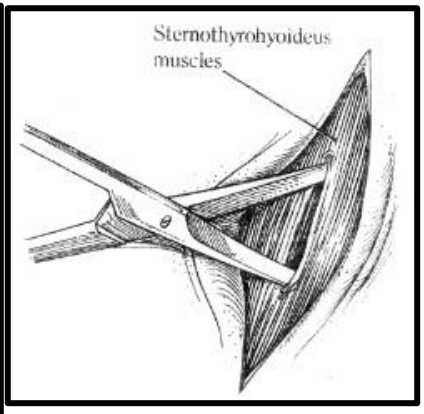
6-For permanent tracheostomy, or when the tracheostomy tube is expected to remain prolonged time, an elliptical piece of cartilage is removed from the cranial and caudal tracheal rings.

7-The piece of cartilage removed should not exceed than half the ring.

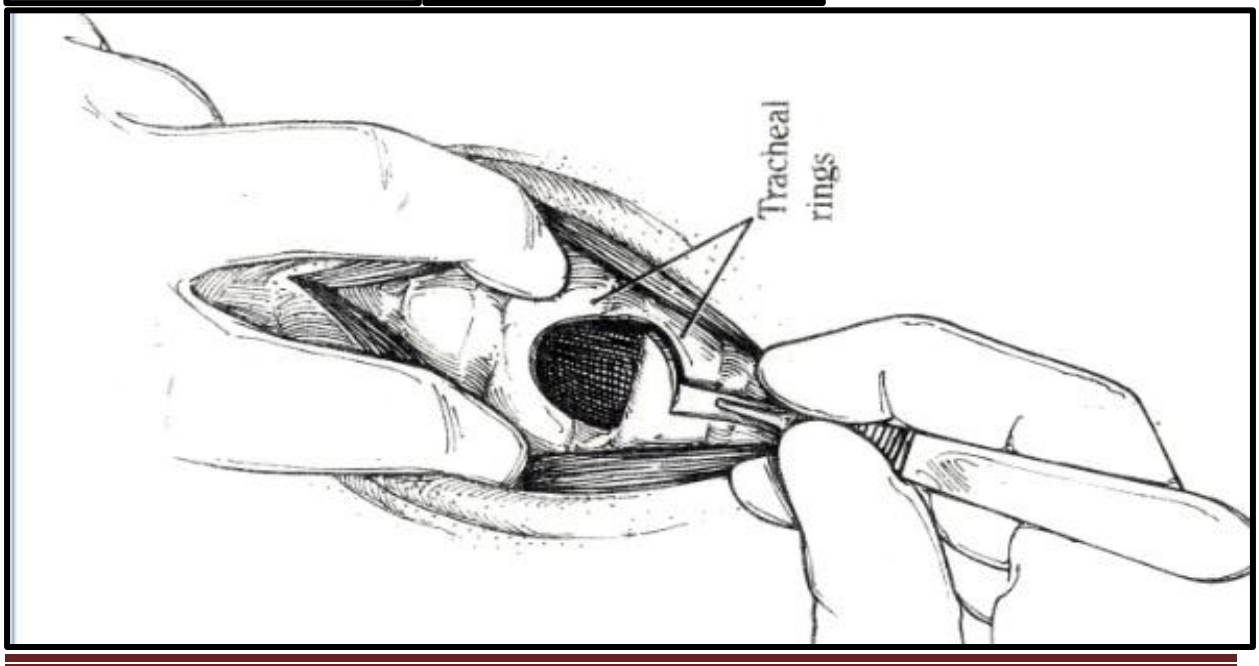
8-Selfretaining metallic tracheostomy tube is introduced through the window in the trachea.

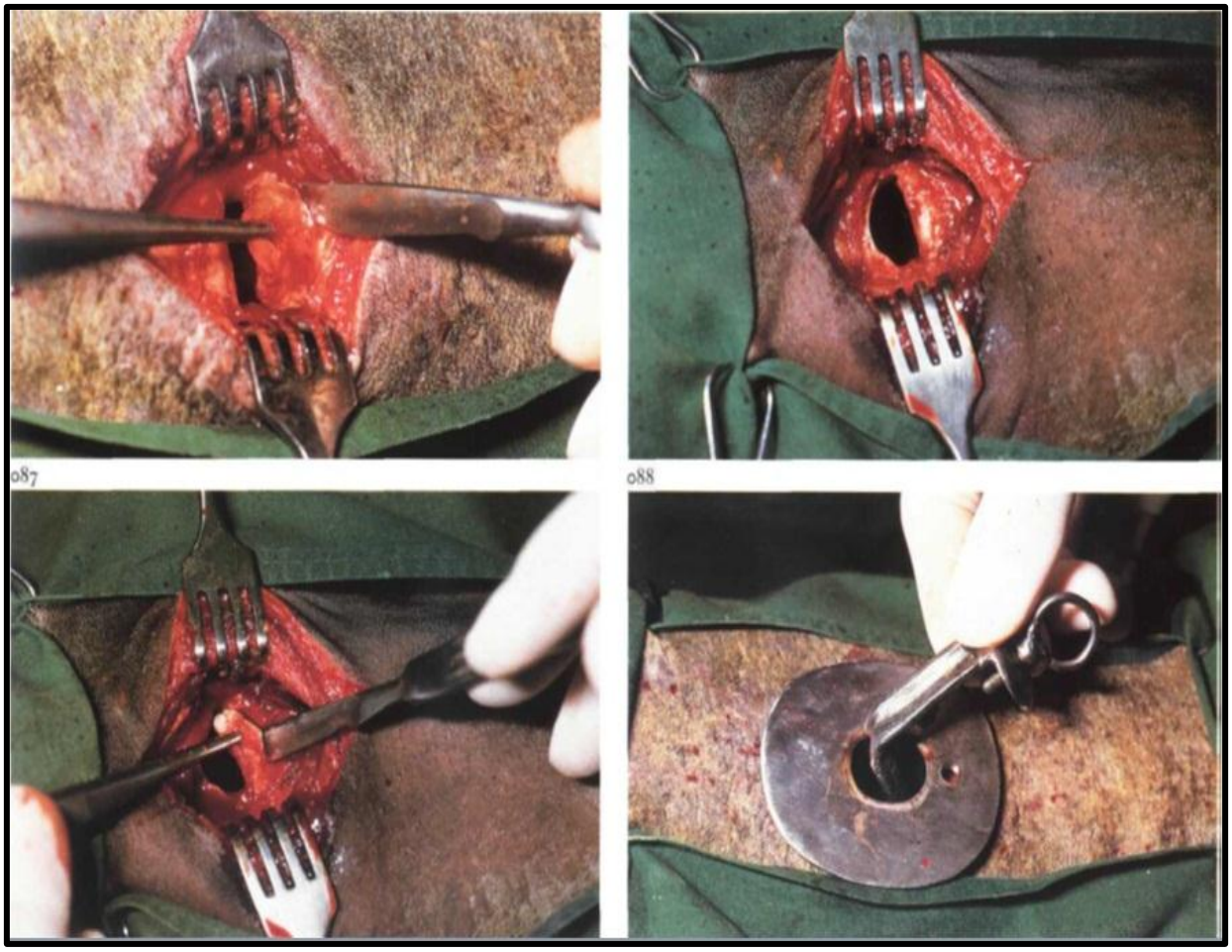







**Tracheostomy**

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# Write short note on temporary tracheostomy

## 1-Indications: -

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## 2-Anesthesia: -

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## 3-Technique: -

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# Write short note on permanent tracheostomy

## 1-Indications: -

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## 2-Anesthesia: -

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## 3-Technique: -

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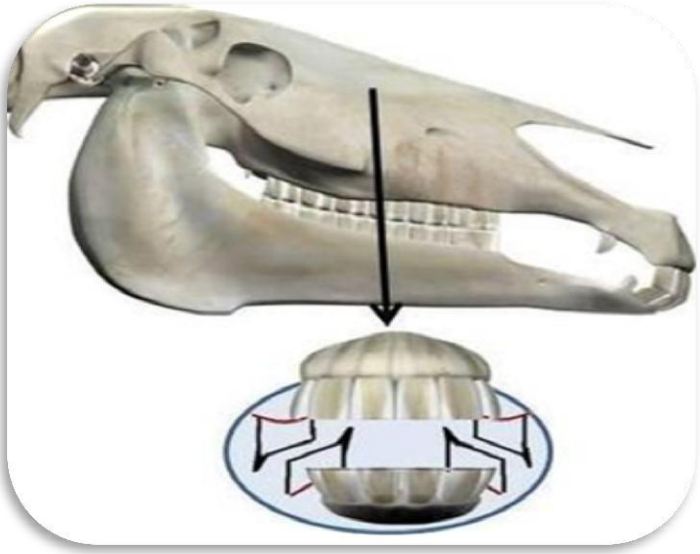
# SHARP ENAMEL POINTS (sharp teeth)



This condition is characterized by formation of a sharp enamel points at the buccal aspect of the maxillary arcade and lingual aspect of mandibular arcade. Sharp enamel points are a common condition in horses and donkeys.

***Causes: -***

1-Anatomically, the lower jaw is 30% narrower than the upper jaw. The maxillary cheek teeth are set more laterally than the mandibular cheek teeth thus the palatal maxillary aspect and buccal mandibular aspect are subjected to more wear

2-Restricted movements of the jaw due to a painful lesion in the mouth, weakness of the masseters and inflammation of the mandibular joints.

3-Type of food and unequal hardness of the teeth

***Clinical signs: -***

1-Presence of sharp enamel points at the buccal aspect of the maxillary arcade and the lingual aspect of the mandibular

2-Wounds and lacerations at the cheek, tongue and gum

3-Difficulties during mastication and quidding of the food

4-Swelling of the cheek due to accumulation of food between the teeth and cheek

5-Bad general condition of the animal and weight loss as a result of anorexia and/or improper mastication followed by progressive emaciation and weakness.

***Treatment: -***

1-Regular rasping of the cheek teeth (floating of teeth) using tooth rasp or tooth float.

2- Touch the wounds with antiseptic solution or Tr. of iodine.

# Write short note on sharp teeth in equine

**1-Causes: -**

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**2-Anesthesia: -**

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**3-Treatment: -**

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**4-After care: -**

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# OBSTRUCTION OF THE ESOPHAGUS

Obstructive esophageal disease, or choke, is frequently occurred in cattle and buffaloes.

***Causes: -***

1-Intra-luminal obstruction by foreign bodies.

2-Extra-luminal obstruction by peri-esophageal abscess, enlarged mediastinal lymph nodes or tumors

***Signs: -***

***1-Signs of complete obstruction***

1-Anorexia and ptyalorrhea (saliva dripping from the mouth because of inability to swallow).

2-The animal keeps the neck stretched and may swing the head from side to side with repeated attemps to swallow.

3-Severe tympany develops soon after complete obstruction

4-The patient remains thirsty and makes attemps to drink water, which often returns back through the nostrils

5-In cervical esophageal obstruction, a swelling at the left side of the neck can be seen and palpated.

***2-Signs of incomplete obstruction***

1-Anorexia and dysphagia may be observed

2-Bloat may occur repeatedly and resolved spontaneously or after passage of a stomach tube.

***Predilection seats of esophageal obstruction: -***

1-At the pharyngeal entrance, as the opening of the esophagus is bigger than the lumen

2-At the thoracic entrance.

3-At the level of the aortic arch, as the aorta and trachea limit esophageal distension.

4-At the cardia, where sphincter tone diminishes the lumen.

***Diagnosis: -***

1-Case history

2-Clinical signs

3-Palpation of the foreign body (in cervical obstruction)

4-Introduction of stomach tube

5-Plain and contrast radiography

***Differential diagnosis: -***

1-Rabies must always be considered when dysphagia is present and appropriate precautions were taken.

2-Tetanus may be similar to esophageal obstruction as a result of presence of bloat dysphagia and drooling of saliva

3-Ingesion of several poisonous plants may cause extensive salivatin, drooling and bloat

4-Pharyngitis

***Treatment: -***

It must be born in mind that complete obstruction of the esophagus in ruminant prevents eructation. This results in sever bloat and a cannula should introduce immediately into the rumen to provide continuous escape of gases.

Treatment is divided into three categories; medical treatment, manipulative treatment, and surgical traetment.

**1-Medical treatment**

1-Drugs used to reduce muscular spasm as tranquilizer

2-Fluid therapy to compensate fluid losses. Sign of acidosis should be treated by addition of sodium bicarbonate to the infusion fluid.

**2-Manipulative treatment**

1-It might be possible to clear the cervical obstruction by placing the thumb or fingers distal to the palpated foreign body and gradually forcing it upward until it reaches the pharynx and then can be removed by hand from the pharynx.

2-A stomach tube can be used to gently push the obstructed forgein body into the rumen. However, such a method may be of value only if the obsructed foreign body is a round smooth object. Moreover, there is also danger of shifting the obstruction from the cervical to the thoracic esophagus.

3-The foreign body can be extracted by means of foreign body extractor under effect of tranquilizer

## 3-Surgical treatment

### *A-Surgical exposure of cervical esophagus without esophagotomy*

1-Ventrolateral exposure occurs between sternocephalic muscle and trachea in the upper two thirds of the neck in large ruminant and equine. In sheep and goat the exposure of the esophagus is performed by ventrolateral exposure technique along the whole length of the neck

2-Lateral exposure occurs between the jagular vein and brachiocephalic muscle or between jagular vein and sternocephalic muscle in the lower one third of the neck in large ruminant and equine.

3-The exposure of the cervical esophagus is performed by the ventral exposure technique along the whole length of the neck between the two sternohyoid muscles.

After exposure of the esophagus, attemps are made to push the foreign body by direct manipulation, towards the pharynx (external taxis).

### *B-Esophagotomy*

The stomach tube is placed to the level of the obstruction prior to anesthesia. The neck is prepared for aseptic surgery. After approaching the esophagus, the affected area is isolated from the surgical field using moist sponges. The left carotid sheath, containing the carotid artery and vagus and recurrent laryngeal nerves, should be retracted laterally. Care should be taken to preserve the small vessels that supply the esophagus. The esophagus is incised, and the foreign body is removed. The incision should be made in healthy esophageal tissue if possible. Where the incision is made into the esophagus depends on the mobility of the foreign body within the lumen and the amount of swelling in and compromise to the esophageal wall.

After removal of the foreign body, if the esophagus has a normal appearance in the area of the incision, closure should be completed. Primary esophageal closure involves a 2-layer technique. The mucosa and submucosa are closed together in either a simple continuous or simple interrupted pattern. A nonabsorbable (e.g.,

polypropylene or nylon) or long lasting absorbable (e.g., polyglactin 910, polydioxanone, or polyglyconate) suture material is used.

It is recommended the knots be tied within the esophageal lumen to prevent contamination of the wound by ingesta migrating along suture tracts. The muscular layer can be closed by using either an absorbable or non-absorbable non-capillary suture with a simple interrupted or mattress pattern.

A suction drain is placed beside the esophagus and exits ventral to the skin incision through a small stab wound. This drain is maintained under constant suction for 48 hours to remove serum and blood from the surgical site and to provide early detection of salivary leakage.

Postoperatively, food and water are withheld for 48 hours after surgery, and maintenance intravenous fluid therapy is instituted. Most esophagotomy incisions heal by first intention, and the intra-luminal suture will slough into the lumen within 60 days. If the esophageal wall is compromised, it should be allowed to heal by second intention with daily wound care.

# How to deal with pregnant cow with signs of choke

**1- Anesthesia: -**

**2-Surgical interference: -**

## What are the complications of surgical interference?

## What are the complications of manipulative interference?

# RUMENOTOMY OPERATION

***Indications: -***

It is the treatment of choice for TRP although it is indicated for many other conditions affecting ruminant stomach.

1-Frothy tympany

2-Ruminal indigestion (acid indigestion and alkaline indigestion)

3-Primary ruminal impaction

4-Ingestion of toxic plants

5-For diagnosis and differential diagnosis (exploratory laparotomy and rumenotomy)

Rumenotomy should be done early in the course of disease for best results especially in valuable animals

***Anesthesia: -***

1-Paravertebral analgesia

2-Local infiltration analgesia in the form of linear infiltration or inverted L

***Preoperative preparation: -***

1-Clipping and shaving of hair of the left flank region

2-Washing of the site of operation by warm water and soft soap

3-Application of antiseptic agent such as Tr. of iodine and alcohol

***Techniques: -***

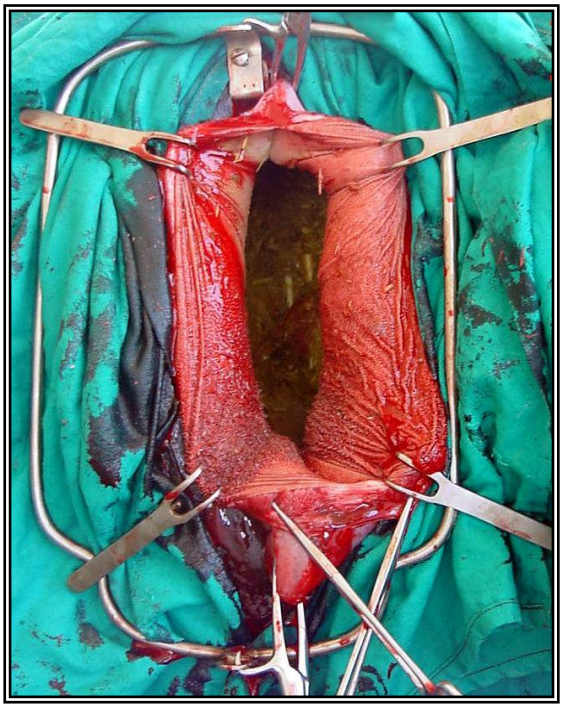
**1-Weingart's technique**

1-Left flank laparotomy, the incision is about 20-25cm in length and parallel to and caudal to the last rib by 5cm and below the transverse processes of the lumbar vertebrae by 5cm. The incision passes through; skin, subcutaneous tissue, external oblique abdominal m., internal oblique abdominlal m., transverse abdominal m. and parietal layer of peritoneum.

2-The Weingart's ruminal frame is fixed at the upper commissure of the wound with screw.

3-A ruminal fold is grasped and fixed to the Weingart's frame by two Weingart's forceps.

4-A sterile towel is trapped between the exteriorized ruminal fold and the abdominal incision to avoid leakage of ruminal contents into the peritoneal cavity.



5-The right hand is introduced into the abdominal cavity to examine rumen, reticulum, spleen, left lobe of liver, kidneys, bladder, intestine and uterus.

6-The rumen is punctured by scalpel and the wound is widened by a scissors then the lips of the ruminal wound is fixed to the Weingart's frame by 4 or 6 Weingart's hooks.

7-Part of ruminal contents is evacuated and ruminal foreign bodies, if present, are removed then the hand is directed forwards, downwards and somewhat medially to reach the reticulum through the wide reticular orifice. Reticular foreign bodies either floating or penetrating are removed then the reticular cells are examined carefully for presence of any penetrating foreign body. Adhesions are detected and perireticular abscesses are located and drained to outside through a needle and polyethylene tube if they are large enough and soft, otherwise they are left without any surgical interference.

8-The cardia and the reticulo-omasal orifices are examined.

9-The hooks are removed and the ruminal wound is cleaned then sutured by double rows of inverting sutures using chromic gut No. 2 or 3.

10-The parietal peritoneum and transverse abdominal m. are sutured with simple continuous suture using chromic gut No. 2 or 3.

11-The internal and external oblique abdominal muscles are sutured with simple continuous pattern using absorbable suture material.

12-The subcutaneous tissue is sutured also with absorbable suture material in a simple continuous pattern.

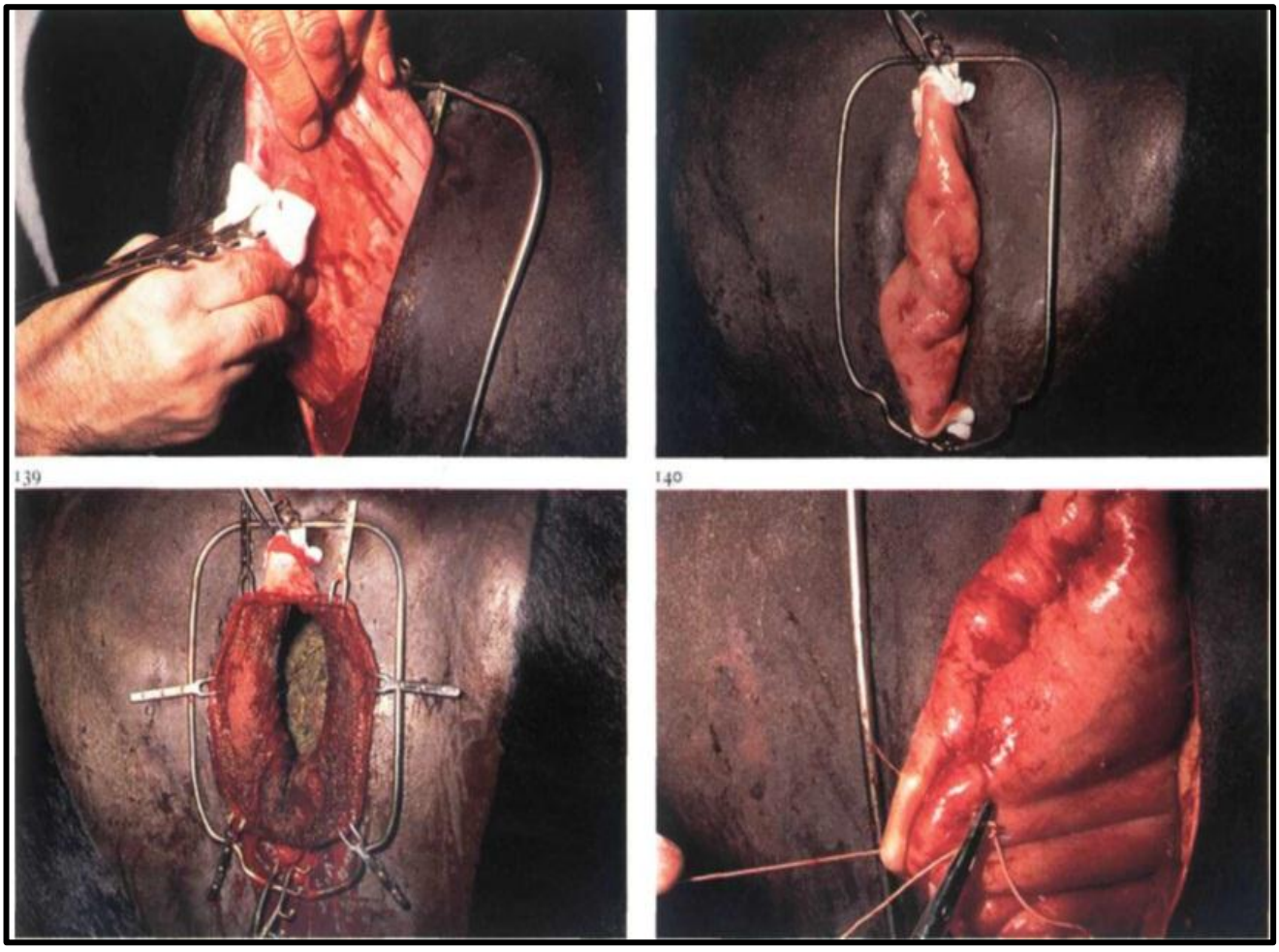
13-The skin wound is sutured with simple interrupted, interrupted mattress or continuous interlocked suture using non absorbable suture material and a sharp needle.

14-A thin layer of cotton is applied to the skin wound

15-Sutures are removed 10 days post-operatively

## 2-Goetze's technique

This technique can be performed without the use of special set for fixation of ruminal fold and edges. After laparotomy, the ruminal fold is exteriorized and sutured all around with the parietal layer of peritoneum to close the peritoneal cavity. The rumen is then incised and the edges of the ruminal wound are sutured to the skin. In addition, a special plastic manchette is applied to the seat of operation to reduce contamination of wound edges. After completion of operation, the manchette and skin sutures to the ruminal edges are removed, while the suture of parietal peritoneum to the ruminal fold is left.



# How to deal with a buffalo suffers from impaction

## 1- Anesthesia: -

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## 2-Surgical interference: -

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## What are the indications of rumenotomy?

## What are the complications of rumenotomy?

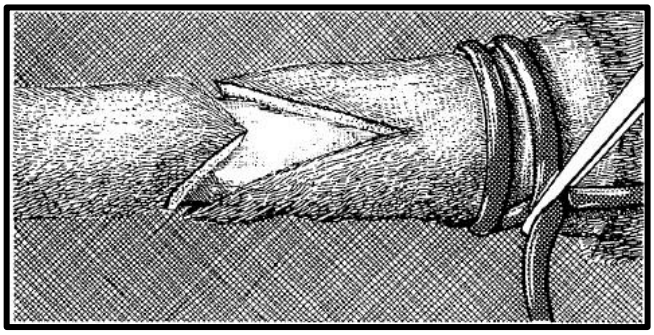
# DOCKIING

***Indications: -***

1-In curable legion of the tail

2-Cosmetic in dogs

3-Fattening in sheep



***Anesthesia: -***

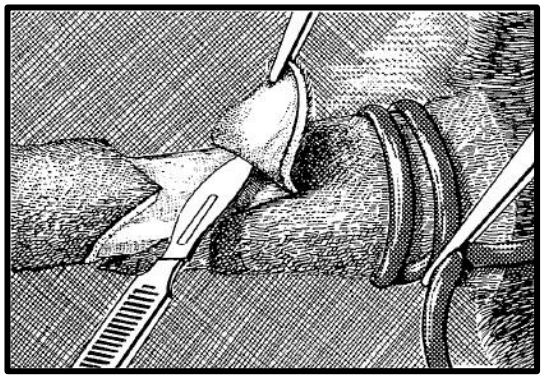
Sedation or narcosis

Posterior epidural analgesia

Ring block analgesia

***Technique: -***

Application of tourniquet



Induction of V shape incision on the dorsal aspect of the tail

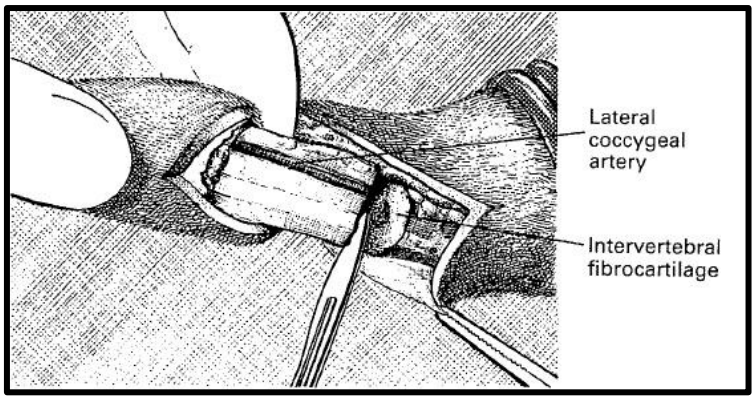
Induction of V shape incision on the ventral aspect of the tail

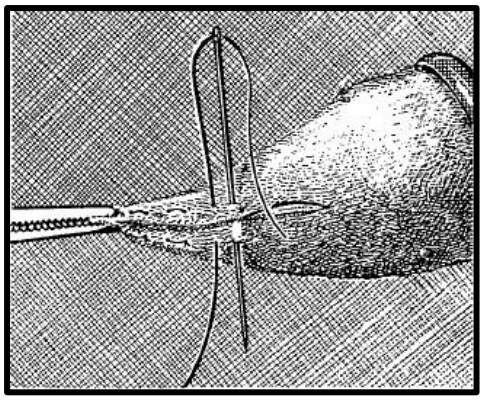
Dissection of both V shapes

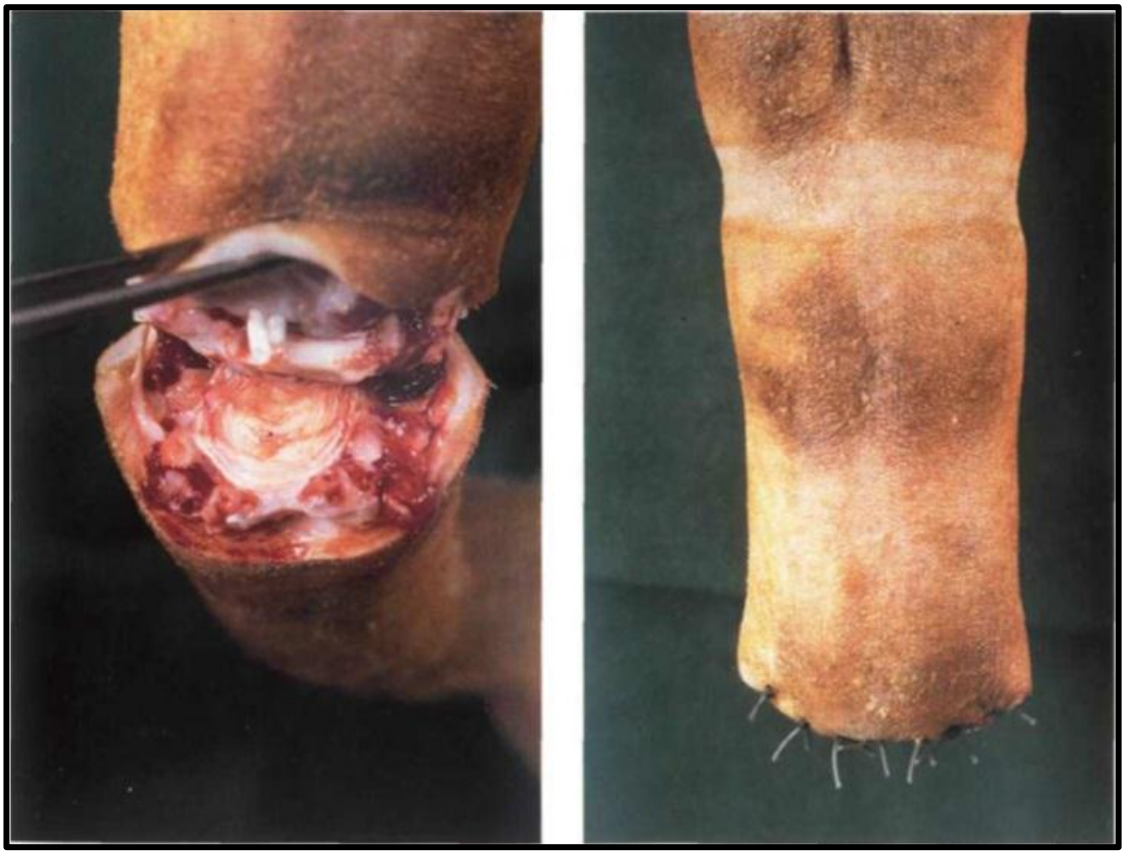
Excision of the distal portion

Purse string suture of the stump

Suturing of the dorsal V shape to the ventral one





# Write short note on docking in equine

**1-Indication: -**

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**2-Anesthesia: -**

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**3- Treatment: -**

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**4-After care: -**

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# Ophthalmology

## I-Ocular Pharmacology & Therapeutics

### Factors Affecting Selection of the Drug

1-The penetrating power of the drug to the intact corneal epithelium and blood aqueous barrier

2-The target site of drug within the eye, cornea, anterior chamber, vitreous chamber etc…

3-The stability of the drug and durability of its action

### Factors Affecting Choice of Rout of Administration

1-The drug character

2-Understanding of the ocular disease and knowledge of ocular barriers

It should be kept in mind that the route of administration of the ophthalmic drug has the same importance as the choice of the drug itself. Generally speaking, diseases of the conjunctiva, superficial cornea and eyelids may be corrected with topical or subconjunctival application, while diseases of the uveal system, anterior and posterior segments, orbit and lacrimal glands may be managed by topical, subconjunctival, retro-bulbar, and systemic administrations. Ocular drugs usually administered topically and directly into the eye, and topical means application of the drug in a direct contact with the surface of the cornea and conjunctiva.

### Factors Affecting Penetration Power Of The Drug

## I-DRUG CHARACTERISTICS

### 1-Chemical Characters of the Drug

The drug penetrates the cornea by differential solubility not by simple diffusion. Certain drugs have high power to penetrate the cornea while others poorly penetrate, and the rest are unable to penetrate the cornea.

### 2-Size of the Molecule

The size of the molecule has inverse relationship to the penetration power (the small sized molecules penetrate the cornea faster and more efficient than larger ones).

## 3-Drug Concentration

Drug concentration has direct relationship with penetration power, but this concentration should be within the limit that can't produce eye irritation by its high osmotic pressure.

## II-VEHECLE OF THE DRUG

According to the vehicle of the drug, medical preparations are presented as one of the following

## 1-Drops

It is the least irritating form with short topical effect duration; accordingly it requires higher frequency of medication (most of eye drops administered every 0.5-2 hours). This frequent medication sometimes is impossible with viscous animals or those of bad tempers, by then other forms of medication are preferred like ointments. The number of drops applied to the eye shouldn't be so high, as this high amount will stimulate the lacrimation and predisposes to rapid elimination of the drug from the eye, accordingly the drops should be administered as 1-2 drops every minute (2-3 times each medication) and this will reduce lacrimal stimulation and drug elimination.

## 2-Ointments

They cause some irritation but they have longer duration than drops. Usually they are used at night only to reduce the unease feeling of patient.

## 3-Powders

They are too much irritating, as the particles of the powder cause friction to the highly enervated cornea.

Types of vehicles for drops and ointments are aqueous methylcellulose, hydroxyl ethyl cellulose, polyvinyl alcohol, and artificial mucin.

After topical application, the drug may pass away with the tears to outside or to the nasolacrimal duct, or penetrate the cornea and/or conjunctiva.

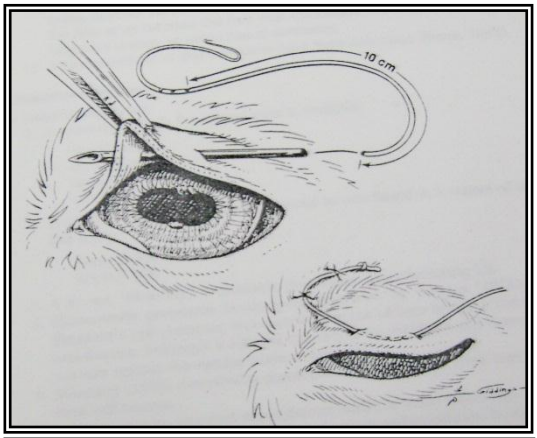
# ROUTS OF ADMINISTRATION

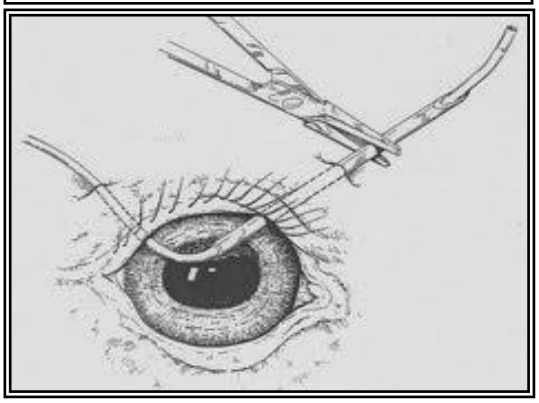
## I-TOPICAL ADMINISTRATION OF DRUG

### 1-Periodic Administration

The medication is applied to the lower conjunctival cul-de-sac by applying thumb pressure at the base of the lower eyelid for rolling it out, 1-2 drops are applied, the animal is left for 1 min, then another 1-2 drops are applied. This insures absence of lacrimal stimulation and flushing of the drug.

### 2-Subpalpebral Administration (Sub-Palpebral Lavage)



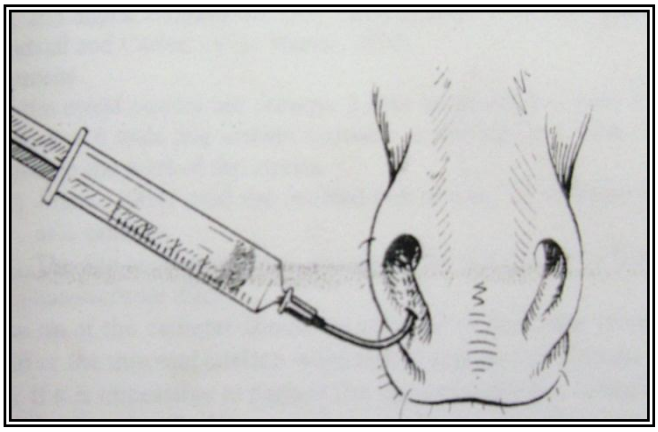
Many horses with ocular injuries or diseases have painful eyes and resist application of topical medication. Fractious or unbroken horses and foals are particularly difficult to handle. Often owners are unable to apply topical medication to the eye of a horse because of the strong orbicularis muscle and the difficulty of simultaneously applying restraint and administering medication. Consequently, ocular lavage systems have been described to facilitate frequent intermittent or continuous administration of topical ophthalmic medication.

***Technique: -***

Sedate the patient, induce auriculopalpebral nerve block, shave the hair from the upper eyelid at the orbital rim and use povidone iodine soap to cleanse, inject lidocaine or similar local anesthetic subcutaneously in the shaved region, place

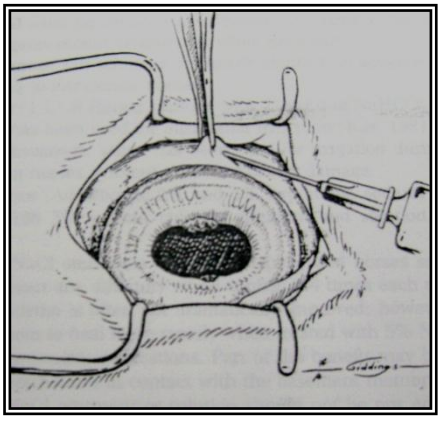
ophthalmic proparacaine or similar topical anesthetic in the eye, with gloved hand insert the needle (trochar) under the upper eyelid, then through the palpebral conjunctiva and eyelid skin at a point near the orbital rim and about midway along the length of the upper eyelid, insert the lavage tubing through the needle (trochar), going from the inner (conjunctival) to the outer (skin) side, pull the needle (trochar) and tubing through the skin and then remove the needle by pulling it along the tubing and off the end, apply the multiple injection port and tape the tube and port to a tongue depressor to make the unit rigid, then tape this to the mane, for added security, a piece of tape can be applied to the tubing flush with the point at which the tubing exits the skin in order to prevent the tubing sliding inward.

## 3-Nasolacrimal Lavage System



It is a method, through which the drug is periodically injected retrograde through the nasal punctum by a tube and a syringe, or a stent tube is placed temporarily into the nasolacrimal duct (NLD) through the nasal punctum and the drug is periodically injected through this tube by a syringe. This method is suitable for treatment of inflammation and obstruction of the NLD or topical administration of drug to the corneo-conjunctival lesions

## II-SUBCONJUNCTIVAL ADMINISTRATION



This procedure is indicated when sustained, high concentrations of medication are needed such as with stubborn corneal disease (e.g., pannus), anterior uveitis, or scleritis. Other disadvantages apart from problems associated with the medication itself include the risk of introduction of infection and the temporary pain associated with the injection. However,

these usually are not significant.

***Technique: -***

Most patients can be injected without general anesthesia or sedation. A topical anesthetic is necessary. You should use appropriate restraint for the species in question (on side for dogs and cats, a twitch and auriculopalpebral nerve block for horses, nose tongs for cattle). The injection is given under the bulbar conjunctiva. It is important that the injection be placed as close to the lesion site as practical because this increases effectiveness. For example, in pannus the lesion usually is most prominent ventro-laterally and the injection should be directed there. Raise the upper eyelid. A 25 or 27 gauge needle is used. The needle (with syringe attached) should be directed tangential to the globe so that you will not penetrate the globe. The syringe should be held so that you can make the injection the moment you are under the conjunctiva; trying to change the position of your hand at this time may cause the needle to come out. You also should be resting the hand holding the syringe against the patient's head (or your other hand which is against the patient's head) so that if the head moves, your hand and syringe move together with the head rather than in opposite directions. A quick thrust is used to enter the conjunctiva and the injection is made; you must use a quick thrust because of the tendency for the globe to rotate away from you. Inject up to ½ ml in small animals and 1 ml in large animals. The therapeutic benefit from this type of injection lasts from several hours to several weeks depending on the agent used.

***Advantages: -***

1-Bypasseing the lipoidal epithelial barriers of the cornea and conjunctiva

2-Achieveing high intra-ocular drug level in a short time

3-Achieveing excellent intra-ocular absorption of the drug

***Disadvantages: -***

Inflammation, necrosis, hemorrhage and abscess formation at the seat of injection

Injection of the drugs sub-conjunctively at the base of the third eyelid is used but penetration of the globe and intra-ocular injections of the drug by mistake are serious complications.

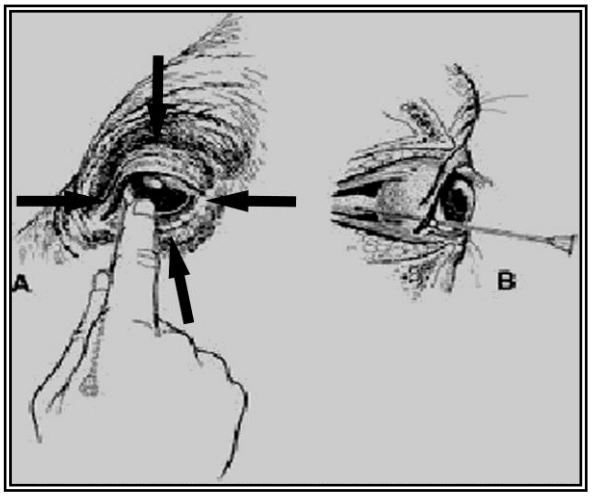
## III-INTRAVITREAL INJECTION

The anatomical barriers of ocular tissues and the characteristics of the vitreous body are responsible for poor penetration of drugs into the vitreous humour. Direct injection into the vitreous is a method for achieving high concentration of the drug in vitreous body. The technique can be performed by using short 22-25 gauges needle with 1 ml syringe that is inserted at the ora lineata posterior to limbus and directed towards the posterior pole of the eye.

***Indication: -***

Diffuse posterior segment inflammatory disease

## IV-RETROBULBAR INJECTION




Local analgesic solutions are often injected around the muscles behind the globe for exenterating the orbital cavity in cattle. A long needle is used for injection of the anesthetic solution at four sites adjacent to the globe at 3, 6, 9 & 12 O'clock, while in equine the retro-bulbar injection is performed through the supra-orbital fossa. Antibiotics are sometimes injected by this route for intra-ocular infections, or retro-bulbar cellulites or abscess, as the sclera does not act as a barrier for drug penetration as does the cornea.

## V-INTRAOCULAR INJECTION (INTRACAMERAL)

Injection of the drug into the anterior chamber through the limbus is indicated during surgery (to control hemorrhage or pupil size) and in the management of intra-ocular inflammatory disease. The procedure is performed under aseptic condition. During intra-ocular surgery sterile saline can be used to irrigate blood and fibrin out the eye.

## VI-PARENTERAL ADMINISTRATION (SYSTEMIC)

Oral, intravenous, and intramuscular routes are used for treatment diseases of the posterior and anterior segment of the globe, orbit, sclera and eyelids. However, the used drugs should be able to penetrate the blood aqueous barrier

# OPHTHALMIC THERAPEUTIC AGENTS

## I-CLEANSING SOLUTIONS, EYE WASHES-COLLYRIA

The use of tap water as eyewash is not recommended, and the eyewash is used for flushing the conjunctival sac and removal of ocular discharge, foreign bodies and irritants. Cleansing solution should be used worm or at room temperature. Application is accomplished by eyedropper, soft-rubber bulb syringe or plastic irrigating bottle. These fluids include

1-Normal saline solution 2-B.S.S. (Balanced salt solution)

3-Boric acid solution 2%

## II-ASTRINGENTS

Astringents are locally acting protein precipitants, and they are occasionally used in various forms of conjunctivitis.

### 1-Zinc Sulfate

Zinc sulfate is the inorganic compound with the formula $ZnSO_4$, it can be used as solution (0.2 - 0.25%) and ointment (0.5%) and it has mild astringent and antiseptic properties. It is used for mild non-specific conjunctivitis and is often combined with vasoconstrictor and antihistaminic drugs.

### 2-Silver Nitrate

Silver nitrate solution (1%) is brushed to the everted eyelids and conjunctiva in various forms of conjunctivitis, as a result of its ability to kill microorganisms. It is very irritating drug and its use in veterinary ophthalmology is completely outmoded. It can be sued as stick for touching corneal ulcers for cauterization and stimulation of sloughing of necrotic tissues.

## 3-Copper Sulfate

It is used for the removal of lymphoid follicles in chronic follicular conjunctivitis, and mainly used in crystal form. The palpebral and bulbar surfaces of the nictitating membrane may be rubbed lightly with the crystal and the eye immediately flooded with normal saline solution.

## 4-YELLOW MERCURIC OXIDE (Golden Eye Ointment)

This is an outmoded agent that was used for its antiseptic properties. It is employed in an ointment (1-3%) and useful for blepharitis, chronic conjunctivitis and superficial punctate keratitis.

# III-CAUTERIZING AGENTS

Cauterizing substances are those substances used to destroy tissue for medical reasons, these cauterants are severe protein-precipitating agents that cause tissue destruction and are used to remove necrotic tissues and debris.

## 1-Carbolic Acid (Phenol)

It is used safely used for cauterization of corneal ulcer and producing corneal sloughs as the corneal protein is quickly precipitated by the acid and in turn acts as a barrier for further penetration of acid into deeper layers of the cornea and destruction of these deeper layers.

## 2-Tincture Iodine

Iodine is a milder cautrant than phenol, used for cauterization of corneal ulcers. Tincture of iodine (3-7%) may be used for treatment of superficial corneal erosion, however it had been replaced by surgical superficial keratectomy in dogs.

## 3-Trichloroacetic Acid

Trichloroacetic acid 25% solution is a powerful cauterizing substance used for cauterization of corneal ulcer and fistulae

## 4-Silver Nitrate Sticks

It is a dangerous cauterizing agent and it must be neutralized, after touching of the cornea, by sodium chloride solution to precipitate the silver as silver chloride, to avoid further reaction with the cornea and irreversible damage.

# IV-MYDRIATICS AND CYCLOPLEGICS

## Mydriatics

They are agents that produce dilatation of the pupil by induction of paralysis of circular muscle without affecting radiating muscle or stimulate contraction of radiating muscle, with resultant increase in the size of pupil.

## Cyloplegics

They are agents that cause paralysis of the ciliary body with resulting dilatation of the pupil, this paralysis of ciliary body and its muscles, relieve pain of the eye induced by spasm of ciliary muscles. Thus cycloplegics act as mydriatics but a mydriatic does not necessarily cause cycloplegia.

## 1-Parasympatholytic Drugs (Anticholinergic Drugs)

These drugs produce dilatation of the pupil and cycloplegia

## A-Atropine

Atropine sulfate, solution or ointment, is one of the most important mydriatic cycloplegic in veterinary ophthalmology. Atropine is not frequently used as a mydriatic for examination because its action lasts for more than 24 hours. Moreover, it is contraindicated in breeds susceptible to glaucoma, in cases of lens luxation, in animals affected with keratitis sicca. Moreover, its use in high dose in equine may lead to absorption and systemic reaction like paralysis of GIT, or blurred vision and its associating bad temper.

***Indications: -***

1-Ophthalmoscopic examination, to view the fundus of the eye

2-Iritis, cyclitis or anterior uveitis, to relieve painful spasm by relaxing ciliary muscle

3-Deep keratitis and corneal ulceration, as mydriasis may lower IOP and prevent rupture of the ulcer

## B-Tropicamide (1% Solution)

It is a fast acting drug, of short duration, used to induce mydriasis for intraocular ophthalmoscopy. A maximum mydriasis is obtained within 20-30 minutes and the pupil will return to normal within several hours.

## C-Scopolamine (0.3-0.5%)

Sometimes it is used before intra-ocular surgery.

## 2-SYMPATHATIC DRUGS

The common drugs in this group are adrenaline and phenylephrine. They do not cause cycloplegia and their effect is upon the dilator muscle of iris.

## A-Adrenaline (Epinephrine)

***Indications: -***

1-Break down of recent synechia

2-Vasoconstriction for control of hemorrhage in the eye originated from the iris, or blood vessels of the conjunctive or sclera, as it stimulates contraction of vascular smooth muscle, resulting in vasoconstriction.

3-Reduction of the process of drugs absorption

## B-Phenylephrine

It is used as mydriatic in 10% solution for ophthalmoscopy and in the treatment of minor allergic and inflammatory conjunctival disorders

## V-MIOTICS

Miotics are drugs that constrict the pupil. They may be used in the treatment of glaucoma or after a mydriatic examination. Miotics are either parasympathomimetic (cholinergic-stimulating) drugs which have a direct muscarinic action, such as pilocarpine and carbachol, or anticholinesterase drugs which block the effect of acetylcholinesterase thus letting

acetylcholine produce its effect, such as physostigmine, neostigmine, echothiophate and demecarium. There are also some miotics which act by blocking α-or β-adrenergic receptors. For example, dapiprazole and thymoxamine block the α-adrenergic receptors and propranolol blocks the β-adrenergic receptors.

## 1-Direct Acting Miotics

Cholinergic drugs which stimulate the effect of acetylcholine as pilocarpine, acetylcholine and carbachol.

## 2-Indirect Acting Miotics

Anticholinesterases drugs, which prevent the hydrolysis of acetylcholine by the enzyme cholinesterase, they include phospholine iodide, fluoropryl, humorsol and eserine.

***Indications: -***

1-Reduction of IOP in case of glaucoma by their topical instillation leading to increased outflow of aqueous

2-Stimulate secretory glands (lacrimator) in case of keratoconjunctivitis sicca

3-Induction of miosis after application of mydriasis

# VI-LOCAL ANESTHETICS OR ANALGESICS

A number of diagnostic and surgical procedures can be performed in veterinary ophthalmology under the effect of local anesthesia. Instillation of topical anesthetic is used for minor diagnostic and surgical processes that require superficial manipulation of the cornea and conjunctiva such as tonometry, gonioscopy, foreign body removal, suture removal, conjunctival follicles removal, conjunctival scraping, and corneal ulcer cauterization. More detailed surgical procedures such as third eyelid flap, conjunctival flap, repair of eyelid laceration and removal of eyelid neoplasms can be achieved with nerve block and local tissue infiltration. Tranquilization may be essential to facilitate instillation of topical anesthetics, nerve block and local infiltration.

## 1-Topical Analgesics

Variations among them depend on

1-Time of onset 2-Duration of action 3-Stability

4-Local and systemic toxicity

Nearly all of them inhibit corneal epithelial healing in variable degrees

| | |
|---|---|
| Marked healing inhibition | 1-Cocaine 2%<br>2-Cornacaine 2%. |
| Slight delay of healing | 1-Lignocaine 4%<br>2-Pontocaine (Tetracaine®) 4%<br>3-Proparacaine (Ophthaine®) 2% |
| No delay of healing | 1-Lidocaine 2% (Xylocaine®)<br>2-Metycaine 2%. (Piperocaine®) |

## Considerations on Use of Topical Anesthetics

1-Local anesthetics should not be used therapeutically or included in any therapeutic preparation

2-Most of them are toxic to normal corneal epithelium and inhibit corneal regeneration

3-Bacterial samples should be taken before application of topical anesthetics as the anesthetic drug and its preservative will kill the bacteria in conjunctival sac that interfere with sensitivity test results

4-Topical anesthetics are unsuitable for local infiltration

5-Some of them is extremely toxic

## 2-Injectable Analgesics

Local infiltration and nerve block (regional anesthesia) are useful in veterinary ophthalmology for examination and minor surgical procedures especially in large animals. The most common injectable anesthetics are Lidocaine 1-2% (Xylocaine®) and Procaine1% (Novocaine®).

# VII-ANTIBIOTICS

Antibiotics are the most commonly used drugs in veterinary ophthalmology. Unfortunately, its misuse is nearly as great as its benefits. Antibiotics are prescribed before specific diagnosis has been established. Before application of antibiotics, the clinician should be certain that the inflammation is infectious and not due to trauma, foreign body, mechanical or chemical irritation, allergy, contact sensitivity and degenerative or metabolic disease. In external infection of the eye, a smear should be prepared before application of antibiotics. In acute severe and chronic infected cases, culture and sensitivity test should be performed. Antibiotics may be administered until the results of the sensitivity test is determined

## Factors Affecting Selection of Antibiotic

The ideal basis for selection of antibiotic is the identification of the responsible organism and its antibiotic sensitivity, and combination of different antibiotics should be synergistic and not antagonistic. However selection of suitable antibiotic depends up on the following

1-The nature of the causative organism and its sensitivity to the antibiotic

2-The spectrum of activity of the antibiotic

3-The penetrating properties of the antibiotic into the eye through the intact corneal epithelium and blood-aqueous barrier

4-The pharmacologic and toxic properties of the antibiotic

## Advantages of Combination of Antibiotics

1-The ability to provide broader spectrum coverage than one antibiotic

3-It insures the sensitivity to other antibiotics if the organism developed resistance to one of them

2-It permits the use of sub-toxic dose if one of them is highly toxic

## The Most Important Ocular Antibiotics

## 1-Antibiotic Can’t Pass Corneal Epithelium

These are antibiotics that can't penetrate intact corneal epithelium and blood-aqueous barrier as streptomycin, terramycin, and penicillins and its derivatives except ampicillin. Intraocular penetration of these drugs is very poor even if they were injected sub-conjunctively, and they can't cross the blood-aqueous barrier unless administered in high doses, accordingly these drugs can be used for superficial eye disease.

## 2-Antibiotic Can Pass Corneal Epithelium

These are antibiotics, which have the power to penetrate the intact corneal epithelium and cross the blood-aqueous barrier as chloramphenicol, neomycin, bacitracin and gentamycin. Chloramphenicol is a broad-spectrum antibiotic, effective against a wide variety of gram-positive and gram-negative organisms, and it is one of the most effective drugs for ocular infection. Chloramphenicol can be used topically, sub-conjunctively, intravenously and orally. Neomycin, bacitracin and gentamycin are broad-spectrum antibiotics effective for the treatment of superficial ocular infections.

## VIII-ANTIVIRAL DRUGS

Viruses are obligate intracellular parasites that utilize the metabolic processes of the host's cells. The location of the virus and intimate relationship to the host make effective therapy difficult. Idoxuridine (IDU) is chemically very similar to thymidine, one of the constituents of nucleic acid. IDU substitutes for thymidine in DNA synthesis and thus inhibits the action of the virus. Antiviral drugs are used for treatment of herpes keratoconjunctivitis, follicular conjunctivitis and superficial punctate keratitis in dogs and cats.

## IX-ANTIFUNGAL AGENTS

Any non-specific corneal ulcer associated with corneal opacity that does not respond to antibiotic therapy should be scraped, stained and cultured for possible mycotic involvement. Superficial keratectomy of infected corneal tissues is often as effective as drug therapy and should be combined with it. It should be kept in mind that the use of antibiotics for long periods may kill beneficial bacteria in the eye and in turn stimulate growth of mycotics.

Topical antimycotics are nystatin, amphotercin B, and natamycin. However, mycotic infection of the eye may involve

1-Infection of the skin of the eyelids "blepharodermatomycosis"

2-Mycotic keratitis following corneal injuries by foreign vegetable objects

3-Intraocular infection leads to mycotic endophthalmitis

## X-SULPHONAMIDES

Sulphonamides have largely been replaced by antibiotics but still useful for minor infection. They are bacteriostatic and act by blocking utilization of para-aminobenzoic acid (PABA) by bacteria. Purulent exudate that contains para-aminobenzoic acid interferes, with the action of sulfonamides. Sulfa drugs are effective against gram-positive and some gram-negative organisms, and in higher concentration, against some viruses, fungi and toxoplasma. These drugs have a tendency to retard healing of corneal epithelium. Local anesthetics inhibit the effect of sulfas because topical anesthetics are esters of para-aminobenzoic acid.

## XI-ANTI-INFLAMMATORIES

Anti-inflammatories are generally classified into non-steroidal and steroidal anti-inflammatories.

### 1-Non-Steroidal

These drugs involve aspirin (acetyl salicylic acid), Declophen, Ketoprofen, or Flunixin meglumine. They have analgesic, anti-pyritic, anti-inflammatory action, and have no adverse effect on immune system like steroidals.

### 2-Corticosteroids

Corticosteroids are anti-inflammatories that affect the tissue response to causative agents rather than affecting the causative agents. They have analgesic effect but at the same time they have many adverse effects on the immune system and healing of wounds.

### Ocular Effects of Corticosteroids

1-Suppress the inflammatory process by decreasing capillary dilatation, capillary permeability, exudation and the migration of the phagocytes to the site of inflammation.

2-Suppress scar formation of the cornea by inhibition of the process of collagen formation and reduction of the fibroblast activity

3-Suppress neovascularization (capillary proliferation) of the cornea

4-Suppress hypersensitivity reactions by inhibiting release of histamine from sensitized mast cell

5-Stimulation of collagenase enzyme that enhance break down of collagen bundles, accordingly it shouldn't be used with corneal ulcers

6-They retard epithelial and endothelial regeneration of the cornea, thus delaying the normal wound healing process.

## Methods of Corticosteroids Application

## A-Topical and Sub-conjunctival Injections

These methods offer numerous advantages over systemic administration as it achieves high local concentration for long periods with minimal systemic side effect. Hydrocortisone solution 2%, prednisolone 0.25%, and dexamethasone solution 0.1% are the most common corticosteroids used for topical and subconjunctival injections.

***Indications: -***

1-Blepharitis 2-Non-pyogenic conjunctivitis

3-Superficial keratitis 4-Iritis

## B-Systemic Administration

Most types of corticosteroids penetrate the blood-aqueous barrier. Commonly used drugs are prednisolone, methyl prednisolone and dexamethasone.

***Indications: -***

1-Interstitual keratitis 2-Anterior and posterior uveitis

## XII-ANTIHISTAMINES

Histamine antagonists are used to prevent immediate hypersensitivity reaction by preventing histamine formation within the mast cells, preventing its release from the mast cells, competing with it at the site of action and blocking its effect on the receptor cells (chlorpheniramine maleate or Avil®).

## XIII-DRUGS USED FOR TREATMENT OF GLAUCOMA

### 1-Carbonic Anhydrase Inhibitors

Carbonic anhydrase is an enzyme presented in the ciliary body and is responsible for aqueous production. Its inhibition by carbonic anhydrase inhibitors reduces aqueous humour production and IOP.

1-Acetazolamide (Diamox) 10-20 mg/kg b.w.

2-Methazol amide (Neptazane) 5 mg/kg b.w.

3-Ethoxzolamide (Ehamide) 5 mg/kg b.w.

### 2-Osmotic Diuretics

Osmotic diuretics are used frequently in veterinary ophthalmology to reduce intraocular pressure. The osmotic agents act by increasing the osmotic concentration of blood, thus drawing fluid from the eye (aqueous and vitreous) directly into the blood stream.

***Indications: -***

1-Acute glaucoma 2-Prior to intraocular surgery

3-Traumatic proptosis of the globe to reduce swollen tissues in order to reposition the globe back into the orbit

4-Clearing of corneal edema (when the drug is applied topically)

### A-Mannitol

It is a vegetable sugar, penetrates the eye poorly, not metabolized and rapidly excreted by the kidney. Mannitol is administered intravenously in a

dose of 1-5 ml/kg b.w. 20% solution in small animals. It causes rapid decrease in intraocular pressure within one hour.

## B-Glycerol

It is administered orally in small animals in a dose of 1-2 ml/kg. Glycerol is effective in lowering intraocular pressure. It penetrates the eye poorly and remains extracellular.

## C-Urea

It is administered intravenously in a dose of 1-2 gram/kg b.w. 30% solution. Urea is markedly lower intraocular pressure. It penetrates eye readily, not metabolized, and rapidly excreted in urine. Extravascular injection of urea causes sloughing of tissues and phlebitis. It is rarely used since mannitol and glycerol are available.

## XIV-VITAMINS

Various vitamins have been advocated for their supposed therapeutic efficacy in the treatment of ocular disorders of animals. In the absence of a specific vitamin, there is little to be gained from such local therapy.

## 1-Vitamin A

It plays an important role in the physiology of vision. Vitamin A deficiency causes deterioration of the retina specially rods. Fortunately, they can regenerate with 2-4 months of vitamin A administration. Also it is essential for the normal life of the epithelial cells. In absence of this vitamin the epithelial cells degenerate and atrophy and the basal cells proliferate resulting in keratinization and keratomalacia.

## 2-Vitamin C

It is essential for proper maintenance of intercellular cement substances, and its deficiency causes failure of the endothelial cells of the capillaries to produce cement substance resulting in capillary hemorrhage.

## 3-Riboflavin (Vit. B)

Vit. B deficiency is characterized by superficial vascularization and ulceration of the cornea.

## XV-ENZYMES

Enzymes preparations are rarely used in veterinary ophthalmology.

## 1-Fibrinolysin

This enzyme is used to remove clotted blood from the anterior chamber in traumatic hyphema. Most of such clots are resorbed spontaneously in 7-10 days. This enzyme acts on fresh clots and should be considered for use in extensive hemorrhage.

## 2-Alpha Chymotrypsin

Trypsin is useful for absorption of intraocular debris in cases of hypopyon. Alpha chymotrypsin is a proteolytic enzyme used for removal of the lens by intra-capsular extraction in cases of cataract. It is used in human but may be of little value in animals as the zonules are considerably more resistant to enzymatic digestion.

## XVI-OPHTHALMIC STAINS

Ophthalmic stains are used commonly as diagnostic aids in diseases of anterior and posterior segment of the eye and nasolacrimal system.

## 1-Fluorescein Dyes

Fluorescein is available as solution of 0.5-2.0%. Filter paper stripe impregnated with fluorescein may be placed in the conjunctival sac until moistened by tears. It is readily soluble in water produces a bright green fluorescent color.

***Uses: -***

1-It acts as an indicator dye for corneal epithelial defects. When the epithelium disrupted, fluorescein rapidly penetrates the corneal stroma, resulting in an intense green fluorescence.

2-It is used for detection of the patency of the nasolacrimal duct. The head may be lowered to aid drainage of tears through the excretory part of the lacrimal system. Within 1-5 minutes, the fluorescein usually appears at the external naries, indicating patency of the NLD.

## 2-Rose Bengal

It stains devitalized corneal and conjunctival cells and mucous

## XVII-ARTIFICIAL TEARS

Aqueous solutions as normal saline are unsuitable for tear replacement because these hydrophilic solutions do not adhere to the lipophilic corneal epithelium. Viscous agents, bind the solution to the epithelium. They are indicated in cases of keratoconjunctivitis sicca, exposure keratitis and as cushioning solution during gonioscopy as well as an ophthalmic vehicle.

1-Methylcellulose 0.5-1.0% solution  2-Poly vinyle alcohol 1.4%

## Student's notes

**Mention the following**

**1-Methods of drug administration**

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**2-Astringents**

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**3-Mydriatics and cycloplegics**

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## 4-Drugs used for treatment of glaucoma

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## 5-Enzymes

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# II-Entropion and Ectropion

## 1-Entropion

***Definition: -***

Entropion means rolling in or inversion of the eyelid margin leading to contact between cilia and cornea, and corneal irritation and damage which in turn causes blepharospasm which aggravates the entropion

***Causes: -***

**A-Congenital Entropion**

**B-Acquired Entropion**

**1-Spastic Entropion**

**2-Cicatrical Entropion**

**3-Bulbar Entropion**

***Symptoms: -***

1-Rolling in of the lid margin with absence of eyelashes and trichiasis

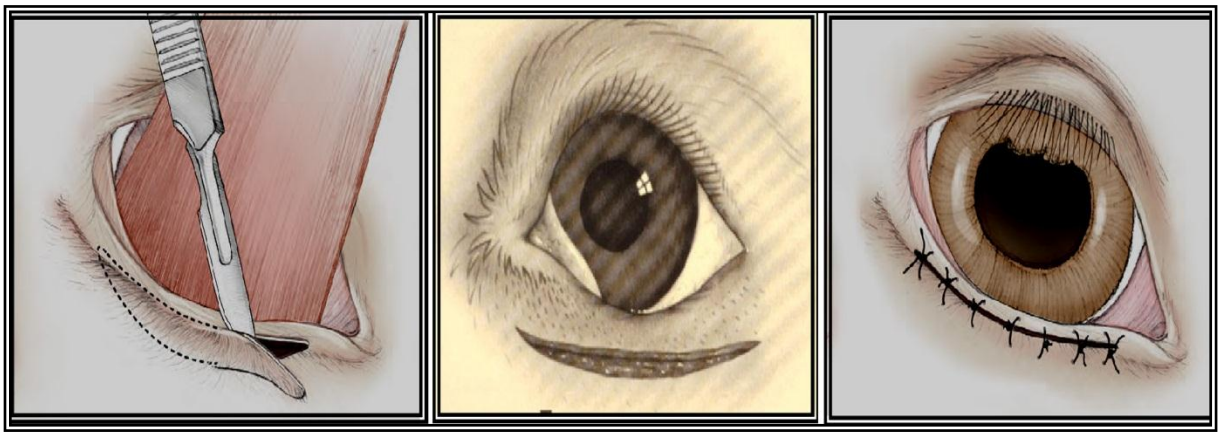
2-Epiphora, photophobia, and blepharospasm

3-Conjunctivitis with purulent discharge in chronic cases

3-Keratitis, corneal ulceration and corneal vascularization

***Treatment: -***

**1-Elliptical Skin Resection Technique**



An initial skin incision is made parallel to and 2-3 mm far from the lid margin to a depth that includes the orbicularis oculi muscle, to a length determined by the length of inverted eyelid margin. The second elliptical incision is performed below the first one and joins it at both ends. The width of skin flap depends on the amount of entropion. The incised area of skin is excised, and hemorrhage is controlled. The wound is suture with 4/0 non-absorbable simple interrupted sutures. The sutures are removed 10-14 days after surgery

***Complications: -***

1-Over correction (ectropion)

2-Under correction

3-Genral wound complication like hemorrhage, infection, stitch dehiscence

# Student notes

**1-Mention causes of entropion**

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**2-Mention signs of entropion**

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**3-By diagram, illustrate steps of surgical correction of entropion**

# 2-Ectropion

***Definition: -***

Ectropion is an out rolling or turning out of the eyelid margin that most commonly involves the lower eyelid. Although it is common in dogs, it is rare in cats and other domestic animals. Ectropion is classified according to the cause into:

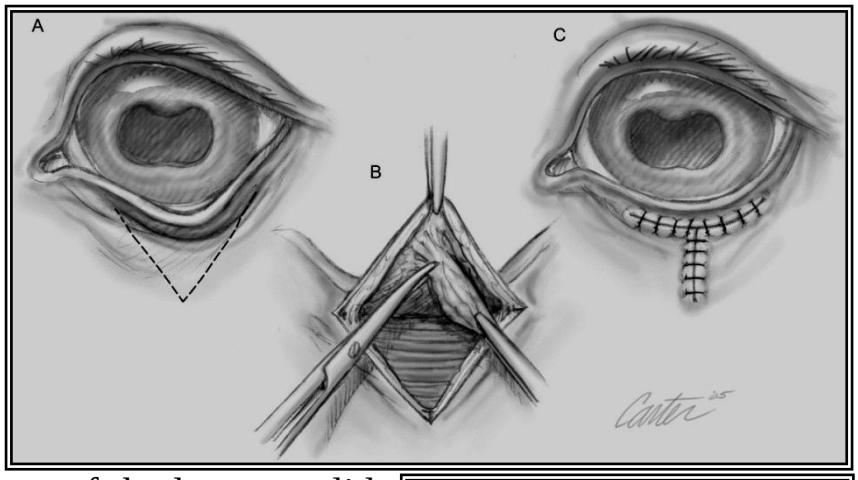
***Causes:***

## A-Congenital Ectropion

## B-Acquired Ectropion

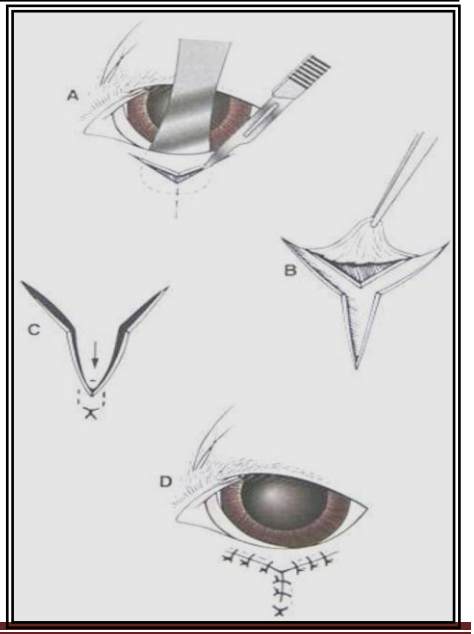
**1-Senile Ectropion 2-Cicatrical Ectropion 3-Intermittent Ectropion**

***Symptoms: -***




1-Rolling out of the eyelid with exposure of the palpebral conjunctiva

2-The degree of ectropion varies markedly from just slight ectropion of the medial or middle part of the lower eyelid to complete ectropion of the entire lower eyelid.




3-Marked ectropion may leads to marked epiphora, corneal keratinization, hypertrophy of the conjunctiva, and exposure keratitis due to faulty eyelid closure.

***Treatment: -***

This technique is used to correct cicatrical ectropion. Most cases of cicatrical ectropion are associated with scar formation from bite wound or other forms of trauma. The

cicatrical ectropion differs from senile and congenital types is that instead of too much tissue being present in the later, there is loss of tissue in cicatrical one. The aim of surgical procedure is to free the skin from the underlying scar and allow the lid to return back to its normal position. A V-shape skin incision is made including the scar. The skin flap-is freed from the underlying scar tissue by blunt scissors dissection and the scar tissue is excised. The skin flap is moved upward to correct the eyelid margin. Undermine the skin at the apex of the "V". Close the defect in a "Y" shaped pattern to cover the bared are of skin with simple interrupted suture.

***Complications: -***

1-Under correction

2-Genral wound complication like hemorrhage, infection, stitch dehiscence

# Student notes

**1-Mention causes of ectropion**

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**2-Mention signs of ectropion**

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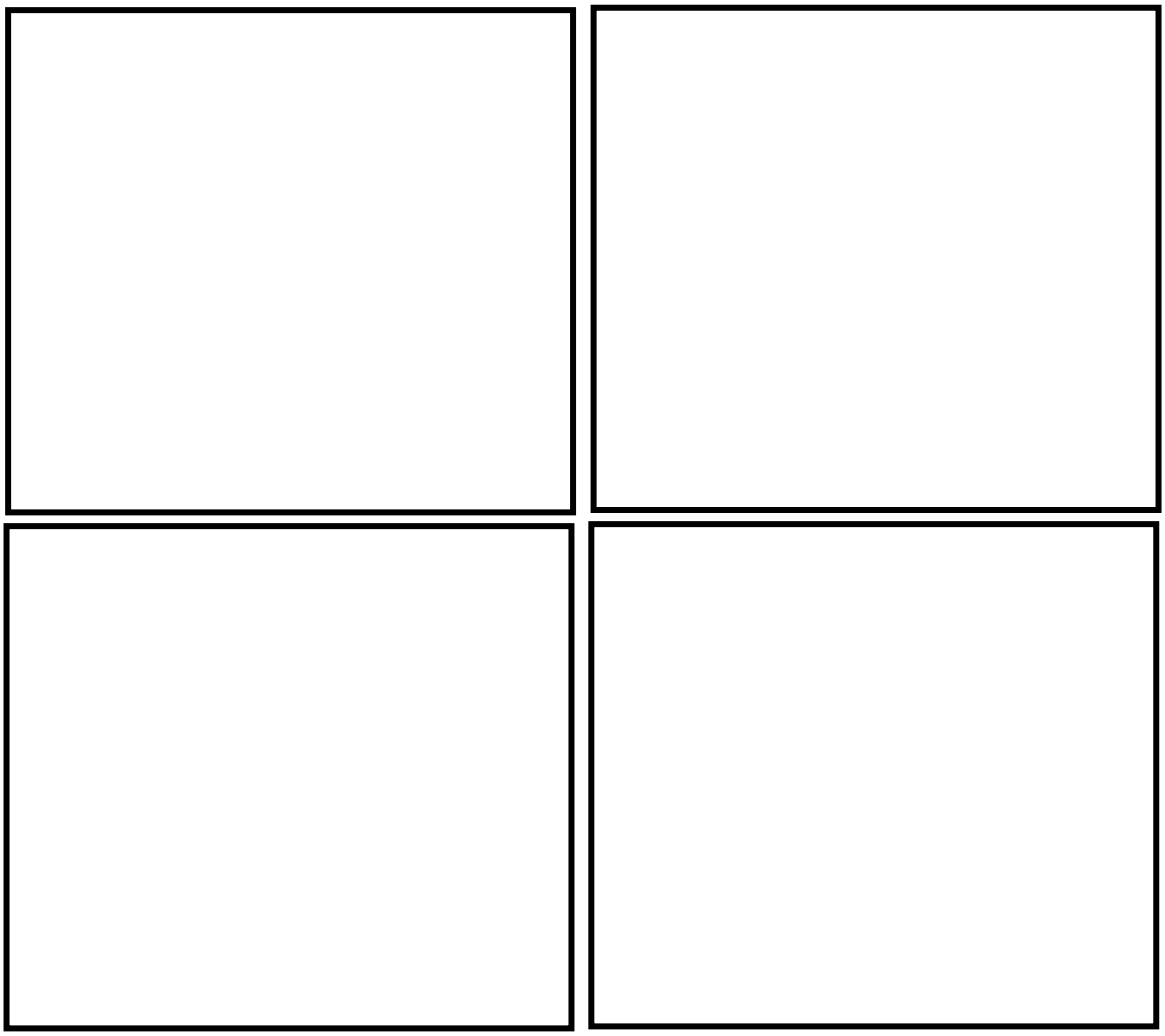
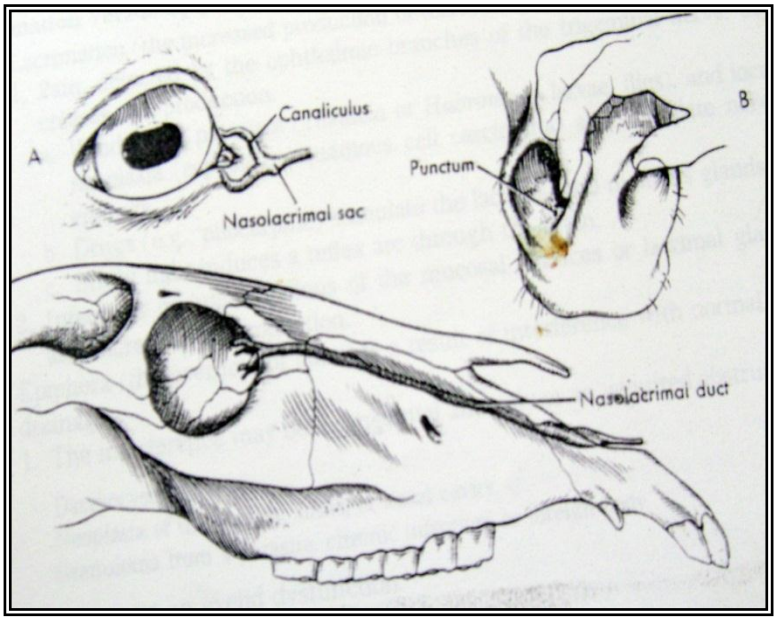
**3-By diagram, illustrate steps of surgical correction of ectropion**



# III-Flushing of NLD

***Definition of NLD obstruction : -***

Obstruction of NLD is either congenital atresia or acquired obstruction due to inflammatory debris or foreign materials




***Signs of obstruction: -***

1-Epiphora, moisture and tear staining of the medial canthus

2-Tear scalds in chronic cases

3-Conjunctivitis secondary to obstruction of NLD

***Treatment: -***

nasal punctum should be located on the inner aspect of false nostril, on the dorsal, lateral, or ventral surface, and veterinarian should ensure that there is only one punctum, if there are more than one, veterinarian should check to see if both are patient, are they connected, and if one of them has dorsal opening . Then a fine catheter is inserted in the nasal punctum then connected to syringe and gentle pressure is applied to the syringe until the fluid appears in the eye. Violent pressure on the syringe plunger is contraindicated especially when resistance is felt during injection, to avoid rupture of the duct.

# Student notes

**1-Mention causes of obstruction of the NLD**

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**2-Mention signs of NLD obstruction**

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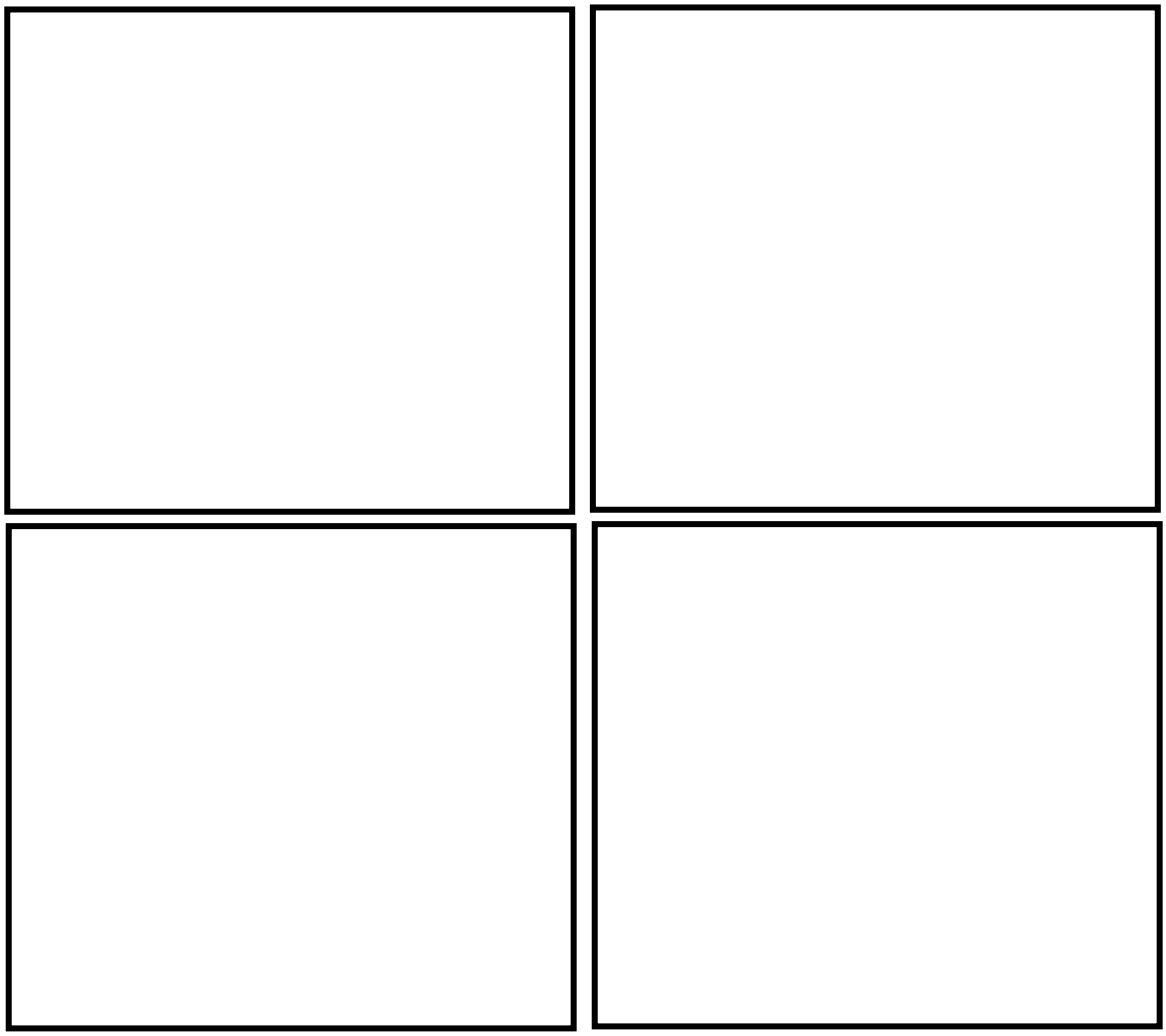
**3-By diagram, illustrate steps of flushing of NLD**



# IV-Third Eyelid Flap Technique

***Definition: -***

It is a simple surgical procedure used to support the cornea when there is corneal ulcer or in some surgical affections of the eye

***Advantages: -***

1-It protects the weakened structure of the cornea from additional insults

2-The temperature of the cornea is elevated and the metabolic rate of the cornea is increased, thus facilitating healing process.

3-It prevents light sensitively thus precludes the photophobia

4-It permits direct contact of the corneal ulcer with lymphoid follicles of the third eyelid, which contain several types of leucocytes and immunoglobulins essential for corneal healing.

5-It is quickly and easily performed without the need for general anesthesia

6-Hemorrhage is minimal and only 2 or 3 sutures are necessary

***Indications: -***

1-Facial nerve paralysis with decreased function of orbicularis oculi and lagophthalmos

2-Eyelid laceration and exposure of the globe

3-Severe chemosis of the bulbar and palpebral conjunctiva

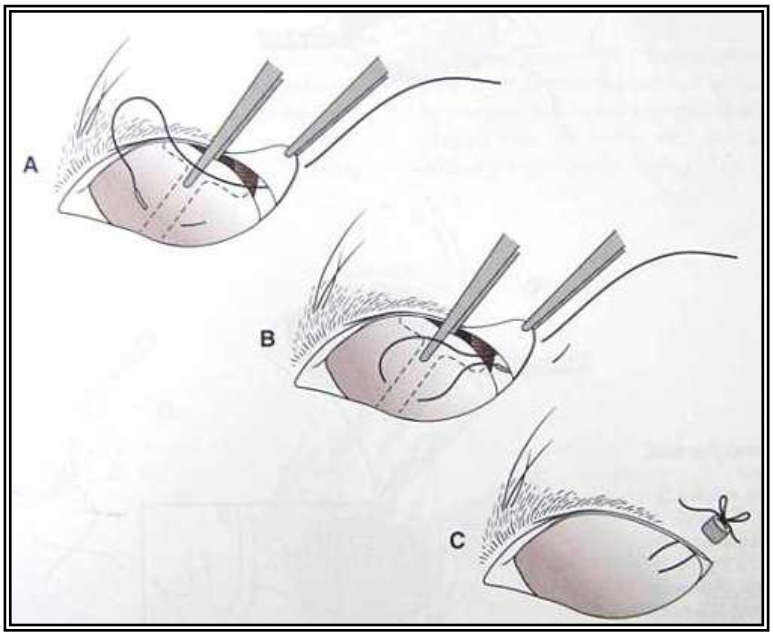
4-Subluxation of the eyeball secondary to retrobulbar swellings

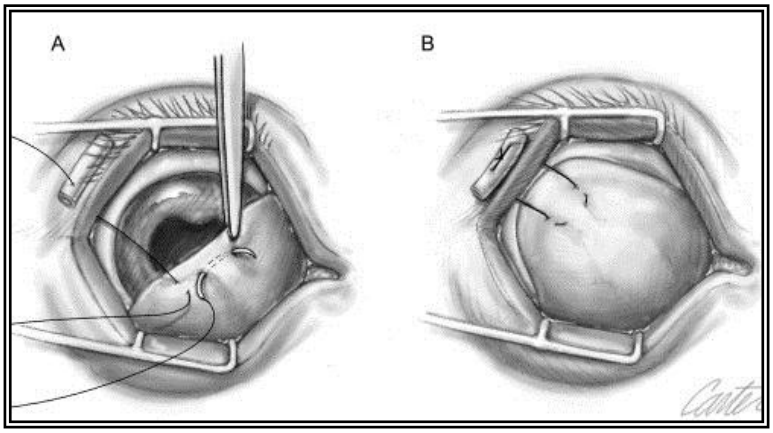
5-Corneal ulceration (protection and support of the cornea)

6-Exposure keratitis and severe corneal edema following endothelial damage

7-Postoperatively after intraocular surgery

***Technique: -***




The suture is first passed through intravenous tubing or a rubber band stent that helps to distribute the suture pressure over a wider area of the eyelids. The tension in the sutures will be in the direction of the normal movement of the third eyelid. The suture is then passed 5 mm from the eyelid margin through the lateral aspect of the upper eyelid and the dorsolateral conjunctival fornix. The next bite is taken parallel to the third eyelid margin, about 5 mm from the edge in order to encircle the middle portion of the stem of the T-shaped nictitans cartilage. The horizontal mattress suture is completed by passing the needle through the conjunctival fornix and the upper eyelid skin 5 mm from the first point, and then through the old intravenous tubing or rubber band stent. The suture is then tied over the old intravenous tubing or a rubber band stent.

# Student notes

**1-Mention advantages of 3rd eyelid flap technique**

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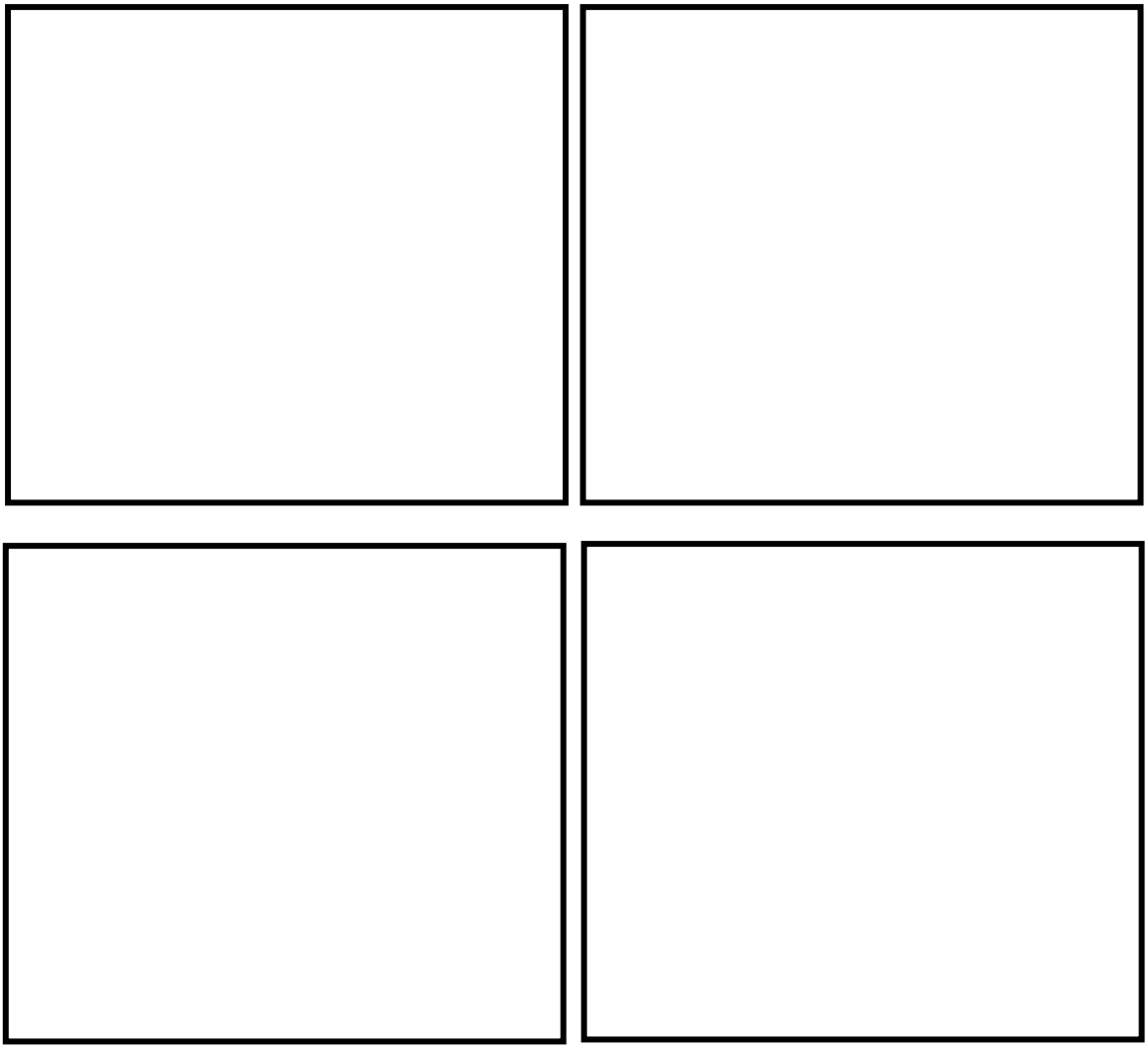
**2-By diagram, illustrate steps of 3rd eyelid flap technique**



# III-Eye Enucleation & Orbital Exenteration

Eye enucleation means surgical excision of the eye ball while orbital exenteration means surgical excision of the eye and all contents of the orbit. In Arabic, both techniques have the same meaning.

Enucleation of the eye is performed when three conditions present together including

1-The eye is blind

2-The eye has painful lesion that does not response to medical treatment

3-The lesion is localized within the eye and does not extend to the orbit

If the lesion or infection extends outside the eye ball, we make orbital exenteration

***Technique: -***

***1-Anesthesia***

Retrobulbar nerve block

***2-Surgical technique***

-The two eyelids are sutured together in continuous pattern and the two free ends of the third are knotted together to hang the eye, this procedure has some advantages

1-To help I holding the eye

2-To prevent extension of infection from the conjunctival sac to the sterile surgical field

-An incision is made 1.5 cm from free edge of the lid margin to endure excision of Meibomian gland to avoid cyst formation

-Blunt dissection is made to reach orbital rim and his is followed by penetration of orbital septum

-Assistant applies traction to the made silk knot, and blunt dissection is continued to remove lacrimal gland dorsally and 3$^{rd}$ eyelid medially

-The medial and lateral palpebral ligaments are severed and curved hemostatic forceps is inserted behind the eye to crush the optic nerve including central retinal artery

-Torsion and violent traction of muscles should be avoided to avoid oculo-cardiac reflex and bradycardia

-Ligation is applied to the optic nerve and the eye with all surrounding tissue, are excised

-The orbital cavity is filled with sterile gauze and the wound is sutured from the lateral canthus to the medial canthus leaving 2 cm opening through which the gauze pass, this drain should be changed day after day

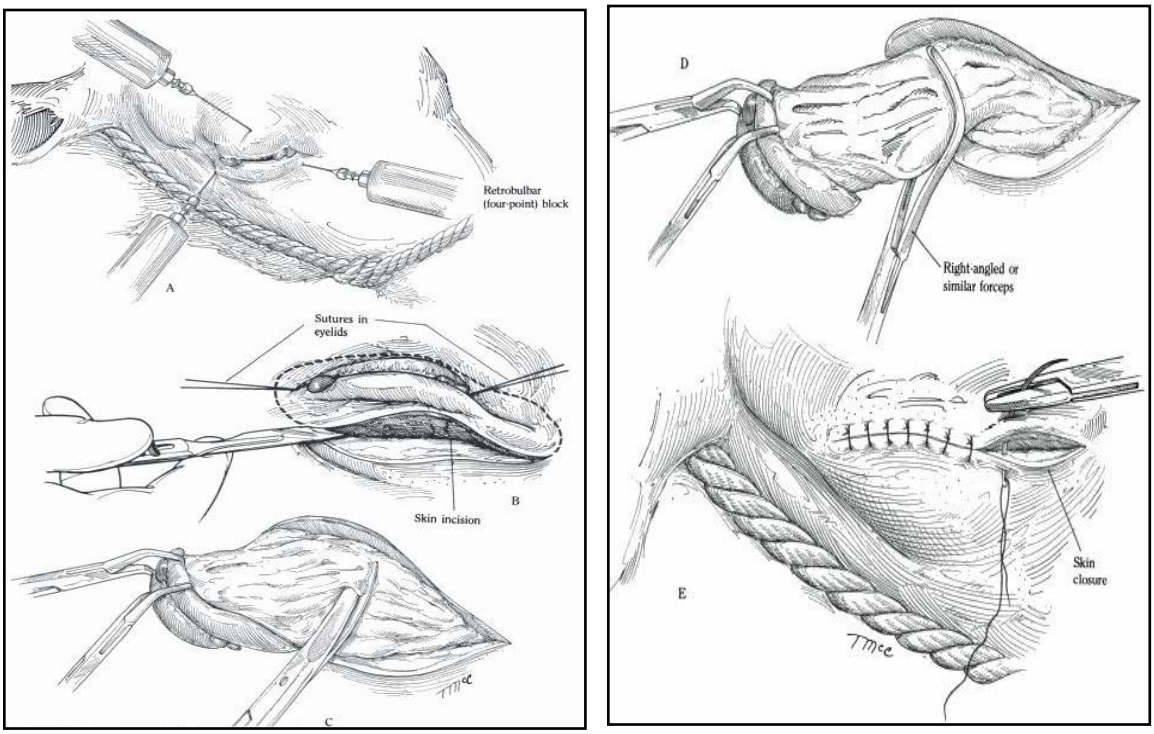
***Complications: -***

1-Menengitis and encephalitis

2-Severe hemorrhage

3-Cardiac arrest due to violent traction of extra-ocular muscles

4-General complications of wound



# Student notes

**1-Mention causes of eye enucleation and orbital exenteration**

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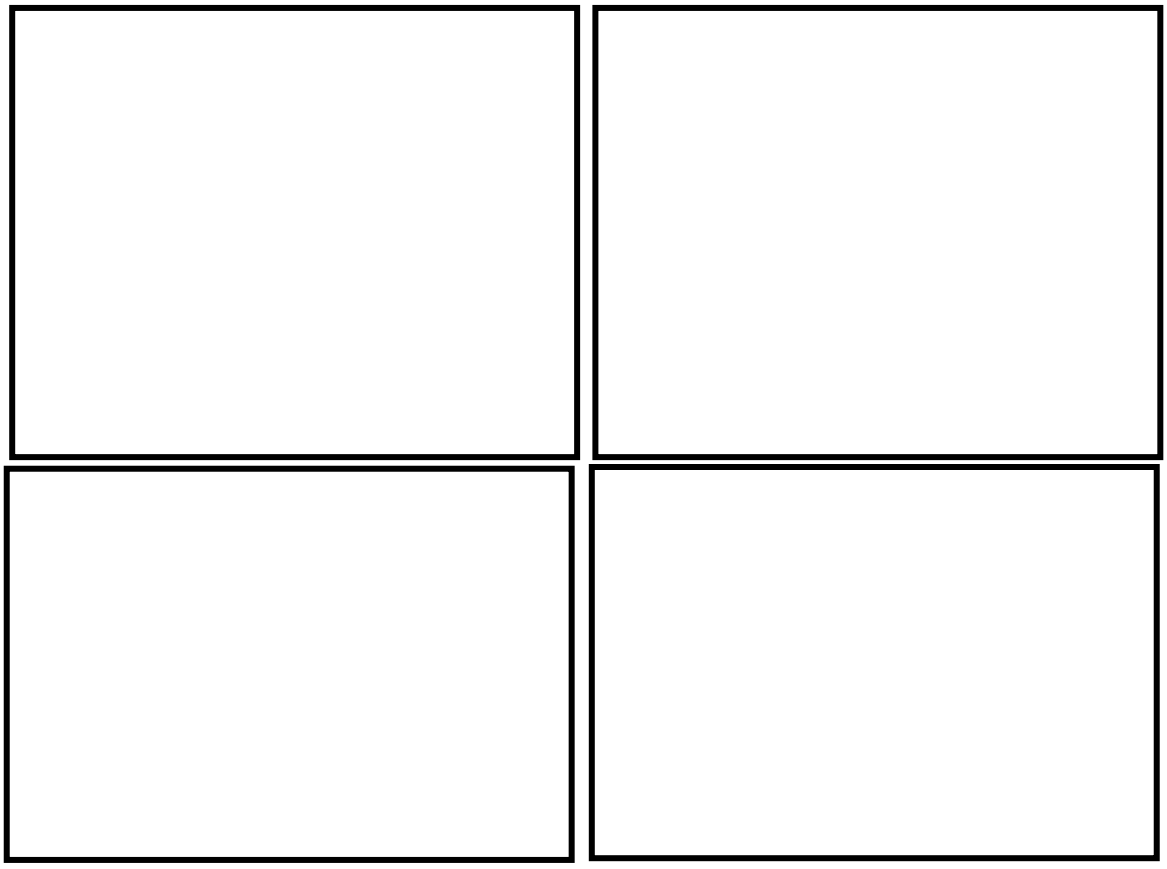
**2-By diagram, illustrate steps of orbital exenteration technique**



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**Diagnosis: -**

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