

Regional Veterinary Surgery (VSR 421; 2+1)

MANUAL



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2013-2014#

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PRACTICAL-1

Date.....

EXAMINATION OF BUCCAL CAVITY AND DEVICES**Mouth Gags**

1. Varnell's mouth gag
2. Bayer's mouth gag for horses & cattle
3. Bayer's mouth gag for dogs
4. Hausmann's gag open & closed
5. Carrez's gag
6. Jogger's mouth gag for horses
7. Gray's mouth gag

EXPLORATION OF MOUTH**HORSE**

Put a halter on the horse pass the left hand into the interdental space on the right side catch the tongue gently but firmly. Draw the tongue out at the right side of the mouth. Pass the thumb of the right hand inside the left cheek at the commissure of the lips. Draw the left cheek outwards to expose the gums and teeth. Reverse the hand, examine the other side of the mouth in the same way.

CATTLE

As discussed above

DOGS

Place the right hand under the throat between the fingers & thumbs. Grasp the lower jaw pass the left hand gradually down the face & grasp the upper jaw with the fingers & thumb. Release the hold with the right hand. Depress the lower jaw by placing the thumb of the right hand on the inner aspect of the incision teeth.

CATS

Separate the jaws by means of two index finger applied to the upper & lower incision.

AMPUTATION OF HORN IN BOVINE

INDICATIONS:

- ☛ Horn cancer
- ☛ Horn fracture
- ☛ Overgrown horn
- ☛ Misdirected horn
- ☛ To render animal less dangerous
- ☛ To enhance appearance of the animal

SITE OF OPERATION:

At the base of horn

SURGICAL ANATOMY:

The horn is actually the cornual process of frontal bone. The hollow interior of the horn consists of irregular spaces which are continuation of frontal sinuses. The horn substance is thicker towards its apex where it is almost solid.

The nerve supply to the horn is by cornual nerve. The cornual nerve is a branch of lachrymal nerve which itself is a branch of ophthalmic nerve that again is a branch of fifth cranial nerve the trigeminal (CLOT).

The blood supply to the horn is through the cornual artery, which is a superficial branch of temporal artery. The cornual artery bifurcates into rostral and caudal branches to circumcate the base of horn.

SPECIAL INSTRUMENTS:

- ✓ Gigli wire saw
- ✓ Bone chisels and osteotome
- ✓ Mallet
- ✓ Bone rongeur and bone cutter

ANAESTHETIC TECHNIQUE:

1. Cornual nerve block along with sedation
2. General anaesthesia

CONTROL:

Lateral recumbency with the affected horn upwards

SURGICAL PROCEDURES:

- ➔ A small 1-2 inches long incision is given in the skin of lateral aspect of the base of horn over the course of cornual artery.
- ➔ The cornual artery is located and ligated.
- ➔ The incision is extended at right angle on both sides to circumcate the base of horn.
- ➔ Another small one-inch incision is made at right angle of this circular incision just on the opposite side of the very first incision to create skin flap.
- ➔ The skin is undermined sharply to expose the site of amputation.
- ➔ Now gigli wire saw is applied at the base of horn, as near to frontal bone as possible and the horn is amputated.
- ➔ The bleeding, if any, is controlled.

- ➔ The horn core is trimmed with chisel and hammer if required to appose the skin flaps.
- ➔ The wound is cleaned and the skin flaps are sutured together either with simple interrupted or vertical mattress sutures over the wound.

POST OPERATIVE CARE:

Regular antiseptic dressing and a course of antibiotics.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

TREPHINING OF FRONTAL AND MAXILLARY SINUSES

INDICATIONS

1. Sinusitis and pus in the sinuses.
2. Neoplasms in the sinuses.
3. Fracture of related bones.
4. Horn cancer in cattle and buffalo.
5. Dental fistula.
6. Alveolar periostitis.
7. Presence of any foreign body/cyst/parasite in sinuses.

SURGICAL ANATOMY

FRONTAL SINUS

I. CATTLE AND BUFFALO

- a) Largest and involves whole of frontal bone.
- b) Median septum separates right & left sinuses.
- c) The boundaries of frontal sinus are:
 - i. Anteriorly, an imaginary transverse line from inner canthus of one orbit to the other.
 - ii. Posteriorly squamous part of the occipital bone.
 - iii. Laterally, supraorbital process and the lateral border of frontal bone.
 - iv. Medially, median septum.
 - v. Caudally sinus extends for a variable distance into cornual process.
- d) The sinus is very irregular and is divided into numerous diverticulae by ridges and partial septae.
- e) Several small openings from middle nasal meatus communicate directly with each sinus.
- f) The anterior portion of frontal sinus communicates with the lacrimal part of maxillary sinus through a large opening which remains closed by a mucous membrane in living state.

2. HORSE

- a) Frontal sinus in horse is not so extensive as that of cattle. The median septum divides right and left sinuses.
- b) The frontal sinus is divided into frontal and turbinate parts and further subdivided in small compartments by number of bony plates. Each compartment communicates with each other by small openings.
- c) The frontal bone lines the roof of sinus which extends anteriorly with anterior margin of orbit and caudally to temporal condyles and laterally to the foot of the supraorbital process.
- d) The turbinate part is located in the posterior part of the dorsal turbinate bone covered by nasal and lacrimal bones.
- e) The turbinate part is separated from the nasal cavity by a thin tissue of dorsal turbinate bone.
- f) The frontal and maxillary sinuses communicate with each other through a large fronto-maxillary opening, which is situated ventral to the osseous canal and medial wall of the orbit.
- g) The frontal sinus has no direct communication with the nasal cavity.

MAXILLARY SINUS

1. CATTLE AND BUFFALO

- a) It is situated anterior to orbital cavity and is formed by lacrimal, malar and the body of maxilla. It is single and doesn't communicate with frontal sinus.
- b) It is irregular sinus. The roots of last three or four cheek teeth project into it.
- c) The boundaries of maxillary sinus are:
 - i) Dorsally – Lacrimal bulla, little below the point of bifurcation of the zygomatic process of malar.
 - ii) Posteriorly- Base of alveoli and maxillary tuberosity.
 - iii) Anteriorly – Line joining infraorbital foramina to the orbital rim.
 - iv) Laterally- Maxilla, lacrimal and malar bones.
 - v) Medially- Irregular bone plates.
- d) The maxillary and palatine sinuses communicate freely with each other.

2. HORSE

- a) Maxillary sinus is the largest sinus in horse. It is divided into anterior and posterior compartments by an oblique septum.
- b) It is formed by the superior maxillary, lacrimal, malar and posterior turbinate bones.
- c) The boundaries of this sinus are:
 - i) Medially- Maxilla, ventral turbinate and lateral mass of the ethmoid bone.
 - ii) Posteriorly – The border extends upto transverse plane in front of root of the supraorbital process.
 - iii) Anteriorly- Line drawn from the anterior end of the facial crest to the infraorbital foramen parallel to the facial crest.
 - iv) Ventrally- Alveolar part of maxilla.
- d) The sinus is irregular and four cheek teeth project into it.
- e) The sinus communicates with frontal sinus and nasal cavity.

SITE OF OPERATION

FRONTAL SINUS

1. Cattle & Buffalo

- a) 4 cm from the posterior edge of the orbital cavity and just dorsal to the temporal canthus or where the bulging of bone is seen to drain out postorbital diverticulum.
- b) Posterior to a line joining the center of the orbit and 2-3 cm from the mid line to drain out medial part.
- c) For drainage of turbinate part-site is same as in horse.

2. Horse (Turbinate portion)

- a) Locate the anterior border of sinus with the help of thumb and index finger passing backward along the nasal bones. The point where thumb and finger begin to diverge from each other forms the anterior limit of the sinus. The site of operation is about 3-4 cm posterior to this point and about 1-2 cm lateral to the median line.

MAXILLARY SINUS

1. Cattle and buffalo

Site of trephining is just dorsal and posterior to the facial tubercle.

2. Horse

- a) The anterior maxillary sinus is trephined at above 2.5-3.0 cm posterior and 2 cm medial to the lower end of the zygomatic ridge.
- b) Posterior maxillary sinus is trephined about 2 cm medial to the lower end of the zygomatic ridge.

CONTROL AND ANAESTHESIA

- a) Lateral recumbency with affected side up after proper sedation/tranquilization.
- b) Analgesia by local infiltration anaesthetic technique.

SURGICAL TECHNIQUE

A. HORSE

FRONTAL SINUS

1. Make a 'V' shaped skin incision at the site of trephining and expose the periosteum.
1. With the help of a trephine of appropriate size open the frontal sinus through the turbinate portion.
2. Establish a communication between the sinus and nasal cavity with a curved mare catheter. Apply slight pressure to break the median septum, felt with finger through the trephining opening.
4. Place a gauge in the sinus and daily irrigation with 1:1000 potassium permanganate may be done till complete infection is removed.
5. Skin wound is sutured after complete removal of the infection.

MAXILLARY SINUS

1. Enter the maxillary sinus in the posterior compartment at the proposed site.
2. Irrigate with 1:1000 potassium permanganate solution.
3. For entering the anterior chamber, another trephine opening is made.

POST OPERATIVE CARE

1. ATS immediately after surgery.
2. Antibiotics for 5-6 days.
3. Cover trephine opening with sterilized gauze smeared with antiseptic, which is replaced daily.
4. Suture skin flap after complete cure from infection.

B. CATTLE AND BUFFALOES

1. Trephine opening is made at the proposed site to drain out posterior, anterior or turbinate part of frontal sinus or the maxillary sinus as mentioned for horses.
2. The technique for trephining, drainage and post operative care is same as for horse except for the use of ATS.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
									Total dose-

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

LATERAL EAR CANAL RESECTION (ZEPP'S OPERATION) IN DOGS**INDICATIONS:**

1. Chronic otitis or otorrhoea for drainage.
2. Neoplasms in ear canal for removal.
3. Correction of anatomic deformity of ear canal.

SURGICAL ANATOMY:

- Ear has three parts: External, Middle and Internal ear.
- External ear has two parts: Auricle or pinna and external acoustic meatus. Middle ear comprises of tympanic cavity, its contents and Eustachian tube. Internal ear consists of osseous and membranous labyrinth.
- Cartilages helix, tragus, antitragus, tragohelicine incisure and intertragic incisure surround the external canal.
- The movement of external ear is like a ball and socket joint as base of pinna rests on a pad of fatty tissue.
- A small boot shaped cartilagenous plate, the scutiform cartilage is located in the rostroauricular muscles medial to the ear in front of the base of the conchal cartilage.
- The external ear canal is lined with a thin cutaneous membrane, which contains few sebaceous glands.
- Rostroauricular, ventroauricular and caudoauricular group of muscles control the movements of pinna.
- Branches of superficial temporal external carotid and the occipital artery supply blood to the external ear.
- Venous drainage is primarily by jugular vein and superficial temporal vein.
- Facial 1st and 2nd cervical nerves are the motor supply to external ear where as branches of mandibular and the vagus nerves are sensory supply to the ear.

CONTROL AND ANAESTHESIA

Lateral recumbency position with affected ear up under general anaesthesia.

SITE OF OPERATION

Ventral to cranio-caudal aspect of the ear canal

SURGICAL TECHNIQUE

1. Measure the length of vertical portion of ear canal with the help of a probe.
2. Make two parallel incisions starting at the indentations on either side of the tragus. The incision should be about a half times the length of vertical canal. Join these incisions with horizontal incision on ventral side.
3. Dissect out the skin flap and sub cutaneous tissue until it remains attached to the external opening of the ear canal and reflected dorsally.
4. Incise the lateral cartilage of vertical canal by two parallel incisions. Extend these incision ventrally upto the level of the horizontal ear canal.
5. Reflect the cartilage flap ventrally to expose the orifice of horizontal canal.
6. Trim the skin and excess of cartilage and then suture the cartilage with skin by applying simple interrupted suture pattern.

PRECAUTION: Avoid damage to the parotid salivary gland.

POST OPERATIVE CARE

1. Proper bandaging of the pinna.
2. ASD of the surgical wound.
3. Systemic antibiotics.
4. Sutures removed after 8-10 days
5. Use neck collar

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
									Total dose-

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

OPERATION FOR AURAL HAEMATOMA IN DOG**Indications:**

Haematoma of the ear flap.

Surgical Anatomy:

External ear is funnel shaped structure. It consists of the auricle (pinner, flap, leather) and external ear canal that extends to the tympanic membrane. The auricle is supported by auricular cartilage, which is covered with skin on both sides. It is pierced by many foramina which permits the passage of numerous vessels from great auricular artery. The auricle varies in size, shape and general conformation from the small, V shaped, erect to semierect type. The convex surface of the erect type faces medially and slightly rostrally. The auricle can be turned to focus on sources of sound. Haematoma usually forms on the concave surface of ear but can occur on convex surface or on both sides.

Site of Operation:

Ear flap over the haematoma.

Control and Anaesthesia:

The animal is controlled in lateral recumbency keeping the affected ear upwards after proper premedication and general anaesthesia.

Surgical Technique:

Many treatments have been advocated for haematomas, varying from simple aspiration to complicated surgical techniques.

- a) Aspiration may be effective when haematoma is very small. It is repeated as often as necessary (2 to 3 times weekly) until serum no longer accumulates. A protective bandage should be applied with pressure exerted over the area of haematoma. If the haematoma is extensive, however this method is time consuming and likely to fail. Therefore surgical intervention is needed.
- b) 1) There are many surgical techniques for operating ear flap haematoma. Best results are obtained if surgery is performed 10 to 14 days after formation of the haematoma.
- 2) Many surgical incisions like longitudinal, S shape and criss cross for removal of an aural haematoma have been practised. S shape incision is general preferred since it covers more surface area of the aural haematoma.
- 3) A longitudinal or 'S' shaped curve incision is made along the entire length of haematoma after preparing the ear flap for aseptic surgery. The ear canal should be properly plugged with cotton prior to operation.
- 4) The haematoma is removed and cavity is corrected and flushed with saline to remove fibrin debris.
- 5) Mattress sutures are placed parallel to the skin incision by using non-absorbable suture material size 20 or 30. In case of large haematoma, two or three rows of sutures 5 to 10 mm in width and 5 to 10 mm apart in each row may be placed.
- 6) The sutures should penetrate the full thickness of the ear flap and tied on the convex surface of the ear. The edges of the incision are not brought into opposition, but the sutures are placed so that the incision remains open, a gap of

4 to 5 mm is considered best to acquire drainage. The number of sutures should be sufficient to obliterate the dead space.

Post-Operative Care:

- 1) After treating haematoma, ear canal is cleaned and proper medication should be applied.
- 2) Change the dressing as needed, usually every 3 days and keep the animal sedated.
- 3) the ear should be usually bandaged.
- 4) Sutures are removed on 7th to 10th post-operative day.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug		Dose	Route	Time	Drug		Dose	Route	Time
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

CROPPING OF EAR IN DOG

Indications: To improve the appearance of the animal.

Control and Anaesthesia:

The animal is controlled in sternal recumbency after proper premedication and general anaesthesia.

Site of Operation:

Lateral boarder of ear flap.

General Guidelines:

- 1) After folding the ear flap with slight traction, the medial edge of flap is made to touch the medial angle of the eye. It makes the tip of the cropped ear.
- 2) To made 3/4 crop, the ear flap is folded in half and the point at which the fold occurs is marked. The flap is held erect and the tip is folded down to the previously marked half way point. This point where this fold occurs will be come the tip of cropped ear.

Note: 1) The cropped ear should confirm to the standard for the breed, the prevailing style and characteristics of individual dog.

- 2) *In large breeds, ears should be cropped between 9 to 12 weeks of age. In small breeds, ears are trimmed when the dogs are 4 to 6 months old.*

Surgical Technique:

- 1) The ear clamp is applied from the upper to lower points of a flattened ear flap so as to adjust the flap to the desired shape. A concave curve can be made by pulling ear flap laterally through the clamp and convex curve the pulling ear flap medially or area to be cropped is demarcated.
- 2) Lateral portion of ear flap is excised by cutting along the clamp leaving the clamp in place or on the line of demarcation on the medial side.
- 3) The bleeding from the cut surface of cropped surface is controlled by using electro-cautery or with sponges/ligatures.
- 4) The auricle ear cartilage is trimmed with scissors at the base of ear flap.
- 5) The upper 2/3 of earflap is closed skin to skin with simple continuous sutures of 3-0 to 4-0 silk. The lower portion of incision is sutures with simple interrupted sutures. Care should be taken to avoid folding or puckering of skin edges.
- 6) The second ear is cropped in the similar manner as the first.

Post-Operative Care:

- 1) The ear flaps should be bandaged over the head for first 48 hours and sedative/analgesic is given to the animal.
- 2) Scratching of ears should be prevented to avoid disruption of suture line, if needed light bandaging of ear flap to the head may be done.
- 3) Antibiotics should be given for 4 to 5 days.
- 4) Sutures should be removed 8th to 10th post-operative day or after complete healing.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
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Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
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HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

AMPUTATION OF TONGUE
(Partial Glossectomy)

INDICATIONS:

1. Extensive lacerations, which can't be sutured.
2. Gangrenous tongue.

SURGICAL ANATOMY

1. Tongue occupies great part of oral cavity and extends into oropharynx.
2. It has an attached root body and free apex.
3. The root is attached to hyoid bone where as body is attached to mandible.
4. The intrinsic and extrinsic muscles form the bulk of tongue covered with a mucous membrane.
5. The mucosa is tough and tightly adherent in ruminants, softer in equines and softest in canines.
6. Papillae of different types cover the mucosa.
7. Frenulum, a mucosal fold, attaches the tongue to ventral surface of oral cavity.
8. Lingual artery and veins form the vasculature of tongue, which are present on ventral side.
9. The nerve supply to tongue is:
 - a. Lingual branch of mandibular nerve responsible for general sensation.
 - b. Chorda tympani branch of facial responsible for special sensation of taste.
 - c. The muscles of tongue are supplied by hypoglossal nerve.
 - d. The general and special sensation of the root of tongue are because of glossopharyngeal and vagus nerves.

CONTROL AND ANAESTHESIA

Lateral recumbency under general anaesthesia.

SITE OF OPERATION: Tongue

SURGICAL TECHNIQUE:

1. After anaesthesia place two clamps transverse across the tongue.
2. Make a 'V' shaped incision with the base of V towards the root. The incision is made around the area to be removed.
3. Ligate the lingual artery and vein separately.
4. Release the clamps after removal of part of the tongue.
5. Suture the edges of wound to bring them in apposition.

POST OPERATIVE CARE

1. Soft diet for 10 days.
2. Post operative antibiotics and analgesics as per need.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time		Drug	Dose	Route	Time	
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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HR			
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Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

PRACTICAL-8**Date.....****EXTERIORIZATION AND CANNULATION OF STENSON'S DUCT IN BOVINE****Indications :**

Salivary calculi (sialolithiasis); rupture of stenson's duct; Parotid Sialography; Parotitis; For collection of saliva.

Surgical Anatomy :

Parotid duct leaves the gland at its ventral aspect and passes on the medial side of vertical ramus of mandible, thereafter it crosses obliquely at the angle of mandible and runs on lateral surface along the anterior border of masseter muscle and lie in between masseter muscle and fascial vein. In case of bovines, the stenson's duct opens at the level of 5th upper check tooth in the buccal cavity.

Control and Anesthesia:

- 1) Animal is secured in lateral recumbency and an area just in front of the rostral border of the masseter muscle is prepared for aseptic surgery.
- 2) Sedation is achieved by using chloral hydrate narcosis. Local anaesthetic is infiltrated along the line of incision to achieve analgesia at the operative site.

Site of Operation:

- 1) Stenson's duct can be located about an inch above the horizontal ramus of mandible and just anterior boarder of masseter muscle. This is easy and most preferred site.
- 2) The duct can also be located at the posterior boarder of vertical ramus of mandible where duct leaves the parotid gland.

Surgical Technique:

- 1) An oblique skin incision about 2-3 cms length is made about an inch above the horizontal ramus of mandible and just anterior boarder of masseter muscle.
- 2) The underlying fascia is cut bluntly and incision is extended deep along the masseter groove to isolate the parotid duct which lies along side the fascial artery and vein.
- 3) The duct is identified and exteriorized through the cutaneous incision and then cannulated.
- 4) Two catheters of different diameters are used for cannulating two sides of the duct so that a sliding catheter can be maintained to collect saliva whenever required or to infuse counterirritants for destruction of parotid gland.
- 5) The surgical skin wound is closed with few interrupted sutures.

Post-Operative Care:

- 1) The animal should be kept on intravenous fluids for 3-5 days.
- 2) Parenteral Antibiotics and Analgesics should be administered to the patient for five and three days respectively.
- 3) The surgical wound should be dressed with antiseptics till complete healing occurs.
- 4) The cutaneous sutures to be removed after 7-8 days.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
									Total dose-

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
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Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
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Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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Incision site			
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Examination day 5		Treatment	Instructor
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Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

DENTAL SCALING

DENTAL TARTAR

Also called dental calculus is a mixture of calcium phosphate and carbonate with organic material that accumulates on the teeth. Tartar varies in color from tan to dark brown and may appear as a small deposit at the gum line or completely cover the tooth.

INCIDENCE

Heaviest deposit usually occurs on the Molars & last premolars and then on Canines. The lightest deposits occur on the incisor & first premolars.

INDICATIONS

1. Tartar accumulation are a source of bad breath and are unsightly
2. These deposit encroach upon germs causing them to recede.
3. Invasion of pyogenic organisms can cause alveolar periostitis.

ANESTHETIC TECHNIQUE & CONTROL

Dental patients are anesthetized with ultra short acting anesthetics with endotracheal intubation old or debilitated patients might better be narcotized with morphine or one of its derivatives to relieve pain and apprehension.

TOPOGRAPHIC ANATOMY

The outer surface of premolars & molars facing towards the buccal surface are mostly affected, along with involvement of gingiva, may some times cause gingivitis.

SURGICAL PROCEDURE

- Mouth is held open with an oral speculum
- Tartar is cracked before attempting to remove it. A canine dental root extractor can be used to break the tartar, but a Mastoid Rongeur forceps is more effective for this purpose.
- Then scaler is used to remove the broken bits of encrustation. Care should be taken while removing tartar/scaling tartar since they cause minor haemorrhages.
- Scaling does not remove all stains after encrustation, so for this swabbing with 3% Hydrogen peroxide solution or 1% hydrochloric acid will help in removing the stain.

POST- OPERATIVE CARE

Little after care is necessary following scaling. Sometime see for any Hemorrhages during scaling, then go for controlling this haemorrhage by pressure with cotton or gauge sponges. Systemic antibiotic can be given if there is an injury to gums.

REMARKS

Ultrasonic scalars are available in the market where the sound energy is used to scale the tartar.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time		Drug	Dose	Route	Time	
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
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HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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Incision site			
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Examination day 5		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			

TOOTH RASPING

INDICATIONS

1. Sharp teeth
2. Overlapping or irregular molars
3. Wave formed mouth
Generally seen in ruminants.

ANAESTHETIC TECHNIQUE & CONTROL

1. Tranquilization & in standing restraint
2. GA if the animal is uncooperative

SURGICAL TECHNIQUE

- Restrain the animal well
- Hold the tongue out of the mouth at the inter-dental space by an assistant.
- Apply the mouth gag on the opposite side of molars to be rasped.
- Apply the rasp to the outer border of the upper & inner border of the lower molars running it freely from one extremity of the bone to the other taking care not to damage the other soft structures.
- Do not use the rasp excessively at a time
- Repeat the use of rasp periodically to produce sufficient improvement in medication.

REMARKS

- Keep the head on lower level so that the rasped material or any damaged tissue should not go inside the trachea.
- Perform coluturia with mild P.P. lotion to clean the gum injuries.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time		Drug	Dose	Route	Time	
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Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
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Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
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Incision site			
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Examination day 4		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

EXTIRPATION OF TOOTH

INDICATIONS

1. Retained deciduous teeth
2. Infected teeth
3. Mal-occluded & supernumerary teeth
4. Traumatized teeth.

INSTRUMENTS

Root elevators, canine extractors, molar extractors, a small hacksaw blade, bone chisels, rangeur forceps and periosteal elevator.

ANESTHETIC PROCEDURE & CONTROL

General anesthesia. The trachea should be intubated because this prevents aspiration of blood or mucous & ensures patent air passage. Local anesthesia is contraindicated in periodontal disease because of the difficulty of administration, the risk of causing infection into deep tissues and its ineffectiveness in relieving pain associated with inflammatory conditions.

SURGICAL ANATOMY

The crown is the part of tooth projecting the gums & the root is the part contained within the bony tooth cavity or alveolus hidden by the gums and where crown & root meet it is called neck.

SURGICAL PROCEDURE

Regardless of which tooth is being extracted the principle is the same to displace the root with the root elevator.

- Loosen the gums by inserting the elevator completely around the neck between the tooth and gum.
- The elevator is then inserted around the root separating it from any remaining attachment.
- Once the tooth is loosened with the elevator the back of the extractor can be used as a fulcrum against the remaining teeth to withdraw the loosened one.

SURGICAL METHOD

A method for extracting the upper carnassial tooth by alveolar resection:

- The gum over the affected tooth is incised vertically between the anterior & posterior roots.
- When the gum has been reflected from the tooth the lateral aspect of the alveolus is removed with a mallet and chisel
- Then the tooth is loosened & extracted with non-crushing molar forceps.

POST OPERATIVE CARE

- Control of hemorrhage by packing the alveolus with cotton or absorbable gelatin foam.
- The alveolus should be checked for spicules of bone.
- If alveolar cavity is large then it should be filled with dental wax.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
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HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
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Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

OPHTHALMOSCOPY

A. OPTHALMOSCOPY:

It is a method used for internal examination of the eye especially the examination of fundus and vitreous humour.

INDICATIONS

1. Lesions on the retina
2. Fundic degeneration
3. Congenital fundic anomalies
4. Examination of intraocular growths
5. All parts of cornea

MEHTODS OF OPTHALMOSCOPY

i) **Direct:** Intraocular examination done directly with an ophthalmoscope. The image presented is in its original position. For examination of various parts of the eye the position of ophthalmoscope is kept as under:

- 0 to -3 → Fundus
- 0 to +5 → Vitreous humour
- 5 to 8 → Posterior of lens
- 8 to 12 → Anterior of lens
- 12 to 15 → Anterior chamber
- 15 to 20 → Anterior cornea

Method

1. Keep the ophthalmoscope at 0 setting and at 2 feet distance from cornea.
2. Slowly bring the ophthalmoscope near to cornea and examine internal eye structures at a distance atleast 1 inch away from cornea
3. Change the position of ophthalmoscope from 0 to others (as listed above) as per the part to be examined.

PRECAUTIONS

1. Examination should be done in a semi dark room.
2. Proper restraining is done in a quiet room.
3. If required dilatation of pupil is done with mydriatics (Atropine) atleast half an hour prior to examination.
4. Ophthalmoscope should be kept in vertical position.
5. Start examination at -3 position and examine optical disc and retinal vessels.

ii. Indirect ophthalmoscopy

In this method, the examination of internal eye is done with the help of a condensing lens kept between the eye and the ophthalmoscope. The image presented is small and inverted. It is better as it provides larger area for visualization and a stereoscopic image is presented. It is specifically used for diagnosis of fundic degeneration and retinal detachment. Commonly used in human beings.

TECHNIQUE OF SUB CONJUNCTIVAL INJECTION

It is indicated for all types of eye affections especially involving some infections like infections keratitis, kerato-conjunctivitis, conjunctivitis etc.

METHOD

1. Reflect the palpebral conjunctiva of upper or lower eyelid.
2. Inject the medicine under conjunctiva using 23/24/25 gauze needle keeping the position of the syringe parallel to eyelid.

PRACTICAL-14

Date.....

CORRECTION OF ENTROPION AND ECTROPION IN ANIMALS**A) ENTROPION****SITE OF OPERATION**

1. Affected area of the eye lid not more than 4-5 mm from the margin of eyelid.

TOPOGRAPHIC ANATOMY

- The eyelids are thin, pliable and movable fold of integument in front of the eyeball. The eyelid is covered externally by skin and the innermost layer is palpebral conjunctiva.
- The movement of the eyelid is governed by orbicularis oculi muscle and levator palpebral muscles.
- The eyelids are present in upper palpebral border in several irregular rows.
- The palpebral conjunctiva extends from inner eyelid margin to the fornix and crosses over to eyeball to become bulbar conjunctiva.
- Lymphoid follicles, mucous glands and accessory lacrimal glands are present in the palpebral conjunctiva.
- The blood supply to eyelid is from branches of ophthalmic and facial arteries.
- Eyelids have the sensory nerve supply from ophthalmic and maxillary nerves where as the motor supply comes from facial and oculomotor nerve.
- The upper eyelid is more extensive and mobile than the lower eyelid.

INDICATIONS

Inward turning of the margins and palpebral border of the eyelid.

CONTROL AND ANAESTHESIA

1. Auriculopalpebral nerve block along with local linear infiltration analgesia at the side of incision after proper sedation/ tranquilization.
2. General anaesthesia in dogs.

SURGICAL TECHNIQUE (MODIFIED HOTZ CELSUS BLEPHAROPLASTY)

1. Make an elliptical skin incision, parallel and about 3-4 mm from the lid margin.
2. Remove the elliptical skin portion in its full thickness.
3. A portion of orbicularis oculi muscle is also removed.
4. The skin edges are finally apposed with simple interrupted suture pattern using appropriate size silk thread.

POST OPERATIVE CARE

1. Antiseptic dressing of surgical wound till healing is complete when sutures are removed (10-12 days after operation).

IMPORTANT CONSIDERATION

1. Do not use alcoholic iodine preparations during site preparation.
2. Length of incision is determined prior to use of sedatives/tranquilizers/general anesthesia.

B. ECTROPION

Site of operation, surgical anatomy, control and anaesthesia, postoperative care and important considerations are same as for entropion.

INDICATIONS

Eversion of eyelid margin exposing the palpebral conjunctiva.

SURGICAL TECHNIQUE (V-Y BLEPHAROPLASTY)

1. Make a 'V' or 'Y' shaped skin incision at the site of defect including the margin of eyelid, with the point of V or Y away from the lid margin.
2. Full thickness skin flap from conjunctiva to skin is removed.
3. Apply simple interrupted suture patterns using appropriate non-absorbable suture material.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time		Drug	Dose	Route	Time	
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
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Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
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RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
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Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

OCCULAR PARACENTESIS

INDICATIONS

Intraocular filariasis

SITE OF OPERATION

Limbus of the eye

SPECIAL EQUIPMENT

Bard- parker blade size 15 or 5 cm long, 15 gauze needles with glass syringes, eyelid retractor.

CONTROL AND ANAESTHESIA

The animal is controlled in recumbent position after proper tranquilization/sedation keeping the affected eye upper most. Anaesthesia is obtained by auriculo-palpebral and retro-bulbar nerve blocks & topical application of surface anaesthetic.

SURGICAL TECHNIQUE

- The incision is made at 6 o' clock or 12 o' clock position on the limbus with a No.15 BP blade after retracting the eyelids.
- The parasite tries to escape along with the aqueous humour & comes outside.
- Alternatively after retracting the eyelids 15 gauze, 5cm long needle mounted on a 2ml glass syringe is introduced into the anterior chamber at the dorso-medial position on the limbus.
- The level of needle is maneuvered in different directions and as the parasite, trespasses the bevel, it is immediately aspirated.

POST OPERATIVE CARE

1. It is advisable to inject hydrocortisone acetate into the affected anterior chamber.
2. Cortisone-neomycin ophthalmic ointment for topical application.
3. Cornea generally clears in 2 to 3 months.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time		Drug	Dose	Route	Time	
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
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HR/min.					
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MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
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Exudate			
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Appetite			
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Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
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Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
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Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

EXTIRPATION OF EYE BALL

INDICATIONS

1. Neoplastic growth of the eye ball and adjacent tissue.
2. Penetrating wounds associated with evacuation of ocular contents and causing irreparable injury to the eye.
3. Supportive destruction of the eye.

SURGICAL ANATOMY

- The eye ball is situated in the anterior part of the orbital cavity. It is protected in front by the upper and lower eye lids, bulbar and palpebral conjunctiva and its middle by the complete orbital ring. It is related behind to the fascia bulbi, fat and ocular muscles.
- The eye ball consists of three tunics, the fibrous tunic; sclera and cornea; the vascular tunic; choroids, ciliary body, the iris; and the nervous tunic: retina, within which three refractive media, the aqueous humour, the lens substance and vitreous humour are enclosed.
- The third eye lid or membrana nictitans is situated at the anteromedial angle of the eye.
- The movement of eye lids are governed by orbicularis oculi and levator palpebrae superioris muscles.
- The movement of the eye ball is controlled by four straight, two oblique and a retractor muscles.
 - a) The straight muscles which are band like arise close together around the optic foramina and end into the sclera. They are designated according to their position as rectus dorsalis, rectus ventralis, rectus medialis and rectus lateralis. These straight muscles rotate the eye ball about the transverse axis.
 - b) The oblique dorsalis superior which is the longest and narrowest of the ocular muscles, arises near the ethmoidal foramina and inserts into the sclera between dorsal and lateral recti. It rotates the eye ball about the longitudinal axis and raises the lateral end of the pupil.
 - c) The oblique ventralis, a wide and shorter muscle arises from the middle of the orbit behind the lacrimal fossa and inserts into the sclera beneath the rectus lateralis. It lowers the lateral end of the pupil.
 - d) The retractor oculi entirely surrounds the optic nerve. It arises from the optic foramina and inserts into the sclera behind the recti. It draws the whole eye ball backwards.
- The arteries of the vascular tunic come from the ciliary branches of the ophthalmic artery while the eye lids and conjunctiva is supplied by the facial arteries. Venous drainage is by satellite veins.
- Sensory innervation is by the branches of ophthalmic and maxillary nerves while motor innervation is by facial, oculomotor and sympathetic nerves.

SITE OF OPERATION

Between eye ball and orbital rim through the skin of both eye lids about half cm from the border .

CONTROL AND ANAESTHESIA

1. The animal is controlled in lateral recumbency with the affected side up.
2. Sedative/tranquilizer or general anaesthesia can be administered depending upon the temperament of animal.
3. Analgesia at the site of operation is achieved by auriculopalpebral and

retrobulbar nerve blocks or by infiltration of local anaesthetic into upper and lower eye lids and deeper tissues at the site of incision, in case sedative or tranquilizers are used.

SURGICAL TECHNIQUE

1. The upper and lower eye lids are sutured together with a continuous suture leaving the suture ends atleast 15-20 cm long for grasping and applying traction during the operative procedure.
2. An incision completely encircling the eye lids is made approximately 1/2 cm from the margin of the lids
3. The incision is extended around the entire circumference of the lid margin between the orbital rim and eye ball by blunt dissection taking care that conjunctiva is not punctured.
4. Haemorrhage is carefully controlled either by ligation or forcipressure.
5. Conjunctiva from the lids back to its attachment to the orbit 'is separated leaving its attachment to the border of the lids. The dissection is carried out back to the point of insertion of the conjunctiva to the orbit.
6. All the muscles of the eye are incised with scissors and finally the optic nerve is cut. Before cutting, the optic vessels are ligated firmly in order to control the haemorrhage
7. All the periorbital fat is left in place.
8. The haemorrhage is controlled with gauze pressure temporarily packed up inside the orbital cavity. All the blood clots are removed from the cavity.
9. Temporary pack is removed and a 70-80 cm long piece of bandage impregnated in antiseptic lotion is inserted into the orbital cavity. Outer skin edges of the lids are sutured with interrupted sutures in order to close the wound leaving a little portion of impregnated gauze outside towards the inner canthus.

POST OPERATIVE CARE

1. A pressure bandage should be tied for about 24 hours after the Operation.
2. A 15-20 cm piece of impregnated bandage should be removed on 3rd and 7th day, and the rest on 10th day after the operation.
3. A course of antibiotics should be administered for 4-5 days or till the healing is complete.
4. The sutures of the lids should be removed 8 to 10 days after the operation or till the healing is complete.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
					Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

TESTS FOR BLINDNESS

Test for blindness is difficult in animals. True evaluation of pain, light and dark adaptation, field of vision and percentage of vision is practically impossible in animals. For subjective analysis of blindness in animals, good history is very important. The history includes following queries:

1. Movement of dog in the house especially up and down movement, movement on lighted and unlighted stairs, outdoor movements, dark versus sunlight day movements.
2. Reaction to small versus large objects.
3. Ability to jump on sofas, beds etc.

Method

1. Blind fold unaffected eye.
2. Subject the dog to an obstacle course and see the reaction. The blind animal will move with caution and sniff their way around. They step high with front feet.

PRECAUTIONS

1. Do the test in quiet place.
2. Never do hand waving technique. Motion causes lid blinking.

**SURGICAL DRAINAGE OF EMPYAEMA OF GUTTURAL POUCH
(HYOVERTEBROTOMY IN HORSE)****Indications:**

- 1) Accumulation of pus/chondroids in the guttural pouch.
- 2) Food material in the pouch.

Surgical Anatomy:

Guttural pouch is a large mucous sac which is a ventral diverticulum of the eustachian tube and is situated on both the sides on the dorsal surface of the pharynx. It connects the pharynx through the pharyngeal orifice of the eustachian tube. Dorsally it is related to the base of the cranium and ventrally to the pharynx and the origin of the oesophagus. Laterally, it is related with numerous surgically important structures such as parotid, maxillary salivary glands, the external carotid artery, jugular veins, the glossopharyngeal, hypoglossal and anterior laryngeal nerves.

Site of Operation:

- 1) Two centimeter anterior to and parallel with the anterior boarder of the wing of the atlas.
- 2) In long direction of neck lateral to the omohyoideus and strenohyoideus muscles and medial to the external maxillary vein and tendons of sternocephalicus muscle (In viborg's Triangle).

Control and Anaesthesia:

Horse is controlled in lateral recumbency with the affected side up after giving basal narcosis or general anaesthesia. Analgesia at the operative site is achieved by infiltration of local anaesthetic.

Surgical Technique:

- A) Surgical drainage of the guttural pouch can be achieved as follows:-
 - i) An incision of about 4 cm in length is made using site No.2 through the skin and fascia.
 - ii) Blunt dissection with the help of fingers or blunt instruments is done between the external maxillary vein and the ventral muscles of the neck (omohyoideus and strenohyoideus).
 - iii) The pouch is identified and a stab incision is made through the ventral wall of the pouch. The opening in the pouch may be enlarged to provide drainage.
- B) The inspissated mass of pus or chondroids or food material should be removed as follows:-
 - i) An incision of about 6-7 cm in length is made in the skin and subcutaneous tissue using site No.1.
 - ii) The fascial attachment of the parotid gland to the wing of atlas is carefully separated and reflected cranially.
 - iii) Guttural pouch is recognized just medial to the bifurcation of the carotid artery. An incision is made through the lateral wall of the guttural pouch. The incision is enlarged with the help of index fingers sufficient to remove food particles or inspissated pus.

- iv) Incisions are not sutured and allowed to heal as an open wound.

Post-Operative Care:

- 1) The pouch and the wound should be irrigated daily with non-irritant antiseptic solution till healing takes place.
- 2) Anti-tetanus serum should be given immediately after surgery and a course of antibiotics for 4 to 5 days.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
				Total dose-					

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

CERVICAL OESOPHAGOTOMY IN ANIMALS

SITE OF OPERATION

1. At the level of obstruction or lesion
2. At upper or lower border of irregular furrow

TOPOGRAPHIC ANATOMY

1. The oesophagus is three to three and a half feet long in medium sized animals and is comparatively small in dogs. It connects pharynx and the stomach.
2. The whole length of oesophagus is divided into cervical, thoracic and abdominal part in horses and dogs the abdominal part is absent in dogs.
3. The average diameter is approximately one to two inches and is musculomembrane tube.
4. In cervical area it is almost in dorsal position at origin and passes gradually to left side of the trachea at the level of about 4th cervical vertebrae. Thereafter it occupies the left position of trachea upto 3rd thoracic vertebrae. In the thoracic region it is median in position and enters the abdominal cavity through hiatus oesophagus and terminates at the cardia of the stomach.
5. As the oesophagus crosses to left side of the trachea it is accompanied by longus coli and longus capitis muscles dorsally, left carotid artery, vagosympathetic trunk, jugular vein and recurrent laryngeal nerve laterally. Overlying the oesophagus are skin, cervical fascia, cervical panculus muscle and the omohyoideus muscle, which crosses the jugular furrow obliquely from below upward, forward and inward towards the median line.
6. Its wall is composed of fibrous sheath, the tunica adventitia, the muscular coat, the submucous and mucous coat. In cervical area the oesophageal wall is thicker.
7. The oesophagus is supplied by branches of carotid, brachio-oesophageal and gastric arteries.
8. The nerve supply to oesophagus is by vagus, glosso-pharyngeal and sympathetic nerves.

INDICATIONS

1. Oesophageal obstruction and wounds of oesophagus.
2. Stricture of oesophagus or oesophageal stenosis.
3. Neoplastic growths inside the oesophagus
4. Oesophageal diverticulum.

CONTROL AND ANAESTHESIA

1. The position of animal is right lateral recumbency after proper sedation.
2. Anaesthesia is by general anaesthesia in small animals or by local infiltration analgesia at the site of operation.

SURGICAL TECHNIQUE

1. At the marked site, a long incision is made on skin and subcutaneous tissue, sufficient enough to extract the obstruction, if present.
2. The omohyoideus muscle is separated from upper and lower structure. The areolar tissue is bluntly dissected with the help of fingers.
3. The trachea is recognized to locate the oesophagus on its lateral surface.
4. The oesophagus is drawn out and fixed in position by placing blunt instrument under it.
5. Make an incision on dorsal wall of oesophagus either anterior or posterior to obstruction. The incision should be large enough to extract the obstruction/foreign body.
6. The repair of oesophageal incision can be done in two layers. The mucous membrane can be sutured with mattress sutures or continuous sutures. The

muscularis layer is to be sutured with connell pattern or continuous lock stitch pattern. Chromic catgut or silk suture is used for suturing.

7. The oesophagus is replaced in its original position.
8. The skin wound is closed in routine manner or it is left as open wound.

POST OPERATIVE CARE

1. Do not allow solid food for few days and intravenous feeding is done twice daily.
2. A course of antibiotics is to be completed (4-5 days)
3. Antiseptic dressing of the wound should be carried on till healing is complete or when sutures are removed after 8-12 days.

IMPORTANT CONSIDERATION/ REMARKS

1. Check hemorrhage during surgery
2. If oesophagus is empty it is recognized by passing a stomach tube.
3. During dissection, prevent damage to recurrent laryngeal nerve.
4. Suturing only oesophagus and leaving the skin wound open is the procedure of choice because
 - a) It favours early closure of oesophageal wound
 - b) It prevents escape of alimentary matter during swallowing.
 - c) It permits drainage of any material, if present.

Anaesthetic and Intra-Operative observations

Group			Date			Procedure			
Surgeon						Assist. Surgeon			
Anaesthetist						Helper			
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC
			Poor	Good	Excellent				
Preanaesthetics/Other drugs					Anaesthetic drugs				
Drug	Dose	Route	Time	Drug	Dose	Route	Time		
								Total dose-	

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

TRACHETOMY AND TRACHEOSTOMY IN ANIMALS

Mostly indicated in buffalo and cattle.

SITE OF OPERATION

At the junction of upper and middle third portion of the neck on mid ventral line.

TOPOGRAPHIC ANATOMY

1. Trachea is a musculo-membrano-cartilagenous tube extending from the larynx to the hilus of the lungs. It occupies a median position in the ventral aspect of the neck.
2. It is composed of incomplete cartilaginous rings, which helps to keep the trachea permanently open. In ruminants these rings are 45 to 60 in number. These rings are enclosed and connected by fibroelastic membrane and constitute the tracheal annular ligament.
3. The cervical part of the trachea is related dorsally to the longus coli muscle and oesophagus and laterally to the thyroid gland, the carotid artery, the jugular vein, the vagus, sympathetic and recurrent laryngeal nerves, the tracheal lymph duct and cervical lymph gland.
4. The sternocephalicus muscle converges from below to above and crosses the trachea obliquely, passing from the ventral surface, forward its sides and diverging to reach the angle of jaws. The left-over area of trachea is covered only with skin, subcutaneous tissue and areolar tissue between the two halves of sternothyroideus muscles which lie on the ventral surface.
5. The branches of common carotid artery supply the trachea and the nerve supply is by vagus and sympathetic nerves.

INDICATIONS

1. Obstruction in the upper respiratory passage.
2. Paralysis of intrinsic muscles of the larynx
3. Fracture of tracheal ring causing obstruction of trachea.

CONTROL AND ANAESTHESIA

1. The animal is positioned in lateral recumbency with neck extended.
2. Head is kept in lower position to prevent aspiration of fluids.
3. The anaesthesia is local linear infiltration analgesia at the site of incision.

SURGICAL TECHNIQUE

1. A mid line 7-10 cm long incision is made through the skin and subcutaneous tissues.
2. Separate two portions of sternothyroideus muscle and exposed the trachea after bluntly dissecting the areolar tissue.
3. Two tracheal rings are selected, exposed at wound edges and fixed with the help of two sharp hooks through the inter-annular ligament.
4. If temporary tracheotomy is desired, an incision is made on the inter-annular ligament. just enough to permit the passage of tracheal tube.
5. If permanent tracheotomy (tracheostomy) is desired, the incision is made in the tracheal ring using either of following techniques.

a) Incise the inter-annular ligament and the tracheal ring in its transverse plane going semi circularly leaving half portion of the tracheal ring intact. Repeat the same procedure on opposite tracheal ring. The incised portion of the cartilage along with inter-annular ligament is removed. An oval opening in the trachea will be created. Instead of oval, square opening can also be made.

OR

b) Make a longitudinal incision on two or three tracheal rings and with the help of traction sutures, applied through cartilaginous rings on either side of incision, the tracheal lumen is exposed.

6. Insert the tracheostomy tube through these openings into the tracheal lumen and then keep in position by suturing it to trachea
7. The remainder tracheostomy incision is sutured, applying continuous suture pattern using silk thread.
8. The skin wound is closed in routine manner.

POST OPERATIVE CARE

1. The tube is cleaned daily for first few days.
2. The opening of tracheostomy tube should be covered with gauze to prevent entrance of any foreign material.
3. The course of antibiotics for 5 days must be completed.
4. Daily/alternate day antiseptic dressing of wound till complete healing when sutures are removed (normally 8-12 days after operation).

Anaesthetic and Intra-Operative observations

Group			Date			Procedure				
Surgeon						Assist. Surgeon				
Anaesthetist						Helper				
Animal	Sex	Wt	Physical status			PCV	Hb	TLC	DLC	
			Poor	Good	Excellent					
Preanaesthetics/Other drugs						Anaesthetic drugs				
Drug		Dose	Route	Time		Drug	Dose	Route	Time	
						Total dose-				

Record of different parameters-

	Before medication	After induction of anaesthesia			
		5 min.	10 min.	20 min.	End
Temperature					
HR/min.					
RR/min.					
MM colour					
Pulse quality					
CRT					

Procedure start time:	Anaesthesia induction time:
Procedure end time:	Anaesthesia recovery time:
Total time of procedure:	Total time of anaesthesia:

Any special intra-operative observation:

Remarks of instructor:

Signature

Post-operative observations

Day 1		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 2		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 3		Treatment	Sign of instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 4		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 5		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			
Examination day 6		Treatment	Instructor
Appetite			
Temp.			
HR			
RR			
Exudate			
Incision site			
Any other			

**LANDMARK FOR APPROACHES TO VARIOUS VISERAL
ORGANS IN LARGE ANIMALS**

THORACIC CAVITY**BOVINE**

Procedure	Site of Incision
Thoracocentesis, drainage of pericardial sac	5th to 7th inter costal space
Pericardiectomy/Pericardiotomy	5th inter costal space or 5th rib
Diaphragmatic herniorrhaphy	7th rib
Diaphragmatic abscess	6th or 7th rib
Lobectomy	7th rib
Pneumonectomy	4th to 5th rib
Transthoracic oesophagotomy	8th rib

ABDOMINAL CAVITY**EQUINE**

Flank incisions/ approaches	Approachable organs & structures
Right flank incision	Base & apex of caecum, ileocaecal junction, middle portion of the right ventral colon, right internal inguinal ring, right kidney & ovary.
Left flank incision	Pelvic flexure of colon, left ventral colon, spleen, left kidney, left internal inguinal ring & the left ovary
Ventral approaches	
Mid line incision	Greater exposure of abdominal organs for caesarian scission, enterotomy in volvulus or torsion as in caesarean section.
Paramedian incision	Abdominal organs, better exposure of the bladder and uterus with surgery.

CATTLES

Flank approaches	Approachable organs & structures
Upper last flank approaches	Exploratory laparotomy, rumenotomy, left flank abomasopexy, repair of ruptured bladder & removal of mummified or macerated foetus.
Lower flank incision	Caesarian section in cows & buffaloes
Upper right flank approach	Explanatory laparotomy, abomasopexy, omentopexy, surgical correction of intestinal obstruction & caecal dilatation.
Ventro-lateral oblique incision	Caesarian section in cows & buffaloes
Ventral approaches	
Paramedian incision	Abomasopexy, caesarian section
Median incision	Generally used to expose the non-pregnant genitalia in small ruminants for experimental purposes

Post -Xiphoid incision	Diaphragmatic repair in DH, to remove extra articular abscesses & to incise diaphragmatic abscesses.
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**LANDMARK FOR APPROACHES TO VARIOUS VISERAL
ORGANS IN SMALL ANIMALS
DOG & CAT**

THORACIC CAVITY

Thoracic structure and/or surgical problem	Inter costal space (left side)	Inter costal space (right side)
Thoracic trachea	-	3
Cranial mediastinal oesophagus (cranial to heart)	3-4	3-4
Patent ductus arteriosus, persistent right aortic arch, Pulmonic stenosis	4	-
Esophagus (at heart base) cardio pulmonary bypass	-	4-5
Cranial lung lobe, pericardium	5	5
Middle lung lobe	-	6
Caudal lung lobe, accessory lung lobe	5-6	5-6
Esophagus (caudal to heart base), diaphragm	7-10	7-10
Thoracic duct, dog; thoracic duct, cat	-	8-10
Intervertebral disc fixation	8-10	-
T ₁₀ to L ₂	11	11

ABDOMINAL CAVITY

- Ventral midline approach - For almost all the abdominal organs
- Paramedian approach - For unilateral cryptorchidectomy, prostatectomy, cystotomy.
- Flank approach - Good access to dorsally located abdominal organs including kidney, ovaries and uterus.
- Lower flank (right) - Lower flank, above the mammary gland for caesarian sections.
- Para costal approach - Provide access to the cranial and ventral part of the abdominal cavity including organs such as stomach, spleen and caecum.
- Combined midline para-costal approach - Increased access to the cranial abdomen
- Combined paralumber paracostal - Can be combined with trans diaphragmatic approach incision to give access to both thoracic and abdominal cavity. On the right side access can be obtained to the portal vein, abdominal vena cava, intestines, and liver

TECHNIQUES OF PARACENTESIS**I. ABDOMINOCENTESIS****INDICATIONS:**

Differential diagnosis of colic is of critical importance in peritonitis and mainly in cattle where chances of peritonitis are more.

SURGICAL SITE:

-Lowest point of abdomen at linea alba.

ANASTHETIC TECHNIQUES & CONTROL:

If fine needle is used, no need of anaesthetic agents, but with a larger needle local anesthesia can be infiltrated at site.

SURGICAL PROCEDURE:

1. First detect the linea alba, clip & shave the area.
2. Insert 18G needle (4cm) through the abdominal wall at the linea alba on the lowest point of abdomen.
3. Then move the needle slightly to correctly place it to enable free flow of peritoneal fluid.
4. At least four attempts are made before calling paracentesis as negative & these should be made 6-8cm away from the primary puncture.

REMARKS:

- i) Sterile plain tube is to be used for collection.
- ii) EDTA is used as a preservative.
- iii) The collected sample should be divided, one, one half for the total nucleated cell count as for blood, and the other half for cytological examination and differential white cell counts. Centrifuge for the latter at 1500 rpm for 5 minutes.

II. RUMINOCENTESIS

From the left flank region with the help of 18 gauze needle (5inch in length).

III. LIVER BIOPSY**INDICATIONS:**

1. To confirm a lab diagnosis
2. To determine the nature & severity of structural changes.
3. To investigate on underlying biochemical defect i.e. measurement of heavy metal accumulations, measurement of certain vitamin levels & their precursors.
4. Histochemical determination of certain inherited disorders like copper toxicosis.

SURGICAL SITE :**1. Cattle –**

The site is between 11th & 12th ribs, 15-20 cm from the dorsal midline according to animal's age & size. When the 14th rib is present, the site is in the 3rd last intercostal space.

2. Calves -

In calves the point of insertion is between 11th & 12th ribs at a point in lines with transverse process of the lumbar vertebrae.

CONTROL & ANAESTHETIC TECHNIQUE:

The animal is restrained against a gate or fence with the right side facing the operator. The sites & deeper structures are infiltrated with 2% Xylocaine.

Instrument used is trocar & canula.

SURGICAL PROCEDURE:

1. The skin is incised about 12mm (1/2") parallel to the ribs.

2. The trocar & canula is introduced through the intercostal muscles and peritoneum until the liver is reached.
3. Negative pressure is induced and the care is collected. Care should be 2-4cm long to weigh about 0.25-0.5 gm.

POST OPERATIVE. CARE ;

- Regular ASD of the area.
- Systemic hemostats.

IV. OCCULAR PARACENTESIS

INDICATIONS:

Intraocular filariasis

SITE OF OPERATION: Limbus of the eye

SPECIAL EQUIPMENT: -

Bard- parker blade size 15 or 5 cm long, 15 gauze needles with glass syringes, eyelid retractor.

CONTROL & ANAESTHESIA:

The animal is controlled in recumbent position after proper tranquilization/sedation keeping the affected eye upper most. Anaesthesia is obtained by auriculo-palpebral and retro-bulbar nerve blocks & topical application of surface anaesthetic.

SURGICAL TECHNIQUE:

1. The incision is made at 6 o' clock or 12 o' clock position on the limbus with a No.15 BP blade after retracting the eyelids.
 2. The parasite tries to escape along with the aqueous humour & comes outside.
 3. Alternatively after retracting the eyelids a 15 gauze, 5cm long needle mounted on a 2ml glass syringe is introduced into the anterior chamber at the dorso-medial position on the limbus.
1. The level of needle is maneuvered in different directions and as the parasite, trespasses the level, it is immediately aspirated.

POST OPERATIVE CARE:

1. It is advisable to inject hydrocortisone acetate into the affected anterior chamber.
2. Cortisone-neomycin ophthalmic ointment for topical application.
3. Cornea generally clears in 2 to 3 months.

V. ANTHROCENTESIS

INDICATIONS:

1. For diagnosis of affections of joints e.g. arthritis, synovitis etc.
2. For removal of infected synovia from affected joint.
3. For collection of fresh synovia for treatment of infected joint from healthy joints.

TECHNIQUE:

1. The affected joint is palpated for the intraarticular space & the site is prepared.
2. The skin over the depression is punctured and Xylocaine is infiltrated at the site. Thereafter a 18 gauze needle (2.5 cm) is inserted into the cavity & the fluid is aspirated.

REMARKS:

1. Extreme sterile conditions using sterile instruments is to be practiced.
2. Infiltration of antibiotic into the joint after withdrawal of synovia is also recommended to prevent contamination from skin.

PRACTICAL-4

Date_____

TECHNIQUES FOR OBTAINING CEREBROSPINAL FLUID**INDICATIONS:**

1. For evaluation of disease of CNS and response to treatment.

ANAESTHETIC CONTROL:-

Tranquilization

TECHNIQUE:**BOVINE-**

CSF in case is removed either by sub-occipital or lumbar puncture. Site is between the dorsal process of the last lumbar vertebrae and the anterior end of the median sacral crest.

1. Before puncturing, the area is clipped, shaved & disinfected.
2. 5 inch, 14-16 gauze needle with stylet is used.
3. Sub-arachnoid space is punctured to fluid is with drawn in a sterile syringe.

HORSES-**SITE:**

Sub-occipital puncture between atlas & axis.

CANINE:

At cisterna magna at the atlanto-occipital articulation.

PRACTICAL-5

Date_____

LAPAROTOMY (COELIOTOMY) IN CANINE**INDICATIONS:**

- Gastronomy
- Enterotomy/ Enterectomy
- Cystotomy/ Cystorrhaphy
- Nephrectomy
- Splenectomy
- Hysterotomy/hysterectomy
- Ovariohysterectomy
- Oophorectomy
- Exploratory purposes

SITE OF OPERATION:

Ventral Midline incision – (Cranial or caudal)

The incision is given on linea alba.

Para-median incision - (Right/Left and cranial/ caudal)

Para-rectal incision - (-do-)

Para-costal incision - (Left/Right)

The incision is parallel to last rib.

Flank incision (Right/Left and vertical/oblique)
The incision is given on the hollow of the flank.

SURGICAL ANATOMY:

The abdominal cavity is limited anteriorly by the diaphragm and posteriorly by the pelvic inlet. The lateral wall is formed by three abdominal muscles namely obliques abdominis externus, obliques abdominis internus and transverse abdominis. The ventral wall is formed by rectus abdominis and aponeurosis of all the abdominal muscles. The dorsal wall is limited by lumbar vertebrae and their transverse processes.

The external obliques abdominis is the most superficial and originates from middle portion of third to twelfth ribs and also from the entire lumbar area of thoracolumbar fascia. It courses mainly caudoventrally and inserts on the linea-alba and prepubic tendon by its aponeurotic portions. The caudal most portion of this muscle thickens and forms inguinal ligament.

The fibres of obliques abdominis internus are cranioventral that is at the right angle to that of obliques abdominis externus. This muscle originates from the thoraco-lumbar fascia and the cranial iliac spine. It inserts along the costal arch to the lateral border of rectus abdominis.

The transverse abdominis is the deepest of all the abdominal muscles and lies just outside the transverse fascia. It originates from the medial side of costal arch as cranial as the xiphoid cartilage and the transverse thoracic. Its lumbar part originates from thoraco-lumbar fascia. Its fibers course transversely to attach to an aponeurosis, which passes deep to the rectus abdominis to join linea-alba.

The rectus abdominis lies longitudinally arising by broad flat tendon over the sternal costal cartilage and insert on the prepubic tendon.

The transverse fascia covers the inner most surface of these abdominal muscles. The parietal peritoneum lies beneath it.

The nerve supply to the abdominal wall is by the various branches of thirteenth thoracic, first, second and third lumbar spinal nerves.

The blood supply to the abdominal wall is through:

1. Cranial & caudal epigastric vessels.
2. External pudic artery
3. Deep circumflex iliac artery
4. Cranial abdominal artery
5. Lumbar arteries

SPECIAL INSTRUMENTS:

Self-retaining abdominal retraction is required some times.

ANAESTHETIC TECHNIQUE:

General anesthesia

CONTROL:

1. Lateral recumbency for flank and paracostal incisions
2. Dorsal recumbency for ventral abdominal incisions

SURGICAL PROCEDURE:

A 4-12cm long incision as per need is made in the skin at the proposed site.

In case of ventral midline incision, a nick on linea-alba in centre is made and with the help of a groove director and scissors. The incision is increased up to required length.

In case of other incisions, the muscles are bluntly dissected and the peritoneum is entered similar to linea-alba.

After completion of the desired work, the peritoneum and transverse abdominis muscles may be sutured together with absorbable suture in the simple continuous pattern. The other muscles are also sutured like wise but separately.

In case of mid-line incision, the peritoneum and linea-alba is sutured together likewise.

Now subcutaneous sutures are placed and then the skin is sutured with interrupted horizontal mattress or simple interrupted non-absorbable sutures.

POST OPERATIVE CARE:

Routine ASD and antibiotic therapy

Soft & restricted diet for about 15 days

Prevention of self mutilation

Restricted movement for 15 days

ENTERECTOMY AND ENTEROANASTOMOSIS IN DOG**INDICATIONS:**

Intestinal foreign bodies
Intestinal Intussusception
Intestinal Volvulus
Intestinal Torsion
Intestinal Strangulation
Intestinal Neoplasm
Intestinal Gangrene
Intestinal Perforating wounds

SITE OF OPERATION:

1. Caudal ventral midline incision
2. Right flank incision

SURGICAL ANATOMY:

The intestinal wall is composed of serosa, muscularis, sub mucosa and mucosa. In which sub-mucosa is most dense and have more suture-holding capability. The small intestine of an average sized adult dog is about 4 meters long. It is clearly divided into a fixed and a mesenteric part. The fixed part, termed as duodenum, is the shortest portion, which starts at the pylorus and passes caudally and dorsally. Near the pelvis it turns medially and passes cranially along the medial side of left kidney, bends ventrally to join jejunum.

The mesenteric part is arbitrarily divided into jejunum and ileum which are suspended by a double fold of peritoneum termed as mesentery. The jejunum, which is the longest part of small intestine, is composed of six to eight coils which take up the space between the stomach and liver on one side and the pelvic inlet on the other. The difference between jejunum and ileum is not discernible grossly although there are distinct differences in the mucosa of dog. The large intestine averages about 60-70 cms and composed of caecum, colon and rectum.

In dogs caecum exist only as a blind end diverticulum of the proximal portion of colon. The colon is attached to the sub-lumber region by mesentery 'the mesocolon'. The colon has three parts; ascending, transverse and descending part. The ascending part passes cranial along the medial surface of cranial part of duodenum until it reaches pyloric part of stomach, here it turns to the left and crosses the median plane forming transverse colon. The last part of the descending colon passes caudally along the medial border of the left kidney to join rectum.

The nerve supplies to the intestines are from vagus and celiac plexus. The blood supplies are from the branches of celiac and anterior mesenteric arteries.

SPECIAL INSTRUMENTS:

Crushing intestinal clamps
Non-crushing (Such as doyen) intestinal clamps.

ANAESTHETIC TECHNIQUE:

General anaesthesia

CONTROL:

Dorsal recumbency for ventral midline incision
Left recumbency for right flank incision

SURGICAL PROCEDURE:

(The intestinal anastomosis can be performed either with the end-to-end, side-to-side or side to end anastomosis techniques; however only the most commonly performed end-to-end technique is being described here).

The laparotomy is performed and the affected part of the intestine is identified and exteriorized.

The abdominal wound is packed off with moistened sterile towel or surgical drape to isolate the exteriorized portion of intestine.

The mesenteric vessels supplying to the affected area are isolated and ligated.

The arcual vessels within the mesenteric fat along the intestine are also isolated and ligated.

Within minutes the entire section of the intestine bounded by these vessels become cyanotic.

It is imperative that a short segment of the normal intestine on either side of the affected area is included in the resection scheme.

Crushing clamps (or straight long artery forceps) are now placed at approximately 60° angles to the long axis of the intestine just inside the arcadial ligatures.

The ingesta are gently milked away from the crushing clamps for a distance of about 3-5 cms and a non-crushing is placed over the intestine.

The non-crushing clamps should not obstruct blood flow in the arcadial vessel supplying to the end of intestine.

An assistant should gently hold all these four clamps.

Now the intestine is excised with a sharp scalpel along the outside edge of the crushing clamp without cutting the arcadial ligature. The mesentery is also resected with fine scissors and the whole stump is discarded.

The cut ends of the intestine are gently mopped clean with moist gauze and are held together.

The outwardly rolled mucosal collar around the transected ends is also resected to ensure that the individual layers of the intestine are accurately apposed.

The anastomosis is carried out using atraumatic thumb forceps and swedged-on taper-end needle with 3-0 or 4-0 polyglycolic acid or polyglactin-910 sutures (silk can also be used in care of non-availability of these sutures).

Two simple interrupted sutures are first placed including all layers on mesenteric and anti-mesenteric border of cut ends.

Now the intestine is apposed with 10-16 simple interrupted through and through sutures placed 2-3 mm apart and 2-3 mm from cut ends. The sutures can be pulled down until they crush through serosa, and muscularis so that these are tightened in dense submucosa.

The intestinal anastomosis can also be performed with many other suture patterns such as simple continuous, continuous Cushing/Lambert, Gambee patterns, Parker-Ker patterns. However, the above-described technique is the simple most.

Now anastomosis site is inspected for any leakage by milking the ingesta gently through the apposed part after removing the non-crushing intestinal clamps. Additional interrupted sutures may be applied if needed.

Now the mesenteric defect is also closed with absorbable sutures using interrupted pattern.

The intestinal is now gently cleaned with moist gauzes and reposed back into abdomen. The laparotomy wound is closed routinely.

POST OPERATIVE CARE:

Routine antibiotic therapy

Multiple foods should be given for 15 days

REMARKS:

The surgeon and assistant should wear two sets of surgical gloves at the start of operation. One upper set may be removed after anastomosis is complete. This minimizes contamination.

If gross abdominal contamination occurs, then abdominal lavage with two to three cycles of irrigation and suction with 250 to 1000 ml of NSS or lactated ringer's solution should be employed.

The oral feeding should be started within 24 hours post-surgery in order to minimize the chances of paralytic ileus.

CYSTOTOMY IN DOG

INDICATIONS:

Cystic calculi
Cystic neoplasm

SITE OF OPERATION:

Caudal ventral mid-line incision in females
Caudal paramedic incision in males

SURGICAL ANATOMY:

Urinary bladder lies on the ventral abdominal floor cranial to the pubis. Neck of the bladder lies in the pelvic cavity and is the only part not covered by the peritoneum. Two lateral ligaments one on each side and a single ventral median ligament keep the bladder in position. The ureters open on the dorsal aspect of bladder.

The sphincter of bladder is supplied by pudendal nerve. The blood supply to the bladder is by the branches of internal pubic arteries.

SPECIAL INSTRUMENTS:

Suction pump

ANAESTHETIC TECHNIQUE:

General anaesthesia

CONTROL:

Dorsal recumbency

SURGICAL PROCEDURE:

After performing laparotomy, the urinary bladder is exteriorized and the abdominal wound is packed with moistened surgical towels or drapes.

A stay suture on the apex of bladder involving only up to submucosa or muscularis is applied to facilitate the manipulation.

The 2-3 cms long cystotomy incision is made on the dorsal aspect of bladder between the major blood vessels and away from the ureters (in case of cystic neoplasm, the incision has been given around the neoplasm).

The urine is removed by suction and calculi are removed with forceps (or with a smooth edged gall bladder spoon)

In case of males, a catheter is passed from the external urethral opening by an assistant and the calculi, if any, is back flushed into bladder from where these are removed.

In case of females, the catheter is passed from the bladder into the urethra and flushed until all urethral calculi are removed and the catheter can be passed freely.

The cystotomy incision is then closed in 2 to 3 layers using swaged-on atraumatic needle with 3-0 to 4-0 absorbable suture material.

The first layer of horizontal mattress is used to close mucosa and the subsequent layer/s is/are applied by continuous inversion sutures (Cushing/ Lambert) to close remaining layers.

The stay suture is removed.

The laparotomy incision is closed routinely.

POST OPERATIVE CARE:

Urinary antiseptics and alkalizers should be used for few days post-operatively.

REMARKS:

Intravenous fluid therapy in pre-operative period is quite beneficial.

Evacuation of all urine from bladder by a urinary catheter before operation is not recommended as the collapsed bladder may be difficult to exteriorize in larger breeds.

While closing mucosa no knot should be placed to lie in the bladder lumen as it may act as a nidus for further cumuli deposition.

Culture sensitivity test is a must. It should be done for the culture taken directly from the bladder mucosa.

EXTIRPATION OF ANAL SACS IN DOG (ANAL SACCULECTOMY)

INDICATIONS:

- Recurrent episodes of anal sac impaction
- Ineffective medical therapy in recurrent anal sac infection
- Anal sac abscessation with or without fistulous tract
- Anal sac gland adeno-carcinoma.

SITE OF OPERATION:

Linear incision (about 2cm long) lateral to the anal orifice.

SURGICAL ANATOMY:

The two anal sacs are situated on either side of anal opening between the external sphincter muscle and the rectal wall (Approximately at 4 & 8 O'clock position). The function of anal sacs is not clearly understood, however but it is thought of provide peculiar scent/odors to faeces perhaps to mark the territories. The normal secretion is a slightly granular, brownish serous or viscid fluid, which comes out by the action of external anal sphincter muscle.

SPECIAL INSTRUMENTS:

1. General anaesthesia
2. Local infiltration along with tranquilizers
3. Epidural analgesia

CONTROL:

Ventral recumbency with hind parts raised

SURGICAL PROCEDURE:

The anus is packed off with sterile gauze to minimize the contamination at the site. The duct opening of one of the anal sacs is identified just under the anal orifice and a mosquito haemostate is pushed into the sac. The incision is made on the hairless skin of the perineal region over this distended area bounded by the haemostate in the sac. The sac is now grasped with forceps and is dissected sharply as well as bluntly by the curved metzembaum scissors from the surrounding tissue. The neck of the sac should be carefully dissected so that external sphincter muscle is not damaged. The duct is identified, isolated, ligated and transected. The subcutaneous tissue and the skin are sutured in the routine manner. The other anal sac is now removed in the same manner.

POST OPERATIVE CARE:

- Routine antibiotic therapy
- Prevention of self-mutilation by applying Elizabethan collar
- Stool softness and soft diet for at least 10 days.

REMARKS:

The anal sac may be filled with paraffin wax, Indian ink or simply distilled water before operation to outline the margins. Anal gland adenocarcinoma is a malignant neoplasm of the gland that surrounds the sac. It is locally invasive and metastasizes to distant sites. Therefore adjunctive therapy is must. Inadvertent incomplete removal of anal sacs may result into chronic fistula formation; therefore the sac should be examined to ensure that removal is complete. The dissection should be limited to the surface of anal sacs as accidental damage to pudendal branch may lead to fecal incontinence. In addition to that the excessive trauma in and around the external anal sphincter muscle may cause tenesmus.

PRACTICAL-9

Date_____

CASTRATION IN DOG

(Orchiectomy, Testectomy, Sterilization, Neutering)

INDICATION:

Aggressive behavior of the dog

Neoplastic growth

Sever blunt penetrating or crushing injuries of testis

Chronic orchitis

To remove the source of androgenic/estrogenic hormones which act as mediators for the development of benign prostatic hypertrophy, perineal adenoma and perineal hernia.

Enlarged prostate and perineal hernia

Prevention of breeding nuisance.

SITE OF OPERATION:

1. Pre-scrotal site: 3 cm long incision on the midline in front of the scrotum.
2. Scrotal site:
 - A. Longitudinal incision on the ventral aspect of scrotum lateral & parallel to median raphe on either side.
 - B. Similar incision on one scrotum to remove testes of that side and then a second incision (through the first) on the mediastinum testes to remove the other testicle.

SURGICAL ANATOMY:

The testes are contained into two distinct sacs inside the scrotum. These sacs are attached together by scrotal septum also known as mediastinum testes. The wall of the scrotum is composed of skin, tunica dartos, spermatic fascia and Tunica vaginalis parietalis. The tunica vaginalis is the peritoneal invagination that envelops the spermatic cord, the testes and the epididymis. The epididymis is attached to the dorsal lateral aspect of two testes, the head of epididymis pointing anteriorly. The tail of epididymis is continuing to ductus deferens which is contained in spermatic cord. The spermatic cord in fact has two distinct bundles namely anterior vascular bundle and posterior avascular bundle which contain the testicular artery, testicular vein (which joins the pampiniform plexus), testicular plexuses of autonomic nerves, lymphatic vessels and the ductus deferens respectively. The ductus deferens passes through the vaginal ring and within the abdominal cavity it terminates at the prostate gland by looping caudally and medially around each ureter.

The nerve supply to testes is through the spermatic nerves, which are derived from the renal and mesenteric plexus. The branches of second and third lumbar spinal nerves supply the scrotum. The blood supply is by spermatic vessels to the testes and branches of external pudic vessels to the scrotum.

SPECIAL INSTRUMENTS:

None

ANAESTHETIC TECHNIQUES:

General anaesthesia

CONTROL:

Dorsal recumbency

SURGICAL PROCEDURE:

One testis is pushed forward (in case of pre-scrotal incision) or toward (in case of scrotal incision) and is held in position by left index finger and thumb and about 2-3 cms long incision is made in the skin.

The testicle is continuously pushed outwards and gentle incisions are made in the subcutaneous fascia till shiny white tunica vaginalis is visible.

The testicle is now squeezed out and can be removed by any of the following methods:

1. Open methods:

An incision is given in the tunica vaginalis longitudinally over the spermatic cord.

The anterior and posterior bundles of spermatic cord are identified.

The testicular artery and vein are ligated with a non-absorbable suture proximal to the pampiniform plexuses. One end of the ligature is left long and held with an artery forceps.

The ductus deferens may be ligated separately and cut with a scissors.

An artery forceps is now placed distal to the ligature in testicular vessels and the cord is cut between them. The testicle is now removed out along with artery forceps.

The hemorrhage is checked carefully and only then the ligature end is cut short and the stump is allowed to recede in vaginal ring.

2. Closed method:

No incision is given in tunica vaginalis. It is ligated as such closed to the vaginal ring and is transected taking similar care for any hemorrhage as described in open method.

The contra lateral testicle may be similarly removed after pushing it through the same incision (by making an additional incision in scrotal septum) or by making another incision in the contra lateral sac of scrotum or in case of pre-scrotal incision by incising only the contra lateral spermatic fascia.

In cases of prescrotal incision, the skin wound is closed routinely, however in cases of scrotal incisions, these may be left open

POST OPERATIVE CARE:

Routine ASD and antibiotic therapy

Prevention of self mutilation

REMARKS:

The skin of the scrotum is very sensitive, bleeds heavily and swells postoperatively, therefore routine castration in dogs are preferred by presacrotal incisions.

The incision on scrotal septum also increases the chance of postoperative scrotal haematoma, therefore testicle should be removed without incising mediastinum raphae preferably.

Open method of castration ensure the proper ligations of vascular bundle and is therefore preferred in large and giant breeds of dogs. However, it has the disadvantage of opening of the cavity of vaginal tunic, which communicates proximally with the main peritoneal cavity.

Extreme care should be taken while placing a ligature around testicular vessels. There should be transfixed so that ligature may not slip.

Proper haemostasis is must. It is very difficult to locate the spermatic cord stump once it is cut and retract towards the external inguinal ring.

OVARIOHYSTRECTOMY IN BITCH

The operation involves the surgical removal of the ovaries and uterus.

INDICATIONS :

1. Prevention of estrus and problem associated with bloody discharge, attraction of male dogs, accidental mating, pregnancy and unwanted puppies.
2. Treatment of metritis, pyometra, endometrial hyperplasia (CPC), neoplasia, injury, neglected dystocia and congenital abnormalities.
3. Hyperplasia and neoplasia of mammary gland.

AGE AND TIME:

1. Though operation can be done at almost any age and at any phase of reproductive cycle but it is best performed either before puberty or during anoestrus. Some prefer to wait until the animal has passed through one heat period.
2. Six to eight months of age is generally considered best.
3. The surgery may be most hazardous during estrus or pregnancy and in old obese female.
4. Most favourable time to spay a mature bitch is 3 to 4 months after estrus. After whelping, the operation should be done about 6-8 weeks, as soon as the puppies have weaned and lactation has ceased.

SURGICAL SITE :

Ventral midline abdominal incision, beginning over the umbilicus and extending caudally for 6-8 cms.

SURGICAL ANATOMY :

Ovaries lie close to the caudal pole of the corresponding kidney, ventral to the 4th lumbar vertebra, and half way between last rib and the crest of the ilium. The ovary is completely enclosed by the bursa and is attached to cranial end of the uterine horn by ovarian ligament continuous with its suspensory ligament of ovary. Ovaries receive the blood supply through ovarian artery and vein. The uterus has a very short body and extremely long narrow horns. Broad ligament is attached to the anterior part of vagina.

PREPARATION, CONTROL AND ANAESTHESIA :

Food is withheld for at least 8-12 hours before the operation. The animal is controlled in dorsal recumbency. The operation table may be slightly tilted so as to allow the abdominal viscera to move forward. After proper premedication, the general anaesthesia is achieved by using parenteral or inhalant anaesthetic. After the animal has been anaesthetized, the urinary bladder is expressed and the ventral wall of the abdomen is prepared for surgery.

SURGICAL TECHNIQUE :

1. A 6-8 cm long midline incision is made on the ventral aspect of the abdomen beginning over the umbilicus and extended caudally.
2. Skin, Subcutaneous tissue, linea alba, falciform ligament and peritoneum are incised.
3. An ovariectomy hook or index finger can be passed to locate the uterine horn by taking the urinary bladder as landmark. Uterus is withdrawn and followed to the ovary.
4. No definite sequence is required for excising the ovaries and uterus, but it is convenient to remove the left ovary then right ovary and finally the body of uterus.
5. The ovarian bursa is clamped across by artery forceps. The ovary is grasped between thumb and index finger and withdrawn for ligation. The suspensory ligament of the ovary is ruptured by traction and ovary is withdrawn from the abdomen.
6. Application of three artery forceps facilitates the ligature procedure for ovarian pedicle. A double ligature with chromic catgut size 1-0 is used to ligate ovarian pedicle. The attachment between the ligature and the ovary is then severed. The severed stump should be checked carefully for haemorrhage before returning to the abdomen.
7. After removing one ovary, the other ovary is located and removed in the similar manner. The broad ligament is then severed.

8. The body of the uterus is withdrawn from the abdomen. The uterine vessels are ligated on each side and cut. Transfixation double ligature is used to encompass the entire cervix. The uterus is severed just cranial to the ligatures.
9. Uterine stump is checked carefully for haemorrhage and returned into the abdomen. Care should be taken to remove as much uterine body as possible.
10. Abdominal incision is closed in the usual manner..

POST OPERATIVE CARE :

- i) The operative site should be checked for swelling or discharge.
- ii) Operative incision should be dressed with betadine.
- iii) The patient should receive antibiotics and analgesics for seven and three days respectively.
- iv) Exercise should be restricted for 10-12 days.
- v) Liquid diet should be given for the first 63 days and the patient should be observed for proper urination and defecation.
- vi) Cutaneous sutures should be removed after 8-10 days of operation or after complete healing.

PRACTICAL-11

Date _____

LAPAROTOMY IN BOVINE

INDICATIONS:

Rumenotomy
 Enterotomy/Enterectomy
 Splenectomy
 Cystotomy/Cystorrhaphy
 Abomasopexy
 Hysterectomy (Cesarean section)
 Exploratory purposes

SITE OF OPERATION:

It may be one of the following depending upon the purpose of opening the abdomen and the topography of the organ(s) to be manipulated-

1. Incision through ventral abdominal wall
 - A. Median incision (Cranial or caudal)
 - B. Para-median incision (Cranial or caudal)
 - C. Para-rectal incision (Cranial or caudal)
 - D. Trans-rectal incision (Cranial or caudal)
2. Incisions through para-lumber fossa (3.5 cms ventral to transverse process of lumber vertebra)
 - A. Mid upper flank incision
 - B. Upper paracostal incision
 - C. Caudal upper flank incision
3. Incision medial/parallel to thigh
 - A. Lower flank incision
 - B. Ventrolateral incision

SURGICAL ANATOMY:

After incising skin the following structures may be encountered in different sites of operation

—
 Superficial fascial layer
 Abdominal tunic
 External oblique abdominal muscle
 Internal oblique abdominal muscle
 Nerves and blood vessels on the deep face of internal oblique abdominal muscle
 Rectus abdominal muscle
 Cranial and caudal deep epigastric blood vessels (on the inner face of rectus abdominal muscles)
 Transverse abdominal muscle
 Transverse fascia
 Parietal peritoneum

The external oblique abdominal muscle is the most extensive of all the abdominal muscles. Its fibers are mostly directed ventral & caudal but which in the area of Para lumbar fossa are horizontal. It is originated

from the caudal border and lateral surface of the last eight ribs over the intercostal muscle. It is inserted by means of aponeurotic tissue on the tuber-coxae, pre pubic tendon and linea-alba.

The fibers of internal oblique abdominal muscles are mostly directed ventral, cranial and medial. The muscle originates from the coxal tuber and deep lumbar fascia. It inserts on the caudal border of last rib, the pre-pubic tendon and linea-alba.

The transverses abdominal muscle originates from the deep lumbar fascia and thus indirectly to the first five lumbar transverse processes and the medial surface of the false ribs. It inserts on the linea-alba. The direction of its fibers is transverse. Therefore, this muscle forms a muscular sheet on the deep face of oblique internal abdominal & rectus abdominal muscle.

The rectus abdominal muscle is confined to the ventral abdominal wall. It extends from the sternum to the pubis. It originates from ventral and lateral surfaces of the sternum as cranial as third or fourth costal cartilage. It inserts on pre pubic tendon.

The nerve supply to the abdominal area is through-

Lateral and ventral branches of last thoracic (T₁₃)

Ventral branches of L₁ & L₂

Lateral cutaneous femoral nerve formed by fibers of L₃ & L₄.

The blood supply to abdominal wall is through

Costo abdominal vessels

Branches of lumbar vessels

Deep circumflex iliac

Cranial & caudal epigastric vessels.

SPECIAL INSTRUMENTS:

None

ANAESTHETIC TECHNIQUE:

1. General anaesthesia
2. Para-vertebral analgesia
3. Field block by inverted L
4. Linear infiltration

CONTROL:

1. Standing position for incisions through paralumber fossa
2. Lateral recumbency for incisions in lower flank
3. Dorsal recumbency for incisions through ventral abdominal wall

SURGICAL PROCEDURE:

A 10-25 cm long incision depending upon the need for available spaces for manourability is made in the skin at the proposed operation site wherever practicable. A grid-iron technique should be used to dissect the underlying muscles if present along the direction of their fibers. Otherwise the underlying muscles or linea-alba may be incised along the direction of skin incision.

A groove director is then passed through the small cut in the peritoneum and the incision is enlarged using scissors.

After the desired work, the abdominal layer may be closed in different layers. If gridiron technique is used, the peritoneum and transverse abdominis may be sutured together with absorbable sutures. The other muscles are sutured separately with absorbable 2-3 number sutures.

Then the skin sutured with simple interrupted or horizontal or cross mattress non-absorbable sutures. If the muscles are directly incised, then the whole abdominal muscles may be sutured in only three layers viz peritoneum and transverse abdominis, internal and external oblique muscles and the skin. In median incisions where peritoneum is adhered to the linea-alba, these two can be sutured together with interrupted sutures or lock stick pattern. Then subcutaneous and skin sutures should be applied preferably with non-absorbable sutures.

POST OPERATIVE CARE:

Routine ASD & antibiotic therapy

If the incision is made in ventral abdomen the animal should be fed with easily digestible food and in less quantity for about two weeks.

REMARKS:

In larger animals such as buffaloes, the incision on ventral aspect of abdomen should be avoided if possible.

When the two oblique muscles are quite thick, these should be sutured separately & preferable by interrupted sutures.

PRACTICAL-12

Date _____

RUMENOTOMY IN BOVINE

INDICATIONS:

Severe or persistent ruminal impaction

Severe frothy bloat

Removal of phytobezoars, trichobezoars or any other foreign bodies from rumen or reticulum.

Removal of ruminal contents prior to surgical repair of diaphragmatic hernia.

Exploratory purposes.

SITE OF OPERATION:

1. Left mid paralumber fossa
2. Left cranial paralumber fossa near to last rib (in cases of larger animals or in cases where reticulum has to be approached).

SURGICAL ANATOMY:

The rumen occupies almost whole left half and some ventral right half of abdominal cavity. The rumen extends from 7th-8th intercostal space to pelvic inlet. The rumen is opened through its dorsal sac. The structures to be divided in rumenotomy include skin subcutaneous fascia, external oblique muscle, internal oblique muscle, transverse abdominal muscle, peritoneum and the ruminal wall.

The nerve supply to the left paralumber fossa is mainly by thirteenth thoracic, first and second lumbar spinal nerves. The third lumbar spinal nerve also supplies a small cutaneous branch in the caudal aspect of paralumber fossa..

The blood supply to the site is by phrenico- abdominal and deep circumflex-iliac vessels. However, no major vessel is located at the site of incision.

SPECIAL INSTRUMENTS:

Rumenotomy set (Weingarh set or Mc'limtoch set)

Suction pump

Hose pipe

Siphoning tube (with a diameter of at least 3" to 4")

ANAESTHETIC TECHNIQUE:

1. Para-vertebral nerve block
2. Inverted 'L' regional nerve block
3. Local linear nerve block

SURGICAL PROCEDURE:

An 18-20 cms long vertical skin incision starting about 3-4 cms below the transverse process of the lumbar vertebral is made.

The abdominal muscles and peritoneum are also incised corresponding to the skin incision.

The Weingarh's ring is now fixed to the abdominal wall with the help of screw fixed at dorsal aspect of incisional wound.

The rumen is now exteriorized and fixed in the Weingarh set with the help of two strong tissue forceps placed at dorsal and ventral aspect at least 12 cms apart. The forceps are now hooked tightly into the

frame (ring) of rumenotomy set. Thick gauze should always be used to cover the grasping edges of the tissue forceps before applying them on rumen to minimize trauma.

In case of non-availability of rumenotomy set, the rumen can be fixed temporarily to the skin edges by through & through mattress sutures applied dorsally and ventrally. Now abdominal wound is packed tightly by surgical shrouds all around the exteriorized rumen to prevent entry of ruminal contents into the abdominal cavity during its removal later.

The exposed part of the rumen is now incised for about 8-10 cms and rumen hooks are applied into the cut edges and hooked into ring. About 6-10 such hooks are applied to the exposed rumen. After finishing the required job the ruminal cut edge are thoroughly cleaned after removal of hooks and sutured by a double row of continuous Lamberts and Cushing using absorbable suture material.

The wound is again cleaned. The shrouds are also discarded and fresh sterilized shrouds are used to drape the animal.

The abdominal wound is sutured in a routine manner.

POST OPERATIVE CARE:

The animal should be kept on light diet for about two weeks post surgery.

REMARKS:

- The instruments, which get contaminated during removal of ruminal contents, should be discarded immediately.
- The surgeon should scrub his hands freshly to close incisional wound.
- The ruminal hooks should be counted before and after their application to avoid inadvertent leaving of any of those into the rumen in case of accidental dropping.

URETHROTOMY IN BOVINES

INDICATIONS:

Obstructive urethral calculi

SITE OF OPERATION:

1. Post scrotal site: About 3 inches behind the scrotum along the median line. This is used for removal of calculi at the sigmoid flexure.
2. Sub ischial site: About 7-8 inches behind the scrotum along the median line. It is used for removal of calculi lodged in sub-ischial area.
3. Ischial site: About two inches below the ischial arch downwards along the median line. It is used to remove calculi closed to ischial arch.

SURGICAL ANATOMY:

The urethra of an adult bullock/bull is over a meter long and about one quarter of its length is taken up for the formation of 'S' shaped sigmoid flexure which present caudally and dorsally to the scrotum.

The urethra is made of two parts, the pelvic and extra pelvic part. The pelvic part is about 10-12 cms long and is of small uniform caliber. The urethral lumen is kinked and narrow at the ischial arch. At the ischial arch the urethra passes between the bulbourethral glands, which open into the urethra under a fold of mucous membrane, and forms a blind pouch of about 1 cm deep on the dorsal wall of urethra. The extra pelvic part of urethra passes between the two crura of penis and runs along the groove on the ventral surface. It passes through the glans penis at the end and opens via external urethral orifice. The lumen of the extra pelvic part of urethra decreases gradually towards the external urethral orifice. The nerve supply to the various muscles of the penis is through the dorsal nerve of penis. This nerve is a branch of pudendal nerve, which arises from ventral branch of third sacral nerve mainly.

The blood supply comes from the branches of internal pubic artery.

SPECIAL INSTRUMENT:

A hard polyethylene catheter of 2.0/2.5 or 3.0 mm diameter

ANAESTHETIC TECHNIQUE:

Linear infiltration of local analgesia

CONTROL:

1. For post scrotal and sub ischial site: Right lateral recumbency with left hind limb tied anteriorly.
2. For ischial site: Standing position with tail tied towards one side.

SURGICAL PROCEDURE:

A 6 cm long skin incision is given at the proposed site. The subcutaneous tissue and fascia is bluntly dissected to expose the two retractor penis muscles lying on either side of penis. The muscles are bluntly dissected longitudinally to expose the penis.

The penis is now levered out of the skin incision with the help of a curved artery forceps. However, it cannot be taken out from ischial and sub ischial sites.

The urethra is palpated on the ventral aspect of this penis. The urethra is thoroughly examined to palpate the obstructing urolith. A nick or small longitudinal incision is given over this calculi, which is then pressed out or retrieved by a forceps. A suitable sized sterilized polyethylene catheter is now passed up the urethra to the urinary bladder. The other end is now passed out of the external urethral opening.

The incision of urethra may be left open if the catheter is snugly fitting otherwise it may be sutured with a swedged-on atraumatic needle with 3-0 absorbable sutures. The exteriorized part of penis is pushed back and the skin wound is sutured in a routine manner. The catheter is now transfixed with prepuce and left in site for a few days.

POST OPERATIVE CARE:

Routine ASD & antibiotic therapy

The inducing catheter is removed after 10 days

REMARKS:

The post scrotal site is the easiest site to approach a larger length of urethra
At urethrotomy sites higher than post scrotal site, haemorrhage is usually more extensive.
Any effort to catheterize the urethra forcefully with a metallic catheter (such as clutch wire) must be avoided as they induce extensive damage to the urethral lining, which becomes prone to infection.
If the urinary bladder of the animal is found full and enlarged prior to operation the bladder should be emptied by per-rectal catheterization before casting the animal for urethrotomy.

PRACTICAL-14

Date _____

RESECTION OF RECTUM IN ANIMALS

INDICATIONS:

1. Irreparable rectal tear
2. Prolapsed of rectum (reposition & retention not possible)
3. Recto vaginal fistula.
4. Rectal fistula and perforating injuries.
5. Necrosis & gangrene of rectum
6. Thromboembolism, infarction and strangulation.

SURGICAL ANATOMY:

The rectum is app. 30 cm long in an adult horse and extends from the pelvic inlet to the anus. The peritoneal part is attached dorsally by the mesorectum, which is the continuation of the mesocolon. The retroperitoneal part of the rectum forms a dilatation called the rectal ampulla, which has thick longitudinal muscle bundles. The anal canal is 5 cm long.

ANAESTHETIC CONTROL & TECHNIQUE:

For rectal resection in large animals low epidural anaesthesia is used. In small animals general or epidural anaesthesia is used.

SURGICAL PROCEDURE:

- i) The rectum is pulled posteriorly as much as possible and a series of 5-7 interrupted sutures using chromic catgut size 0 or 1 with full curved atraumatic needle are inserted around the circumference of the bowel.
- ii) After putting the sutures the prolapsed portion of the bowel is removed with an incision through the tissues about 1.5 cm posterior to the sutures.
- iii) The rectal mucosa, muscularis and serosal layers should be sutured with series of interrupted sutures. The remainder of the bowel will retract pulling the suture anterior to the sphincter.
- iv) All large bleeding vessels should be ligated.

POST-OPERATIVE CARE:

- 1.The patient as for as possible should be given analgesia & frequent epidural blocks to prevent straining in first 5 days after the operation.
 - 2.The patient should be kept on easily digestible green fodder.
 - 3.Anal area should be lubricated with sterile vaseline or lignocaine jelly mixed in on antibiotic ointment namely sofradex.
- A course of antibiotic is preferred after the operation.
Careful digital removal of faeces from rectum can also be tried.

REMARKS:

1. A temporary suture may be tied taking healthy portion of rectum in it with the skin around anal sphincter, so as to prevent quick retaining of prolapsed mass inside the cavity, as it can pose difficulty in suturing of cut portion. These sutures are removed after completion of procedure.

SPLEENECTOMY IN ANIMALS

SITE OF OPERATION:

1. Cranial mid ventral/left paramedian/left paracostal incision in dogs.
2. Anterior flank incision parallel to last rib in case of large animals (ruminants).

TOPOGRAPHIC ANATOMY:

A. CANINES-

1. The spleen is present in the left hypogastric region alongside greater curvature of stomach.
2. It extends from the anterior ends of kidney (left) below the left crus of diaphragm to the middle of the caudal border of the left rib cage.
3. Gastro-splenic omentum attaches it to the stomach.
4. Splenic artery from celiac artery supplies blood to spleen whereas splenic vein drains blood to gastrosplenic vein.
5. The nerve supply to the spleen is from celiac plexus and vagus.

B. RUMINANTS-

1. The spleen is present alongside the left surface of rumen.
2. The dorsal extremity of spleen lies under the dorsal ends of last two ribs and is attached to left crus of diaphragm.
3. The ventral extremity is free and mainly lies opposite the 8th and 9th rib, about 6 inches above the sternal end. The hilus is small and is situated on dorsal third of visceral surface at anterior border.

INDICATIONS:

1. Neoplasm, rupture, torsion, abscess, infarction of spleen.
2. Spleenomegaly

CONTROL AND ANAESTHESIA:

1. Supine position in dogs under general anaesthesia
2. Right lateral recumbency or standing position in ruminant and the anaesthesia is achieved by paravertebral block/local infiltration after proper sedation/ tranquilization.

SURGICAL TECHNIQUE:

CANINES-

1. Make an 8-12 inch long incision through the abdominal wall at proposed site. Following laparotomy exteriorize the spleen.
2. Inject 1-2 ml of epinephrine (1:1000) into splenic artery after putting a loose ligature and immediately ligate the artery. Cut the artery between two ligatures.
3. The splenic vessels are doubly ligated individually and cut in between ligature. After ligating and cutting all the vessels, the spleen is removed.
4. Close the abdominal wound in routine manner.

RUMINANTS-

1. Perform laparotomy, parallel to last rib.
2. Carefully remove the attachments of spleen from rumen leaving the spleen attached to the hilus.
3. Ligate and transfix the splenic vessels at hilus after clamping the vessels with hemostats.
4. The vessels are then severed. Ensure that there is no bleeding from ligated vessels the spleen is carefully removed.
5. Close the laparotomy wound in routine manner.

POST OPERATIVE CARE:

1. Provide fluid therapy in case of excessive blood loss. If possible blood transfusion may be done.

2. Parental antibiotics for 3-5 days.
3. Proper hygiene of surgical wound.
4. Sutures removed after 8-10 days.

IMPORTANT CONSIDERATIONS:

1. Use of epinephrine is contraindicated in neoplasm and abscess of spleen.
2. Proper ligation and transfixation should be ensured.
3. Gentle handling of spleen to avoid its rupture.

PRACTICAL-16

Date _____

END TO END ANASTOMOSIS OF INTESTINE IN BOVINE

INDICATIONS:

- 1) Intestinal foreign body leading to necrosis of intestine.
- 2) Intussuception.
- 3) Volvulus
- 4) Strangulation
- 5) Torsion
- 6) Neoplasm
- 7) Gangrene.

SITE OF OPERATION:

Right flank incision.

CONTROL AND ANAESTHESIA:

In bovine, the right flank laparotomy can be undertaken by controlling the animal in standing position in trevis or in left lateral recumbent position. Analgesia at the operative site can be achieved with local anaesthetic by using paravertebral or inverted 'L' blocks.

OPERATIVE TECHNIQUE:

- 1) The affected part of the intestine is located, identified and exteriorized through the laparotomy incision.
- 2) The mesenteric vessels of the part are doubly ligated.
- 3) Intestinal contents are milked away and intestinal clamps are placed.
- 4) The intestine is transected between the crushing and non crushing clamps, taking care to avoid the ligated vessels and the affected segment of the intestine is removed.
- 5) While anastomosing the intestine, care should be taken to avoid any gap due to unequal diameter of the lumen of two segments.

In large animal surgery, single layer inverting, everting and end on pattern or schmieden techniques are mostly used for anastomosis of the intestine.

A) INVERTING TECHNIQUE:

- 1) In this technique, the first suture is placed at the mesenteric border of the each segment and tied within the intestinal lumen.
- 2) Continuous connell sutures are then inserted to oppose cut edges of the intestine.
- 3) Two separate strands of suture material are used on each side of the intestine to meet at anti-mesenteric border.
- 4) Sutures are placed approximately 3 mm apart and 3 to 5 mm from cut ends of intestine.
- 5) The knots should be tied outside the lumen. This results serosa to serosa apposition.

B) EVERTING TECHNIQUE:

The everting technique employs interrupted horizontal mattress sutures to evert the mucosa of intestine. The sutures begin at the mesenteric end as with inverting pattern described earlier. The healing occurs by mucosa to mucosa apposition.

C) END ON TECHNIQUE (Gambie's pattern):

In this technique a simple interrupted suture, penetrates the lumen and passes through a small segment of the mucosa and submucosa on the same side. The suture then penetrates through the submucosa and mucosa towards the lumen of the other side and finally penetrates all the layers to come out at serosal surface. The knot is fixed outside the lumen.

D) SCHMIEDEN TECHNIQUE:

This technique is frequently used in clinical cases, results in serosa to mucosa apposition of the cut ends of the intestine. The suturing begins at the mesenteric border and meet at the antimesenteric border. The knot is tied outside the lumen.

After completion of the anastomosis, the intestinal clamps are removed and patency of the lumen at the anastomotic site is checked. The defect in the mesenteric is closed and the segment is rinsed in normal saline and replaced in the abdominal cavity. The abdominal wound is closed in a routine manner.

POST-OPERATIVE CARE:

- 1) Adequate and appropriate fluid therapy, antibiotics and analgesics should be administered for the first 4-5 days.
- 2) Animal should be kept on liquid and/or soft diet for 3-4 days.
- 3) Restore the normal gastro-intestinal motility and check infection at the operative site.
- 4) The cutaneous wound should receive adequate care till the sutures are removed on 8-10 days.

PRACTICAL-17

Date _____

EXAMINATION OF BODY CONFORMATION

Lameness is an indication of a structure or functional disorder in one or more limbs manifested during progression or in the standing position. One of the predisposing factors of lameness is body conformation especially of limbs.

The conformation is defined as the form or out line of an animal. It includes relationship of form to function. For normal balance the horse's body is divided into three equal parts of visually drawing/ vertical line.

1. Line from point of elbow to whither.
2. Line from tuber coxae to the cranial aspect of stifle.

The above two line should assume perpendicular relationship to the ground surface.

3. Line from point of shoulder to the center of stifle should assume a relatively parallel relationship to the ground surface.

4. From top, a line between whither down through center of back roughly divides the body into two separate halves.

A horse's body should be pleasing and in balance with the limbs.

Some of the body conformations noticed are as under:

1. Body taller at croup than whither
2. Long backed horses
3. Short backed horses.

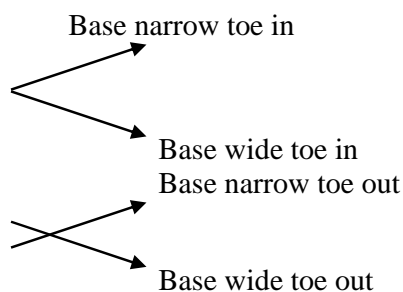
However body conformation does not affect locomotion as commonly as limbs conformation.

LIMBS CONFORMATION:**A. Forelimbs**

Normally both the forelimbs should be straight in cranial view. A line from point of the shoulder should bisect the limb and the toes should point straight forward. The distance between fore feet should be same as distance between bases of limbs.

FAULTS IN CONFORMATION OF FORE LIMBS:

1. Base narrow
2. Base wide
3. Toe in/pigeon toe
4. Toe out/splay foot
5. Plaiting
6. Calf knees/sheep knees
7. Bucked knees/ goat knees/knee sprung
8. Knock knees/ carpus valgus/ knee narrow
9. Bow legs/ carpus Vagus/ Bandy legs
10. Offset or bench knees
11. Tied in knees
12. Cut out under the knees
13. Standing under in front
14. Camped in front



15. Short upright pastern
16. Long upright pastern
17. Long sloping pastern

B. Hind limbs

Normally a line dropped from the point of tuber ischii should divide the limb into equal parts when viewed from posterior.

FAULTS IN HIND LIMB CONFORMATION:

1. Base narrow
2. Base wide
3. Sickie hock
4. Straight behind
5. Standing under behind
6. Camped behind

DETECTION OF LAMENESS:

A. ANAMNESIS

1. Acute/chronic lameness
2. Hot/cold lameness
3. Possible cause
4. Stumbling
5. Recent shoeing
6. Any treatment adopted.

B. CLINICAL EXAMINATION:

1. Visual examination
 - a. **At rest:**
 - i. Position of horse: Any deviation from normal
 - ii. Type of conformation
 - iii. Resting of toe on ground
 - iv. Shifting of weight on limbs
 - b. **At exercise**
 - i. Incoordination in movements of limbs during walk/trot/canter or gallop on hard surface.
 - ii. Movement of head & neck during exercise.
 - iii. Landing on the part of foot.
 - iv. Limb contacts (Brushing, cross firing etc.)

Visual examination at exercise helps in grading the lameness I, II, III or IV.

- I. No lameness in walk but present in trot.
- II. Lameness in walk but no variation in head movements (seen during trot).
- III. Lameness in walk and trot.
- IV. No weight bearing lameness.
2. Examination by palpation and manipulation for painful lessons.
3. Radiography
4. Thermography
5. Angiography
6. Cinematography
7. Electro goniometry
8. Bone scintigraphy
9. Arthroscopy
10. Local anaesthesia/nerve blocks

11. CT scan and MRI
12. Exploratory arthrotomy
13. Biochemical profile/synovial fluid analysis
14. Biopsy
15. Culture/antibiotic sensitivity test of synovia

MEDIAL PATELLAR DESMOTOMY IN BOVINE

INDICATIONS: Recurrent upward fixation of patella with locking.

SURGICAL ANATOMY:

The patella is a large sesamoid bone which develops in the tendon of quadriceps femoris muscle. It is connected to the femur by collateral ligaments and to the cranial tibial tuberosity by patellar ligaments. The patellar ligaments, medial, middle and lateral, are the continuations of the fibrous bands of the quadriceps muscle to the cranial tibial tuberosity. The middle patellar ligament is thick and strong as compared to other two ligaments. The medial patellar ligament is widely separated from the middle patellar ligament at both the ends. The lateral patellar ligament is flat and lies close to the middle ligament at both the extremities.

SITE OF OPERATION:

In the medial aspect of stifle joint where medial patellar ligament inserts into the inner aspect of the anterior tibial tuberosity.

CONTROL AND ANESTHESIA:

1. The animal is controlled in lateral recumbency with the affected limb towards the ground and the upper unaffected hind limb is drawn forward and tied with the fore legs.
2. Affected hind leg which lies downward is dragged backward and is tied with a piece of bamboo in order to expose the stifle joint and to tense the patellar ligaments.
3. Analgesia is achieved by local anaesthetic using linear infiltration at the operative site and site is prepared for aseptic surgery.

SURGICAL TECHNIQUE:

Medial patellar desmotomy to correct upward fixation of patellar in bovine can be performed by two methods:

- a) Open Method.
- b) Closed Method.

A. OPEN METHOD:

1. A small skin incision of about 3 cm in length is made directly over the medial ligament, starting immediately in front of the medial tibial tuberosity, towards the cranial tibial tuberosity.
2. The fascia is dissected to expose the glistening medial patellar ligament. In buffaloes, the fascial layers are thick and highly engorged with blood vessels.
3. The ligament is exteriorized by passing a curved scissors or tenaculum flat wise under the ligament. The ligament is then sectioned near its insertion using a knife.
4. The wound is explored with index finger and undivided fibers of the ligament are severed completely by scissors.
5. The cutaneous wound is closed by three or four simple interrupted or mattress sutures by using black braided silk No.3.

NOTE:

Protrusion of the adipose tissue through the gap created by the cut ends of the ligament, cessation of crunching sound and immediate relief of the characteristic jerky flexions during progression are indications of a successful medial patellar desmotomy.

B. CLOSED METHOD:

1. A stab incision is made into the skin with B.P. blade immediately in front of the medial tibial tuberosity.

2. A pointed knife or Hey groove knife is passed flat wise with its tip fixed in the 'V' shaped groove between the middle and medial patellar ligaments. The sharp edge of the blade is directed towards ligament.
3. The ligament is then transected by withdrawing the knife towards the operator and the scalpel is taken out.
4. Few drops of betadine are poured at the operated site.

POST-OPERATIVE CARE:

1. The animal should not used for hard work for 8-10 days.
2. The antiseptic dressing of the surgical wound is done with tincture iodine or betadine for one week.
3. Skin sutures should be removed on 7th or 8th post-operative day.

PRACTICAL-19

Date_____

APPLICATION OF PLASTER CAST

INDICATIONS:

- Closed fractures of long bones distal to stifle and elbow
- Severe sprain or strain of ligaments of joints distal to stifle and elbow

SITE:

The plaster cast should be applied all around the affected part including at least one joint above & one joint below the affected part. For better immobilization of the affected bone, full limb cast extending as far above to the stifle or the elbow joint should be applied.

SPECIAL REQUIREMENTS:

- ✓ Plaster of Paris impregnated gauge rolls of various sizes (3", 4", 6")
- ✓ Small tub (full of Luke warm water)

ANAESTHETIC TECHNIQUE:

1. General anesthesia particularly for non-cooperating small animals.
2. Deep sedation
3. Epidural analgesia for application of POP in hind limb of large animals.

CONTROL:

2. Lateral recumbency with the affected limb uppermost in most of the cases.
3. Lateral recumbency with the affected limb downward for repair of radius-ulna and metacarpal fracture repair in dogs.
4. Dorsal recumbency with the affected limb suspended alone the patient's body for immobilization of radius ulna fracture in dogs.

PROCEDURE:

- The hair of the intended area for P.O.P. application is trimmed short.
- The affected limb including the foot is cleared and dried

- ➔ In cases of large animals, two holes are drilled in the hoof anteriorly and a long wire is passed through it. This wire is held by an assistant exerting a slow, steady and constant pull to facilitate reduction at the fracture site.
- ➔ In case of small animals adhesive tape stirr-up is applied over the dorsal and palmar/plantar surfaces of foot. This stirr-up is held by an assistant to provide traction.
- ➔ A bandage (or rope in case of large animal) loop is applied in groin or axilla and the counter traction is provided by an assistant in an opposite direction to the that of traction.
- ➔ Talcum powder or Boric acid powder is liberally sprinkled over the intended area for POP application.
- ➔ The fracture is now reduced by traction, counter traction and/or by toggling.
- ➔ The limb is kept as such in the position of reduced fracture.
- ➔ One to two layers of cotton bandages are now applied over the whole area and then moderately thick cotton padding is done over that. Extra padding is done over bony prominences.
- ➔ The POP bandage is now immersed in lukewarm water till bubbles stop coming from the bandage. The bandage is gently squeezed and is applied over the cotton padding with a moderate pressure.
- ➔ The bandage is generally applied from lower most part to upwards. The first two to three turns are applied at exactly the same area whereas subsequent turns overlap the preceding turn by one half of its width.
- ➔ Each layer is smoothed with hands and also by moistened cotton by an assistant. This provides a good bond of POP with the preceding layer.
- ➔ One by one other POP bandages are similarly applied till adequate thickness of POP cast is achieved.
- ➔ At the knee & hock joint the plaster is applied in the figure of eight fashion to prevent breakage of POP just below these joints.
- ➔ The plaster cast is kept moist through out its application.
- ➔ When the application of the cast is complete, the surface of the cast is rubbed with hand to provide a smooth & hard coating.
- ➔ The traction & counter traction bandages are removed.
- ➔ The animal is kept in cast position until plaster hardens. Usually one hour for thinner cast and four to five hours for thicker cast are required for adequate hardening.

POST OPERATIVE CARE:

- Restricted movements for first few days as the plaster may take 36-48 hours to get completely hard.

- Thereafter also only limited movement of the animal should be allowed throughout the period of application.
- Antibiotic therapy
- Prevention of self-mutilation.
- The animal is examined closely for first few days for any development of pressure sore. If the cast is too tight, it should be removed & reapplied.
- Periodic radiographs to examine the fracture healing process should be taken preferably every fifteen days.
- After radiographic evidence of fracture healing the cast is removed approximately in about 4-6 weeks in young animals and in 8-10 weeks older and larger animals.

REMARKS:

- In large animals, hoof is not included in POP cast, whereas in small animals only two central toes of the fingers are kept outside the POP cast.
- If the water in which the POP bandages are being immersed is too hot, the cast will set too rapidly and will not allow time to constitute a good cast in a one solid unit. However, too cold water causes delay in setting time thus prolonging the period of restraint of the animal.
- POP cast should be used only for those closed fractures, which can be reduced optimally. The fractures with unmanageable overriding are better treated by other means.
- If POP cast is to be used for open fracture, a window in the cast has to be made for antiseptic dressing (ASD) and proper evaluation of the wound.
- For larger and heavier animals, the bamboo, PVC or aluminum splints usually placed on dorsal and planter aspects can reinforce the cast. However, additional POP bandages are required with the concomitant use of these splints.
- The cast should not be too tight. The rule of thumb is that one finger should go under the upper margin of cast easily.
- In heavy animals, the cast should be periodically checked for development of any crack. Usually it becomes necessary to replace the POP cast after two weeks in such animals.
- The adult large animals (+300 Kg) require about 8-12 six inches rolls for full limb cast with splints.
- The small animals may need just 3-6 three to four inches POP rolls.

APPLICATION OF HANGING PIN CAST

INDICATIONS:

Closed fractures of tibia and radius and ulna in large heavy animals where plaster cast alone cannot provide adequate stability because of the heavy musculature in the proximal area.

SITE:

Same as for limb plaster cast.

SPECIAL INSTRUMENTS:

- i) Electric heavy-duty bone drill, Steinmann pins of different diameters, pin cutter, rasps and pin bender.
- ii) All equipments and things required for plaster cast application.

ANAESTHETIC TECHNIQUE:

1. General anaesthesia
2. Epidural analgesia may be employed for procedure in hind limbs.

CONTROL:

Lateral recumbency with the affected limb upwards.

PROCEDURE:

- ❖ The proximal tibial area is prepared as for aseptic surgery.
- ❖ A sufficiently thick Steinmann pin is driven through a nick in the skin of lateral aspect of proximal tibial or radius ulna region. The pin is introduced into all layers of tissue into the bone and out from the fan cortex through all layers of soft tissue to the out side of skin in the medial aspect.
- ❖ The drill is removed and the pin is cut after leaving about two three inches or either side of limb.
- ❖ The haemorrhage is controlled and cut ends of the pin are rasped smooth.
- ❖ A thick gauze piece impregnated with an antiseptic solution is placed over the area from where the pin is introduced and exited.
- ❖ The fracture is now reduced and plaster of Paris bandages are applied all over the limb as routinely. The bandages should involve the Steinmann pin in it. The pin now will not let these bandages slip over the thick muscles of the surrounding area.

POST OPERATIVE CARE:

Same as for routine plaster cast application.

REMARKS:

- ❖ Extreme care should be taken while introducing Steinmann pin. Any major vessel should be avoided. There should not be wobbling in the pin during its introduction as this would create much bigger hole in the bone and may create a fracture itself.
- ❖ The direction of pin should be perpendicular to the long axis of bone and it should pass through the bone at middle.
- ❖ The placement of pin should be sufficiently away from the articular surface as well as from the fracture site.

APPLICATION OF K-NAILS IN CALVES**INDICATIONS:**

Management of long bone fracture of humerus, femur, radius and tibia.

SPECIAL EQUIPMENTS:

K-nails of appropriate size and diameter, suitable drills, guide wire, bone holding forceps and other instruments required for fracture repair of long bones.

CONTROL AND ANAESTHESIA

Lateral recumbency with affected limb on upper side. Local/regional anaesthesia under proper sedation.

SURGICAL TECHNIQUE:

1. Expose the fractured bone depending upon the bone involved.
2. Reduction of bone fragments is done.
3. Drill the proximal fragment through medullary cavity at dorsal aspect to come out through cortex and skin.
4. Intramedullary nail of appropriate size is inserted into medullary cavity with the help of guide wire.
5. Guide the nails into medullary cavity of distal fragment so as to fix it into epiphysis.
6. The exposed part of K nail is cut.
7. The skin wound is closed in routine manner.

POST OPERATIVE CARE

1. System antibiotics and analgesics.
2. Antiseptic dressing, till sutures are removed.
3. Sutures are removed after 8-10 days.

PRECAUTION:

To prevent rotation, modified Thomas splint can be applied.

INTRAMEDULLARY PINNING OF FEMUR IN DOG

INDICATIONS:

Management of femur fracture by open reduction.

SITE OF OPERATION:

Cranio-lateral incision, extending from slightly caudal to the greater trochanter to the lateral condyle of the femur.

CONTROL AND ANAESTHESIA:

Animal is positioned in lateral recumbency with the affected limb up and general anaesthesia is administered after proper premedication. The femoral area is prepared for aseptic surgery.

SURGICAL ANATOMY:

The femoral bone is covered and supported by the two major muscles, vastus lateralis and biceps femoris. The superficial fascia and the tensor fascia lata covers these two muscles.

OPERATIVE TECHNIQUE:

- 1) The femoral diaphysis and metaphysis is approached through a cranio-lateral skin incision made on the lateral aspect, extending from slightly caudal to the greater trochanter to the lateral condyle of the femur.
- 2) The subcutaneous tissue and superficial fascia are incised directly under the skin incision.
- 3) Fascia later is incised to the entire length of the skin incision along the cranial border of the biceps femoris muscle aponeurosis.
- 4) Biceps femoris and vastus lateralis are reflected caudally and cranially respectively after excising the inter-muscular septum between these muscles to expose the shaft of femur.
- 5) After locating the site of fracture, the proximal bone fragment is elevated and an intramedullary pin which almost fills the diameter of the medullary canal is inserted into the proximal fragment and the pin is withdrawn through the skin after making stab incision at the trochanteric fossa.
- 6) The fracture is reduced and the proximal and distal bone fragments are aligned and the pin is then inserted in the distal fragment and anchored at the distal extremity thus immobilizing the fracture.
- 7) After accomplishing the open reduction, the muscles are apposed and the fascia later is sutured and finally the skin is sutured in routine manner.
- 8) The skin around the protruding pin at trochanteric fossa is depressed and the pin is cut as short as possible to buried subcutaneously. A simple interrupted suture is applied on the skin to close the hole.

POST-OPERATIVE CARE:

- 1) A course of antibiotics and analgesics should be administered for 5-7 days.
- 2) Exercise should be limited for 3-4 weeks period.
- 3) If necessary, limb should be immobilized by application of modified thomas splint.
- 4) Careful clinical and radiographic evaluation of fracture healing process should be done.
- 5) Skin sutures should be removed 8-10th post-operative day.
- 6) Intra-medullary pin should be removed after complete fracture healing as evidenced by clinical and radiographic evaluation.

PRACTICAL-23

Date _____

DIGITAL FLEXOR TENOTOMY IN BOVINE**INDICATIONS:**

Contraction of superficial / deep digital flexor tendons (Knuckling) or deformity due to partial or permanent flexion of the fetlock or interphalangeal articulations.

SITE OF OPERATION:

Outer aspect of the limb at the level of lateral border of tendon in the midway point of metatarsal region or at the inner aspect of the limb on the anterior border of the tendon about 1 cm below the middle of metacarpus.

SURGICAL ANATOMY:

In cattle, the superficial digital flexor divides into two bellies, superficial and deep, terminating on tendons at the distal part of the forearm. The superficial tendon joins the deep tendon about the middle of metacarpus. The conjoined tendon bifurcates, and passing under the two digital annular ligaments, they are inserted into the volar surfaces of 2nd phalanges by three slips. The deep digital flexor divides near the distal end of the metacarpus into two branches, which are inserted into the volar surface of the 3rd phalanx.

NOTE:

- 1) In some cases, the flexion deformity improves spontaneously.
- 2) In mild cases, treatment is not required because daily normal walking exercise is sufficient to stretch the tendons.
- 3) In other cases, affected joint has to be kept in forced extension by splint or a plaster cast.
- 4) Radiography of the affected joint should be done prior to tenotomy to rule the evidence that the tendons are involved or the bones are affected.
- 5) Tenotomy should be performed if the contraction of tendon or deformity can not be corrected by stretching the limb under general anaesthesia or (2nd)/(3rd) points mentioned above fails.

CONTROL AND ANAESTHESIA:

The animal is selected controlled in lateral recumbency with the affected limb lower most. The operative site is prepared for aseptic surgery. The site of operation is infiltrated by linear infiltration using 2% lignocaine hydrochloride to obtain local analgesia.

SURGICAL TECHNIQUE:

- 1) A 2cm long skin incision is made on the medial aspect of the limb between the two flexor tendons.
- 2) A mid metacarpal or metatarsal site is preferred since it lacks the synovial sheath.
- 3) The subcutaneous tissues are separated by blunt dissection, and the blood vessels are identified and retracted.
- 4) A small tenotome or curved knife is pushed between the two tendons.
- 5) Both the tendons are identified and separated by blunt dissection.
- 6) The affected tendon is transected while forcibly extending the fetlock joint.
- 7) The skin wound is then sutured routinely.

- 8) The limb should be put under the plaster cast just below carpers tarsus.

Z-TENOTOMY:

This technique is used for lengthening of the tendon for correction of the contracted tendons. A longitudinal incision is made in the centre of the exposed tendon. At each end of the incision, a transverse incision is made but in apposition direction. The ends are then sutured. The skit incision is closed and plaster cast is applied on the limb.

POST-OPERATIVE CARE:

- 1) A course of antibiotic is desirable, if infection is suspected.
- 2) The plaster cast should be kept for 3 to 4 weeks.
- 3) Skin sutures should be removed 8 to 10 days after operation and plaster cast is reapplied.
- 4) Following removal of plaster cast at 3rd or 4th week, the physiotherapy for the treated limb should be suggested.

AMPUTATION OF DIGIT (CLAW) IN BOVINE

INDICATIONS:

1. Irreparable injury.
2. Foul-in the foot of the digit
3. Gangrenous dermatitis

SURGICAL ANATOMY:

The three bones of digit are

1. Os- suffragins as first phalanx
2. Os-corona as second phalanx
3. Os-pedis third phalanx

The respective interphalangeal joints are

1. The suffragine-coronal (first interphalangeal joint)
2. The corono-pedal (second interphalangeal joint)

ANAESTHESIA & CONTROL

- Planter retro block
- Intravenous retrograde anesthesia
- General anesthesia

SURGICAL SITE

1. Through the corono-pedal joint, leaving the coronary band intact
2. Through the lower third of the os-suffragins

SURGICAL TECHNIQUE

A tourniquet is applied above to knee to control bleeding.

TECHNIQUE I

For amputation through the second interphalangeal joint:

1. The wall of the hoof is pared, leaving only a thin layer of horn.
2. A horizontal incision over the thinned hoof, close to and below the coronary band, cutting through the horny tissue and sensitive laminae, is made, and the interphalangeal joint is reached.
3. Disarticulate through the joint and complete the amputating digit.

TECHNIQUE II: -

Amputation through the lower third of the first phalanx, above the first interphalangeal joint:

1. The skin is incised horizontally above the coronary band & another vertical incision on the lateral aspect of the pastern is made to join it, so as to raise two skin flaps & expose the lower portion of the first phalanx.
 2. The first phalanx is cut horizontally with a saw and the amputation is completed.
- After amputation the digit by any one of the above 2 methods, the tourniquet is removed & further haemorrhage is controlled by ligating the bleeding vessels & by gauze packing. The skin flaps are sutured and a bandage is applied.

The sutures are partially removed to remove the gauze packing the next day and after wards the wound is treated on general principles.

AMPUTATION OF FORE LIMB

INDICATIONS:

1. Severe trauma or mangling of the body part
2. End stage osteomyelitis
3. Gangrene
4. Neoplasia
5. Total loss of neurological function results in limb dysfunction.

ANAESTHESIA AND CONTROL:

General anesthesia, recumbent state

The pectoral limb is amputated using one of two specific techniques, fore quarter amputation, which includes scapulolectomy or a scapulohumeral disarticulation.

1. The animal is placed in lateral recumbency with the affected leg uppermost, resting on a sand bag. The distal extremity of leg is draped.
2. A semi circular skin incision is made on the lateral aspect of the limb extending from the line through the middle of the humerus down to the elbow joint. The leg is then abducted and the incision joined by corresponding incision on the medial aspect.
3. The skin flap is reflected on the lateral aspect to expose the long and lateral heads of the triceps brachii muscle, the brachio cephalicus muscle and the cephalic vein, which is ligated.
4. The common tendon of insertion of the triceps brachii is severed and the muscle mass reflected proximally to expose the brachialis muscle where it curves around the lower third of the humerus and the superficial radial nerve, which is severed proximally.
5. The brachialis and brachio cephalicus muscles are severed and reflected to expose the lateral aspect of the shaft of the humerus.
6. The animal is turned over and the skin flap on the medial aspect reflected to expose the biceps brachii muscle, the brachial artery and vein which are ligated and the ulnar nerve, which is severed proximally.
7. The biceps brachia muscle is severed just proximal to where it divides to be inserted on to the ulna and is rejected.
8. The leg can now be amputated by sawing through the shaft of the humerus using a hacksaw blade or giggly wire saw.
9. The ends of the severed muscles are sutured together with interrupted chronic catgut sutures to form a protective muscle pad over the stump of the humerus. The brachialis & biceps brachii muscles are first sutured together over the stump & then the brachio cephalicus and triceps brachii muscles.
10. After the ends of the muscles have been sutured together, care must be taken to ensure that their edges are also co-apted.
11. The skin flaps are co-apted with interrupted mattress sutures using mono-filament nylon and the edge of the wound protected by over sewing a gauze pad.

AMPUTATION OF HIND LIMB

The pelvic limb is amputated using one of two specific techniques:

- I) **COXO-FEMORAL DISARTICULATION**
- II) **MID-DIAPHYSEAL FEMORAL AMPUTATION-**

There is no inherent advantage in one technique over the other, however the mid shaft technique may be considered more cosmetically acceptable by the owners of male dogs because it will cover the genitals.

SURGICAL TECHNIQUE

- 1) The leg is draped & positioned.
2. A semi circular skin incision is made on the lateral aspect of the leg, extending from a line through the lower third of the thigh down to stifle joint. The leg is then abducted and the incision joined by a corresponding incision on the medial aspect.
3. THE skin flap is reflected on the lateral aspect to expose the sartorius, , quadriceps femoris, biceps femoris muscles and the fascia lata.
4. The fascia lata is incised along the length of the attachment to the biceps femoris muscle.
5. The quadriceps femoris & biceps femoris muscles are separated by blunt direction to expose the lateral aspect of femur.
6. The tendon of insertion of the quadriceps femoris muscle and the anterior belly of the sartorius muscle are severed proximal to the patella & reflected to exposes the lateral aspect of the femur and the distal posterior femoral artery, which is ligated.
7. The aponeurosis of insertion of the biceps femoris is incised transversely and the muscle reflected to expose the popliteal artery, the sciatic nerve and the abductor, semimembranosus and semitendinosus muscle. The popliteal artery is ligated and the sciatic nerve divided proximally.
8. The animal is turned over and the skin flap on the medial aspect reflected to expose the posterior belly of the sartorius and the gracillus muscle. These muscles are severed and reflected to expose the femoral artery and vein, which are ligated, and saphenous nerve which is divided proximally.
9. Also exposed are the semi membranous and semi tendinosus muscles, which are severed together which the underlying abductor muscle to expose completely the shaft of the femur.
10. The leg can now be amputated by sawing through the shaft of femur using alacusane blade and the operation completed in the manner described for coapting an amputated front leg.

REMARKS

- 1.The limb should be removed as near to the trunk as possible.
- 2.Hemostasis is critical; replace fluid or blood lost during the surgery.
- 3.Strive for speed in the surgery to prevent excessive haemorrhage & soft tissue drying.
- 4Never ligate large arteries & vein together because an arterio-venous fistula may develop.
- 5.Be certain that animals general condition can tolerate such a traumatic procedure.
- 6.Never amputate a limb in the face of thoracic metastasis, unless the pain is excessive.

AMPUTATION OF TAIL

INDICATIONS:

1. To improve the appearance of the animal
2. Injury as neoplasm of the tail
3. Tail gangrene

SURGICAL ANATOMY:

1. The skeletal framework of tail is made up of coccygeal vertebrae of which number varies with species to species.
2. The paired muscles of the tail are enclosed in the strong coccygeal fascia, which is loosely attached at the root of the tail.
3. Sacro- coccygeal dorsalis muscles lie on either side of the dorso-median aspect of the tail.
4. Sacro-coccygeus lateralis muscles lie immediately lateral to dorsalis.
5. Sacro-coccygeus ventralis lies on the ventral aspect of the sacrum and coccy.
6. Inter transversalis caudae consists of muscles bundles and lies on the lateral aspect of the tail between sacro- coccygeus lateralis & ventralis.
7. The blood supply to the tail is through the middle and lateral coccygeal arteries and nerve supply by coccygeal nerves.

SITE OF OPERATION

Above the injury or seat of infection at the intervertebral articulation.

ANESTHESIA & CONTROL:

1. Large animal is controlled in standing or in recumbent position & small animal on the operation table in recumbent position.
2. Anaesthesia is achieved by infiltrating local anaesthetic solution subcutaneously encircling the tail above the site of operation or by posterior epidural anesthesia.
3. In uncontrollable animal sedative as tranquilizers may be required.

SURGICAL TECHNIQUE:

1. Tourniquet should be applied on the back of the tail.
2. Two 'V' shaped flaps one on dorsal and the other on ventral side are made at the site of operation after palpating the articulation.
3. Prominent vessels at the lateral and ventral aspect are identified and ligated proximal and distal to the proposed site of amputation.
4. Intervertebral space is located by blunt dissection and the joint is disarticulated with the help of BP blade. The distal portion of the tail is then removed.
5. Skin flaps are united by simple interrupted or interrupted mattress sutures.

POST-OPERATIVE CARE:

1. Sutures are removed 7-8 days after surgery or after complete healing
2. Daily antiseptic dressing is to be done.

PRACTICAL-21

Date_____

**LANDMARK FOR APPROACHES TO VARIOUS VISERAL
ORGANS IN LARGE ANIMALS**

THORACIC CAVITY**BOVINE**

Procedure	Site of Incision
Thoracocentesis, drainage of pericardial sac	5th to 7th inter costal space
Pericardiectomy/Pericardiotomy	5th inter costal space or 5th rib
Diaphragmatic herniorrhaphy	7th rib
Diaphragmatic abscess	6th or 7th rib
Lobectomy	7th rib
Pneumonectomy	4th to 5th rib
Transthoracic oesophagotomy	8th rib

ABDOMINAL CAVITY**EQUINE**

Flank incisions/ approaches	Approachable organs & structures
Right flank incision	Base & apex of caecum, ileocaecal junction, middle portion of the right ventral colon, right internal inguinal ring, right kidney & ovary.
Left flank incision	Pelvic flexure of colon, left ventral colon, spleen, left kidney, left internal inguinal ring & the left ovary
Ventral approaches	
Mid line incision	Greater exposure of abdominal organs for caesarian scission, enterotomy in volvulus or torsion as in caesarean section.
Paramedian incision	Abdominal organs, better exposure of the bladder and uterus with surgery.

CATTLES	
Flank approaches	Approachable organs & structures
Upper last flank approaches	Exploratory laparotomy, rumenotomy, left flank abomasopexy, repair of ruptured bladder & removal of mummified or macerated foetus.
Lower flank incision	Caesarian section in cows & buffaloes
Upper right flank approach	Exploratory laparotomy, abomasopexy, omentopexy, surgical correction of intestinal obstruction & caecal dilatation.
Ventro-lateral oblique incision	Caesarian section in cows & buffaloes
Ventral approaches	
Paramedian incision	Abomasopexy, caesarian section
Median incision	Generally used to expose the non-pregnant genitalia in small ruminants for experimental purposes
Post –Xiphoid incision	Diaphragmatic repair in DH, to remove extra articular abscesses & to incise diaphragmatic abscesses.

PRACTICAL-22

Date_____

LANDMARK FOR APPROACHES TO VARIOUS VISERAL**ORGANS IN SMALL ANIMALS****DOG & CAT****THORACIC CAVITY**

Thoracic structure and/or surgical problem	Inter costal space (left side)	Inter costal space (right side)
Thoracic trachea	-	3
Cranial mediastinal oesophagus (cranial to heart)	3-4	3-4
Patent ductus arteriosus, persistent right aortic arch, Pulmonic stenosis	4	-
Esophagus (at heart base) cardio pulmonary bypass	-	4-5
Cranial lung lobe, pericardium	5	5
Middle lung lobe	-	6
Caudal lung lobe, accessory lung lobe	5-6	5-6
Esophagus (caudal to heart base), diaphragm	7-10	7-10
Thoracic duct, dog; thoracic duct, cat	-	8-10
Intervertebral disc fixation	8-10	-
T ₁₀ to L ₂	11	11

ABDOMINAL CAVITY

Ventral midline approach	-	For almost all the abdominal organs
Paramedian approach	-	For unilateral cryptorchidectomy, prostatectomy, cystotomy.
Flank approach	-	Good access to dorsally located abdominal organs including kidney, ovaries and uterus.
Lower flank (right)	-	Lower flank, above the mammary gland for caesarian sections.
Para costal approach	-	Provide access to the cranial and ventral part of the abdominal cavity including organs such as stomach, spleen and caecum.
Combined midline para-costal approach	-	Increased access to the cranial abdomen
Combined paralumber paracostal	-	Can be combined with approach trans diaphragmatic incision to give access to both thoracic and abdominal cavity. On the right side access can be obtained to the portal vein, abdominal vena cava, intestines, and liver

PRACTICAL-23**Date**_____**TECHNIQUES OF PARACENTESIS****I. ABDOMINOCENTESIS****INDICATIONS:**

Differential diagnosis of colic is of critical importance in peritonitis and mainly in cattle where chances of peritonitis are more.

SURGICAL SITE:

-Lowest point of abdomen at linea alba.

ANASTHETIC TECHNIQUES & CONTROL:

If fine needle is used, no need of anaesthetic agents, but with a larger needle local anesthesia can be infiltrated at site.

SURGICAL PROCEDURE:

1. First detect the linea alba, clip & shave the area.
2. Insert 18G needle (4cm) through the abdominal wall at the linea alba on the lowest point of abdomen.
3. Then move the needle slightly to correctly place it to enable free flow of peritoneal fluid.
4. At least four attempts are made before calling paracentesis as negative & these should be made 6-8cm away from the primary puncture.

REMARKS:

- i) Sterile plain tube is to be used for collection.
- ii) EDTA is used as a preservative.
- iii) The collected sample should be divided, one, one half for the total nucleated cell count as for blood, and the other half for cytological examination and differential white cell counts. Centrifuge for the latter at 1500 rpm for 5 minutes.

II. RUMINOCENTESIS

From the left flank region with the help of 18 gauze needle (5inch in length).

III. LIVER BIOPSY

INDICATIONS:

1. To confirm a lab diagnosis
2. To determine the nature & severity of structural changes.
3. To investigate on underlying biochemical defect i.e. measurement of heavy metal accumulations, measurement of certain vitamin levels & their precursors.
4. Histochemical determination of certain inherited disorders like copper toxicosis.

SURGICAL SITE :

1. Cattle –

The site is between 11th & 12th ribs, 15-20 cm from the dorsal midline according to animal's age & size. When the 14th rib is present, the site is in the 3rd last intercostal space.

2. Calves -

In calves the point of insertion is between 11th & 12th ribs at a point in lines with transverse process of the lumbar vertebrae.

CONTROL & ANAESTHETIC TECHNIQUE:

The animal is restrained against a gate or fence with the right side facing the operator. The sites & deeper structures are infiltrated with 2% Xylocaine.

Instrument used is trocar & canula.

SURGICAL PROCEDURE:

1. The skin is incised about 12mm (1/2") parallel to the ribs.
2. The trocar & canula is introduced through the intercostal muscles and peritoneum until the liver is reached.
3. Negative pressure is induced and the care is collected. Care should be 2-4cm long to weigh about 0.25-0.5 gm.

POST OPERATIVE. CARE ;

- Regular ASD of the area.
- Systemic hemostats.

IV. OCCULAR PARACENTESIS

INDICATIONS:

Intraocular filariasis

SITE OF OPERATION: Limbus of the eye

SPECIAL EQUIPMENT: -

Bard-parker blade size 15 or 5 cm long, 15 gauge needles with glass syringes, eyelid retractor.

CONTROL & ANAESTHESIA:

The animal is controlled in recumbent position after proper tranquilization/sedation keeping the affected eye upper most. Anaesthesia is obtained by auriculo-palpebral and retro-bulbar nerve blocks & topical application of surface anaesthetic.

SURGICAL TECHNIQUE:

1. The incision is made at 6 o' clock or 12 o' clock position on the limbus with a No.15 BP blade after retracting the eyelids.
2. The parasite tries to escape along with the aqueous humour & comes outside.
3. Alternatively after retracting the eyelids a 15 gauge, 5cm long needle mounted on a 2ml glass syringe is introduced into the anterior chamber at the dorso-medial position on the limbus.
1. The level of needle is maneuvered in different directions and as the parasite, trespasses the level, it is immediately aspirated.

POST OPERATIVE CARE:

1. It is advisable to inject hydrocortisone acetate into the affected anterior chamber.
2. Cortisone-neomycin ophthalmic ointment for topical application.
3. Cornea generally clears in 2 to 3 months.

V. ANTHROCENTESIS**INDICATIONS:**

1. For diagnosis of affections of joints e.g. arthritis, synovitis etc.
2. For removal of infected synovia from affected joint.
3. For collection of fresh synovia for treatment of infected joint from healthy joints.

TECHNIQUE:

1. The affected joint is palpated for the intraarticular space & the site is prepared.

2. The skin over the depression is punctured and Xylocaine is infiltrated at the site.
Thereafter a 18 gauze needle (2.5 cm) is inserted into the cavity & the fluid is aspirated.

REMARKS:

1. Extreme sterile conditions using sterile instruments is to be practiced.
2. Infiltration of antibiotic into the joint after withdrawal of synovia is also recommended to prevent contamination from shin.

PRACTICAL-24**Date**_____**TECHNIQUES FOR OBTAINING CEREBROSPINAL FLUID****INDICATIONS:**

1. For evaluation of disease of CNS and response to treatment.

ANAESTHETIC CONTROL:-

Tranquilization

TECHNIQUE:**BOVINE-**

CSF in case is removed either by sub-occipital or lumbar puncture. Site is between the dorsal process of the last lumbar vertebrae and the anterior end of the median sacral crest.

1. Before puncturing, the area is clipped, shaved & disinfected.
2. 5 inch, 14-16 gauze needle with stylet is used.
3. Sub-arachnoid space is punctured to fluid is with drawn in a sterile syringe.

HORSES-**SITE:**

Sub-occipital puncture between atlas & axis.

CANINE:

At cisterna magna at the atlanto-occipital articulation.

PRACTICAL-25**Date**_____**LAPAROTOMY (COELIOTOMY) IN CANINE****INDICATIONS:**

- Gastronomy
- Enterotomy/ Enterectomy
- Cystotomy/ Cystorrhaphy
- Nephrectomy
- Splenectomy
- Hysterotomy/hysterectomy
- Ovariohysterectomy
- Oophorectomy
- Exploratory purposes

SITE OF OPERATION:

Ventral Midline incision – (Cranial or caudal)

The incision is given on linea alba.

Para-median incision - (Right/Left and cranial/ caudal)

Para-rectal incision - (-do-)

Para-costal incision - (Left/Right)

The incision is parallel to last rib.

Flank incision (Right/Left and vertical/oblique)

The incision is given on the hollow of the flank.

SURGICAL ANATOMY:

The abdominal cavity is limited anteriorly by the diaphragm and posteriorly by the pelvic inlet. The lateral wall is formed by three abdominal muscles namely obliquus abdominis externus, obliquus abdominis internus and transverse abdominis. The ventral wall is formed by rectus abdominis and aponeurosis of all the abdominal muscles. The dorsal wall is limited by lumbar vertebrae and their transverse processes.

The external obliquus abdominis is the most superficial and originates from middle portion of third to twelfth ribs and also from the entire lumbar area of thoracolumbar fascia. It courses mainly caudoventrally and inserts on the linea-alba and prepubic tendon by its aponeurotic portions. The caudal most portion of this muscle thickens and forms inguinal ligament.

The fibres of obliquus abdominis internus are cranioventral that is at the right angle to that of obliquus abdominis externus. This muscle originates from the thoraco-lumbar fascia and the cranial iliac spine. It inserts along the costal arch to the lateral border of rectus abdominis.

The transverse abdominis is the deepest of all the abdominal muscles and lies just outside the transverse fascia. It originates from the medial side of costal arch as cranial as the xiphoid cartilage and the transverses thoracic. Its lumbar part originates from thoraco-lumbar fascia. Its fibers course

transversely to attach to an aponeurosis, which passes deep to the rectus abdominis to join linea-alba.

The rectus abdominis lies longitudinally arising by broad flat tendon over the sternal costal cartilage and insert on the prepubic tendon.

The transverse fascia covers the inner most surface of these abdominal muscles. The parietal peritoneum lies beneath it.

The nerve supply to the abdominal wall is by the various branches of thirteenth thoracic, first, second and third lumbar spinal nerves.

The blood supply to the abdominal wall is through:

1. Cranial & caudal epigastric vessels.
2. External pudic artery
3. Deep circumflex iliac artery
4. Cranial abdominal artery
5. Lumbar arteries

SPECIAL INSTRUMENTS:

Self-retaining abdominal retraction is required some times.

ANAESTHETIC TECHNIQUE:

General anaesthesia

CONTROL:

1. Lateral recumbency for flank and paracostal incisions
2. Dorsal recumbency for ventral abdominal incisions

SURGICAL PROCEDURE:

A 4-12cm long incision as per need is made in the skin at the proposed site.

In case of ventral midline incision, a nick on linea-alba in centre is made and with the help of a groove director and scissors. The incision is increased up to required length.

In case of other incisions, the muscles are bluntly dissected and the peritoneum is entered similar to linea-alba.

After completion of the desired work, the peritoneum and transverse abdominis muscles may be sutured together with absorbable sutured in the simple continuous pattern. The other muscles are also sutured like wise but separately.

In case of mid-line incision, the peritoneum and linea-alba is sutured together likewise.

Now subcutaneous sutures are placed and then the skin is sutured with interrupted horizontal mattress or simple interrupted non-absorbable sutures.

POST OPERATIVE CARE:

Routine ASD and antibiotic therapy

Soft & restricted diet for about 15 days

Prevention of self mutilation

Restricted movement for 15 days

PRACTICAL-26**Date_____****ENTERECTOMY AND ENTEROANASTOMOSIS IN DOG****INDICATIONS:**

Intestinal foreign bodies
Intestinal Intussuseption
Intestinal Volvulus
Intestinal Torsion
Intestinal Strangulation
Intestinal Neoplasm
Intestinal Gangrene
Intestinal Perforating wounds

SITE OF OPERATION:

1. Caudal ventral midline incision
2. Right flank incision

SURGICAL ANATOMY:

The intestinal wall is composed of serosa, muscularis, sub mucosa and mucosa. In which sub-mucosa is most dense and have more suture-holding capability. The small intestine of an average sized adult dog is about 4 meters long. It is clearly divided into a fixed and a mesenteric part. The fixed part, termed as duodenum, is the shortest portion, which starts at the pylorus and passes caudally and dorsally. Near the pelvis it turns medially and passes cranially along the medial side of left kidney, bends ventrally to join jejunum.

The mesenteric part is arbitrarily divided into jejunum and ileum which are suspended by a double fold of peritoneum termed as mesentery. The jejunum, which is the longest part of small intestine, is composed of six to eight coils which take up the space between the stomach and liver on one side and the pelvic inlet on the other. The difference between jejunum and ileum is not discernible grossly although there are distinct differences in the mucosa of dog. The large intestine averages about 60-70 cms and composed of caecum, colon and rectum.

In dogs caecum exist only as a blind end diverticulum of the proximal portion of colon. The colon is attached to the sub-lumber region by mesentery 'the mesocolon'. The colon has three parts; ascending, transverse and descending part. The ascending part passes cranial along the medial surface of cranial part of duodenum until it reaches pyloric part of stomach, here it turns to the left and crosses the median plane forming transverse colon. The last part of the descending colon passes caudally along the medial border of the left kidney to join rectum.

The nerve supplies to the intestines are from vagus and celiac plexus. The blood supplies are from the branches of celiac and anterior mesenteric arteries.

SPECIAL INSTRUMENTS:

Crushing intestinal clamps

Non-crushing (Such as doyen) intestinal clamps.

ANAESTHETIC TECHNIQUE:

General anaesthesia

CONTROL:

Dorsal recumbency for ventral midline incision

Left recumbency for right flank incision

SURGICAL PROCEDURE:

(The intestinal anastomosis can be performed either with the end-to-end, side-to-side or side to end anastomosis techniques; however only the most commonly performed end-to-end technique is being described here).

The laparotomy is performed and the affected part of the intestine is identified and exteriorized.

The abdominal wound is packed off with moistened sterile towel or surgical drape to isolate the exteriorized portion of intestine.

The mesenteric vessels supplying to the affected area are isolated and ligated.

The arcadial vessels within the mesenteric fat along the intestine are also isolated and ligated.

Within minutes the entire section of the intestine bounded by these vessels become cyanotic.

It is imperative that a short segment of the normal intestine on either side of the affected area is included in the resection scheme.

Crushing clamps (or straight long artery forceps) are now placed at approximately 60° angles to the long axis of the intestine just inside the arcadial ligatures.

The ingesta are gently milked away from the crushing clamps for a distance of about 3-5 cms and a non-crushing is placed over the intestine.

The non-crushing clamps should not obstruct blood flow in the arcadial vessel supplying to the end of intestine.

An assistant should gently hold all these four clamps.

Now the intestine is excised with a sharp scalpel along the outside edge of the crushing clamp without cutting the arcadial ligature. The mesentery is also resected with fine scissors and the whole stump is discarded.

The cut ends of the intestine are gently mopped clean with moist gauze and are held together.

The outwardly rolled mucosal collar around the transected ends is also resected to ensure that the individual layers of the intestine are accurately apposed.

The anastomosis is carried out using atraumatic thumb forceps and swedged-on taper-end needle with 3-0 or 4-0 polyglycolic acid or polyglactin-910 sutures (silk can also be used in care of non-availability of these sutures). Two simple interrupted sutures are first placed including all layers on mesenteric and anti-mesenteric border of cut ends.

Now the intestine is apposed with 10-16 simple interrupted through and through sutures placed 2-3 mm apart and 2-3 mm from cut ends. The sutures can be pulled down until they crush through serosa, and muscularis so that these are tightened in dense submucosa.

The intestinal anastomosis can also be performed with many other suture patterns such as simple continuous, continuous Cushing/Lambert, Gambee patterns, Parker-Ker patterns. However, the above-described technique is the simple most.

Now anastomosis site is inspected for any leakage by milking the ingesta gently through the apposed part after removing the non-crushing intestinal clamps. Additional interrupted sutures may be applied if needed. Now the mesenteric defect is also closed with absorbable sutures using interrupted pattern.

The intestine is now gently cleaned with moist gauzes and reposed back into abdomen. The laparotomy wound is closed routinely.

POST OPERATIVE CARE:

Routine antibiotic therapy

Multiple foods should be given for 15 days

REMARKS:

The surgeon and assistant should wear two sets of surgical gloves at the start of operation. One upper set may be removed after anastomosis is complete. This minimizes contamination.

If gross abdominal contamination occurs, then abdominal lavage with two to three cycles of irrigation and suction with 250 to 1000 ml of NSS or lactated ringer's solution should be employed.

The oral feeding should be started within 24 hours post-surgery in order to minimize the chances of paralytic ileus.

PRACTICAL-27**Date**_____**CYSTOTOMY IN DOG****INDICATIONS:**

Cystic calculi
Cystic neoplasm

SITE OF OPERATION:

Caudal ventral mid-line incision in females
Caudal paramedic incision in males

SURGICAL ANATOMY:

Urinary bladder lies on the ventral abdominal floor cranial to the pubis. Neck of the bladder lies in the pelvic cavity and is the only part not covered by the peritoneum. Two lateral ligaments one on each side and a single ventral median ligament keep the bladder in position. The ureters open on the dorsal caudal aspect of bladder.

The sphincter of bladder is supplied by pudendal nerve. The blood supply to the bladder is by the branches of internal pubic arteries.

SPECIAL INSTRUMENTS:

Suction pump

ANAESTHETIC TECHNIQUE:

General anaesthesia

CONTROL:

Dorsal recumbency

SURGICAL PROCEDURE:

After performing laparotomy, the urinary bladder is exteriorized and the abdominal wound is packed with moistened surgical towels or drapes.

A stay suture on the apex of bladder involving only up to submucosa or muscularis is applied to facilitate the manipulation.

The 2-3 cms long cystotomy incision is made on the dorsal aspect of bladder between the major blood vessels and away from the ureters (in case of cystic neoplasm, the incision has been given around the neoplasm).

The urine is removed by suction and calculi are removed with forceps (or with a smooth edged gall bladder spoon)

In case of males, a catheter is passed from the external urethral opening by an assistant and the calculi, if any, is back flushed into bladder from where these are removed.

In case of females, the catheter is passed from the bladder into the urethra and flushed until all urethral calculi are removed and the catheter can be passed freely.

The cystotomy incision is then closed in 2 to 3 layers using swedged-on atraumatic needle with 3-0 to 4-0 absorbable suture material.

The first layer of horizontal mattress is used to close mucosa and the subsequent layer/s is/are applied by continuous inversion sutures (Cushing/Lambert) to close remaining layers.

The stay suture is removed.

The laparotomy incision is closed routinely.

POST OPERATIVE CARE:

Urinary antiseptics and alkalizers should be used for few days post-operatively.

REMARKS:

Intravenous fluid therapy in pre-operative period is quite beneficial. Evacuation of all urine from bladder by a urinary catheter before operation is not recommended as the collapsed bladder may be difficult to exteriorize in larger breeds.

While closing mucosa no knot should be placed to lie in the bladder lumen as it may act as a nidus for further cumuli deposition.

Culture sensitivity test is a must. It should be done for the culture taken directly from the bladder mucosa.

PRACTICAL-28

Date_____

**EXTIRPATION OF ANAL SACS IN DOG
(ANAL SACCULECTOMY)****INDICATIONS:**

- Recurrent episodes of anal sac impaction
- Ineffective medical therapy in recurrent anal sac infection
- Anal sac abscessation with or without fistulous tract
- Anal sac gland adeno-carcinoma.

SITE OF OPERATION:

Linear incision (about 2cm long) lateral to the anal orifice.

SURGICAL ANATOMY:

The two anal sacs are situated on either side of anal opening between the external sphincter muscle and the rectal wall (Approximately at 4 & 8 o'clock position). The function of anal sacs is not clearly understood, however but it is thought of provide peculiar scent/odors to faeces perhaps to mark the territories. The normal secretion is a slightly granular, brownish serous or viscid fluid, which comes out by the action of external anal sphincter muscle.

SPECIAL INSTRUMENTS:

1. General anaesthesia
2. Local infiltration along with tranquilizers
3. Epidural analgesia

CONTROL:

Ventral recumbency with hind parts raised

SURGICAL PROCEDURE:

The anus is packed off with sterile gauze to minimize the contamination at the site

The duct opening of one of the anal sacs is identified just under the anal orifice and a mosquito haemostate is pushed into the sac.

The incision is made on the hairless skin of the perineal region over this distended area bounded by the haemostate in the sac.

The sac is now grasped with forceps and is dissected sharply as well as bluntly by the curved metzembaum scissors from the surrounding tissue.

The neck of the sac should be carefully dissected so that external sphincter muscle is not damaged.

The duct is identified, isolated, ligated and transected.

The subcutaneous tissue and the skin are sutured in the routine manner.

The other anal sac is now removed in the same manner.

POST OPERATIVE CARE:

- Routine antibiotic therapy
- Prevention of self-mutilation by applying Elizabethan collar
- Stool softness and soft diet for at least 10days.

REMARKS:

The anal sac may be filled with paraffin wax, Indian ink or simply distilled water before operation to outline the margins.

Anal gland adenocarcinoma is a malignant neoplasm of the gland that surrounds the sac. It is locally invasive and metastasizes to distant sites. Therefore adjunctive therapy is must.

Inadvertent incomplete removal of anal sacs may result into chronic fistula formation; therefore the sac should be examined to ensure that removal is complete.

The dissection should be limited to the surface of anal sacs as accidental damage to pudendal branch may lead to fecal incontinence.

In addition to that the excessive trauma in and around the external anal sphincter muscle may cause tenesmus.

PRACTICAL-29

Date_____

CASTRATION IN DOG

(Orchiectomy, Testectomy, Sterilization, Neutering)

INDICATION:

Aggressive behavior of the dog

Neoplastic growth

Sever blunt penetrating or crushing injuries of testis

Chronic orchitis

To remove the source of androgenic/estrogenic hormones which act as mediators for the development of benign prostatic hypertrophy, perineal adenoma and perineal hernia.

Enlarged prostate and perineal hernia

Prevention of breeding nuisance.

SITE OF OPERATION:

1. Pre-scrotal site: 3 cm long incision on the midline in front of the scrotum.

2. Scrotal site:

A. Longitudinal incision on the ventral aspect of scrotum lateral & parallel to median raphe on either side.

B. Similar incision on one scrotum to remove testes of that side and then a second incision (through the first) on the mediastinum testes to remove the other testicle.

SURGICAL ANATOMY:

The testes are contained into two distinct sacs inside the scrotum. These sacs are attached together by scrotal septum also known as mediastinum testes. The wall of the scrotum is composed of skin, tunica dartos, spermatic fascia and Tunica vaginalis parietalis. The tunica vaginalis is the peritoneal invagination that envelops the spermatic cord, the testes and the epididymis. The epididymis is attached to the dorsal lateral aspect of two testes, the head of epididymis pointing interiorly. The tail of epididymis is continuing to ductus deferens which is contained in spermatic cord. The spermatic cord in fact has two distinct bundles namely anterior vascular bundle and posterior avascular bundle which contain the testicular artery, testicular vein (which joins the pampiniform plexus), testicular plexuses of autonomic nerves, lymphatic vessels and the ductus deferens respectively. The ductus deferens passes through the vaginal ring and within the abdominal cavity it terminates at the prostate gland by looping caudally and medially around each ureter.

The nerve supply to testes is through the spermatic nerves, which are derived from the renal and mesenteric plexus. The branches of second and third lumbar spinal nerves supply the scrotum. The blood supply is by

spermatic vessels to the testes and branches of external pudic vessels to the scrotum.

SPECIAL INSTRUMENTS:

None

ANAESTHETIC TECHNIQUES:

General anaesthesia

CONTROL:

Dorsal recumbency

SURGICAL PROCEDURE:

One testis is pushed forward (in case of pre-scrotal incision) or toward (in case of scrotal incision) and is held in position by left index finger and thumb and about 2-3 cms long incision is made in the skin.

The testicle is continuously pushed outwards and gentle incisions are made in the subcutaneous fascia till shiny white tunica vaginalis is visible.

The testicle is now squeezed out and can be removed by any of the following methods:

1. Open methods:

An incision is given in the tunica vaginalis longitudinally over the spermatic cord.

The anterior and posterior bundles of spermatic cord are identified.

The testicular artery and vein are ligated with a non-absorbable suture proximal to the pampiniform plexuses. One end of the ligature is left long and held with an artery forceps.

The ductus deferens may be ligated separately and cut with a scissors.

An artery forceps is now placed distal to the ligature in testicular vessels and the cord is cut between them. The testicle is now removed out along with artery forceps.

The hemorrhage is checked carefully and only then the ligature end is cut short and the stump is allowed to recede in vaginal ring.

2. Closed method:

No incision is given in tunica vaginalis. It is ligated as such closed to the vaginal ring and is transected taking similar care for any hemorrhage as described in open method.

The contra lateral testicle may be similarly removed after pushing it through the same incision (by making an additional incision in scrotal septum) or by making another incision in the contra lateral sac of scrotum or in case of pre-scrotal incision by incising only the contra lateral spermatic fascia.

In cases of prescrotal incision, the skin wound is closed routinely, however in cases of scrotal incisions, these may be left open

POST OPERATIVE CARE:

Routine ASD and antibiotic therapy

Prevention of self mutilation

REMARKS:

The skin of the scrotum is very sensitive, bleeds heavily and swells postoperatively, therefore routine castration in dogs are preferred by presacrotal incisions.

The incision on scrotal septum also increases the chance of postoperative scrotal haematoma, therefore testicle should be removed without incising mediastinum raphae preferably.

Open method of castration ensure the proper ligation of vascular bundle and is therefore preferred in large and giant breeds of dogs. However, it has the disadvantage of opening of the cavity of vaginal tunic, which communicates proximally with the main peritoneal cavity.

Extreme care should be taken while placing a ligature around testicular vessels. There should be transfixed so that ligature may not slip.

Proper haemostasis is must. It is very difficult to locate the spermatic cord stump once it is cut and retract towards the external inguinal ring.

PRACTICAL-30

Date_____

OVARIOHYSTRECTOMY IN BITCH

The operation involves the surgical removal of the ovaries and uterus.

INDICATIONS :

1. Prevention of estrus and problem associated with bloody discharge, attraction of male dogs, accidental mating, pregnancy and unwanted puppies.
2. Treatment of metritis, pyometra, endometrial hyperplasia (CPC), neoplasia, injury, neglected dystocia and congenital abnormalities.
3. Hyperplasia and neoplasia of mammary gland.

AGE AND TIME:

1. Though operation can be done at almost any age and at any phase of reproductive cycle but it is best performed either before puberty or during anoestrus. Some prefer to wait until the animal has passed through one heat period.
2. Six to eight months of age is generally considered best.
3. The surgery may be most hazardous during estrus or pregnancy and in old obese female.
4. Most favourable time to spay a mature bitch is 3 to 4 months after estrus. After whelping, the operation should be done about 6-8 weeks, as soon as the puppies have weaned and lactation has ceased.

SURGICAL SITE :

Ventral midline abdominal incision, beginning over the umbilicus and extending caudally for 6-8 cms.

SURGICAL ANATOMY :

Ovaries lie close to the caudal pole of the corresponding kidney, ventral to the 4th lumbar vertebra, and half way between last rib and the crest of the ilium. The ovary is completely enclosed by the bursa and is attached to cranial end of the uterine horn by ovarian ligament continuous with it is suspensory ligament of ovary. Ovaries receive the blood supply through ovarian artery and vein. The uterus has a very short body and extremely long narrow horns. Broad ligament is attached to the anterior part of vagina.

PREPARATION, CONTROL AND ANAESTHESIA :

Food is withheld for at least 8-12 hours before the operation. The animal is controlled in dorsal recumbency. The operation table may be slightly tilted so as to allow the abdominal viscera to move forward. After proper premedication, the general anaesthesia is achieved by using parenteral or inhalant anaesthetic. After the animal has been anaesthetized, the urinary

bladder is expressed and the ventral wall of the abdomen is prepared for surgery.

SURGICAL TECHNIQUE :

1. A 6-8 cm long midline incision is made on the ventral aspect of the abdomen beginning over the umbilicus and extended caudally.
2. Skin, Subcutaneous tissue, linea alba, falciform ligament and peritoneum are incised.
3. An ovariectomy hook or index finger can be passed to locate the uterine horn by taking the urinary bladder as landmark. Uterus is withdrawn and followed to the ovary.
4. No definite sequence is required for excising the ovaries and uterus, but it is convenient to remove the left ovary then right ovary and finally the body of uterus.
5. The ovarian bursa is clamped across by artery forceps. The ovary is grasped between thumb and index finger and withdrawn for ligation. The suspensory ligament of the ovary is ruptured by traction and ovary is withdrawn from the abdomen.
6. Application of three artery forceps facilitates the ligature procedure for ovarian pedicle. A double ligature with chromic catgut size 1-0 is used to ligate ovarian pedicle. The attachment between the ligature and the ovary is then severed. The severed stump should be checked carefully for haemorrhage before returning to the abdomen.
7. After removing one ovary, the other ovary is located and removed in the similar manner. The broad ligament is then severed.
8. The body of the uterus is withdrawn from the abdomen. The uterine vessels are ligated on each side and cut. Transfixation double ligature is used to encompass the entire cervix. The uterus is severed just cranial to the ligatures.
9. Uterine stump is checked carefully for haemorrhage and returned into the abdomen. Care should be taken to remove as much uterine body as possible.
10. Abdominal incision is closed in the usual manner..

POST OPERATIVE CARE :

- i) The operative site should be checked for swelling or discharge.
- ii) Operative incision should be dressed with betadine.
- iii) The patient should receive antibiotics and analgesics for seven and three days respectively.
- iv) Exercise should be restricted for 10-12 days.
- v) Liquid diet should be given for the first 63 days and the patient should be observed for proper urination and defecation.
- vi) Cutaneous sutures should be removed after 8-10 days of operation or after complete healing.

PRACTICAL-31**Date**_____**LAPAROTOMY IN BOVINE****INDICATIONS:**

Rumenotomy
 Enterotomy/Enterectomy
 Splenectomy
 Cystotomy/Cystorrhaphy
 Abomasopexy
 Hysterectomy (Cesarean section)
 Exploratory purposes

SITE OF OPERATION:

It may be one of the following depending upon the purpose of opening the abdomen and the topography of the organ(s) to be manipulated-

1. Incision through ventral abdominal wall
 - A. Median incision (Cranial or caudal)
 - B. Para-median incision (Cranial or caudal)
 - C. Para-rectal incision (Cranial or caudal)
 - D. Trans-rectal incision (Cranial or caudal)
2. Incisions through para-lumber fossa (3.5 cms ventral to transverse process of lumber vertebra)
 - A. Mid upper flank incision
 - B. Upper paracostal incision
 - C. Caudal upper flank incision
3. Incision medial/parallel to thigh
 - A. Lower flank incision
 - B. Ventrolateral incision

SURGICAL ANATOMY:

After incising skin the following structures may be encountered in different sites of operation —

Superficial fascial layer
 Abdominal tunic
 External oblique abdominal muscle
 Internal oblique abdominal muscle
 Nerves and blood vessels on the deep face of internal oblique abdominal muscle
 Rectus abdominal muscle
 Cranial and caudal deep epigastric blood vessels (on the inner face of rectus abdominal muscles)
 Transverse abdominal muscle
 Transverse fascia
 Parietal peritoneum

The external oblique abdominal muscle is the most extensive of all the abdominal muscles. Its fibers are mostly directed ventral & caudal but which in the area of Para lumbar fossa are horizontal. It is originated from the caudal border and lateral surface of the last eight ribs over the intercostal muscle. It is inserted by means of aponeurotic tissue on the tuber-coxae, pre pubic tendon and linea-alba.

The fibers of internal oblique abdominal muscles are mostly directed ventral, cranial and medial. The muscle originates from the coxal tuber and deep lumbar fascia. It inserts on the caudal border of last rib, the pre-pubic tendon and linea-alba.

The transverses abdominal muscle originates from the deep lumbar fascia and thus indirectly to the first five lumbar transverse processes and the medial surface of the false ribs. It inserts on the linea-alba. The direction of its fibers is transverse. Therefore, this muscle forms a muscular sheet on the deep face of oblique internal abdominal & rectus abdominal muscle.

The rectus abdominal muscle is confined to the ventral abdominal wall. It extends from the sternum to the pubis. It originates from ventral and lateral surfaces of the sternum as cranial as third or fourth costal cartilage. It inserts on pre pubic tendon.

The nerve supply to the abdominal area is through-

Lateral and ventral branches of last thoracic (T₁₃)

Ventral branches of L₁ & L₂

Lateral cutaneous femoral nerve formed by fibers of L₃ & L₄.

The blood supply to abdominal wall is through

Costo abdominal vessels

Branches of lumbar vessels

Deep circumflex iliac

Cranial & caudal epigastric vessels.

SPECIAL INSTRUMENTS:

None

ANAESTHETIC TECHNIQUE:

1. General anaesthesia
2. Para-vertebral analgesia
3. Field block by inverted L
4. Linear infiltration

CONTROL:

1. Standing position for incisions through paralumber fossa
2. Lateral recumbency for incisions in lower flank
3. Dorsal recumbency for incisions through ventral abdominal wall

SURGICAL PROCEDURE:

A 10-25 cm long incision depending upon the need for available spaces for manourability is made in the skin at the proposed operation site wherever practicable. A grid-iron technique should be used to dissect the underlying muscles if present along the direction of their fibers. Otherwise the underlying muscles or linea-alba may be incised along the direction of skin incision.

A groove director is then passed through the small cut in the peritoneum and the incision is enlarged using scissors.

After the desired work, the abdominal layer may be closed in different layers. If gridiron technique is used, the peritoneum and transverse abdominis may be sutured together with absorbable sutures. The other muscles are sutured separately with absorbable 2-3 number sutures.

Then the skin sutured with simple interrupted or horizontal or cross mattress non-absorbable sutures. If the muscles are directly incised, then the whole abdominal muscles may be sutured in only three layers viz peritoneum and transverse abdominis, interval and external oblique muscles and the skin. In median incisions where peritoneum is adhered to the linea-alba, these two can be sutured together with interrupted sutures or lock stick pattern. Then subcutaneous and skin sutures should be applied preferably with non-absorbable sutures.

POST OPERATIVE CARE:

Routine ASD & antibiotic therapy

If the incision is made in ventral abdomen the animal should be fed with easily digestible food and in less quantity for about two weeks.

REMARKS:

In larger animals such as buffaloes, the incision on ventral aspect of abdomen should be avoided if possible.

When the two oblique muscles are quite thick, these should be sutured separately & preferable by interrupted sutures.

PRACTICAL-32

Date_____

RUMENOTOMY IN BOVINE**INDICATIONS:**

Severe or persistent ruminal impaction

Severe frothy bloat

Removal of phytobezoars, trichobezoars or any other foreign bodies from rumen or reticulum.

Removal of ruminal contents prior to surgical repair of diaphragmatic hernia.

Exploratory purposes.

SITE OF OPERATION:

1. Left mid paralumber fossa
2. Left cranial paralumber fossa near to last rib (in cases of larger animals or in cases where reticulum has to be approached).

SURGICAL ANATOMY:

The rumen occupies almost whole left half and some ventral right half of abdominal cavity. The rumen extends from 7th-8th intercostal space to pelvic inlet. The rumen is opened through its dorsal sac. The structures to be divided in rumenotomy include skin subcutaneous fascia, external oblique muscle, internal oblique muscle, transverse abdominal muscle, peritoneum and the ruminal wall.

The nerve supply to the left paralumber fossa is mainly by thirteenth thoracic, first and second lumbar spinal nerves. The third lumbar spinal nerve also supplies a small cutaneous branch in the caudal aspect of paralumber fossa..

The blood supply to the site is by phrenico- abdominal and deep circumflex-iliac vessels. However, no major vessel is located at the site of incision.

SPECIAL INSTRUMENTS:

Rumenotomy set (Weingarth set or Mc'limtoch set)

Suction pump

Hose pipe

Siphoning tube (with a diameter of at least 3" to 4")

ANAESTHETIC TECHNIQUE:

1. Para-vertebral nerve block
2. Inverted 'L' regional nerve block
3. Local linear nerve block

SURGICAL PROCEDURE:

An 18-20 cms long vertical skin incision starting about 3-4 cms below the transverse process of the lumbar vertebral is made.

The abdominal muscles and peritoneum are also incised corresponding to the skin incision.

The Weingarh's ring is now fixed to the abdominal wall with the help of screw fixed at dorsal aspect of incisional wound.

The rumen is now exteriorized and fixed in the Weingarh set with the help of two strong tissue forceps placed at dorsal and ventral aspect at least 12 cms apart. The forceps are now hooked tightly into the frame (ring) of rumenotomy set. Thick gauze should always be used to cover the grasping edges of the tissue forceps before applying them on rumen to minimize trauma.

In case of non-availability of rumenotomy set, the rumen can be fixed temporarily to the skin edges by through & through mattress sutures applied dorsally and ventrally. Now abdominal wound is packed tightly by surgical shrouds all around the exteriorized rumen to prevent entry of ruminal contents in to the abdominal cavity during its removal later.

The exposed part of the rumen is now incised for about 8-10 cms and rumen hooks are applied into the cut edges and hooked into ring. About 6-10 such hooks are applied to the exposed rumen. After finishing the required job the ruminal cut edge are thoroughly cleaned after removal of hooks and sutured by a double row of continuous Lamberts and Cushing using absorbable suture material.

The wound is again cleaned. The shrouds are also discarded and fresh sterilized shrouds are used to drape the animal.

The abdominal wound is sutured in a routine manner.

POST OPERATIVE CARE:

The animal should be kept on light diet for about two weeks post surgery.

REMARKS:

- The instruments, which get contaminated during removal of ruminal contents, should be discarded immediately.
- The surgeon should scrub his hands freshly to close incisional wound.
- The ruminal hooks should be counted before and after their application to avoid inadvertent leaving of any of those into the rumen in case of accidental dropping.

PRACTICAL-33**Date**_____**URETHROTOMY IN BOVINES****INDICATIONS:**

Obstructive urethral calculi

SITE OF OPERATION:

1. Post scrotal site: About 3 inches behind the scrotum along the median line. This is used for removal of calculi at the sigmoid flexure.
2. Sub ischial site: About 7-8 inches behind the scrotum along the median line. It is used for removal of calculi lodged in sub-ischial area.
3. Ischial site: About two inches below the ischial arch downwards along the median line. It is used to remove calculi closed to ischial arch.

SURGICAL ANATOMY:

The urethra of an adult bullock/bull is over a meter long and about one quarter of its length is taken up for the formation of 'S' shaped sigmoid flexure which present caudally and dorsally to the scrotum.

The urethra is made of two parts, the pelvic and extra pelvic part. The pelvic part is about 10-12 cms long and is of small uniform caliber. The urethral lumen is kinked and narrow at the ischial arch. At the ischial arch the urethra passes between the bulbourethral glands, which open into the urethra under a fold of mucous membrane, and forms a blind pouch of about 1 cm deep on the dorsal wall of urethra. The extra pelvic part of urethra passes between the two crura of penis and runs along the groove on the ventral surface. It passes through the glans penis at the end and opens via external urethral orifice. The lumen of the extra pelvic part of urethra decreases gradually towards the external urethral orifice. The nerve supply to the various muscles of the penis is through the dorsal nerve of penis. This nerve is a branch of pudendal nerve, which arises from ventral branch of third sacral nerve mainly.

The blood supply comes from the branches of internal pubic artery.

SPECIAL INSTRUMENT:

A hard polyethylene catheter of 2.0/2.5 or 3.0 mm diameter

ANAESTHETIC TECHNIQUE:

Linear infiltration of local analgesia

CONTROL:

1. For post scrotal and sub ischial site: Right lateral recumbency with left hind limb tied anteriorly.
2. For ischial site: Standing position with tail tied towards one side.

SURGICAL PROCEDURE:

A 6 cm long skin incision is given at the proposed site. The subcutaneous tissue and fascia is bluntly dissected to expose the two retractor penis muscles lying on either side of penis. The muscles are bluntly dissected longitudinally to expose the penis.

The penis is now levered out of the skin incision with the help of a curved artery forceps. However, it cannot be taken out from ischial and sub ischial sites.

The urethra is palpated on the ventral aspect of this penis. The urethra is thoroughly examined to palpate the obstructing urolith. A nick or small longitudinal incision is given over this calculi, which is then pressed out or retrieved by a forceps. A suitable sized sterilized polyethylene catheter is now passed up the urethra to the urinary bladder. The other end is now passed out of the external urethral opening.

The incision of urethra may be left open if the catheter is snugly fitting otherwise it may be sutured with a swedged-on atraumatic needle with 3-0 absorbable sutures. The exteriorized part of penis is pushed back and the skin wound is sutured in a routine manner. The catheter is now transfixed with prepuce and left in site for a few days.

POST OPERATIVE CARE:

Routine ASD & antibiotic therapy

The inducting catheter is removed after 10 days

REMARKS:

The post scrotal site is the easiest site to approach a larger length of urethra. At urethrotomy sites higher than post scrotal site, haemorrhage is usually more extensive.

Any effort to catheterize the urethra forcefully with a metallic catheter (such as clutch wire) must be avoided as they induce extensive damage to the urethral lining, which becomes prone to infection.

If the urinary bladder of the animal is found full and enlarged prior to operation the bladder should be emptied by per-rectal catheterization before casting the animal for urethrotomy.

PRACTICAL-34**Date_____****RESECTION OF RECTUM IN ANIMALS****INDICATIONS:**

1. Irreparable rectal tear
2. Prolapsed of rectum (reposition & retention not possible)
3. Recto vaginal fistula.
4. Rectal fistula and perforating injuries.
5. Necrosis & gangrene of rectum
6. Thromboembolism, infarction and strangulation.

SURGICAL ANATOMY:

The rectum is app. 30 cm long in an adult horse and extends from the pelvic inlet to the anus. The peritoneal part is attached dorsally by the mesorectum, which is the continuation of the mesocolon. The retroperitoneal part of the rectum forms a dilatation called the rectal ampulla, which has thick longitudinal muscle bundles. The anal canal is 5 cm long.

ANAESTHETIC CONTROL & TECHNIQUE:

For rectal resection in large animals low epidural anaesthesia is used. In small animals general or epidural anaesthesia is used.

SURGICAL PROCEDURE:

- i) The rectum is pulled posteriorly as much as possible and a series of 5-7 interrupted sutures using chromic catgut size 0 or 1 with full curved atraumatic needle are inserted around the circumference of the bowel.
- ii) After putting the sutures the prolapsed portion of the bowel is removed with an incision through the tissues about 1.5 cm posterior to the sutures.
- iii) The rectal mucosa, muscularis and serosal layers should be sutured with series of interrupted sutures. The remainder of the bowel will retract pulling the suture anterior to the sphincter.
- iv) All large bleeding vessels should be ligated.

POST-OPERATIVE CARE:

- 1.The patient as for as possible should be given analgesia & frequent epidural blocks to prevent straining in first 5 days after the operation.
 - 2.The patient should be kept on easily digestible green fodder.
 - 3.Anal area should be lubricated with sterile vaseline or lignocaine jelly mixed in on antibiotic ointment namely sofradex.
- A course of antibiotic is preferred after the operation.
Careful digital removal of faeces from rectum can also be tried.

REMARKS:

1. A temporary suture may be tied taking healthy portion of rectum in it with the skin around anal sphincter, so as to prevent quick retaining of prolapsed mass inside the cavity, as it can pose difficulty in suturing of cut portion. These sutures are removed after completion of procedure.

PRACTICAL-35

Date_____

SPLENECTOMY IN ANIMALS**SITE OF OPERATION:**

1. Cranial mid ventral/left paramedian/left paracostal incision in dogs.
2. Anterior flank incision parallel to last rib in case of large animals (ruminants).

TOPOGRAPHIC ANATOMY:**A. CANINES-**

1. The spleen is present in the left hypogastric region alongside greater curvature of stomach.
2. It extends from the anterior ends of kidney (left) below the left crus of diaphragm to the middle of the caudal border of the left rib cage.
3. Gastro-splenic omentum attaches it to the stomach.
4. Splenic artery from celiac artery supplies blood to spleen whereas splenic vein drains blood to gastrosplenic vein.
5. The nerve supply to the spleen is from celiac plexus and vagus.

B. RUMINANTS-

1. The spleen is present alongside the left surface of rumen.
2. The dorsal extremity of spleen lies under the dorsal ends of last two ribs and is attached to left crus of diaphragm.
3. The ventral extremity is free and mainly lies opposite the 8th and 9th rib, about 6 inches above the sternal end. The hilus is small and is situated on dorsal third of visceral surface at anterior border.

INDICATIONS:

1. Neoplasm, rupture, torsion, abscess, infarction of spleen.
2. Splenomegaly

CONTROL AND ANAESTHESIA:

1. Supine position in dogs under general anaesthesia
2. Right lateral recumbency or standing position in ruminant and the anaesthesia is achieved by paravertebral block/local infiltration after proper sedation/ tranquilization.

SURGICAL TECHNIQUE:**CANINES-**

1. Make an 8-12 inch long incision through the abdominal wall at proposed site. Following laparotomy exteriorize the spleen.
2. Inject 1-2 ml of epinephrine (1:1000) into splenic artery after putting a loose ligature and immediately ligate the artery. Cut the artery between two ligatures.
3. The splenic vessels are doubly ligated individually and cut in between ligature. After ligating and cutting all the vessels, the spleen is removed.
4. Close the abdominal wound in routine manner.

RUMINANTS-

1. Perform laparotomy, parallel to last rib.
2. Carefully remove the attachments of spleen from rumen leaving the spleen attached to the hilus.
3. Ligate and transfix the splenic vessels at hilus after clamping the vessels with hemostats.
4. The vessels are then severed. Ensure that there is no bleeding from ligated vessels the spleen is carefully removed.
5. Close the laparotomy wound in routine manner.

POST OPERATIVE CARE:

1. Provide fluid therapy in case of excessive blood loss. If possible blood transfusion may be done.
2. Parental antibiotics for 3-5 days.
3. Proper hygiene of surgical wound.
4. Sutures removed after 8-10 days.

IMPORTANT CONSIDERATIONS:

1. Use of epinephrine is contraindicated in neoplasm and abscess of spleen.
2. Proper ligation and transfixation should be ensured.
3. Gentle handling of spleen to avoid its rupture.

PRACTICAL-36

Date_____

END TO END ANASTOMOSIS OF INTESTINE IN BOVINE**INDICATIONS:**

- 1) Intestinal foreign body leading to necrosis of intestine.
- 2) Intussusception.
- 3) Volvulus
- 4) Strangulation
- 5) Torsion
- 6) Neoplasm
- 7) Gangrene.

SITE OF OPERATION:

Right flank incision.

CONTROL AND ANAESTHESIA:

In bovine, the right flank laparotomy can be undertaken by controlling the animal in standing position in trevis or in left lateral recumbent position. Analgesia at the operative site can be achieved with local anaesthetic by using paravertebral or inverted 'L' blocks.

OPERATIVE TECHNIQUE:

- 1) The affected part of the intestine is located, identified and exteriorized through the laparotomy incision.
- 2) The mesenteric vessels of the part are doubly ligated.
- 3) Intestinal contents are milked away and intestinal clamps are placed.
- 4) The intestine is transected between the crushing and non crushing clamps, taking care to avoid the ligated vessels and the affected segment of the intestine is removed.
- 5) While anastomosing the intestine, care should be taken to avoid any gap due to unequal diameter of the lumen of two segments.

In large animal surgery, single layer inverting, everting and end on pattern or schmieden techniques are mostly used for anastomosis of the intestine.

A) INVERTING TECHNIQUE:

- 1) In this technique, the first suture is placed at the mesenteric border of the each segment and tied within the intestinal lumen.
- 2) Continuous connell sutures are then inserted to oppose cut edges of the intestine.
- 3) Two separate strands of suture material are used on each side of the intestine to meet at anti-mesenteric border.
- 4) Sutures are placed approximately 3 mm apart and 3 to 5 mm from cut ends of intestine.

5) The knots should be tied outside the lumen. This results serosa to serosa apposition.

B) EVERTING TECHNIQUE:

The everting technique employs interrupted horizontal mattress sutures to evert the mucosa of intestine. The sutures begin at the mesenteric end as with inverting pattern described earlier. The healing occurs by mucosa to mucosa apposition.

C) END ON TECHNIQUE (Gambie's pattern):

In this technique a simple interrupted suture, penetrates the lumen and passes through a small segment of the mucosa and submucosa on the same side. The suture then penetrates through the submucosa and mucosa towards the lumen of the other side and finally penetrates all the layers to come out at serosal surface. The knot is fixed outside the lumen.

D) SCHMIEDEN TECHNIQUE:

This technique is frequently used in clinical cases, results in serosa to mucosa apposition of the cut ends of the intestine. The suturing begins at the mesenteric border and meet at the antimesenteric border. The knot is tied outside the lumen.

After completion of the anastomosis, the intestinal clamps are removed and patency of the lumen at the anastomotic site is checked. The defect in the mesenteric is closed and the segment is rinsed in normal saline and replaced in the abdominal cavity. The abdominal wound is closed in a routine manner.

POST-OPERATIVE CARE:

- 1) Adequate and appropriate fluid therapy, antibiotics and analgesics should be administered for the first 4-5 days.
- 2) Animal should be kept on liquid and/or soft diet for 3-4 days.
- 3) Restore the normal gastro-intestinal motility and check infection at the operative site.
- 4) The cutaneous wound should receive adequate care till the sutures are removed on 8-10 days.