SPECIAL SURGERY

الجراحة الخاصة

By Staff Members

Our website
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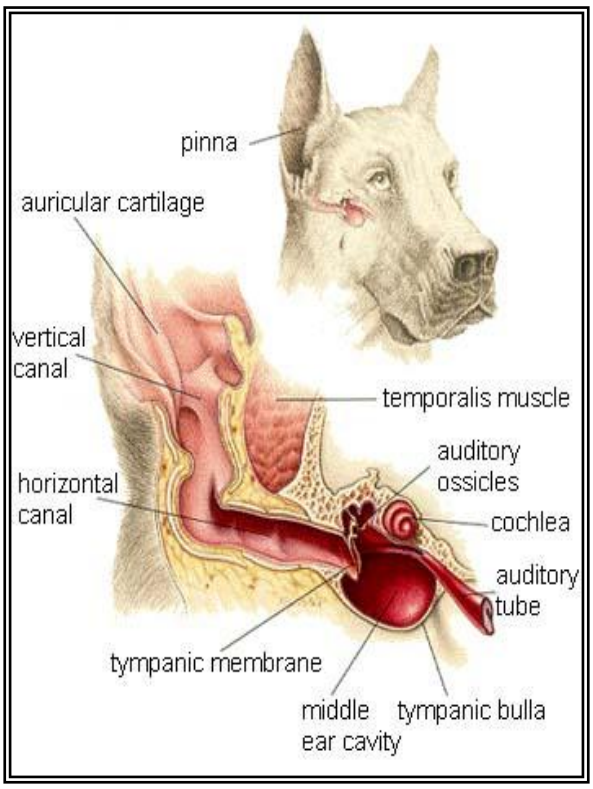
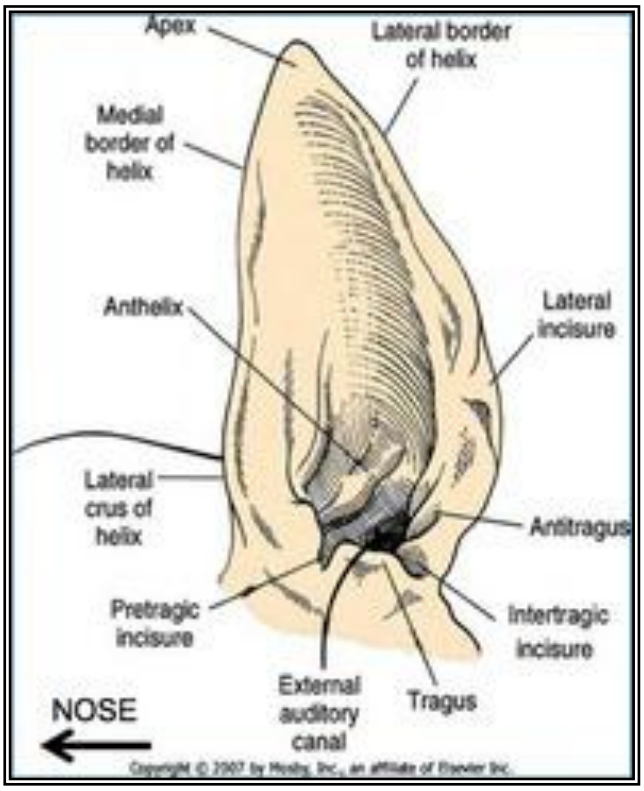
AFFECTIONS OF THE EAR





I-EXTERNAL EAR

I-SURGICAL DISORDERS OF PINNA (Ear flap or Auricula)

The ear flap, or pinna, is a sheet of cartilage covered on both sides by a layer of skin and hair.

1-WOUNDS

It is not uncommon for the pinna to be injured during fighting with other animals. Most of recent ear injuries are traumatic as a result of biting, barbed wire or tree branches and

they are characterized by perfuse hemorrhage, while old wounds are either extension of neglected recent wounds or occur as a result of seton, mild irritation after using rope or chain tie at the base of the horn.

Symptoms: -

The same general symptoms of wound

1-Hemorrhage in *recent* wounds

2-Cellulites and infection in *old* one

Prognosis: -

When a part of the tip of the pinna has been avulsed, it is difficult to restore the ear appearance. The splitted or punctured ear should be repaired surgically as quickly as possible to achieve the maximal cosmetic appearance of the ear.

Treatment: -

1-Recent Wounds

Control the bleeding, treat the wound as described in wounds, and apply a topical antibiotic ointment. Aim of treatment here is to prevent scarring and deformity.

1-The wound edges are excised and refreshed (including the cartilage if necessary). Divided cartilage is not sutured but the skin over the cartilage on both sides is sutured.

2-In large animals, leave the ear uncovered and restrain the head to prevent the animal from rubbing the ear against fixed objects. In case of dogs, if they shake head and reopen the wound causing bleeding, you may need to bandage the ear to the head.

3-Wounds caused by animal bites are often complicated by infection and must be watched carefully.

The aftercare is the same as general principles used for ordinary wound.

2-Old Wounds

Treatment of the old wounds follows the rules of general surgery (daily dressing with antiseptic and injection of antibiotic).

2-EAR FISTULA (Ear Cyst or Fistula Auris Congenita)

It is a dentigerous cyst with fistulous opening on the ear's anterior edge.

Symptoms: -

An opening of the fistula is present at the anterior edge of the ear 1-3 cm from its base, through which a gray mucoid or purulent fluid comes out and runs down the temporal and buccal regions and dries. The skin around the opening shows excoriation. The fistulous tract is connected to a tooth-like structure that can be determined by passing a probe or by radiography.

Treatment: -

It is primarily surgical and includes excision of the fistula with separation of the bony tooth-like structure from its attachment to the temporal bone, and closure of wound layers.

3-AURICULAR CELLULITIS

It is an inflammatory condition of the earflap as a result of pyogenic infection of the ear wound.

Symptoms: -

The earflap is swollen (of 1-2 cm thickness), warm, and painful. The swollen earflap droops to one side and can't be raised. Serous fluid exudates from the ear, dries on both surfaces of the ears and forms crusts.

Treatment: -

1-The external auditory meatus is backed with cotton, an ear bandage is applied and moisten with warm saline every 2 hours

2-Massive dose of antibiotic and anti-inflammatory should be administered.

The fate of such condition is either resorption or abscess formation over the earflap.

When an abscess is formed, it is treated by the general principles of surgical treatment without splitting of the cartilage but if necrosis occurred in the cartilage, it is indicated to perform partial amputation of the earflap.

4-EXTERNAL EAR NEOPLASMS

The most predominant type of neoplasms observed on the ear is the wart or papilloma, which is a benign tumor, but other types of tumors can involve the deeper auricular tissues.

Treatment: -

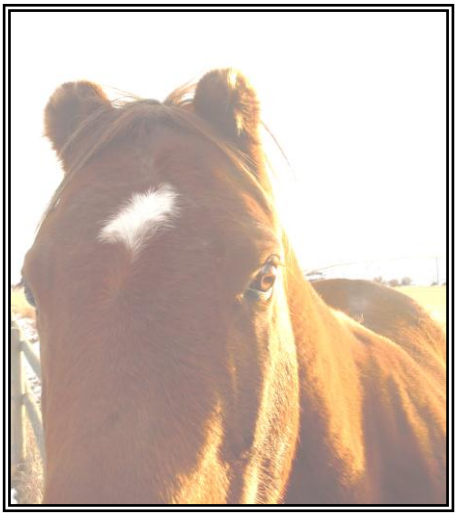
Neoplasms of the ear can be treated either by surgical resection, cryotherapy or thermally.

Neoplasms on the edge of the earflap or on its inner or outer surface are removed surgically and in some cases it is necessary to remove a part of the cartilage during resection.

Neoplasms of deep auricular tissue, that cause obstruction of the external ear canal, should be removed with the canal itself.

5-DEFORMITIS & ABNORMALITIES OF CARTILAGE

A-Stubby Ears



Definition: -

It is a unilateral or bilateral, congenital or acquired condition characterized by small and short earflap, and there is no treatment for such condition

B-Floppy Ears

Definition: -

It is a state of ears enlargement with irregular movements of the ears

Treatment: -

In many cases surgical reduction of the earflap size is sufficient to correct the abnormal ear cartilage. In other cases it is necessary to shorten the adductor muscles of the ear by resecting 1-2 cm of the muscles.

C-Drooping Ears

Definition: -

It is inability of the ear to move in its normal arc or to remain in upright position as a result of rupture of the muscles responsible for ear movement or paralysis of the seventh cranial nerve (facial nerve). The condition is caused by trauma, twisting of the ear, or application of twitches at the base of the ear.

Treatment: -

Suturing of the ruptured muscles or shortening if the muscles are stretched.

6-BROKEN CONCHAL CARTILAGE

Treatment: -

The condition is treated surgically by incising and reflecting the skin over the injured cartilage, then two or three Kirschner wire pins are inserted into the cartilage and fixed externally to the skin by stitch. The cartilage is sutured with wire suture by simple interrupted pattern and the skin is closed routinely. The wire pins are removed 16-20 days after surgery.

7-HEMATMA OF THE EAR (Aural Hematoma)

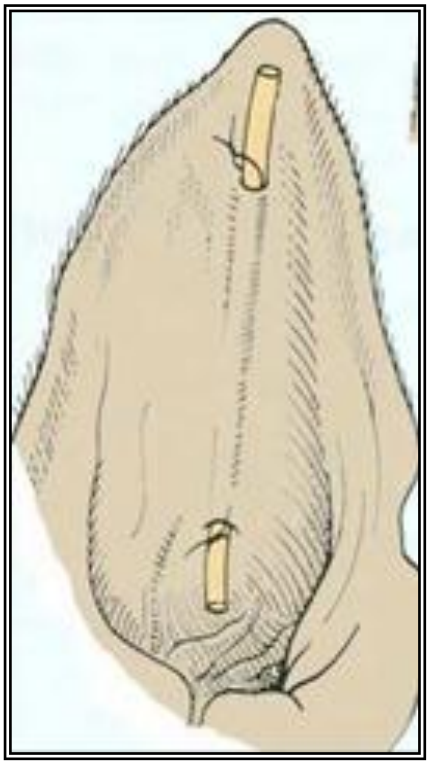
The condition is a common affection in pet animals. The exact cause of such affection is not well known, but it is accepted that it is a self-inflecting trauma leading to rupture of blood vessels.

Symptoms: -

Accumulation of blood between the skin and the cartilage, either on one side or on both sides, and the size and consistency of the hematoma depends up on the duration and severity of trauma.

Treatment: -

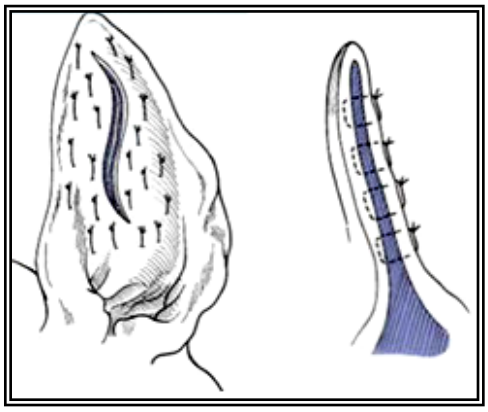
It is treated either by application of counter irritants or antiphlugestic to facilitate resorption if the condition is recent and small-sized or by drainage technique. Sometimes it is better to leave it for 7-10 days to permit closure of the ruptured vessels and clotting of the blood, and then surgical incision is indicated.



1-Drainage Technique

It is a method used for recent hematoma on the concave surface of the pinna to facilitate drainage of the hematoma by applying

Silastic tubing, butterfly catheter tubing, or two plastic teat canulas at the proximal and distal aspects of the hematoma via stab incision of the skin. The canulas are fixed by silk, and the hematoma is flushed with sterile saline daily with monitoring the maintenance of the drainage, and they are removed after 7-21 days when the drainage is minimal.



2-Incision-Suture Technique

1-Incise the inside (concave) surface of the ear by Straight or S shaped incision, with thorough removal of hematoma by the use of curette, the cavity is flushed by saline

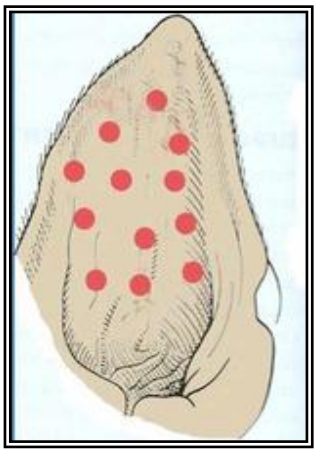
2- Obliterate dead space either by

a-Pressure bandage which is not recommended as it may be difficult to cover large hematoma, must be changed regularly, and time consuming. The bandage should be removed after 7 days when the drainage is diminished. Disadvantage of this technique is the possibility of thickening and wrinkling of the ear.

b-Multiple mattress sutures that must be oriented parallel to the incision and blood supply, and left a little loose because of post-surgical swelling (edema), and the sutures are removed after 14 days.

3-Incision-Sutureless Technique

An elliptical incision is made from end to end of the hematoma to expose it, the cavity is flushed, the ear is firmly taped to expose the incision, the pinna is reflected over a large-roll of cast padding and taped in place, and a nonstick dressing bad is applied to the incision and changed according to the need for three weeks. Suturing is not used in this technique.



4-Dermal Punch technique

Another method is Dermal punch technique through which multiple holes are made in the skin so the accumulated fluid has more areas to drain.

II-SURGICAL DISORDERS OF THE EAR CANAL

1-OTITIS EXTERNA

Definition: -

It is an inflammation of the epithelium of the external ear canal characterized by an increased production of ceruminous and sebaceous material, desquamation of epithelium, and pain.

Etiology: -

The usual causes of otitis externa are parasitic infestation, bacterial or fungal infection, allergy, trauma, or presence of foreign body.

Signs: -

Chronic cases can change the size and characters of the external ear canal permanently. The epithelium can be thickened, fibrosed, and ulcerated, and if the epithelium become scarred, the canal undergo stenosis.

Treatment: -

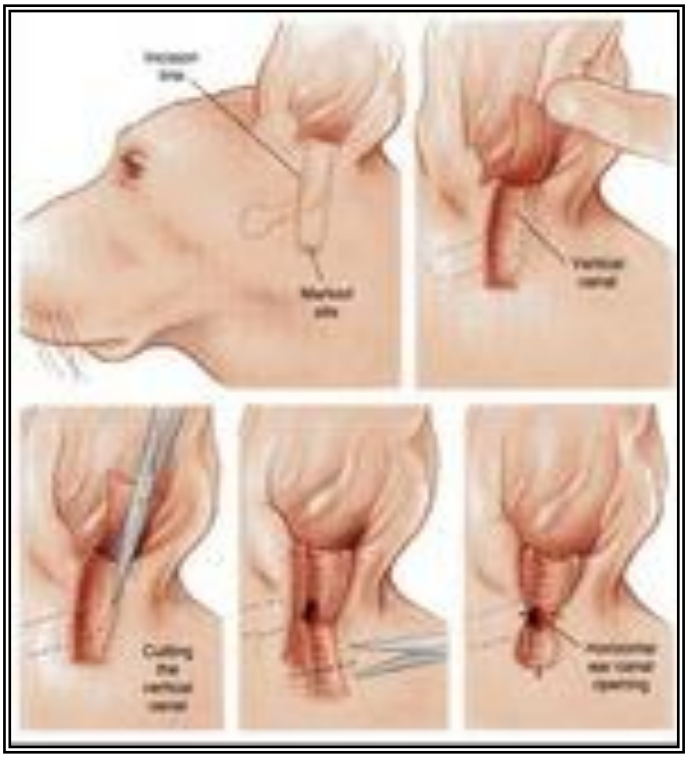
A-Medical Treatment

The initial treatment is directed toward irrigation and cleaning of the canal with antiseptic and topical antibiotic, antifungal or antiparasitic according to the cause with parenteral injection of antibiotic and using of ceruminolytic agents.

Chronic case is better treated by topical Swimmer solution (three parts 70% isopropyl alcohol and one part vinegar) that has cleaning and drying action and changes the pH.

B-Surgical Treatment

1-Lateral Vertical Ear Canal Resection

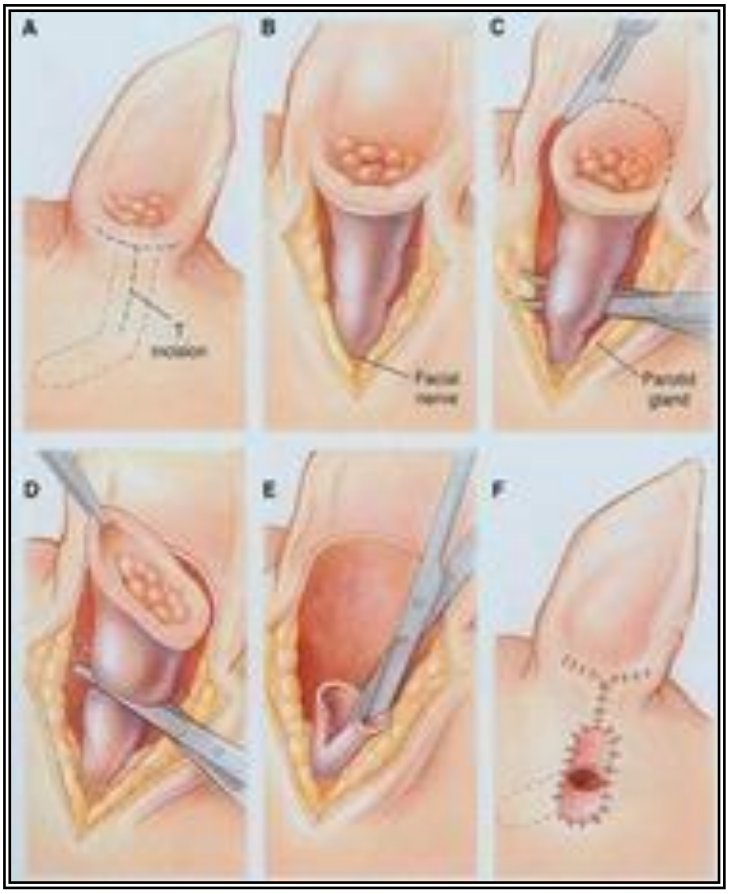


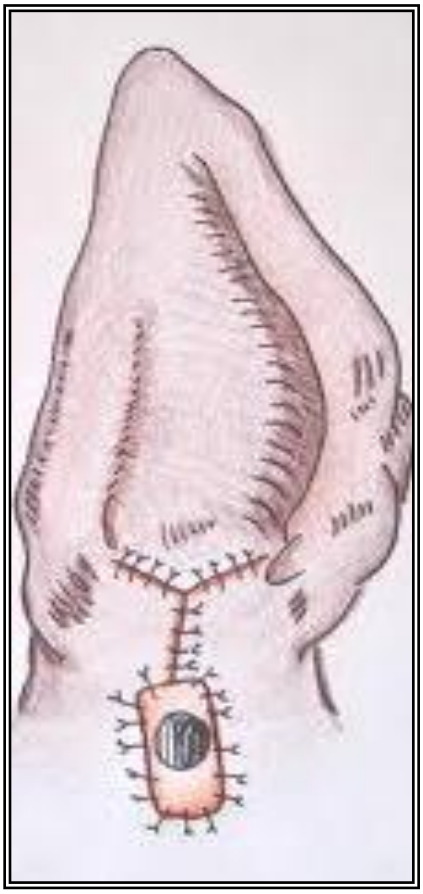
This procedure is designed to improve ventilation to the remainder of the ear canal and to remove moister, humidity, and temperature. As much of the inflamed medial lining of the vertical canal is left in place, irritation may persist and require medical management. Further pathological changes to the remaining tissues can occur despite optimal care, resulting in a disappointing surgical outcome. Flap of skin is created by incision lateral margins of the vertical canal, skin is pulled up, and the cartilage of vertical canal is cut on each side (avoid the parotid salivary gland). Drain board is created by the small ventral flap which serves as a way to avoid a circular closure, supplies a surface to drain fluid, and maximizes the opening of the horizontal canal

2-Vertical Canal Ablation

It is only useful when pathology is limited to the vertical canal (the horizontal canal and bulla should be disease free for this procedure to be successful). However, this is not the case in the vast majority of chronically affected animals. With chronic ear disease it is unusual for the entire canal including the bulla NOT to be affected; hence the latter

two procedures outlined above may be of limited value unless the disease is mild; in which case consideration should be given to further medical management anyway It is indicated when the horizontal ear canal is obliterated with proliferative tissue and the animal didn't response to resection of the vertical ear canal.





3-Total Ear Canal Ablation

It is used for removal of the entire vertical and horizontal ear canal, and is indicated for treatment of severe ear trauma, neoplasia of the horizontal canal, or persistent otitis externa, following the two previously mentioned techniques.

II-MIDDLE EAR

I-OTITIS MEDIA

Definition: -

It is an inflammation of the mucous membrane of the tympanic cavity as a result of extension of infection from the pharynx through the eustacian tube or from otitis externa after perforation of the tympanic membrane. In the horse it is also caused by infection of the upper respiratory tract and the guttural pouch

Signs: -

1-Head shaking, rubbing the affected ear on the floor, and rotating the head toward the affected side

2-The head is held to one side, disturbance of the movement, equilibrium, and general condition of the animal

3-The ear is usually painful, with pus or a discharge of foul-smell and inflammatory changes in the ear canal that soils the hair below the ear

Diagnosis: -

The diagnosis of otitis media in dogs can be quite difficult to make because of the long, bent, funnel-shaped conformation of the dog's ear canal, which makes it hard to see the tympanic membrane (TM). In addition, many patients with otitis media have an intact TM, giving the clinician the impression that there is nothing wrong in the middle ear. Most canine patients with otitis media also have chronic otitis externa with pathologic changes to the ear canal that cause stenosis, making visual examination of the TM impossible

Treatment: -

The condition is usually incurable in the horse, and treatment attempts include irrigation with antiseptic and application of antibiotic.

In dogs, antibiotics given by mouth or injection may be prescribed for 3 to 6 weeks if inflammation of the inner ear exists. In long term otitis media, surgery may be necessary to allow for drainage and adequate resolution of the infection. Otitis media with an intact eardrum usually responds well to antibiotic therapy

AFFECTIONS OF THE HORN

I-SEPARATION OR AVULSION OF THE HORN SHEATH

Etiology: -

The most probable cause of separation of the horn is the direct violence like during fighting or trauma against the wall. Another cause of such affection is the repeated slight injury or neglected injuries at the base of the horn leading to chronic inflammation of the keratogenous membrane at the base of the horn, therefore the sheath becomes loose and easily detached. This affection has good prognosis and the lost horn can regenerate over a long period.

Treatment: -

This affection can be treated medically by cleaning the exposed core with antiseptic solution, with application of topical antibiotic ointment and horn bandage, and flies repellent if necessary. The surgical treatment involves surgical amputation of the horn or even both horns.

II-FRACTURE OF THE HORN

Etiology: -

The causes of fracture of the horn are the same like separation of the horn sheath. The fracture may be complete or partial, and it may involve the tip, the middle or the distal third of the horn.

Treatment: -

1-Incomplete Fracture

The fractured horn is fixed by a splint, which is tied to the other horn by a rope or wire.

2-Complete Fracture

The completely fractured horn can be treated surgically by partial amputation by sawing and a bandage is applied to the remaining healthy part, otherwise, complete amputation of the affected horn or both horns is performed.

III-OVERGROWTH OF THE HORN

It is an affection that is more frequent in small ruminants than large ruminants, and is characterized by overgrowth of the horn in curved manner that it can reach the skin of the head and penetrate it leading to many complications.

Treatment: -

Treatment is directed toward partial or complete amputation of the horns.

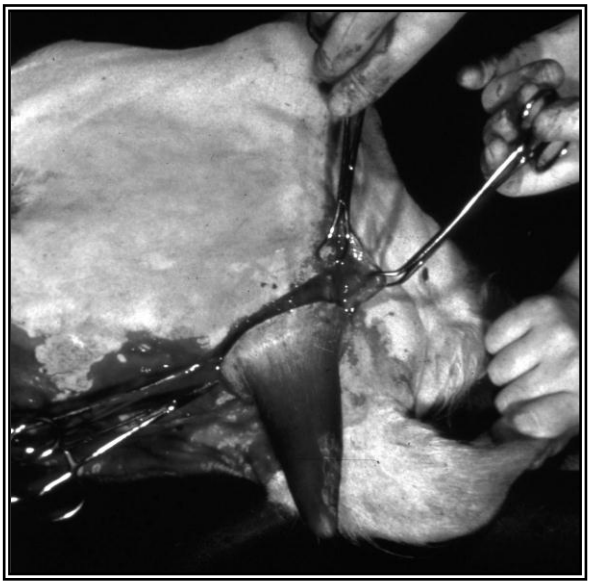
DISBUDDING (IN CALF)

Cattle are polled so that they can't gore one another and are less dangerous to be handled, so if it is preferred to disbud calves rather than waiting until they are adult 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, or by surgical removal of the horn buds 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



AFFECTIONS OF THE WITHERS AND BACK

The withers and back are frequently the seats of injury caused by the saddle or other causes. Nature of the lesion varies according to the depth of the injury and degree of infection.

I-EXCORIATION OF THE SKIN

It is common in young horses when first put to work

Etiology: -

The epidermis becomes softened by the sweat and is rubbed off by the movement of the saddle exposing Malpighian layer, which appears bright red in color. Serous discharge comes out from the wound and later on dried and forms scab on the denuded surface, and the denuded surface is highly painful.

Treatment: -

1-Removal of the cause (removal of the saddle)

2-Application of astringent lotion and antiseptic ointment

II-GALLS & GIRTH GALLS

Definition: -

It is an edematous condition of the skin and or subcutaneous tissue as a result of infiltration of the tissue by serum and inflammatory exudates.

Etiology: -

It occurs as a result of sticking of the moisten skin to the saddle; later on the skin is dragged by the moving saddle with laceration of the connective tissue. The condition is characterized by presence of one or more circular swellings of various sizes and can be recognized by passing the hand over the seat of the saddle. Theses swellings are sensitive and pit on pressure. When the saddle-bed is wet, theses swellings dry first.

Treatment: -

These cases can be treated by removal of the cause, cold applications and astringent lotions can treat the early stages, but later on, warm fomentation and massage are indicated.

III-HEMATOMA

Etiology: -

It is caused by direct pressure of the saddle on a particular part (unequal distribution of the weight of the rider or uneven padding of the saddle). The swelling is formed rapidly and it is hot, soft, fluctuating, but later on it becomes firmer and crepitates as a result of coagulation of the blood. Exploratory puncture will confirm the diagnosis.

Treatment: -

The same measures used for treatment of gall can be used for treatment of hematoma, but large cases require surgical incision, evacuation, and application of drain with Tr. Iodine.

IV-SIT-FAST

It is an area of dry gangrene and ulceration.

Etiology: -

It ensues as a result of arresting of blood supply of certain area of the skin by means of the saddle. Depth of the lesion varies, it may involve the skin only or it may extend into the subcutaneous tissue. The outer surface is greater than the inner surface as it assumes a cone shape. This area is sloughed later on with formation of clear line of demarcation at the periphery.

Treatment: -

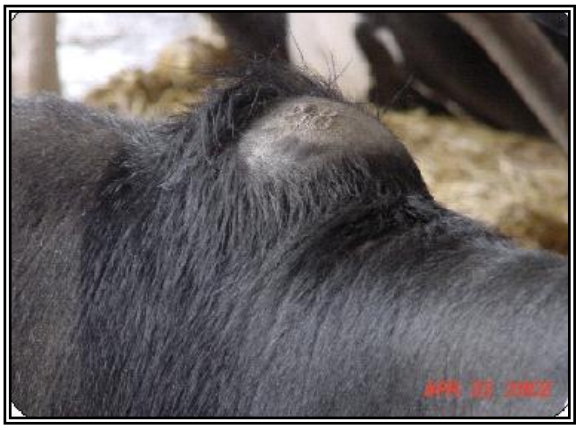
The condition can be treated by application of counter irritants like iodine ointment to hasten separation of the gangrenous tissue, and when the line of demarcation appears, the dead part should be cut away.

V-HYGROMA OR BURSAL ENLARGMENT

It is an over distention of bursa on the top of the anterior dorsal spines and accumulation of serum in the connective tissue in the space beneath the trapezius or rhomboideus. The condition similar to abscess formation and can be distinguished from abscess by exploratory puncturing.

Treatment: -

Hygroma is treated on the general principles of this affection. It must be differentiated from abscess. Anti-phlogistics should be applied, and when it fails to resolve the problem, incision is indicated despite it predispose to infection.



VI-ABSCESS

Circumscribed swelling containing pus

Etiology: -

It ensues as a result of infection of certain area by pyogenic microorganism. It may be superficial or deep, and may be located

laterally or centrally. Diagnosis is easy and can be confirmed by exploratory puncturing. Abscess may be associated with necrosis of the deep tissues and constitute the first stage of fistulous withers.

Treatment: -

Abscess is treated on the general principles of this affection (maturation, evacuation, and application of drain). Incision shouldn't be transverse to the long axis of the back to avoid gaping of the wound that would be slow to cicatrize. Counter opening may be required.

VII-OPEN WOUND

Etiology: -

It can be ensue as a result of many objects like sharp, pointed, blunt objects or even gunshot. Wounds may predispose to infection and necrosis of ligament, cartilages, or bones of the withers leading to fistulous withers.

Treatment: -

Wounds are treated according to general principles (recent or old wound).

VIII-FRACTURE OF THE DORSAL SPINES

Etiology: -

Usually it is accidental and occurs as a result of falling on the back over hard object. Signs of severe contusion are clear and

crepitation can be detected by placing the hand on the affected part during motion of the animal. Stiffness of the shoulders may be evident during progression. Fracture may be simple or compound, and recovery ensue in the former without complication but the later form may predispose to fistulous withers.

Treatment: -

Simple fractures of the spines resolve spontaneously with few weeks of rest, and it is advised to apply antiseptic solution over the affected area to avoid infection of the fracture via small hidden abrasions of the skin. Compound fractures need frequent antiseptic irrigation of the wound.

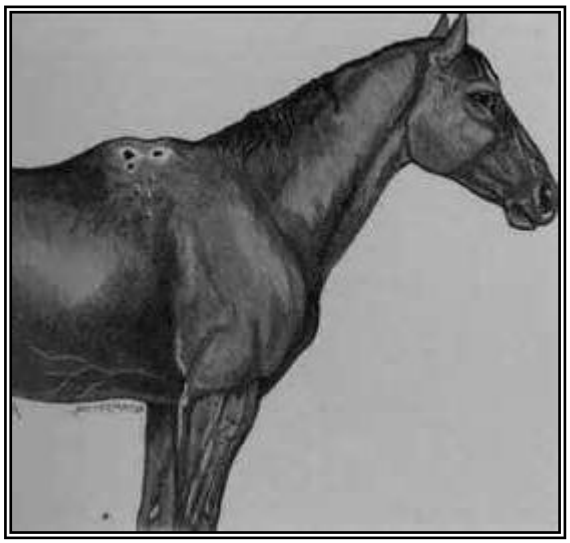
IX-FISTULOUS WITHERS

It is a sinus or a blind fistula develops in the region of the withers

Etiology: -

It ensues as a result of injury and infection that is followed by necrosis of some of the deep tissues. It is usually ensues as a result of abscess or deep sit-fast. The most affected tissues are the ligamentum nuchae, supra spinatus ligament, cartilages of the dorsal spines, spines, cartilage of prolongation of the scapula, and/or the ribs. Many cases of fistulous withers or poll evil were observed without presence of external exciting cause, and these cases were believed to be due to brucella and filarial parasites especially when the animal suffers from vitamin E deficiency.

Symptoms: -



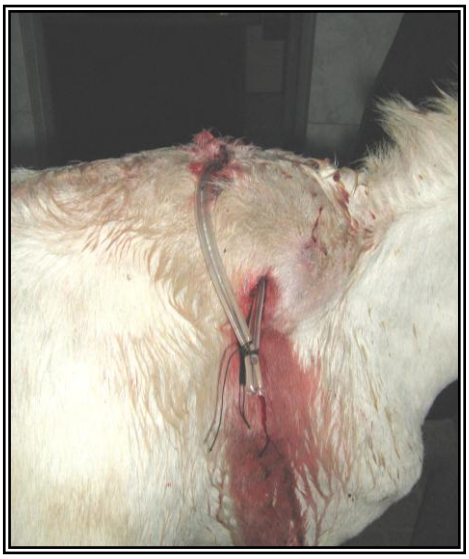
Symptoms of fistulous withers are always well marked, and are those of a sinus associated with an inflammatory swelling varying in size according to extent of the lesion, and it is usually painful in manipulation. The skin shows dermatitis, blood infiltration, excoriation, and necrosis. The subcutaneous tissue shows hematoma which either resorbed

under aseptic condition or undergo phlegmone if it is infected.

The fascia and the muscles show phlegmone or necrosis. The supra spinous bursa on the second or third thoracic spines may be affected with acute serous bursitis and later on it changes to chronic bursitis (hygroma) or purulent bursitis. Spinous processes of the thoracic vertebrae undergo ostitis and periostitis. One or more orifices are present and discharging pus with a quantity directly related to the size of the necrosed area. The disease usually advances from behind forward and from above to below. Suppuration spreads easily in the inter-muscular spaces and it can accumulate behind the scapula. In late cases, fistula of the neck may ensue as a result of spreading of necrosis through the ligamentum nuchae. Rare cases showed penetration of the neural canal or the chest cavity with septicemia.

Prognosis: -

It depends up on the location of the lesion (the deeper the lesion and the more anterior the position, the worse the prognosis). Lesions on the summit of the spines in the high withers respond more readily to treatment than that on the low withers as a result of isolated position and better drainage of the former.



Treatment: -

Treatment of fistulous withers depends up on providing of good drainage to facilitate escape of the pus, promoting separation and removal of necrotic tissues. Excessive incision is needed in some cases to expose the affected area and to facilitate the contact between the tissues and the antiseptic. Necrotic ligament should be severed in healthy part and removed. If one of the spines undergoes caries, removal by saw is indicated. If pus is collected behind the scapula, counter opening inferior and posterior to the scapula is indicated.

AFFECTIONS OF THE MALE GENITAL SYSTEM

I-CRYPTORCHIDISM

Definition: -

During the early stages of development of the fetus, the testicles are intra-abdominal, and usually they descend into the scrotum before birth. If one or both testicles fail to descend to the scrotum, the condition is called unilateral or bilateral cryptorchidism. The condition may be temporary in foals up to one year, but elder horses are considered cryptorchid animals.

Forms of cryptorchidism: -

1-INGUINAL CRYPTORCHIDISM

It is a condition characterized by one or both testicles retained in the inguinal canal

2-ABDOMINAL CRYPTORCHIDISM

It is a condition characterized by one or both testicles retained in the abdominal cavity

A-Complete

Both of the testis and the epididymis are present in the abdominal cavity

B-Incomplete

The testis is present in abdominal cavity while the epididymis is present in the inguinal canal

Etiology: -

1-Heriditary

2-Hormonal disturbance of the dam during pregnancy

Symptoms: -

1-Absence of one or both testicles from the scrotum

2-The animal is sterile in bilateral affection

3-Retained testicle produce higher amount of sex hormones on expense of reduced spermatogenesis, with increased sexual desire and the animal gets bad temper or becomes vicious (kicking and biting). However these animals are hard workers.

Diagnosis: -

1-History 2-Examination

3-Recctal examination in large animals

4-Radiography and songraphy in small animals

Treatment: -

Castration if the animal has bad habits

II-ORCHITIS

Definition: -

It is an inflammation of one or both testicles, while epididymo-orchitis means inflammation of both epididymis and testicles.

Aside from destruction of affected testicle, the other healthy one may be destroyed as a result of elevated temperature of affected one.

Causes: -

1-Trauma that may occur during transportation or by biting

2-Infection either by non-pyogenic organism like Salmonella and Brucella or by pyogenic organisms like Staph and Strept

3-Infestation by some types of filarial in camel

Signs: -

Signs are usually marked in acute cases while in chronic cases it usually misdiagnoses

A-General Signs

Fever, loss of appetite, and dullness, and loss of sexual desire

B-Local Signs

1-Hotness, pain, and swelling of affected testicle that seems hard on manipulation, this hardness or induration may extend to the epididymis and the whole structure becomes single hard mass of considerable size.

2-Testicle can't move freely within the scrotum

3-Abduction of hind limbs to reduce pressure on affected testicle

C-Changes in Seminal Fluid

1-Spermatozoa are reduced in number, have abnormal shape, and have reduced viability, accordingly the animal may be come infertile or even sterile in bilateral cases

2-Presence of large number of leucocytes and pus clots in semen

Treatment: -

A-Symptomatic Treatment

Cold application, anti-biotic, analgesic, and sedative

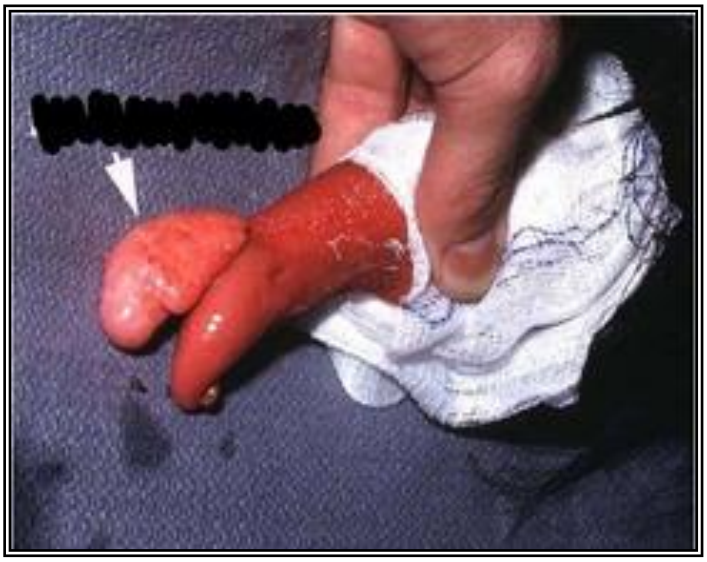
B-Surgical Treatment

Castration to save the other sound testicle

Differential diagnosis: -

	Orchitis	Tumor	Hernia	Hydrocele	Hematocele
Onset	**Rapid**				**Rapid**
Signs of inflammation	**Present**				
Palpability of testicle				**Impossible**	
Movability of testicle	**Impossible in chronic cases**				
Reducibility			**Present**		
Exploratory puncture	**Pus**	**Nothing**		**Serous fluid**	**Hemorrhagic**

III-PHIMOSIS



Definition: -

Inability to protrude the penis from its sheath either as a result of narrowing of its opening, or relative increase in size of glans penis due to inflammation

Causes: -

1-Congenital

2-Inflammation as a result of trauma or infection with subsequent cicatrical contraction of the orifice

3-Tuomors of the penis

4-Presence of strands connecting the glans penis to the prepuce

Signs: -

1-Inability to protrude the penis

2-Inflammation of the glans penis (balanitis) and the sheath (posthitis)

Treatment: -

1-Cleaning with application of warm fomentation for reduction of the size of penis

2-Surgical removal of neoplasms or scar

3-Surgical widening of the opening of the sheath

4-Surgical removal of the strand connecting the glans to the prepuce

IV-PARAPHIMOSIS

Definition: -

Inability of the animal to retract the penis into the prepuce that predisposes the glans penis to dryness and infection

Causes: -

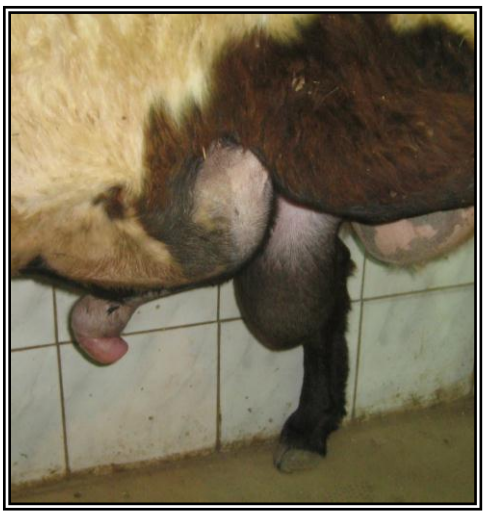
1-Strangulation of the penis by hairs around preputial orifice in case of bulls and dogs

2-Paralysis of the penis

3-Inflammatory swelling of the penis by trauma or infection

4-Neoplasmis of glans penis

Signs: -



1-Protrusion of the glans outside the preputial orifice

2-Constriction by the orifice causes congestion and edema of the glans that gradually changes in color and get infected

3-Necrosis and gangrene may be observed in old cases

Treatment: -

1-Remove the cause

2-Warm antiseptic fomentation for reduction of size of the glans penis, application of oily antibiotic for lubrication, reduction of the penis to its normal position, and closure of the preputial orifice by purse string

3-Surgical incision of the preputial orifice

4-Amputation of the penis in case of gangrene or paralysis

V-HYDROCELE

Definition: -

Accumulation of serum between the two layers of tunica vaginalis

Causes: -

1-Trauma 2-Infestation by filaria

Signs: -

1-Soft fluctuating swelling of the scrotum

2-Atrophy of the testicle in old cases

3-The testicle can't be felt if the amount of the fluid is large enough

Diagnosis: -

1-History 2-Signs

3-Clinical examination and exploratory puncturing

Treatment: -

Castration

VI-HEMATOCELE

It is a state of accumulation of blood between the two layers of tunica vaginalis as a result of trauma and treated by castration

VII-VARICOCELE

It is persistent vasodilation of veins of pampiniform plexus in old horses and treated by castration

VIII-SCIRRHOUS CORD

Definition: -

Chronic purulent, fibrous, hyperplastic, inflammation of spermatic cord and its covering tunica, that is usually observed after castration in equine and it is usually associated with abscess and fistula

Causes: -

1-Botromycosis in horses, and actinomycosis or TB in bulls

2-Small surgical incision during castration that predisposes to accumulation of secretions which are a good media for bacterial growth

3-Sepsis before, during or after castration

4-Weak cremastric muscle predisposes to protrusion of spermatic cord through the surgical wound and subjects it for infection

Signs: -

1-Stiffness and lameness of the corresponding hind limb

2-Delay of healing more than 6 weeks with presence of one or more opening discharging pus

3-Examination of these openings reveals connection to a canal

4-Rectal palpation reveals that the stump of spermatic cord is voluminous, hard, and painful

Treatment: -

Surgical excision of affected portion of spermatic cord

TECHNIQUES OF CASTRATION

Castrating an animal is unsexing a male animal. It isn't as simple as most people may think, nor is it exactly painless. However, castrating is a practice that has been done on cattle for hundreds of years and is the oldest surgical operation known.

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

Timing: -

Most castrating should be done during early spring or late fall. It can also be done in the winter time, as the cold will constrict the blood vessels making it less likely for an animal to bleed out sooner. The operation is better performed at younger ages, and Bulls can be castrated at 8 months of age although they can be castrated at any time. Castration of old animals predisposes to greater stress, risk of bleeding, and slows the growth rate. On average, calves are castrated around 8 weeks of age or sooner.

1-NON-SURGICAL CASTRATION

It is a process through which the gonads are retained non-functional without surgical removal of them. This process is far more painless, less invasive and less stressful on cattle than traditional methods. It includes chemical destruction of the gonads by injecting them with irritant substances, solution or a vaccine that targets hormones responsible for sexual characteristics and sperm production. This method destroys the testicles and spermatic cords of bull calves weighing up to 150 lbs. It's not as effective on bulls over this weight. Using the Immunocastration, however, is a vaccine that is being developed to target the hormones responsible for the sex characteristics and sperm production of the bull. So far, none of such vaccines have provided the possibility of long-term castration.

A-Banding by Elastrator

Technique: -

Put an elastic ring over the closed end of the elastrator. There are four points on the elastrator, and when the handle is squeezed, this opens up and stretches the green band. Restrain the calf in a sitting or lying position. Press both testicles through the ring and to the lower end of the scrotum. Release the rubber ring, and finally release the calf.

Advantages: -

1-Bloodless (no blood is lost when banding or crushing the cords through the scrotal wall)

2-Less chance of infection occurring because no open wounds are created

3-More painless than cutting because the area quickly numbs after the band is put on, there is a little discomfort, but it goes away after a while.

4-Quick and easy to do if done properly

5-No risk of maggot infestation if done during the fly season

6-Cutting off blood supply enables the testes and scrotum to gangrene and fall off on their own

Disadvantages: -

1-Mistakes can happen; put the rubber ring around the testes instead of the cord, one testicle is only banded because the other hasn't descended yet, ring is too brittle and comes off sooner than the scrotum starts to atrophy, etc.

2-A little painful during the application, but the area goes numb very quickly soon after.

3-Tetanus shot may be required as there is risk of infection as the scrotum atrophies and sloughs off

B-Castration by Burdizzo Pincher

By this operation neither the skin of the scrotum incised nor the gonads removed. A machine named Burdizzo which is a castration device that employs a large clamp designed to break the blood vessels leading into the testicles. Once the blood supply to the testicles is lost, testicular necrosis occurs, and the testicles shrink, soften, and eventually

deteriorate completely. When the device is used the operator crushes the spermatic cords one after one, leaving a space in between in order to maintain uninterrupted blood-flow to the scrotum. The burdizzo is used primarily on farm animals such as cattle and sheep. Because an incision is not required, castration by burdizzo is usually bloodless and, according to some research, has a lower risk of infection, compared with traditional methods. While the risks of blood loss and infection are low, anesthesia is a must, as the burdizzo causes blunt force causing trauma to the spermatic cords, which are thickly wrapped in nerve fibers.

Technique: -

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 BY CUTTING

It is a process through which the gonads are removed surgically

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 open spermatic cord, and higher incidence of peritonitis

AFFECTIONS OF THE URINARY SYSTEM

I-PERVIOUS URACHUS

Definition: -

It is a congenital defect of the urinary tract characterized by failure of the urachus to obliterate at birth.

Signs: -

1-In recent cases the hair at the umbilical area remains wet due to continuous dribbling of urine through the umbilicus

2-In old cases, animal may show ascending infection of the umbilicus, abscess formation, peritonitis, cystitis, omphalophlebitis, or poly arthritis

Treatment: -

1-CONSERVATIVE TREATMENT

It can be used if there is no complication and it is performed by repeated cauterization of the urachus to enhance healing and obliteration.

2-SURGICAL TREATMENT

It can be used if conservative treatment failed or if there is complication.

Technique: -

1-Aseptic preparation of umbilical region

2-Anesthsia

3-Eleptical incision around the umbilicus, then the umbilical vessels are dissected and ligated proximal to the abscess and excised. The stump is touched with Tr. Iodine. The urachus is located, double ligated, and

excised, and then the stump is cauterized with phenol 90%. The abdominal wall is closed as usual.

4-Silk is removed after 8-10 days

II-URINE RETENTION

Definition: -

It is the inability of the animal to empty the urinary bladder as a result of obstruction of the urethra

Etiology: -

1-Obstruction of the urethra due to a calculus or tumor

2-Constipation when the rectal contents press on the pelvic urethra

3-Paralysis of the bladder as in case of accidental trauma of the spinal cord

4-Spasm of the neck of the bladder that may occur in association with other conditions like colic and tetanus

Urolithiasis, urethrolithiasis or urinary stones

Urinary calculi occur in all species of animals, but it is of special importance in males than females, and in ruminants than other species. The disease usually observed in ruminants being fed heavy concentrated ration or grazing pastures of plants containing large quantities of oxalates, silica, or estrogens.

Predilection seat of lodged stone: -

Urinary calculi may be formed in the kidney, the bladder or any part of the urinary tract

1-The kidney (Renal calculi)

2-The ureters (Uretral calculi)

3-The urinary bladder (Vesical or cystic calculi)

4-The urethra (Urethral)

Classification of urinary stones: -

A-According to the Size

1-Sabulous material like fine sand

2-Gravel or small concretions resembling coarse sand

3-Small calculi or stones (capable of passing through the ureter to the bladder

4-Large calculi incapable of passage through the ureter

B-According to the Species

1-Equines

Usually *calcium carbonates*

2-Ruminants

Usually *calcium oxalate* or *calcium, magnesium, and ammonium phosphate* in those fed concentrated ration

3-Carnivores

Usually *magnesium* and *calcium triphosphate* or *carbonate*. *Oxalate, ureate*, and *cystine* stones may be present. In some cases the stone may be mixed containing one or more of the mentioned salts.

Causes of stone formation: -

1-Hereditary predisposing factors

2-Excess of certain salts in the ration or water e.g. magnesium and calcium oxalate

3-Excess of nitrogenous materials in the ration as in ruminants fed on cake, grains, and bran.

4-Insufficient or limited water intake or drinking highly mineralized artesian water

5-The pH of the urine affects the solubility of some salts. Alkaline urine favors formation of mixed phosphate and carbonate calculi.

6-Inflammation of mucous membrane of urinary tract as in case of pyelonephritis and cystitis, as the desquamated epithelium forms a nidus up on which the salts are deposited

7-Avitaminosis A in summer months may be a factor as vitamin A is essential for healthy epithelium

8-Early castration of small ruminants that predisposes to infantile or rudimentary penis and narrow urethra

9-Anatomical considerations play a role in the lodgment of the calculi in the penile urethra.

a-In large and small male ruminants, the sigmoid flexure

b-In small male ruminants, the urethral process

c-In dogs, the level of the caudal end of the urethral grooves of the oss penis

Symptoms: -

Urolithiasis occurs in both males and females, however, the condition rarely seen in female due to its short wide urethra while males are more susceptible to urine retention as a result of short long urethra, and lodgment of the stones in the sigmoid flexure or urethral process.

A-Urine retention with Intact Bladder

1-Colic, straining, grunting the teeth, stiff gait, and arched back

2-*Anurea* in case of complete obstruction, or *dripping* of bloody urine (*hematourea*) in case of partial obstruction

3-Loss of appetite and depression

4-Urethra is painful on manipulation

5-Presence of urethral pulsation on finger rectal examination

B-Urine retention with Ruptured Bladder

1-History of anurea for long period (2-3 days)

2-Absence of urethral pulsation on finger rectal examination

3-Constipation and inspissation of fecal matter

4-Enlargment or distention of the abdomen (bear shape) as a result of uro-peritoneum

5-On exploratory puncture of the abdomen, urine comes out

6-General signs of depression, off food, and lethargy

7-Uremia is the fate if the animal is not treated (the breath has urenephrous odor, with nervous sings like severe depression, and death)

Diagnosis: -

1-History

2-Signs

3-Clinical examination

a-Palpation of bladder reveals its over filling or rupturing

b-Presence or absence of urethral pulsation by finger rectal palpation

c-Detection of the seat of stone lodgment by palpation

d-Exploratory puncturing of the abdomen in case of ruptured bladder

f-Presence of the stone at the root of urethral process, or presence of adhesion of this process to the glans penis in case of male small ruminants

4-Radiography and sonography

Treatment: -

A-Medical Treatment

This method usually fails, however it can be tried and the aim of most of the used drugs is to help pushing of the stone or relieving the spasm of the urethra around it. This method is used only for cases with intact bladder

1-Spasmolytics

Drugs like *anlagen* can be used to relieve spasm of the urethra to help pushing of the stone under gravity by the accumulated urine in the bladder.

2-Diuretics

Diuretics and fluid therapy help pushing the stone, however, rupture of the bladder or the urethra may occur

3-Parasympathomimitics

Parasympathomimitics like neostigmine or acaprine were tried also, they will induce severe contraction of the bladder and this method either will push the stone or will cause rupture of either the bladder or the urethra

4-Parasympatholytics

Atropine has been used by many veterinarians to prevent contraction of the bladder and the subsequent rupture, and the aim of its use is the pushing of the stone by the accumulated urine under gravity

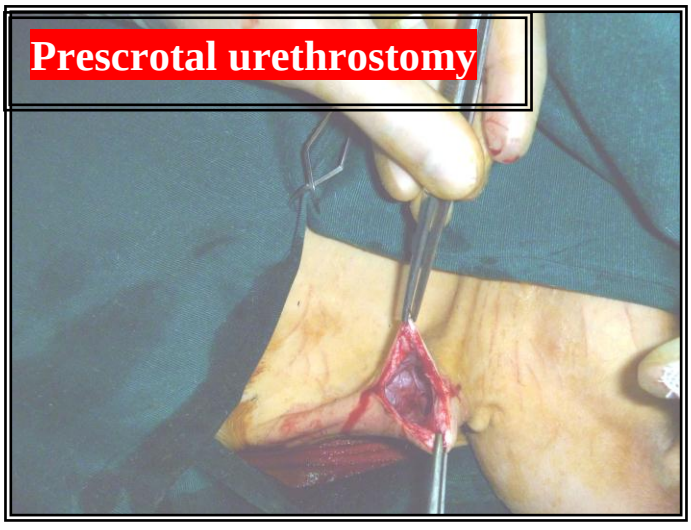
5-Tranquilizers or Sedatives

Tranquilizers and sedatives like xylazine HCl were used to induce relaxation of the penis to help pushing the stone from the relaxed sigmoid flexure

B-Surgical Treatment

1-Intact Bladder

Animals with intact bladder can be treated surgically by many techniques, however, the fate of the animal after surgery, the cost, and the complications of surgery control the choice of such techniques.


Prescrotal urethrostomy

a-Urethrostomy

Creation of a fistula in the perineal urethra at a level higher than the seat of obstruction and


Perineal urethrostomy

animal will urinate through this opening forever unless obstruction of this fistula occurs.

Subject animal: -

Calves and rams

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.


Low perineal urethrostomy

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 fir 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

b-Urethrotomy

This technique can be used for animals with intact bladder too (Calves and rams)

Technique: -

1-Aseptic preparation of the perineal region

2-Anesthesia by epidural analgesia, and sedation

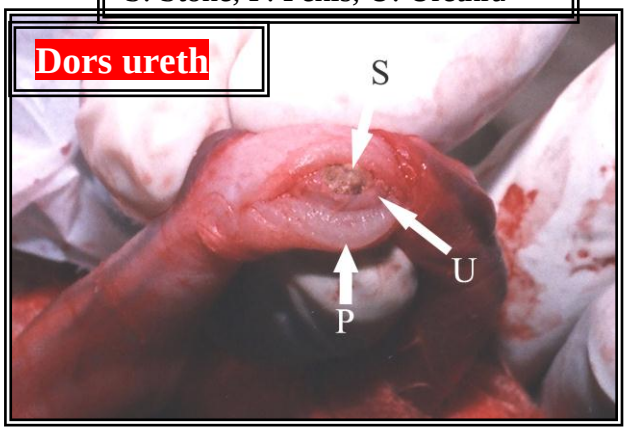
3-The animal is kept in lateral recumbency, the seat of stone is detected, the skin over the seat of obstruction is incised, the penis is exteriorized, and then the stone is removed by *ventral* or *dorsal* urethrotomy

4-Seat of incision in the urethra or penis is sutured with vicryl No. 5/0

5-The penis is washed with saline and lubricated with oily antibiotic, and the skin is closed

i-Ventral urethrotomy	***ii-Dorsal urethrotomy***
The technique is performed by incising the urethra directly over the stone	The technique is performed by incising the body of the penis dorsally and longitudinally among dorsal penile veins and nerves
Advantages: - 1-Simple, direct and precise method for reaching the stone which is superficially located 2-The disadvantages of urethrostomy can be avoided	*Advantages: -* 1-The low probability of stenosis after suturing 2-The low probability of leakage of urine through incision line 3-The disadvantages of urethrostomy can be avoided
Disadvantages: - 1-The seat of incision has many pathologic changes like necrosis as a result of pressure of the lodged stone and this may lead to rupture of suture line, leakage of urine or ruptured urethra 2-Suturing of the urethra after removal of the stone may lead to stenosis of the urethral lumen with subsequent urine retention with smaller stones	*Disadvantages: -* 1-Techniqually more difficult

S: Stone, P: Penis, U: Urethra



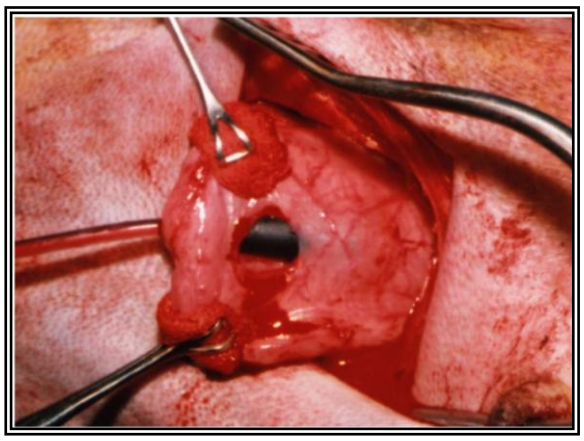
c-Tube cystotomy

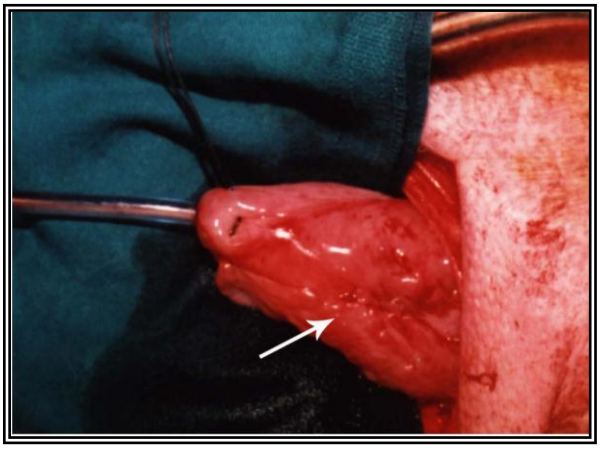
It is a technique through which the bladder is catheterized after laparotomy, and the urine comes out through this catheter either temporarily or permanently

Subject: -

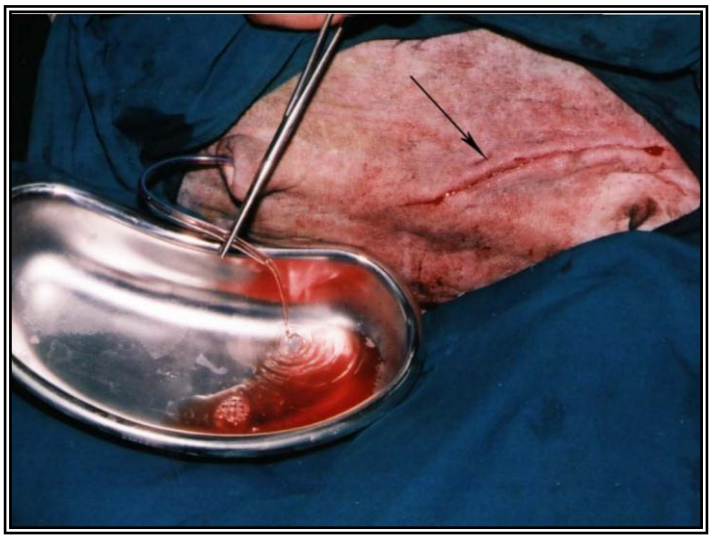
Calves and rams

Technique: -





1-Aseptic preparation of the left flank or the left prepubic region



2-Anesthesia

3-The abdominal wall is incised in layers, the intact or ruptured bladder is located, and a Folly catheter or Rayle's tube is introduced to the bladder and a purse string is made around it.

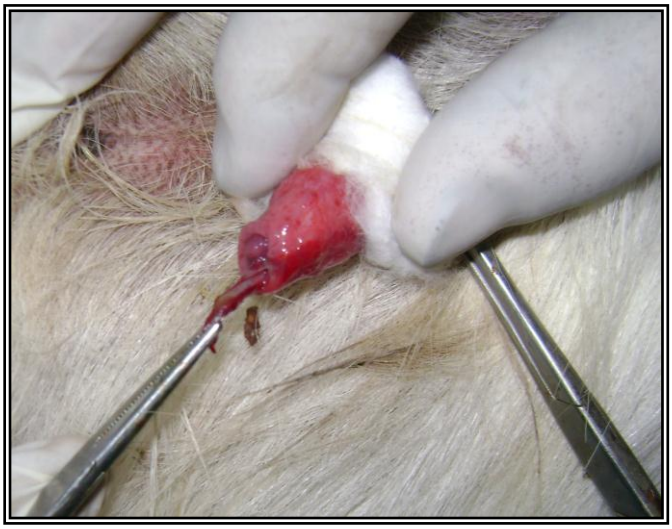
4-Folly catheter can pass through the flank and fixed outside, or if the surgeon used Rayle's tube, it can pass through the prepuce and fixed to the glans penis.

5-The abdominal wall is closed as usual.

The aim of using Folly catheter (*temporary*) is the hope that the stone will dissolve and when the animal starts to urinate normally, the catheter can be removed, while using Rayle's tube is a *permanent* method of urine diversion.

d-Amputation of urethral process

This technique can be used for rams with intact bladder



Subject: -

Rams

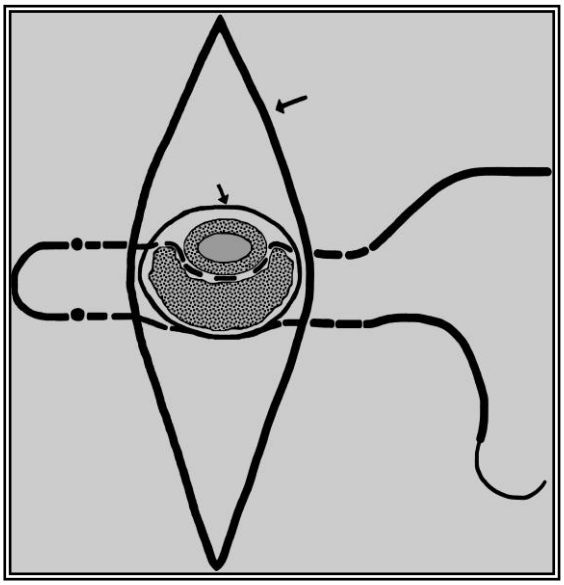
Technique: -

1-The animal administered tranquilizer or injected with epidural analgesia for relaxation of the penis.

2-The penis is protruded manually then the adhered urethral process is dissected and removed after which the animal will urinate. Urination after amputation indicates that the stone was lodged in the urethral process, otherwise, the stone is lodged at higher level and requires urethrostomy which it is a cheaper method of treatment, and these two surgical procedures can be used for ram because the cost of laparotomy is higher than the animal price in our localities.

f-Penile transection and translocation

This is a fast surgical technique used for beginner veterinarians as the possibility of failure of the technique is low, and the procedures are simple



Securing penile stump to the skin penectomy. U:Urethra, I:Skin incision, S: Tunica albuginea of the penile stump

Technique: -

1-Epidural analgesia and securing of the animal in lateral recumbency position

2-Perineal region is prepared for aseptic

surgery

3-The penis is located dorsal to scrotum and exteriorized

4-The penis is cut in transverse manner

5-The urethra is incised longitudinally for 3-4 cm and fixed to the perineal skin

Advantages: -

1-Simple, fast, low cost procedure

2-Low incidence of failure

3-Low possibility of urine scalds

4-Low possibility of stenosis

Disadvantages: -

1-The animal can't be used for breeding

2-Animal is sold for low price

2-Ruptured Bladder

a-Tube cystotomy

As mentioned before

b-Laparotomy and suturing of the bladder

The only solution of ruptured bladder is laparotomy for welding of the bladder, preceded by urethrotomy for removal of the stone

Subject: -

Calves

Technique: -

1-Aseptic preparation of the left prepubic region

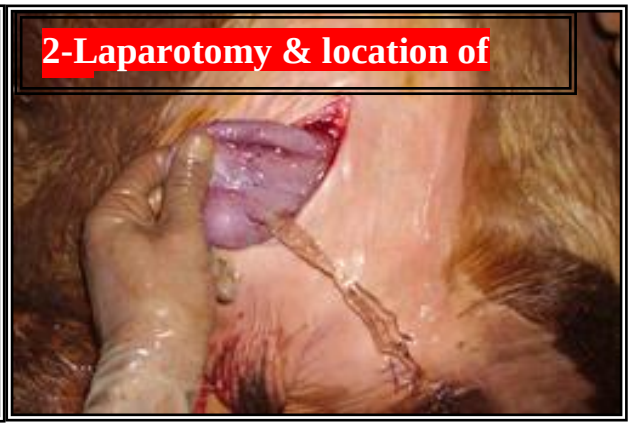
2-Anesthesia by epidural analgesia, and sedation if sedation doesn't threaten the animal due to bad the general health condition

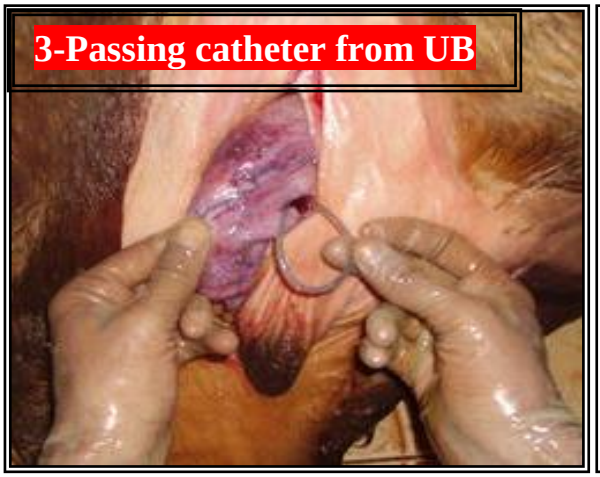
3-The animal is kept in lateral recumbency, with the right flank facing the ground. An oblique anterior-ventral incision is made at the prepubic region. The prepuce is splitted and the penis is exteriorized. The stone is removed by urethrotomy, the seat of incision over the stone is sutured, and the penis is lubricated with oily antibiotic and the prepuce is sutured.

4-Through the same prepubic incision, laparotomy is performed and the left hand is introduced to the abdomen and urine is prevented from escape to preserve the abdominal distension. The bladder is located, cleaned from other stones or clotted blood, then a Rayel's tube is inserted to the bladder and advanced through its neck to the urethra and exteriorized through the external urethral orifice.

5-The stump of Rayel's is removed and the tube is fenestrated and kept inside the bladder, the wound of the bladder is closed with catgut, the abdominal wall is sutured in layers, and finally the skin is sutured.

6-The catheter is removed after 3 days and its function during this period is lowering pressure on sutured areas in the bladder and urethra, and the silk is removed after 8-10 days.





Advantages: -

1-The disadvantages of urethrostomy can be avoided (Durable technique and animal can be used for breeding)

2-The high loss by slaughtering the animal can be avoided

Disadvantages: -

1-The high cost

2-The need for special equipment

3-The need for high skills and experiences

C-Bladder Marsupialization

Definition: -

It is a technique through which the wound of the bladder is sutured to the abdominal wall (creation of fistula between the bladder and outside)

Subject: -

Dogs

Disadvantages: -

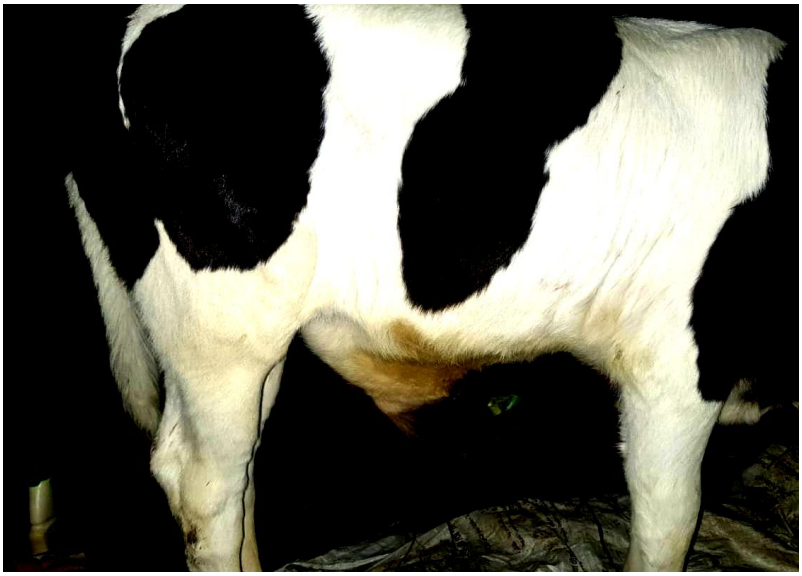
1-High incidence of ascending cystitis

2-Urine scald

III-RUPTURED URETHRA

Definition: -

It is a process through which the urethra undergoes rupture and the urine comes subcutaneously with gradual swelling at the belle and scrotal region. The condition is a sequel of urine retention and usually it is not accompanied with rupture of the bladder.



Etiology: -

1-Urine retention by stone

2-Trauma

Signs: -

1-Absence of urination

2-Gradually increasing swelling at scrotal and ventral abdominal region

3-Presence of urethral pulsation by finger rectal examination

4-Slow on set of moist gangrene at the seat of swelling including;

a-Formation of dark blue skin areas

b-The hair can be removed easily form affected areas

c-Exploratory puncturing reveals urine accumulation with clear odor of ammonia that gradually changes to bad odor

5-Final death due to septicemia

Treatment: -

1-Urethrostomy 2-Scarification of the swelling for evacuation of urine

3-Control of moist gangrene

IV-CONGENITAL URETHRAL DILATATION

Definition:-

Congenital anomaly of the urethra that causes dilatation of the urethra, accumulation of urine within the dilatation, urethritis, and cystitis

Cause: -

Congenital

Signs: -

1-Presence of circumscribed swelling anywhere along the course of the penis, usually below the anus in calves and pre-scrotal in kids

2-Dripping of urine

3-Recurrent cystitis and fever

Diagnosis: -

1-History

2-Clinical signs

3-Clinical examination

4-Differential diagnosis from abscess, hematoma, tumors, cyst etc..

Treatment: -

Urethrostomy or surgical excision and urethrostomy

AFFECTIONS OF THE UDDER & TEAT

Anatomical consideration: -

The udder of the cow and buffalo is composed of four quarters each of which is a separate unit and is considered as an independent compartment. Thus the affection of one quarter does not necessitate the involvement of the other quarters. In cow, the teats of the anterior quarters are longer than the posterior. In buffaloes the anterior teats are shorter than the posterior, so the anterior teats of the cow and the posterior ones of buffaloes are more subjected to injuries. The udder in ewes and goat is composed of two halves, right and left. Most of surgical procedures of the udder and appendages are performed on the bovine are the same adopted on small ruminants and other large species.

I-CONGENITAL ANOMALES

1-SUPERNUMERARY TEATS

This may occur and can be present anywhere on the udder but are most frequently seen posterior to the last two normally-placed teats. These additional number teats may or may not have adjacent glandular tissue that will become functional. If there is a glandular tissue that has a functional potential, it will atrophy if not milked.

Treatment: -

It is better to amputate the accessory teats when that animal is young heifer, before the gland becomes active. It is essential to take care that only the supernumerary teats are removed and not those which are normally-placed. It may be desirable to remove the supernumerary teats

for cosmetic reasons or because some may be so close to normally-placed teats that may interfere with milking procedures.

Procedure: -

1-Infiltrate the base of the teat by means local anesthetic

2-An elliptical incision is made including the necessary teat

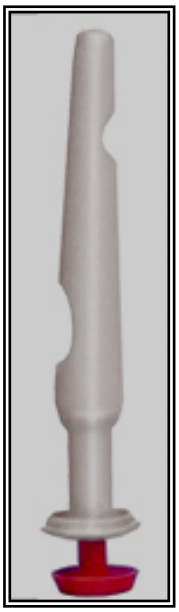
3-Crush the tissue and the skin is then sutured in an interrupted pattern

2-OLIGONUMERARY TEATS

It means that the number of teats is lower than the normal number in that species

3-HARD MILKER

It also known as *Contracted teat orifice* or *hard milker*, and it is either congenital or acquired as a result of trauma to the end of the teat.



Signs: -

There is a small stream of milk and the stenotic teat orifice result in prolonged milking time. There may be loss of milk due to incomplete milking or trauma to the teat due to attempts to obtain milk more rapidly by sternuous milking methods.

Treatment: -

The orifice should be cleansed, disinfected, local infiltration analgesia injected into the teat canal and then the orifice enlarged. The enlarging procedure may be accomplished by the inserting of a teat knife. The opening in the sphincter is maintained at the desired size by inserting a Larson teat-tube and leaving it in place for 5 - 7 days. Milking is accomplished by removing the cap of the tube.

4-FREE MILKER

Definition: -

It is a condition of wide teat orifice leading to continuous dripping of milk at times other than milking leading to milk loss, and predisposes to udder infection. It is also known as enlarged teat orifice or Leaker, and it occurs due to a relaxed or a traumatized sphincter.

Treatment: -

The condition may be treated by injecting minute amounts of sterile mineral oil or lugol's solution around the orifice to reduce its size to the desired effect. This may have to be done more than once to obtain the optimal size for milk flow. If it is overcorrected and result in stenosis, handle as contracted sphincter or orifice.

5-OCCLUSION OF THE TEAT ORIFICE

Definition: -

This is a congenital anomaly characterized by occlusion of the teat orifice deposit the teat fills with milk at the time of lactation. It may also be acquired as a result of trauma at the teat orifice that results in healing with occlusion.

Treatment: -

1-A small amount of local analgesic is injected into the area

2-Insert a septic hypodermic needle where the opening should be located

3-Insert the needle into the teat canal until milk flows out; then withdraw the needle and enlarge the opening as described for contracted sphincter

II-ACQUIRED AFFECTOIONS

1-WOUNDS OF THE UDDER AND TEATS

Wounds of the udder and teats are most frequent seen in cows and the skin may be divided or only bruised

Cause: -

1-Treads especially in large pendulous udders animals that may even tread on their own teats when rising

2-Bites from dogs or by sharp objects like thorns

Types: -

A-Bruises

They cause bleeding either into the gland ducts (bloody milk), or into the skin and subcutaneous tissue that either absorbed, as in other soft parts, or infected with formation of an abscess.

B-Wounds

1-Superficial Wounds

They are wounds that neither penetrates the gland substance nor the milk ducts, they are of no particular importance. Considerable bleeding sometimes occurs at the base of the teat, but they can be treated on general principles.

2-Penetrating Wounds

They are wounds that open into the gland, associated with danger of the formation of milk fistulae. Though healing then appears to proceed satisfactorily, cicatrisation fails to occur, on account of the milk continuously flowing through the wound, which nearly closes, but leaves

a little funnel shaped opening, termed a milk fistula. This is, however, only to be feared during lactation.

Injuries of the teat may produce cicatricial contraction, and consequent difficulty in milking.

Treatment: -

A-Bruises

Bruises accompanied by the passage of blood-stained milk, treated by

1-Keeping the udder and the teats clean to prevent infection

2-Removal of the blood and milk by catheter

3-Application of poultices to stimulate resorption

B-Wounds

Treatment of *deep wounds* of the udder directed towards induction of healing by first intention.

1-Recent wounds are treated on general principles of recent wound treatment, the edges of the wound are carefully refreshed and sutured, and it should be kept in mind that during lactation wound healing resists the most careful treatment, although they readily heal when the animal becomes dry.

2-The gaping of wounds of the teats and escape of milk can be prevented by applying a well-fitting rubber ring (not be too tight), or adhesive plaster.

3-The use of milk catheter or teat syphon allows milk discharge and ensures healing by primary intention

4-If immediate healing is impossible, treatment must follow general principles by following careful antisepsis, and prevention of infection extension, pus formation and cellulitis.

5-When teat fistula is formed, is can be closed by using caustics or by inserting deep and superficial sutures with using milk catheter during treatment, and failure of such treatment can be corrected by waiting the

end of the lactation period then the fistula is closed by suturing or cauterising the edges with silver nitrate.

2-LACTIFEROUS OR MILK CALCULI (Milk stones or lacteolith)

Definition: -

Milk stones sometimes form in the mammary gland from organic substances with considerable quantity of phosphate of lime. They are rounded masses varying in size and number, and usually they are not numerous.

Diagnosis: -

Palpation of the udder or teat

Treatment: -

1-Calculi which do not enter the teat, seldom prove troublesome

2-Those which enter the teat can usually be removed by manipulation from above downwards with the finger and thumb

3-Larger calculi obstructing the teat canal can be crushed by means of special forceps

4-Failing of these methods may necessitate that the teat be opened at the base, the calculus removed, and the wound closed by sutures

3-GANGRENOUS MAMMITIS (gangrenous mastitis)

Gangrenous mastitis is commonest in sheep and goats

Signs: -

1-The disease starts as a per-acute parenchymatous mammitis with severe general symptoms like fever, loss of appetite, great weakness, pain, and straddling gait.

2-Local symptoms soon develop, the skin of the affected gland exhibits redness, with bluish-violet or black discrete spots, which on palpation are found to be soft, insensitive, and very cold. These spots quickly coalesce forming necrotic patches. They are surrounded by a crepitating inflammatory edema which extends along the abdomen, and even to the chest and thighs.

4-Milk secretion ceases, the lambs are hungry, and many of them suffer from sores on the lips

5-Later, the affected ewes are constantly down, groaning and grinding the teeth in acute pain, and after a short interval, the temperature falls, the animals show great prostration, with rapid, shallow breathing and small or imperceptible pulse.

6-Symptoms of toxemia then appear, and not infrequently death follows within twenty-four hours

Prognosis: -

In exceptional cases the local process is limited and dissecting inflammation sets and separates the necrotic tissues and may result in recovery

Prognosis is usually unfavorable, and in many cases excision of the udder can't save the animal's life, even if she survive, she will never regain her former condition, but remains weak and unthrifty.

Treatment: -

1-Surgical ablation or excision of the affected gland is the best treatment

2-In mild cases, early partial amputation of the necrotic portions or incision into the gangrenous parts with antiseptic dressing of the wounds may cause improvement

Technique of mastectomy: -

1-Aseptic preparation

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

3-The vessels are ligatured, and the fibro-elastic suspensory bands are then divided

4-The gangrenous udder is excised and sutures are applied

4-TEAT FISTULA

Definition: -

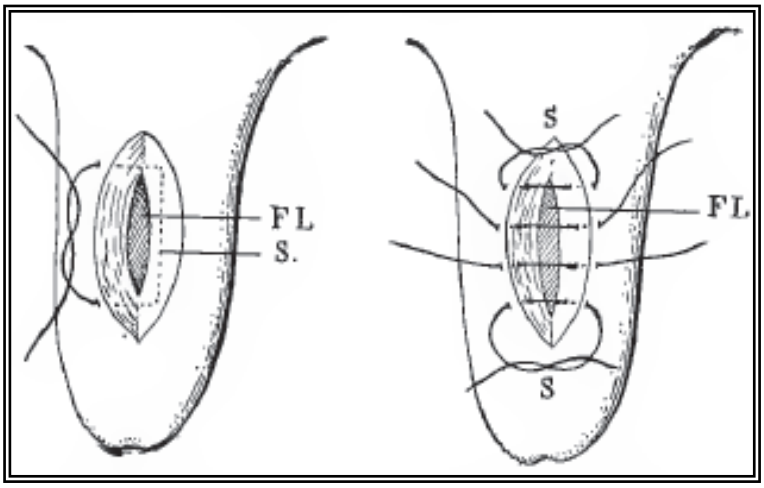
The term teat fistula (milk fistula), refers to an opening in the wall of the teat, connecting the exterior to the pre-existing channel, the teat canal is characterized by persistent outflow of milk. Such fistula may be congenital or acquired. It is mostly acquired as a result of penetrating wound that extend to the teat canal or cistern and fails to heal completely because of the continuous drainage of milk. Fistulae vary in size from so tiny difficult to be located to large ones through which the mucous membrane may be seen.

Diagnosis: -

1-History and signs

2-Examination

Treatment: -



Fistulae can be treated by either cauterization of the edges of the fistula with caustic substances or surgical excision of the fistula and suturing of the recent wound. However it is contra indicated to carry out such surgery if mastitis is supervening or the lips of the wound are edematous, and this should treated before surgery.

1-The entire area is prepared for aseptic surgery by washing the field of the operation with soap and water, swap with alcohol. Tincture iodine should never be used because of its marked irritant effect.

2-Analgesia by ring block at the base of the teat and local infiltration analgesia of the edges of the fistula

3-Apply a suitable tourniquet at the base of the teat as much high as possible to secure hemorrhage during the operation

4-The wound edges should be debrided before suturing. If the fistula is old and the tissues around it have healed, the tract should be excised before suturing

5-Apply a teat siphon to guard against injuring tissues of the other side and to avoid excessive trimming

6-The teat fistula is then sutured and the suture is carried out in two rows including all layers with the exception of the mucosa using non absorbable, non-capillary suturing material. A vertical mattress or similar stitch is used to effect the apposition of the edges deep in the tissue and superficially. The apposition must be complete and firmly held in place or milk seepage will cause the fistula to recur.

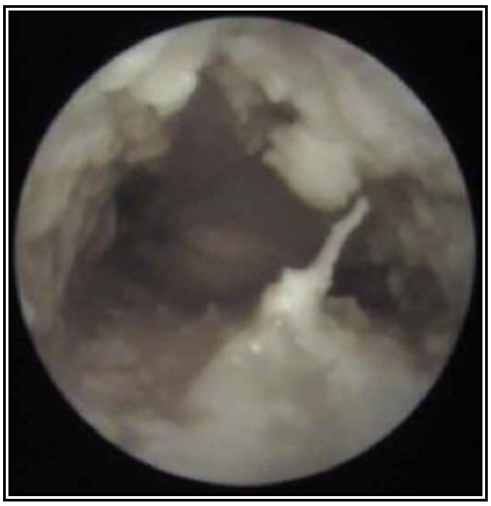
7-A teat bougie is applied to prevent adhesion of both sides of the teat cistern

8-An elastic adhesive bandaged is wrapped around the teat to reduce milk pressure on the sutures and to protect the wound

9-The tourniquet is then removed, the bandage removed after 5 - 7 days, and the stitches removed in 10 - 14 days post operatively

10-Siphoning the milk every with intra-mammary infusion of udder antibiotic ointment to guard against mastitis

5-TEAT POLYPS



Definition: -

They are hypertrophy and reflections of the endothelial lining of teat cistern that interfere with normal milking

Causes: -

Chronic irritation of endothelium of teat cistern

Treatment: -

Open teat surgery and removal of the polypes

AFFECTIONS OF THE ABDOMEN

I-OPEN WOUNDS

1-NON PENETRATING WOUNDS

Definition: -

Superficial wounds that don't divide or penetrate abdominal wall, don't likely to be followed by further laceration of the abdominal walls, and neither associated with prolapse or injury of internal organs.

Treatment: -

These wounds merely require to be kept clean, and are treated on aseptic principles according to the condition of the wound (recent or old). Such wounds generally heal well if freely dressed with antiseptics. If infection or suppuration extends, counter-openings or drains are resorted. When the walls are extensively lacerated, and further laceration is possible, the wound should be carefully sutured, and supported with a bandage. Strong and deeply-inserted stitches are required, and complete rest should be prescribed. Suppuration sometimes occurs between the abdominal muscles. This condition is treated in the same way as infected wounds.

2-PENETRATING WOUNDS WITHOUT PROLAPSE

Definition: -

They are wounds extending to or dividing the parietal peritoneum, neither associated with prolapse nor injury to internal organs. The use of probe is contraindicated, to avoid conveying infective material into the peritoneal cavity, and it has low diagnostic value owing to the layers of muscle being often displaced and occluding the deeper channel of the wound

Causes: -

1-Thrusts with the horns

2-Sharp instruments like stable-forks, lances, bayonets, knives, or scissors

3-Gun-shots

4-Injuries from leaping over hedges or fences, or by falling on sharp objects, as harrows or spurs

5-The bites of dogs may also penetrate the peritoneal cavity

Signs: -

Every penetrating wound of the abdomen must be regarded as dangerous and prognosis principally depends on whether prolapse of the intestine and peritonitis can be prevented.

1-Presence of abdominal wound

2-Perforation may occur without peritonitis, and it may be disclosed by protrusion of abdominal organs, or discharge of the contents of the bowel

3-Penetration of the peritoneum may shortly be demonstrated by symptoms of peritonitis, marked tension of the abdominal wall, increased pulse rate, paleness or dirty red color of the mucous membranes, slight or continuous colic, and vomiting in pets.

Treatment: -

Treatment is directed towards prevention of wound sepsis, peritonitis and prolapse of the intestine

1-Peritonitis may be prevented by following general aseptic treatment of the wound, and massive systemic antibiotics. Careful cleansing and disinfection of the wound according to its state (recent or old) and its neighborhood are necessary, bleeding must be checked by ligaturing injured vessels, and prevent blood accumulation in the wound. Foreign bodies, and loose shreds of tissue, likely to become necrotic, should be removed. The wound is sutured with suitable suture material and pattern

2-Prolapse of internal organs can be prevented by bandages passed around the body of the animal, with keeping him in quiet well-padded place or kept on slings. For several days the food chosen should be

digestible, nutritious, and small in amount, and water given only in small quantities

3-PENETRATING WOUNDS WITH PROLAPSE

Definition: -

It is an open penetrating abdominal wound that is associated with prolapse of portions of omentum, bowel, uterus, or other abdominal organ, and constitutes a dangerous complication. The prolapse is not so dangerous, but there is much difficulty in returning and retaining the viscera in position, preventing soiling and injury of viscera during preplacing, and preventing entrance of infective materials into the peritoneal cavity.

Treatment: -

Early reposition is the most important indication, with prevention of viscus injury and soiling.

1-The wound and its neighborhood, together with the protruding portion, are carefully cleansed, any foreign bodies are carefully removed, and the necrotized wound, omentum, or organ is excised.

2-Reposistioning of the prolapsed organ, *Omental prolapse* is least dangerous, because when its return is difficult or impossible, a large piece may be removed without bad consequences. *Bowel prolapse* is more dangerous, because when the serosa is injured its vitality is lowered and favors the growth of infective organisms. Prolapses of the large intestine are generally least troublesome. In the horse, prolapse of the colon or cecum, is easier to be reduced and kept in position than that of the small intestine, because the colic mesentery is shorter than that of the small intestine, and the viscus is less sensitive to operative interference.

3-Suturing of the wound with suitable suture material

4-Bandage to prevent reopening of the wound and subsequent prolapse

5-Massive dose of systemic antibiotic

6-Digestible, nutritious, and small amount food and small quantities of water for several days

4-WOUNDS WITH INJURY TO INTERNAL ORGANS

Definition: -

It is a perforating abdominal wound associated with injury of internal organs with or without prolapse. In herbivora the colon is most frequently injured, on account of its great area, its distension with hard food, and its fixed position while the more mobile small intestine being generally filled with fluid frequently evades the object producing the injury. Accordingly, pointed instruments may penetrate the abdomen deeply without injuring small intestine.

Treatment: -

1-Suturing the injured organ with suitable suture materials if it is prolapsed, or widening of the wound under aseptic condition, if it is not prolapsed, and then the organ is sutured. The injured organs must be carefully cleansed and foreign bodies are removed, and if there is necrosis or gangrene, the necrotized part should be excised and the bowel is anastomosed. The peritoneum must be washed with normal saline solution.

2-The subsequent treatment has already been described

II-CLOSED WOUNDS

1-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

called 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

ESSENTIAL CONSTITUENTS OF HERNIA

A-Opening In The Abdominal Wall (hernia ring)

It is an opening through which the viscus has protruded, and it may be a normal opening like the umbilicus, or one abnormally dilated, as the inguinal canal sometimes is, or a rupture in the abdominal coats, without solution of continuity in the skin. The rim of this orifice is termed the hernial ring. Its form and size vary greatly, from little finger to a man's fist, and it is round, oval or slit-like.

B-Hernial Swelling

It may vary from the size of a hazel nut to that of a man's head or more, consists of the portion of protruded viscus (*hernial contents*), and its coverings (*hernial sac*). The latter is divided into neck and base. The hernial sac consists of skin and subcutis, the latter is usually thickened, and sometimes it has layers of muscle and abdominal fasciae.

CLASSIFICATION OF HERNIAE

A-According To Reducibility

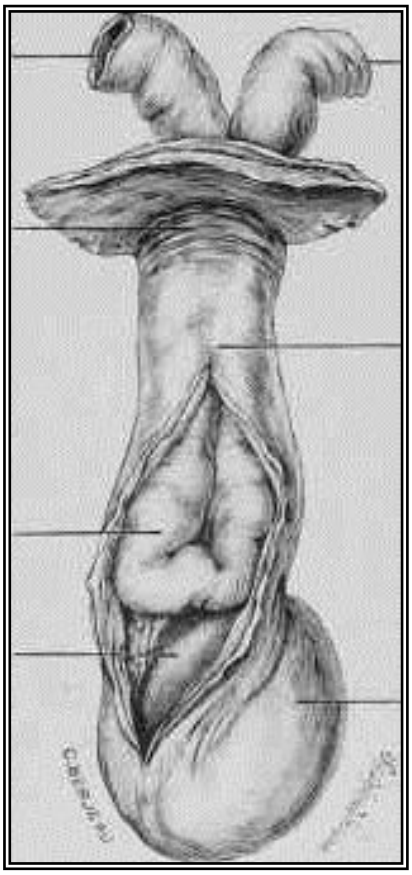
1-Reducible Hernia

This type of hernia can be reduced to the abdominal cavity through the hernia opening (ring), the contents lie free in the sac, and can be returned to the peritoneal cavity.

2-Irreducible Hernia

It is the hernia that can't be reduced into abdominal cavity either due to large size of the contents and sac than the opening, the hernial contents and sac become adherent to one another, excessive distension of the protruded portion of intestine by gas or hard masses of faeces, or strangulation of the contents.

B-According To Strangulation



1-Non-strangulating

Herniae that predispose to no involvement of blood supply of the hernial contents, and they are less likely to cause death of the animal

2-Strangulating

Herniae that predispose to involvement of blood supply of the hernial contents, and they are likely to cause death of the animal. Hernial ring compresses the contents and interferes with normal passage of ingesta through the intestinal loop. In consequence of this compression the return of blood through the veins is first affected followed by the arteries, whose strong walls and high blood-pressure oppose considerable resistance to compression. Blood continues, therefore, to enter by the arteries even after the inception of strangulation, and soon

produces a severe venous congestion, usually associated with more or less extensive rupture of small vessels and hemorrhage. Infective inflammation of the intestinal wall follows, blood-stained serum is exuded, the hernial fluid increases, and in consequence of mixture with blood becomes red in color. The hernial contents, especially the serosa of the intestine, are dark red or black, and this coloration is distinctly and usually sharply bounded by the ring-like circle of compression, which is usually grey and anemic. Both these anemia and venous congestion impair nutrition in the strangulated parts, which if not relieved undergoes necrosis. Stasis predisposes the intestinal contents to putrefy, irritate the mucous membrane, and co-operate with defective circulation in inducing necrosis of the mucous membrane. Necrosis and gangrene are suggested by the presence of offensive fluid or gas in the hernial sac. The anterior portion of the bowel appears greatly distended with food, whilst the posterior portion may be empty and narrower than normal.

Causes of strangulating herniae: -

1-Contraction of the hernial ring by inflammatory swelling near the neck of the hernia

2-Increase in the size of hernia contents

3-Distension of hernia contents so that the hernial ring acts as a ligature

4-Twisting of hernial contents

Signs of strangulating herniae: -

1-Presence of swelling, hernial sac and ring

2-Symptoms of regular colic, and vomiting in pets, the hernia will be found to have increase in its size, become hard, painful, and tenser than formerly.

3-Symptoms of peritonitis, and the animal soon dies if reduction is not effected

C-According To Contents

The contents consist of a loop of intestine (*enterocele*), omentum (*epiplocele*), both of intestine and omentum (*entero-epiplocele*), stomach (*gastrocele*), uterus, bladder, liver or a serous fluid (hernial fluid).

D-According To Location

1-Internal

These are herniae that can't be seen outside the abdomen like diaphragmatic hernia. Diaphragmatic hernia usually seen in cattle as a result of ingestion of sharp metallic foreign bodies that lead to traumatic reticulitis and subsequent weakness of the diaphragm, then after the rumen or reticulum can pass through such openings into the thorax.

2-External

These are herniae that pass outside the abdominal cavity through pre-existing opening that undergo widening or induced abdominal defects, and it can be seen outside the abdomen as swellings. Examples of these herniae are umbilical, scrotal or inguinal hernia.

Diagnosis of hernia: -

1-Presence of a swelling free from inflammatory symptoms (especially pain), soft, elastic, and compressible and may be diminished by pressure in case of non-strangulating hernia

2-Non-strangulating reducible hernia varies in size from time to time, increases by coughing or severe exertion with increased abdominal pressure and decreases when intra-abdominal pressure falls

3-In case of reducible hernia, the swelling may completely disappear on pressure, or on placing the animal in a suitable position, and it returns on removal of pressure or alteration of position

4-Irreducibility may be suspected when the hernial swelling undergoes no alteration in size from day to day.

5-Presence of hernial opening that can be felt by thrusting a finger into the depth of the sac, especially after reducing the hernia

6-Examination per rectum is sometimes useful in horses and oxen as the hernia can be reduced by traction on the bowel

7-Exploratory puncture may be helpful in doubtful cases, and for differential diagnosis in case of abscess or hematoma

Prognosis: -

Reducible hernia is not a fatal condition unless strangulation occurs. Prognosis chiefly depends on the probability of strangulation. The smaller the hernial aperture compared with the size of the sac, the greater the danger of strangulation. Small intestine becomes more easily strangulated than colon or omentum. The size of the aperture, and the use to which the animal is put, must be considered, whilst it should be remembered that strangulation occurs more easily in working-horses, and that large herniae may interfere with usefulness.

Many herniae, and especially umbilical and inguinal herniae in young animals, disappear without treatment, and others may last the animal's whole life without interfering with its use.

Irreducible herniae are more dangerous than reducible, recent than old, and intestinal than omental, because in each case the former are more likely to become incarcerated than the latter.

Treatment: -

A-Treatment Of Non-strangulated Herniae

1-Palliative Cure (slight herniae in young animals)

In many cases no treatment is required, because of spontaneous recovery and rare strangulation. Peculiarities of treatment will be separately described in connection with each of the various hernias.

Bringing about a gradual diminution in the hernial sac via suitable dietetic precautions (supplying concentrated and easily digested food), avoiding hard work, and preservation of a suitable position so that the viscera will move from the position of the hernia

a-Hernial truss

Trusses don't have the same effect in domestic animals as in human. They are impracticable for inguinal herniae in animals. Usually they have low success rate in animals than they do in human.

b-Diminution of hernial sac & reduction of contents into abdomen

By induction of inflammatory and cicatricial processes in the skin of the sac by application of the actual cautery, or by subcutaneous injections of irritants leading to inflammation and swelling in the skin and S.C. and cicatricial contraction that forces contents into the peritoneal cavity.

2-Radical Cure (herniae of elder animals)

The radical cure means closing the hernial opening, and it directed towards removal of the sac and closure of the hernial aperture by causing the hernial ring or the neck of the hernial sac to unite or by other methods.

a-Ligation of the hernial sac

It can be used when the sac possesses a narrow neck, and displacement of ligation can be prevented by trans-fixation transversely through the neck of the sac after reduction of the hernia.

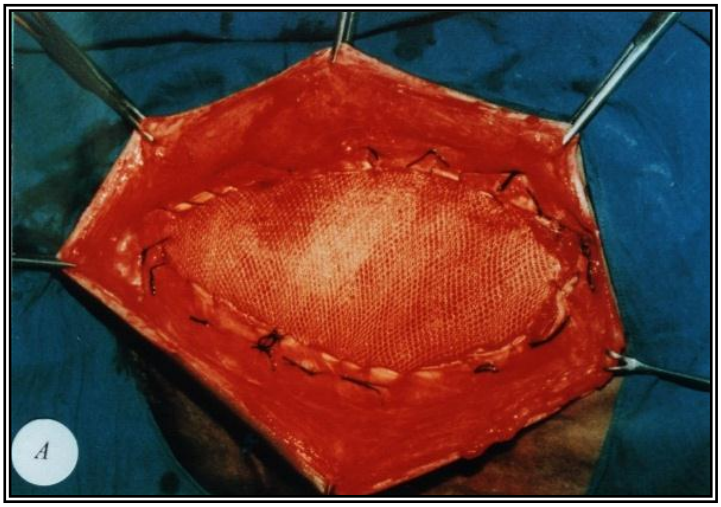
b-Interrupted ligatures

It is used for hernia with broad base. After returning the hernia, strong threads of sterilized silk are passed through the neck of the sac close to the hernial opening in the form of multiple ligations and then the skin of the hernial sac can then be cut through. This method is frequently employed, and usually allows healing by first intention, which greatly tends to ensure success.

c-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.

d-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.

B-Treatment of strangulated herniae

This type of hernia should be treated as fast as possible, otherwise the animal will die, and in equine it can kill the horse within 12 hours unless surgery is performed. The technique is the same mentioned technique in (c and d) put the ring should be extended to permit proper reduction of the strangulated bowel with minimal traction. The technique is made after incising the peritoneum. If the bowel suffers from necrosis it should be amputated and anastomosed, then the ring is closed by suturing or by using sterile mesh.

AFFECTIONS OF THE RESPIRATORY SYSTEM

The incidences of respiratory disorders are less common in ruminants and small animals as compared to equines.

I-EPISTAXIS

Definition: -

It is a state of bleeding from the nose which is a sign of respiratory diseases.

1-UNILATERAL

It resulted from trauma, dehorning, nasal granuloma, tumors or entrance of leeches into the nasal cavity.

2-BILATERAL

It results from septicemic conditions, diseases of blood coagulation, some infectious diseases as bovine rhinotracheitis or malignant catarrhal fever, deficiencies of vitamin K or calcium or during extreme exertion due to increased blood pressure.

Signs: -

Epistaxis may be continues or recurrent and may be profuse or scanty. If the epistaxis is due to an obstruction, inspiratory dyspnea will be present, while if it is due to pulmonary tissue involvement, the blood is frothy fresh and increase whenever the animal lower its head. When it caused by sinus affection the blood may be mixed with purulent exudates. Epistaxis associated with systemic disease has a characteristic necrotic odor. In case of heamoptysis, cough is usually noticed and in case of sinusitis, percussion of the infected sinuses produces dull sound.

Diagnosis: -

1-History

2-Signs

3-X-ray

4-Endoscopy

Treatment: -

1-Treatment of the cause is essential

2-Application of ice or cold water over the nostrils and flushing the nasal cavity with epinephrine solution or packing it with a gauze tape immersed with epinephrine (in case of unilateral epistaxis).

3-In case of bilateral epistaxisis, tracheostomy should be performed and packing of both nostrils as described above

4-Administration of coagulants as vitamins K and Calcium are helpful.

II-NASAL CAVITY OBSTRUCTION

Obstruction of nasal passage ensues as a result of space occupying lesion that may be neoplastic or non-neoplastic

1-NON-NEOPLASTIC (polyps)

Polyps may be formed either due to continuous irritation of mucous membrane with foreign body or infectious diseases as nasal schistosomiasis, rhinopordiasis, T.B, actinomycosis or actinobacillosis. The newly formed tissue (polyps) is usually attached to the lateral wall of nasal cavity and rarely to the nasal septum.

2-NEOPLASTIC CAUSE (epithelial & non-epithelial neoplasms)

Signs: -

A-Unilateral obstruction

1-The animal shows restlessness and may rub the nostrils against the ground

2-Nasal discharge, inspiratory dyspnea, stertor and frequent sneezing

B-Bilateral obstruction

1-The animal exhibits mouth breathing

2-In long standing cases, facial deformity may be observed

Diagnosis: -

1-History 2-Signs

3-X-ray 4-Endoscopy 5-Histopathology

Treatment: -

1-Pedunculated growths at the external nares are removed by excision at the base of attachment.

2-Rhinotomy is indicated when the growth is excessive and inaccessible through external nares.

a-An incision is made through the skin and cartilage on the dorsolateral aspect of the nostril

b-The base of the growth is debrided and cauterized

c-Hemorrhage is controlled by packing the nasal cavity with a gauze immersed with antiseptics

3-Trephining of the nasal bone is indicated for removal of growths that extends up to the nasal septum.

4-Tracheostomy facilitates the surgical intervention.

III-ATHEROMA

Definition: -

Sebaceous cyst located in the false nostril of the horse, it may reach the size of the hen egg

Causes: -

It is a retention cyst formed by obstruction of the duct of the sebaceous gland

Signs: -

1-Presence of non-painful swelling caudal and dorsal to the nares

2-Atheroma may cause respiratory sound during breathing due to narrowing of the nasal passage, but it rarely causes blockage

Treatment: -

The case is treated by surgical excision and suturing the resulted wound

IV-SINUS EMPYEMA

Anatomy of sinus: -

1-In domestic animals, there are four pairs of paranasal sinuses; frontal, maxillary, ethemoidal and spheno-palatine. The frontal sinuses are mostly affected, followed by the maxillary.

2-In equines; the frontal sinus communicates with the maxillary one by opening in the floor.

3-In cattle; the frontal sinus has a post-orbital diverticulum, in addition to presence of transverse septum making difficulty in its drainage.

Definition: -

It is a suppurative inflammation of the nasal sinus associated with accumulation of pus within the paranasal sinus

Causes: -

It usually ensues as a sequel to

1-Dehorning or fracture of horn in cattle; because the frontal sinus communicates with the horn core

2-Oestrus ovis larvae infestation in sheep (frontal and maxillary)

3-Depressed fractures of the frontal or maxillary bone

4-Dental diseases especially in equines and canines (maxillary)

5-Actinomyces and actinobacillous infection in bovines (maxillary)

6-Infection from the nasal cavity (frontal and maxillary)

Signs: -

1-Unilateral or bilateral purulent discharge may be seen unless the nasal openings of the sinuses are occluded; these discharges increase with exercise and it is of bad odor when the cause is infected tooth.

2-These discharges may accumulate causing bulging of the frontal or maxillary bone at the affected side

3-The affected animal appears depressed and may show convulsions due to pressure on the brain

4-In cattle; accumulation of pus in the postorbital diverticulum may cause bulging eye, walk in circles, holding the neck to one side, closing the eyes and carrying the nose higher than usual.

5-In case of camel, it will refuse to lower its head to drink

6-In long standing cases, the pus may extend through bones forming fistulae discharging pus.

Diagnosis: -

1-History of dehorning, dental problem, trauma, …..etc

2-Signs 3-Examination 4-X-ray

Treatment: -

A-Sinusitis secondary to dehorning

1-Irrigation of the sinus with antiseptic antibiotic solution through the dehorning wound

2-Parentral antibiotics

B-Chronic cases

1-Remove and treat the cause (actinomycosis or actinobacillosis or dental problem)

2-Surgical exposure of the affected sinus (trephining)

3-Flushing the sinus with antiseptic solution

4-In case of cellulites, warm application is indicated

BONE FLAP TECHNIQUES &TREPHINATION

Surgical access to the paranasal sinuses can be obtained by either bone flap techniques or trephination. The bone flap techniques are superior to trephination because they provide better exposure, visualization, and access for surgical manipulation within the sinuses, and they eliminate the need for multiple trephine openings. *Trephination* is the traditional approach for surgical access to the paranasal sinuses. It is useful for diagnostic and therapeutic access to the sinuses.

Indications: -

1-Chronic empyema 2-Fractured facial bones

3-Repulsion of tooth 4-Removal of foreign bodies from the sinus

Site of the operation: -

A-Frontal sinus

1-Cattle

There are five sites;

1-To drain post-orbital diverticulum; 4 cm above the upper border of the orbital cavity at the level of the supraorbital foramen

2-To drain the caudal compartment; halfway between the midline and horn base over the nuchal diverticulum

3-To drain the medial compartment and base of the horn; below the base of the horn (care should be taken to avoid puncturing the cranium in this area)

4-To drain the rostral compartment; caudal to a line passing through the center of the orbit, about 2.5 cm from the midline

5-To drain the turbinate portion of the frontal sinus; at the point of diversion of the nasal bone (identified by the thumb and index)

2-Camel

Opening is done near the orbit and over a line connects the two canthi

3-Equines

For the fronto-nasal *bone flap*, the caudal margin is a perpendicular line from the dorsal midline to a point midway between the supraorbital foramen and the medial canthus of the eye; the lateral margin begins at the caudal margin 2 to 2.5 cm medial to the medial canthus of the eye and extends to a point approximately two-thirds the distance from the medial canthus of the eye to the infraorbital

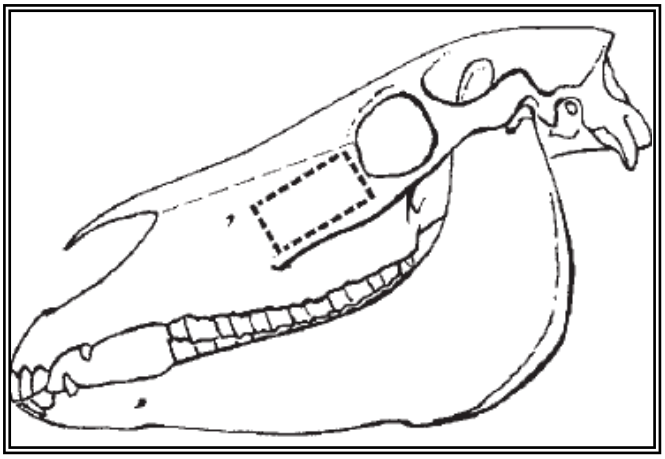
foramen; and the rostral margin is a perpendicular line from the dorsal midline to the rostral extension of the lateral margin. The estimated course of the nasolacrimal duct is a line from the medial canthus of the eye to the naso-incisive notch.

For *trephination*, an opening is made midway between medial canthus and midline.

B-Maxillary sinus

1-Cattle

Just above the facial tuberosity



2-Equines

Maxillary sinus is divided into two compartments; the superior and inferior maxillary sinuses. The superior maxillary sinus communicates dorsally with the frontal sinus. For the maxillary *bone flap*, the rostral margin is a line drawn from the rostral end of the facial crest to the infra-orbital foramen; the dorsal margin is a line from the infra-orbital foramen to the medial canthus of the eye; the caudal margin is a line (parallel to the rostral margin) from the medial canthus of the eye to the caudal aspect of the facial crest; and the ventral margin is the facial crest. These boundaries provide maximal exposure of the maxillary sinus while protecting the vulnerable infra-orbital canal and nasolacrimal duct.

For the maxillary *Trephination*, opening of the superior (posterior) maxillary sinus is made in an area just

dorsal to the facial crest and 5-7 cm posterior to the end of the facial crest. The inferior (anterior) one is opened in an area just dorsal to the facial crest and 2-3 cm posterior to the end of the facial crest.

Anesthesia and control: -

1-The animal either in standing or lateral recumbency

2-The operation is done under sedation with local analgesia, basal narcosis or general anesthesia

Technique: -

1-Surgical preparation of the area of operation

2-Incision is made through skin, subcutaneous tissue and periosteum

3-The trephining is then done by pierce the bone with the central pin of the trephine machine and rotate till complete incision of the bone

4-After removal of a circular disc of the bone, the sinus is irrigated thoroughly with antiseptic solution like 1:1000 potassium permanganate

5-The sinus opening should be packed with gauze plugs to prevent its premature closure and keep maggots away from the sinus

Postoperative care: -

1-Daily flushing with antiseptic solution till healing (indicated by absence of pus discharges)

2-After irrigation, the animal exercised to encourage drainage.

3-The trephine hole should be plugged with gauze till complete healing.

V-LARYNGEAL HEMIPLEGIA

Definition: -

It is Permanent paresis or paralysis of the left arytenoids cartilage and vocal fold manifested clinically by exercise intolerance and respiratory noise (roaring or whistling). Right sided or bilateral involvement

(laryngeal paraplegia) is uncommon. It is also known as roaring or recurrent laryngeal neuropathy.

Causes: -

1-Hereditary; more common in long necked and larger breeds

2-The left recurrent nerve is more commonly involved because of its longer length and subjected to more stretching as it pass around the aortic arch.

3-It may be resulted from peri-vascular injection of irritating substances or intoxication from chemicals or plants.

Clinical findings diagnosis: -

1-Abnormal respiratory noise during Exercise and exercise intolerance

2-Laryngeal palpation and observation of the arytenoid movement is helpful aid for diagnosis

3-Endoscopic examination show the focal fold is located in the median position and immobile

Treatment: -

1-The case is incurable and the line of treatment is directed towards stabilization of affected side of the larynx during inspiration

2-Laryngeal ventriculectomy; by removing the mucous membrane lining the laryngeal saccules to permit adhesion between the arytenoid and vocal cord, and this usually improves inspiratory noise.

3-Prosthetic laryngoplasty may be used in racing horses

4-Subtotal arytenoidectomy

VI-LARYNGEAL OBSTRUCTION IN RUMINANTS

Laryngeal obstruction in cattle is either

A-Acute

It resulted from laryngeal necrosis due to balling gun and drenching injuries or laryngeal edema due to smoke inhalation

B-Chronic

It resulted from retropharyngeal swelling as abscess or tumor, calf diphtheria in calves 3-18 months, or laryngitis caused by fusobacterium necrophorum in sheep and goats

Signs: -

1-Excessive salivation and dysphagia, inspiratory dyspnea and stertor due to laryngitis

2-Anorexia and depression

3-In calve diphtheria; fever and characteristic foul odor can be observed

Diagnosis: -

1-History and signs

2-Oral examination with a speculum or endoscope via the nares

3-X-ray; may show presence of gas, foreign bodies or laryngeal abnormalities.

Treatment: -

1-Parentral Antibiotics

2-In severe dyspnea; tracheostomy is needed

3-Fluid therapy

4-Severe affected cases are directed to slaughter

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 (fourth to sixth 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 larynx 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.

VII-THORASIC WOUNDS

Most of thoracic wound are a result of trauma, special attention must be taken to prevent pnemothorax and collapse of the lung. Wounds of the thoracic wall may cause rib fracture and the resulted splinters may penetrate the lung causing pnemothorax.

Treatment: -

The wounds treated on the same principals of open wound treatment.

DIGESTIVE SYSTEM

Many surgical diseases can interfere with an animal's prehension ability and transfer food material to the esophagus. The cause of dysphagia can be a congenital abnormality or diseases acquired through pain and/or mechanical obstruction.

I-Oral cavity

1-DENTISTRY

Anatomy: -

The teeth are hard white or yellowish white structures implanted in the alveoli of the bones of the jaws. Functionally the teeth serve mainly as organs of prehension and mastication. The domesticated mammals have two sets of teeth. The first set appears during early life and is known as deciduous or temporary teeth. The second set appears later in life and is known as permanent teeth. Teeth are: Incisors, Canine, and Cheek teeth (premolars and molars).

In male horse, there are four canine teeth while in the mare they are usually absent or rudimentary. In ruminants the canine teeth are absent. In dogs four canine teeth are well developed. Cheek teeth (premolars and molars) are located caudal to the canine teeth and embedded in the maxilla of the upper jaw and the mandible of the lower jaw.

COMPOSITION OF THE TOOTH

A-The Pulp Of The Tooth

Is a soft, gelatinous tissue located in the central part of the tooth; the pulp cavity. The pulp consists of blood vessels, nerves and lymphatics with primitive connective tissue holding these structures. At the apex of the root is an apical foramen for passage of these vessels and nerves.

B-Dentine

Is a modified bone, forms the bulk of the tooth and covering the surface of the pulp. It consists of 30% organic contents and has dental tubules which pass to the pulp cavity. Dentine has some sorts of innervations.

C-Enamel

Is a hard, dense and white structure covers the crown of the simple tooth from the neck to the exposed tip. In complex tooth the enamel and cementum extending along the entire length of the tooth and are invaginated into the central part of the tooth forming the infundibulum or cup in the incisors and upper cheek teeth in equines. Enamel is the hardest substances in the animal body. It has only 2% organic contents and has no innervations.

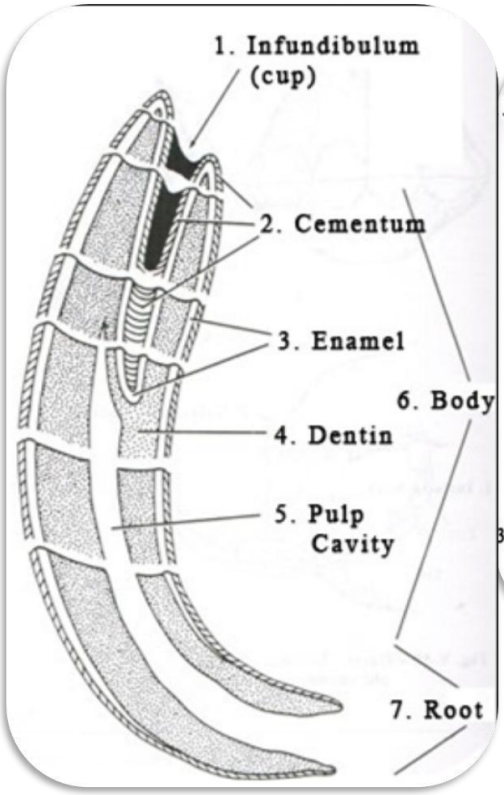
D-Cementum

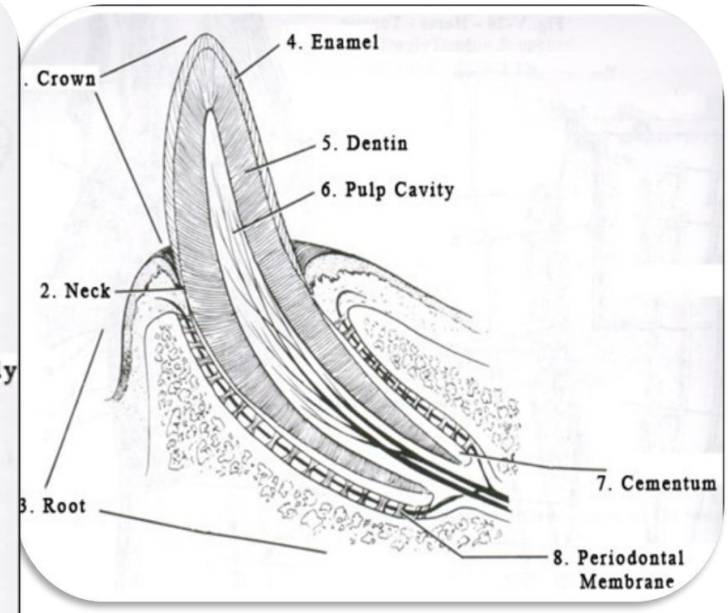
Is a bone-like tissue without havarsian canals which covers the dentine at the level of the root in simple tooth, but exists in a large quantity, to fill in the spaces between enamel folds of the crown in complex tooth.

E-Peridontal Ligament

It is a modified periostium consists of dense connective tissue with collagen bundles connect the cortical bone of the alveoli (lamina dura) with cementum. It is responsible for cushioning mechanism of the teeth. Each simple tooth has three parts; the crown, which is the projected or exposed part of the tooth above the gum; the root, the embedded part of the tooth, and the neck, the demarcation between these two parts which is located at the gum line. The complex tooth consists of long body and very short root or roots. The body has a free portion, which protrudes from the gum and an embedded portion, commonly called the reserve crown. With continuous wear of the occlusal surface, in equine and cattle, the reserve crown erupts from the gum line and becomes the free portion of the tooth. The root is usually short and has within it an apical foramen or foramina. In dogs, once the teeth are fully erupted, tooth development ceases except in the laying down of dentine on the inside of pulpal surface. The surface of the tooth directed towards the lips is termed "labial, towards the cheek "buccal", and towards the tongue"

lingual and palatal. The surface opposed to the neighboring tooth is termed "contact surface". The masticatory or occlusal surface is that facing the opposite dental arcade. In dogs, mesial and distal refer to surfaces of the teeth that face towards and away from the medial plane, respectively. Anterior teeth are the incisors and canines lying in the rostral aspect of jaws, while posterior teeth are the premolars and molars positioned caudally. Apical and coronal are terms for a direction of the teeth towards the root or crown, respectively.





DENTAL FORMULAE (PERMANENT TEETH)

Horse and donkey: 2 (I 3/3, C 1/1, PM 3-4/3, M 3/3) = 40-42

Cow, sheep goat: 2 (I 0/4, C 0/0, PM 3/3, M 3/3) = 32

Camel: 2 (I 2/4, C 1/1, PM 2/1, M 3/3) = 34

Dog: 2 (I 3/3, C 1/1, PM 4/4, M 2/3) = 42

Cat: 2 (I 3/3, C 1/1, PM 3/2, M 1/1) = 30

1-CONGENITAL ANOMALIES OF THE TEETH

A-Anodontia

Definition: -

It is the absence of teeth. It can be either total (no teeth is present) or partial (one type of teeth is absent). Congenital absence of teeth is more common in the permanent dentition than in deciduous dentition. No treatment is recommended.

B-Oligodontia

Definition: -

It is the presence of a reduced number of teeth.

1-Pseudo-oligodontia

It occurs most frequently due to impaction of one or more teeth in the jaw. The radiographic examination may be necessary for a definitive diagnosis.

2-True Oligodontia

It occurs due to either an absence of tooth bud and known as reductive oligodontia or destruction or suppression of the tooth bud during embryonic life and known as sporadic oligodontia. Oligodontia is usually without any symptoms and treatment is not indicated. Only sequelae are treated. Abnormal elongation of the opposing tooth should be regularly shortened or floated to prevent damage to the oral mucosa.

C-Polydontia (supernumerary teeth)

It is the presence of extra or supernumerary teeth in addition to the normal number. The extra tooth may crowd other teeth causing malposition, malocclusion or incomplete eruption of adjacent teeth and periodontal disease. Supernumerary teeth are generally incisors and molars. Frequently supernumerary molars

are just posterior to the third molar and quite often on both sides. Polyodontia is classified into two types

1-Pseudopolyodontia

It is the retention of some or all deciduous teeth beside or behind the permanent teeth. Pseudopolyodontia can be observed also when different kinds of teeth come abnormally close together gives an impression of presence of additional number such as canine tooth occurring directly adjacent to the third incisor.

2-True polyodontia

This form is a true malformation in which there is an increased number of tooth germs or resulted from division of one tooth germ. The extra tooth may possess the characteristics of deciduous or permanent tooth (typical polyodontia) or exhibit a simple conical shape (atypical polyodontia).

Clinical signs: -

1-Injuries of the gum and soft tissues in the mouth cavity

2-Entrapment of food materials between the supernumerary tooth and the normal adjacent one which may leads to periodontal disease.

Treatment: -

1-Extraction of the retained deciduous tooth

2-In horses and cattle, when the true extra-teeth wear more or less evenly and cause no apparent trouble, they should be left without extraction and when the extra-teeth elongate and interfere with the occlusal surface of the arcade they should be shortened or extracted.

3-In dogs no extraction is recommended except by owner's request

D-Diastasis Dentium

This condition is characterized by presence of a space between two neighboring teeth. It is frequently observed in horses, donkeys, and

dogs and less common in cattle

Causes: -

1-Congenital causes

1-Failure in the position of the tooth bud during embryonic stage of development

2-Torsion or rotation of the tooth during development

3-Presence of supernumerary tooth which leads to formation of a space between it and the normal one

2-Developmental causes

1-Retention of one deciduous tooth 2-Impaction of one permanent tooth

3-Extraction or missing of one tooth

Clinical signs: -

1-Presence of a space between two neighboring teeth

2-Entrapment of food materials in these spaces and putrefaction may take place resulting in periodontal disease.

Treatment: -

1-Frequent brushing of the teeth and removal of accumulated food materials

2-Removal of supernumerary tooth or retained deciduous tooth

E-Brachygnathism (parrot mouth or over shot bite)

Definition: -

It is a congenital anomaly in which the upper jaw is longer than the lower jaw. The mandible lies in an excessively caudal position in relation to the upper jaw. The mandibular incisors are lingual to their maxillary counter parts.

Brachygnathism (overbite)

Clinical signs: -

The upper incisors protrude more than halfway past the occlusal surface of the lower incisors, in such case the lower incisors develop hooks on their lingual border. In severe cases there may be no contact at all between the occlusal surfaces of the incisors, resulting in elongation of all incisors due to absence of wear. This condition causes wounds or ulceration of the gum. Difficulty in prehension of food is observed and affected animals may exhibit gastro-intestinal disturbances and general emaciation.

Treatment: -

1-Rasping of the sharp hooks in slight cases using tooth rasp

2-In severe cases frequent shortening of the lower incisors with special tooth cutter is indicated

3-In complicated cases the extraction of the lower incisors may improve the animal's condition and lessen the trauma to the soft tissues of the upper jaw and mouth

4-Wounds and ulcerations of the gum are treated by daily irrigation with antiseptic and astringent solutions

F-Prognathism (pig mouth or under shot bite)

Definition: -

It is a congenital anomaly in which the lower jaw is longer than the upper jaw. The mandibular incisors lie labial to their maxillary counter parts. In dogs, the mandibular canines lie mesial to the maxillary third incisors.

Clinical signs: -

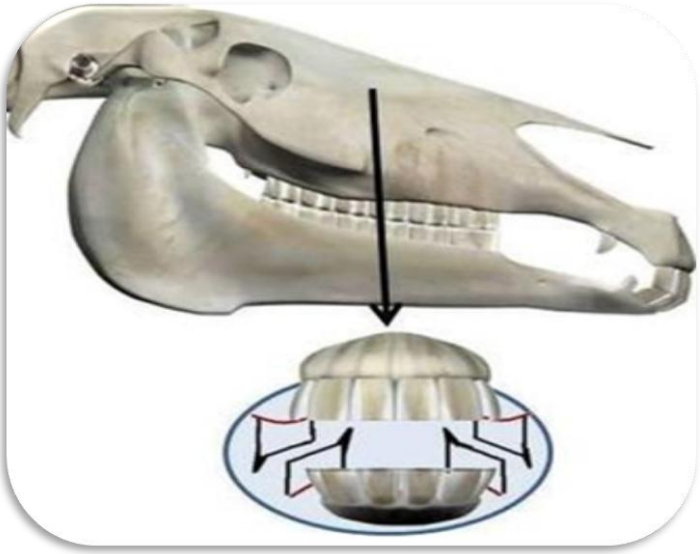
The same signs as in brachygnathism except that the upper incisors are responsible for troubles in soft tissues at the lower jaw.

Treatment: -

The same as in the brachygnathism. In slight cases the sharp hooks are rasped and in severe cases frequent shortening of the upper incisors or complete extraction is indicated.

2-DEVELOPMENTAL ANOMALIES OF THE TEETH

A-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.

B-Step-formed Teeth (step mouth)

It is the presence of abrupt variations in the height of the adjacent teeth.

Causes: -

1-Unequal hardness of teeth substance

2-Defective growth of one tooth (Hypodontia)

3-Distortion or rotation of one tooth

4-Extraction or shedding of a tooth and consequent over growth of the opposing one

5-Fracture of a tooth (splintered or transverse fracture)

6-Presence of supernumerary tooth (Polyodontia)

7-Projection of a tooth

8-Elongation of a tooth

Clinical signs: -

1-Presence of abnormal variations in the height of the cheek teeth

2-Falling of food materials from the mouth mixed with saliva

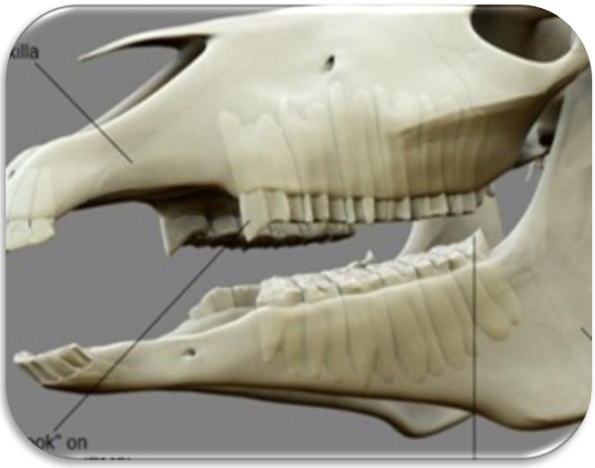
3-Bad mastication with general emaciation and weakness of the animal

Treatment: -

1-Removal of the projections by tooth rasp or float

2-Shortening of long tooth by using dental cutter

C-Projection Of The Tooth (Hooking)



This condition affects equine and cattle. It is characterized by the presence of a small or large hook at the rostral point of the first upper cheek tooth and caudal point of the sixth lower cheek tooth. The hooked tooth may reach double the length of normal tooth. This condition is usually accompanied by parrot mouth. Hooking may develop in any tooth not subjected to equal wear

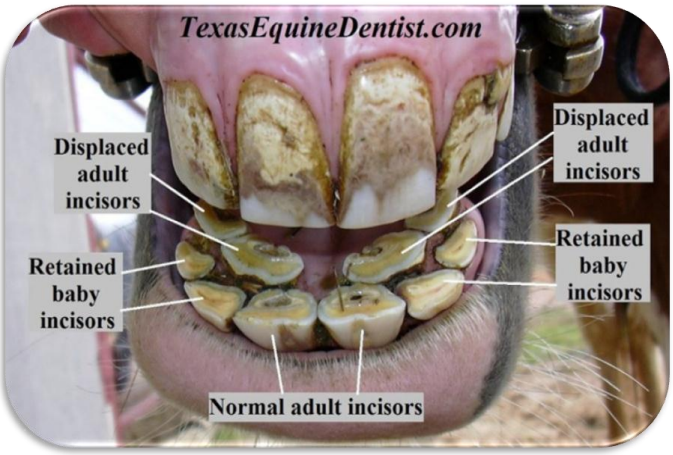
Treatment: -

Removal of the projected part by dental cutter and rasping it by tooth rasp

D-Retained Deciduous Tooth

The deciduous tooth is retained and prevents the permanent tooth in that location to erupt. The permanent tooth may erupt close to the retained one and may cause change in the direction of the eruption, crowding or malocclusion. Retained deciduous premolar teeth are identified by eruption of the permanent one covered with the deciduous tooth (dental

caps). This condition is observed in animals with signs of mastication difficulties. Caps remain attached to the permanent teeth after these teeth



have been erupted for variable time. Caps should be removed once the permanent tooth has grown beyond the gingival line. It is best not to attempt to remove caps if it requires a great deal of effort to loosen them.

E-Impaction Of A Tooth (Delayed eruption of a tooth)

It is the failure of a tooth to erupt due to presence of a barrier in the normal eruption pass way. This condition is not uncommon in dogs and rare in other animals.

A completely impacted tooth is recognized by its absence in the dental arcade but its presence radiographically.

Causes: -

1-Lack of space

2-Presence of a deciduous tooth

3-Misalignment of the tooth bud

Treatment: -

1-When radiographic examination revealed presence of the impacted tooth under the level of the gum, the gingiva should be splitted to allow the crown to emerge.

2-Extraction of the impacted tooth is dictated when the impaction is affecting the position or causing resorption of the roots of the permanent teeth adjacent to it or if they are causing abscessation.

F-Attrition In Dogs

It is the rapid loss of the crown height in dogs. Slight wear is considered normal, however attrition is abnormal. Diet and chewing habits count for most instances of severe attrition. Grooming is a major function of the incisor teeth in dogs. Pathological grooming as in cases of flea bite dermatitis may wear the teeth completely down to the gingivae. The dental pulp responds to rapid wear by lying down reparative dentine, which is visible as a dark brown mark on the affected teeth. Sometimes, the rate of wear is too rapid for the reparative process to keep pace with, and pulp exposure occurs.

Treatment: -

It is usually not necessary unless pulp exposure has occurred.

G-Changes in the shape of the teeth

Developmental anomalies in the shape of teeth are rare and of little clinical significance.

H-Dichotomy

Ii is the division of a single tooth bud resulting in a single root with two crowns.

I-Gemination

It is the joining of two normally separate tooth buds.

J-Dilaceration

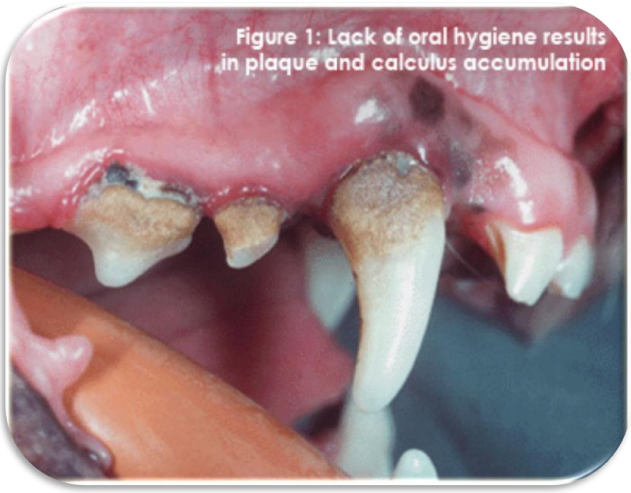
It is an abnormal sharp curvature of the root of tooth.

3-DISEASES OF THE TEETH

A-Dental Tartar Or Dental Calculi (Odontolithiasis)

Definition: -

It is a salivary concretion that accumulates on the dental surfaces.



Causes: -

Soft and convenient diets given to animals contribute to the build-up of food debris on the surface of the teeth. The first stage in the formation of deposits is called dental plaque. The later consists of a soft, light-colored amorphous mass formed of food debris, leukocytes, microorganisms and desquamated epithelial cells. The second stage is mineralization of the dental plaque. It takes place through calcium and phosphorus salts present in the saliva. The soluble calcium bicarbonate which present in the saliva is converted into insoluble calcium carbonate with release of CO2 and its deposition inside the plaque resulting in formation of dental calculus.

Signs: -

Dental tartar produces no clinical signs but in severe cases it may cause the following:

1-Offensive fetid bad breath

2-Localized inflammatory reaction at the gingivae which termed gingivitis

3-Gingivitis results from mechanical irritation caused by the calculus and from endotoxins liberated from the bacterial plaque. The gum is red with swollen gingival margin which bleed easily to the touch.

4-Periodontal disease may supervene if treatment is not carried out.

5-Dental calculus varies in color from grayish-white to grayish –brown. It has a rough surface which encourages further build-up of plaque.

6-The common seats of calculus formation are the lingual surface of the incisors especially that of the lower jaw, around the canines and the buccal surfaces of premolar and molar teeth.

Treatment: -

1-Hand scaling: It is the removal of soft and mineralized plaque from the surfaces of the teeth as atraumatically as possible to leave a smooth surface which discourages the build-up of the further deposits. The sharp edge of the tooth scaler is placed apical to the calcified deposits and moved by pulling action in a coronal direction. The process is repeated around the circumference of each tooth until the deposits are removed.

2-Mechanical scaling: Hand scaling is time consuming and ultrasonic device is used for rapid removal of deposits.

3-Large calculi can be dislodged by inserting a special dental instrument between the tooth and calculus and exerting a gentle pressure.

4-The mouth cavity is washed with mild antiseptic solution as potassium permanganate.

5-The stains of the teeth are removed by using 3% H2O2 or 1% HCl.

6- The inflamed gum is swabbed with Tr. of iodine or glycerine/iodine combination. Tr. Myrrh or catechu can be used.

7-Dogs must be given raw meat and bones.

8-Periodical brushing 2-3 times a week is essential for dogs using nylon brush and special tooth paste that has a meat flavor to encourage dogs to accept them.

B-Periodontal Disease

Definition: -

It is the inflammation and/or degeneration and destruction of the soft and hard tissues which surrounds and supports the teeth.

Causes: -

Complicated cases of dental tartar lead to periodontal disease. In periodontitis, the epithelial attachment of the gingivae migrates apically (recession of the gum) and periodontal ligament and alveolar bone will be destroyed. Enzymes such as protease, collagenase and elastase play a major role in the breakdown of the periodontal tissues, as collagen is the main component of the periodontal ligament and alveolar bone. The sources of enzymes are the microorganisms and/or the leukocytes. Spaces often developed between the teeth and gums called periodontal pockets, which in turn harbor further microbial irritants.

Signs: -

1-Bad breath, yellow teeth and facial swellings

2-Gingivitis and ulceration of subgingival epithelium

3-Recession of the gum (apical migration of the gum)

4-Loss of attachment between periodontal tissues and the tooth

5-Tooth mobility and spontaneous exfoliation of loose teeth may occur

6-Osteoclastic resorption of the marginal alveolar bone

7-Abscessation of the periodontal and periapical tissues may occur and exudates may come from beneath the gingival margin

8-Pulpitis, evidence of pain and difficulty in mastication

9-The condition may lead to pathological fracture or dental fistula.

10-Toxins will constantly be liberated into the blood stream and play an important role in the etiology of endocarditis, nephritis and hepatitis

Diagnosis: -

1-Clinical signs

2-Inspection of gingival sulcus with a thin calibrated periodontal probe. Animals with pockets deeper than 3 mm may have peridontitis

3-Radiography

Treatment: -

Periodontal disease is a multi-faceted condition. Usually, there is no simple, single therapy to alleviate the condition. Periodontal treatment is divided into two equally important areas;

Professional treatment: -

This includes scaling, polishing, elimination of any stagnation area and extractions. The purpose of professional periodontal treatment is to remove the irritants from the surfaces of the teeth and create an environment that helps in the control of future build-up of these deposits. Scaling is done by removal of calcified deposits from the teeth. It must be carried out systematically with a full understanding of the underlying pathology, objectives and limitations of the treatment. Careless scaling may lead to irreversible damage to the surfaces of the teeth which will only exacerbate the periodontal disease. Correct scaling and polishing will leave the surfaces of the teeth smooth, which discourage the build-up of further deposits. Polishing is essential to eliminate the microscopic scratches that have been created. Gingivectomy can be beneficial in eliminating false pockets as in the case of hyperplastic gingivitis. This simple surgery can eliminate the dead space of a pocket which harbors debris, bacterial plaque … etc. In advanced cases of periodontal disease, extraction of the teeth is the treatment of choice.

Home care and maintenance: -

The utilization of dietary and artificial oral hygiene aids by owners. The successful periodontal treatment of domestic animals lies with their owners, who have to be motivated to take an active step in the care and maintenance of the animal's oral health. Motivational factors may be one or all of the following; cost of anesthetics and scaling, risks of general anesthesia for daily maintenance, bad smell and level of halitosis will be reduced and tooth conservation. Diet is an essential factor for self-cleaning action. Soft diet encourages plaque formation. Also, bone is not an ideal cleaning material. Dry bet food with large pieces of fibrous meat, in the form of an ox heart or ox tail can have a considerable self-cleaning action on the teeth. Brushing teeth is an important way of reducing bacterial plaque.

C-Dental Caries

Definition: -

It is a progressive, localized and circumscribed decay or disintegration of the tooth substance (enamel, dentine and cementum) with subsequent formation of a hole, which increased in width and depth until reaches the pulp cavity producing endodontic disease. Dental caries observed in horses more than in dogs.

Causes: -

1-Presence of a small fissure at the wall of the tooth and invasion of acid-forming microoganisms which are present normally in the mouth cavity. The effect of acids leads to disintegration of the tooth substance, especially the enamel

2-Softening of the substance of the tooth by decomposed saliva and fermented food materials which accumulated at the cement cavity (infundibulum) of the tooth

3-Entrapment of food materials at the spaces between the teeth and its fermentation

4-Hypoplasia of the enamel

5-Deficiency of trace elements and vitamins

Signs: -

1-Dental caries started by appearance of a yellow spot which changed quickly into brown or black color at the neck of the tooth or at the contact surface of the tooth or at any place where the fissure or hypoplasia of the enamel was present (enamel flecks).

2-Formation of a hole after disintegration of the tooth substance

3-Formation of large tubular

defects that extend to the pulp and root apex causing secondary pulpitis, periodontitis, dental fracture

4-Severe pain when drinking a cold water and during mastication due to accumulation of food materials at the hole and its pressure over the content of the pulp cavity

5-Offensive odor from the mouth

6-Cemental or infundibular caries (cemental necrosis) develops within the infundibulum and usually progressed to reach the pulp.

Treatment: -

1-When dental caries is present near the root or contact surface or when pulpitis and periodontitis are present the tooth cannot be saved and "Extraction" using tooth extractor is the only treatment.

2-Repulsion was performed when extraction was impossible.

3-In small defects and when caries is present at the occlusal surface, filling of the tooth is recommended. The necrotic tissues and decayed portion of the tooth are removed from the defect by drill or tooth burr. The cavity is washed and cleaned by hydrogen peroxide solution then dried by sterile paper points. Then the cavity is lined by copper cement and filled with suitable filling material (Amalgum). Zinc oxide and euginol may be applied as a sedative at the depth of the cavity before filling with amalgam.

D-Pulpitis

It means pyogenic inflammation of the dental pulp

Causes: -

1-Fissures and fractures in the crown of the tooth expose the pulp cavity to bacterial invasion

2-Dental caries and exposure of the pulp cavity

3-The senile and presenile erosion of one or more tooth

4-Abnormal wear due to bad habits as cribbing

5-Dental periodontitis

6- Hematogenous infection

Clinical signs: -

1-Severe pain due to acute inflammation of the pulp with difficult mastication

2-Percussion of the affected tooth is painful

3-The tooth is dead and the pulp is no longer sensitive to stimuli

Treatment: -

Extraction of the tooth involved.

E-Dental Fistula

It is a purulent tract connecting between the alveolus of the affected tooth and the outside surface of the skin.

Causes: -

1-Alveolar periostitis

2-Abscess at the root of the tooth

Clinical signs: -

1-Fistual opening at the level of the upper jaw in dogs and lower jaw in horses

2-The opening is small funnel-shaped, discharging pus with very foetid odor

3-Swelling of the bone and skin around the fistula opening

4-Metal probe is passed through the canal, striking the root of the tooth, and a hell-like sound is heard

Treatment: -

1-Extraction of the involved tooth

2-Curetting of the fistula and washing with antiseptic solution

N.B. : -

Fistula resulting from a splintered fracture of the mandible or maxilla may be misdiagnosed as dental fistula and known as false dental fistula. It characterized by short canal and small opening; there may be more than one, dull sound by metal probe, the inflammation of the bone around the opening is slight, discharged pus is small in amount and not very bad smelling, and the teeth are healthy. It is treated as fistula in general.

2-ORAL CAVITY SOFT TISSUE AFFECTIONS

1-LACERATIONS

The soft tissues of the oral cavity are susceptible to traumatic injuries by harness bits, sharp external objects, blows to the head, injury during recovery from general anesthesia, and iatrogenic damage during intra-oral procedures. The lacerations may involve the lips, buccal membranes, and the tongue. Animals usually present with excess salivation, which may be mixed with blood, decreased appetite, and various degrees of dysphagia, depending on the severity of the laceration.

The oral cavity soft tissues have a tremendous capacity for repair. Most superficial lacerations heal without surgical intervention by using daily mouth lavage and systemic antibiotics and by feeding a soft diet.

A-Tongue Lacerations

Lacerations of the tongue are not uncommon and can be severe, with transverse lacerations more frequent than longitudinal ones. The free portion of the tongue is usually involved because this part has more exposure to the external environment. Clinical signs include oral hemorrhage, inappetence, anorexia, dysphagia, malodorous breath, pyrexia, and tongue protrusion from the mouth. Management of tongue lacerations is guided by the severity, duration, and location of the injury.

Treatment: -

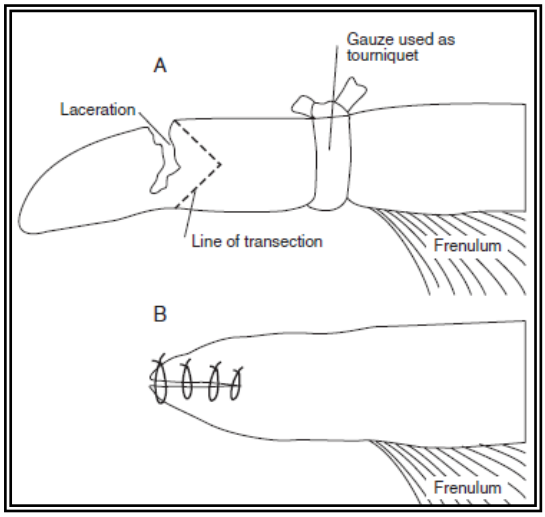
1-Superficial wounds of the tongue heal well due to bacteriostatic effect of the saliva as well as good blood supply of the tongue.

2-Deep wounds and lacerations are sutured with non-absorbable suture material with obliteration of dead space within the tongue substance.

3-Partial glossectomy is reserved for cases in which the rostral tongue tissue is devitalized and minimal attachment is left between the severed section and the remaining body. Tissue color, temperature, and evidence of bleeding at an incision can be used to assess viability. Partial glossectomy works well in horse, pig, sheep and goat up to 10 cm from the apex without causing feeding disturbances. In cattle because of the tongue's crucial role in prehension of food, as much of the tongue as possible should be preserved.

PARTIAL GLOSSECTOMY

The animal is anesthetized and placed in lateral recumbency. A tourniquet (made of rolled gauze) is applied proximal to the intended transection site. The lingual artery and vein are tied on each side of the ventral middle portion of the tongue at the level of amputation.



The tongue is divided in a V-shaped fashion, the base of the V pointing towards the tongue root. The tips of the two triangular arms of the tongue are brought together with one interrupted silk stitch. Then a line of silk stitches starts at the point of amputation at the dorsal surface and runs forward, over the point of the tongue, and along the ventral surface backward to the point of amputation again. Only mucosa is incorporated in the suture. The tourniquet is removed. The animal should receive systemic antibiotics postoperatively and should be fed a soft diet (not pasture) for best results.

B-Buccal Cavity Laceration

Partial-thickness buccal cavity lacerations are managed by second-intention wound healing with oral lavaging after meals and nonsteroidal anti-inflammatory drugs. Large, full thickness injuries may be

reconstructed to prevent oro-cutaneous fistula development. Repairing the oral aspect of the wound is difficult because of limited space. Suturing the wound from the external side, starting with the mucosal layer, is more practical.

C-Lip Lacerations

When there is major disruption, surgery is indicated to preserve lip function and cosmetic appearance. The wound edges are prepared routinely by sharp debridement and lavage. First-stage healing is best achieved by the construction of intraoral mucosal flaps to achieve an oral seal. The skin is apposed with simple interrupted sutures.

2-STRANGULATION OF THE TONGUE

Causes: -

1-Tying of a string around the tongue as a mean of control in horses or tying of a cord around the lower jaw and tongue for a period of time

2-Strangulation of the tongue by a rounded foreign body such as rubber rings, tracheal rings and piece of large blood vessel in dogs.

Treatment: -

1-Removal of string or foreign body early as much as possible

2-Scarification of the dorsal surface of the tongue

3-Partial glossectomy if necrosis of the tongue has been occurred

3-SELF-SUCKING IN CATTLE

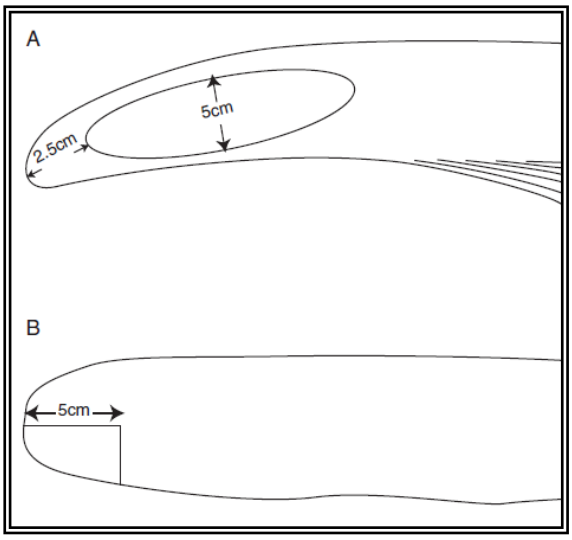
In ruminant kept for milk production, some animals learn to self-suck. This will result in a loss of large quantities of milk as well as high incidence of mastitis within these animals.

Treatment: -

Self-suckling is most commonly treated by using a nasal ring with a burr and individual housing. If these more conservative treatments are not

successful, a partial glossectomy or intralingual sutures patterns can be considered.

PARTIAL GLOSSECTOMY



Two surgical techniques have been created to perform a partial glossectomy to prevent self-suckling in animals. The techniques are performed with sedation and local infiltration of lidocaine. Both techniques alter the tongue's contour to prevent the animal from forming a U-shaped tongue for suckling. For the ventral glossectomy technique, an elliptical incision is made that is approximately 5 cm at its widest part and starts rostral to the frenulum attachment on the tongue and extends rostrally 2.5 cm caudal to the tip of the tongue. Each side of the ellipse is incised at an angle toward the midline to facilitate closing the defect. The lateral glossectomy technique removes half of the tip of the tongue. Again, the incision is extended at an angle to facilitate closing the tongue.

4-ORAL CAVITY FOREIGN BODIES

Various types of metallic, usually linear, foreign bodies can penetrate the soft tissues of the oral cavity after inadvertent ingestion. Plant matter, such as grass awns or wood splinters, is also a frequent cause of foreign body reaction. External clinical signs include focal or diffuse inter-mandibular, retro-pharyngeal, or facial swelling, depending on where the foreign body has lodged or what it is migrating through. Swellings typically have increased heat, and the animal has evidence of pain to palpation of them. Ptyalism, dysphagia, inappetence, and anorexia can be observed. Additionally, there may be a painful response and difficulty when attempts are made to open the jaw. Oral and oropharyngeal examinations can reveal firm, painful swellings, the end of the foreign body, or ulcerated mucosal surfaces where the foreign body has penetrated the tissue, or where an abscessed site has ruptured spontaneously.

Diagnosis: -

It requires a combination of thorough history taking, external and oral examination, and imaging aids. Radiography is helpful for metallic foreign bodies, but care must be taken not to miss a fine, short structure. Ultrasonography is very useful to help pinpoint the exact location of a foreign body.

Treatment: -

The treatment of choice is removal of the foreign body. Surgical approaches may have to be creative. An external approach to a foreign body that has migrated into the deep part of the masseter muscle requires care to avoid trauma to facial nerve branches, parotid duct, and blood vessels in that region. Foreign bodies associated with intraoral swelling may be approached by incising the mass on the oral side and draining exudate into the mouth. Digital or instrumental exploration and debridement of the cavity can then be performed. The cavity is lavaged and allowed to heal by second intention. Postoperative care may consist of a combination of oral lavaging, necrotic tract lavaging, and antibiotic and anti-inflammatory therapy.

5-GLOSSOPLEGIA (PARALYSIS OF THE TONGUE)

Glossoplegia means paralysis of the tongue. It results from uni- or bilateral paresis or paralysis of the hypoglossal nerve (12^{th} cranial nerve – purely motor).

Causes: -

1-Central paralysis results from encephalomyelitis (rabies, brain tumor, and severe intoxication).

2-Peripheral paralysis results from contusion, pressure, strain and torn of nerve along its course.

Signs: -

1-In bilateral paralysis, the whole tongue is flaccid and hangs out of the mouth at the center of the lips.

2-In unilateral paralysis, the tongue deviates towards the affected side when extended and towards the unaffected side when retracted.

3-Salivation is extensive. Mastication and swallowing of food are difficult or impossible.

4-At early stages of glossoplegia the tongue is unchanged but later on may develop secondary mucosal injuries, either self-inflected or from external trauma.

Treatment: -

1-Protection of the prolapsed part of the tongue from injury if it is possible

2-Injection of nerve tonics such as vitamin B-complex

3-Paralysis extends for more than 14 days has a poor prognosis. Scarification may be indicated

3-SALIVARY GLANDS

Anatomy: -

The salivary glands are grouped into:

-Minor salivary glands

-Major salivary glands

A-Minor or small salivary glands

They are present in the mucosa of the lips, cheeks, tongue, palate and the sublingual oral floor. These glands produce a mucous secretion. The buccal minor salivary glands form larger aggregates ventrally and dorsally. In canines the latter is referred to as *zygomatic gland*, based on its position. Ruminants have an additional middle group of buccal glands. The majority of saliva is produced by the major salivary glands. These are located at a distance from the oral cavity and drain through ducts.

B-Major salivary glands

-Parotid salivary gland

-Mandibular salivary gland

-Sublingual salivary glands

1-The parotid salivary gland

It is a paired organ, which lies at the junction of the head and neck, ventral to the auricular cartilage in the retromandibular fossa. The parotid duct (Stenson's duct) opens into the oral vestibule at the top of a small papilla opposite the third to fifth cheek tooth depending on the species.

2-The mandibular salivary gland

It is located close to the angle of the jaw and is partially covered by the parotid salivary gland. It is slightly bigger than the parotid salivary gland in most dogs and cats. In carnivores it is oval in shape, situated subcutaneously, caudal to the monostomatic salivary gland between the linguofacial and maxillary veins. It drains by a single large duct, which passes ventral to the mucosa of the floor of the oral cavity, close to the lingual frenulum to open with the major sublingual duct on the sublingual caruncle.

3-The sublingual salivary glands

They consist of two glands on either side except the horse, in which the major (monostomatic) sublingual salivary gland is absent. The major (monostomatic) salivary gland is situated more caudally and is a compact gland with a single draining duct The major sublingual salivary duct shares a common opening with the mandibular salivary duct on top of the sublingual caruncle. The diffuse minor (polystomatic) salivary gland is located more rostrally and opens through several smaller ducts. These openings are located on a longitudinal fold in the lateral sublingual recesses.

I-SALIVARY MUCOCELE (SIALOCELE or SALIVARY CYST)

Definition: -

Salivary mucocele is a collection of saliva that leaked from a damaged salivary gland or salivary duct, and accumulated in the tissues. This is often noticed as a fluctuant, painless swelling of the neck or within the oral cavity. While often inaccurately called a salivary cyst, mucoceles are lined by inflammatory tissue (called granulation tissue) which is formed secondary to the inflammation caused by the free saliva in the tissues, while a cyst is lined by epithelial (glandular) tissue which is itself responsible for the production of the fluid. Salivary mucoceles are the most common salivary gland disorders of dogs but are very rarely in cats. While any of the salivary glands may be affected, the sublingual and mandibular glands are involved most commonly. Salivary mucocele may be classified as follows:

1-Cervical Mucoceles

This is probably the most common type of mucocele. It is a collection of saliva in the upper neck region, at the angle of the jaw, or between the mandibles.

2-Sublingual Mucoceles (Ranula)

Another frequent location for the formation of a mucocele is on the floor of the mouth alongside the tongue. This is frequently seen in association with a cervical mucocele.

3-Pharyngeal mucoceles

This type of mucocele is much less common. The fluid accumulation is almost entirely within the throat (pharynx).

Causes: -

The cause of salivary mucoceles is rarely identified, although trauma is generally considered to be the most likely initiating event. As the saliva

leaks from the torn salivary gland or duct, it accumulates in the tissue and initiates an intense inflammatory response. A connective tissue capsule gradually forms around the saliva to prevent it from migrating further.

Signs: -

1-Cervical mucocele is seen as a gradually enlarging soft, painless, fluctuant mass in the upper cervical (neck) or mandibular (between the jaws) region. In most animals there are no problems associated with the development of the mass.

2-Sublingual mucocele (ranula) the dog may have some difficulty eating and may develop bleeding from trauma to the mucocele as the dog chews.

3-Pharyngeal mucocele is generally totally undetectable until the oral cavity is examined with sedation. The animal may present with respiratory distress because the mass developing in the throat is beginning to obstruct the airways. This is a potentially very serious problem and treatment must be instituted rapidly because these animals may die from acute respiratory distress. Dysphagia (difficulty swallowing) may be another sign that a pharyngeal mucocele is present.

Diagnosis: -

1-Palpation of the mucocele is easily accomplished, and with the exception of the pharyngeal mucocele, the mucoceles are easily identified as a soft, fluctuant, painless mass that must be differentiated from abscesses, tumors, and other retention cysts of the neck.

2-A salivary mucocele usually can be diagnosed by aspiration of the characteristic golden or blood-tinged, viscous saliva.

3-Occasionally cervical mucoceles migrate to the ventral midline making it difficult to determine whether the problem involves the left or right side glands. Examining the animals with sedation in dorsal recumbency often allows the mucocele to migrate to the affected side; if not, sialography may be helpful.

Treatment: -

The only satisfactory treatment for a salivary mucocele is removal of the salivary gland or glands that are involved with the mucocele. Surgical removal of the mandibular and sublingual glands on the side of the mucocele is the normal surgical treatment. The glands are removed together because the duct of the mandibular gland travels through the sublingual gland and removal of one gland would unavoidably traumatize the other.

Sublingual mucoceles (ranulas) may be treated with marsupialization to facilitate drainage into the oral cavity. Marsupialization is performed by excising an elliptical portion of sublingual mucosa overlying the mucocele and suturing the rim of oral mucosa to the connective tissue.

EXCISION OF MANDIBULAR & SUBLINGUAL GLANDS

1-The surgical removal of the mandibular and sublingual salivary glands and their duct requires general anesthesia.

2-Wide clipping of the mandibular and cervical areas, and preparation for an aseptic surgery. The dog is positioned in lateral recumbency.

3-A linear incision is made from the angle of the jaw to where the linguofacial vein and the maxillary vein meet to form the jugular vein. The platysma muscle is divided, and the common capsule of the mandibular and sublingual glands is identified deep to the veins.

4-The capsule is opened, and the mandibular gland is grasped with an instrument. Caudolateral traction is carefully applied during sharp and blunt dissection of the gland. All these major vessels require ligation.

5-The dissection is carried to the digastricus muscle rostrally

6-The common salivary duct is ligated as far rostral to the termination of the sublingual salivary gland as possible

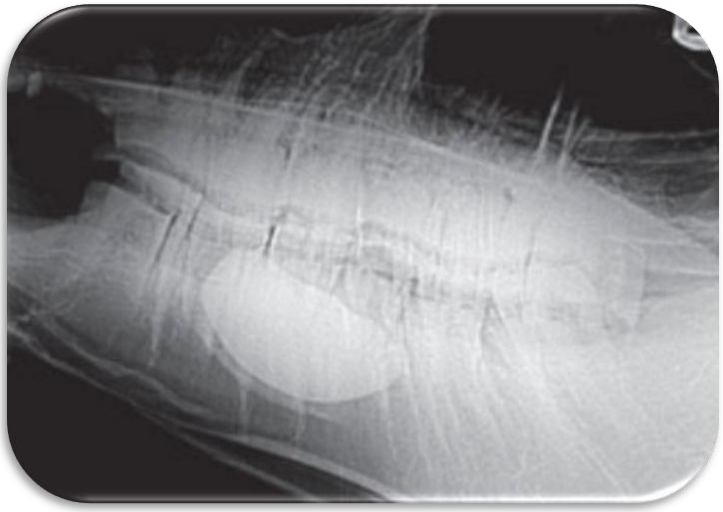
7-A quarter-inch Penrose drain may be placed to drain the primary incision

8-Closure consists of absorbable interrupted sutures in the platysma muscle or subcutaneous tissue, and skin closure

9-The drain may be removed in 3 to 5 days

10-Complications can include seroma formation, and local infection

II-SALIVARY CALCULI (SIALOLITH)



A sialolith is a calcified stone within the salivary ducts. The parotid duct is the most commonly involved. Sialolith is seen more often in equines and also recorded in cattle, dogs and camels. The sialolith is formed of an organic nucleus, surrounded by concentric layers of calcium phosphate crystals.

Causes: -

An ascending foreign body (such as spicules of grass), cellular debris or sloughed epithelial cells act as nidus for deposition of calcium salt.

Signs: -

1-Nonpainful, movable, firm structure is palpable on the lateral aspect of the face near the rostral end of the facial crest. In some cases, the sialolith may be palpable orally.

2-Obstruction of the duct is often incomplete, and saliva may continue to pass around the sialolith. However, with more severe obstruction, back pressure may cause duct and gland distention.

3-Reddening at the parotid papilla

4-Difficulty masticating, quidding, and decreased appetite

5-Calculi vary in size from cherry size to a fist

Diagnosis: -

1-Clinical signs

2-Metal probe inserted into the ostium of the duct strikes hard stone like structure

3-Radiography

Treatment: -

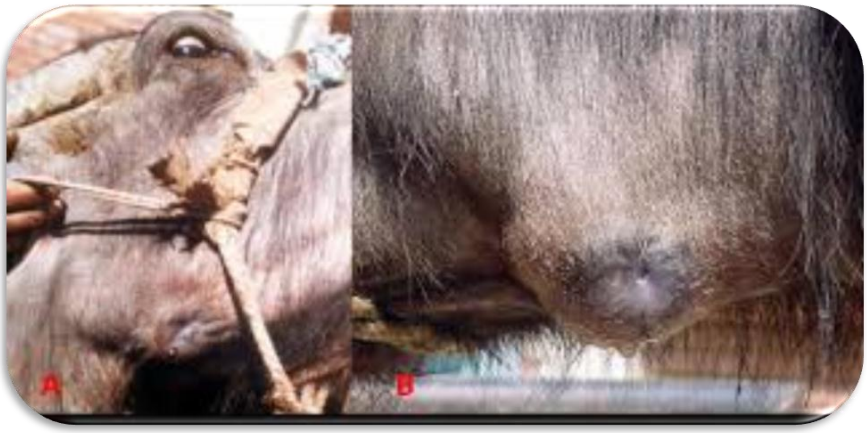
1-Definitive treatment is by removal of the sialolith

2-Smaller calculi may be massaged out of the parotid papilla. The use of lubricant oil may facilitate its removal.

3-If this is not possible, and the calculus is near the papilla, direct intraoral incision over the sialolith, leaving the wound to heal by second intention, is preferred.

4-Calculi inaccessible by the intraoral route must be removed by external longitudinal incision of the duct. Cannulation of the parotid duct via the parotid papilla can be helpful to locate the exact calculus position and then may act as a stent for suturing the duct if primary closure is performed. The entire duct and gland should be lavaged with sterile polyionic solution. Closure of the duct with a simple interrupted or continuous pattern of fine absorbable suture material. Postoperative care is antibiotics and lavage of the duct and gland via catheterization of the oral papilla are recommended in infected cases.

III-SALIVARY FISTULA



It is abnormal tract connecting the salivary duct or gland to skin surface. Because of their superficial location, the parotid salivary gland and duct are more subject to traumatic

injury than the two other, more deeply located glands.

Causes: -

1-Trauma to the side of the face

2-Previous surgical treatment of an abscess or calculi

Signs: -

A watery fluid is found to discharge through an opening in the skin at or near the lower border of the jaw. The quantity will depend upon the size of the opening and also upon the act of mastication. When feeding, the secretion of saliva is most active and the flow is very considerable, but becomes comparatively slight when food ceases to be taken.

Diagnosis: -

1-Clinical signs

2-Retrograde catheterization of the duct

3-Retrograde contrast radiography of the duct

Treatment: -

1-Repair the fistula

Excision of fistulous tract by a circular incision around the fibrous wall. Introduce a polyethylene tube (catheter) into the duct. Pull the tube until it is wholly in the duct and then push it in the reverse direction until it slides past the fibrous opening in the duct, toward the gland. Secure the end in the mouth by suture. Close the wound where the fistula has been excised in several layers with catgut. The skin wound is closed with simple interrupted silk suture. The catheter supports the suture line and prevents stricture development while maintaining saliva flow till wound healing.

2-Creation of intra- oral fistula (marsupialization)

A sharp needle or trocher penetrates the cheek (at the level of fistula) to the oral cavity. A strong silk thread is passed through the opening and the two ends are knotted at the commissure. The thread is kept in position

until a permanent fistula is formed. The thread is then removed and the external opening of the duct and skin are sutured.

3-Destruction of the function of the gland

The alternative approach to managing a chronic parotid salivary duct fistula is to attempt to eliminate saliva secretion. This may be performed by surgical removal of the gland, duct ligation proximal to the fistula, or chemical ablation of the gland.

The gland may be injected with a caustic agent to destroy all secreting cells until the fistula resolves and heals. Use of 10 to 15 ml of Lugol's iodine or up to 35 ml of 10% buffered formalin injected through a catheter placed into the duct.

IV-ECTASIA OF THE PAROTID DUCT

It is a dilatation of the parotid duct

Causes: -

1-Congenital

2-Obstruction by a foreign body lodged at the orifice of the duct

3-Obstruction by salivary calculi

4-Scaring of the orifice at the papilla

Signs: -

1-The duct is dilated to the size of a thumb over the entire course

2-The swelling is soft and having the consistency of engorged vein

3-The dilated duct may reach the fest size in buffaloes.

Treatment: -

1-An attempt to pass a probe through the orifice of the duct

2-Incision of the narrow orifice with special scalpel

3-Creation of artificial intra-oral fistula (marsupialization): 1-2 cm long incision is performed in the oral mucosa and passed through the dilated duct. This artificially created internal fistula will provide an outlet for continuous salivary drainage. The constant secretion prevents healing of the fistula.

V-SIALADENITIS

Definition: -

Inflammation of the salivary gland

Cause: -

1-Trauma from penetrating wounds

2-Systemic infection affecting the salivary gland or surrounding tissue

3-Systemic viral disease as canine distemper

4-Retrograde infection through the parotid duct

Signs: -

1-Fever, depression, and painful, swollen salivary glands

2-Rupture of a gland abscess may discharge pus into the surrounding tissue or the mouth

3-Rupture through the skin may lead to salivary fistula formation

Treatment: -

1-Abscess should be drained through the overlying skin

2-Systemic antibiotics should be administered

II-AFFECTIONS OF THE ESOPHAGUS

Anatomy: -

The esophagus is the tube between the pharynx and the stomach. At its origin it passes to the left of the trachea, so that at the thoracic inlet it

comes to lie on the left lateral aspect of the trachea. Within the thoracic cavity it is located dorsal to the trachea and runs in the mediastinum, continuing beyond the tracheal bifurcation and over the base of the heart. It continues ventral to the ascending aorta with a slight dorsal inclination and enters the abdominal cavity through the esophageal hiatus of the diaphragm. It passes over the dorsal border of the liver to join the stomach at the cardia. Since it traverses most of the neck, all of the thorax and ends on entering the abdomen it is divided into cervical, thoracic and abdominal portions. The esophagus has four layers; these are (from the inside to the outside); Mucosa, Submucosa, Muscular layer, Adventitia in the cervical portion and serosa in the thoracic portion (pleura) and abdominal portion (peritoneum)

I-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 attempts to swallow.

3-Severe tympany develops soon after complete obstruction

4-The patient remains thirsty and makes attempts 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

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 it can be removed by hand from the pharynx.

2-A stomach tube can be used to gently push the obstructed foregin body into the rumen. However, such a method may be of value only if the

obstructed 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 between sternocephalic muscle and trachea in the upper two thirds of the neck in large ruminants 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 ruminants 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, attempts 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.

II-ESOPHAGEAL STENOSIS OR STRICTURE

It means narrowing of the esophagus. It may be obstructive stenosis or compression stenosis.

1-Obstructive stenosis

It caused by fibrous tissue formation in the wall of the esophagus itself due to:

1-Deep damage to the esophageal wall following removal of a foreign body.

2-Local pressure necrosis of the mucosa

3-Esophageal perforation

4-Severe esophagitis due to caustic anthelminitics or gasroesophageal reflux of HCL

5- Following esophagotomy operation

2-Compression stenosis

It is not caused by fibrous tissue formation around the wall of the esophagus as in:

1-Neoplasia or abscessiation in the wall of the esophagus

2-Peri-esophageal swelling as abscess, neoplasia or enlarged lymph node

Signs: -

1-Signs of esophageal obstruction

2-Accumulation of food at the seat of stricture

3-Dilatation of the esophagus cranial to the stricture site which is palpable in cervical esophagus

4-Stricture impedes passage of stomach tube but narrow tube might pass.

Diagnosis: -

1-Clinical signs

2-Contrast radiography

3-Endoscopy

Treatment: -

1-Surgical removal of the cause of narrowing

2-Partial resection

3-Complete resection and anastmosis

4-Esophagoplasty

III-ESOPHAGEAL DIVERTICULUM

There are two types of esophageal diverticulum, and both are usually acquired conditions.

1-Traction (true) diverticulum

It has shallow body and wide opening, able to transmit peristalsis, not prone to impaction. It results from contraction of periesophageal fibrous scar tissue, often secondary to a wound or previous surgery. Traction diverticula are usually asymptomatic because its wide neck does not entrap feed, and it retains sufficient musculature to transmit normal peristalsis.

2-Pulsion (false) diverticulum

It has flask-like body and narrow opening, usually located in cervical region in horse, prone to impaction. It results from protrusion of mucosa and submucosa through a defect in the esophageal musculature. These diverticula may result from external trauma, fluctuation in esophageal intraluminal pressure, and overstretch damage to esophageal muscle fibers by impacted foodstuffs. Affected animals are often dysphagic but able to drink. They may regurgitate after eating. The diverticulum may enlarge over time and become evident as a large swelling in the neck, which results in dysphagia or choke. Esophagoscopy helps define the relative size of the opening of the diverticulum.

Diagnosis: -

1-Clinical signs 2-Contrast radiography 3- Endoscopy

Treatment: -

1-*Traction diverticulum*, even when quite large seldom requires treatment.

2-*Pulsion diverticulum* can be repaired by diverticulectomy with resection of the mucosal-submucosal sac, followed by reconstruction of the mucosa, submucosa, and muscularis, or by inversion of the mucosal-submucosal sac with reconstruction of the muscular layer.

Diverticulectomy should be used when the mucosal sac is very large and the neck of the diverticulum very narrow. However, mucosal inversion is the preferred technique because it decreases the chance of postoperative leakage, infection, or fistula formation.

IV-ESOPHAGEAL PERFORATION OR LACERATION

Causes: -

1-Esophageal perforation or rupture is caused most often by overzealous use of an instrument to dislodge an obstruction.

2-The foreign body itself can also cause pressure necrosis of the esophageal wall.

3-Other causes include pharyngeal trauma, extension of a soft tissue infection, and cervical trauma.

Signs: -

1-Affected animals usually develop impressive subcutaneous emphysema. They are inappetent and depressed.

2-Swelling develops at the site of the rupture and can progress to a sizable infection of the surrounding area.

3-Migration of infection down fascial planes to the mediastinum and thoracic cavity can be catastrophic.

Diagnosis: -

1-The diagnosis can be confirmed with esophagoscopy, ultrasound, or a contrast radiographic study.

2-On survey radiographs, irregular gas opacities may be detected in the soft tissues of the neck, surrounding the esophagus and trachea, and/or within the mediastinum.

3-If esophagraphy is performed, iodinated contrast medium should be used. If the esophagus is perforated, contrast medium is detected in the soft tissues outside the esophagus.

Treatment: -

1-Tissues healthy enough to be closed after esophageal perforation are rare, but primary closure can be attempted with a lesion less than 12 hours old.

2-Closed suction drainage should be used to avoid serum and blood accumulation at the surgical site.

3-Therapeutic antibiotics, non-steroidal anti-inflammatory drugs, and tetanus prophylaxis are administered.

4-If primary closure is not possible, ventral drainage is provided, and the wound is allowed to heal by second intention. Adequate ventral drainage is mandatory to prevent septicemia and cellulitis, extending along fascial planes and causing lower airway disease or possibly generalized septicemia.

5-The patient can be fed via a rumen fistula. Healing these tissues can be a long, drawn-out process and is rarely warranted.

V-ESOPHAGEAL FISTULA

It means presence of fistulous tract connecting the lumen of the esophagus with the skin at the left side of the neck

Causes: -

Esophageal fistulae may result from healing esophagotomy incisions or after esophageal perforation.

Signs: -

Presence of an opening discharge food, water and saliva. This discharge increase during eating

Diagnosis: -

1-Clinical signs

2-Contrast radiography.

Treatment: -

Resection of the fistulous tract and closure of the stoma

VI-MEGAESOPHAGUS

Segmental or generalized dilation of the esophagus. This disorder is usually described in young animal that have an atonic esophagus that accumulates solid food that may occlude the esophagus. However, some cases may be described in an adult animal.

Signs: -

Affected animals are dysphagic, salivate, and cough. Aspiration pneumonia is common.

Diagnosis: -

Regardless of age, survey radiographs reveal air or an air fluid interface within an atonic esophagus. Esophagraphy shows a large accumulation of contrast material in the esophagus.

Treatment: -

Treatment is supportive. Animals should be frequently fed small amounts of easily digestible feeds. Antibiotics are indicated for pneumonia.

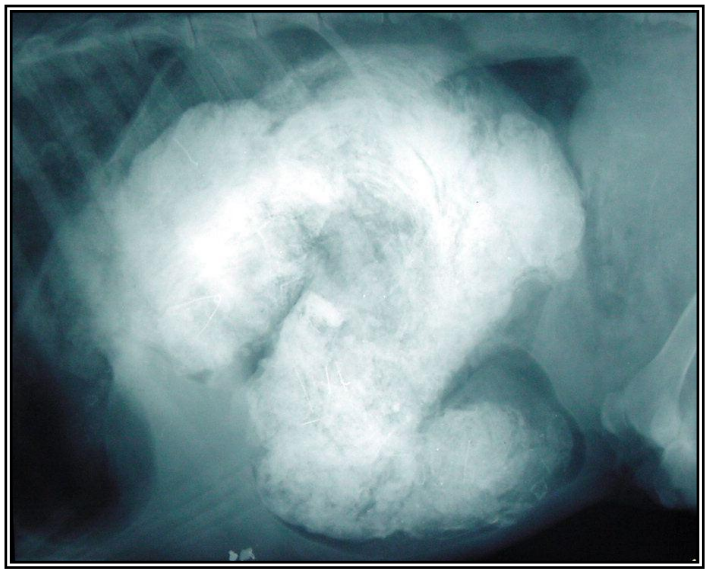
The prognosis is unfavorable.

III-AFFECTIONS OF STOMACH

A-RUMENANT STOMACH

1-RUMINAL IMPACTION

Primary rumen impaction occurs in buffaloes and cattle mostly with depraved appetite. Most of these animals eat plastics, ropes leather pieces and cloths that make large tight ball inside the rumen due to churning movements leading to impaction.



Signs: -

1-Tympany

2-Anorexia

3-Leather pieces can produce obstruction at the reticulo-omasal orifice and most of them were recovered from the reticulum.

4-The foreign body can be palpated as a fetus in small ruminants

Treatment: -

1-Rumenotomy is performed to remove impacted materials. The churned up mass is difficult to remove and has to be cut into pieces.

2-Correction of the rumen pH and addition of ruminal fluid from healthy animals speed up the recovery process

3-yeast tablets (50 tab) can be kept inside the rumen. Also, administer 20 yeast tablets orally twice a day for 2-3 days to revive the normal fermentation process in the rumen.

2-TRAUMATIC RETICULOPERITONITIS (TRP)

It means penetration of the wall of the reticulum by a hard object resulting in localized reticulitis and peritonitis.

Incidence: -

The condition is common in house-holding buffaloes and cattle in Egypt. Nearly more than 10% of animal are affected with traumatic reticulo-peritonitis. 20-25% of buffaloes and cattle have metallic foreign bodies in their reticulum. Incidence of the condition is very low in foreign countries because of better awareness by livestock raisers. Also, administration of magnet reduces the incidence of the condition in these countries. TRP is mostly found in middle and old aged animals. It is considered a disease of dairy cattle and buffaloes. Condition is very rare in camel and small ruminants.

Causes: -

1-Sewing needles

They are the most dangerous foreign body swallowed by animals. 95% of extracted needles during rumenotomy were found penetrating and in many instances were recovered from the heart at necropsy findings.

2-Hair clips

Also a dangerous foreign body recovered from many animals affected by TRP. The sharp end of one prong was found penetrating while the other blunt end was found bearing weight on the reticular wall.

3-Nails

They are the most common metallic object recovered from the reticulum. Our results in some studies performed on the varieties and sequelae of ingested foreign bodies indicated that only 30% of nails were found penetrating the reticulum.

4-Wire pieces

In governmental and private farms, feeding bales are sometimes tied off by wire. Feed cutters often cut accidentally baling wire into short pieces and offered to animals with food.

5-Other types of sharp metal objects

They are rarely causing TRP in animals. Most of them cause injuries and wounds to the reticular mucous membrane without penetration.

6-Nutritional deficiencies

Many animals seek out for metals in an attempt to tolerate their craving.

7-Bad management

Bad management and bad hygienic conditions which lead animals to grass on unsuitable places as seat of garbage collections around cities.

Animals usually take these foreign bodies accidentally and because the process of mastication is not complete, foreign bodies are quickly swallowed. In addition, papillae of the tongue are directed caudally ad thus prevent the animal to get red easily of these foreign bodies.

Clinical signs: -

1-The onset of the signs is usually sudden

2-Capricious appetite

3-Milk yield is significantly diminished

4-The head and neck are somewhat stretched

5-Thoracic kyphosis and lumbar lordosis are evident in some cases

6-Stiffness of the thoracic limb and abduction of the elbows

7-Lying down, standing and turning especially to the left are painful

8-Rumination is weak or absent

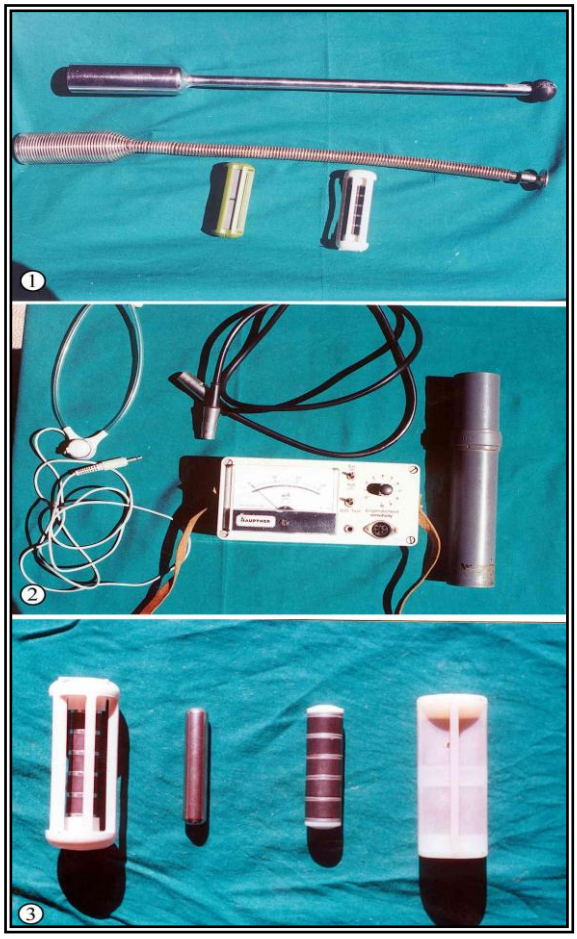
9-Feces are firm and decreased in quantity.

10-Temperature usually remains normal except when there is spreading peritonitis.

11-Heart beats and rate are normal.

12-Respiration is normal except when the rhythm is disturbed by grunting

13-Ruminal movements are normal or decreased



Diagnosis: -

1-Case history

2-Clinical signs

3-Pain tests; pole (stick) test, withers test, back test, percussion at the xiphoid region and going up and down a hill. These tests are used to detect the pain resulting from penetrating foreign body in cattle, and appear to be not satisfactory for buffaloes.

4-Hematological examination: Shift to left in WBC count – leucocytosis is variable with lymphopenia and neutrophilia.

5-Radiographic examination: plain radiograph of the caudal thorax and cranial abdomen is a useful diagnostic aid. Apart from locating foreign bodies, the radiographs also provide sufficient information concerning the nature and extend of the damage caused by potential foreign bodies.

6-Metal detector is a good mean for detection of metallic foreign bodies.

Disadvantages of metal detectors: -

1- It does not detect if the foreign body is penetrating or non-penetrating.

2- It does not detect if the foreign body is sharp or not.

3- It does not detect the accurate location of the foreign body.

Treatment: -

Surgical treatment by laparo-rumenotomy is the only serious surgical interference for correction of such cases.

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)

6-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 block

Preoperative preparation: -

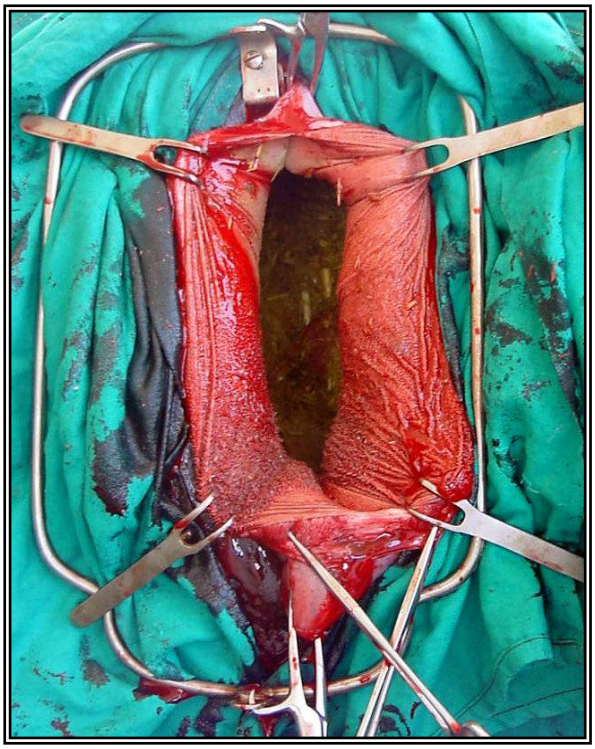
1-Clipping and shaving of hair of the left flank region

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.

Complications of TRP: -

1-Perireticular abscesses

2-Generalized peritonitis

3-Traumatic pericarditis

4-Traumatic pneumonia and lung abscess

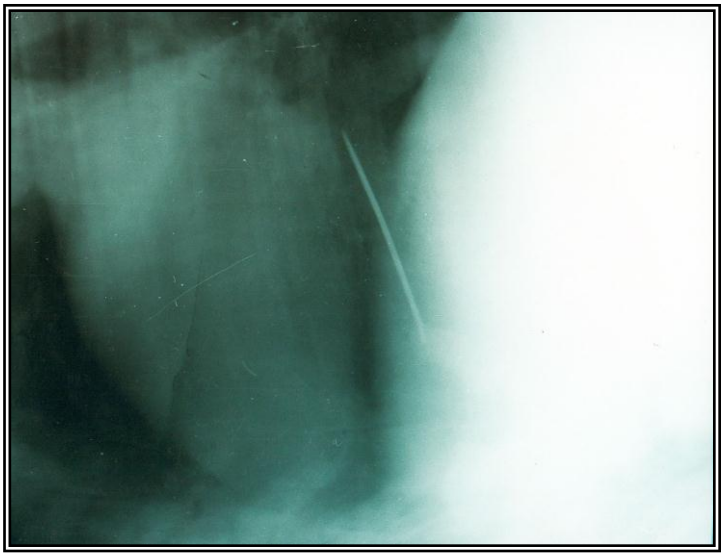
5-Liver abscess

6-Intestinal rupture

7-Vagal indigestion

8-Diaphragmatic hernia

3-TRAUMATIC PERICARDITIS (TP)



Traumatic pericarditis results from penetration of a sharp foreign body into the pericardial sac. First of all, the foreign body penetrates the reticulum then the diaphragm and finely penetrates the pericardium inducing pericarditis. The condition is observed in cattle more than buffaloes and recorded mostly in pregnant animals at the latter stages of pregnancy or soon after parturition.

Signs: -

1-A history of complete anorexia, loss of body weight and reduction of milk-yield

2-Sudden appearance of mandibular and brisket edema filling and pulsation of the jugular vein

3-In some cases, edema of the thoracic limbs and ventral abdominal wall was clear.

4-Arched back and winged elbows were evident in many cases.

5-Auscultation revealed muffled heart sound and dyspnia, increased pulse rate and rise of body temperature up to 40C.

Diagnosis: -

1-Case history

2-Clinical signs

3-Pericardiocentesis revealed presence of purulent exudates coming out from the pericardial sac in jets with heartbeats. The seat of pericardiocentesis is in the intercostal space between the left fifth and sixth ribs just behind the elbow. A 10-12cm, 24-gauge-needle is used and suction with syringe is sometimes indicated.

4-Plain radiography of the thorax revealed poor differentiation of the thoracic contents. The contour of the diaphragm was lost and the cardiac silhouette was undifferentiated. In some cases the shadowgraph of metallic foreign bodies was seen at the level of the heart or in the area connecting the dome of the diaphragm with the heart.

Treatment: -

No treatment in such cases is indicated. It is recommended to send the animal to slaughterhouse.

4-OMASAL IMPACTION

Omasal impaction occurs mostly secondary to rumen impaction and is a result of poor quality feed. The omasum gets distended with stagnated ingesta. Omasal impaction usually discovered during rumenotomy operation. A very hard rounded mass was found right to the reticulum and rumen.

Signs: -

1-Anorexia, restlessness and signs of dehydration

2-Omasal sounds on auscultation are absent at the level of right elbow at the 9th intercostal space

Treatment: -

1-Administration of 4-5 liters of liquid paraffin or mineral oil to soften the contents through a stomach tube or laparorumenotomy incision

2-Tablets of yeast (50), 2-3 kg sugar, and 2-3 liters of ruminal fluid from healthy animal may also be added to stimulate the rumen flora.

3-Rumenotomy may be performed and a long tube with needle attached to a syringe may be used to inject solution directly into the omasum through the right ruminal wall.

4-Neglected cases proceed to a dangerous course and necrosis of omasal leaves may occur due to continuous pressure exerted by the impacted materials.

5-ABOMASAL IMPACTION

Seen in cattle and recorded in buffaloes. The primary cause is excessive consumption of poor quality indigestible roughages and inadequate mineral supplementation with restricted access to water. Foreign bodies, trichobizoars (hair balls), or phytobizoars (plant balls), and sand may also cause impaction. TRP, abomasal lymphosarcoma,

fat necrosis and vagal indigestion may lead to abomasal impaction.

Signs: -

1-Complete anorexia

2-Scanty feces

3-Marked dehydration

4-Moderate distension of abdomen

5-Lower right abdominal quadrant may appear distended giving a pear shaped appearance from behind

6-Reduction of milk yield

Treatment: -

1-Softening of impacted contents with lubricants

2-Intensive fluid therapy containing sodium chloride, potassium and calcium

3-Abomasotomy may be indicated to evacuate the contents

4-Slaughtering may be the ideal solution

6-ABOMASAL ULCER

It occurs in suckling calves and adult cattle and may cause gastric hemorrhage, indigestion, melena and in some cases perforation with local or diffuse peritonitis. Abomasal ulceration has also been reported in buffalo calves.

Causes: -

1-In high producing cows within first few weeks postpartum

2-In calves, it appears to occur when diet of low dry matter content (milk) is changed to high dry matter content (grass, grains and hay) suddenly

3-Trichobizoars (hair balls) are often present in calves with abomasal ulcers but it is not clear if trichobizoars cause the ulcers or found after ulcers have developed

4-Hyperacidity and increased mucosal permeability to hydrogen ions are requisite for ulcer formation

5-Abomasal ulcerations were seen in necropsy findings secondary to traumatic pericarditis, diaphragmatic hernias, vagal indigestion, abomasal displacement, abomasal foreign bodies and some cases of traumatic reticlo-peritonitis

Types: -

1-Erosion and ulcers with slight hemorrhage

2-Bleeding ulcers

3-Perforation with acute local peritonitis

4-Perforation with diffuse peritonitis

Signs: -

The clinical signs vary depending on the type of ulcer and whether are associated with hemorrhage or perforation.

1-Abdominal pain, melena, pale mucous membranes

2-Anorexia, ruminal stasis

3-Calves become recumbent suddenly with cold extremities

4-Tachycardia and dehydration then death occur within 24 hours in newly borne animals

Diagnosis: -

It depends mainly on clinical signs.

Treatment: -

1-Change of diet from high to low concentrates

2-Anti-acids such as magnesium silicate (100gm) or magnesium hydroxide/aluminum hydroxide 50ml 3 to 4 times daily administered orally for 2 to 3 weeks

3-In bleeding ulcers and perforation with local peritonitis, treatment is directed to control bleeding and injection of coagulants, antibiotics and adequate fluid therapy is recommended.

4-Radical excision of ulcerative patches following abomasotomy

7-ABOMASAL DISPLACEMENT

The abomasum is a wandering organ due to its loose attachments with the greater and lesser omentum. The organ can displace easily to the left (LDA) or to the right (RDA). LDA is more common than RDA and occurs primarily in cattle in countries where feed consists of high proportion of grains and other concentrates than roughages. However, some Indian colleagues stated that displacement of the abomasum is very rare in buffaloes.

Incidence: -

1-In foreign breeds of cattle with large size and high producing milk in age group from 3-7 years

2-The highest incidence has been recorded 3 weeks anti-partum to 4 weeks postpartum

Etiology: -

The exact etiology of the disease is unknown. The following causes may be suggested.

1-Genetic factors

Large and deep abdominal cavity in foreign breeds

2-Mechanical factors

1-Enlarged gravid uterus during pregnancy. The rumen is lifted by gravid uterus and the abomasum may slide to the left under the rumen. Following parturition, the rumen will come to its normal position, while

atonic and distended abomasum may get trapped between the rumen and left abdominal wall.

2-Lameness in the left fore or hind limb.

3-Right recumbency for claw trimming

3-Physiological factors

1-Abomasal atony with increased gas production may act as a predisposing cause.

2-Feeding of high concentrate ration increases production of volatile fatty acids. Unabsorbed volatile fatty acids pass from the rumen to the abomasum and decrease the contractility of the latter. Accumulation of gases causes distension and displacement.

Signs: -

Usually appears as a result of grossly distended abomasum and partial obstruction of the digestive tract.

1-Loss of appetite, sudden drop in milk yield and dehydration

2-Decreased quantity of feces (scanty)

3-Ruminal movements are sluggish and weak

4-Auscultation of the left side area of the last three ribs reveals a gas distended structure and produce tympanic resonance sound (ping)

5-Bulge behind the last rib

6-Hypocalemia and hypochloremia

Treatment: -

The aim of treatment is the correction of displaced abomasum, restoration of the GIT motility, rehydration and correction of metabolic disorders.

1-Calcium preparation to stimulate the GIT motility

2-Administration of warm saline solution and mineral oil to help evacuation of contents

3-Intensive IV fluid therapy using balanced solution to correct dehydration

4-Surgical correction of displaced abomasum includes decompression, replacement to normal position and fixation of omentum or abomasum to the body wall to form adhesions so that recurrence does not occur by:

a-Left flank laparotomy and omentopexy or abomasopexy

b-Right flank laparotomy and omentopexy or abomasopexy

c-Ventral laparotomy and abomasopexy

d-Quick stitch method (Blind stitch)

B-EQUINE STOMACH

1-GASTRIC ULCER

Gastric ulceration produces signs of abdominal distress and may result in stomach perforation leading to fatal peritonitis. Formation of ulcers has been related to diet, race, training and stabling. It is usually clinically silent or develops as a result of colic and may lead to lack of condition, weight loss and poor performance.

Treatment includes maintaining gastric pH above 4 until ulcers have healed.

2-GASTRIC DILATATION

Gastric dilatation refers to the abdominal accumulation of fluid and gaseous ingesta that induce clinical signs of acute abdominal distress. Ingestion of foodstuffs that swell with moisture or fermentable food may lead to primary gastric dilatation. Volatile fatty acids formed by fermentation produce delay in gastric emptying, further exacerbating gas accumulation.

3-GASTRIC IMPACTION

It means abnormal accumulation of dry, poorly fermentable ingesta in the stomach producing anorexia, dysphagia, mild colic and gastric pain.

Also non-nutritious feeds, irregular feeding, dental diseases, gastric atony and pyloric stenosis are additional causes of gastric impaction. Treatment to relief gastric impaction include; gastric lavage with nasogastric tube in the standing horse with external massage of the stomach via a ventral celiotomy, hydration of the impaction by a tube or long needle passed directly into the stomach or manual removal of impacted food material after surgical approach.

4-PYLORIC STENOSIS

The causes of pyloric stenosis include congenital hypertrophic pyloric stenosis, acquired hypertrophic pyloric stenosis as a result of gastritis, muscular hypertrophy of the pylorus, gastric ulceration and formation granulation tissue. Clinical signs include weight loss, poor appetite, tooth grinding, salivation and gastric retention. Pyloric stenosis can be relieved either by pyloroplasty in which a full-thickness longitudinal incisions through the pylorus was closed transversely or by side-to-side gastroduodenostomy.

5-GASTRIC RUPTURE

Gastric rapture occurs at the greater curvature of the stomach with colic in horses. Grain overload, ulcerative gastritis, gastric impaction and nasogastric feeding may lead to gastric rapture. Also strangulating or non-strangulating obstruction and adhesions have been reported as a cause of gastric rapture.

Gastric rapture is a fatal condition because of the gross contamination of the abdomen that occurs

C-CANINE STOMACH

1-GASTROESOPHAGEAL INTUSSUSCEPTION

It means that the stomach or part of it is herniated into the esophagus. Young animals are most frequently affected and it is often fatal condition.

Clinical signs: -

Dyspnea, choke, vomiting, regurgitation, hematemesis, dehydration, abdominal pain and weight loss

Diagnosis: -

It is usually confirmed by plain and contrast radiography and fluoroscopy. Radiographs reveal esophageal dilation and mass in the distal esophagus.

Treatment: -

Supportive therapy, emergency laparotomy and gastropexy to the left body wall

2-HIATAL HERNIA

It means protrusion or herniation of any structure mostly stomach, through the esophageal hiatus of the diaphragm. It may be sliding or paraesophageal forms.

Clinical signs: -

It includes vomiting, dyspnea, hyper salivation, weight loss and signs of pneumonia.

Diagnosis: -

It is usually confirmed by radiography and fluoroscopy. Megaesophagus may be seen on plain radiography along with a gas-filled soft tissue density in the caudal thorax.

Treatment: -

1-Medical treatment

Dietary modification and administration of anti-acids

2-Surgical treatment

The goal of surgery is to return the lower esophageal sphincter and distal esophagus to the abdominal cavity and to close the esophageal hiatus. The operations performed are esophagopexy, gastropexy and diaphragmatic crural apposition.

3-PYLORIC STENOSIS

It is a congenital thickening of the pyloric sphincter that results in delayed gastric emptying of solid food.

Signs: -

Vomiting that usually starts after weaning and growth of the animal may be retarded.

Diagnosis: -

It is confirmed by contrast radiography, ultrasonography and exploratory laparotomy.

Treatment: -

It is surgical by either pyloromytomy or pyloroplasty

4-GASTRIC FOREIGN BODIES

Ingestion of foreign bodies becomes a significant problem when gastro-intestinal obstruction or perforation occurs.

Signs: -

Frequent or intermittent vomiting as seen in pyloric obstruction

Diagnosis: -

It is confirmed by abdominal palpation and survey radiography. Contrast studies or endoscopy may also be useful.

Treatment: -

It is based on the size and the shape of the foreign body

1-Small objects may be expelled by induction of vomiting. Apomorphine and Xylazine have been used to induce vomiting in dogs and cats respectively.

2-Small foreign bodies with smooth surface can be extracted with grasping forceps during endoscopy.

3-Large or rough foreign bodies can be extracted by laparogastrotomy.

5-GASTRIC DILATATION AND VOLVULUS

It is a life-threatening condition in which the stomach becomes dilated and displaced along its long axis, permitting a gaseous distention from erophgia but prevent release of gases through the pylorus or esophagus.

Prolonged gastric distention compromises the intramural gastric blood vessels and compresses the portal vein and caudal vena cava. Reduction of the venous return to the heart from the caudal vena cava compression eventually results in hypovolemic shock with clinical signs of tachycardia, weak pulse, pale mucous membrane, hypothermia and collapse. Venous stenosis may lead to fundic ischemia, mucosal necrosis, endotoxic shock and death.

Signs: -

Restlessness, abdominal distention, ptyalism, depression and signs of acute collapse

Diagnosis: -

Clinical signs and confirmed by radiography. Survey films reveal a displaced air-filled pylorus and gastric distention.

Treatment: -

1-Stomach decompression: the stomach is decompressed by orogastric tube, percutaneous gastrocentesis, or through gastrotomy.

2-Surgical derotation of the stomach and gastropexy to prevent recurrences.

3-Partial gastroectomy may be necessary in presence of non-viable portions of the gastric wall.

4-Splenectomy is necessary if splenic torsion and vascular thrombosis are present.

IV-INTESTINAL OBSTRUCTION

It means interruption in the passage of the intestinal contents. Intestinal obstruction may be mechanical (physical blockage) or functional (altered motility due to dietary factors, enteritis, peritonitis,…etc) and may occur in any part of the intestine.

Classification: -

1-Acute or Chronic

2-Partial (stenosis) or complete

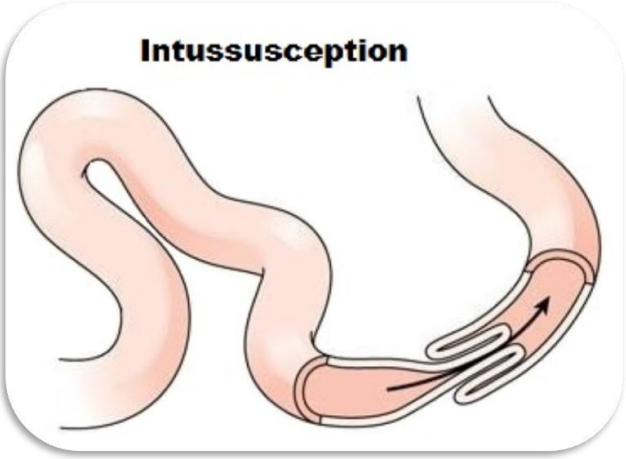
3-Simple (when the blood vessels are not involved) or strangulated (when the blood vessels are impaired).

Types of intestinal obstructions: -

A-Mechanical

1-Extra-luminal obstruction

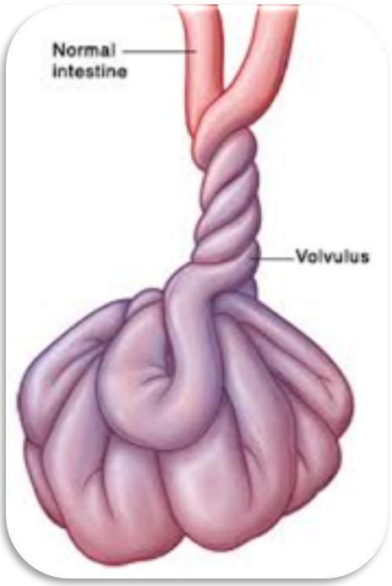
a-Intussusception (invagination)



Invagination or telescoping of one part of the intestine into another part. It can occur at anywhere throughout the length of the intestine. The invaginated part consists of outer, middle and inner layers and it may associate with enteritis or systemic illness. This condition commonly reported after environmental changes and intestinal surgery and common at

the age less than one year. Clinical signs vary with the level and the severity of the obstruction.

The case can progress to a point at which the small intestine protrudes from the anus (differentiated from rectal prolapse by the easy passage of a probe between the prolapsed segment and the rectum). Plain radiograph show bowel distension with gases or fluids and displacement of the abdominal organs. The case may be manually reduced (if the blood vessels are patent and the wall does not look ischemic).



b-Volvulus

A life threatens rare condition, in which the intestine twists along its mesenteric axises causing obstruction and compression of the mesenteric artery and ischemic necrosis occurs.

Causes: -

1-Congenital long mesentery

2-Indigestion and colic

3-Violent movement and rolling

4-Irregular peristalsis

5-Unequal filling of the bowel

c-Strangulation

2-Intra-mural obstruction (tumor)

As a result of intestinal tumor in the wall of the intestine or hemorrhage

3-Intra-luminal obstruction

a-Foreign bodies

b-Sand (in horse)

In case of presence of sand within the bowel of a horse, x-ray shows radiopaque materials within the bowel.

c-Phytobezoars and triychobezoars

Bezoars are indigestible materials within the GIT (impair motility or cause intestinal obstruction). Phytobezoars are indigestible food material while trichobezoar are hairball.

B-Functional

1-Ileus or Hypo-dynamic state (ileus)

Ileus is the absence of propulsive movement of GIT contents resulting in distension of the bowel with gases. Thrombi and emboli (larva) within the mesenteric blood vessels cause ischemia and inability to contract.

2-Strangulation (incarceration)

A condition in which the intestine entrapped in a natural / artificial opening in the mesentery or by pedunculated tumor. Strangulation arrests the bowel blood flow causing edema, cyanosis and gangrene

PATHOPHYSIOLOGY OF INTESTINAL OBSTRUCTION

In simple mechanical obstruction, blockage occurs without vascular impairment. The ingesta are accumulating above the obstruction and the proximal bowel distends and the distal segment collapses. The normal absorptive function is depressed, and the wall becomes edematous and congested.

Severe intestinal distention is progressive, intensifying the peristalsis and secretion and increase the risks of dehydration and progression to strangulation. Strangulating obstruction is accompanied with impaired blood flow and can progress to infarction and gangrene. Venous

obstruction occurs first, followed by arterial occlusion, resulting in rapid ischemia of the bowel wall. The ischemic bowel becomes edematous and infarcts, leading to gangrene and perforation.

During obstruction, there is increased intestinal secretion and reduced absorption leads to reduction in intravascular volume and dehydration that cause hypovolemic shock.

Profuse vomiting may cause less in CL, Na and K. and HCL causing metabolic alkalosis. Loss pancreatic secretion (rich with Na, water and Hco3) leads to metabolic acidosis.

Diagnosis: -

1-The history and signs

2-Physical examinations

3-Rectal examination

4-Radiography, ultrasonography and laparoscopy

Signs: -

Signs differ according to nature, location, duration and severity of the obstruction;

1-General signs

Anorexia, scanty feces tinged with blood and mucous, abdominal distention, increased pulse, temperature may increase (become subnormal in late stages).

In equines; frequent laying and standing, sweating, looking to site of pain, kick on abdomen, and paddling of hind limbs (death occur within 24 hours).

Rectal examination; intussusception appears as a firm coiled mass. In case of volvulus and strangulation the intestine appears distended with gas and firm. In case of intestinal rupture with peritonitis; there is adhesion of the viscra.

In cattle; abdominal distension, straining, grunting, kicking on the belly, depressed back (death occur within 10 days).

Rectal examination; caecal dilatation and torsion palpated as a dome shaped structure on the dorsal right region runs to the ventral left region

In dogs; vomiting, anorexia, weakness and weight loss and frequent attempt to defecate with tiny feces

In ovine; abdominal distention, anorexia, no faces.

General Principals Of Small Intestine Surgery

1-Fluid therapy: -

-Fluids are essential to restore fluid and electrolytes balance.

-Balanced fluids and electrolytes are recommended.

2-Antibiotics: -

They are recommended because;

-Stagnant contents and dead cells are good growth media for microflora.

-Opening of the intestine may causes leakage of contents and the contamination may results in peritonitis.

3-Assessment of intestinal viability: -

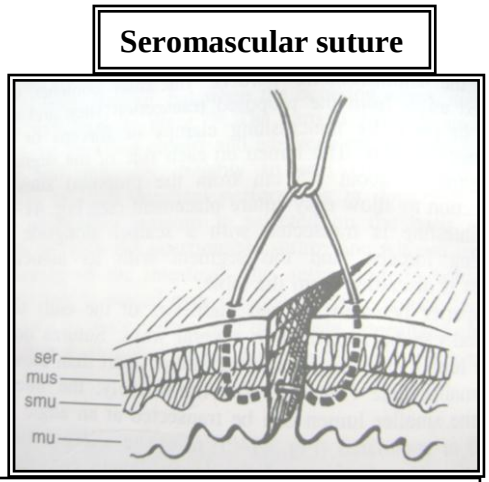
Considering the color, peristaltic waves (Progressive wave-like contractions) and vascular pulsations

4-Choice of suture materials for closure:

Monofilament absorbable (polydioxnone, chromic catgut) or non-absorbable (nylon or polypropylene) suture materials

5-Choice of suture pattern: -

Submucosa is the strongest part and its apposition result in primary intestinal healing, so seromascular suture patterns (lambert and cushing) are



recommended).

6-Surgical line reinforcement: -

Using the omentum which has an extensive vascular and lymphatic supply and has adhesive properties, it also control infection and restore blood supply and lymphatic drainage

SURGICAL TECHNIQUES FOR INTESTINAL SURGERY

1-Enterotomy

2-Enterectomy (Intestinal resection and anastomosis)

Surgical Anatomy: -

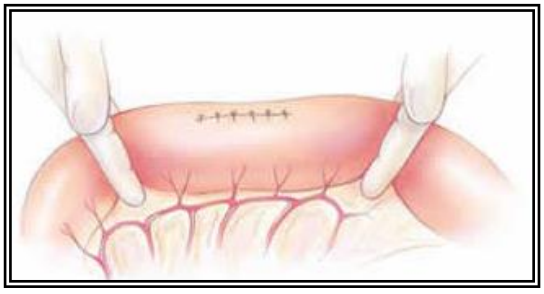
The duodenum is the most fixed portion of the intestine, the jejunum forms most of small intestine coils and lying in the ventrocaudal abdomen while the ileum has an anti-mesenteric vessel.

Blood supply of the intestine comes from mesenteric artery and gastro duodenal artery (which supply the cranial duodenum).

Nerve supply: Vagus and splanchnic nerves.

Anesthetic Considerations: -

Special consideration for cases of obstructions, ischemia or perforations. Enlarged viscera may disturb circulation (compression of vena cava) and disturb respiration (displace the diaphragm cranially). Visceral manipulations may induce bradycardia.



1-Enterotomy

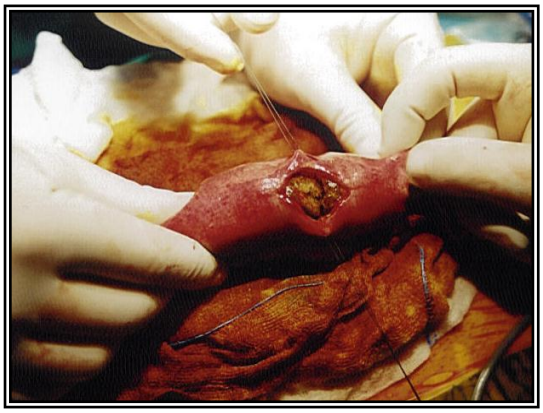
Opening of the intestine by incision and re-suturing of incised wound

Indications: -

Removal of an intra-luminal foreign body, biopsy, ….

Technique: -

Milk away the intestinal content from the site of obstruction. Apply intestinal forceps proximal and distal to the obstruction. The incision is done through the anti-mesenteric border just distal to the obstruction. The foreign body may be pulled by a forceps. Enterotomy incision is closed longitudinally (may be closed transversely)



2-Enterectomy

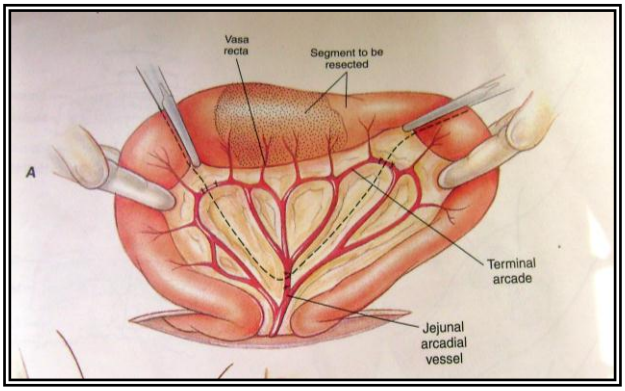
It means intestinal resection and anastomosis, it can be performed by end to end, end to side, or side to side anastomosis

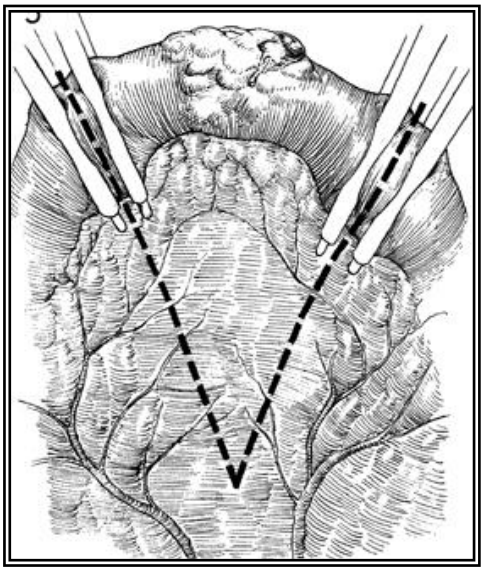
Indications: -

1-Ischemic or necrotic intestinal segments

2-Irreducible intussusception

3-Tumor





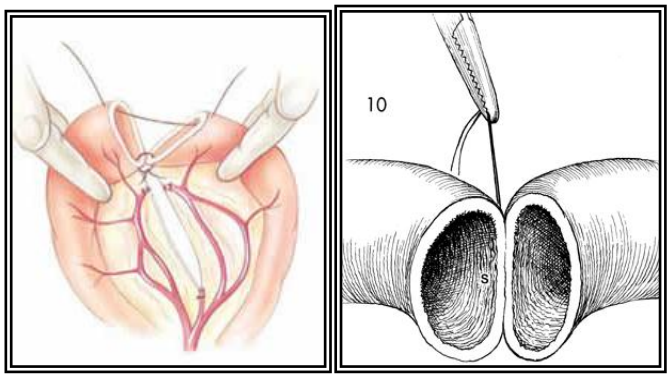
Technique of enteroectomy: -

1-The affected segment is clamped with intestinal forceps

2-The mesenteric vessels are ligated

3-The triangular piece of mesentery distal to ligature is torn and bowel is divided close to the clamp and removed

Techniques: -



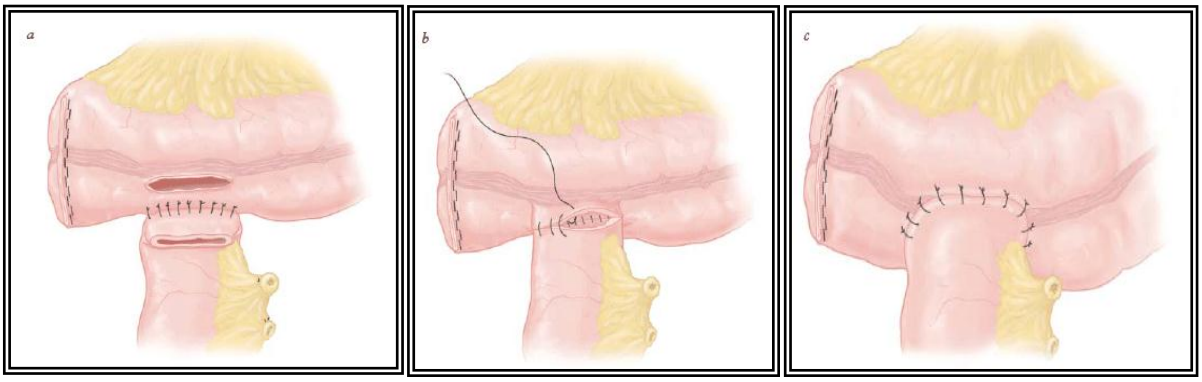
a-End to end anastomosis

There are several ways to suture small and large diameter intestinal segments:

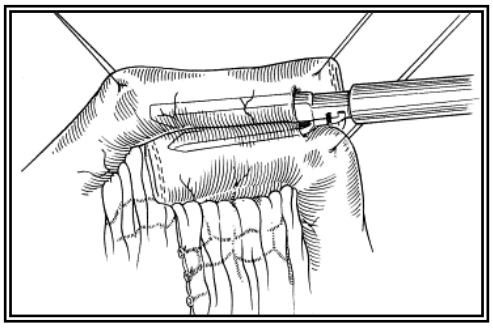
1-Transecting smaller segment at an angle, creating a lumen of larger diameter

2-The smaller segment incised longitudinally in the anti-mesenteric border to create a larger opening. The first and second sutures are placed in mesenteric and anti-mesenteric borders

b-End to side anastomosis



The end of a small diameter viscus is sutured to the side of wider one



c-Side to side anastomosis

The two viscera are sutured side to side

Suture pattern for intestinal anastomosis: -

1-Single layer simple interrupted or simple continuous sutures

2-Single layer from inverting suture like as lambert or cushing pattern.

3-Parker Kerr suture technique: done as follow;

a-Continuous suture applied over clamp jaw

b-The free ends of thread pulled and clamp withdrawn

c-Then Lembert's suture

d-Ends of stay suture are drawn out

Intestinal anastomosis is assessed through: -

1-Absence of leakage

2-Minimal lumen stenosis

3-Minimal adhesions

4-Rapid healing

Complications of enteretomy and enterectomy: -

1-Septic peritonitis

-Associated with dehiscence of anastomosis or enterotomy site.

-Clinical signs appear 2-5 days after surgery.

Treatment: -

Antibiotics, fluids, supportive therapy and surgical correction of the problem and complete drainage of the peritoneal cavity

2-Adhesions

-Dogs &cats have active fibrinolytic system prevents this adhesion

-Peritoneal irrigation with dialysis solution after surgery reduces this adhesion

3-Short Bowel Syndrome

-Mal-digestion and mal-absorption after extensive resection

4-Ileus

-A common complication

-Reduced motility due to over-activity of sympathetic system due to manipulation of intestine, long operative time and extensive resection

V-AFFECTIONS OF THE RECTUM

I-WOUNDS

It is common in domesticated animals

Etiology: -

It may occur as a result of; back racking, severe rectal impaction, dystocia, during overyectomy, and false introduction of penis in rectum during coitus, or sharp foreign bodies

Signs: -

Rectal wounds may superficial (limited to mucous membrane) or perforating

1-Painful defecation and bloody discharge

2-Injuries in the dorsal or lateral walls of the rectum may form an abscess or fistula around the anus

3-Wounds in rectal floor may leads to recto-vaginal fistula or peritonitis

Treatments: -

1-Superficial wounds treated by antiseptic infusion after evacuation of the rectum

2-Rectal and pre-rectal abscesses or fistula should be treated according to the principals that discussed in general surgery

3-Perforating wounds are treated through laparotomy

4-Recto-vaginal fistula will be discussed.

II-RECTAL PROLAPSE

It is common in young than adult animals

Forms: -

1-Mucosal Prolapse

The mucosa is protruded without muscular layers

2-Complete Rectal Prolapse

3-Complete Rectal Prolapse With Invagination

The anterior part of rectum is invaginated in a posterior part and both are prolapsed together

4-Complete Rectal Prolapse With Herniation Of The Intestine

A part from small intestine is invaginated in the pelvic portion of the rectum and both structures are prolapsed together

Etiology: -

1-Weakness of the anal sphincter

2-Severe diarrhea, infestation with gastrophilus larvae in equine (attach to the rectal mucosa causing straining)

3-Excessive straining and increase intra-abdominal pressure during colic, parturition, defecation, …

4-After casting the animal

Signs: -

1-Protruded rectum covered by mucous membrane which appears rosy red if the case is recent, while in old cases, ulceration, necrosis and bleeding may occur).

2-In severe cases; the rectum appears cyanotic, edematous and gangrenous.

Treatment: -

Differ according to the prolapsed part:

1-Reduction Of The Prolapsed Part

In recent cases, done under the effect of general or caudal epidural anesthesia. The prolapsed part washed with normal saline and astringent like 2% alum (to reduce swelling) then reduced in its place and purse-string suture is applied. The suture should be opened daily for evacuation of the rectum and removed completely after 7 days.

2-Shortening Of The Prolapsed Part Without Amputation

The idea of this technique is to remove the affected mucous membrane without damaging of the underlying tissue.

Performed if the prolapsed part is less than 15 cm and shows minimal pathological changes.

1-The rectum is packed with cotton tampon, with slight traction to expose a healthy area and then fixed by two needles (20 cm long) inserted close to anus and crossing each other.

2-Two circular incisions (in the mucous membrane only) are made; the first at the apex, and the other one close to the base of the prolapsed part.

3-Another longitudinal incision connecting the two circular ones is performed and the incised part of the mucous membrane is bluntly dissected.

4-The proximal and distal ends of the healthy mucous membrane are sutured together along its circumference using catgut.

3-Amputation Of The Prolapsed Part

Performed if the prolapsed part is more than 30 cm and shows extensive pathological changes s necrosis or gangrene.

The hand is introduced into the rectum to exclude the presence of invagination or herniation which should be corrected at first.

The rectum tracted slightly to expose healthy area, fixed by needles (20 cm).

The double wall of the prolapsed part is sutured along circumference with interrupted *Mattress* using catgut.

The prolapsed part is amputated 3 cm anterior to the line of suture and the edges are sutured.

The operation is completed as mentioned.

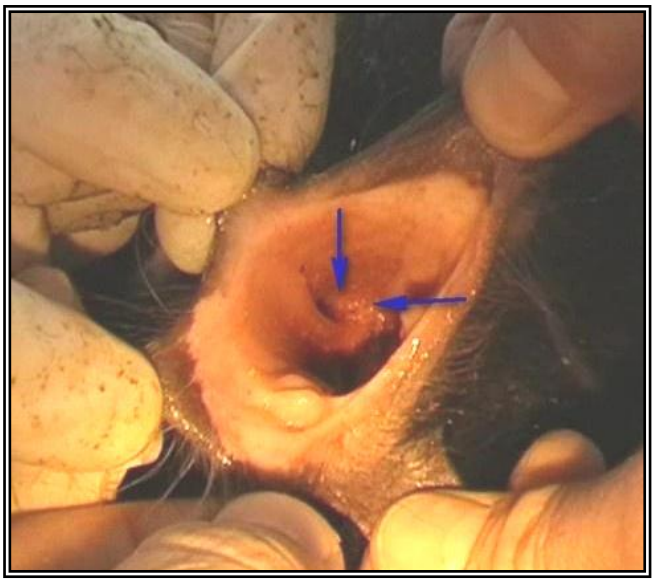
III-RECTAL FISTULA (ano-rectal fistula)

It occurs as a complication of pre-rectal abscess, puncture rectal wounds

Forms: -

1-Complete Fistula

It has two opening, one at the rectum and other near the anus



2-Incomplete (rectal sinus)

a-Inner incomplete

It has one opening in the rectum.

b-Outer incomplete

It has one open opening around the anus.

Treatment: -

1-Washing with antiseptic and cauterization

2-Incision of the fistula without injuring the anal sphincter

3-Complete excision of the fistula and the resulted wound left to heal normally

IV-ANAL ATRESIA

Absence of anal opening resulted when the membrane separating the rectum and anus is failed to rupture.

The condition is discovered at birth by absence of anal opening and the animal shows abdominal pain, distension and no passage of feces.

Treatment: -

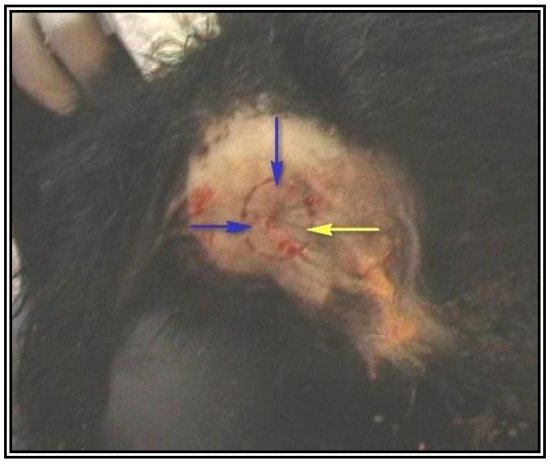
1-Circular skin incision is made over the protruded area at the anus

2-The skin disk is removed

3-The rectal wall is fixed to the surrounding by simple interrupted suture using silk

4-The rectum is punctured at its central part and evacuated

5-Skin suture is removed after 10 days



V-RECAL AGENESIS (rectal segmental aplasia)

It occurs when the rectum terminates before reaching the anus and it is usually accompanied by anal atresia.

Types of intestinal atresia: -

1-Type I Atresia

It is a mucosal blockage within the intestinal lumen

2-Type II Atresia

The proximal segment terminates in a blind end and the distal segment beings similarly with 2 ends being joined by a fibrous cord devoid of lumen

3-Type III Atresia

It is similar to type II except that the proximal and the distal blind ends are completely separated and there is a mesenteric defect corresponding to the missing segment of intestine

a-Type IIIa Atresia

It has a straight distal segment of intestine

b-Type IIIb atresia

It has a coiled distal segment of intestine

4-Type IV atresia

It involves multiple sites of atresia

Treatment: -

It is primarily surgical and includes

1-Cecostomy or suturing of the cecum to the abdominal wall in the form of fistula through which the animal defecates, when the anal opening is absent

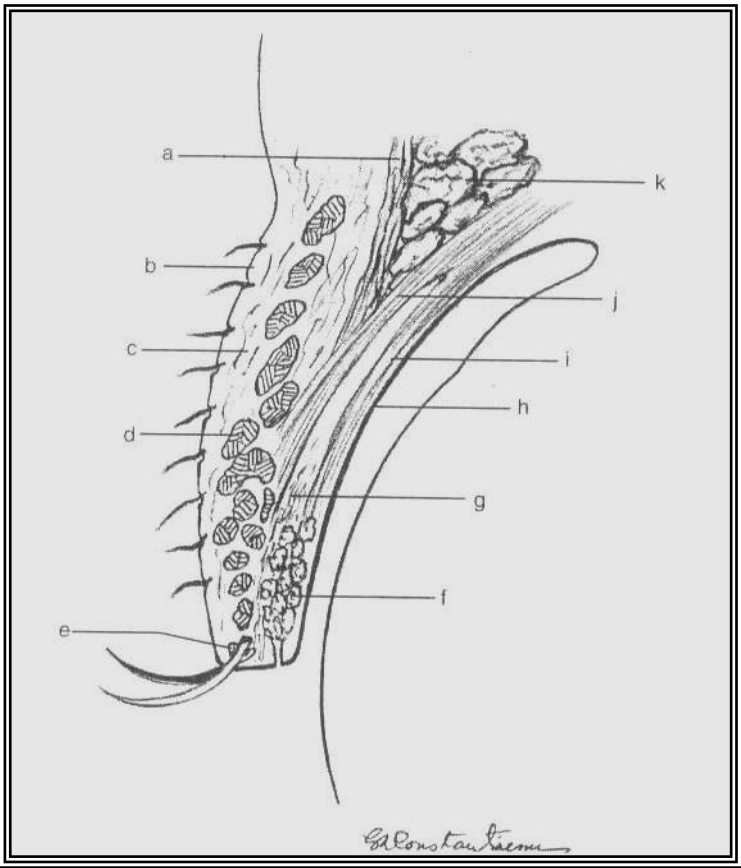
2-Surgical excision of rudimentary part and re-anastomosis of the intestine when the anal opening is present

OPHTHALMOLOGY

Ophthalmology is the branch of medicine that deals with the anatomy, physiology and diseases of the eye. An ophthalmologist is a specialist in medical and surgical eye problems. Since ophthalmologists perform operations on eyes, they are considered to be both surgical and medical specialists. Proper treatment of eye disease requires proper understanding of drugs, their effect, and their use.

I-EYELIDS

An eyelid is a thin layer of skin that covers and protects the eye. The eye contains a muscle that retracts the eyelid to "open" the eye either voluntarily or involuntarily (blinking). Eyelids contain rows of eyelashes that protect the eye from dust particles, foreign bodies and perspiration. The main functions of the eyelid are to regularly spread tears on the surface of the eye to keep it moist, to protect the eyes from foreign bodies, and secrets oily or secretions via meibomian gland that chair in the peri-corneal tear film. Affections of eyelid can be classified like all affections into congenital, congenital anomalies or acquired affections.



a-Orbital septum, b-Epidermis, c-Subcutaneous tissue, d-Orbicularis muscle, e-Eyelashes (cilia), f-Tarsal (meibomian) gland, g-Tarsal plate, h-Conjunctiva, i-Muller's muscle, j-Levator palpebral superioris m., and k-Orbital fat

I-CONGENITAL ANOMALIES

1-Atresia of the Eyelid

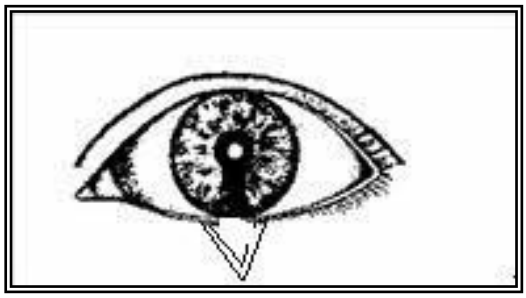
Definition: -

It is congenital anomaly of the eyelid in the form of absence of the eyelid

Treatment: -

Treatment directed towards reconstruction of the eyelid from adjacent skin

2-Coloboma



Definition: -

Absence of a of full thickness segment of the eyelid (notching of the eyelid) like rabbit lips

Treatment: -

Correction of this affection is primarily surgical and treatment is recommended either when the defect is associated by corneal or conjunctival diseases, or for cosmetic reasons.

3-Dermoids

Definition: -

It is a congenital tumour-like masse of tissues that may affect the eyelids only or it may extend to the conjunctiva and /or cornea. Its surface may contain numerous long hairs, and it is pigmented or non-pigmented, single or multiple, and unilateral or bilateral. Presence of such long hairs on its surface may result in keratitis and conjunctivitis.

Treatment: -

Those affections that has irritating long hairs can be treated by surgical excision of the dermoids with blepharoplastic reconstruction of the formed eyelid defects, and conservative treatment of the associating keratitis and conjunctivitis

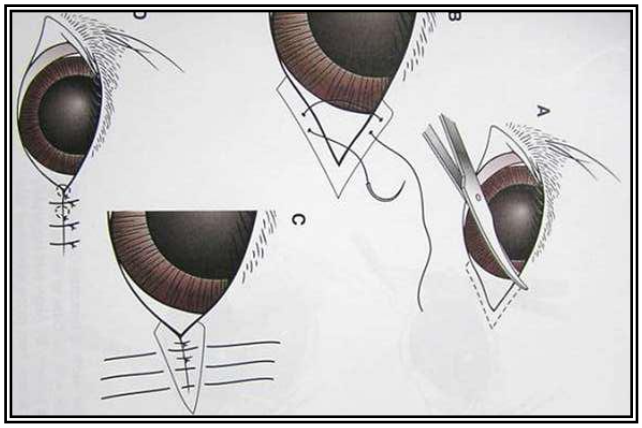
4-Macropapebral Fissure

Definition: -

It is an abnormally large opening between the eyelids that allows greater exposure of sclera. Commonly seen in the brachycephalic dog breeds, where it predisposes to proptosis, abnormal distribution of the tear film, and exposure keratitis because of an inability to close the lids completely.

Treatment: -

The condition is treated by lateral or medial partial permanent tarsorrhaphy. It is an operation aims at permanent suturing of the lateral canthus for reduction of the size of palpebral fissure.



5-Ankyloblepharon

Definition: -

Ankyloblepharon means that the eyelids are adherent to each other. Ruminants and horses have their eyes open at birth. Dogs and cats have congenital ankyloblepharon that persists into the second week of life. If the eyes have not spontaneously opened by 14-16 days, gentle traction on the eyelids generally will separate them. If not, make warm fomentation and slip a blade of a blunt scissors into the medial opening of the eyelid and gently force the scissors toward the lateral canthus to separate the eyelids along their border (do not cut with the blades). This phenomenon is normal in the dog during the first 15 days of life and delayed separation may lead to infection with staphylococcus resulting in ophthalmia neonatorium.

6-Micro-Palpebral Fissure

Definition: -

Abnormal narrow or small palpebral fissure

Treatment: -

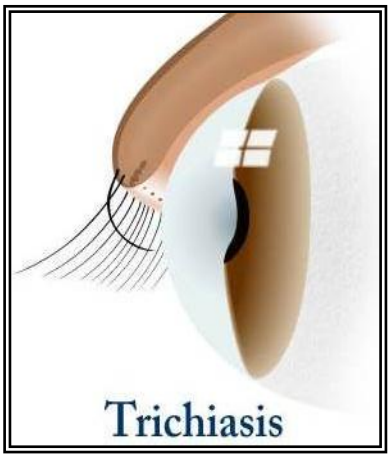
Although it can be treated by canthoplasty, treatment is not indicated in uncomplicated cases.

II-CONGENITAL or ACQUIRED AFFECTIONS

1-Trichiasis

Definition: -

Trichiasis is a common condition in dogs and rare in other domestic animals, characterized by the cilia arising from normal sites and directed toward the eye to come in contact with the cornea and conjunctiva leading to corneal and conjunctival irritation. The follicle of the cilia is normally placed, but the direction of growth directed towards the eye. Although trichiasis is congenital affection, it may be acquired following injury to the eyelid, at the same time it may be asociated with entropion, dermoids, and blepharospasm.


Trichiasis

Symptoms: -

1-Presence of abnormally directed cilia towards the eyeball

2-Blepharospasm due to pain associated the constant irritation of the cornea and conjunctiva and rubbing of the eye

3-Epiphora (excess tearing and staining of the facial hairs). The condition should be differentiated from NLD by flushing the lacrimal puncta and nasolacrimal duct, and presence of epiphora during early age helps to differentiate this disorder from other conditions causing epiphora.

4-Chronic conjunctival erythema and conjunctivitis as a result of conjunctival blood vessels engorgement with blood

5-Corneal ulceration that is usually shallow and eccentrically placed on the cornea corresponding to the position of cilia.

Treatment: -

A-Forceps Epilation

If the cilia are few in number, they may be pulled by a special cilia forceps and the process can be repeated weekly as the lashes grow back.

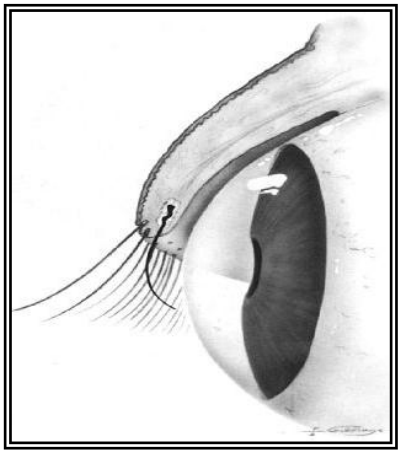
B-Electro-epilation by Buttery Electrolysis

Low current 2-3 MA is used as excessive current will result in excessive scarring of the eyelid. The needle is inserted along the root of the lash and kept in position until the lash is free and extracted during needle withdrawal.

C-Entropion Operations

It will be discussed under topic entropion

2-DISTICHIASIS



Definition: -

Presence of another abnormal row of eyelashes and the cilia originates from abnormally located follicles, which emerge from or just posterior to the openings of the meibomian glands. The affection is rare in domestic animals, but it is congenital and probably inherited in dogs. Distichiasis can be observed in animals of all ages, indicating that the abnormal lash may be present for years before it penetrates the conjunctiva.

Symptoms: -

1-Presence of abnormal cilia, which are usually multiple (from 5-40 cilia) and difficult to be seen as they are thin and lightly pigmented. Magnification, illumination, and eversion of the lid margin facilitate detection of distichia, which sometimes presented as multiple eyelashes emerging from a single follicle (districhiasis).

2-Blepharospasm as a result of pain associated the constant irritation of the cornea and conjunctiva and rubbing of the eye

3-Conjunctivitis, keratitis, corneal ulceration, and epiphora

Treatment: -

A-Epilation by Cilia Forceps

It can be performed under topical analgesia, and should be repeated weekly as the lashes will grow back within few weeks.

B-Electro-epilation

Electrolysis destroys the follicle permanently and the procedure can be performed under topical analgesia, magnification, and illumination. The needle is introduced 2-3 mm along the cilia for 5-30 sec with using low current to minimize tissue destruction and to prevent twitching of orbicularis oculi muscle. This procedure is tedious if cilia are numerous.

C-Lid-splitting Operation

Resection of the cilia-bearing conjunctiva provides more satisfactory results than electro-epilation.

D-Removal of a V- shaped Segment of Tarso-conjunctiva

The condition can be treated by removal of a V- shaped segment of the tarso-conjunctiva containing distichia and the resultant defect may be then filled with sliding graft of tarso-conjunctival or left to granulate.

E-Entropion Operations

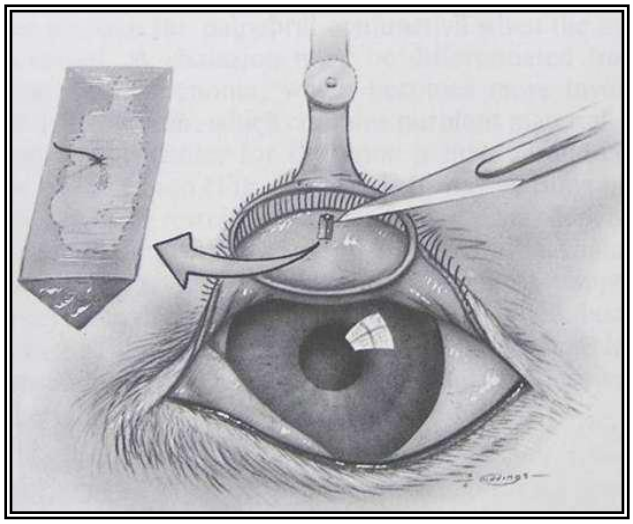
It will be discussed under topic entropion. They are directed towards outward rolling of the eyelid margin, thereby redirecting the distichia away from the eyeball.

3-Ectopic Cilia


Ectopic Cilia

Definition: -

Ectopic cilium is a condition where single or multiple cilia are emerging from the conjunctival surface of the eyelid. The condition is congenital and observed after several months to several years of age. It is evident that while aberrant follicles may be present at birth, the problem is not clear until the cilia grow and penetrate the conjunctival surface.



Symptoms: -

1-Presence of ectopic cilia, at the palpebral conjunctiva, 2-6 mm far from the lid margin, which usually develops from an elevated hypo-pigmented or hyper-pigmented

area of the palpebral conjunctiva

2-Epiphora

3-Blepharospasm

4-Conjunctivitis especially at the bulbar conjunctiva

5-keratitis, corneal ulceration (elongated superficial corneal ulcer), and corneal vascularization

Treatment: -

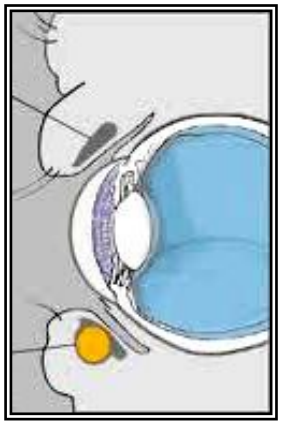
1-Electroepilation of ectopic cilia

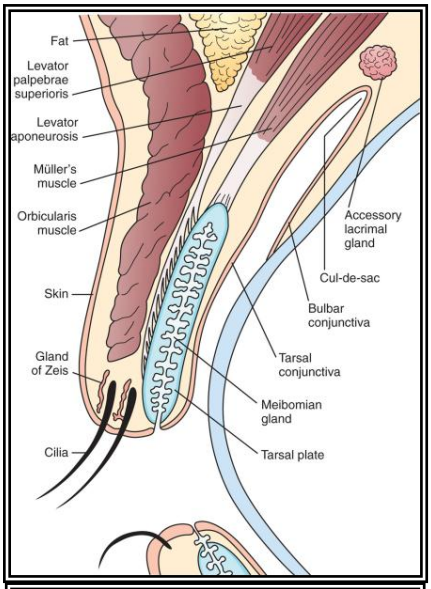
2-Surgical removal of the cilia with part of tarso-conjunctiva containing the follicle

4-Chalazion, Meibomian Cyst, or Tarsal Cyst

Definition: -

It is an enlargement of the meibomian or tarsal gland caused by blockage of its duct leading to formation of retention cyst, which is usually firm and non-painful.





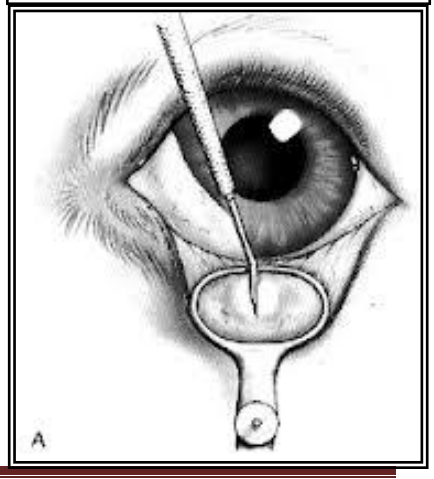
Symptoms: -

1-Localized *painless* swelling that is presented few millimeters from the lid margin, and of yellow-white color when viewed through the palpebral conjunctiva

2-The size of the swelling varies between a pea-like swelling in dogs to a hazel-nut in horses, and bulges freely movable skin over

3-The conjunctiva over the chalazion is reddened and elevated

4-The contents are usually cheesy inspissated oily secretion



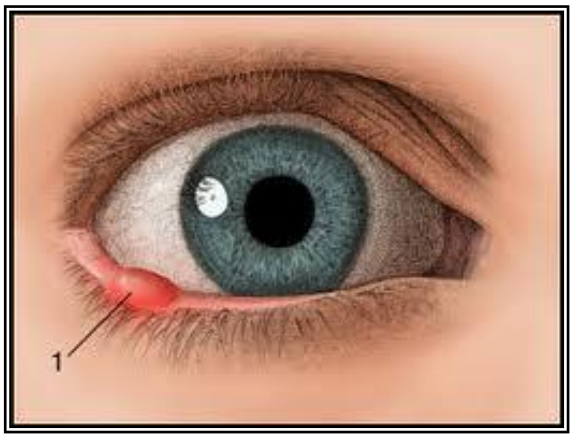
Treatment: -

Ophthalmologist may try medical therapy via topical antibiotics and steroids, but usually the condition needs surgery.

Technique: -

Chalazion clamp is applied to roll the eyelid outward then an incision is made over the conjunctival side of the lesion and parallel with the Meibomian glands the bulk of the mass is removed in one piece and the area is scraped (curettage), the wound is left open to drain and heal by second intention, the clamp is removed, and antibiotic and mild steroid are applied topically during postoperative period.

5-Hordeolum or Stye



Definition: -

Hordeolum is an acute localized suppurative inflammation of the glands of Zies and Moll belonging to the follicle of the eyelashes *(external hordeolum)*, or the Meibomian gland *(internal hordeolum)*. The causative microorganism is usually staphylococcus.

Symptoms: -

1-Small solitary or multiple *painful* abscesses at the lid margin either at the inner surface of the eyelid near the lid margin (*Internal hordeolum*) or near the eyelashes (*External hordeolum*)

2-Blepharitis 3-Blepharospasm 4-Epiphora

Treatment: -

1-Pulling of the offending eyelash (epilation) which is presented at the apex of the swelling

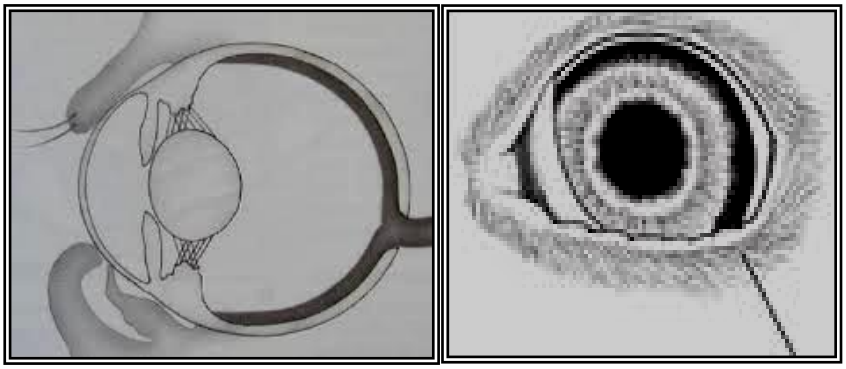
2-Softening of the skin over the abscess by warm moist compresses and apply good eyelid hygienic measures

3-Following maturation of the abscess, it should be incised and evacuated then the lid margin is rubbed with antibiotic ointment

4-Systemic antibiotic may be indicated and when there are recurrences, injection of staphylococcus toxoid.

It is contraindicated to squeeze the abscess to avoid dissemination of the microorganism to the circulation

6-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: -

Entropion can be classified by etiology into two groups

A-Congenital Entropion

It occurs most frequently in dogs, horses and sheep and it may occur sporadically or inherited.

B-Acquired Entropion

1-Spastic Entropion

Chronic irritation of the conjunctiva (like follicular conjunctivitis) initiates the spasm of orbicularis oculi muscle. This continuous blepharospasm tends to accentuate lid margin inversion and the resulting trichiasis increases irritation and a cycle of increased irritation and increasing severity of blepharospasm occurs that ends with spastic entropion.

Treatment: -

Auriculopalpebral nerve block will relieve and define the blepharospastic component of entropion, and the primary cause should be treated

2-Cicatrical Entropion

It occurs due to fibrosis and contraction associated with surgery or trauma of the conjunctiva, or after chronic inflammatory process of the conjunctiva

3-Bulbar Entropion

Usually it results from enophthalmos, microophthalmos, atrophy of the globe, or enucleation of the eyeball

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

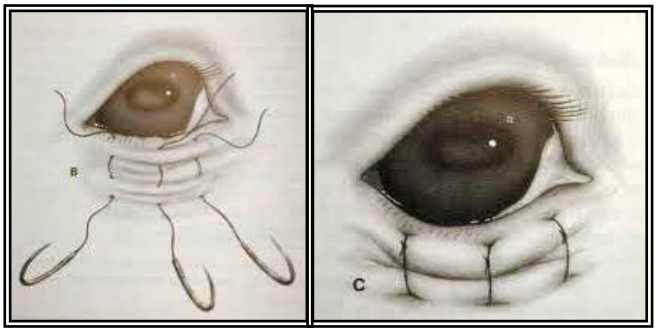
Treatment: -

Entropion is generally a surgical problem and the technique of correction is determined by the cause, location, and extent of entropion.

A-Mild Cases (young animals)

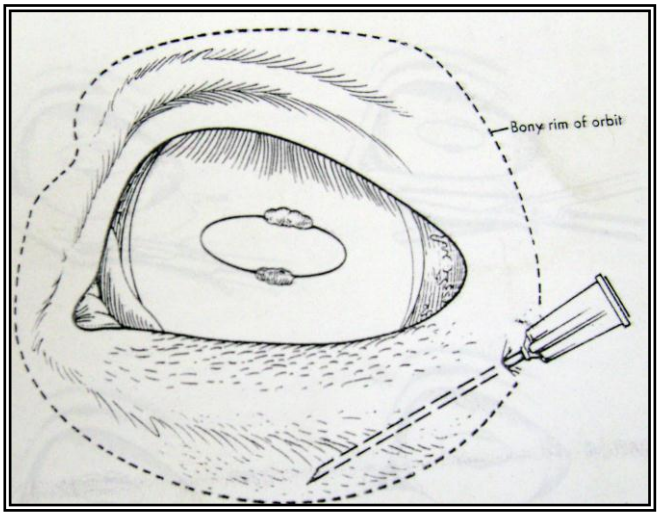
It may be managed medically until maturity for complete facial development and to avoid risk of anesthesia. Different techniques for correction of entropion have been reported including

1-Suture Technique



The edge of the eyelid is retracted with 3-4 vertical mattress sutures that are left in place for 7-10 days. This is the treatment of choice in foals and it aims at formation of fibrous strands that support the eyelid in position and prevents its inversion.

2-Injection Technique



This technique is used mainly in lambs, and various materials can be injected into the lower lid to tense it and cause eversion. Procaine penicillin, melted paraffin wax, or even sterile air (5-15 ml) is effective in many cases, but it should be kept in mind that injection of air from the sheep yard may leads to

infection with spores of clostridium tetani.

3-Stapling Technique (stainless-steel clip)

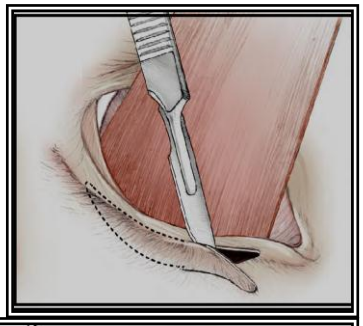
Stapling of an elliptical segment of skin with paper stapler (Michel's. *clip*) can be used in lambs and it has the same function like temporary suturing of the eyelid.

4-Cautery Puncture

This technique is effective in mild cases in dog. The skin of the eyelid is penetrated with a blunt pointed electrode or well-heated strabismus hook. These punctures in one or two rows are made 4-5 mm far from the lid margin and extend through the tissues and not through the palpebral conjunctiva, and the resultant cicaterization ended with correction of the condition.

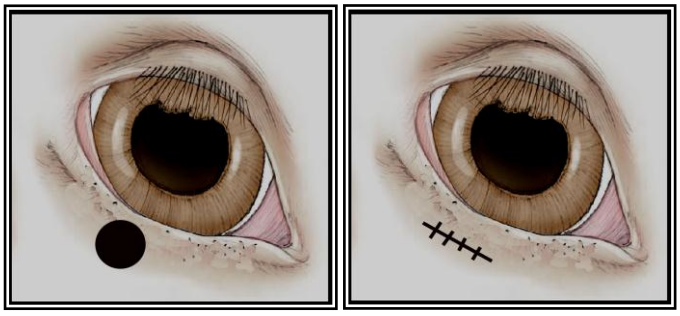
B-Surgical Treatment (severe cases or mature animals)

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.

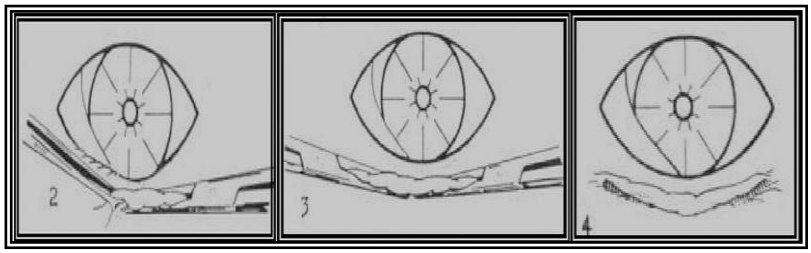
2-Trephine Technique



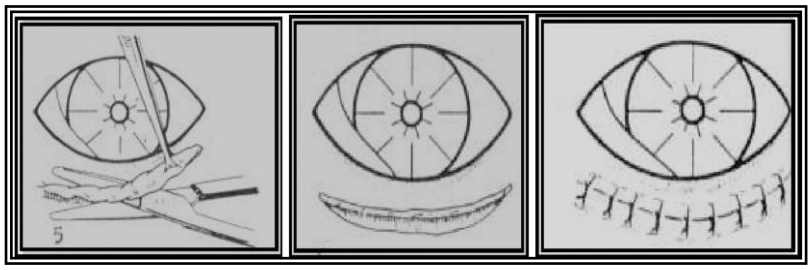
A local area of skin is removed with a dermal punch, resulting in a circular defect that is sutured horizontally. The technique is effective in cases

of entropion affecting small area of the lid or in cases of entropion affecting both the upper and lower eyelid at the lateral canthus.

3-Pinch technique



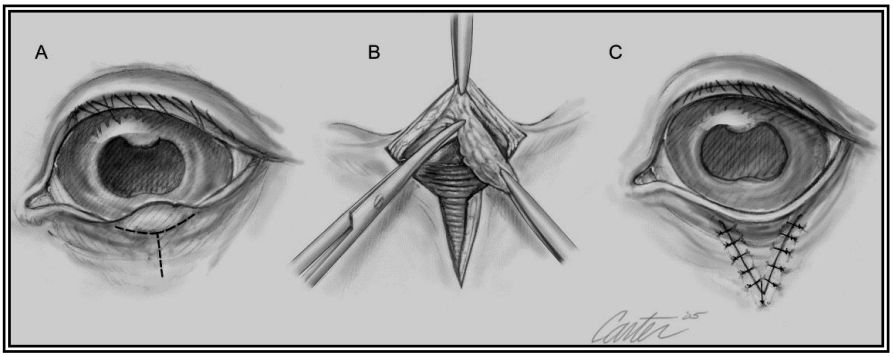
Two curved Mosquito forceps are placed on a fold of skin 2-3 mm far from the lid margin and parallel to it. The amount of skin depends on the degree of entropion and can be estimated before application of forceps by using toothed tissue forceps. The hemostats are closed and the skin is crushed between the jaws. The hemostats are removed.



The strip of skin is grasped and excised by scissors. The wound is carefully sutured with simple interrupted sutures of 4/0 silk. The sutures are removed after 14 days. The pinch technique can be considered the technique of choice for correction of entropion in dogs and cats and can be adopted in mild and severe cases. The resected areas should correspond in location and extent to the affected portion of lid.

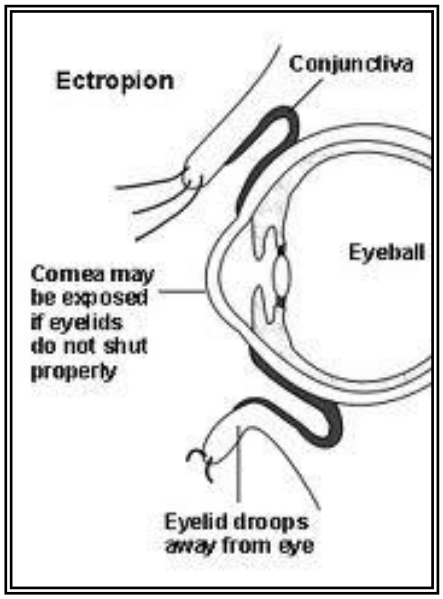
4-Y-V Blepharoplasty (Wharton-Jones blepharoplasty)

Y shape incision is made through the eyelid, then the 3 lips are dissected, and finally the Y shape is sutured as V. this procedure creates much straining on the lid margin, rolls it out, and corrects the inversion.



7-Ectropion

Definition: -



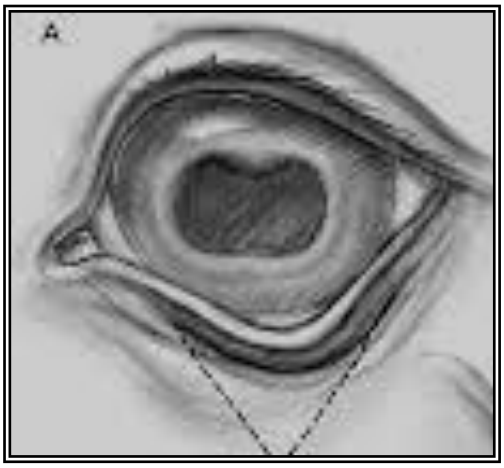
Ectropion is an out rolling or turning out of the eyelid margin that most commonly involves the lower eyelid. Although it is common in dogs, it is rare in cats and other domestic animals. Ectropion is classified according to the cause into:

A-Congenital Ectropion

This type is usually breed associated in dogs with loose face skin

B-Acquired Ectropion

1-Senile Ectropion



It ensues due to decreased tone of orbicularis oculi muscle. It is characterized by elongation of the lower lid, lack of good muscle tone, eversion and drooping of the lower eyelid.

2-Cicatrical Ectropion

It ensues due to retraction of the lower eyelid by contraction of scar tissue secondary to surgery, trauma, thermal or chemical injuries, or chronic inflammation.

3-Intermittent Ectropion

It can be seen in some hunting dogs that develop physiological ectropion due to fatigue of facial muscles. These dogs look normal at morning and have ectropion by evening.

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.

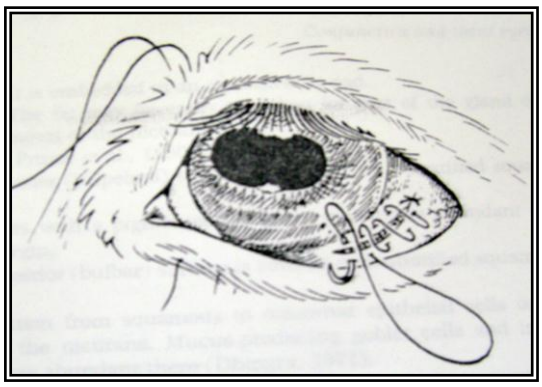
Treatment: -

Ectropion should be corrected surgically when it results in secondary conjunctival or corneal disease (conjunctivitis, corneal vascularization or pigmentation, and blepharitis). Cicatrical ectropion usually results in unsightly cosmetic defects, which justify correction even without presence of ocular lesions. Many techniques have been used to correct different types of ectropion.

A-Cautery Puncture

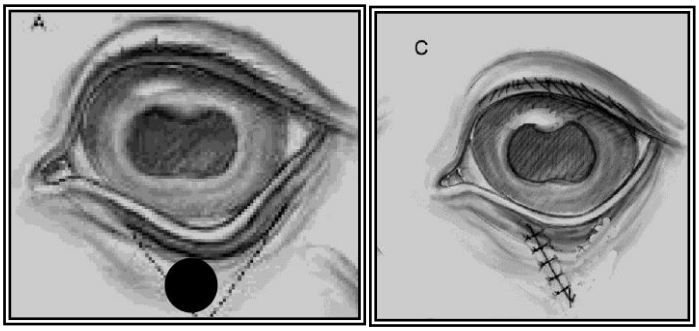
Small areas of electrocautery are performed on the conjunctival side of the affected eyelid to create an area of scar tissue with resultant contraction of the eyelid. The technique has proved very unreliable as the degree of contraction and scaring can't be estimate.

B-Conjunctival Excision



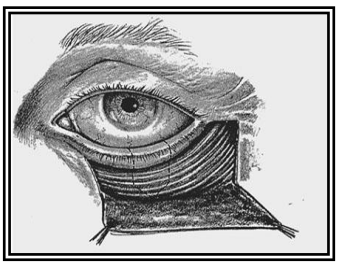
It is the removal of a small horizontal piece of conjunctiva at the level of the area of ectropion. It may be done alone or in combination with other procedures. The conjunctiva is grasped with tine forceps, elevated, and clamped with mosquito artery forceps for one minute. Then the clamp is removed and the elevated ridge of tissue is excised with tenotomy scissors. The conjunctiva is closed with simple continuous suture. This technique has not proved reliable especially in cases of marked eyelid laxity.

C-Skin Trephination

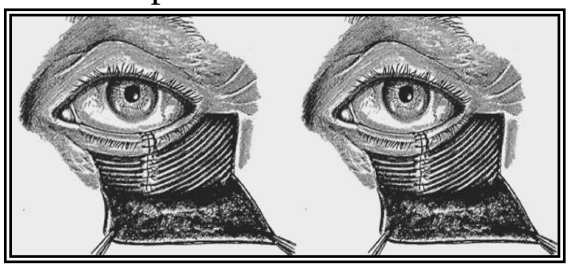


It is used for mild ectropion, especially when only a portion of the lid margin is affected. Several small circles of skin (2-4) are removed with skin biopsy punch (5-7 mm diameter), 3-5 mm from the lid margin. The edges are sutured in a vertical manner in a simple interrupted pattern by using 4/0 suture material and eyeless needle.

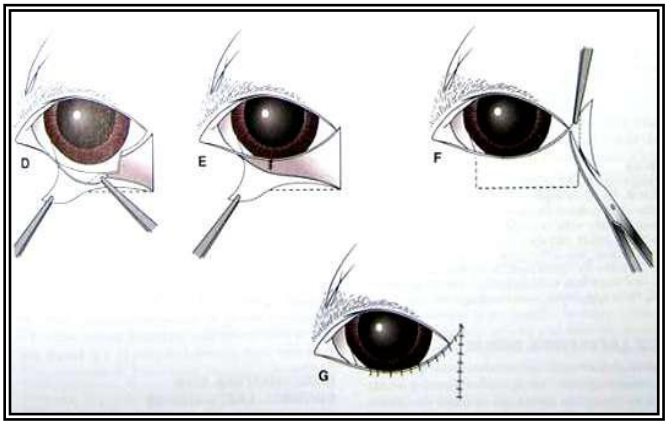
D-Kuhnt-Helmbold Technique



This technique can be used in case of moderate congenital or senile ectropion when the margin of the lower eyelid is too long. The eyelid is split into two layers, anterior skin-orbicularis and posterior tarso-conjunctival layers. A V-shaped tarsoconjunctival wedge is removed medially. A similar V-shaped wedge of skin and orbicularis oculi muscle excised, 5-10 mm lateral to the level of the tarsoconjunctival one. The two V-shaped wounds are closed independently with simple interrupted stitches. Additional sutures of fine absorbable suture materials are used at the lid margin to re-oppose the skin-orbicularis muscle and tarso-conjunctival layers.

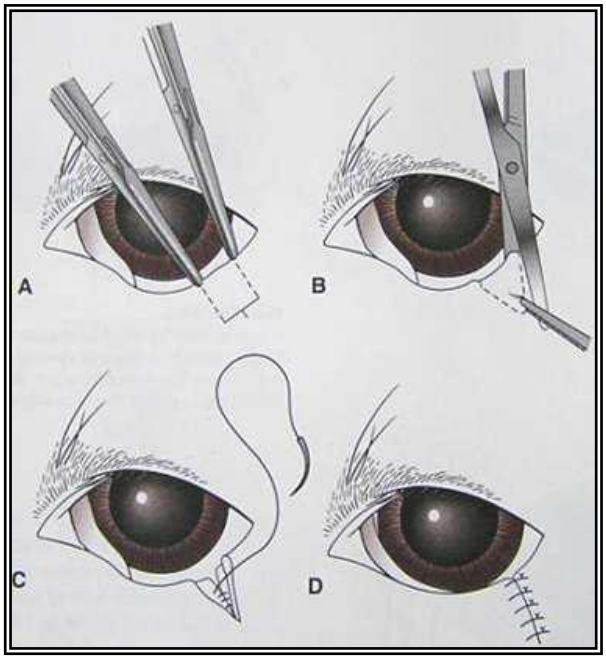


E-Kuhnt-Szymanowski Technique



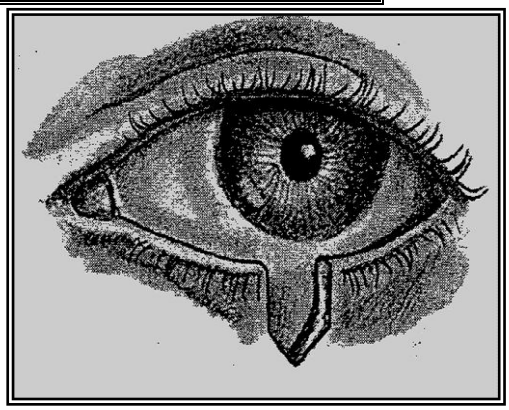
This technique is used in advanced cases of congenital and senile ectropion with elongation of the eyelid margin. The lateral one-half of the lower eyelid is split into skin-orbicularis oculi muscle and tarso-conjunctival layers to a depth of 20 mm. A wedge shape of the tarso-conjunctival layer is excised. The skin incision is continued laterally, following the natural curve of the lower eyelid, for one cm. from the lateral canthus. The skin-orbicularis muscle flap is separated by blunt dissection to provide a lateral movement of the flap. A wedge of the sliding skin-muscle flap is excised at its lateral margin. The tarso-conjunctival and skin-orbicularis muscle wounds are sutured and the edges of the lid margin are opposed as mentioned before. This procedure will shorten the length of the eyelid margin and corrects the state of ectropion.

F-Full-thickness Eyelid Resection at Lateral Canthus (lateral triangle)

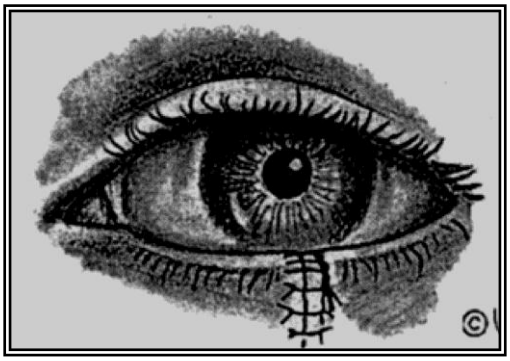


This method is suitable for congenital and senile ectropion with moderate elongation of the lower eyelid. It is essentially a full thickness resection of the eyelid similar to that used for tumor removal. The edge of the eyelid is notched 3-4 mm from the lateral canthus with mosquito artery forceps. The actual lateral canthus is avoided because the eyelid is much thicker at the canthus. The excess length is estimated and the eyelid is notched again by another Mosquito artery forceps to determine the length of the part of eyelid to be removed. A scissors are used to cut the eyelid at the notch near the lateral canthus for about one cm. The cut edge is grasped until the eyelid is tense. The overlapping portion of eyelid estimated before, is removed by a scissors in a form of a V-shaped flap. The V-shaped wound is closed (the tarso-conjunctival layer then the skin-orbicularis oculi layer).

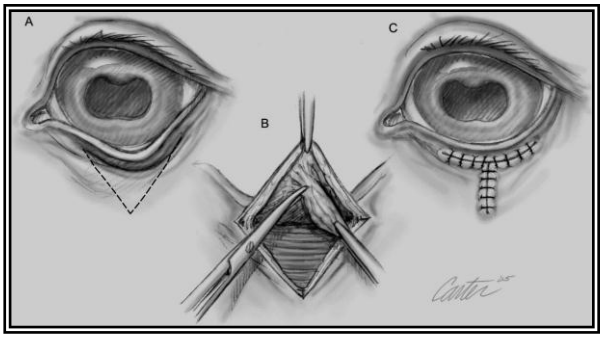
G-Full-thickness Resection at The Middle of the Eyelid



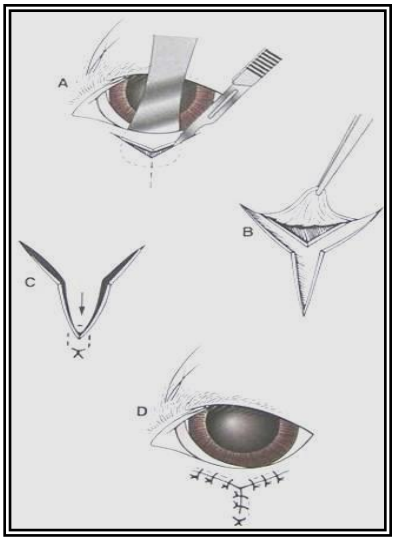
This technique is used when ectropion is accompanied by scarring or deformity at the central area of the lid margin. Stretching of the eyelid from the lateral canthus will not correct the lesion and therefore a central technique must be used. The technique is basically the same as described for full resection at the lateral canthus. In some cases the palpebral conjunctiva is left intact and the eyelid is incised to the level of meibomian gland, then complete triangle of the skin is removed, and the created triangle is sutured in simple interrupted manner creating a wound perpendicular to the lid margin.



H-V-Y blepharoplasty (Wharton-Jones blepharoplasty)



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 of Ectropion Operations

1-Undercorrection is the most prevalent complication.

2-Overcorrection can result if too much eyelid tissue is removed with resultant entropion development.

3-Excessive shortening of the palpebral fissure may result when too much full thickness wedge resection is removed.

8-Blepharitis

Definition: -

Blepharitis means inflammation of the eyelids

Classification: -

1-According to the cause (bacterial, mycotic, parasitis, allergic, traumatic and neoplastic)

2-From the pathological point of view, blepharitis is classified into

a-*Superficial blepharitis* which results from dermatitis, conjunctivitis, hordeolum, chalazion or irritation by mange

b-*Deep blepharitis* which results from a bite or deep lacerating wound

3-Clinically, acute, subacute or chronic; and granulomatous or nongranulmatous blepharitis can be differentiated.

4-Blepharitis may be focal or diffuse, unilateral or bilateral and may involve the upper and/or the lower eyelids

Symptoms: -

1-Pain manifested by blepharospasm

2-Hyperaemia and swelling of the eyelid due to edema or inflammatory cell infiltration

3-Alopecia, Scalpess, pruritis, and epiphora

4-Serous or purulent exudation 5-Ulceration and fibrosis in chronic cases

Treatment: -

1-Careful cleaning of the lid margins and removal of purulent exudates with cotton soaked with worm normal saline or 2% sodium bicarbonate solution.

2-Topical application of antibiotic ointments to the outer and inner lid margins

3-Systemic antibiotics in acute cases

4-Topical fungicide in cases of fungal blepharitis

5-In parasitic blepharitis a protective ointment is applied to the lid

6-Corticosteroids and antihistamines in case of allergic blepharitis

9-Ptosis or Blepharoptosis

Definition: -

It is drooping of the upper eyelid that is classified according to the cause into

Classification: -

A-Congenital Ptosis

As in cases of enophthalmia or atrophy of the globe

B-Acquired Ptosis

1-False Ptosis

As a result of trauma of the eyelid, abscess or tumor of the eyelid, or fracture of the supraorbital process

2-True Ptosis

It may be central as a result of cerebral or cerebellar tumor or peripheral due to paralysis of the nerve supply of the levators of the eyelid. Oculomotor nerve supply the inner levator of the upper eyelid (levator palpebrae superioris) and the facial nerve supply the outer levator of the upper eyelid (corrigator supercilii).

Treatment: -

1-Resection of the levator muscles of the upper eyelid

2-Removal of an elliptical piece of skin or trephination of a circular disc and suturing the wound horizontally

10-Traumatic Eyelid Injuries

Regardless of the cause, eyelid injuries should be handled as any other skin wound, the sooner the defect is repaired, the better the chance of cosmetic and functional result. The globe should be thoroughly examined to insure its integrity as many lacerations that appear superficial may extend through eyelids and penetrate globe.

The lacrimal puncta and canaliculi should be identified and preserved if possible. Check for fractures of bones of orbital rim or deeper, as all of these need to be repaired at same time as skin lesions. Most traumatic injuries of the eyelids are mechanical.

-In small animals, injuries mainly are due to animal bites or cat scratches

-In large animals; nails, hooks and barbed wire are the main cause of eyelid wounds and lacerations

Symptoms: -

1-Presence of injuries involving the skin only or the full thickness of the eyelid, and tears are either parallel or perpendicular to the lid margin

2-Presence of considerable hemorrhage 3-Epiphora 4-Blepharospasm

Treatment: -

The eyelids are highly vascular structures with marked ability for healing and resistance to infection. Nearly complete avulsed eyelid can be successfully repaired simply by suturing it back into proper position directly after injury.

1-Irrigation and cleaning of the wound with boric acid solution 2% or warm normal saline

2-Removal of any blood coagulum or foreign body

3-Minimal debridement of the wound

4-Suturing of the eyelid wound to restore its anatomic and functional integrity. In full thickness injury two-layer closure is preferred (Tarso-conjunctival with absorbable suture material and orbicularis-skin with non-absorbable suture material). The lacrimal punctum and canaliculus should be identified and preserved as much as possible.

5-Protective neck collar is applied and taping of dew claws

Complications: -

1-Epiphora due to distortion of the puncta lacrimalis

2-Entropion or ectropion as a result of fibrous tissue formation

These complications can be corrected latter, after complete healing of primary wound

11-Eyelid Neoplasms

Eyelid neoplasms are not uncommon in domestic animals especially in dogs, and cattle (SCC) and the most common eyelid tumors are:

Treatment: -

All eyelid tumors are regarded as malignant until proved otherwise by biopsy examination.

A-Surgical Excision

The tumor tissue should be removed as much as possible, including the regional lymph node if it is involved. Complete surgical excision is not possible in extensively invading neoplasms as squamous cell carcinoma and additional methods are used to destroy remaining cells. In case of small tumors affecting less than one-third of the lid margin, a full-thickness V-shaped excision technique can be used.

B-Cryo-therapy

The lesion and surrounding margin of normal tissue are frozen, leading to death of the cells, necrosis, sloughing and healing by granulation. The temperature of the probe is -25°C and double freeze-thaw cycle is used. Thawing should be up to 20°C. Freezing can be performed by cold probe or by liquid nitrogen. The surrounding structures must be isolated by a surgical sponges impregnated with petroleum jelly. Freezing of tumors increase the antigenicity of the tumor cells and result in increased immunologic response to the tumor.

C-Radiation Therapy

The most sensitive tumor to radiation therapy is the squamous cell carcinoma. Gamma radiation is used frequently and may be administered by radon seeds, cesium implants or X-ray therapy machine.

D-Chemo-therapy

Chemotherapeutic agents are not commonly used for treatment of eyelid tumors, and it includes alkylating agents, antimetabolites, antibiotics, corticosteriods and enzymes. Such agents are used to reduce the size of tumor before radiation therapy or surgical excision.

E-Immuno-therapy

Different agents have been used to stimulate the immune system of the animal body against neoplastic cells. These are nonspecific immune stimulants injected intramuscularly to stimulate the entire immune system such as tetramizole, live or killed BCG extracts (for equine sarcoid), Brucella abortus vaccine.

12-Eyelid Abscess

Eyelid abscesses are either sub-conjunctival or sub-cutaneous circumscribed swellings containing pus

Causes: -

1-Penetrating wounds 2-Foreign body 3-Agrivation of hordeolum

Symptoms: -

1-Subconjunctival abscess involves the lateral canthus, upper eyelid or lower eyelid, extends over the eyeball and protrudes through the palpebral fissure preventing closure of the eyelids

2-Subcutaneous lid abscess causes swelling of the eyelid, preventing opening of the eyeball.

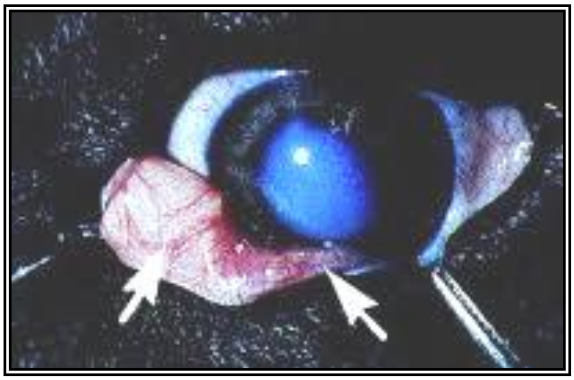
Treatment: -

In subconjunctival abscess, evacuation is performed through a conjunctival incision. After squeezing and flushing of the abscess cavity, antibiotic eye ointment is applied. Subcutaneous lid abscess is drained through a skin incision, and treated in the same manner.

II-NICTITATING MEMBRANE

I-INVERSION-EVERSION of NICTITATING MEMB

Definition: -



Inversion and eversion of the third eyelid refer to rolling-in or rolling-out of the free margin of the membrane respectively. Congenital eversion seems to be more common than inversion. The condition may be unilateral or bilateral and seen mostly in young animals but may develop in middle-aged animals. Traumatic injuries and improper suturing of the

conjunctival membrane of the nictitating membrane during operations may also result in eversion or inversion.

Symptoms: -

1-Increase visibility of the third eyelid

2-Inversion or eversion of the free margin of the membrane. Curling of the cartilage may occur anywhere between the narrow portion of the cartilage and the free border of the membrane.

3-Mild degree of conjunctivitis and mucoid discharge may be evident

Treatment: -

The aim of the treatment is the removal of the abnormally curved part of the cartilage. Sometimes the whole deformed cartilage is removed. The operation is performed under effect of topical or general anesthesia. The free border of the membrane is grasped with Allis tissue forceps and gently elevated. A small amount of normal saline solution is injected between the curved part of the cartilage and the palpebral conjunctiva to separate it from the cartilage. The third eyelid is everted and the incision is made through the bulbar conjunctiva over the deformed part of the cartilage. The cartilage is then dissected and grasped through the wound. A scalpel or scissors are used to excise the deformed part. The wound heals without suturing but if the nictitans gland is exposed, the incision is closed with fine catgut. Topical application of antibiotic-steroid ointment twice daily is indicated for 7 days postoperatively.

II-PROTRUSION of the NICTITATING MEMBRANE

Causes: -

1-Congenital microphthalmos (reduced globe size)

2-Enophthalmos (recession of the globe in the orbit)

3-Diseases accompanied by loss of weight and dehydration (decrease amount of periorbital fat).

4-Encephalitis due to rabies, tetanus or canine distemper and meningitis

5-Post-orbital space occupying lesion such as; abscesses, cysts, tumor and hematomas

6-Homer's syndrome in dogs. It is a partial or complete sympathetic denervation of the eye. The condition manifests itself clinically by miosis of pupil, protrusion of third eyelid, ptosis, enophthalmos, small palpebral fissure and changes in intraocular pressure.

Treatment: - Treat the specific cause.

If the protrusion is severe and vision is impaired by the third eyelid, partial excision of the free edge of the membrane is indicated. Topical anesthesia is sufficient and a tenotomy scissors used for excision. The resulting wound is closed with fine catgut to prevent prolapse of the remaining cartilage and nictitans gland. Partial excision is better than total one, to preserve the function of the membrane and gland. The nictitating membrane is a useful and important structure for the eyeball. The only indications for total excision of the membrane are severe irreparable trauma and malignant neoplasm.

III-HYPERTROPHY of NICTITATING MEMBRANE

Definition: -

It is a specific inflammatory and degenerative disease of the third eyelid

Symptoms: -

1-The first sign is bilateral inflammation and depigmentation of the nictitating membrane and mucoid discharge

2-Later on, the membrane undergoes thickening with development of nodular irregular surface. The cause is not established, but biopsy and scraping from conjunctiva reveal plasma cell and other inflammatory cells.

Treatment: -

1-Long term steroid-antibiotic therapy 2-Excision of the third eyelid

IV-NEOPLASMS OF THE NICTITATING MEMBRANE

Squamous cell carcinoma is the most common tumor of the third eyelid in all species of animals and un-pigmented membranes are more susceptible.

Treatment: -

Surgical removal of the affected area is the treatment of choice, but if the lesion is extensive, radical excision of the entire third eyelid is indicated. If the cartilage is exposed during surgical excision of the tumor, the conjunctival wound is sutured to prevent prolapse of the cartilage or gland. Suturing will speed the process of healing and prevent formation of excessive granulation tissue at the wounded area.

V-ABSCESSES OF THE NICTITATING MEMBRANE

Sub-conjunctival abscesses of the nictitating membrane are most common in cattle and buffaloes.

Causes: -

Foreign body penetration or trauma

Symptoms: -

The third eyelid protrudes and extends over the cornea obscuring the vision

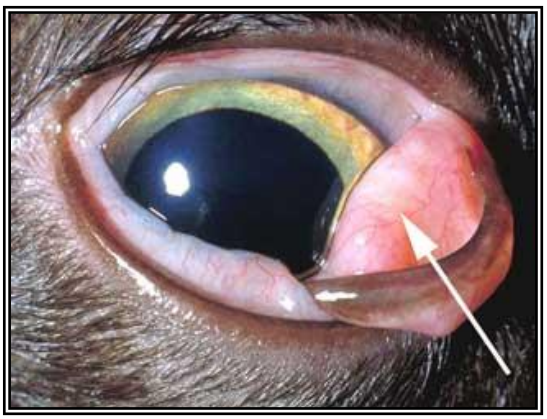
Treatment: -

1-Incision of the abscess at the palpebral surface of the conjunctiva and evacuation of its content

2-Lavage of abscess cavity and the eyeball with mild antiseptic solution

3-Antibiotic ointment is applied twice daily for 5 successive days

VI-PROLAPSE OF NICTITANS GLAND



Prolapse of the nictitans gland over the free border of the third eyelid is also known as hyperplasia, hypertrophy, adenoma of the nictitons gland, or *cherry eye*. The nictitans gland protrudes from behind the nictitating membrane as a reddish mass over its free border. The normal gland has a connective tissue bands that anchoring it to the periorbital tissues at the base of the membrane, when these bands are not developed properly, the gland moves towards the free edge of the membrane. The movement of the membrane causes the gland to prolapse outwards. Inflammation and hypertrophy of the gland develop as soon as the gland prolapsed.

Causes: -

1-Congenital weakness of the connective tissue bands between the gland and periorbital tissues

2-Trauma to the third eyelid or orbit

Symptoms: -

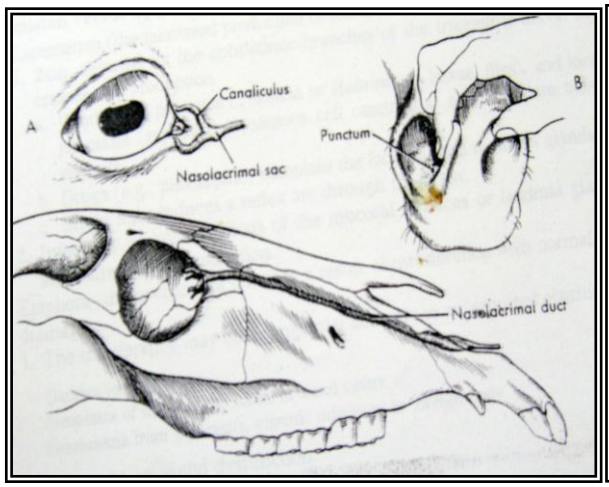
1-A rounded, cherry or pea-like mass appears at the medial canthus of the eyeball (the condition is usually bilateral)

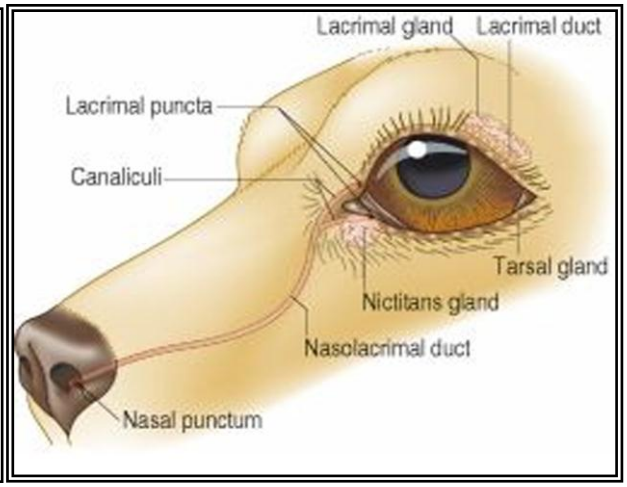
2-Secondary epiphora and conjunctivitis may occur

Treatment: -

Surgical excision of the prolapsed gland is the best treatment. Grasp the gland by fixation forceps and apply a mosquito artery forceps at its base for a minute and then cut it by a scissors. An alternative procedure is that the bulbar conjunctiva is incised first over the gland and bluntly dissected from it then the mosquito artery forceps is applied to the base of the gland. Hemorrhage is controlled, if present, by light pressure on the surgical wound for few minutes. Antibiotic-corticosteroid ophthalmic ointment is applied twice daily for 5 days postoperatively.

III-AFFECTIONS OF THE LACRIMAL SYSTEM

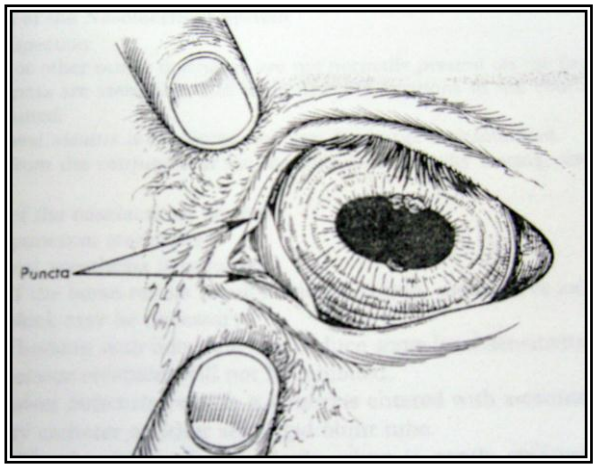




The lacrimal apparatus is the physiologic system containing the orbital structures for tear production and drainage and it consists of *the lacrimal gland*, which secretes the tears, its excretory ducts, which convey the fluid to the surface of the eye and *its drainage system* that consists of lacrimal canaliculi, the lacrimal sac, and the nasolacrimal duct, by which the fluid is conveyed into the cavity of the nose from the nasal punctum.

I-ATRESIA of LACRIMAL PUNCTA (Imperforate puncta)

Definition: -



It is a congenital absence of the upper and/or the lower puncta, and it is either unilateral or bilateral. Absence of the upper punctum usually associated with no clinical signs on the contrary to absence of the lower punctum. In most cases the obstruction consists of a thin layer of conjunctiva over the lumen.

Symptom: -

1-Epiphora (abnormal flow of tears over the face)

2-Excessive moisture at the medial canthal skin

Differential diagnosis from: -

1-Simple obstruction of the punctum due to inflammation

2-Absence of both punctum and canaliculus

3-Displacement of the punctum 4-Dacryocystitis

Treatment: -

Surgical opening of the affected punctum by using lacrimal cannula which is inserted into the patent punctum or the nasal punctum and flushing is performed under pressure. When the thin membrane balloons under pressure it is either excised by a scissor leaving an oval or round defect, or incised in cruciate manner.

The nasolacrimal catheter may be kept in place for 2-3 weeks until healing takes place. After care includes topical application of antibiotic-corticosteroid solutions for 10 days.

II-DISPLACEMENT OF THE LOWER PUNCTUM

Definition: -

It is a state of ventral displacement of the lower punctum few millimeters to its normal position.

Causes: -

1-Primary (congenital anomaly)

2-Secondary (after entropion, trauma, or scaring)

Symptoms: -

1-Epiphora as a result of closure of the punctum by exudates and moistening of the hair at the medial canthal skin

2-Hyperemia of the conjunctiva

Diagnosis: -

1-Signs

2-Fluorescein passage from the eye is delayed or absent

3-The nasolacrimal flush usually indicates patency

4-Examination by surgical microscope confirms ventral displacement of the lower punctum

Treatment: -

It is indicated in severe cases, by relocation of the displaced lower punctum or reconstruction of new exit for tear drainage via

Conjunctivorhinostomy, connection of the cul de sac to the nasal cavity

Conjunctivoralostomy, connection of the cul de sac to the pharynx

III-OBSTRUCTION OF THE CANALICULI

Obstruction of the canaliculi of the lower canaliculus, as the obstruction of the upper one escapes detection as a result of absence of clinical signs

Causes: -

1-Congenital absence of the canaliculus

2-Obstruction of the lower punctum due to inflammation or obstruction by foreign materials

Diagnosis: -

1-Signs 2-Fluorescein passage from the eye is absent

3-Nasolacrimal flushing reveals no passage in cases of congenital absence of the canaliculus and punctum, or it may push the obstructing foreign body and by then it acts as therapeutic diagnosis.

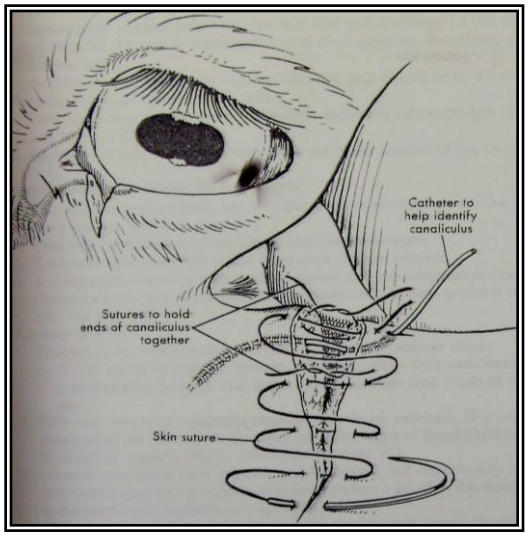
Treatment: -

1-Flushing for expelling the obstructing foreign body or the inflammatory debris

2-Conjunctivoralostomy or conjunctivorhinostomy in cases of absence of the canaliculus

IV-CANALICULUS LACERATIONS

Lacerations may be due to scratching, friction against hard objects, or accidents, and usually they involve the lateral aspect of the palpebral fissure but sometimes it involves the medial part that contain the canaliculus



Symptoms: -

1-Edeama of the eyelid

2-Presence of debris and hemorrhage that may obscure the extent of injury

Treatment: -

1-Suturing of the wound with cannulation of the punctum

2-Topical antibiotic-corticosteruid

V-DACRYOCYSTITIS

Definition: -

It is an inflammation of the nasolacrimal sac which either presented alone or associated with conjunctivitis. The accumulation of cellular debris, inflammatory cells, and foreign bodies within the lacrimal sac constricts or closes the lumen of lacrimal sac and enhances bacterial proliferation. The condition may be acute or chronic.

Symptoms: -

1-Thick mucopurulent discharge at the medial canthus

2-Mucopurulent conjunctivitis

3-Presence of painful small swelling at the medial canthus that extrudes mucopurulent exudates on digital pressure

4-Abscess may be formed in acute cases, and opens subcutaneous at the medial canthus with formation of a fistula connecting the sac with external skin.

Treatment: -

1-Medical Treatment

Control of infection and re-establishing the patency of the duct via irrigation by antiseptic solution followed by topical antibiotic and corticosteroid

2-Surgical Treatment

Temporary catheterization and suturing of the tube to skin of the face for 2-3 weeks with daily flushing of the lower punctum, and topical antibiotic ointment until the tube is removed.

VI-OBSTRUCTION OF THE NASOLACRIMAL DUCT

It is either congenital atresia of the nasolacrimal duct or acquired obstruction due to inflammatory debris or foreign materials

Signs: -

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

2-Tear scalds in chronic cases

3-Conjunctivitis secondary to obstruction of NLD

Treatment: -

1-Congenital Atresia of NLD

Conjunctivoralostomy or conjunctivorhinostomy is the treatment of choice

2-Acquired Obstruction

Flushing of the NLD duct daily for several days with topical application of antibiotics and corticosteroid

VII-ATRESIA OF NASAL PUNCTUM

It means absence of the nasal punctum at the nostrils

Treatment: -

Flushing via the lacrimal punctum reveals distension of the lumen of the duct and the mucosa over the rudimentary nasal punctum may show ballooning that can be dissected until the lumen is entered, then after the lacrimal cannula is inserted for several days until the opening have been established.

VIII-EPIPHORA

Definition: -

The expression epiphora differs from normal tearing, as normal tearing or lacrimation means tear production within normal range that never predispose to out flow of tears on the face, while epiphora means abnormal flow of tears outside the eye either as a result of over production of tear or reduced drainage.

Causes: -

Mainly over production of tears or reduced drainage

1-Medial lower entropion

2-Exophthalmos

3- Congenital absence of the lower punctum or canaliculus or obstruction of nasolacrimal duct or the lower punctum

4-Localized inflammation along the course of the duct

5-Excessive tear production secondary to irritation caused by entropion, ectropion, distichiasis, trichiasis, or ectopic cilia

Symptoms: -

Flow of tears outside the eye with tear staining of the medial canthus skin and hair may with check scalds in old cases

Treatment: -

Remove the primary cause

IX-KERATOCONJUNCTIVITIS SICCA (XEROPHTHALMIA)

Definition: -

KCS or dry eye is a disease involving the cornea and conjunctiva due to deficiency of the aqueous tear film. It is a common condition in dogs and uncommon in cat and rare in other domestic animals.

Causes: -

1-Congenital absence of the lacrimal glands

2-Senile atrophy of the glands

3-Lack of innervation of the glands (traumatic, infection, or unknown cause)

4-Damaging of the lacrimal gland by trauma to the supraorbital area

5-Surgical removal of the nictitans gland of the third eyelid

6-Systemic diseases, as canine distemper, the cause is a virus affecting the lacrimal and nictitans glands and may result in gland dysfunction.

7-Drug reaction as long term using of sulphadiazine

8- Idiopathic causes as the majority of cases are of unknown cause

Symptoms: -

The clinical signs vary according to the degree of hypo-secretion, the duration of the disease, and whether the condition is bilateral or unilateral, acute or chronic, and temporary or permanent.

1-Blepharospasm as a result of intense ocular discomfort

2-Mucopurulent discharge on the eyelids

3-Changes of the mucoid thread, as reduction of tear production increases mucous production (protective mechanism) resulting in increase in the size of mucous thread and change in its color into yellow green and it adheres to the conjunctiva.

4-Corneal changes like loss of luster, opacity, vascularization, pigmentation and keratinization

5-Conjunctival changes as the conjunctiva becomes thicker, dry, inflamed, and congested

Diagnosis: -

1-History 2-Clinical signs

3-Schirmer tear test. Most KCS patients exhibit wetting values less than 5 mm per minute although the average normal tear wetting is 20 mm per minute.

4-Rose-bengal 0.5% stains the degenerated and devitalized corneo-conjunctival epithelium, and reveals presence of necrosis of epithelial tissues following dryness of the eye.

Treatment: -

1-Medical Treatment

a-Replacement of pre-corneal tear film by frequent instillation of artificial tears as Methyl-cellulose 1%

b-Stimulation of lacrimal secretion by pilocarpine 1% solution

c-Removal of excess mucous by gentle and frequent washing and cleaning of the eyeball and eyelids with 5% acetylcysteine

d-Control of infection by using broad spectrum antibiotics

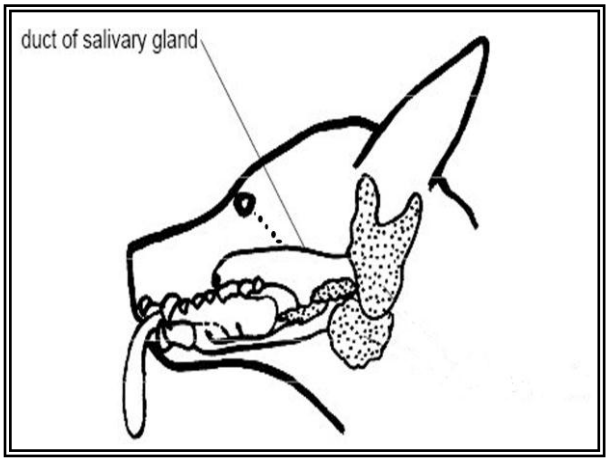
e-Anti-inflammatory agent as corticosteroids to reduce conjunctival and corneal changes

2-Surgical Treatment

a-Surgical or cautery ablation of the lower punctum to conserve the small amount of tears and to reduce drainage, however the technique is not successful as KCS is usually associated with no tear production.

b-Surgical reduction of the size of palpebral fissure through lateral tarsorrhaphy, to reduce the expose surface of the eye, however success of the procedure is dependent on presence of some lacrimal activity.

c-Hydrophilic soft lenses applied to the cornea after application of medication to retains enough moisture and protect the cornea for several hours, however it should be removed periodically to permit oxygenation of the cornea



d-Parotid duct transportation is indicated when the medical treatment have been failed, and using of saliva as replacement for tears produces no harmful effect on the eye as the saliva has nearly the same structure of tears and is non-irritant to the eye.

Postoperative complications: -

1-Twisting or torsion of the duct during operation may be exhibited by intermittent reduced or absent secretion

2-Stenosis of the duct due to fibrosis in certain areas along its course

3-Atrophy of the parotid gland

4-Corneal and periocular crystalization which is not irritating occurs in rare cases, in such cases a mineral-like deposit is formed over the cornea and eyelids.

IV-CONJUNCTIVA

I-CONGENITAL ANOMALIES OF CONJUNCTIVA

1-Dermoids

Definition: -

It is a congenital tumor that may involve the conjunctiva alone, eyelids or cornea. Dermoids are islands of skin displaced to an abnormal site and they are considered choristomas (masses of tissue that are normal histologically, but abnormal in their location). The tumor mass is dark brown to black in color and covered with a variable number of long hairs. Surgical excision of the mass is indicated and conjunctival wound can be left un-sutured in small defects but it should be sutured if it is extensive.

2-Ectopic Cilia

Definition: -

It is one hair or clusters of hairs that originate at the conjunctiva. It is usually developed several months to several years after birth. Ectopic cilia may be a congenitally misdirected hair follicle that produces hairs.

Signs: -

1-Epiphora, blepharospasm and mucoid discharge are evident.

2-A small dark red and slightly raised part of the conjunctiva may surround the cilia.

Treatment: -

Electro-epilation with destruction of the hair follicles

II-ACQUIRED DISEASES OF THE CONJUNCTIVA

1-Conjunctivitis

Definition: -

It is inflammation of the conjunctiva.

General signs of conjunctivitis: -

1-Active hyperaemia; vascular injection of the conjunctival blood vessels

2-Chemosis; oedema of the conjunctiva. Thickening of the conjunctiva may become so severe that bulbar conjunctiva extends over the cornea and beyond the edges of the eyelids.

3-Ocular discharge; usually starts as serous and becomes muco-purulent and purulent

4-Follicles; it is normally present on the bulbar surface of the third eyelid. The development of these follicles on the outer surface of the nictitating membrane or bulbar and palpebral conjunctivae, in addition to its proliferation at the normal sites is considered a diseased condition.

5-Pain; may be mild or severe depending on the cause. Blepharospasm or spastic entropion may result.

Etiology: -

A-Mechanical Causes

A-Exogenous irritative factors such as; foreign bodies, dust, sand, owns, husks, dried leafs, hair, eyelash, smoke, bright sunlight and low humidity.

B-Endogenous factors such as; deficiency of precorneal tear film, entropion, ectropion, distichiasis, trichiasis, ectopic cilia, prominent nasal folds, lagophthalmos, exophthalmos and eyelid tumors.

B-Chemical Causes

A-High percentage of ammonia in stable air due to bad ventilation

B-Gases such as sulfur fumes and formalin vapor in cases of stable disinfection.

C-Eye lotions or ointments applied to the eye in higher concentration.

D-Acids and alkalis burns: Alkalis have a more destructive effect than acids. Acids causes precipitation of protein which act as a barrier against further penetration and destruction.

E-Chalky materials used to beautify the animal coats during exhibition.

C-Traumatic Causes

A slight injury such as cat scratches and abrasions may act as a primary cause or may provide a point of entrance of microorganism.

D-Infectious Causes

May be restricted to the eye or part of a systemic disease

A-Bacterial B-Viral C-Mycotic

E-Parasitic Causes

A-Genus thelazia that has been reported in all domestic animals, and usually cause mild conjunctivitis and epiphora

B-Onchocerca cervical is in horses C-Habronima larvae in horses

D-Face flies in horses and cattle E-Demodectic mange in dogs

F-Allergic Causes

A-Pollen grains B-Type and quality of hay in large animals

C-Conjunctival sensitivity against special antibiotics as penicillin or neomycin

G-Systemic Diseases

Conjunctivitis occurs in the course of some infectious diseases such as canine distemper in dogs; feline catarrh in cat; malignant catarrhal fever, infectious bovine rhinotracheitis and infectious bovine keratoconjunctivitis in cattle; equine influenza in horses; or disease in sheep and swine fever in pigs.

H-Deficiency Causes

Vitamin A deficiency causes degeneration of lid conjunctival epithelium.

I-lodism

In cases of treatment of actinomycosis by using potassium iodide

Classification of Conjunctivitis

Conjunctivitis is classified according to the clinical symptoms into;

A-Catarrhal conjunctivitis B-Purulent conjunctivitis

C-Parenchymatous conjunctivitis

D-Follicular conjunctivitis E-Ophthalmia neonatorium

A-Catarrhal Conjunctivitis

Definition: -

It is catarrhal inflammation of the conjunctiva, which characterized by increased tear and mucous production

Signs: -

1-Increased flow of tears (epiphora) that soon starts to run down the face of the animal. In the earlier stages, these are watery, clear and saline in character. Next the discharge becomes mixed with mucoid secretion and becomes sticky, thick and gelatinous

2-Thickening and edema of the conjunctiva (Chemosis)

3-The eyelids are inflamed and swollen. The edges may be gummed together with exudates.

4-Blepharospasm and photophobia

Treatment: -

1-Thorough examination and elimination of the cause if present

2-Washing of the eyeball and conjunctival sac for removal of discharges using worm normal saline solution or boric acid solution 2%

3-Antibiotics; the drugs are chosen for their effectiveness on the tear film and no need for penetration of epithelium.

4-Corticosteroids (Anti-inflammatory drugs)

5-Antihistaminics (Anti-allergic drugs)

B-Purulent Conjunctivitis

It is purulent inflammation of the conjunctiva mainly due to bacterial infection although other causes can't be neglected.

Symptoms: -

1-The eyelids are swollen, edematous and sticke together

2-The conjunctiva is red, swollen and edematous

3-The discharge at first is like meat-juice and consists of serium, fibrin, inflammatory cells and flacks of pus. Later on becomes purely purulent and comes continuously from the medial canthus of the eyeball.

Treatment: -

1-Elimination of the cause

2-Thorough washing of the eyeball with cleansing solution. Make sure special tests have been completed (culture and Schirmer tests) before irrigation with cleansing solutions.

3-Antibiotic Ointment is applied 2-4 times daily or solutions instilled at least 4 times for 7 days. Broad spectrum antibiotic is used. Combinations of different antibiotics are more useful otherwise sensitivity test is performed first. Treat the least affected eye first and sterilized eye dropper is used for instillation of drugs.

4-Anti-inflammatory; corticosteroids can be used.

C-Parenchymatous Conjunctivitis

Definition: -

It is inflammation of the deeper layers of the conjunctiva. It is mostly considered to be a higher degree of simple catarrhal conjunctivitis.

Symptoms: -

1-Severe swelling of the conjunctiva especially the bulbar

one (chemosis) and the bulbar conjunctiva extends over the cornea covering the limbus and the palpebral conjunctiva extends beyond the eyelid margin.

2-Serous or mucoid discharge

Treatment: -

1-The same treatment for catarrhal conjunctivitis

2-Wormcompresses applied to the closed eye will reduce the swelling of the conjunctiva dramatically.

D-Follicular Conjunctivitis

This type of conjunctivitis is characterized by presence of hypertrophied lymphoid follicles at the bulbar surface of the third eyelid and perhaps on the palpebral surface and on the palpebral conjunctiva of the upper and lower eyelids. Lymphoid follicles are located normally on the bulbar surface of the nictitating membrane in all domestic animals. The follicles are essential for the mechanism of controlling ocular infection. Any chronic irritation or immunological stimulant will stimulate them to become hyperplastic. New follicles will develop anywhere on the conjunctiva. After the follicles have been formed they will sustain themselves even if the initiating cause disappeared.

Causes: -

1-Prolonged ocular irritation especially mechanical causes either exogenous (dust, winds, etc ...) or endogenous (entropion, ectropion, distichiasis, etc ...)

2-Immunological stimulus includes pollen grains and migrating parasites

3-Previous infections as in cases of bacterial conjunctivitis since these lymphoid follicles are centers of antibody production. In 25% of 'cases of follicular conjunctivitis in dogs, inclusion bodies like that isolated in cases of trachoma in human beings was discovered. This indicates that viral infection may be incorporated in such disease.

Symptoms: -

1-Persistent grayish mucoid discharge at the medial canthus of the eye

2-Examination of the bulbar surface of the nictitating membrane revealed presence of a red, roughened appearance of the hyperplastic lymphoid follicles. The follicles may present elsewhere in all conjunctival surfaces.

Treatment: -

1-Removal of any predisposing causes

2-Mild cases can be treated by antibiotic-steroid therapy

3-Removal of the follicles from the bulbar surface of the nictitating membrane by one of the following methods;

a-Debriding (scraping or curetting) of the follicles with a dull blade curette, end of the scalpel handle or any blunt instrument. Then apply zinc sulphate 1/2% solution as astringent. This treatment is followed by 7-10 days topical corticosteroid antibiotic ophthalmic ointment.

b-Cauterization of the follicles with copper sulphate crystals or silver nitrate sticks. Grasp the third eyelid with a mosquito artery forceps, evert the membrane on the forceps and start cauterization. Scraping sometimes is recommended before cauterization. Flush the third eyelid and the eyeball with normal saline and apply a liberal amount of ophthalmic ointment between the third eyelid and the eyeball. Copper sulphate causes severe corneal damage therefore do not allow it to touch the cornea and be sure to flush adequately after cauterization. Antibiotic-corticosteroid ophthalmic preparations are used for 5 days.

4-Individual follicles elsewhere in the conjunctiva don't scrape it or use cauterization, as it will result in an adverse reaction. Try to use electro-cauterization of each follicle or remove each one with scissors.

It should be noted that surgical excision of the third-eyelid is not recommended, as a treatment for follicular conjunctivitis as the disease, is much more distressing to the owner more than to the patient and therefore the treatment is optional. In addition, complications from third eyelid excision add too much stress on the animal than do follicular conjunctivitis itself.

E-Ophthalmia Neonatorum

Definition: -

Acute purulent conjunctivitis of newly born puppies and kittens before eyelids separation takes place. The purulent discharge builds up beneath the lids causing them to swell and may extrude at the medial canthus of the eye.

Treatment: -

1-Seperate the lids with blunt tenotomy scissors

2-Wash the eyeball with cleansing solution

3-Apply broad-spectrum antibiotics

2-Conjunctival Wounds

Causes: -

1-Cat scratches, bite wound, and fighting in small animals

2-Blows on the eye or penetrating foreign bodies or gunshot wound in all animals.

Symptoms: -

1-Bloody tears and Blepharospasm 2-Protrusion of the third eyelid

3-Presence of wound or laceration of the conjunctiva with swelling and edema of the wound edges

Treatment: -

The conjunctiva heals rapidly if it is uncomplicated by infection. Torn bulbar conjunctiva adheres very quickly to the episcleral tissues within few hours and complete healing takes place within 24 hours.

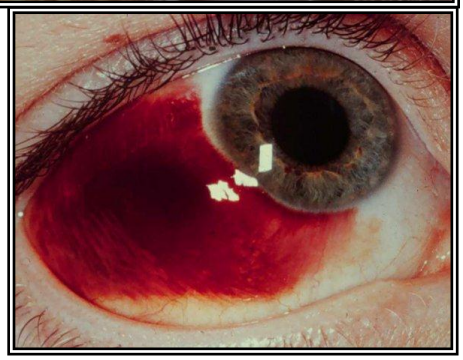
1-Lacerations of the bulbar conjunctiva heal quickly and need to be sutured only if extensive

2-Lacerations at the fornices can be treated by cleaning the wound, removing any protruding peri-orbital fat, and through suturing the wound.

3-Lacerations at the palpebral conjunctiva heal without surgical interferences.

In all cases antibiotic ointment is applied to prevent infection.

3-Sub-Conjunctival Hemorrhage



Sub-conjunctival hemorrhage usually follows blunt trauma to the eyeball with or without proptosis and is due to rupture of subconjunctival (episcleral) blood vessels. Sometimes the blood migrates anteriorly from periorbital hemorrhage. The extravasated blood exists under the distended bulbar conjunctiva. In some cases subconjunctival hemorrhage may be due to some systemic bleeding disorder

Treatment: -

When hemorrhage has stopped, it will recover in most cases without treatment

1-Apply epinephrine 1-2% topically

2-Hasten recovery by subconjunctival corticosteroids

4-Conjunctival Tumors

Conjunctival tumors are most common in cattle and horses and rare in other domestic animals. The common tumor in cattle, horse and cats is squamous cell carcinoma, while in dogs it is usually hemangioma and papilloma.

Treatment: -

Tumors present at the bulbar conjunctiva can be easily excised with suturing of the wound, while those at the palpebral conjunctiva need careful dissection and wound closure.

5-Habronemiasis of the Conjunctiva

Habronema is a GIT parasite that produces eggs which drop with feces and form larvae on the ground. These larvae are taken mechanically by the fly and dropped to the wounds after which the horse will lick it to pass to the GIT to complete its life cycle. Sometimes flies put such larvae into the eye, such larvae can't complete their lifecycle and form 2nd and 3rd stage larvae within conjunctival tissue or lacrimal sac as an aberrant migration. Later on they die and invaded by Eosinophil, and produces focal necrotic tissue in the conjunctiva. This focal necrosis undergoes caseation to form hard yellowish foci that are highly adhered to the conjunctiva. The disease has season predilection (summer) as a result of higher activity of flies during that time.

Symptoms: -

1-Conjunctivitis and epiphora

2-Examination of the conjunctiva reveals presence of pathognomonic lesion

3-Conjunctival smear reveals presence of larvae

Treatment: -

1-Control of infestation in the GIT, and control of flies

2-Topical treatment of the eye lesion

V- SCLERA

I-CONGENITAL ANOMALIES

1-Melanosis of the Sclera

Melanin deposits sometimes can be seen in animals less than one year of age at the sclera and cornea. It appears in a form of diffuse superficial plaques or in a form of firm nodules.

2-Coloboma of the Sclera

It is congenital absence of a segment of the sclera. It is seen in Collies and related breeds. The typical coloborna are seen affecting the optic nerve but it may occur in sclera near the optic nerve or extend forward to the equator.

3-Scleral Ectasia (Thin Sclera)

This condition is known as Collie ectasia syndrome or Collie eye anomaly. Scleral ectasia or lack of scleral development is observed in Albino or subalbinotic animals, Collie eye syndrome, Shelty eye syndrome, Australian Shepherds, Siamese cats and appaloosas horses. The control is accomplished by removal of all affected dogs from the breeding programs.

Symptoms: -

1-Chorioretinal dysplasia 2-Colobomas at the posterior pole of the globe

3-Tortousity of the retinal blood vessels 4-Retinal detachments

5-Intraocular hemorrhage 6-Central corneal opacity

II-ACQUIRED DISEASES OF THE SCLERA

Acquired disorders of the sclera are not common in domestic animals. Because of the inert collagenous nature of the sclera and its relatively poor blood supply, involvement of the sclera in disease processes is rare.

1-Episcleritis

Definition: -

It is a localized nodular or diffuse inflammatory disorder affecting the episcleral tissues near the limbus. The nodules are immovable and the conjunctiva is freely movable over them in nodular form. The episcleral vessels are engorged with blood and overlying conjunctiva is congested and red in diffuse form.

Treatment: -

Topical and subconjunctival corticosteroid administration

2-Ocular Nodular Fascitis (ONF)

Definition: -

It is a benign nodular lesion of connective tissue in the sclera, cornea and/or third eyelid. The lesions are localized and must be differentiated from nodular episcleritis, proliferative keratoconjunctivitis and focal neoplasms.

Treatment: -

Surgical excision (no respond to topical corticosteroids)

3-Scleral Tumors

Primary tumors of the sclera are uncommon. Melanomas or malignant melanomas are seen. Extensions to the sclera from other tissues are more common. Squamous cell carcinomas are the common tumors extended from the conjunctiva and cornea in horse and cattle. Haemangiosarcomas and malignant melanomas are most likely to occur in dogs.

4-Episcleral Hemorrhage

It has been previously described as subconjunctival hemorrhage.

5-Episcleral Trauma

Scleral trauma may leads to lacerations or perforation of the sclera. In equines the cause is severe blows to the eye while in small animals is due to fights with other animals or auto accidents. The ciliary body, iris and/or lens may prolapse through scleral wound. The extent of internal hemorrhage and retinal detachment determines if the eye will be visual following repair. The prolapsed tissues are replaced and the scleral wound is sutured with 6-0 non absorbable suture material.

6-Episcleral Prolapse of Peri-Orbital Fat

The postorbital fat can displace anteriorly between the sclera and Tenon's capsule to prolapse into the episcleral space. The condition may be congenital, or due to abnormal ocular muscle function. Exaggerated eye movement during examination may result in transient prolapse of fat.

Treatment: -

The condition is not routinely treated because it does not affect vision

VI-CORNEA

I-CONGENITAL DISEASES OF THE CORNEA

1-Microcornea

Definition: -

It is abnormally small cornea. Unilateral cases can be easily diagnosed by comparing it with the normal eye. Bilateral conditions can be compared with the standard dimensions in literatures.

Small cornea usually present with microphthalmia.

2-Macrocornea (Megalocornea)

Definition: -

It means large cornea in a globe. Megalocornea is reported is association with congenital buphthalmos due to increased intraocular pressure.

3-Dermoids

Definition: -

Dermoids are islands of skin displaced to an abnormal site, and considered choristomas (masses of tissue that are normal histologically, but abnormal in their location). It is skin-like mass present on the cornea and/or the conjunctiva, and may contain hair and sebaceous glands.

Treatment: -

Superficial keratectomy is the successful method

4-Coloboma of the Cornea

Definition: -

It means absence of a segment of the cornea. It is a very rare condition.

II-ACQUIRED DISEASES OF THE CORNEA

1-Keratitis

Keratitis is a condition in which the eye's cornea, the front part of the eye, becomes inflamed. The condition is often marked by moderate to intense pain and usually involves impaired eyesight, it may cause feelings of scratching each time individual blinks eye, and it is accompanied by subjective and objective symptoms.

A-Subjective Symptoms (general signs)

1-Pain of the cornea exhibited by photophobia and blepharospasm

2- Excessive lacrimation (epiphora)

B-Objective Symptoms (specific signs)

1-Conjunctival and Ciliary Injection of the Blood Vessels

The conjunctival and ciliary blood vessels around the cornea become injected and engorged with blood. The conjunctival blood vessels appear bright red, dilated, tortuous and
darker in color, straighter and no

2-Loss of Corneal Transpare

Loss of corneal transparency
results from corneal eder
inflammatory exudates (leu
infiltration). Presence of
inflammatory cells within the
forces the collagen lamellae
leading to reflection of light as it pass through the cornea and give it the whitish appearance.

3-Vascularization of the Cornea

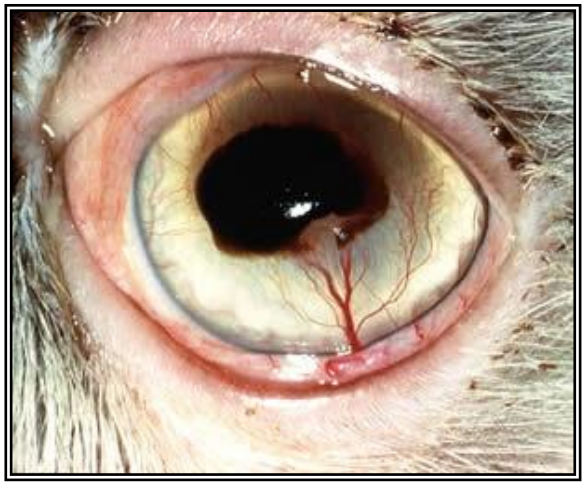
The cornea is a vascular organ, but during inflammation it may be invaded by limbal

neovascularization from the uvea (*deep)* or the conjunctiva *(superficial)* as a defensive mechanism against injury, and for repair of pathological changes affecting the cornea.

a-Superficial neovascularization

They originate from the conjunctival blood vessels at the limbus and invade the anterior third of the stroma under the epithelium.

They are bright red in color and tortuous with numerous branching, and either involves a segment of the cornea or the entire corneal circumference.



b-Deep vascularization

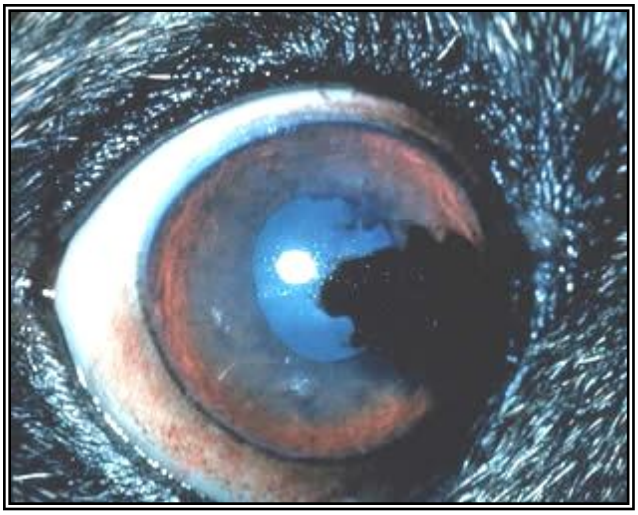
These blood vessels originate from the anterior ciliary branches at the level of the lesion, involve the entire corneal circumference. These blood vessels are usually short in length, straight in direction, non-anastomosing and dark red in color. Usually they encircle the whole cornea and they give the cornea ring appearance.

4-Ulceration of the Cornea

Ulcers are either superficial or deep and spreading or localized, and these ulcers able to be stained by fluorescein dye 1% or Rose bingal dye 0.5 %. They are losses of superficial layers of the cornea

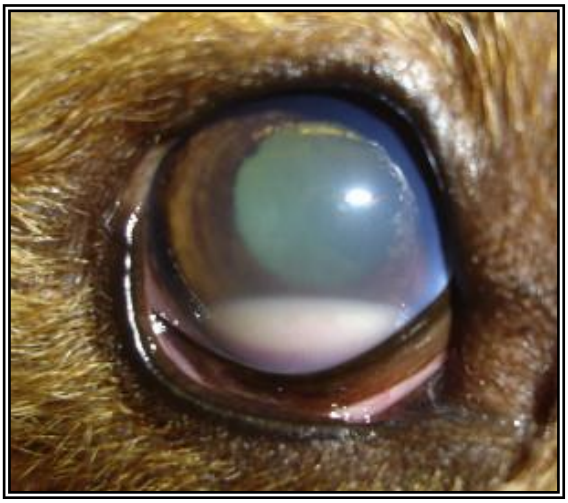
(epithelium) and may be as deep as the Descemet's membrane.

5-Pigmentation of the Cornea



During keratitis, the limbal melanoblasts migrate into the corneal stroma directly or with neovascularization of the cornea. These pigments are permanently deposited in the corneal epithelium or stroma, and if they are dense enough and at the visual axis, they may impair vision.

6-Hypopyon

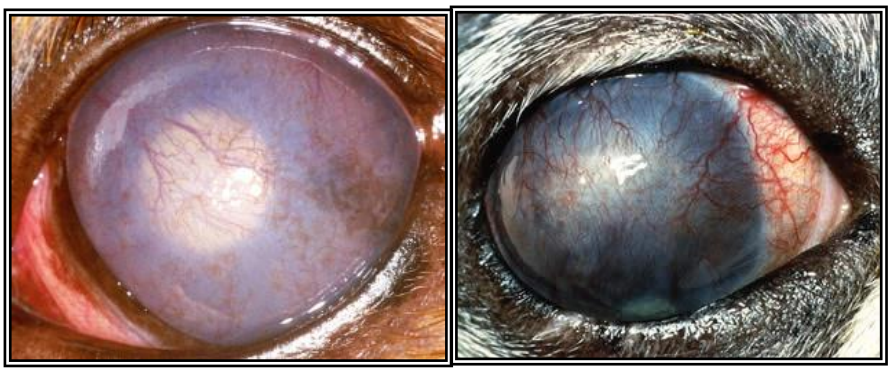


Hypopyon is an accumulation of leukocytic exudate that can be seen in the anterior chamber (mixed with aqueous humour), usually accompanied by redness of the conjunctiva and the underlying episclera. It is a sign of inflammation of the anterior uvea and iris (iritis), which is a form of anterior uveitis. The exudate settles at the bottom due to gravity.

Classification of Keratitis

Keratitis may be classified according to the etiological agents or according to the anatomic structures involved.

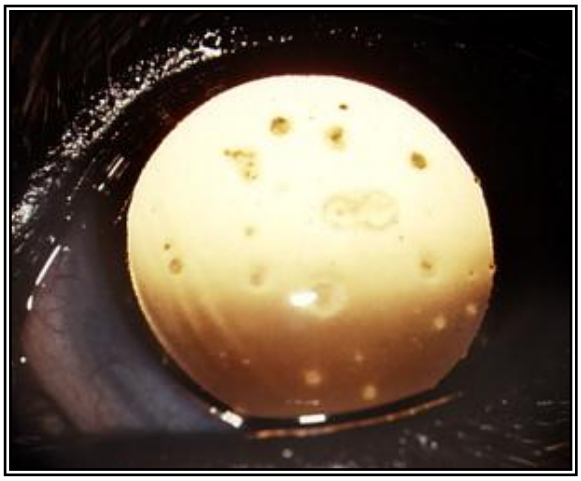
A-Superficial Keratitis



The process of inflammation is limited to the epithelium and superficial part of the stroma, usually associated with superficial neo-vascularization of

the cornea, and after healing, it rarely leaves a scar.

1-Superficial Punctate Keratitis



Definition: -

It is unilateral or bilateral, epithelial and sub-epithelial tiny lumps or white opacities on the cornea, range in size between small to large circuls, and it can be more easily seen after applying fluorescein or rose bengal dye eye-drops. The lumps appear to be randomly positioned on the cornea and they may appear and disappear over a period of time with or without treatment lesions. There are usually no clinical signs or ocular inflammation. The cause of such condition is not yet clear but it may be associated with long standing keratoconjunctivitis or viral infection.

Treatment: -

No specific treatment is recommended since the lesions leave the cornea within several months to a year. Topical corticosteroids, antibiotics and/or yellow mercuric oxide may be helpful.

2-Superficial Corneal Abscess

Abscess formation at the superficial layers of the cornea is not uncommon. It ensues as a result of trauma or scratches. It appears as green yellowish swelling of the cornea that range in size from few millimeters to 20 mm.

Treatment: -

Incision of the abscess, suction of its content, and curettage will correct the condition, otherwise superficial keratectomy may be needed.

3-Pannus or Uberreiter's Syndrome (degenerative pannus)

Definition: -

It is a bilateral diffuse inflammatory keratitis of unknown cause, affecting the superficial corneal layers and it is characterized by sub-

epithelial connective tissue infiltration and neo-vascularization of the cornea. It is a chronic progressive corneal disorder that cannot be cured.

Symptoms: -

1-Grayish haze that starts at the temporal limbus, and then starts at the nasal limbus, and finally it grows to cover the whole cornea.

2-Superficial vascularization that derived from the conjunctiva, and have wavy and branched appearance

3-Pigmentation over the cornea

4-If the condition is neglected, the case may end with blindness

Treatment: -

As it is a chronic progressive corneal disorder that cannot be cured, it can be controlled by a variety of medical and surgical means to avoid blindness, however treatment must be continued for animal life.

1-*Early cases* are treated by daily topical application of corticosteroid and frequency of application is reduced gradually according to the animal respond to medication.

2-*In moderately advanced cases* subconjunctival corticosteroids are indicated

3-*In advanced cases* with minimal scarring animal may be treated with Beta radiation

4-Chemical cauterization with pure carbolic acid (phenol) may be applied to the pannus area.

5-Superficial keratectomy is performed in advanced cases with severe scarring, followed by application of antibiotic ointment until re-epithelialization.

6-Peritomy or destruction of the conjunctival blood vessels at the limbus at the base of the pannus by heat or electro-cauterization

4-Kerato-conjunctivitis Sicca

It is a diffuse superficial keratitis secondary to lacrimal gland insufficiency, leading to corneo-conjunctival injection, corneal loss of

luster, and increased mucus portion of peri-corneal tear film on expense of watery portion.

5-Exuberant Granulation Tissue

Exuberant granulation tissue can be formed on the surface of the cornea as a result of injury, and by then superficial vascularization can be observed crossing the cornea to the area of granulation.

Treatment: -

1-Peritomy (destruction of the conjunctival blood vessels at the limbus at the base of the pannus)

2-Surgical removal of the granulation tissue

2-Pigmentary Keratitis

Definition: -

It means deposition of pigments in the cornea due to irritation. Limbal melanoblasts migrate into the stroma directly or with neovascularization of the cornea. Deposition of pigments may be superficial (epithelium and superficial stroma) or deep (deeper layers of stroma).

Causes: -

1-Trichiasis and distichiasis 2-Exophthalmos and large palpebral fissure

3-Entropion

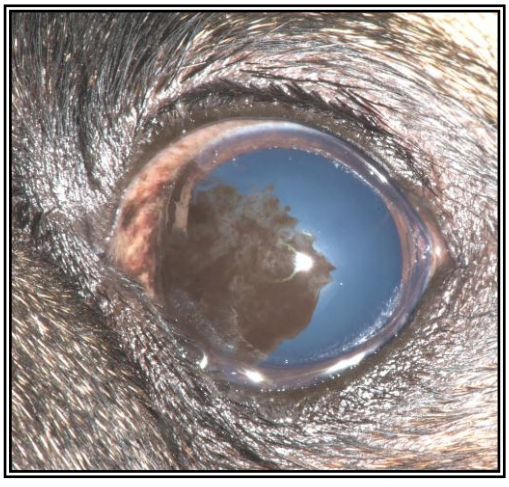
4-Keratoconjunctivitis sicca

5-Diffuse superficial keratitis (pannus)

6-Following corneal injuries

Symptoms: -

Pigments may be present superficially at the epithelium and superficial layers of stroma or deep at the deeper parts of the strorna. It may accompanied by opacities of the cornea and vascularization according to the cause and duration.



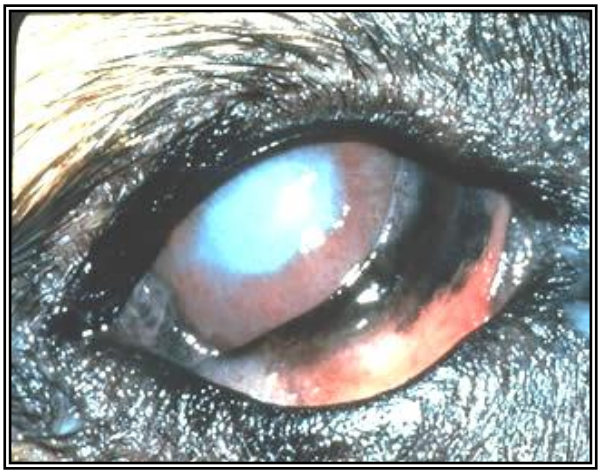
Treatment: -

1-Remove the cause

2-Removal of the pigments, however if the pigment does not interfere with the animal vision, treatment is not indicated, but if the pigments has already resulted in visual impairment, it can be removed by superficial lamellar keratectomy

3-In certain cases, and when the pigment does not interfere with vision, tattooing may be used to stain affected corneal areas with the same color of the iris

3-Interstitial or Deep Keratitis



Interstitial keratitis indicates inflammation of deeper corneal layers up to stroma and endothelium.

Causes: -

1-Extension of bacterial infection from a focus in the animal body

2-Systemic disease such as canine distemer and infectious hepatitis in dogs, leptospira in horses and pinkeye in cattle

3-Extension of infection from superficial layer of the cornea or the sclera, or secondary to anterior uveitis

4-Trauma 5-Neoplasia

Symptoms: -

1-Corneal opacity (edema and leucocytic infiltration), and the cornea assumes ground glass-like appearance and it may occupy the entire cornea or may be localized.

2-Deep vascularization of the cornea especially if there is a concurrent iridocyclitis. The blood vessels are usually present at the limbus circumferentially as short vessels parallel to each other and perpendicular to the limbus. They are directed towards the center of the cornea. In later stages they become prominent and progress in a brush-like fashion.

3-Conjunctival and ciliary injection of blood vessels is usually evident

4-Hypopyon may be present

Treatment: -

Efforts are made to define the cause and correct it

1-Topical application of atropine sulphate 1% solution to reduce the chances of anterior synechia and to reduce pain by relieving the ciliary spasms

2-Corticosteroids locally and systematically when the condition is not associated with corneal ulceration (steroids interfere with re-epithelization of corneal ulcer and stimulate collagenase enzyme that may lead to corneal perforation).

4-Broad spectrum antibiotics locally and systematically especially when bacterial infection is suspected. Selected antibiotic should have high penetrating power to the blood-aqueous barrier and intact corneal epithelium, to be more effective on the deeper layers of the cornea.

4-Ulcerative Keratitis or Corneal Ulcer

Definition: -

Corneal ulcer is a lesion in which the epithelium and a variable amount of stroma have been lost and it is a chronic lesion that either heals slowly or do not heal, and it is usually accompanied by infection.

Causes: -

1-Mechanical causes: -

Abrasions, trichiasis, distichiasis, ectopic cilia, foreign body injury, and entropion

2-Infectious causes: -

a-Bacterial-strept., Staph., E.coli, and Moraxella

b-Mycotic c-Viral (Canine distemper and herpes virus in dog and cat)

3-Metabolic causes: -

Vitamin A deficiency

4-Neurotrophic causes: -

Paralysis of the ophthalmic branch of the trigerninal

5-Exposure factors: -

Exophthalmos and lagophthalmos

Symptoms: -

1-Severe pain that is manifested by btepharospasm and photophobia (partial or complete closure of the eyelids) and rubbing of the affected eye against objects

2-Mucopurulent or purulent discharge

3-Loss of corneal transparency (corneal opacity) due to edema or cellular infiltration, around the ulcer or it may affect the entire cornea.

4-Vascularization of the cornea (superficial and deep vascularization) can be observed according to the type of the ulcer.

5-The presence of the ulcer itself is a diagnostic sign. Although deep ulcer can be easily recognized, the superficial one needs fluorescein dye for staining.

Diagnosis: -

1-Clinical symptoms

2-Staining with fluorescein or rose Bengal stain, as Fluorescein is water-soluble and can't penetrate the intact corneal epithelium, and it only stains areas with disrupted epithelium with green color.

Treatment: -

The main object of the treatment is to control infection and hastening the repair process

1-Remove the cause

2-Control of infection by broad-spectrum antibiotics as gentamycin, neomycin or polymyxin and bacitracin in case of bacterial infection, idoxuridine in case of viral infection, or natamycine or miconazole in case of mycotic infection.

3-Atropine topically can be used to relieve pain by induction of relaxation of ciliary muscles

4-Cauterization of the ulcer by Tr. iodine or phenol for sterilization of the ulcer, and stimulation of sloughing of dead tissues

5-Third eyelid flap and/or conjunctival flap can be used to support the ulcer, warming it to hasten enzymatic and metabolic reactions, and nutrition of the corneal ulcer.

6-Superficial keratectomy may be used in certain cases

Fate of Corneal Ulcer

A-Scar Formation

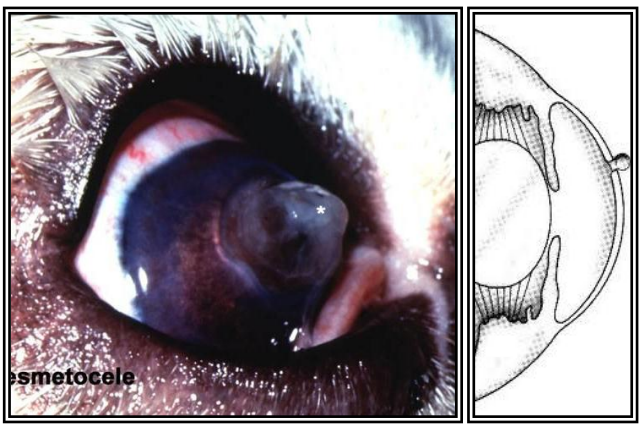
When corneal stroma is destroyed, regeneration is made by keratocyte and fibroblasts cells. Collagen fibrils produced by these cells are not laid down in a regular manner and do not transmit light, and with time scars tend to become clear. This tendency is greater in young animals as a result of the higher regeneration power in young ages, however deeper injury usually has more dense and permanent the scar. Corneal scars are termed nebula, macula, and leucoma according to its size and density. It should be noted that corneal scardiffer from corneal edema as it is usually associated with no inflammatory signs and the animals usually has history of very old eye affection controversial to corneal edema.

Treatment: -

In most cases no treatment has been recommended, as long as the scar does not interfere with vision. In large leucomas, corneal graft is the treatment of choice.

B-Descemetocele (Keratocele)

Definition: -



It is a state of protrusion of the Descemet's membrane through the floor of a deep corneal ulcer, forming a small transparent vesicle at the center of the corneal ulcer. The membrane is protruded due to the pressure of the aqueous humour posteriorly and Descemet's membrane does not rupture due to its elasticity. Sometimes the protruded membrane is covered by fibrinous exudates and corneal epithelium.

Treatment: -

1-Reposition of the protruded membrane back with an iris spatula or blunt instrument then the wound is sutured by one or two interrupted stitches.

2-In case of deep ulcer, paracentesis of the anterior chamber, by small needle introduced at the limbus, is required to relieve pressure over membrane.

3-Nictitating membrane flap is placed over the cornea for 10-14 days.

4-Medical therapy consists of topical antibiotic and 1% atropine ointments

C-Iris Prolapse

Definition: -

It means protrusion of iris through penetrating corneal wound or rupture corneal ulcer. The iris is carried forward into the corneal defect by escaping aqueous humour. Strangulated part of the iris may show various degenerative changes and necrosis.

Treatment: -

The wound is flushed with boric acid solution and the iris is repositioned into the anterior chamber or amputated if it appears unhealthy. The corneal wound can be sutured after trimming of the edges of the wound. The eyelid flap is applied for 10-14 days, and topical antibiotics and atropine ointments are applied for several successive days.

D-Iris Staphyloma

Definition: -

It means protrusion of a part of the iris covered with thin corneal ulcer without rupturing of the ulcer and the protruded part is covered with fibrin and layer of endothelium. Adhesion usually present between the protruded part of iris and the edges of corneal wound.

Treatment: -

The protruded part of iris is repositioned and the wound edges are trimmed with care and then are opposed with simple interrupted sutures

in the same manner as *Descemetocele*. A nictitating membrane flap is then performed and topical antibiotic and atropine is applied.

E-Hypopyon

Definition: -

It means accumulation of inflammatory exudate at the ventral part of the anterior chamber. It usually occurs in cases of severe corneal ulceration with secondary iridocyclitis.

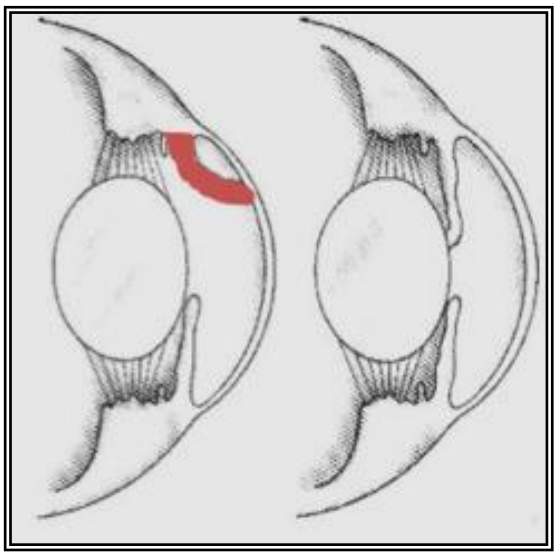
Treatment: -

Paracentesis, aspiration of the inflammatory exudates, and injection of Alfachymotrypsin enzyme intracameral

F-Anterior or Posterior Synechiae

Definition: -

It means adhesions between the iris and corneal endothelium (posterior surface of the cornea).



Treatment: -

1-Application of atropine 1% may relieve the condition.

2-Surgery may be recommended to remove the adhesions.

G-Panophthalmitis

Definition: -

It means severe purulent inflammation of the entire three layers of the eyeball (pus in the eyeball)

Treatment: -

Enucleation of the eyeball

Conjunctival Flaps

Advantages: -

1-An excellent means for supporting the corneal ulcer as the conjunctiva provides tissue to fill in stromal defect, and provides a more support to the cornea than does a nictitating membrane flap.

2-The conjunctival flap provides a vascularized tissue in intimate contact with the corneal defect

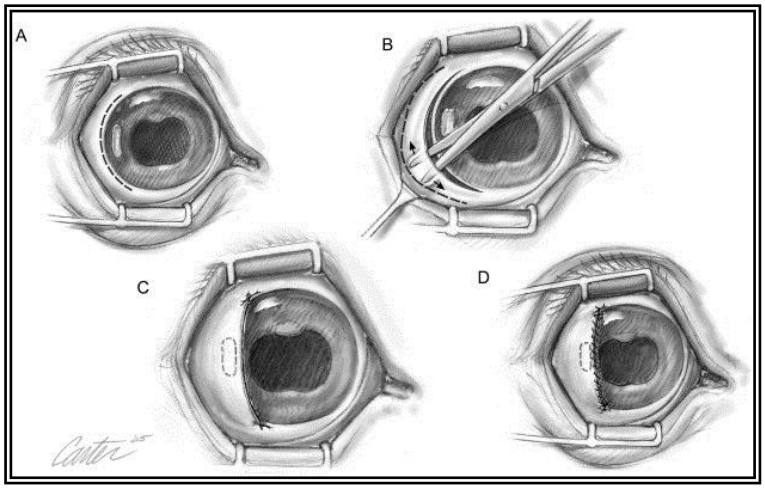
3-Small and thin conjunctival flaps allow partial vision

4-Partial conjunctival flap allows observation of the defect and direct application of medication on the cornea. The conjunctival flap should consist of conjunctiva only which is a very elastic, thin and nearly transparent tissue. If the Tenon's capsule is incorporated, it reduces the elasticity of the flap making it more difficult to position. The flap should be transparent enough to permit some vision. Thicker flaps cannot be left permanently as they will interfere with sight. In some severe corneal degeneration the flap may be left permanently. After transportation, the deep conjunctival surface will adhere to any area where corneal epithelium is missing. It will not adhere to intact surface of the cornea. Most conjunctival flaps have served their purpose and can be removed 2 - 3 weeks after transportation.

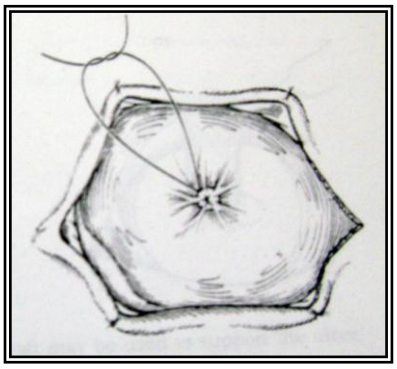
Types: -

A-Partial or Hood Bulbar Conjunctival Flap

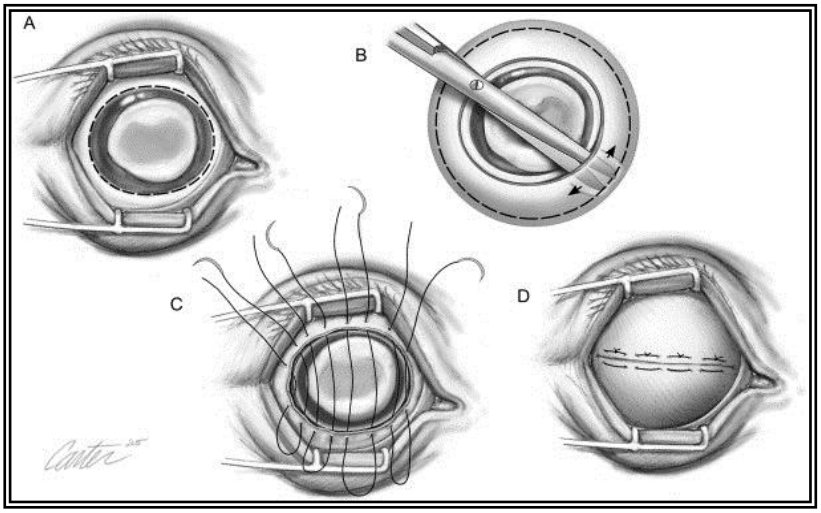
It is employed in case of corneal ulcers with stromal loss near the limbus in the following manners. The bulbar conjunctiva is incised near the limbus and concentric with it. The position of paralimbal incision depends on the seat of corneal ulcer. The bulbar conjunctiva is undermined and dissected from the underlying Tenon's capsule to provide a flap that can be extended over the corneal ulcer. At each end of the flap a suture is applied through the conjunctiva and anchored to the superficial layers of the sclera at the limbus with fine number of absorbable suture material. 2-3 weeks are usually sufficient to heal the corneal defect before removal of the flap.



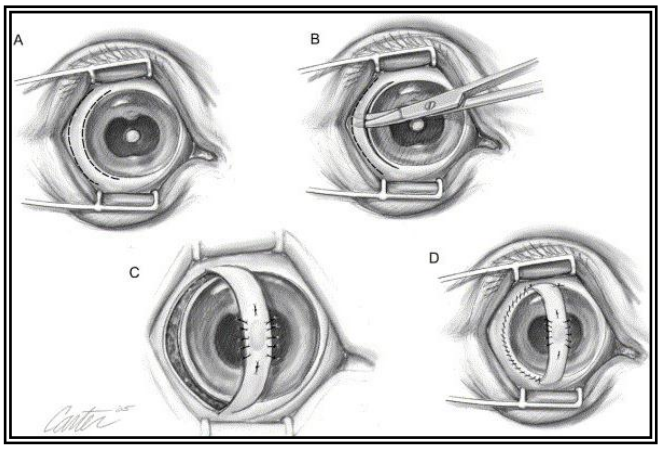
B-Complete Bulbar Conjunctival Flap (double hood flap)



Total conjunctival flaps provide full corneal coverage and can be applied to large corneal ulcers and provide a good blood supply, protection and support to the cornea. A complete perilimbal conjunctival incision is performed immediately adjacent to the limbus. The conjunctiva is then undermined from the underlying tissue, with tenotomy scissors, to a distance of one-half to two-thirds of the diameter of the cornea. The free edges of the conjunctiva are sutured using an interrupted mattress suture in linear manner or in Purse-string manner.

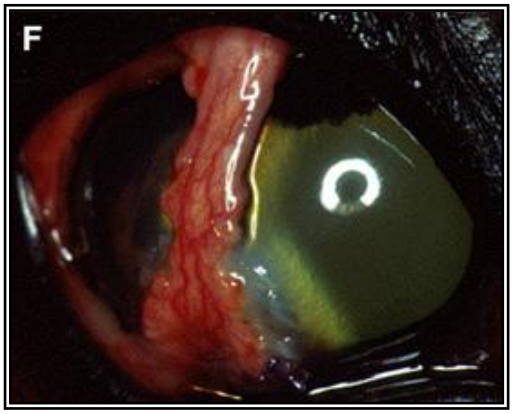


C-Central Bridge Conjunctival Flap



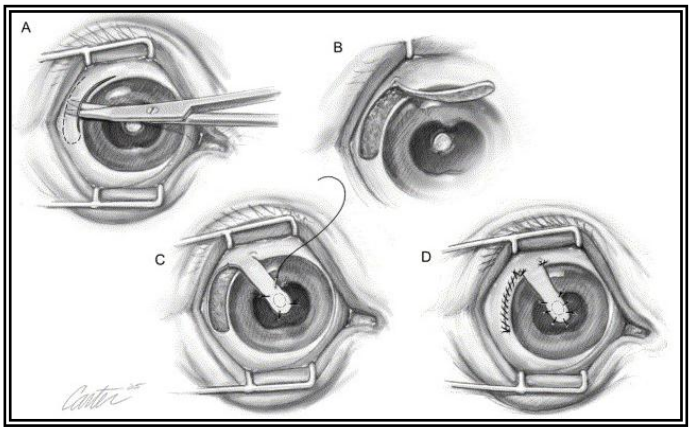
The conjunctival bridge flap is used primarily for central corneal ulcer. A perilimbal conjunctival incision is performed adjacent to the limbus, along the temporal or nasal limbus depending on the position of the ulcer for approximately 180°. The conjunctiva is then undermined with scissors with special care is to free the conjunctival epithelium from the underlying Tenon's capsule. A second conjunctival incision is made parallel to the first one, thus creating a bridge of conjunctiva. The distance between the two conjunctival incisions should be larger than the corneal defect.

The bridge of conjunctiva is then positioned over the corneal defect and simple interrupted sutures are placed around the corneal defect. The bridge should be made vertically so that blinking of the eyes will cause no the graft displacement. Suturing the original graft-harvesting conjunctival site is optional



D-Pedicle or Rotational Conjunctival Graft

A small conjunctival incision is performed 1-2 mm posterior to the limbus. The length of the incision determines the length of the flap and it should be long enough to cover the corneal defect. The conjunctiva is then undermined with scissors then a second incision is made parallel to the first one. The bridge is resected from one end to create a graft that is rotated over the corneal defect. The incision should be made so that when the flap is rotated, it will be perpendicular to the eyelid motion (blinking) to avoid its displacement. The graft is sutured to the edge of the ulcer with simple interrupted sutures. The first sutures are placed at the distal end of the graft and then placed 1.0 to 1.5 mm apart. Two additional simple interrupted sutures are placed at the base of the graft, at the limbus, to provide better stability to the pedicle graft (tension-relieve sutures). Suturing the original graft-harvesting conjunctival site is optional.



Third Eyelid Flap

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.

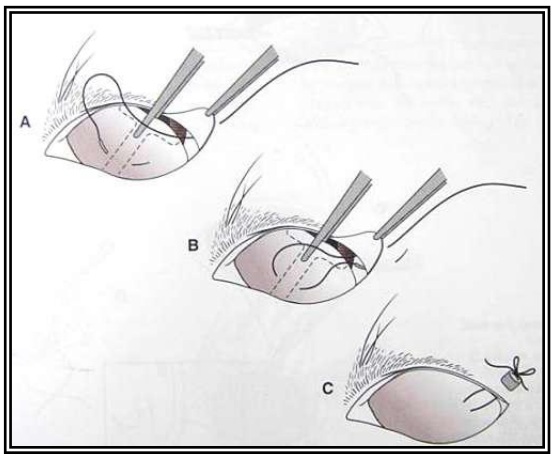
5-It is quickly and easily performed without the need for general anesthesia

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

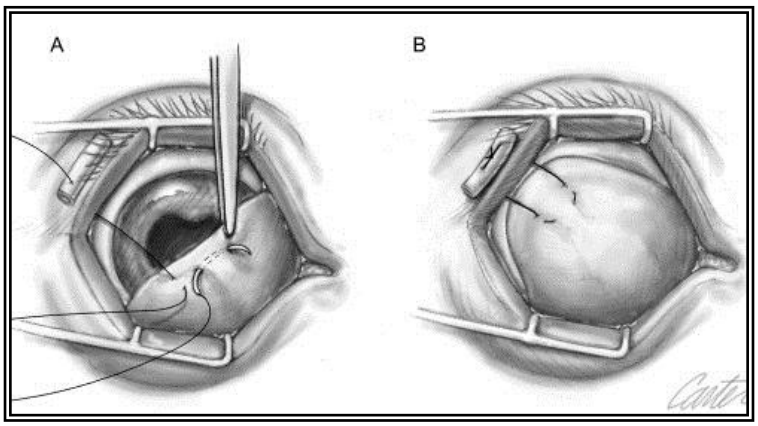
4-Subluxation of the eyeball secondary to retrobulbar swellings

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.

2-Lipid Corneal Degeneration or Lipid Keratopathy

This condition is unilateral or bilateral corneal affection due to the deposition of lipid in the corneal stroma in association with elevated serum level of lipid and systemic metabolic lipid disturbances. The opacities may occur in any area of the cornea and seldom progress to cause total blindness. The cause is not understood and the condition is commonly occurs in adult dogs.

Treatment: -

Treatment by superficial keratectomy is indicated in severe cases only

3-Corneal Wounds

Corneal wounds and lacerations are quite common in domestic animals and fortunately the majority does not perforate.

Causes: -

1-Cat scratches

2-Accidents, fighting or contusion to the eye

3-Striking of the eye against a whip, stick or other objects

Types: -

A-Superficial Wounds

These wounds usually heal within 24-48 hours without treatment unless the source of the laceration introduces pathogenic microorganism into the stroma.

B-Deep Wounds

Deep penetration with minimal corneal damage as deep cat scratch may heal with only topical medication. If the wound extends to the

Descemet's membrane, corneal suturing is indicated. Deep penetration with severe corneal damage should be treated medically and supported by third eyelid flap. Injuries in the form of corneal flaps are corrected by suturing before occurrence of corneal edema.

C-Perforating Corneal Wounds

Different forms of perforating wounds are observed. Small punctured wound without iris prolapse is corrected by suturing the wound and application of third eyelid flap. In cases of iris prolapse, replace the iris in recent cases or amputate it in old cases then suture the cornea and apply third eyelid flap.

4-Infectious Bovine Keratoconjunctivitis (IBK)

IBK is one of the most common diseases in cattle throughout the world and is of major economic importance in beef and milk producing animals. The disease is characterized by excessive lacrimal discharge, conjunctivitis, and keratitis. It is also called pinkeye, contagious ophthalmia and New Forest disease.

Causes: -

Moraxella bovis is considered to be the most common cause of IBK in cattle. Other microbial agents have been isolated from field outbreaks such as mycoplasma, rickettsia, viruses and listeria. Ultra violet radiation appears to increase the susceptibility of the eye for infection. The mode of transmission of M. bovis is suggested by direct contact as well as by mechanical vectors (flies). Younger cattle appear more susceptible to the disease and those less than two years old have the highest morbidity.

Symptoms: -

1-The earliest signs of the disease are epiphora, blepharospasm, photophobia, and conjunctival hyperaemia and chemosis.

2-Then the affected eye may exhibit a white pale or opaque spot near the center of the cornea that may be enlarged and elevated or slough leaving

a shallow ulcer.

3-Corneal opacity appears around the ulcer and a mild to severe anterior chamber aqueous humour flare and iridocyclitis is usually detectable.

4-During the next days, corneal lesion is enlarged and corneal abscess is formed. At the same time circumcorneal congestion of blood vessels is marked with the initiation of corneal neovascularization.

5-By the ninth day a typical picture of the disease is clear include a well-defined ulcer, annular area of corneal opacity, pyogenic necrosis (yellow in color) and corneal vascularization.

6-The repair process starts after 10-15 days and acute symptoms subside. The corneal opacity tends to clear from the periphery to the center. The ulcer fills with granulation tissues and heals leaving a slightly raised dense scar.

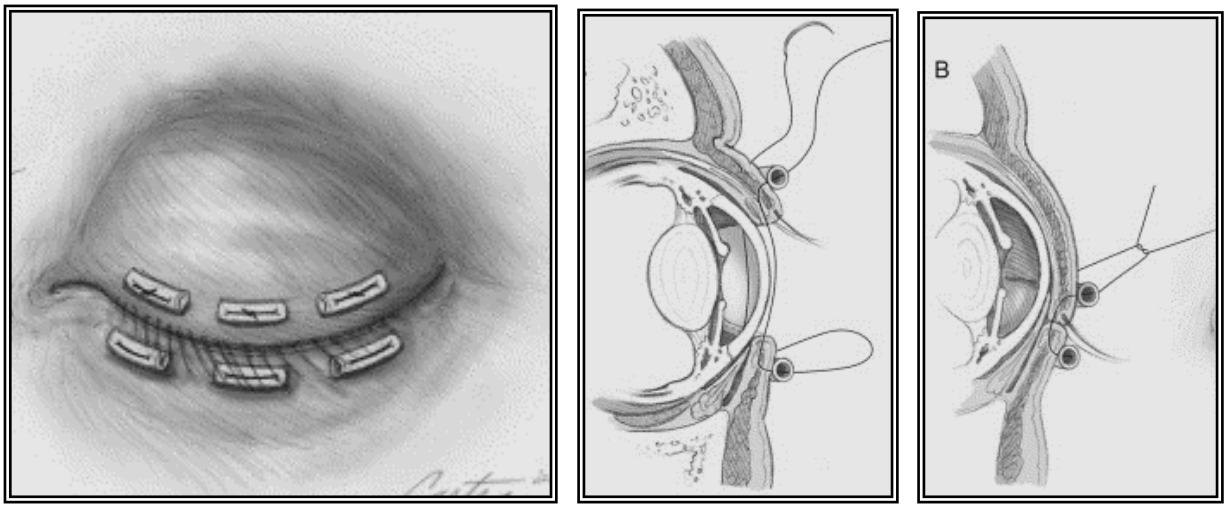
7-After 1-2 months a faint localized corneal scar is formed and surrounded by complete corneal transparency in uncomplicated cases.

Treatment: -

1-Flushing of the eyeball with cleansing solution

2-Topical application of chloramphenicol and systemic injection of Oxytetracycline 20%

3- Nictitating membrane flaps are very useful in the treatment especially when a deep ulcer is present. The flap provides mechanical support to the diseased cornea and may help close and seal perforated corneal ulcer by raising temperature and increasing metabolism of the diseased tissue.

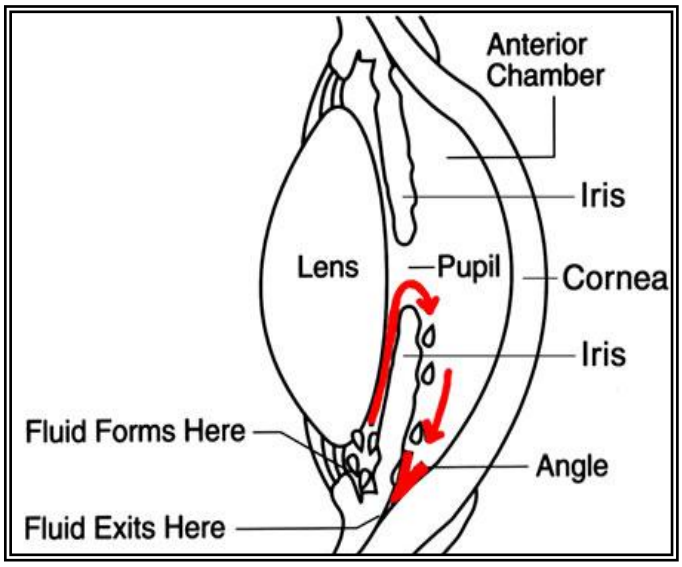


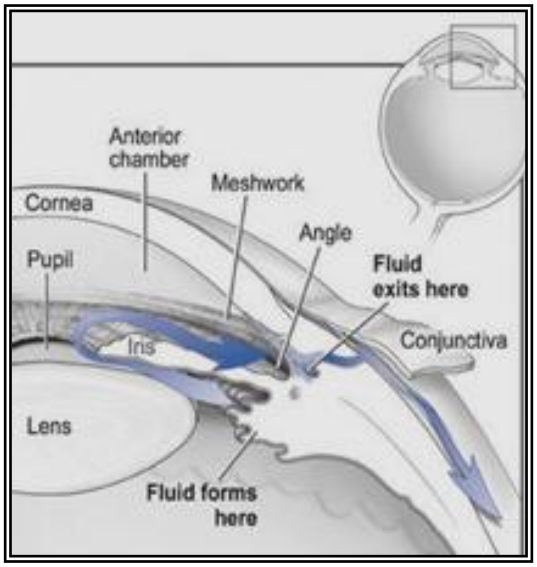
4-Complete temporary tarsorrhaphy is indicated over the third eyelid flap and is achieved by closure of the eyelids with 4-6 interrupted horizontal mattress sutures using non-absorbable suture material.

5-Isolation of the affected animals, quarantine measures and disinfection of the stables are important.

VII-ANTERIOR CHAMBER

The anterior chamber is the space formed anteriorly by the cornea and posteriorly by the iris and is filled with aqueous humour. The filtration angle lies between the iris and cornea.The anterior chamber is examined for its depth (either deep or shallow) and contents. Also the filtration angle is examined by gonioscopy.





I-SHALLOW ANTERIOR CHAMBER

Causes: -

1-Anterior displacement of the lens forcing the iris forward and reducing the size of anterior chamber

2-Posterior synechia, as sealing of the edges of the iris to the lens in a complete circular ring, prevents the aqueous humour from passing to the anterior chamber and causes pressure over the iris forward resulting in iris bombe.

3-Tumor of the iris

4-Corneal perforation and loss of aqueous humour

II-DEEP ANTERIOR CHAMBER

1-Congenital microphakia (small lens)

2-Buphthalmia in chronic glaucoma

III-ABNORMAL CONTENTS OF ANTERIOR CHAMBER

Normally the anterior chamber contains aqueous humour. In uveitis, large particles are present and reflect light in a fashion of searchlight beam at night.

1-Hypopyon

Definition: -

Inflammatory exudates or pus in the anterior chamber

Causes: -

1-Ulcerative keratitis 2-Anterior uveitis

Symptoms: -

The inflammatory exudates settle to the lower part of the anterior chamber. In corneal ulceration, the hypopyon may have a roughly triangular shape with part of it adherent to the corneal ulcer.

Treatment: -

It is directed first to treat the cause

1-Medical treatment by Alpha-chymotrypsin

2-Paracentesis and aspiration of the hypopyon by using sterile needle

3-Removal of the hypopyon through a stab puncture at the limbus by broken razor blade or cataract knife. The clotted exudates are removed by iris hook and the wound is sutured by simple interrupted stitches. The anterior chamber is filled by antibiotic solution.

2-Hyphema

Definition: -

It is hemorrhage or presence of blood in the anterior chamber. The whole anterior chamber may be filled with blood giving the cornea red

appearance, or the blood may be settle down to the fourth half of the cornea.

Causes: -

1-Direct trauma by penetrating foreign body as thorn, stick or buckshot or indirect by severe blows to the eyeball or head

2-Iridocyclitis frequently produce hyphaema

3-Infectious disease as equine periodic ophthalmia

4-Chronic glaucoma especially when the eyeball increased in size (Megaloglobus). The hemorrhage may originate either from the ciliary body or from retinal detachment and is usually unclotted.

5-Primary and metastatic anterior uveal neoplasms as malignant lymphoma and haemangiosarcomas

6-Retinal vascular disease may produce hemorrhage and accompanied or not by retinal detachment.

7-Anterior chamber paracentesis

Treatment: -

1-Correction of the primary cause

2-Hemorrhage due to trauma usually clears up in 24 hours without treatment

3-Topical application -of 1-2% epinephrine solution for 24 hours only and then apply atropine to dilate the pupil until all hemorrhage has disappeared.

4-Injection of fibrlnolysin enzyme intra-cameral to remove blood clot

5-Surgical removal of the clot is rarely indicated. Small limbal incision can be performed and the clot la hooked to an iris hook to bring it out.

3-Fibrin (Plasmoid Aqueous)

Fibrin escape into the aqueous humour in cases of anterior uveitis and in such conditions resulting in reduction of intraocular pressure such as intraocular surgery, perforating wound, and paracentesis

Symptoms: -

The fibrin clot may adhere to the cornea resulting in leucoma or to the lens and iris resulting in synechia and iris bombe. Also it may obliterate the filtration angle and cause glaucoma.

Treatment: -

Treat the cause and inject fibrinolysin intra-cameral

4-Lipid Aqueous

Presence of lipids and lipoproteins in the aqueous humour is correlated with hyperlipemia in dogs. The blood aqueous barrier appears to be destructed by iridiocyclitis and permit the entrance of lipid into the anterior chamber. The fat droplets in the aqueous give it a milky appearance. This can fill the lower part of the anterior chamber or the entire anterior chamber.

Treatment: -

Low fat diet and thyroid therapy will clear up the aqueous within a week

5-Lens

It may be luxated into the anterior chamber or ruptured and its material is mixed with the aqueous humour.

Treatment: -

Removal of luxated lens

6-Abnormal Growths

Several types may be present such as:

1-Anterior uveal tumour (lymphosarcoma and melanomas)

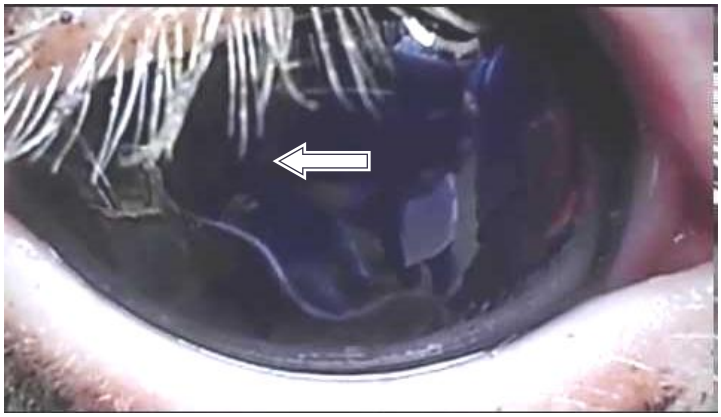
2-granuloma

3-Iris or ciliary body cyst

Treatment: -

Surgical removal

7-Parasitis



Migrating heart worm in dogs may gain access to the anterior chamber or flaria larvae in horses

Treatment: -

Parasites are removed surgically and the animal is treated by antiparasitic drugs

8-Foreign Bodies

Thorns and birds shot (shotgun pellets). Such foreign bodies are removed surgically

VIII-ANTERIOR UVEA

I-CONGENITAL ABNORMALITIES

1-Persistent Pupillary Membrane

Definition: -

Persistent pupillary membrane (PPM) is a condition of the eye involving remnants of a fetal membrane that persist as strands of tissue crossing the pupil. The pupillary membrane in mammals exists in the fetus as a source of blood supply for the lens. It normally atrophies from the time of birth to the age of four to eight weeks. PPM occurs when this atrophy is incomplete. It generally does not cause any symptoms. The strands can connect to the cornea or lens, but most commonly to other parts of the iris. Attachment to the cornea can cause small corneal opacities, while attachment to the lens can cause small cataracts. Using topical atropine to dilate the pupil may help break down PPMs. In dogs, PPM is inherited in the Basenji but can occur in other breeds such as the Pembroke Welsh

Corgi, Chow Chow, Mastiff, and English Cocker Spaniel. It is also rarely seen in cats, horses, and cattle.

Signs: -

1-These strands may extend from one part of the iris to another, from the iris to the lens or to the cornea, or it has free end.

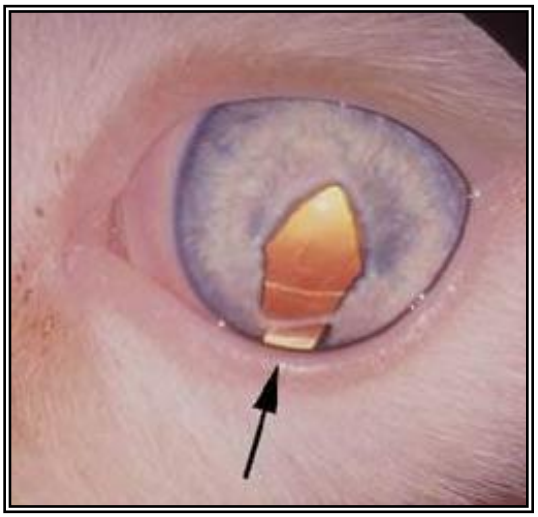
2-Strands from iris to cornea may cause corneal opacity and strands from iris to lens may produce cataract but those from iris to iris have no clinical signs.

Treatment: -

This condition does not reduce functional vision significantly and thus does not require surgical intervention.

2-Iris Coloboma

Definition: -



Iris coloboma, iris hypoplasia, or iris atrophy is a full thickness defect of the iris. Coloboma means a thinning or a hole in the eye structure. In this context, it is an indication of how thin the iris is. The animal is born with the coloboma which is an area of the iris that never formed properly. Large holes allow more light to enter the eye through the pupil, resulting in squinting. The coloboma can be mild or severe. In severe cases, there is a sort of notch in the margins of the pupil. The iris coloboma, which is relatively common, does not affect vision, and it does not progress to anything else and sensitivity to light is not usually a big problem.

Signs: -

1-The defect may be confined to the base of the iris (iridodiastasis) or may involve a portion of the pupillary margin and form a notch giving the pupil a "dumbbell" shape. The number of defects varies and in some cases the colobomata are so numerous that the iris has the appearance of spider web.

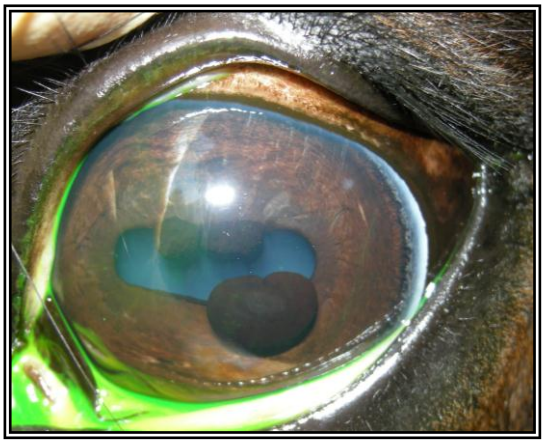
2-The colobomata changes in shape as the pupil is constricted or dilated

Treatment: -

As long as functional vision of the animal is not significantly involved, treatment is not indicated. Nothing can be done to treat it, although it's possible to buy dog goggles that function as sunglasses, and reduce the squinting (Most cats would rather not wear such goggles).

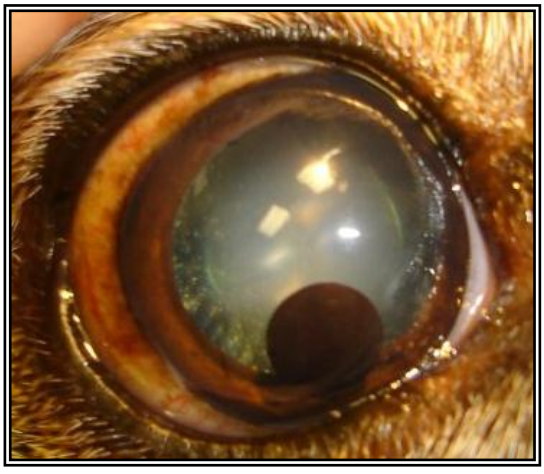
3-Iris Cyst

Definition: -



An iris cyst, or uveal cyst, is a small hollow structure either attached to the iris of the eye or floating free in the anterior chamber. An iris cyst is composed of a single cell layer of epithelium and is filled with fluid. It is most commonly seen as secondary to inflammation in the eye, especially with canine glaucoma. They are most commonly seen in dogs. Iris cysts also occur in cats and horses. The cysts are usually free floating in dogs, attached to the pupillary margin in cats, and present in the interior of the iris (especially blue irises) in horses. Iris cysts usually cause no symptoms, but in large numbers they can cause glaucoma by obstructing the drainage angle of the eye.

Types: -



A-Pupillary Cyst

It is originating from the pupillary margin of the pupil. This type is common in dogs. Large ones may anchor to the corneal endothelium and produce local corneal edema. Surgical removal is not recommended unless causing corneal irritation.

B-Posterior Chamber Cyst

Originates from the posterior surface of the iris and is not seen until the pupil is dilated. Treatment is not recommended.

C-Stromal Iris Cyst

Present in the iris stroma itself. It is common in equine. It may be single or multiple and located near the base of iris. Trans-illumination clarifies its hollow appearance. Treatment is not recommended.

D-Vitreous Cyst

Originate from the ciliary body and usually develop between the lens and vitreous humour. No treatment is recommended.

E-Free Cyst

It is detached from the iris and float freely in the anterior or posterior chamber. It can affect the aqueous flow and its removal in such case is recommended. Also the cyst can be aspirated through a limbal paracentesis using a fine needle.

4-Heterochromia

Definition: -

It is the presence of a difference in the color of the iris in both eyes or part of one iris has a different color. The difference in color may be hypopigmentation or hyperpigmentation. It is a common affection in buffaloes and needs no treatment.

5-Aniridia

Total absence of iris

6-Polycoria

Presence of more than one pupil

7-Ancoria

Absence of pupil

8-Dyscoria

Abnormal shape of the pupil

II-ACQUIRED DISEASES

1-Anterior Uveitis or Iridocyclitis

Definition: -

Anterior uveitis is an inflammatory condition of the iris and ciliary body. When severe, it results in a contraction of the pupil of the eye (miosis), increased accumulation of protein and cells in the anterior chamber, low pressure within the eye, an abnormally high level of blood in the conjunctiva, swelling of the iris, photophobia (high sensitivity to light), mild to severe squinting, blinking, eyelid closure, and tearing. If left untreated, anterior uveitis may lead to glaucoma, cataracts, and retinal detachment. In small breeds, uveitis can develop secondary to lens luxation.

Causes: -

Multiple factors have been implicated in the development of the anterior uveitis, including virus and bacteria, if they gain access to the anterior segment. The most common site of entry is through the cornea after a penetrating injury. Cat scratch injuries most commonly inoculate Pasteurella species. The determination of the exact cause of anterior uveitis is considered to be one of the most difficult problems in ophthalmology

A-Exogenous Causes

Direct trauma to the eye or the introduction of infection by perforating wounds. Intraocular surgery may produce some degree of anterior uveitis.

B-Spreading of Inflammation from Other Parts of the Eye

Deep and ulcerative keratitis has concurrent anterior uveitis.

C-Specific Disease

Dogs (Infectious hepatitis, leukemia and heartworms)

Cats (Infectious feline peritonitis, feline leukemia and toxoplasmosis)

Equine (Leptospirosis, brucellosis and Onchocerca cervicalis)

Bovine (Malignent catarrhal fever, and Pink eye)

Sheep and goat (Mycoplasma)

D-Presence of Primary Focus of Infection in Animal Body

Infection goes through the blood stream sensitizing the anterior uvea (tonsils, teeth, anal sacs and prostate).

Symptoms: -

Anterior uveitis may be acute or chronic, unilateral or bilateral. If the cause is a systemic disease it is usually bilateral and if the cause is hypersensitivity it is usually unilateral. When it is acute, it is manifest by miosis, increased protein and cells in the anterior chamber, low intraocular pressure, bulbar conjunctival hyperemia, iridal swelling, photophobia, and blepharospasm. Secondary glaucoma, cataract, and corneal opacification may be complications. Concurrent posterior uveitis or choroiditis is frequent.

1-Blepharospasm, excessive tearing, eye rubbing and conjunctivitis

2-Circum-corneal injection of the conjunctival and ciliary blood vessels

3-Cloudy cornea

4-Abnormal contents of the anterior chamber that starts out as increased aqueous flare then hyphaema, fibrin clots and hypopyon may be observed.

5-Iris changes, as the iris becomes rough, dull in color and swollen in appearance. The pupil is constricted (miosis) due to exhaustion of the dilator muscles, the more acute the lesion the more severe the miosis. The superficial blood vessels of the iris become congested and may give a red appearance to the iris.

6-Posterior synechiae may develop due to adhesion of the iris to other structures mainly to the lens. Focal adhesion will result in an irregularly shaped pupil and opacity of the lens capsule. Adhesions may prevent aqueous flow into the anterior chamber and the iris bulges (iris bombe), the filtration angle is obliterated and secondary glaucoma develops.

7-Intraocular pressure is hypotonic in early cases then hypertonic in later stages due to obstruction of the filtration angle by fibrin clot or hypopyon.

Treatment: -

A-Mydriatics

Topical atropine is the drug of choice as it is mydriatic cycloplegic

B-Anti-inflammatory drugs

Steroidal anti-inflammatories cause inhibition of the immune medicated uveal response and reduce uveal congestion. Corticosteroids are given systematically, topically and sub-conjunctively.

C-Antibiotics

Less important than atropine and corticosteroid therapy

D-Supportive treatment

Keeping the animal in dark room with application of worm compression

Complications

1-Peripheral anterior synechiae or posterior synechia

2-Cataract 3-Glaucoma

2-Equine Periodic Ophthalmia

Definition: -

Equine periodic ophthalmia (EPO), equine recurrent ophthalmia (ERO), recurrent anterior uveitis (RAU), or moon blindness has been recorded as early as the fourth century. The recurrent nature of the disease has long been recognized and associated with changes in the lunar rotation accordingly it is termed moon blindness. The disease is common and an incidence up to 12% has been recorded in eastern areas of the United States. There is no age, sex or breed predilection.

Causes: -

The condition is probably hypersensitivity. Any disease capable of producing chronic or recurrent sensitization of the vascular tunic of the eye must be considered.

1-Deficiency of vitamins A, B, and C 2-Leptospirosis

3-Brucellosis 4-Streptococcal hypersensitivity 5-Onchocerca cervicalis

Symptoms: -

Moon blindness is the most common cause of blindness in horses and mules

1-Blepharospasm and photophobia 2-Catarrhal conjunctivitis

3-Circum-corneal ciliary injection 4-Cloudiness of the cornea

5-Aqueous flare, hyphaema, and hypopyon

6-Miosis 7-Anterior and posterior synechiae

8-Complicated cataract 9-Retinal edema or detachment

Treatment: -

1-Mydriatics, topical atropine to relieve the ciliary spasm and dilate pupil

2-Antibiotics, antihistamines and vitamins have little effect on the course of the condition.

3-Anti-inflammatory agents are administered parenterally, topically and sub-conjunctively.

4-Additional therapy can be used according to the cause.

3-Anterior Uveal Tumors

Iris tumors can be detected easily before they become extensive, but ciliary body tumors are seldom diagnosed until they cause serious damage to the eye. Small iris tumors can be surgically removed. Massive tumors of the iris and ciliary body should be treated only by removing the eye.

IX-GLAUCOMA

Definition: -

It is an eye disease with which the optic nerve is damaged in a characteristic pattern. This can permanently damage vision in the affected eye and lead to blindness if left untreated. It is normally associated with increased fluid pressure in the eye (aqueous humour). The term ocular hypertension is used for animals with consistently raised intraocular pressure (IOP) without any associated optic nerve damage. Conversely, the term normal tension or low tension glaucoma is used for those with optic nerve damage and associated visual field loss, but normal or low IOP. The elevated IOP eventually involves all tissues of the eye.

Types: -

I-PRIMMARY GLAUCOMA

No overt cause (absence of concurrent ocular disease)

1-Primary Closed-Angle Glaucoma

It is also known as primary angle closure glaucoma, narrow-angle glaucoma or pupil-block glaucoma. Glaucoma is caused by contact between the iris and trabecular meshwork, which in turn obstructs outflow of the aqueous humor from the eye. This contact between iris and trabecular meshwork (TM) may gradually damage the function of the meshwork until it fails to keep pace with aqueous production.

2-Primary Open- Angle Glaucoma

It is also known as chronic open-angle glaucoma or chronic simple glaucoma. The increased pressure is caused by trabecular blockage. Because the microscopic passageways are blocked, the pressure builds up in the eye and causes imperceptible very gradual vision loss.

II-SECONDARY GLAUCOMA

It is inflammatory, traumatic, phacogenic, or secondary to intraocular hemorrhage

III-CONGENITAL GLAUCOMA

Due to congenital malformation at the anterior chamber angle (gonio-dysgenesis)

Effect of Elevated IOP on the Tissues of the Eye

Glaucoma appears a result of impairment of aqueous humour outflow through the anterior chamber angle (trabicular meshwork) at the anterior chamber and uveoscleral outflow to the suprachoroid space. The effect of elevated IOP varies with the age of the animal, duration, and levels of IOP. In young animals, evaluated IOP rapidly leads to buphthalmia (enlargement of the globe).

A-Cornea

The cornea becomes edematous with formation of new vascularization and pigmentation, and enlarged buphthalmia (megaloglobus or megalocornea). At advanced cases, rupture of Descemet's membrane, corneal ulceration or even perforation may result. Corneal edema in acute glaucoma disappears within hours if IOP has been normalized.

B-Sclera

Buphthalmia and elevated IOP result in enlargement of the sclera that becomes thin and atrophied

C-Iris

It undergoes progressive atrophy, and iris stroma becomes thin, and pigments become dispersed into the anterior chamber. The pupil becomes enlarged and less responsive to cholinergic miotics.

D-Ciliary Body

The ciliary body becomes progressively atrophied, and aqueous humour formation becomes impaired with resultant hypotony

E-Anterior Chamber

It exhibits closure, and extensive numbers of peripheral anterior synechiae resulted

F-Choroid

Thinning and atrophy

G-Lens

It exhibits changes in morphology and position (cataract with displacement)

H-Vitreous humour

It undergoes degeneration with formation of distinct strands and extensive liquefaction (syneresis).

I-Retina and optic disc

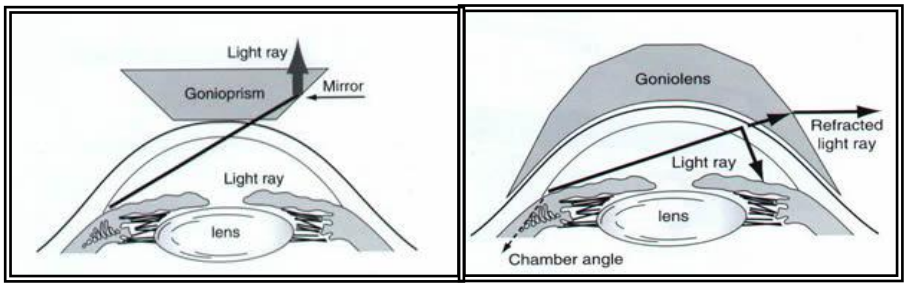
Loss of retinal ganglion cells and thinning of nerve fiber layer, cupping of the optic disc with loss of myelin, loss of vasculature, and atrophy of the disc.

Methods of Diagnosis

A-Tonometry

It is the estimation of the IOP. Tonometry is the procedure eye care professionals perform to determine the intraocular pressure (IOP), the fluid pressure inside the eye. It is an important test in the evaluation of patients at risk from glaucoma. Most tonometers are calibrated to measure pressure in millimeters of mercury (mmHg).

B-Gonioscopy



It is a diagnostic procedure to examine the angle of the anterior chamber. Direct goniolenses and indirect gonioprisms are useful for examinations. Open anterior chamber angles in glaucomatous eyes usually respond to medical treatment, while narrow or closed angles are usually candidates for antiglaucoma surgical procedures

C-Tonography

Is a tonometry for an extended period of time, usually 4 minutes, to estimate the coefficient of outflow of aqueous humour

D-Ophthalmoscopy

It is used for evaluation of the condition of the fundus and optic disc

Treatment: -

A-Medical Treatment

It aims at maintenance of IOP within the normal range

1-Miotics

Pilocarpine 1-2%

2-Adrenergics

Epinephrine 1-2%

It is used to reduce IOP by stimulating the alpha and beta receptors. The alpha receptors increase the outflow of aqueous, and beta receptors decrease the aqueous production

3-Osmotic diuretics

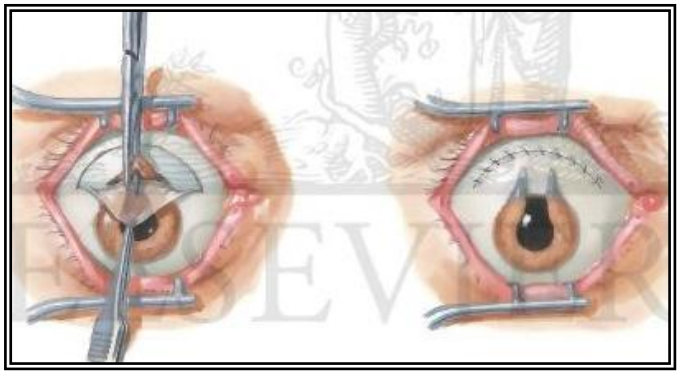
Mannitol intravenously, 1-2 gram/Kg and glycerol orally 1-2 ml/Kg

4-Carbonic anhydrase inhibitors

Acetazolamide oral 10-25 mg/Kg

These drugs reduce active aqueous humour formation by inhibiting enzymatic processes within the ciliary body

B-Surgical Treatment

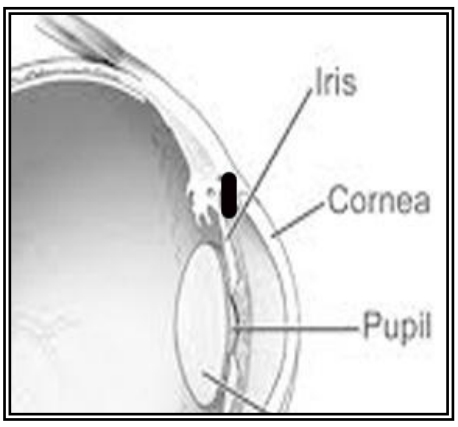


1-Iridencleisis

A radical section of the iris is permanently positioned through a limbal incision into the subconjuctival space beneath the bulbar conjunctiva.

Limbal incision is performed, the pupillary border of iris is grasped and retracted into the limbal incision, and then the iris is torn into 2 separate iridal pillars that are secured at the ends of limbal wound.

2-Cyclodialysis



It is an artificial fistula between the anterior chamber and subconjunctival space through the sclera, formed by excision of a piece of the sclera 4 to 5 mm far from the limbus.

3-Iridectomy

It is the removal of a complete section of the iris.

4-Iridencleisis and Cyclodialysis

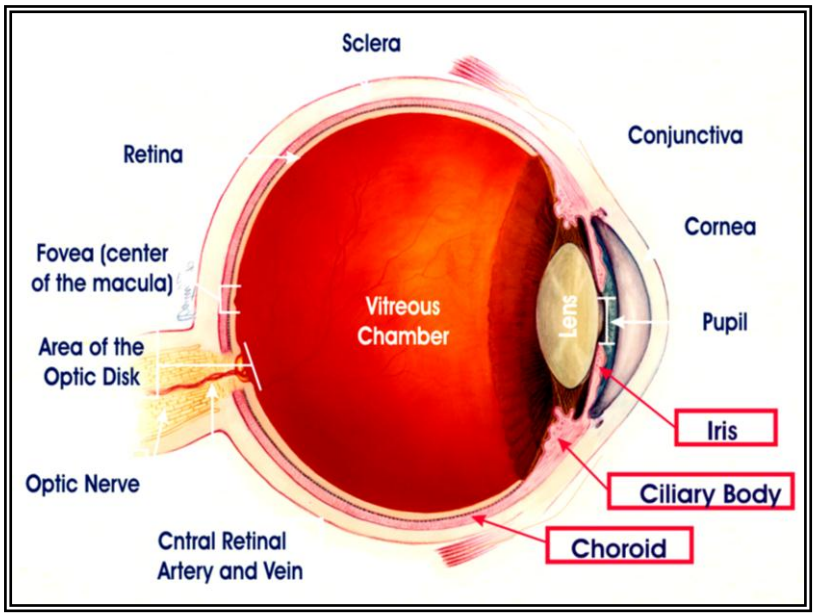
It is a combination of both described operations

5-Removal of Sub-luxated Lens for Treatment of Glaucoma

The sub-luxated lens is removed if it is the main cause of glaucoma

X-AFFCETIONS OF THE LENS

Lens is a transparent, avascular, biconvex structure that refracts light onto a small area of retina to produce a sharp visual image. It maintained in position by zonules. The shape of the lens changes by contraction or relaxation of ciliary muscules a phenomenon that is known as accommodation.



I-LOSS OF ACCOMMODATION

Loss of accommodation has not been clinically estimated in domestic animals, as the animal may depend on other sensory systems as smell, touch, and hearing. Accordingly, removal of the lens may not result in a great degree of functional disability and many animals exhibit normal clinical vision after removal of lens.

II-CONGENITAL ANOMALIES

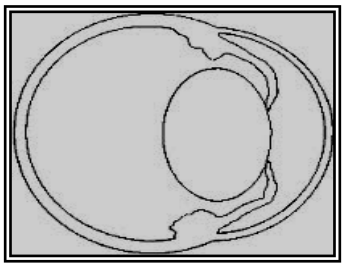
1-Aphakia

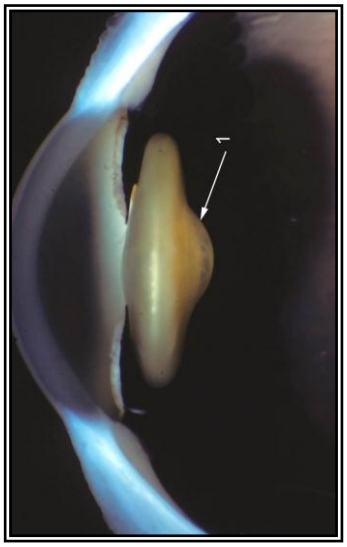
Congenital absence of the lens

2-Microphakia

Abnormally small sized of the lens

3-Lenticonus & Lentiglobus





It is a congenital anomaly in the shape of lens.

Lenticonus means anterior or posterior protrusion of the lens in a conical contour

Lentiglobus means anterior or posterior protrusion of the lens in a spherical contour.

4-Coloboma of the Lens

Coloboma of the lens means complete absence of segment of the lens

5-Persistent Pupillary Membrane

It means presence of remnants of the pupillary membrane in the form of strands that extend to the anterior surface of the lens, posterior surface of the cornea, or from one quadrant of the pupil to the other one.

6-Persistent Hyaloid Vasculature

Remnants of hyaloid artery attached to the posterior lens capsule

III-CATARACT (opacity of the lens and/or its capsule)

Definition: -

Cataract is a clouding of the lens inside the eye which leads to a decrease in vision. It is the most common cause of blindness and is conventionally treated with surgery. Visual loss occurs because opacification of the lens obstructs light from passing and being focused on to the retina at the back of the eye.

Classifications according to: -

1-Degree Of Maturation

A-Incipient Cataracts

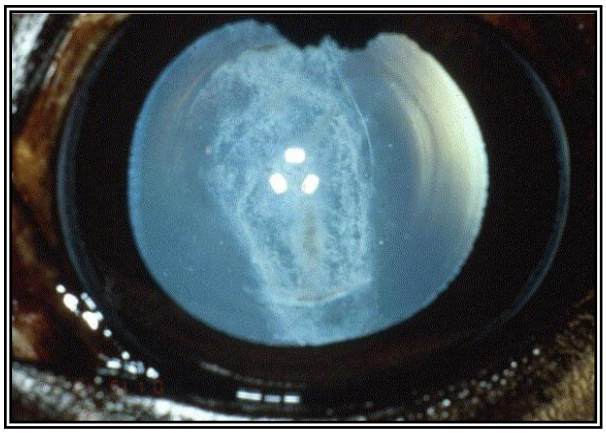
It is an early stage of cataract or lens opacity, and the *sight at this stage still normal*, this stage is characterized by

1-Early cortical vacuolar changes

2-Prominent lens sutures

3-Minute subcapsular alterations

B-Immature Cataracts



At this stage the sight is impaired although the fundic light-reflex still present and it is characterized by

1-Marked lens increase in size due to imbibition of fluid (*intumescent*) leading to complete opacification

2-Enlargement of the lens leads to splitting and separation of the lens suture lines and formation of Y-shaped fissures

C-Mature Cataracts

1-The lens becomes totally opaque with *loss of vision*

2-The fundus can't be visualized with an ophthalmoscope

3-Absence of fundic light reflex

D-Hyper-mature Cataracts

Mature cataracts may progress to hyper-mature stages with additional changes like

1-Shrunken Cataracts

The lens becomes smaller and hard and assumes rough surface, and in many cases it may pull away from the zonules

2-Morgagnian Cataracts

The cortex liquefied giving a milky texture and the lens nucleus gravitates downward, and when the head is moved abruptly, the nucleus will float up and settle down.

3-Resorption Cataracts

The liquefied cortical material may leak through the lens capsule while lenticular fragments remain. The escaped liquefied material may results in iridocyclitis because lens protein is foreign to the animal's immune system. This is exhibited by aqueous flare, miosis, lowered intraocular pressure, episcleral congestion and chronic conjunctivitis.

2-Age of Onset

A-Congenital Cataracts

Begin during fetal life and present at birth and may be stationary or progressive. Congenital cataracts may be associated with other ocular developmental abnormalities such as persistent pupillary membrane, persistent hyaloid artery, microphthalmia and multiple ocular abnormalities.

B-Juvenile Cataracts (developmental cataracts)

Usually develop during early years of life between 1-6 years age. They may be genetic, nutritional, inflammatory, toxic or secondary to radiation.

C-Senile Cataracts

They occur in old age of all animals species. They are of great clinical importance in dogs and horses and then cats and bovine.

3-The Part Involved of the Lens (Location)

A-Capsular Cataracts

The lens capsule is a homogeneous membrane surrounding the lens and provides insertion for zonular fibers and owing to its elastic nature, it plays a major role in accommodation. The capsule maintains the lens integrity and regulates the movement of nutrients and waste products between the lens, the aqueous humour and vitreous body. Bothe anterior and posterior capsules may be subjected to cataract formation.

B-Sub-capsular Cataracts

They occur beneath the anterior lens capsule, a single layer of cuboidal epithelial cells is present. These cells may proliferate due to trauma or toxic insults resulting in focal sub-capsular cataracts.

C-Cortical Cataracts

Cortical changes are usually present at the anterior, posterior or equatorial cortex. A variety of cataractous changes including vacuoles, water clefts and spoke-like opacities are present.

D-Nuclear Cataracts

They are most frequently congenital and bilaterally recorded. Significant visual impairment may occur if the opacity is dense.

E-Total Cataracts

It is a state of opacification of all lens structures including capsule, cortex and nucleus

4-Etiology

A-Inherited Cataracts

These types of cataracts may be associated with progressive retinal atrophy, or multiple ocular defects.

B-Traumatic Cataracts

Trauma to the globe may result from crushing against hard object, or penetration of foreign bodies (glass, shotgun pellets and thorns). Escaped lens material usually results in endophthalmitis which is exhibited by severe pain, epiphora, conjunctival congestion, miosis, aqueous flare, uveitis, posterior synechiae and low intraocular pressure.

C-Metabolic Cataracts (Diabetic Cataracts)

Diabetes mellitus is responsible for cataract formation in dogs.

D-Toxic Cataracts

Several toxic substances can produce cataractous changes when administered systematically.

E-Parasitic Cataracts

Ocular filariasis may cause cataract in some species of animals.

Treatment: -

1-Medical Treatment

1-Selenium-tocopherol injections 2-Sulphadiazine

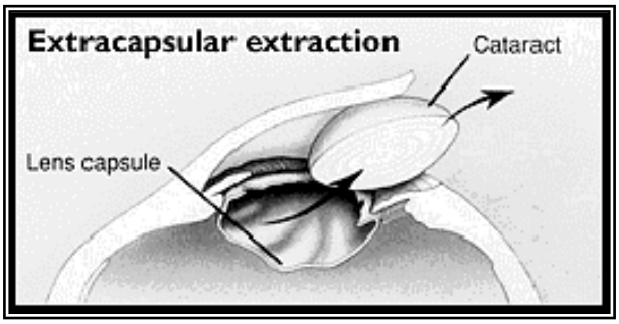
3-Horse serium extract injected intramuscularly following the injection of a cytolyzed culture of Actinomyces bovis

2-Surgical Treatment

Numerous surgical techniques for treatment of cataract have been proposed like extra-capsular extraction, intra-capsular extraction, phacoemulsification and dissection and aspiration.

A-Extra-capsular Extraction

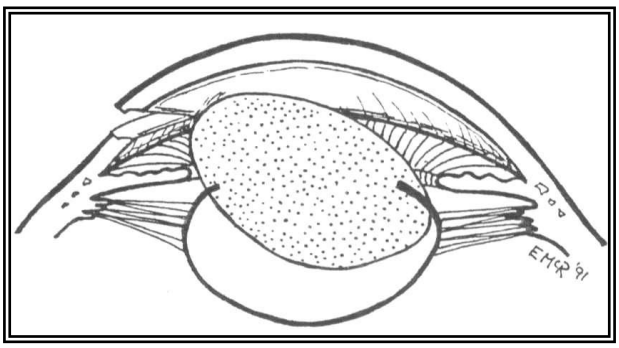
This method is most popular method of lens removal in dogs. In this technique the anterior lens capsule, the lens cortex and the nuclear material are extracted and only the posterior lens capsule remains intact to prevent anterior vitreous presentation. The posterior capsule is left as there is a strong attachment between the posterior capsule and the hyaloid membrane.



Disadvantages: -

1-Escape of the liquefied lens material into the aqueous humour resulting in postoperative iridocyclitis

2-The left posterior capsule may be either opaque or lose its transparency following surgery

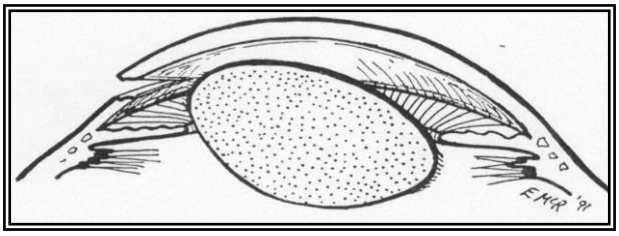


The technique: -

Lateral canthotomy is performed to enlarge the palpebral fissure, followed by retraction of the eyelids. Entry into the anterior

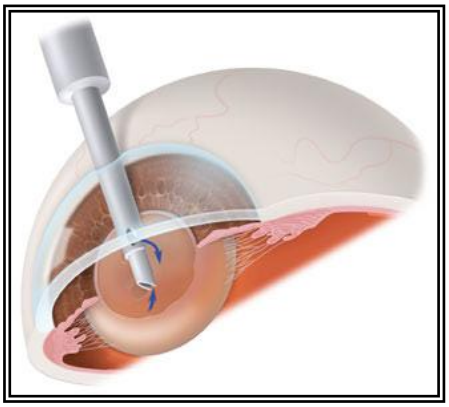
chamber is performed through limbal, corneal or scleral incision. Corneal or limbal incisions are better than scleral one, which is usually accompanied by profuse hemorrhage. Following induction of incision, the anterior lens capsule, the cortex and nucleus are removed. This is followed by closure of the corneal or limbal wound.

B-Intra-capsular extraction



It is the same as extra-capsular except that the lens is completely removed including both capsules as the lens is delivered within intact lens capsule. Zonulolysis of the suspensory ligament is tried prior to lens removal, by using alphachymotrypsin (zonulolytic enzyme), then the lens is removed by forceps or by cryo-extraction.

C-Phaco-Emulsification (Phaco-Fragmentation)



It is the use of high frequency vibrations to break down and emulsify the lens into a solution or emulsion that can be aspirated through the anterior chamber.

D-Dissection & Aspiration

It is performed in small animals as the lens material is soft enough to allow aspiration. The anterior lens capsule is penetrated and the content is aspirated via small limbal incision.

Postoperative Complications

1-Corneal affection (ulceration, inflammation or edema)

2-Wound leakage 3-Secondary glaucoma

4-Inflammation of uvea (Uveitis) 5-Anterior vitreous presentation

6-Endophthalmitis 7-Retinal detachment

IV-LENS DISPLACEMENT

Displacement means luxation or subluxation of the lens as a result of partial or complete breakdown of the suspensory ligaments

Causes: -

1-Congenital 2-Traumatic

3-Secondary to glaucoma and hyper-mature cataracts

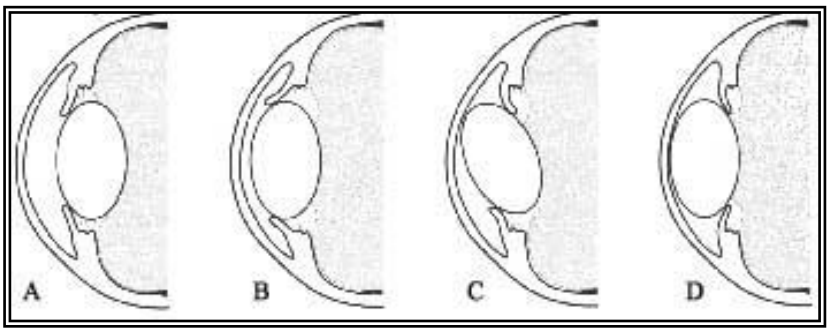
Classification: -

1-Sub-Luxation of the Lens

The displaced lens remains behind the iris, partially fixed to zonules.

2-Luxation of the Lens

Complete displacement of the lens from the patellar fossa, and it may be anterior or posterior luxation. In case of anterior luxation the lens either presses the iris forward or passes through the pupil to the anterior chamber.



Treatment: -

Removal of the lens