SESSION SEVEN: Overview

A) Trephining of Frontal and Maxillary Sinuses in Horse and Cattle====Reading assignment

❑**At the end of this learning session the students will be able to:**

- List indication of Trephining of Frontal and Maxillary Sinuses.
- Describe its surgical treatments

Trephining of frontal and maxillary sinuses in horse and cattle

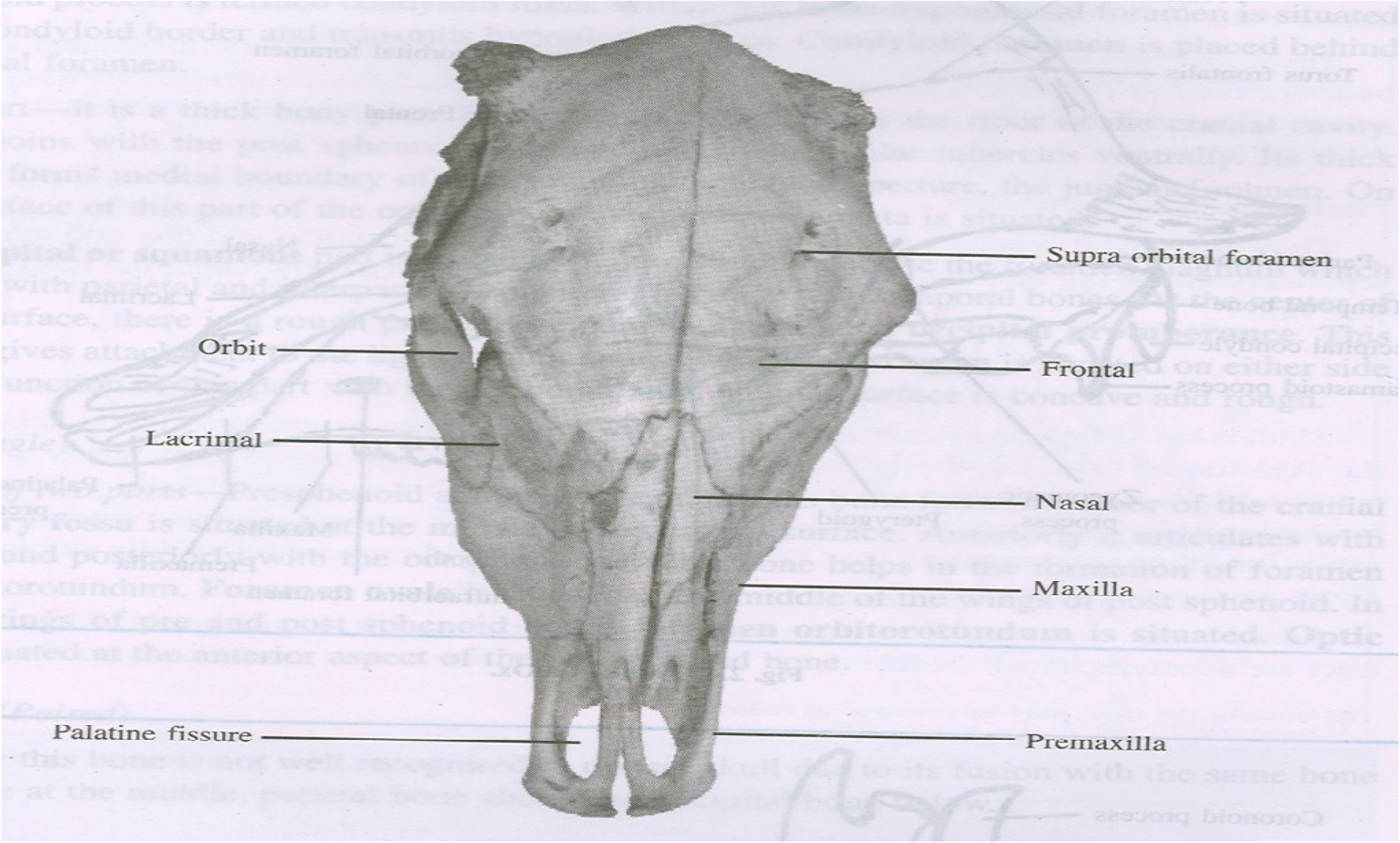
Indications:

- **Sinusitis and pus in the sinus**
- **Neoplastic growth in the sinus**
- **Fracture of the frontal and maxillary bone**
- **Foreign body, cyst or parasite in the sinus cavity**
- **Dental fistula**
- **Alveolar periostitis**
- **when the infection is unresponsive to maximal medical treatment**

Trephination Of The Frontal Sinus: Cattle

- Frontal sinusitis, following de-horning or horn fracture.
- Initially the sinusitis is often confined to the caudal part of the sinus, but can affect entire sinus(Inc. time).
- In the latter case drainage of the sinus is obtained by trephining 2 cm from the midline on a line passing through the center of the orbits[021].
- If the original opening to the sinus at the site of the dehorning wound is narrowed or closed by granulation tissue, it is enlarged or re-opened under cornual nerve block to facilitate adequate flushing of the sinus.

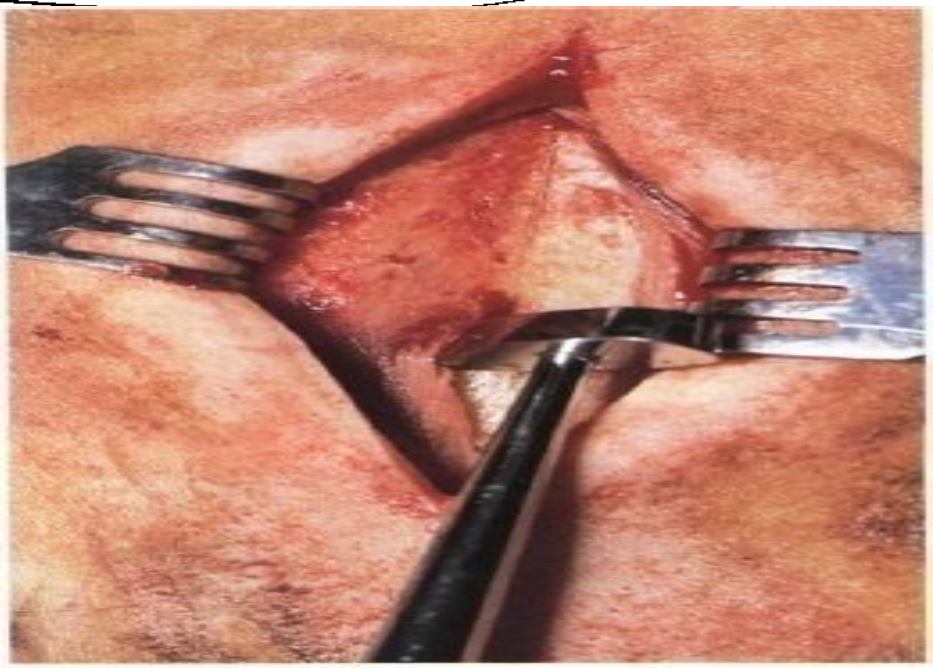
Bone: Head Region



Surgical Technique

- It is carried out on the standing animal position
- An approximately 5 cm long vertical incision is made through skin, subcutis and periosteum.
- The periosteum is dissected (periosteal elevator (022) and drawn aside, together with the skin, with wound retractors).
- Then the point of the trephine is inserted into the bone.

023



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- After Trephination is performed by rotating the trephine (023), Then a circular groove has been cut into the bone, the point of the trephine is retracted, and trephination is continued through the full thickness of the bone.

- So that the disc is removed with a bone screw inserted into the hole made previously by the point of the trephine. Sometimes the disc must be levered out because it remains fixed to a bony sinus septum.

- To remove exudates and necrotic tissue of the sinus is flushed thoroughly with a antiseptic solution (024)
- To prevent premature closure of the openings they are packed with gauze bandage plugs.

- Post-operative flushing is repeated daily, until the sinus has healed, as evidenced by absence of purulent discharge

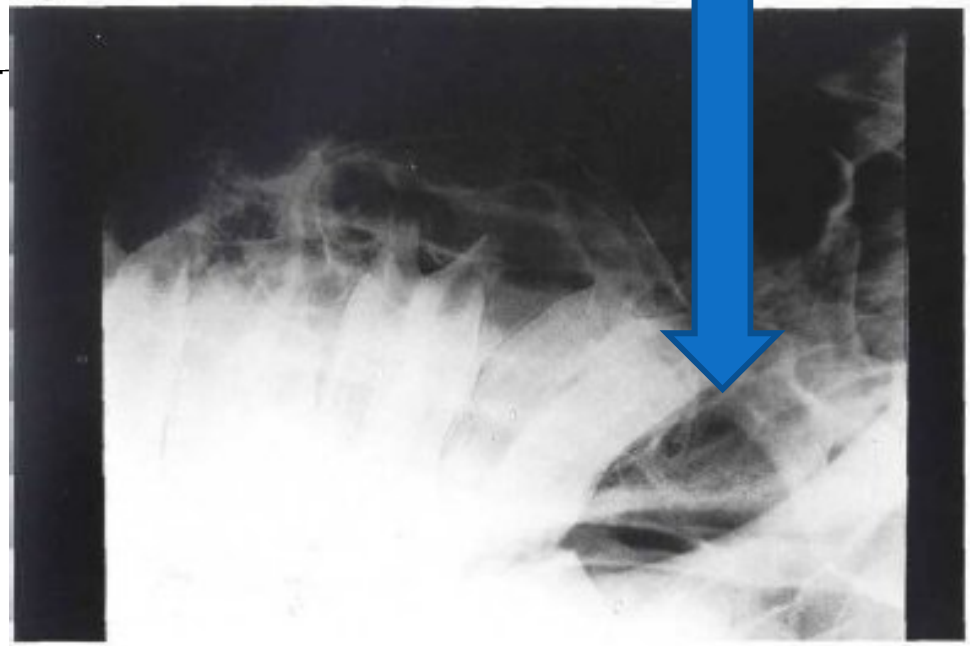
Trephination Of The Maxillary Sinuses In The Horse

- Trephination of the maxillary sinuses is indicated in cases of empyema, cysts or neoplasms, and for repulsion of upper molar teeth.
- Plate 025 represents a radiograph showing chronic alveolitis of the first upper molar.
- The rostral maxillary sinus is trephined about 2-3 cm dorsal to the rostral end of the facial crest; the caudal maxillary sinus is trephined 2-5 cm rostral to the medial canthus and 2-3 cm dorsal to the facial crest [026].
- Care must be taken to avoid damage to the nasolacrimal duct.

Surgical technique

- The operation may be carried out either on the standing animal under local infiltration analgesia, or on the recumbent animal [027] under general anaesthesia. In case of tooth repulsion general anaesthesia is required.

025



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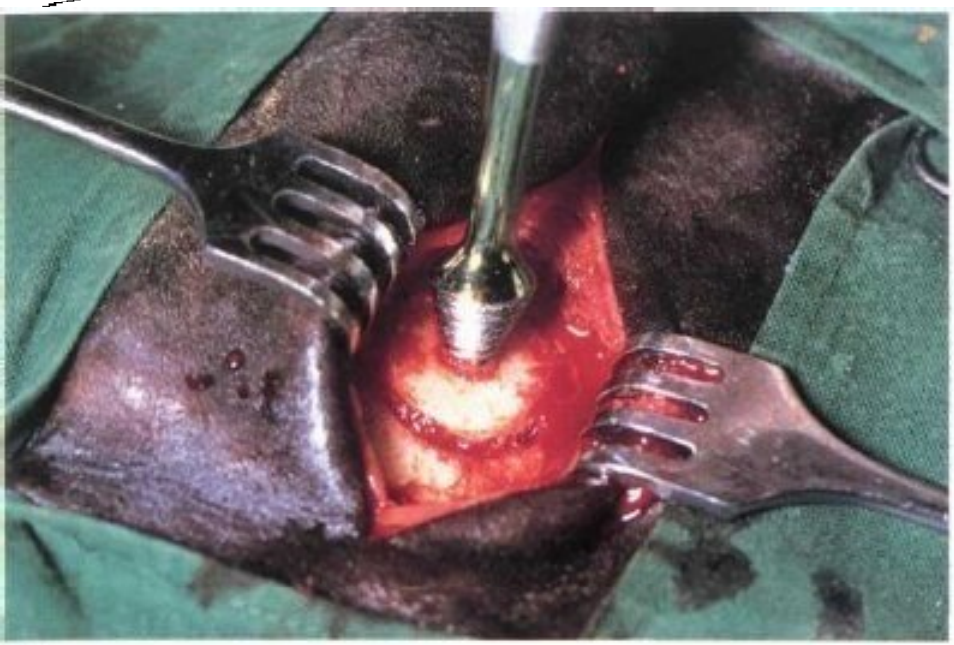

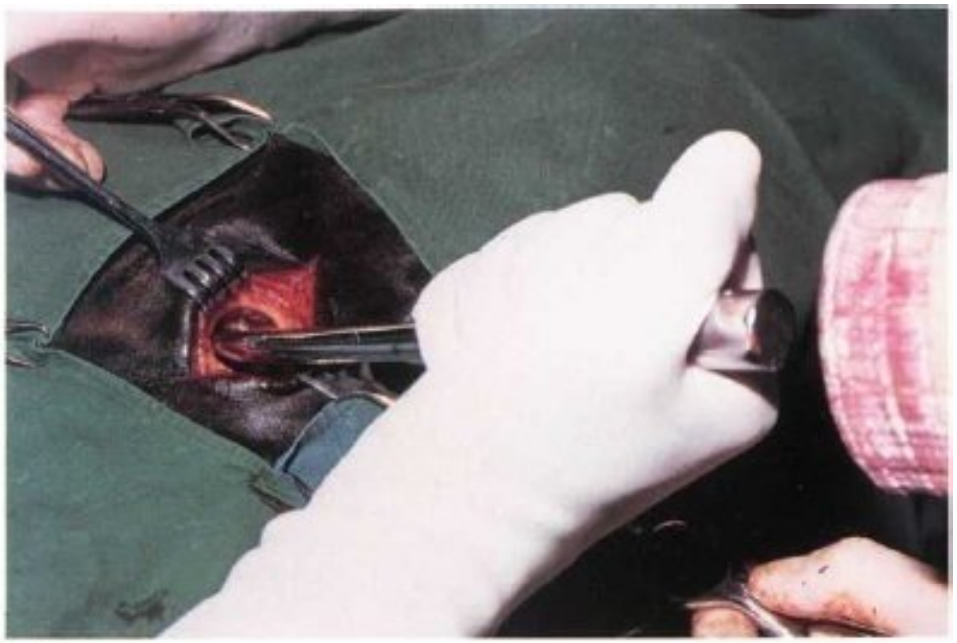

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032

- At the selected site an approximately 4 cm long incision is made parallel to the facial crest through the skin and subcutaneous tissue. Depending on the site of surgery it may be necessary to retract the levator labii maxillaris muscle in order to expose the periosteum.

- The periosteum is then incised with a scalpel and separated from the bone with a periosteal elevator. The wound edges of the skin and periosteum are drawn aside with wound re-tractors [028].

- Trephination is performed as described in 1-4. The disc is removed with a bone screw [029]. In empyema caused by alveolitis, the sinus is flushed and the affected tooth is carefully located.

- A punch is then introduced into the sinus and placed upon the roots of the tooth to be repelled. To prevent damage to adjacent teeth and the maxillary bone, the punch must be placed accurately; it may thus be necessary to enlarge the trephination hole with rongeurs.

- The tooth is repelled from its alveolus with firm, but careful, blows [030]. The course of repulsion is constantly checked by the surgeon's hand in the oral cavity. After removal the tooth is examined to determine if it is complete. Any tooth or bony fragments must be removed.

- Intra-operative radiography is recommended to ensure that no fragments remain. The sinus and alveolus are copiously flushed with a disinfectant solution [031].

- The alveolus and trephination hole are then packed with povidone iodine soaked gauze bandage plugs [032].

- Postoperatively the sinus and alveolus are repeatedly flushed after removal of both plugs. The plug placed in the alveolus after flushing must be some-what smaller than the previous one, in order to enable granulation tissue to gradually fill the alveolus; the plugs in the trephination hole are of constant size.

- Only when the alveolus is closed off by granulation tissue and exudation in the sinus has ceased is the trephination hole allowed to close.

CHAPTER 2
SURGERY OF THORAX

SESSION ONE: Overview

A) Tracheotomy in Cattle and Dog

B) Diaphragmatic Hernia in Cattle and Dog

C) Cervical oesophagotomy in cattle

Session objectives:

- **At the end of the learning session the students will be able to:**
  - ✓ List the indications of tracheotomy in cattle and dog
  - ✓ List types of tracheostomy
  - ✓ Describe surgical techniques of esophagotomy and Diaphragmatic herniorrhaphy in dogs/cattle/

A) Tracheotomy in cattle and dog

- A tracheotomy or tracheostomy-- is a surgical procedure performed on the neck to open a direct airway through an incision in the trachea (the windpipe).

Indications

- Obstruction of the upper respiratory passage
- Paralysis of the intrinsic muscle of the larynx
- Fracture of the tracheal ring causing obstruction of the upper part of trachea

Special instrument required:

- ✓ **Tracheotomy tube**

Tracheotomy in cattle

Site of operation

- Midline on the under-aspect of the neck at the junction of its upper and middle third portion.

Control and anesthesia

- Animal is positioned in lateral recumbence with the neck extended.
- The site of incision is anesthetized by injecting local anesthetic in the linear fashion.
- Head is kept at a lower level in order to prevent aspiration of fluids.

Surgical technique (cattle):

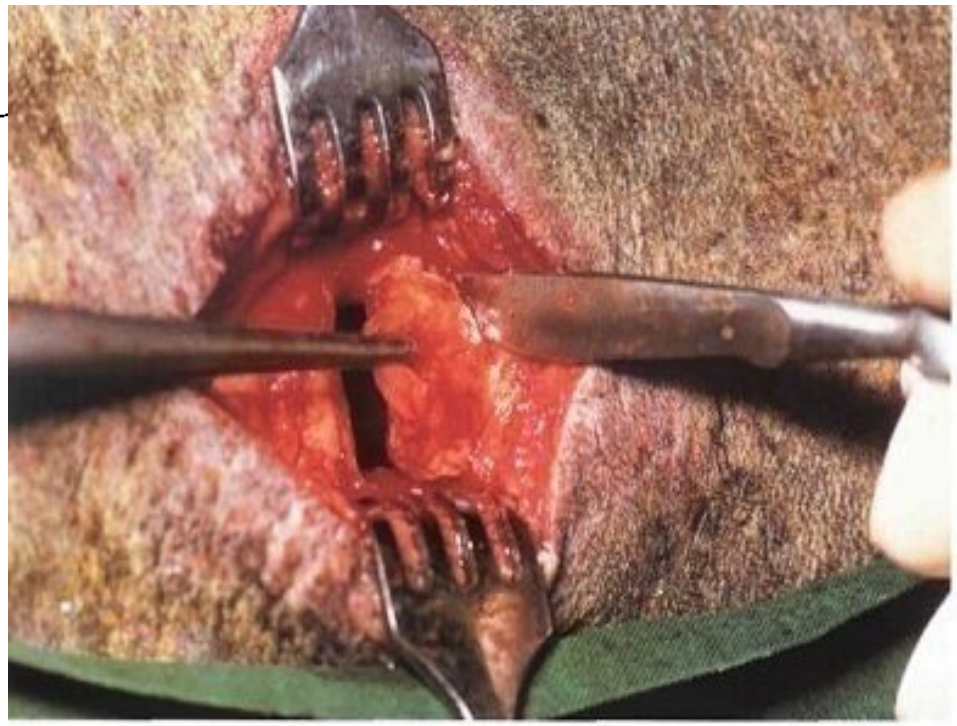
1. A 7-10 cm length incision is made exactly upon the mid-line through the skin and s/c tissue.
2. Two portions of sterno-thyrohyoideus muscles are separated
3. The trachea is exposed by incising the areolar tissue
4. Two tracheal rings which are to be operated upon are selected after retracting the wound (3 and 4 or 4 and 5th tracheal ring)
5. The tracheal rings are fixed by applying two sharp hooks through the inter-annular ligament

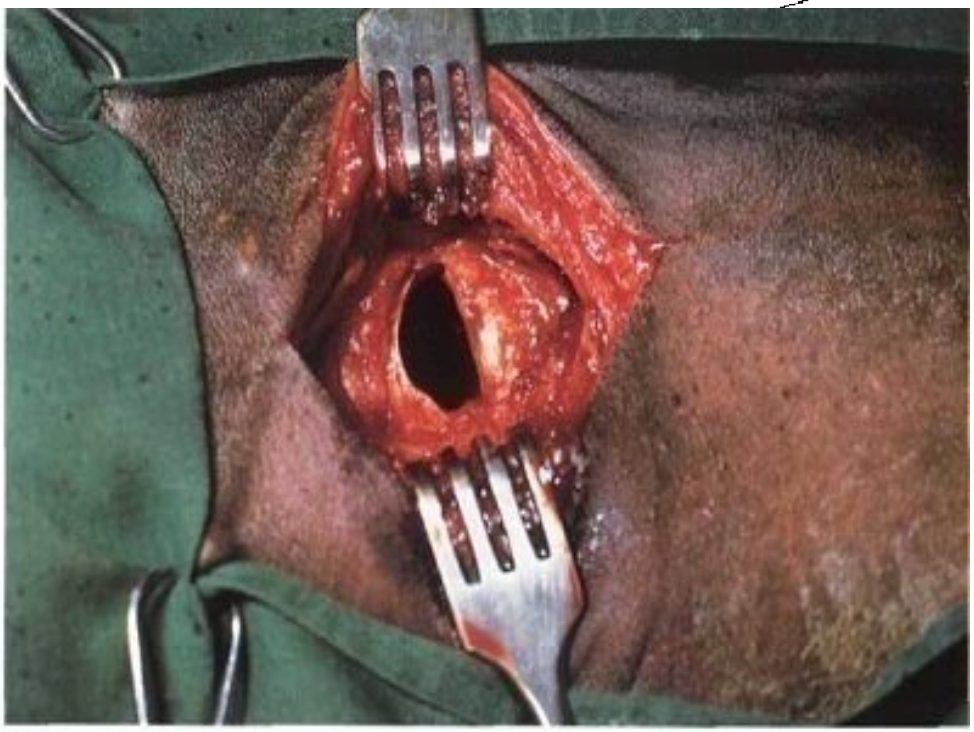
6. Inter-annular ligament is incised with sharp knife just enough to permit passage of temporary tracheal tube (if temporary tracheotomy is desired).

7. If permanent tracheotomy is desired an oval opening is made in the trachea

8. The tracheotomy tube is inserted in the tracheal lumen through the opening and suturing it in place

9. The remainder tracheotomy incision is approximated and finally the skin is sutured by interrupted sutures





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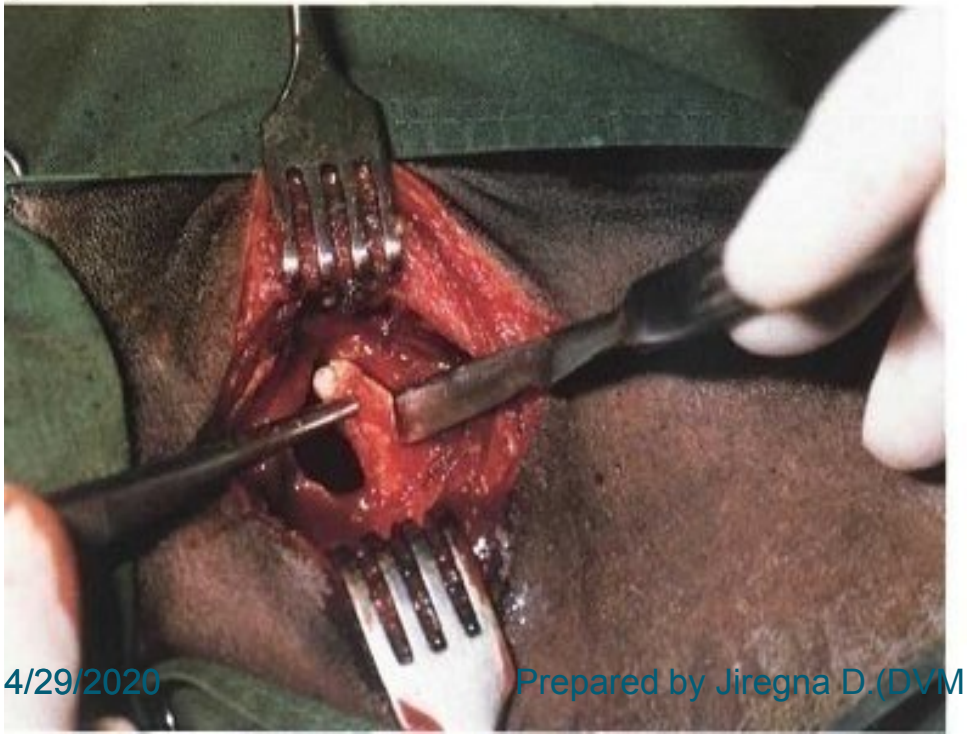

Post operative care:

- The tube is cleaned daily for the first few days
- The animal should not be allowed to rub the tube and damage the trachea
- The opening of the tracheostomy tube should be covered with gauze to prevent entrance of any foreign matter
- A course of antibiotics should be administered
- The skin suture should be removed after 8-12 days

Tracheostomy in Dog

❑**Tracheostomy-** involves creating new opening into the trachea to facilitate the passage of air or the evacuation of secretions(through this hole, rather than through the mouth and nose).

•**Has two types: Temporary and Permanent.**

1.Temporary tracheostomy→ often used in an emergency situation such as (upper respiratory obstruction). May also be performed during some surgical procedures that involve tissues in and around the mouth.

- **Temporary Tracheostomy-** is created in the trachea in the dog's neck. An incision is made through the skin directly over the trachea and then into the trachea itself.

- A plastic breathing tube is passed into the new opening to allow the pet to breathe.

- The tube interferes with the dog's ability to clear his trachea of mucus and debris and it can quickly become obstructed.

- Therefore, intensive monitoring and cleaning of the tube is required to prevent this very serious complication.

- Animals are kept in the hospital under close supervision when a tracheostomy tube is in place.
- When the animal is able to breathe through the upper airways, the tube is removed and the opening is allowed to close on its own.

2. Permanent tracheostomy: is used in cases of severe upper airway obstruction that cannot be treated medically or surgically, such as collapse of the larynx or tumors of the larynx that cannot be removed surgically.

- Is made in the same location in your pet's neck as a temporary tracheostomy. A "window" is created into the trachea and the edges are sutured to the adjacent skin, creating a large opening.

- *Your pet breathes directly through the new opening; without tube requirement*

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B) Diaphragmatic hernia/DH in cattle and dog

Diaphragmatic hernia in cattle

✓ Diaphragmatic hernia: is defined as the passage of abdominal viscera into the thoracic cavity through a congenital or acquired opening in the diaphragm.

✓Commonly it is the reticulum which can be herniated into the thorax, however, the omasum, abomasum, loops of intestine, spleen or liver may also get involved.

✓***Etiology*:** weakening of the diaphragm by lesions of TRP, congenital weak points of the diaphragm and physical force like increased intra-abdominal pressure during pregnancy or act of parturition**.**

Clinical signs:

- Most affected animals develop recurrent tymphany not responding to drugs.
- As more and more of the reticulum herniated the signs become severe due to adhesions between the reticulum and other structures like lungs, pericardium, thoracic wall and hernial ring.

Diagnosis:

- Presumptive Dx based on history
- clinical signs
- Confirmation by radiography

Control and Anesthesia

- The herniorrhaphy is performed under general anesthesia.
- Assisted ventilation throughout the surgery.

- Positive pressure ventilation -is The provision of air under pressure by a mechanical respirator, a machine designed to improve the exchange of air between the lungs and the atmosphere.

- Special equipment: Mechanical ventilator for positive ventilation or inhalation anesthetic machine, self retaining chest retractor, bone saw, osteotome, mallet, chromic catgut, silk and stainless steel wire.

Site of operation:In dog

1. **Abdominal approach:** ventral abdominal midline just behind the xiphoid cartilage.
   - It is easiest and most versatile approach and there is access to both sides of diaphragm.

2. **Thoracic approach:**

   a. **Lateral thoracic approach:** there is an access to dorsal part of diaphragm and caudal part of thoracic cavity. It is preferred in long standing hernia in dorsal part of diaphragm on one side.

   b. **Median sternotomy:** it is preferred in long standing ventral DH involving parenchymatous organs or in contact with pericardium

Control and anesthesia

- The patient is controlled in lateral or dorsal recumbency depending on the approach.
- General anesthesia after proper premedication and intubation
- Positive pressure ventilation

❑ **Surgical technique:**

Ventral abdominal approach

1. An incision is made on ventral midline extending from xiphoid cartilage as far caudally as required.

2. The tear in the daiphragm is explored and herniated organ/omentum or any other organ is returned to the abdomen (cattle)

3.Adhesion, if any should be carefully removed

4. the abdominal viscera are packed off and are kept moist with sterile normal saline.

5. the edges of diaphragmatic tear are elevated with allies tissue forceps and are sutured with simple interrupted or horizontal mattress sutures using chromic catgut (0).

6. If the diaphragmatic tear is at the costal attachment, the sutures should be placed around the rib.

7. The air in the thorax is aspirated through the preplaced chest tube.

Post operative care

- The endothracheal tube should not be removed until swallowing and cough reflexes return.
- Give the patient high level of oxygen during recovery
- Aspirate tracheal secretion at the termination of anesthesia
- Allow the patient to walk daily and coughing stimulated to clear secretions.
- Give analgesics
- Systemic antibiotic if infection is suspected
- Remove skin suture in 8-10 days after surgery

C) Cervical esophagotomy in cattle, horse and dog

Indications

- Esophageal obstruction
  - ➢ Obstruction occurs mostly in the cervical region

Surgical technique:

- The animals is restrained in the right lateral recumbence after deep sedation (in large animals) or deep anesthesia in dogs.
- A longitudinal incision on the cervical area over the site of obstruction under local anesthesia.
- After exposing the oesophagus, attempt should be made to push the obstructing mass, by direct manipulation of the esophagus, towards the pharynx, if the attempt fails, oesophagotomy is done

- For oesophagotomy, the oesophagus is occluded either by placing a tape around it or by traumatic clamps placed proximal and distal to the foreign body.
- The operative field is suitably packed off to avoid any possible contamination

-> *If the esophagus is normal, longitudinal incision is made directly over the foreign body*

-> *If there is damage to the esophagus, incision is made on* healthy tissue either proximal or distal to foreign body

- The foreign body removed
- Oesophageal incision is closed in two rows of sutures (first line connell and second either cushing or simple interrupted) using absorbable suture material.
- Skin and s\c tissue are sutured in routine/usual manner

Post operative care:

- Avoid animal eating solid food for a few days.
- Supportive therapy
- Administer antibiotic for 3-4 days
- Antiseptic dressing of skin wound should be done till healing is complete

CHAPTER 3
SURGERY OF ABDOMEN

SESSION OVERVIEW:

- Laparotomy (Celiotomy) in dog and cattle
- Rumenotomy in cattle
- Gastrotomy in dog
- Abomasopexy for left and right displacement of abomasum in
- Enterotomy in dog
- End to end anastomosis of intestine in dog
- Amputation of rectum in cow
- Surgical management of atresia ani and atresia ani et recti
- Extirpation of anal sac in dog
- **Repair of ventral hernia in cow and horse**
- **Repair of perineal hernia in dog**

J) Hernia management

- Repair of ventral hernia in cow and horse
- Repair of perianal hernia in dog

Session objectives:

- **At the end of the learning session you are expected to:**
  - Describe surgical management of ventral and peri anal hernia in various species of domestic animals.

❑Repair of ventral hernia in cow and horse

- ✓ Ventral or lateral abdominal hernia is a term used to describe a hernia through ventral or lateral part of the abdominal wall other than the natural orifice.

- ✓ Such type of hernia are common in ruminants and are acquired in nature.

Pre-operative preparation, Control and anesthesia:

- ❖ Reduce feed intake for 4-5 days and completely withhold for 24 hrs.
- ❖ Restrain the animal in dorsal oblique recumbency after sedation
- ❖ Infiltrate local anesthesia at the site of incision and at the hernial ring.

- **Surgical Technique:**
  - ✓ Two elliptical incisions are made through the skin on each side of the sac are joined at each end.
  - ✓ The hernial ring is adequately exposed.
  - ✓ The patch of the skin b/n the incisions is bluntly dissected from the peritoneal sac and discarded.
  - ✓ The edges of the skin are reflected from the sac by blunt dissection.
  - ✓ The peritoneal sac is carefully dissected from the underlying tissue.

- ✓ Hernia is reduced by pushing the sac into the peritoneal cavity.
- ✓ The hernial ring is closed by overlapping suture using vicryl 2-0 size.
- ✓ The exposed edge of the ring along with fascia are tucked to the body wall with a simple continuous suture using catgut 2 or 3.
- ✓ Skin edges are apposed with interrupted sutures using non-absorbable suture material.

❑ Repair of perianal hernia in dog

✓**Site of operation:** over the hernial sac lateral to the anus

✓**Control and anesthesia:** the patient is restrained on its sternum and hind quarters are elevated. General anesthesia is used

✓**Surgical technique:**

- A purse string suture is applied around the anus
- Slightly curved skin incision over the hernia extended slightly above and below the hernia and swelling

- Open the hernial sac, isolate hernial contents and identified by blunt dissection and are replaced back into the pelvic cavity by gentle manipulation.

- Interrupted sutures using chromic catgut are used to repair pelvic diaphragm, internal obturator muscle is also sutured to ventrolateral aspect of the rectum.

- Interrupted sutures are also applied between the anal sphincter and Sacro tuberous ligament present along the medial wall of the pelvis

- The S/c tissue is approximated by interrupted sutures
- The excessive skin is trimmed and edges of skin are sutured with interrupted or mattress.
- Anal purse string sutures are removed after closure of the skin.

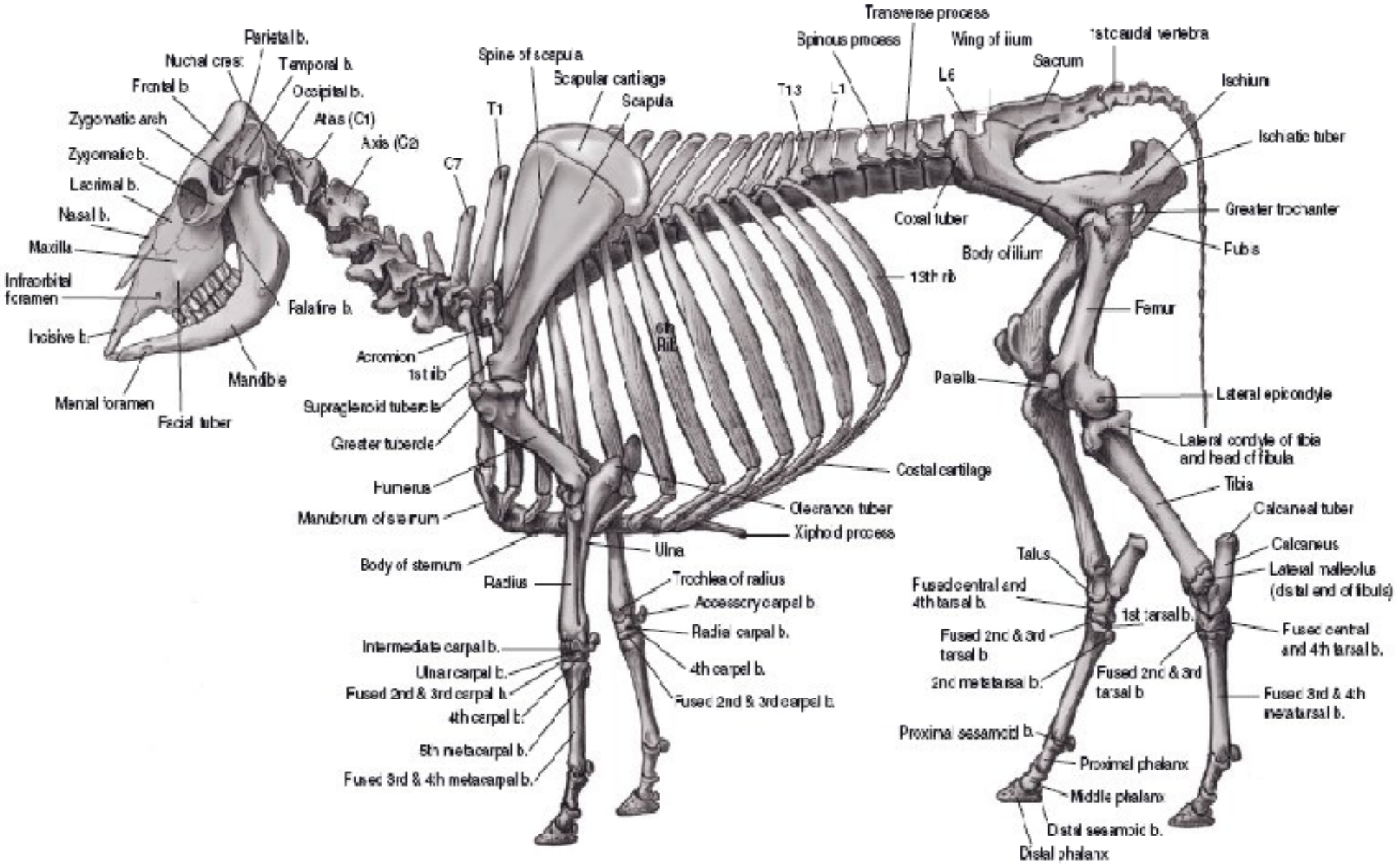
➢ **Post operative care:**

- Semi liquid diet after operation to prevent excessive straining during defecation
- Antibiotics and antipain.
- Remove skin suture 8-10 post operative days

CHAPTER FOUR
SURGERY OF LOCOMOTOR ORGANS AND MUSCULO SKELETAL SYSTEM

- **Session Overview**
  - Amputation of tail
  - External and international immobilization of fracture
  - Surgical approaches of shaft of long bones
  - Amputation of fore and hind legs
  - Tenotomy(superficial/deep flexor) and desmotomy (Medial patellar)

REVISION ON SKELETAL SYSTEM: BOVINE



I) Amputation of tail

Amputate: to trim, prune or cut off.

- ***Surgical amputation:*** *to remove part or all of an anatomic structure in a way that causes* the least tissue damage and minimizes patient morbidity and mortality.
- Amputation is generally considered as a‘last ditch’ treatment when there is no way to restore the affected anatomy to reasonable function.

Indications

- Cosmetic purpose
- Therapeutic

❖**Site of operation**

✓Above the injury or infection at the intervertebral articulation

❖**Control and anesthesia**

✓Large animals are controlled in standing position or in recumbence.

✓Small animal on the operation table in recumbent position.

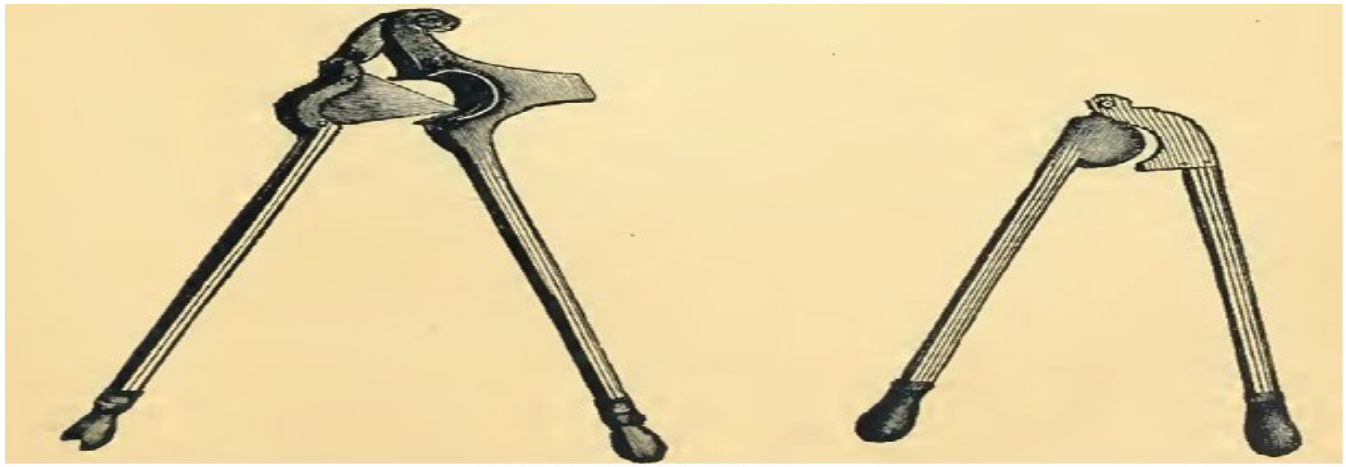
✓Anesthesia-local infiltration of local anesthetic solution subcutaneously encircling the tail above the site of operation or by posterior epidural anesthesia. General anesthesia may be required in small animals.

❖ Surgical technique

One can use any of the two methods:

a) Using docking knife

- A tourniquet is applied at the base of the tail
- An inter vertebral space is located by bending the tail back and forth
- Docking knife is placed at the chosen site
- The tail is amputated on the articulation by closing the knife forcibly
- Sterilized gauze impregnated in anesthetic solution is applied over the tail stump and a bandage is applied sufficiently tight to check bleeding.
- The tourniquet should be released after the operation



Tail cutting knife

b) Flap method

- ✓ Two "V" shaped flaps one on dorsal and the other on ventral side are made at the site of operation after palpating the articulation.
- ✓ Prominent vessels at the lateral and ventral aspect are identified and ligated proximal and distal to the proposed site of amputation.
- ✓ Intra vertebral space is located by blunt dissection and the joint is disarticulated with the help of knife. The distal portion of the tail is then removed.
- ✓ Skin flaps are united by simple interrupted or interrupted mattress suture.

❖ Post operative care

- ✓ In the first method, tail is dressed with an antibiotic ointment on alternative days till the healing is complete.
- ✓ In the second method sutures are removed 7 to 8 days after surgery.
- ✓ If infections is suspected, it is advisable to give antibiotic.

STANDARD FRACTURE REPAIR TECHNIQUES-GENERAL

✓ **The goal of fracture treatment is;**

- Early ambulation
- Complete return of function

✓ **The principles of fracture treatment are;**

- Anatomical reduction
- Stable fixation
- Preservation of blood supply
- Early active pain-free mobilization

✓ Success depends on:

- Insight of the surgeon
- Cooperation of the owner
- Cooperation of the patient

Steps: Reduction and immobilization

- Reduction of Fracture- the process of replacing the fractured segments in their original anatomical position.
- When a bone is fractured the entire apposing muscles (flexors and extensors) contract maximally and *overriding and shortening* of bone occur.
- Can be implemented: closed reduction (traction and counter traction) or open reduction (surgical means).

CLASSIFICATION OF FRACTURE REPAIR

EXTERNAL COAPTATION

- Splints
- Casting
- Modified Thomas splint
- Velpeau Sling
- Ehmer Sling
- Robert Jones Bandage

INTERNAL FIXATION

- Intramedullary Pinning
- Interlocking nail
- Rush Pins
- Cross Pinning
- Cercelage Wires
- Tension Band wires
- Bone Screws
- Bone plates and Screws

❑External Immobilization of Bone Fracture

A) Application of plaster caste on limbs in dog and large animal

❖ **Indications**

✓ External immobilization of the fracture below the elbow and stifle joint

✓ Ligamentous injuries

❖ **Materials required**

- Plaster of paris/POP bandages, cotton, gauze bandages, splints (aluminium stips, wood or bamboo strips).

Site:

- Fracture site incorporating upper and lower joints in the plaster cast.

❖ **Restraint and anesthesia**

✓ In lateral recumbence with the affected limb upper.

✓ General anesthesia for dog and cats.

✓ Deep narcosis/tranquilization for large animals.

❖ Technique:

- Reduce fracture fragments (traction and counter-traction).
- An even layer of cotton is applied around the leg in order to protect bony prominences. Avoid over or under padding.
- Splints are bandaged in place with an even pressure.
- Plaster of partis bandages are soaked in lukewarm water for a few seconds until air bubbles cease to appear.

- Plaster bandages are then removed from the water, squeezed and wrapped over the splints, starting at the fracture site and continuing up and down including the entire limb except the toe pads in dogs and hooves in large animals.

- Do not stretch or tighten the plaster cast around the limb.

➢ ***Note***

- joints above and below the fracture are immobilized with plaster cast.
- No movement is permitted while the cast is setting.
- If mild odema/swelling of limb is expected a change of plaster cast is necessary after oedema subsides.

❖ After care

- ✓ Toes or hooves are inspected several times during the first 24 hrs for any swelling, coldness or constriction and if swollen or cold pressure at the end of cast is released or cast is removed and reapplied after swelling subside.

- ✓ Radiographs are taken at an interval of 15, 30, 60 and 90 days to see the extent of callus formation.

- ✓ Plaster is removed after radiological fracture union occurs.
- ✓ Affected area is massaged to promote circulation after removal of POP cast.
- ✓ Animal is kept on light exercise till the limb regain its normal function.

B) Application of modified Thomas splint

❖ Indications

- Immobilization of fractured distal femur, radius/ulna, distal humerus and tibia/fibula.

❖ Material required:

- Aluminium rod or conduit pipe of various sizes, cotton, Gauze bandage, adhesive tape, splint mold, sedative/tranquilizer

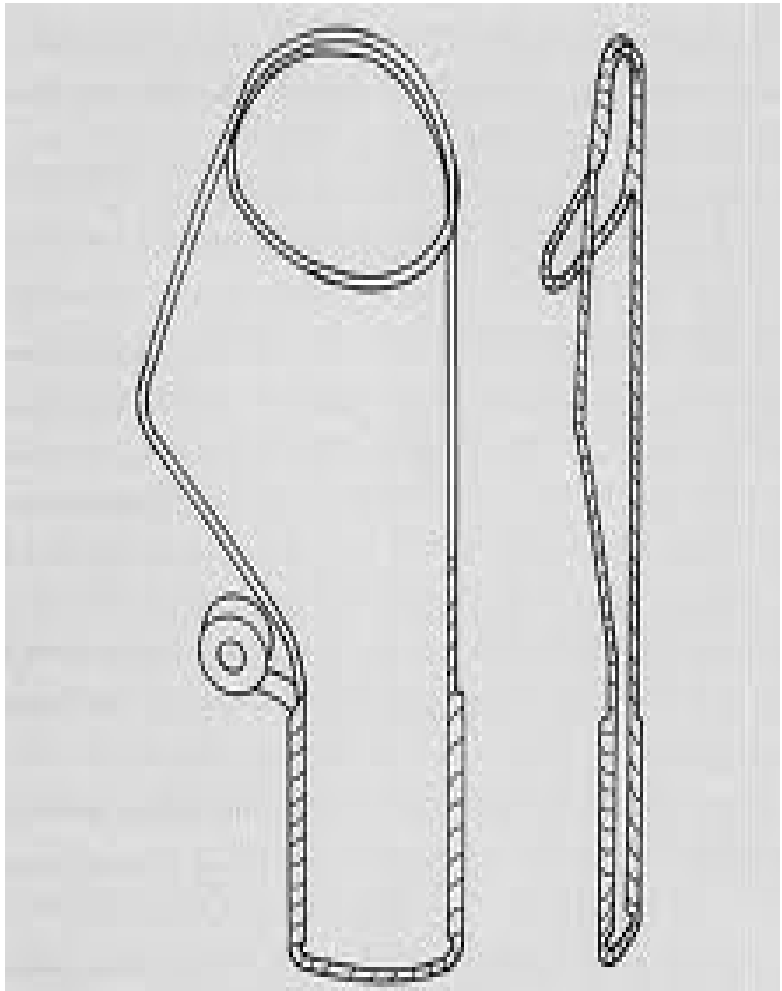


FIG. 16-7 A pelvic limb Schroeder–Thomas splint. The finished splint is shown with flattened tilted groin bar. Tape is applied to keep the traction members from slipping.

A.Thomas splint

B. Application of Thomas splint and cast combination for fracture of tibia in a bull

Technique of application

- ✓ Overriding fracture fragments are reduced
- ✓ Ring and bars are well padded with bandage
- ✓ Entire limb is padded with cotton bandage
- ✓ Splint is applied on the limb and fixed with the help of adhesive tape or bandage.

Post operative care:

- ✓ Splint is kept in place for 3 to 6 weeks depending on the type of fracture
- ✓ All skin wounds created by rubbing of splint, if any is treated with antibiotic ointment.

Internal Immobilization of Long Bone Fractures In Large Animals.

Indications:

- Management of long bone fracture

- Veterinary surgeons in developing country have still not adopted well to the application of internal fixation techniques in large ruminants
- Most failures have been due to faulty techniques, improperly designed devises, break in asepsis and inadequate post operative care.
- If used according to the principles and with strict aseptic techniques, internal fixation along with external support can provide much more satisfactory result than external fixation alone

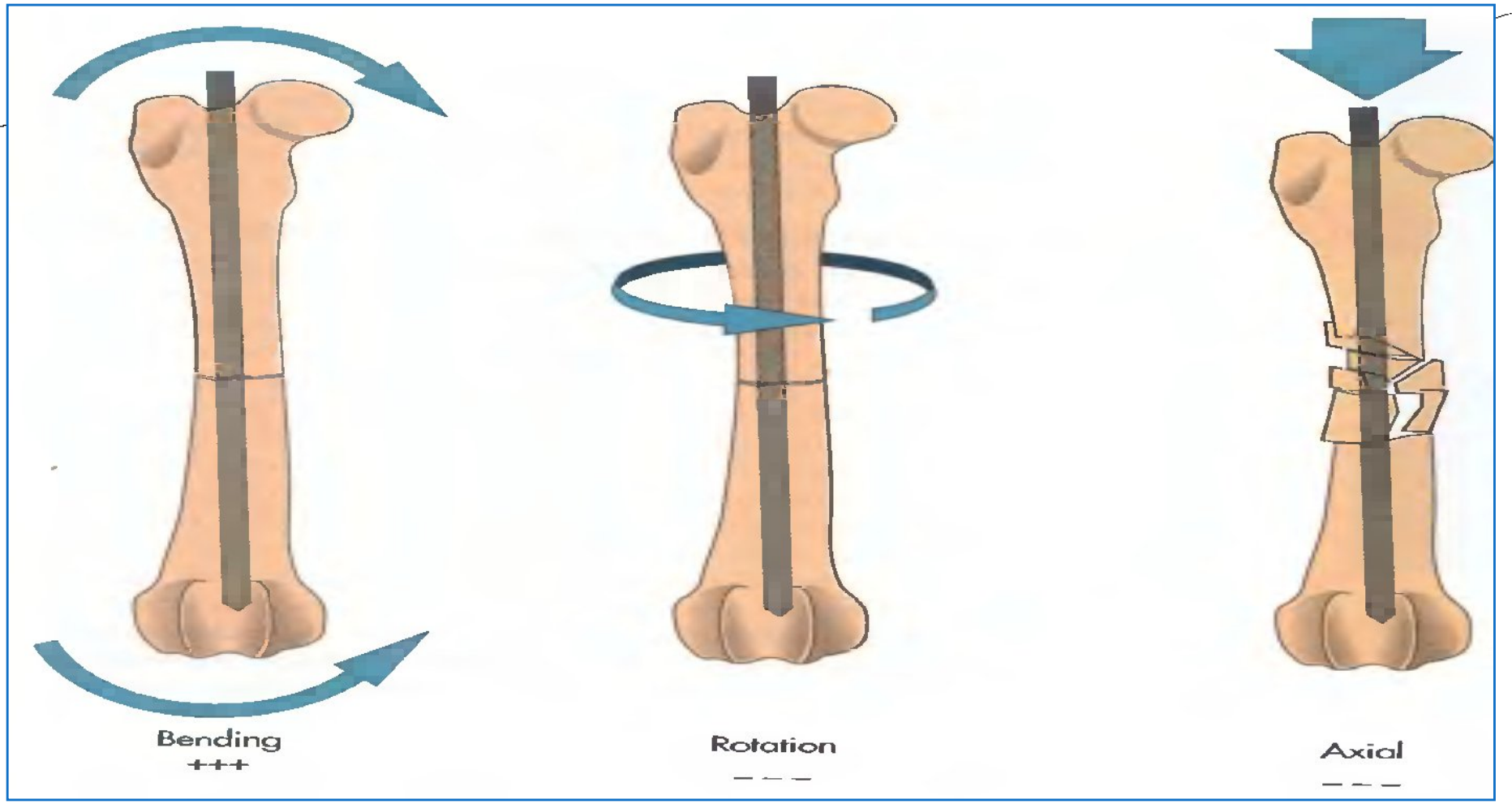
I) Intramedullary pinning

- ✓ The technique is similar to small animals except the use of large size of pins and nails. In young calves, sheep and goat fractures of radius, tibia, humerus and femur can be successfully repaired. Success in large animals depends upon size and age of the animal.

- ✓ Techniques of IM pin fixation are; I. Open or closed method

Instrumentation

- **Steinmann pins**, **Jacobs chuck**
- The pin can be inserted in to the bone by a **hand chuck** or motorized power drill.
- After finishing the fixation of pin the exact length should be cut using a **pin cutter.**



The biomechanical *advantage* of IM pins is the resistance to *bending force*

The biomechanical *disadvantage* of IM pins are; *poor resistance to Rotational forces and Compressive (axial)*

II. Cross pinning

- ✓ It is used to repair fracture of mandible, compound sub articular fracture of tibia, metacarpus and metatarsus.

1. After reduction of the fracture, intramedullary pin suitable diameter is inserted through the skin and cortex from lateral aspect of one fragment of fracture to penetrate the opposite cortex of the other fragment and skin.

2. Another pin is inserted at obtuse angle from the medial aspect through skin and cortex of the fragment to penetrate the opposite cortex of the other fragment and skin

3. The penetrating ends of the pin are bent and enclosed in a plaster cast applied in a figure of "8" fashion

HI) Plate fixation

- Provides rigid immobilization therefore is an effective method of internal fixation. It can immobilize even oblique and communicated fractures.

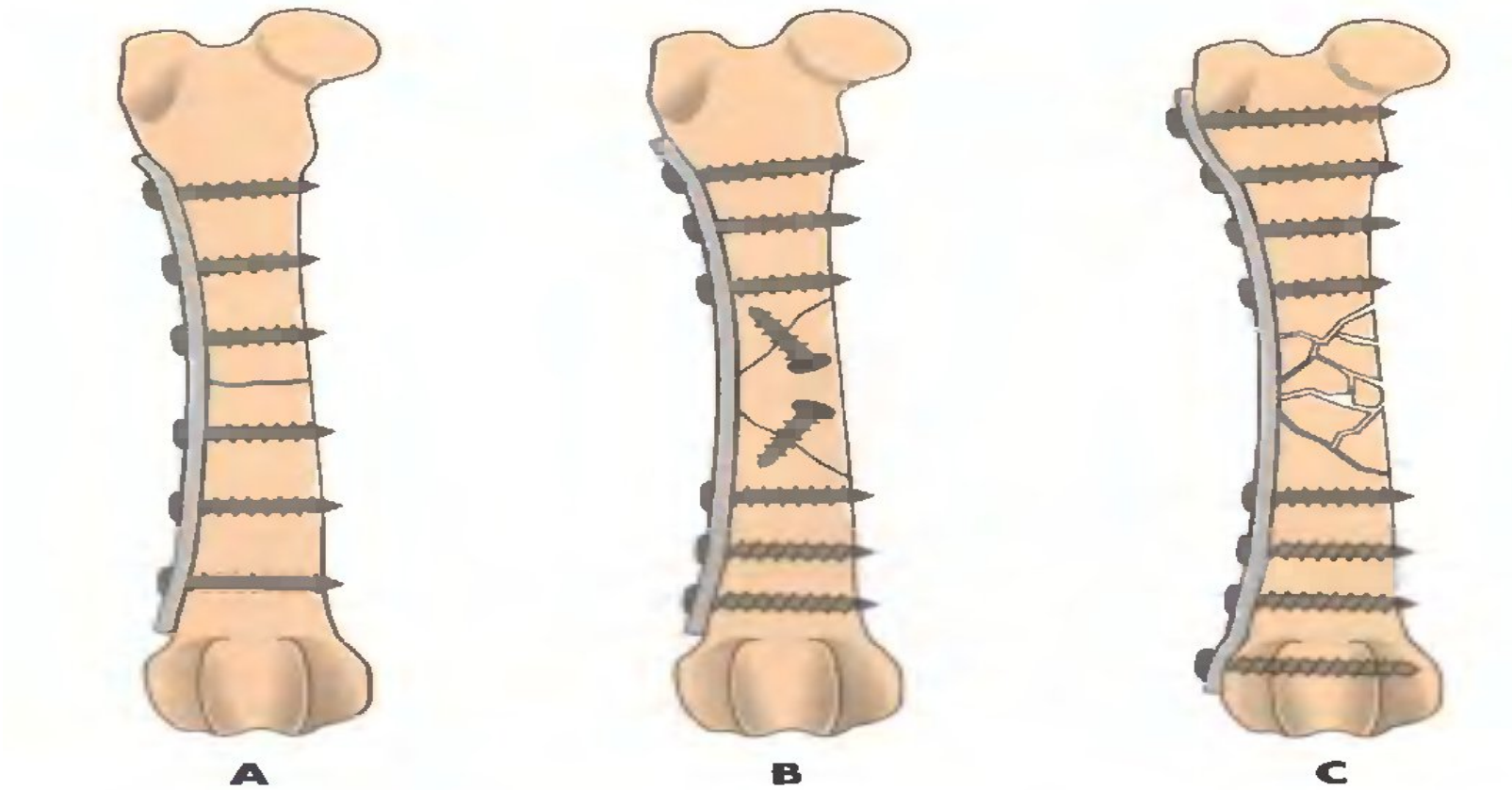
Materials required

- Stainless steel plate, screws, bone holding forceps, bone drill

Technique

- Contoured straight plates or small angle blade plates are used. They are bent to fit/contour to the affected bone and is placed over the fractured bone.
- Fracture is reduced and held with bone holding forceps
- Screws of proper length are selected and is inserted into the hole to loosely attach the plate to the bone
- A hole of appropriate size is drilled through the bone in the place nearest to the fracture end of the opposite fragment
- Screw is inserted and tightened alternatively
- The remaining screws are inserted following drilling, measuring and tapping the holes through the bone on both sides of the fracture site
- Screws are then tightened alternatively and completely

Functions of a bone plate



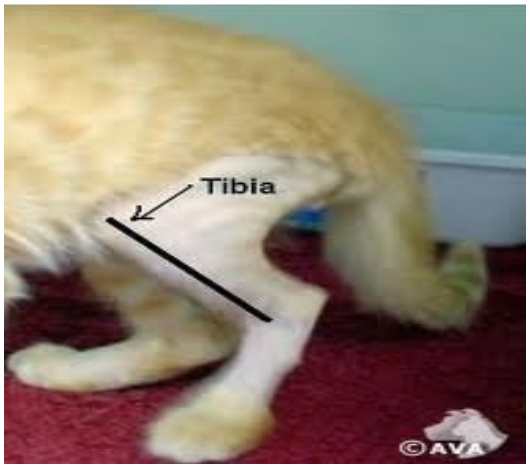
A) Compression Plate B) Neutralization Plate C) Buttress Plate

IV) Intramedullary pinning (IP) of tibia in dogs

❖ **Indications:**

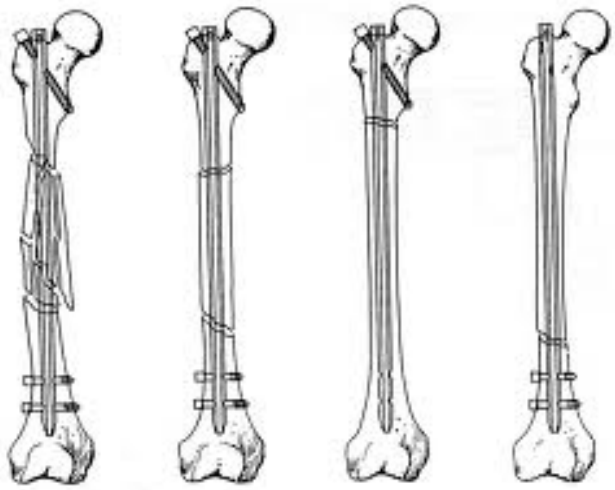
✓ simple metaphyseal fracture(IMP)

✓ is indicated for simple transverse or short oblique fracture of proximal or distal metaphysis (Cross IMP)



❖ **Restraint and anesthesia:**

- Animals are restrained under general anesthesia in lateral recumbence with the affected limb upper most.



❖Surgical technique

- A small incision is made over the anterior medial aspect of the proximal tibia and femorotibial joint.

- A Pin of appropriate size and length is introduced at a point midway b/n the tibial crest and the medial collateral ligament and is directed into the medullary canal.

- In lower distal methaphyseal fracture, a tranarticular pin is placed through the hock joint to provide adequate stability.

v) Bone plating of radius in dog

Indications:

- Internal fixation of fractures especially in non-union cases.

Site of operation:

- ✓Mid shaft of the radius on its medial side in the area parallel with dorso medial surface of the bone.

Restrained and anesthesia:

- ✓The dog is positioned in lateral recumbence under general anesthesia with the affected limb down.

❖ Surgical technique

- The skin incision is made on medial aspect from the medial epicondyle of the humerus to the styloid process of radius.
- Skin and s/c tissue reflected both cranially and caudally
- Deep antibrachial fascia is incised and the other muscles elevated or retracted.
- Proximal and distal fractures are reduced with traction and kept in alignment with bone holding clamp
- Periosteum is loosened with periosteal elevator so that the plate is placed over the fracture fragments.
- Two holes on both cortex are made in each fragment.
- Screw are set in the holes and the plate is fixed in position
- Plate is covered with periosteum
- Incised muscles are sutured to their insertion
- Antibrachial fascia and s/c fascia are close in separate layer
- Skin is closed in simple interrupted suture

VI) Amputation of dew claws in dogs

- **Indications:**
  - Elective indications
    - For cosmetic effect
    - In sporting breeds of dogs
      - To avoid trauma that may occur when hunting in heavy brush.
    - In domestic cats
      - Performed to prevent scratching of people and damaging household belongings.
    - Dewclaws are best removed before 1 week of age.

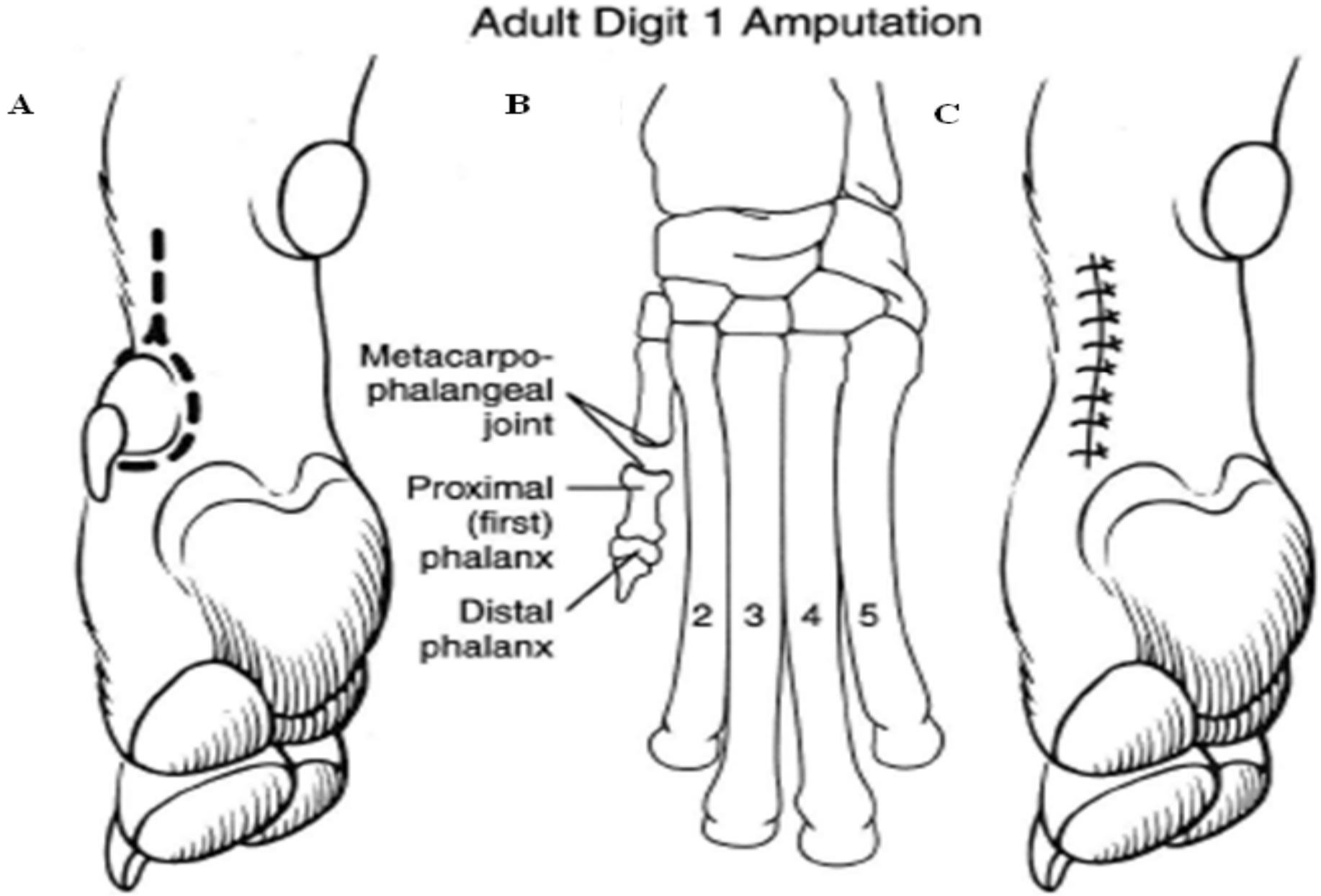
Dewclaw amputation-Dog

- Non-elective indications
  - Congenital deformities
  - Neoplasia
  - Osteomyelitis
  - Severe crushing injuries and necrosis
  - Chronic nonunion fractures and
  - Nerve paralysis.
  - Salvage procedure that is used when the results from other medical and surgical alternatives are not acceptable.

Dewclaw amputation-Dog

- **Surgical technique:**
  - **In adult dog**
    - An elliptical skin incision is made around the base of the dewclaw.
    - The digital artery and vein are identified, isolated, and ligated and the tissues and vessel are severed distal to the ligations.
    - The digit is disarticulated at the metacarpophalangeal or metatarsophalangeal joint to complete the amputation.
    - The subcutaneous tissues and skin are closed routinely.

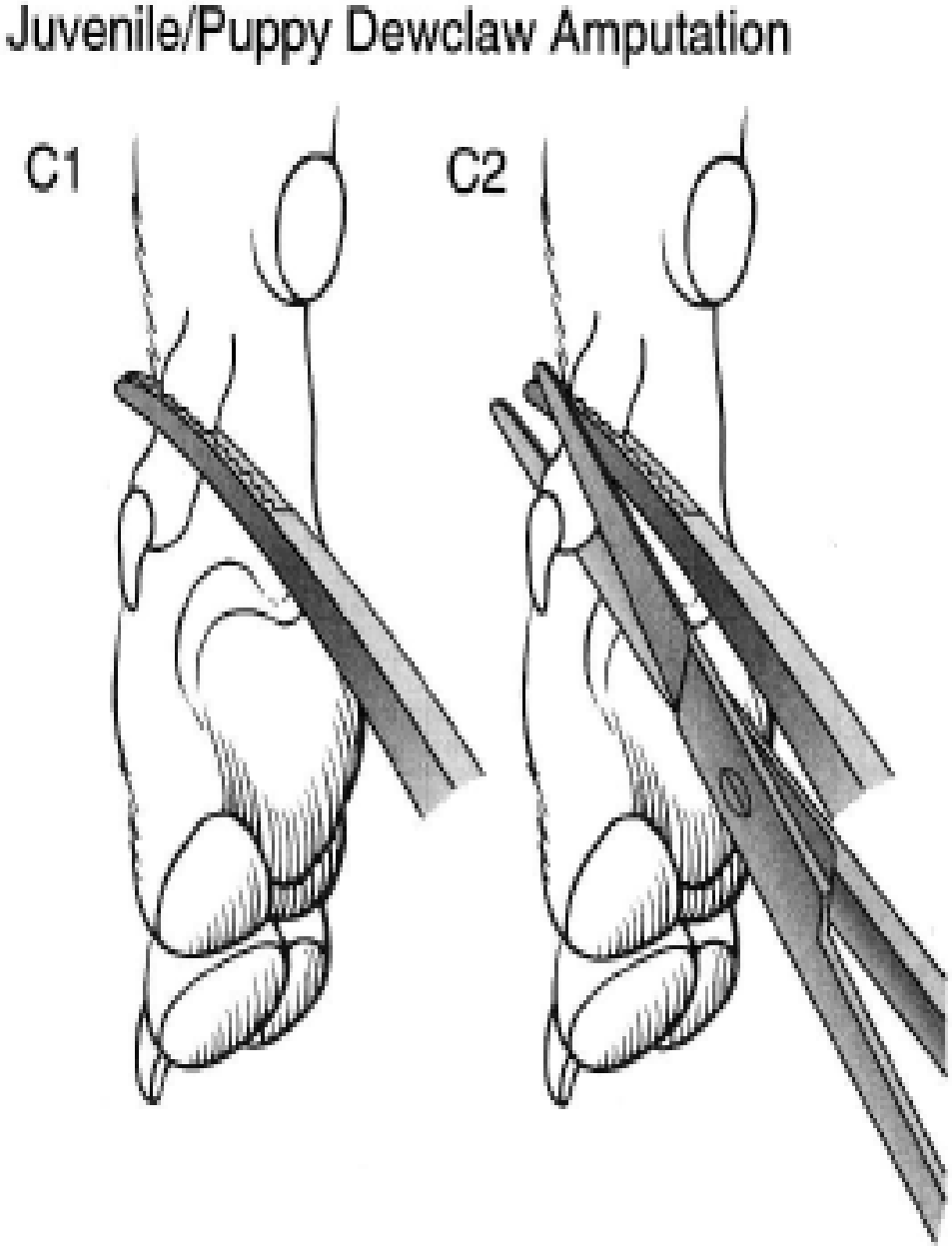
Dewclaw amputation-Dog

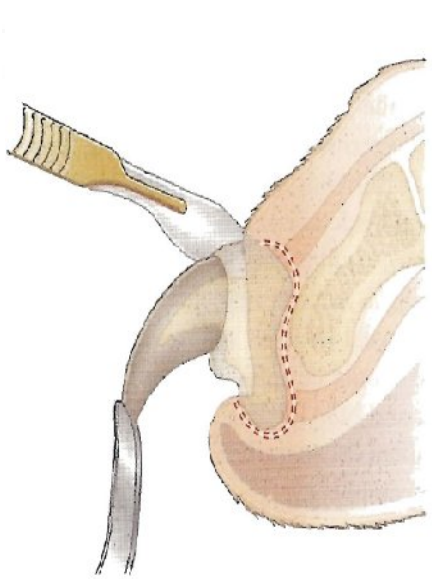


Dewclaw amputation-Dog

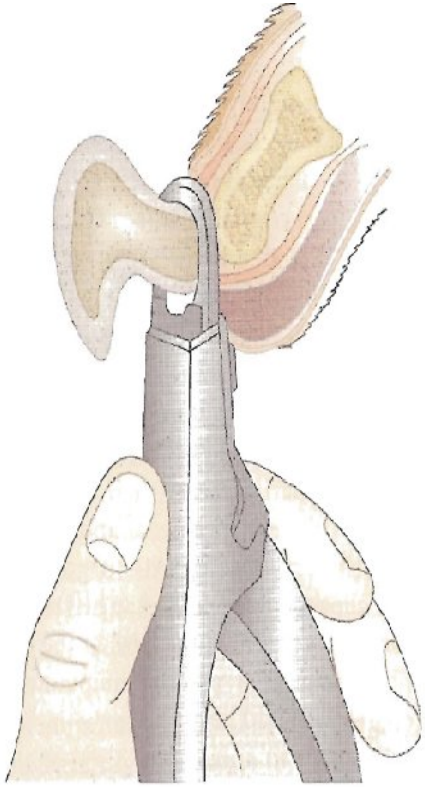
- **Surgical technique cont…**
  - **In a neonate:**
    - Crush the tissue of the dewclaw using straight or curved haemostatic forceps at the level of the appendage's attachment to the paw.
    - Using a scalpel blade, scissors, or digital pressure, remove the digit.
    - Suture the wound with a simple interrupted or cruciate suture using monofilament absorbable suture material.

Dewclaw amputation-Dog





(a) Onychectomy using scalpel

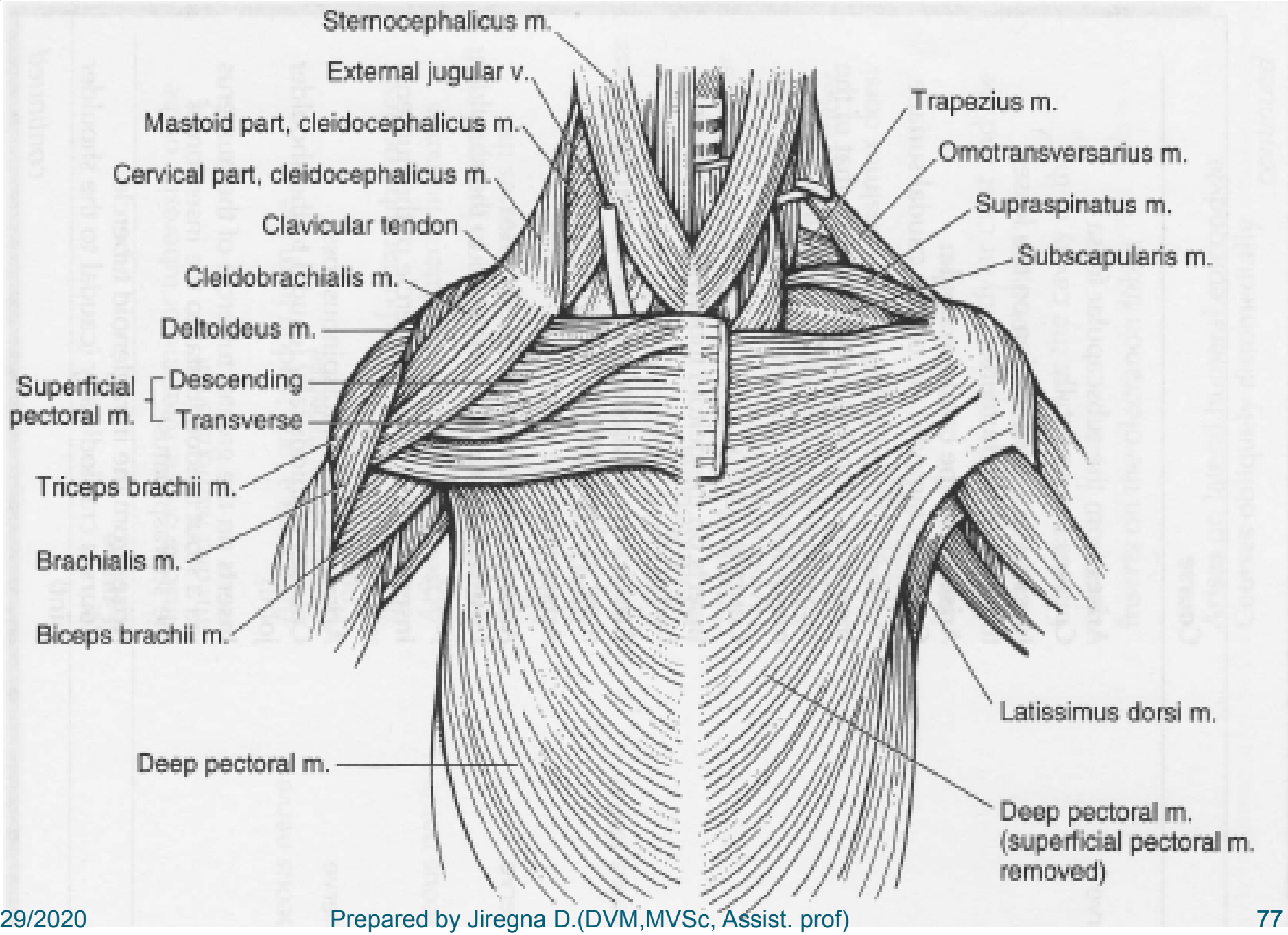


(b) Onychectomy using guillotine nail clippers

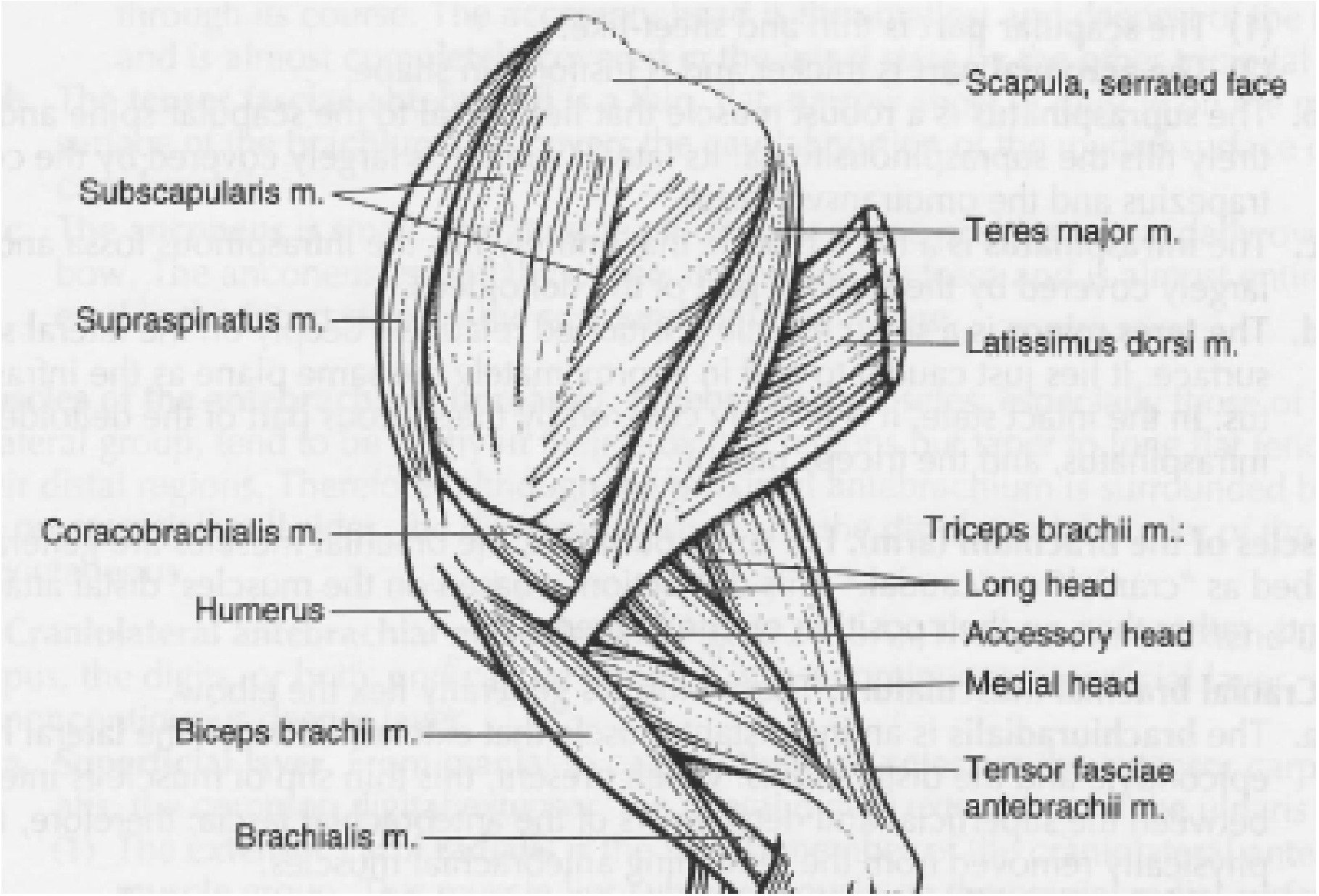
Front Limb Amputation

- It is a salvage procedure
- Performed by removing the limb at
  - The scapula
  - Scapulo-humeral articulation
- **Indications**
  - Congenital deformities
  - Neoplasia and Osteomyelitis
  - Severe crushing injuries and
  - Necrosis, chronic nonunion fractures, and
  - Nerve damage resulting in limb paralysis.
- **Anaesthesia and Control:**
  - Animal is operated under general anaesthesia and controlled in lateral recumbency with the affected limb up.

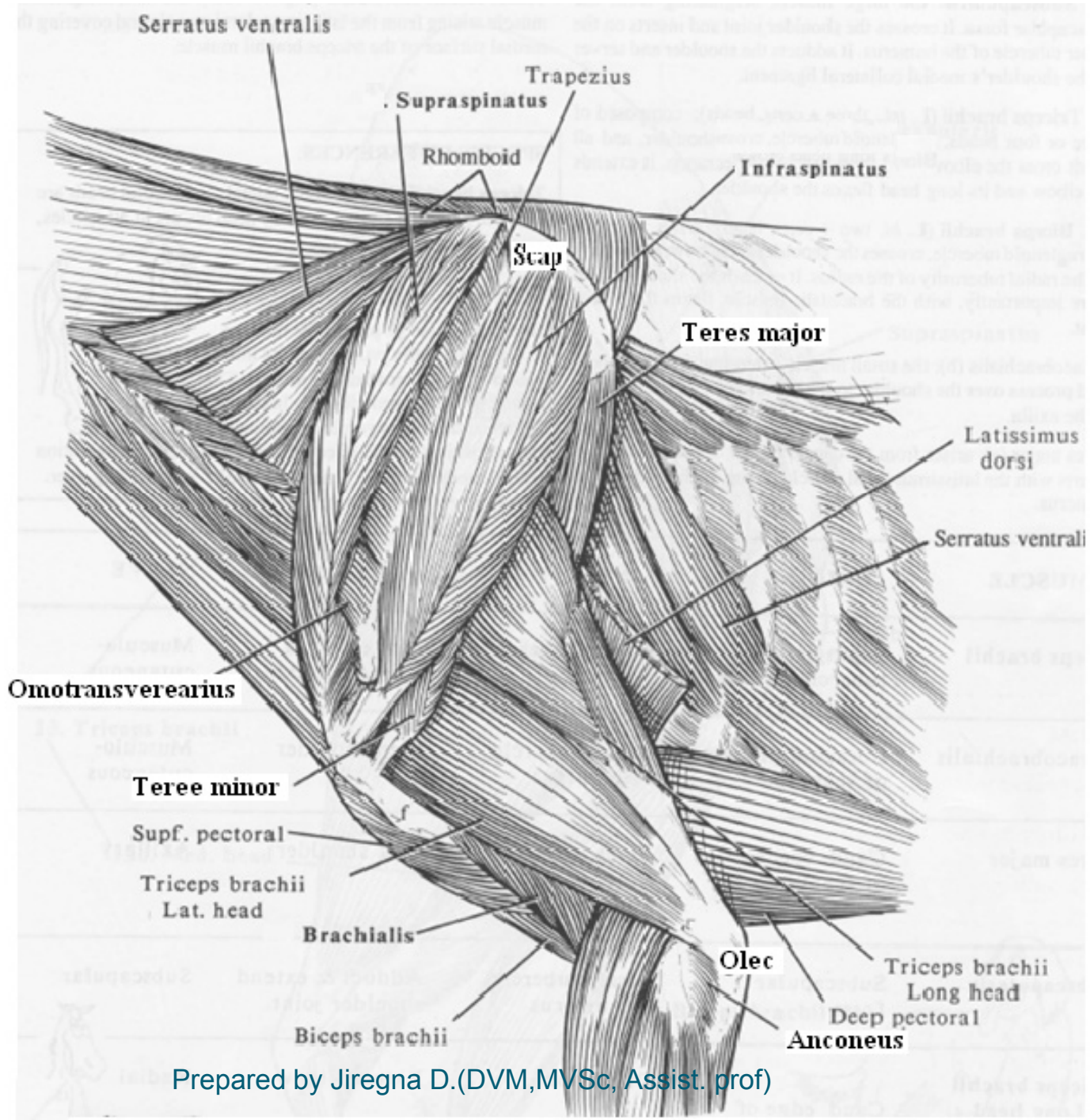
Front limb amputation



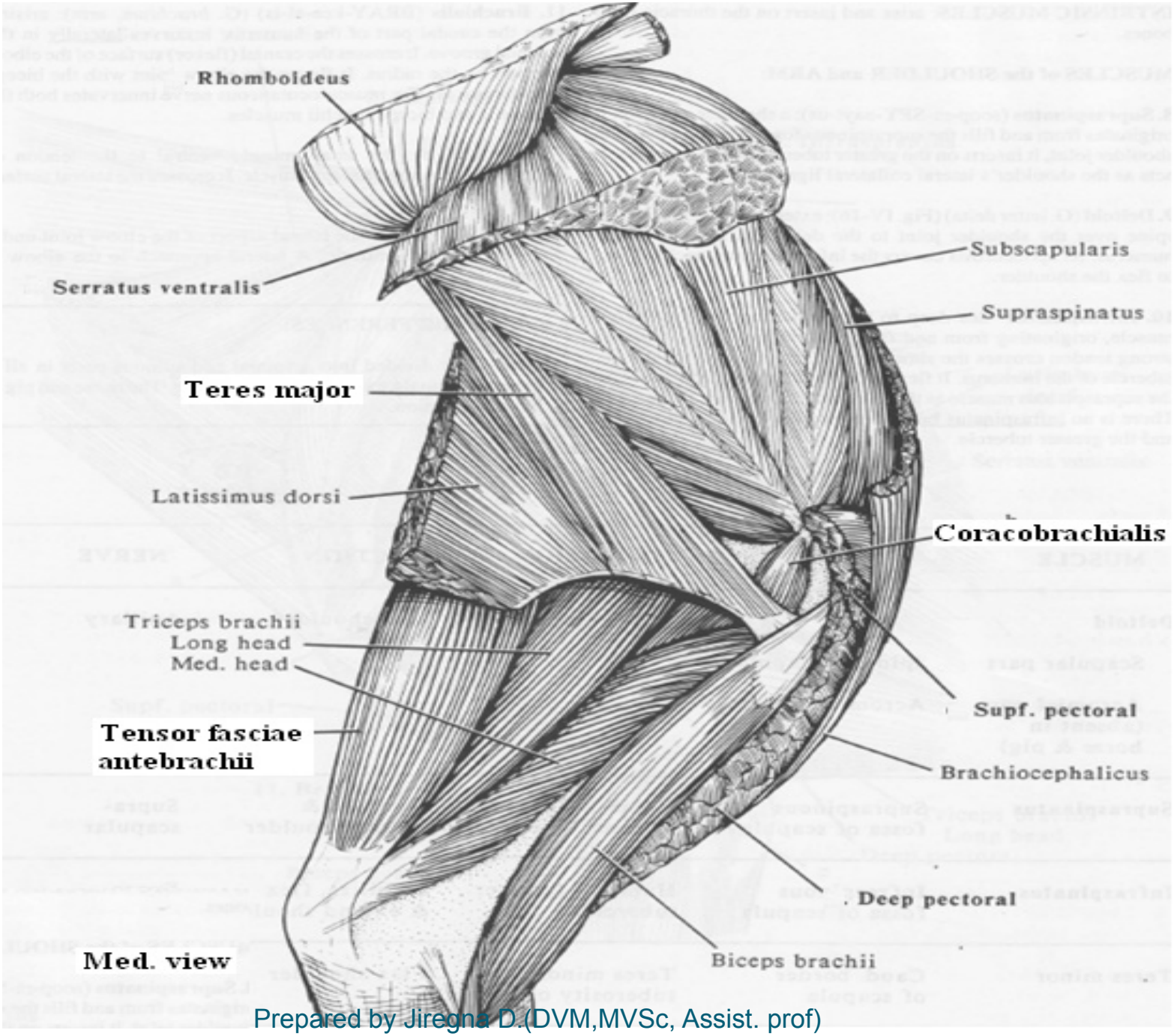
Front limb amputation



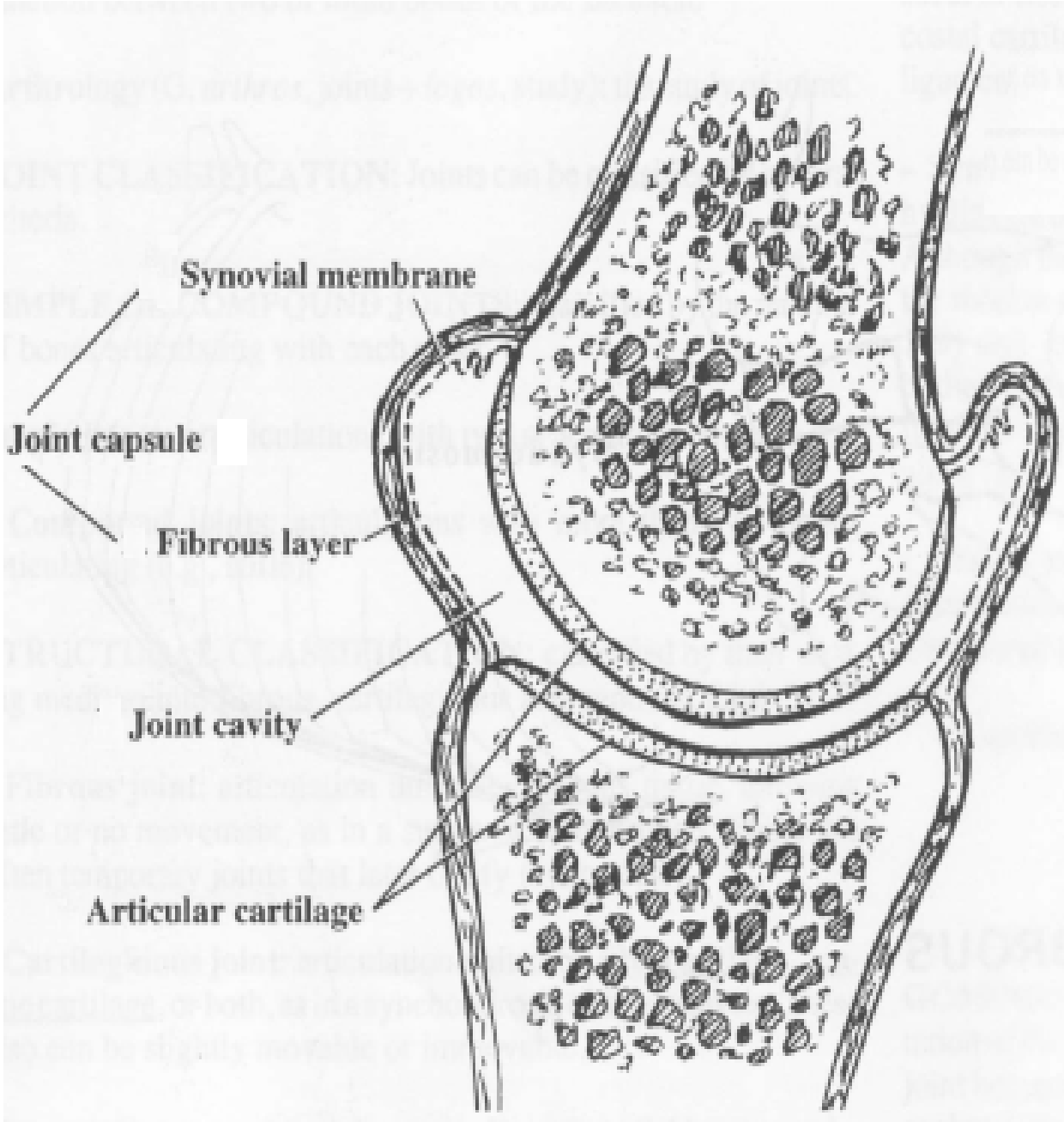
Front limb amputation



Front limb amputation



Front limb amputation

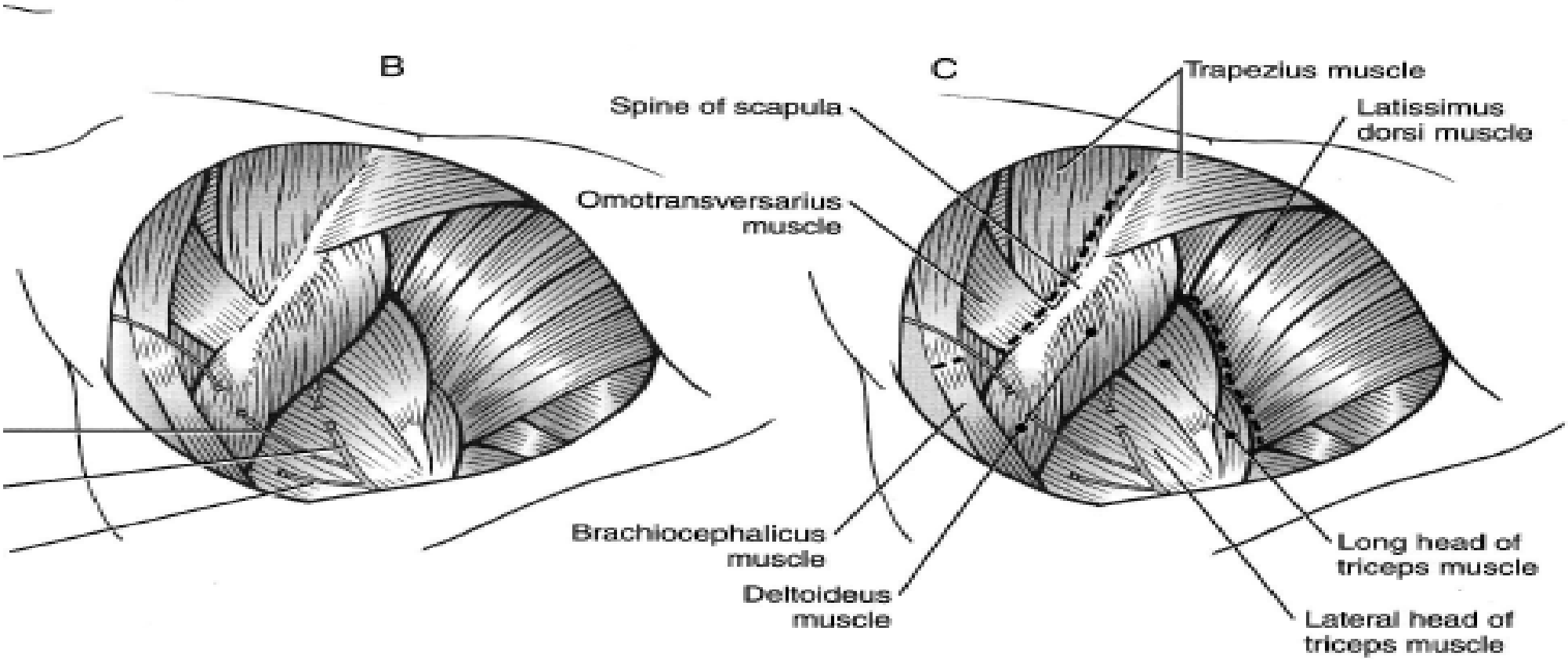


Front limb-Forequarter Amputation

- **Surgical technique:**
  - Animal is placed in lateral recumbency with the affected side up.
  - A Y-shaped skin incision is made

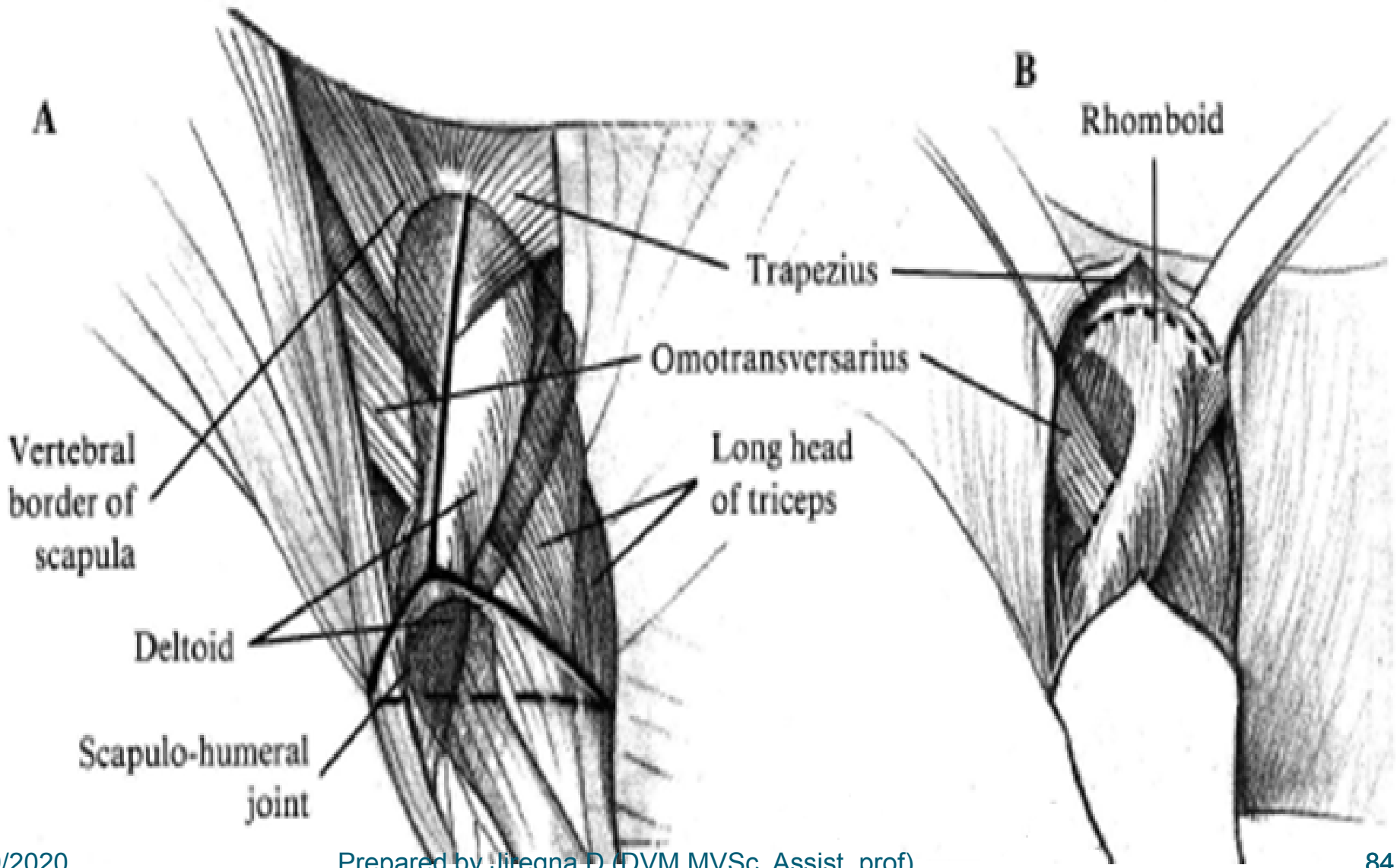
Front limb-Forequarter Amputation

- The skin is reflected and
  - The insertions of the trapezius and omotransversarius muscles are severed, exposing the rhomboid muscle.
- The rhomboid muscle is severed along the scapular spine.



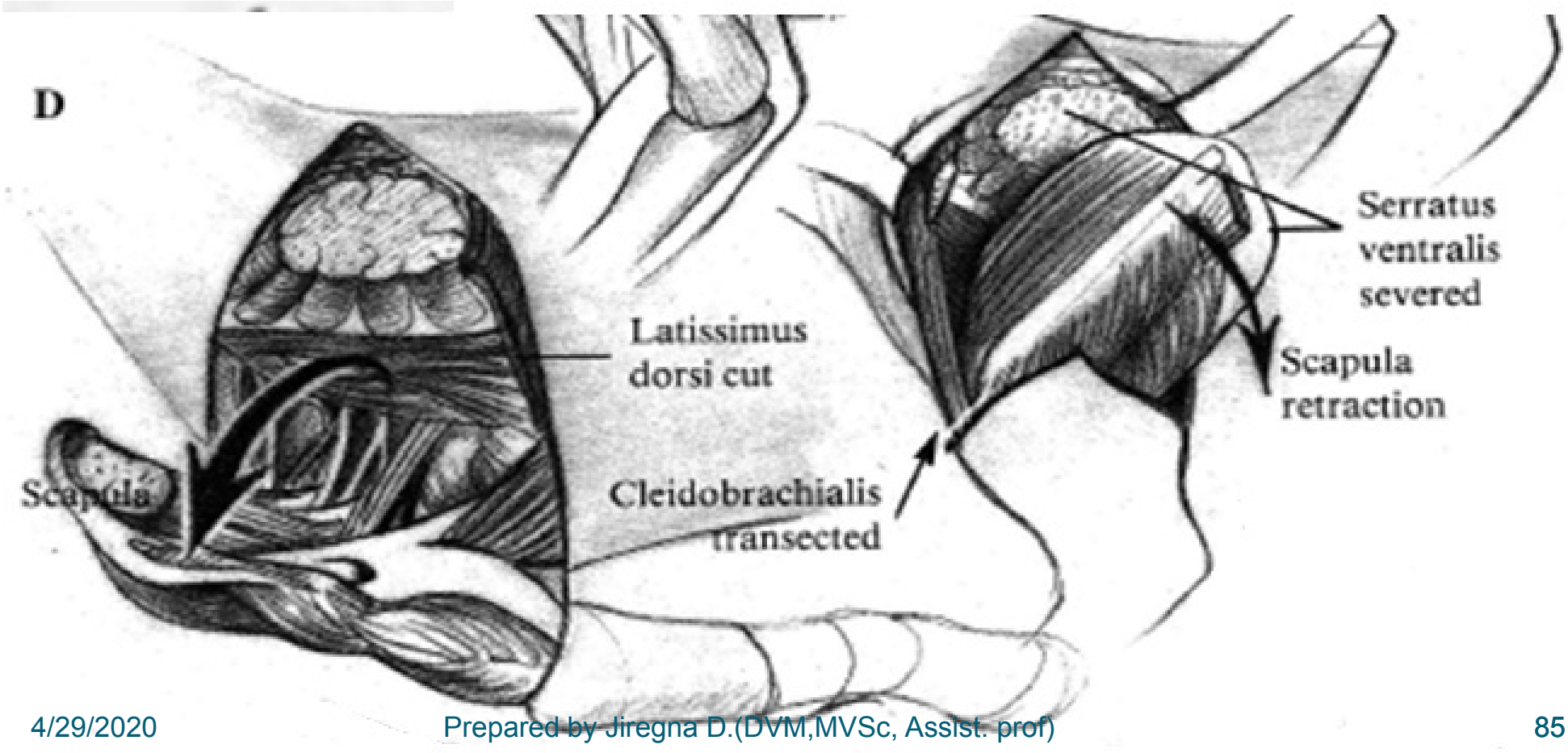
Front limb-Forequarter Amputation

- The rhomboid muscle is severed along the scapular spine.



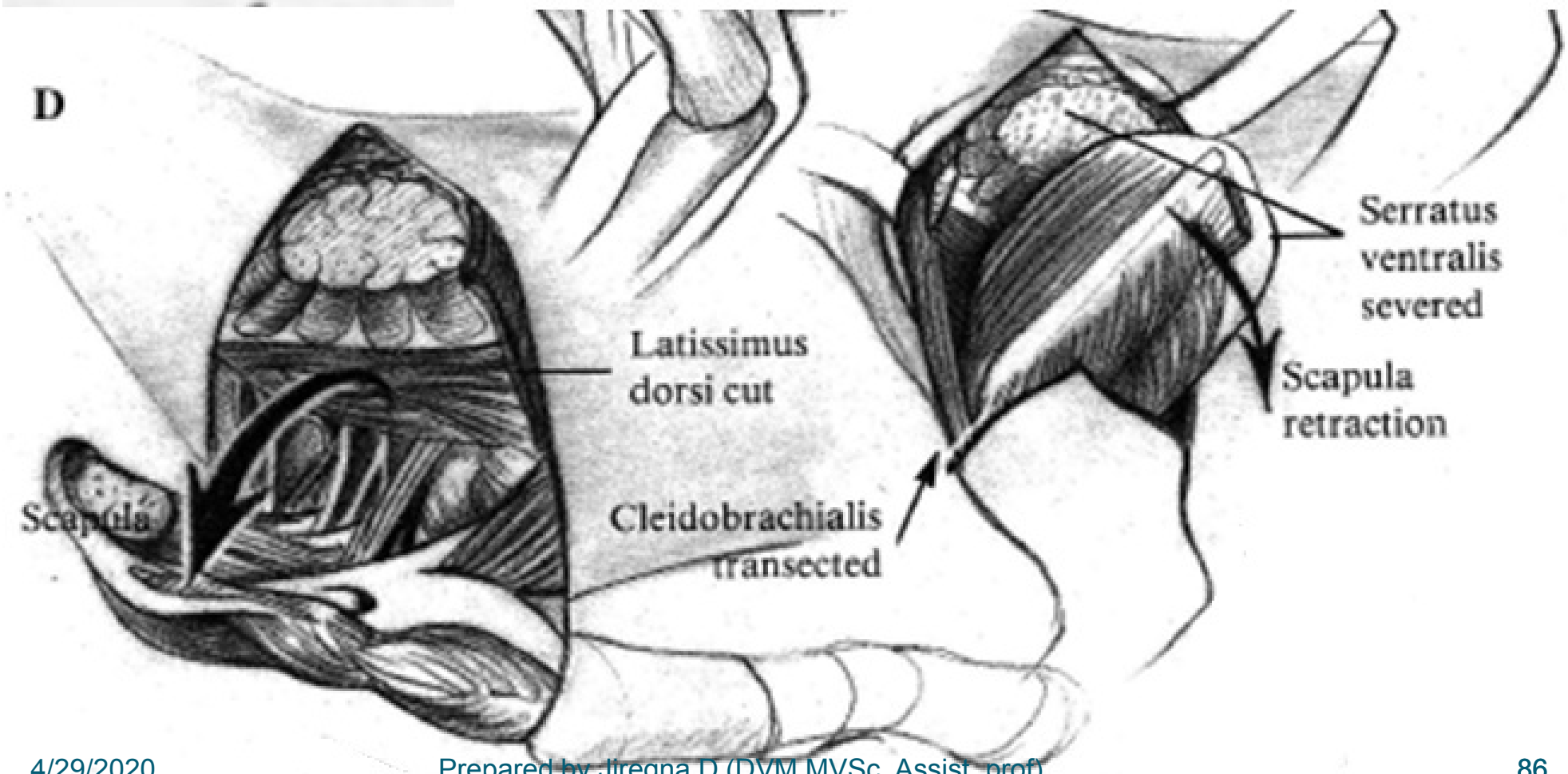
Front limb-Forequarter Amputation

- The scapula is retracted lateroventrally, and the serratus ventralis is severed
- The cleidobrachialis muscle is transected at the level of the scapulohumeral joint.

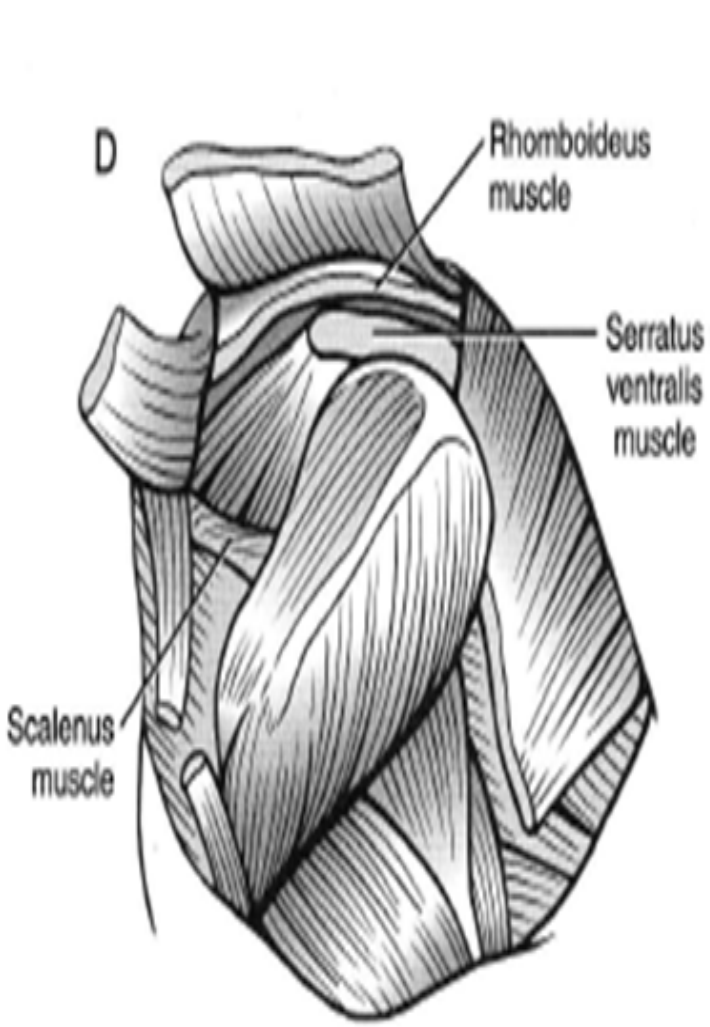


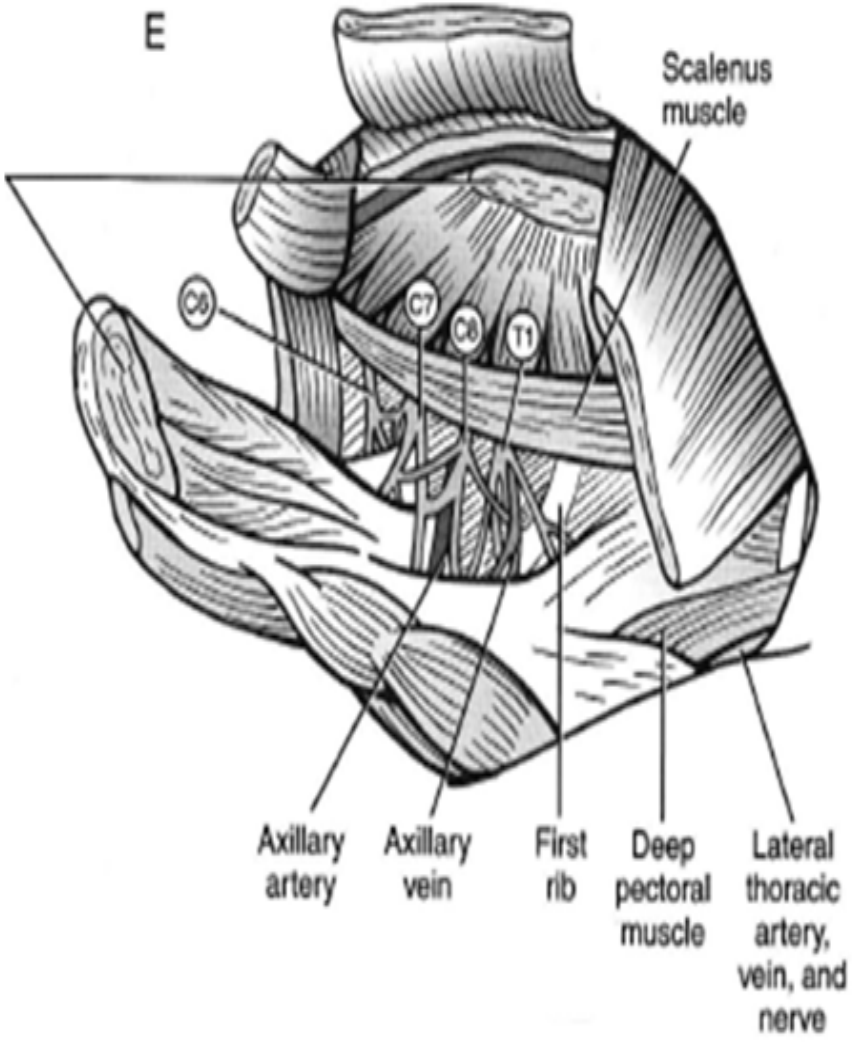
Front limb-Forequarter Amputation

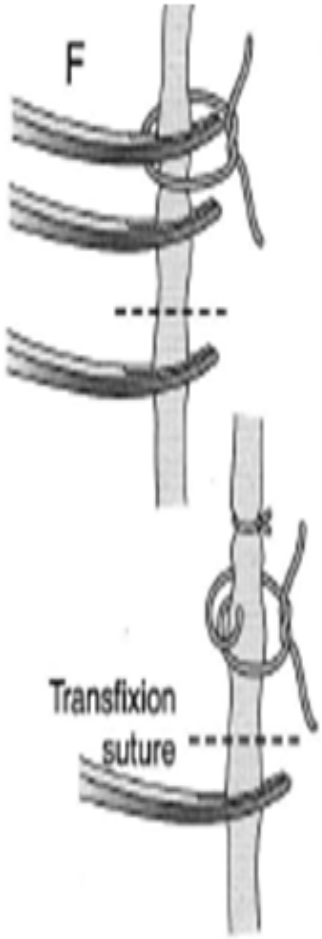
- The nerves at the brachial plexus are divided.
- The axillary artery and vein are double ligated and cut between the ligatures.



Front limb-Forequarter Amputation

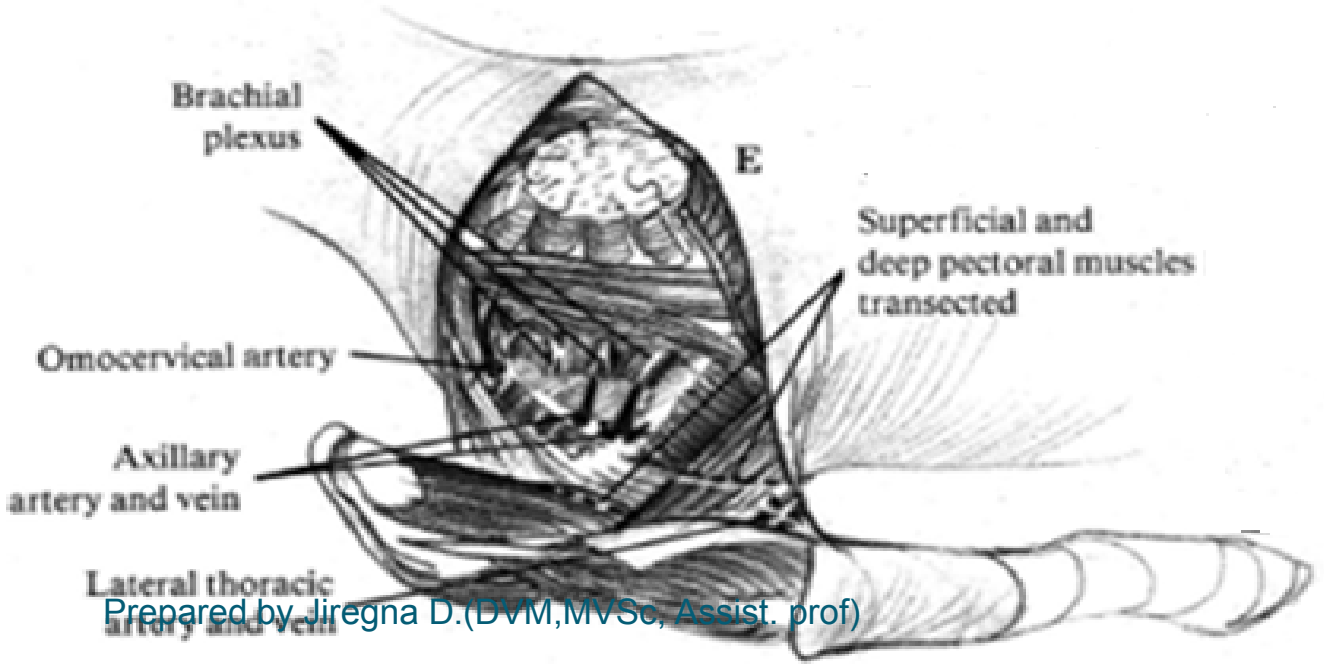






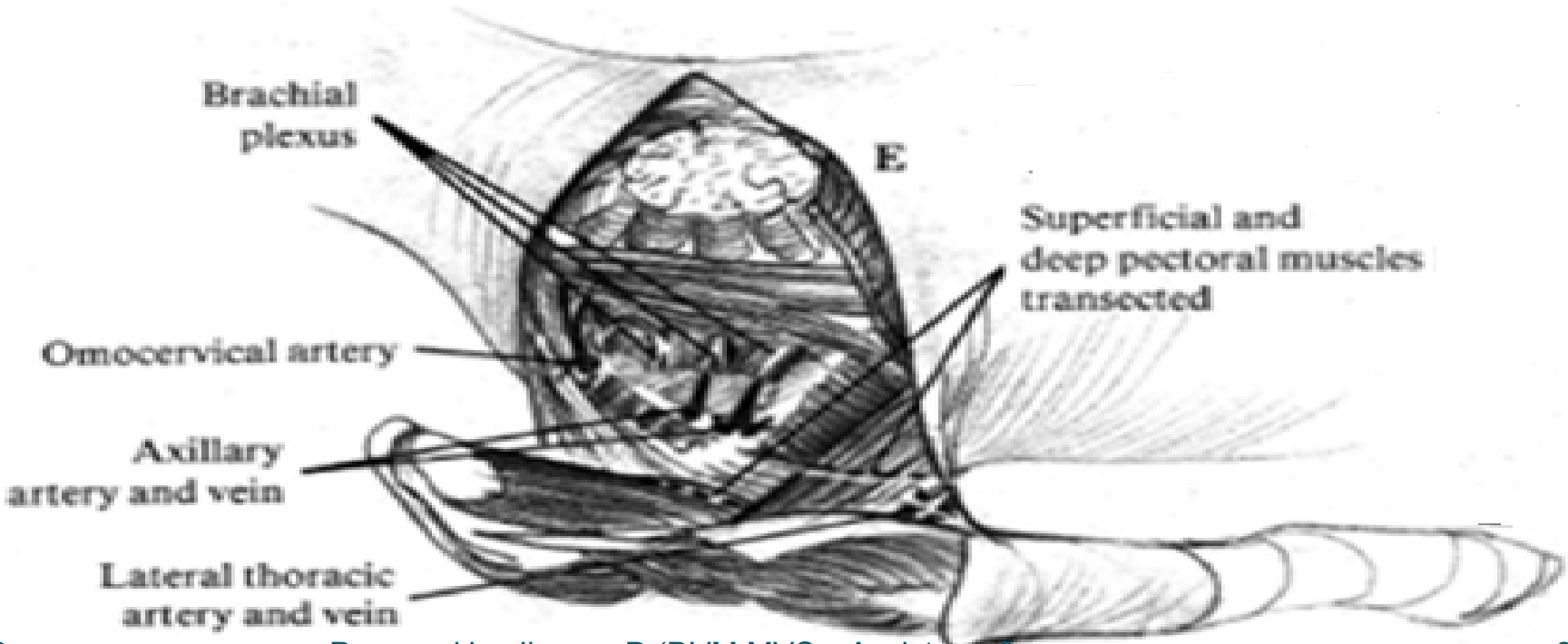
Front limb-Forequarter Amputation

- The superficial and deep pectoral muscles are transected near their attachments on the humerus.
- The omocervical and lateral thoracic artery and vein are observed near the pectoral muscles, double ligated, and severed between ligatures.

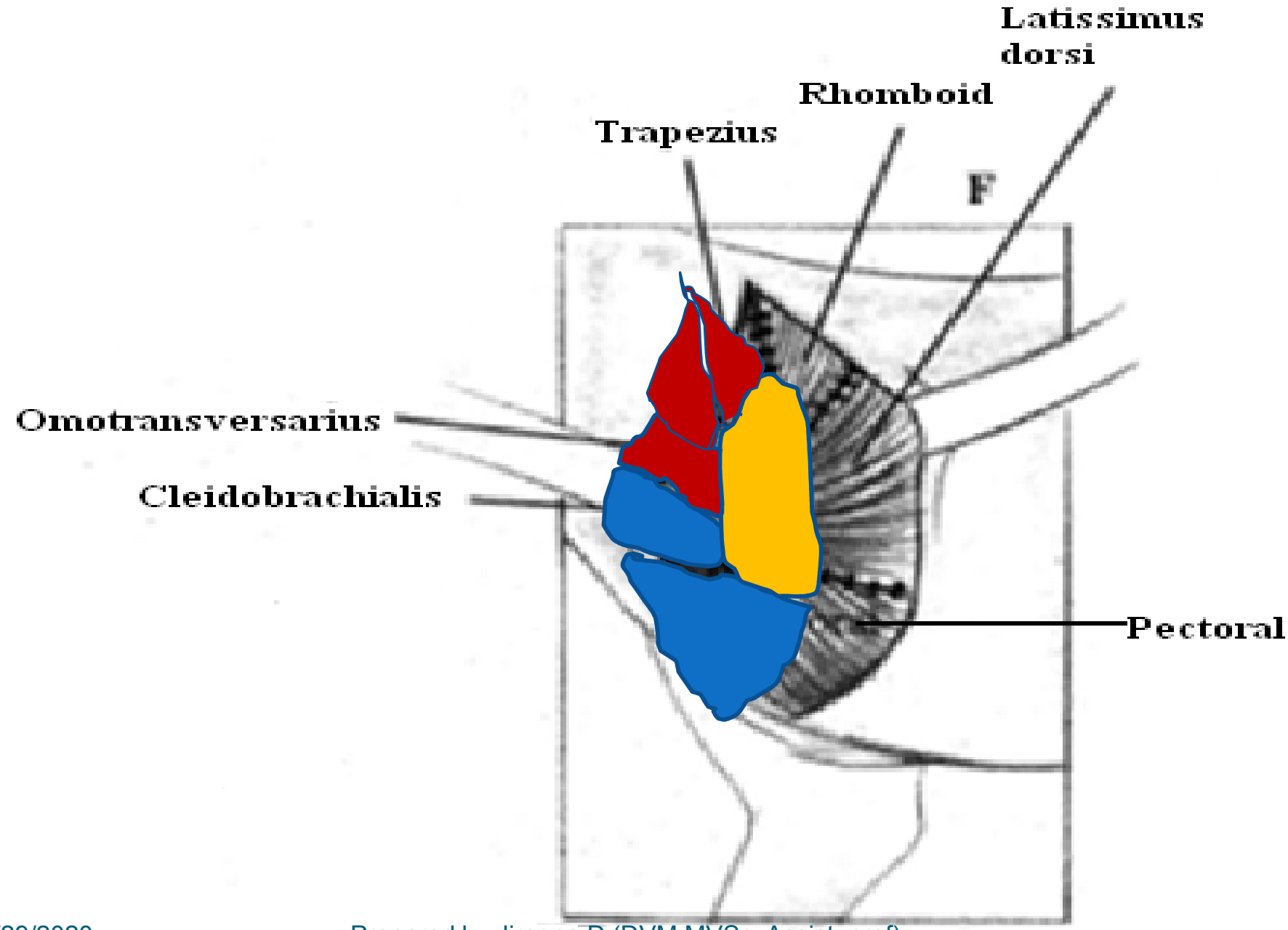


Front limb-Forequarter Amputation

- The pectoral and the cleidobrachialis muscles are apposed ventrally to the latissimus dorsi muscle
- rhomboid, trapezius, and omotransversarius muscles are apposed dorsally to the latissimus dorsi muscle.



Front limb-Forequarter Amputation



Front limb-Forequarter Amputation

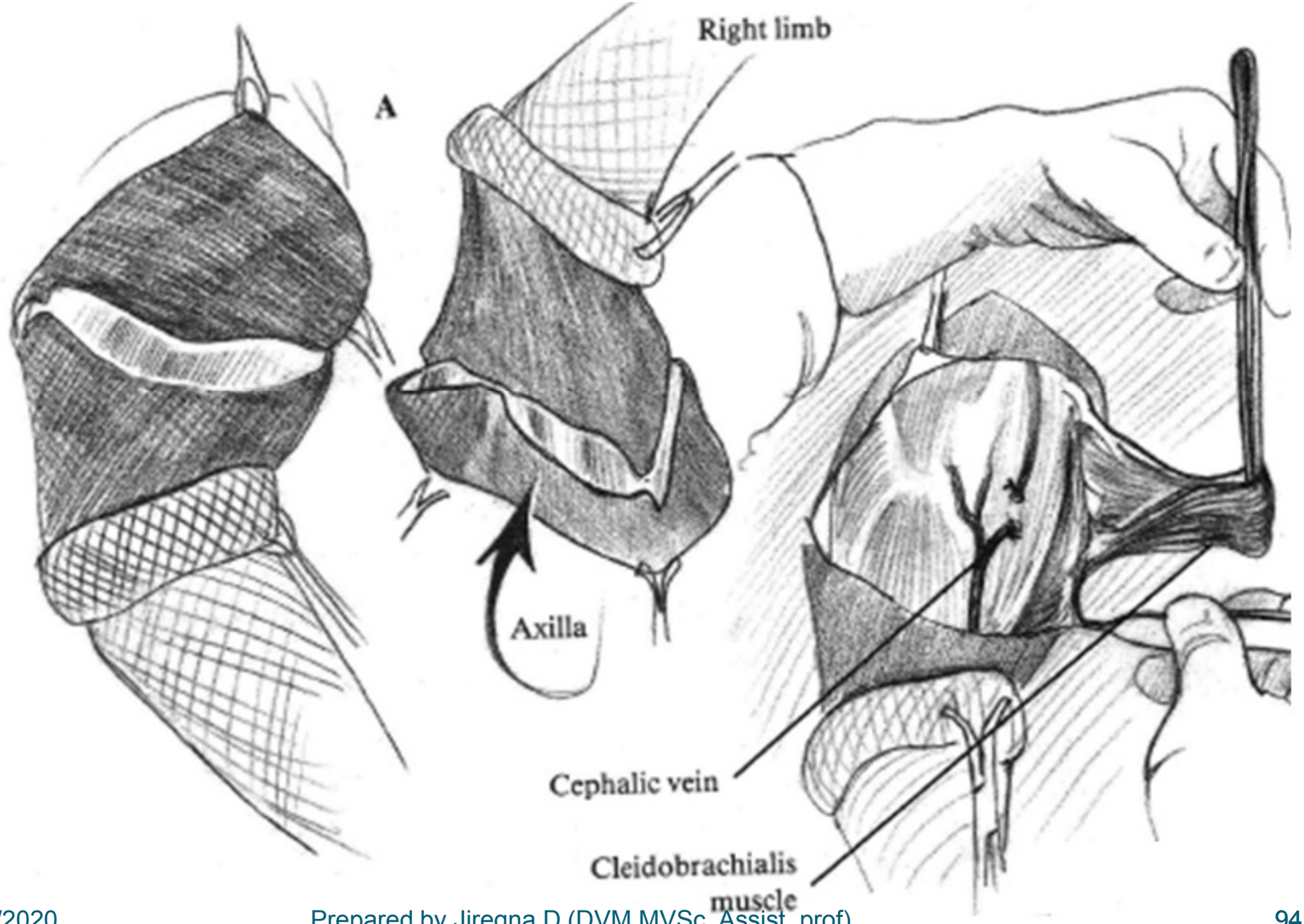
Front limb-Forequarter Amputation

- **Postoperative care**
  - A pressure bandage is applied for 2 to 3 days to help prevent seroma formation.
  - Analgesia should be instituted in all patients for the first 48 to 72 hours.
  - Elizabethan collars should be employed in animals that lick or chew at the incision.

Scapulo-humeral disarticulation

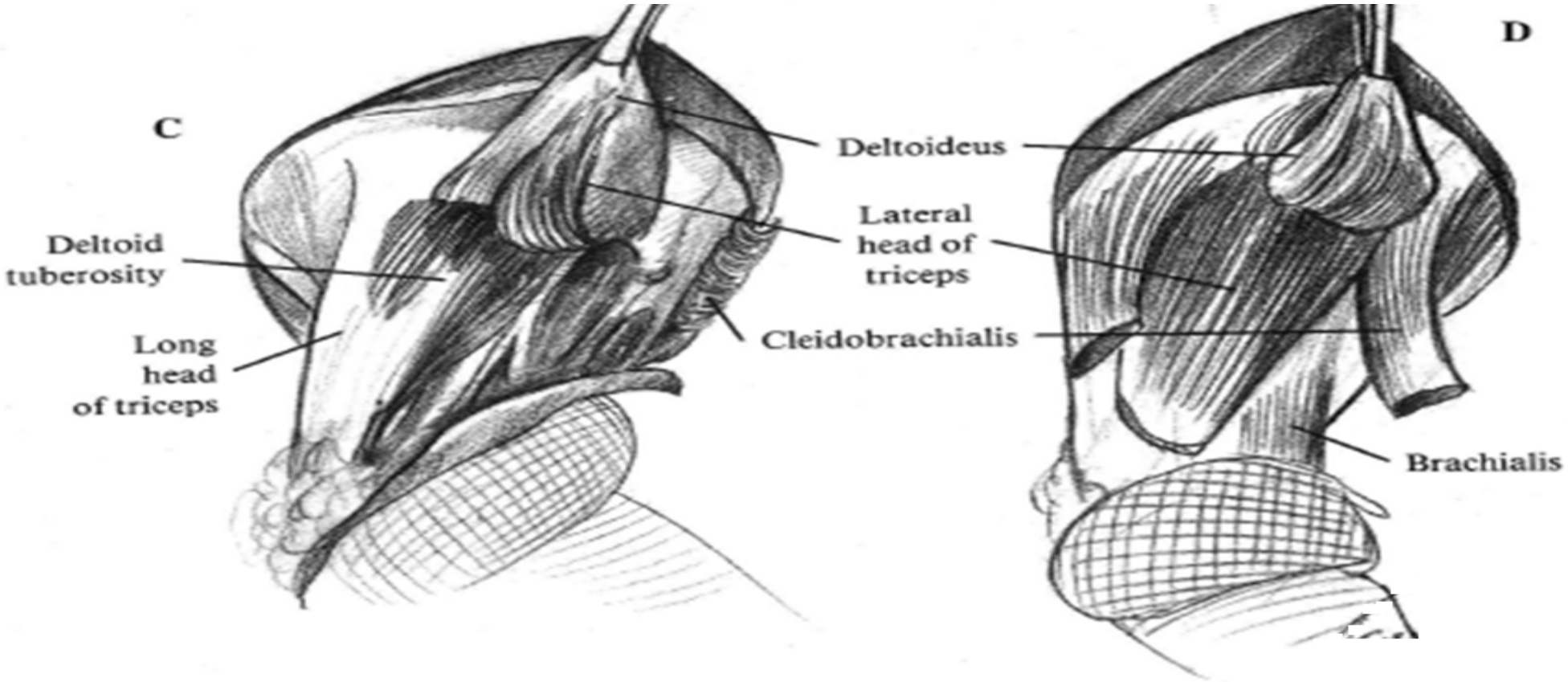
- **Surgical technique:**
  - A curved skin incision is made beginning at the greater tubercle extending caudodistally to the midhumerus, then caudodorsally to the axilla.
  - A straight incision is made on the medial side of the limb, connecting the cranial and caudal extent of the lateral incision.
  - The skin is reflected, and the cephalic vein is double ligated and divided between ligatures.
  - The insertion of the cleidobrachialis muscle is severed from the humerus and reflected proximally.

Scapulo-humeral disarticulation



Scapulo-humeral disarticulation

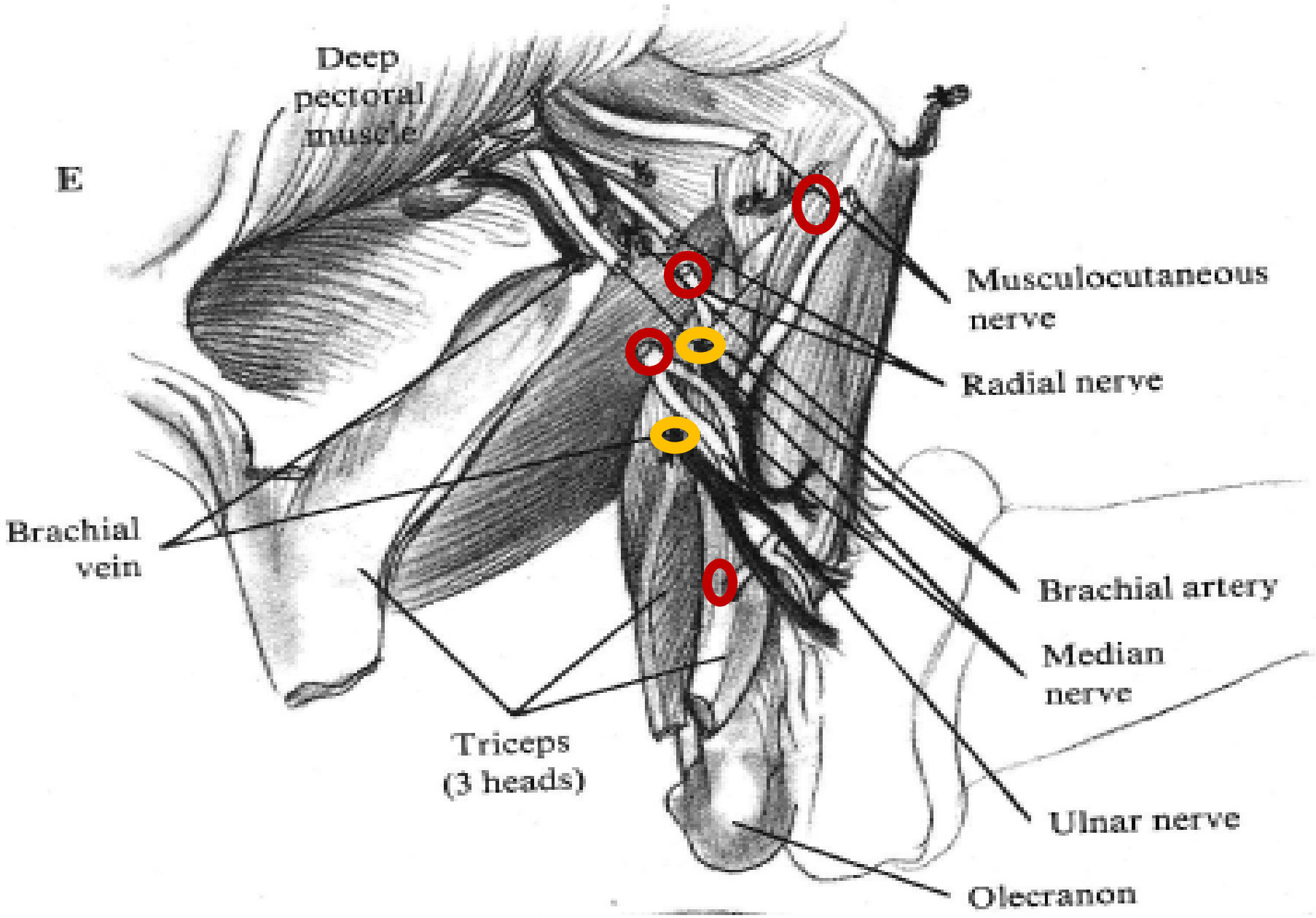
- **Surgical technique cont…**
  - The deltoid muscle is cut at its insertion on the deltoid tuberosity.
  - The tendon of the lateral head of triceps is isolated and cut just proximal to the olecranon.



Scapulo-humeral disarticulation

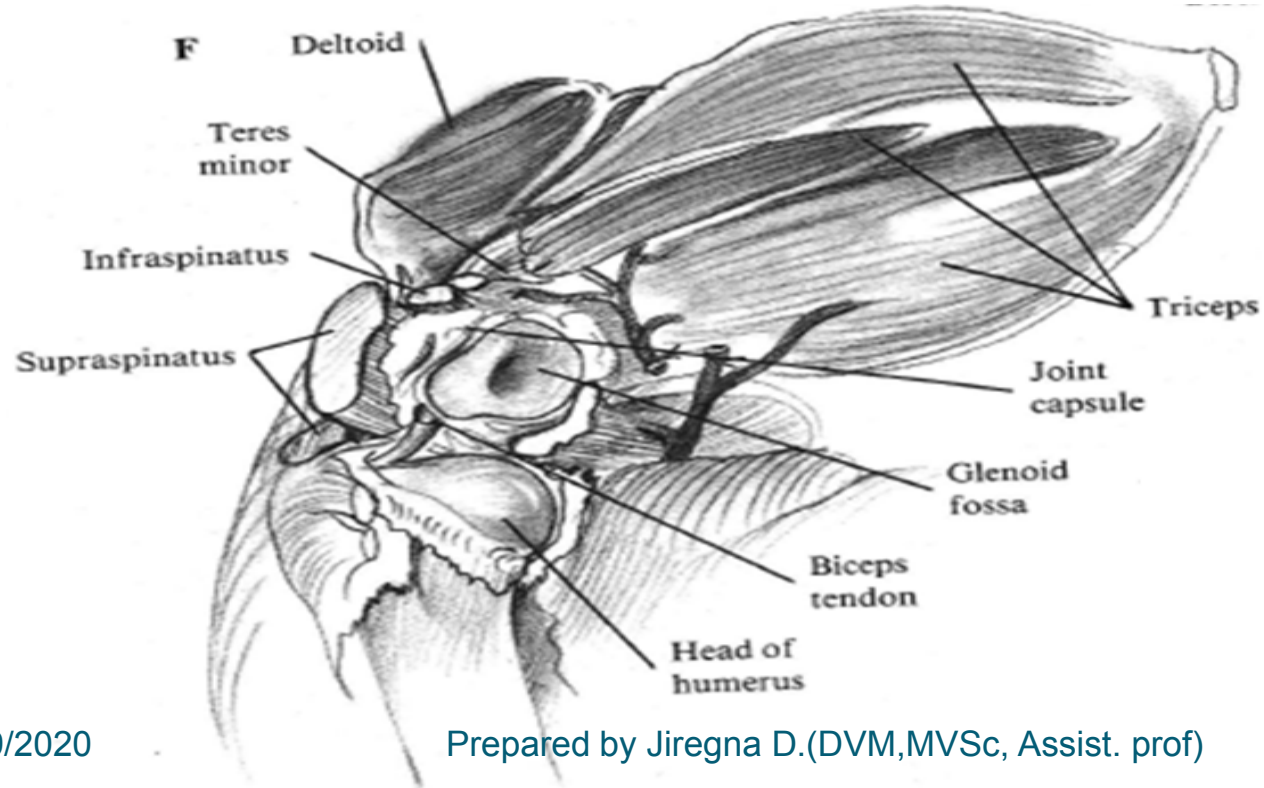
- **Surgical technique cont…**
- On the medial side
  - The insertions of the pectoral muscles are cut on the crest of the humerus and reflected proximally
  - The brachial artery and vein are double ligated and divided between ligatures.
  - The median, ulnar, radial, and musculocutaneous nerves are transected.

Scapulo-humeral disarticulation



Scapulo-humeral disarticulation

- **Surgical technique cont…**
  - The joint capsule and tendons of the biceps brachii, supraspinatus, infraspinatus, and teres minor are cut to disarticulate the shoulder.
  - The insertions of the teres major and latissimus dorsi muscles are severed from the humerus.
- The limb is removed.



Scapulo-humeral disarticulation

- The cleidobrachialis and pectoral muscles are folded dorsally and sutured over the deltoid and lateral and long heads of the triceps.

Amputation of forelimb - Dog

The wound was dressed with retention bandage

The amputated limb

Scapulo-humeral disarticulation

Hind Limb Amputation

Reading assignment

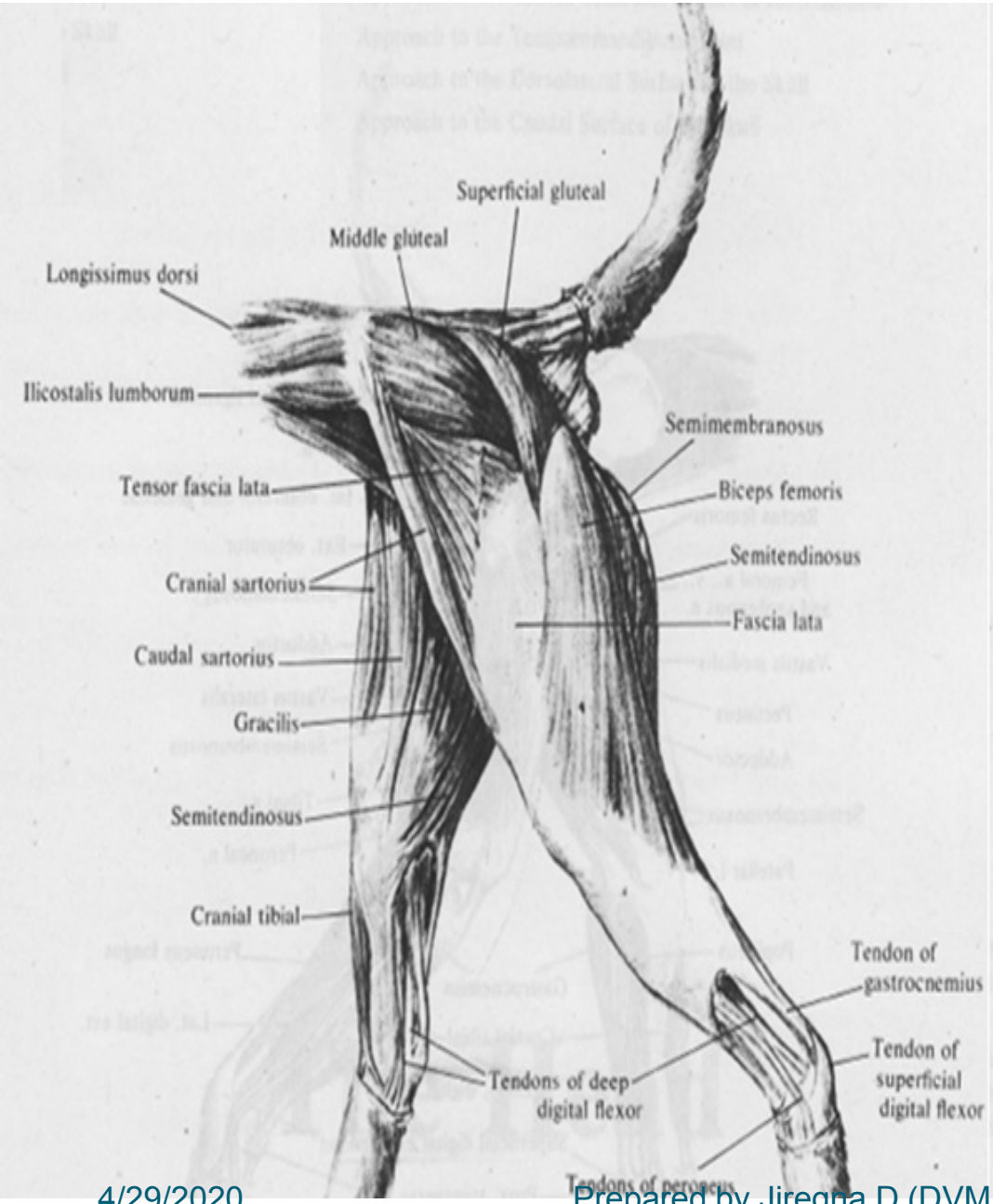
Hind limb amputation

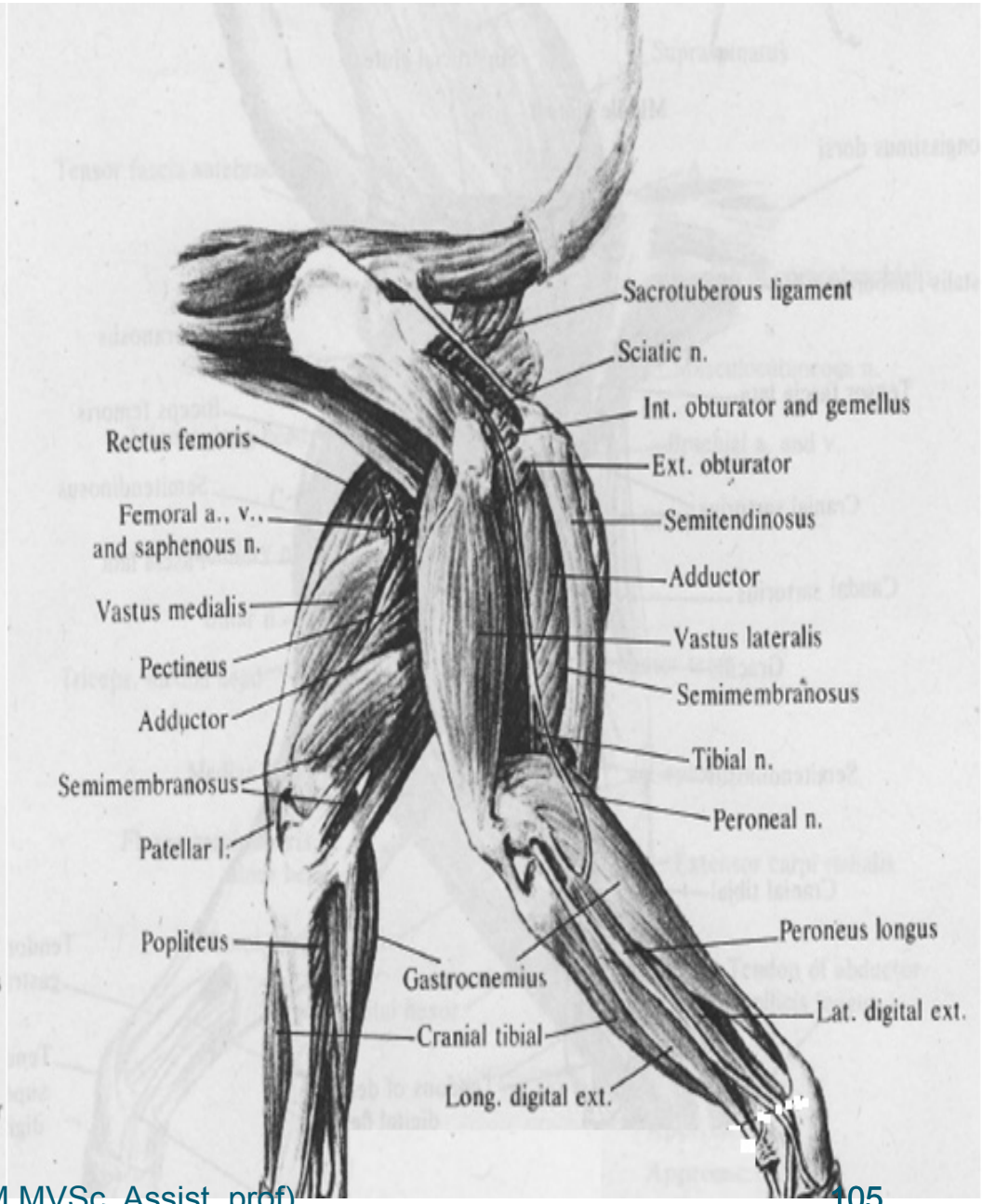
- Performed via two methods:
  - By removing the limb at the midshaft femur or
  - By removal at the coxofemoral joint.
    - Must be performed for dogs with neoplastic conditions affecting the femur
    - It is technically more difficult to perform, provides no protection to the external genitalia, and results in a less cosmetic effect.

Coxofemoral disarticulation

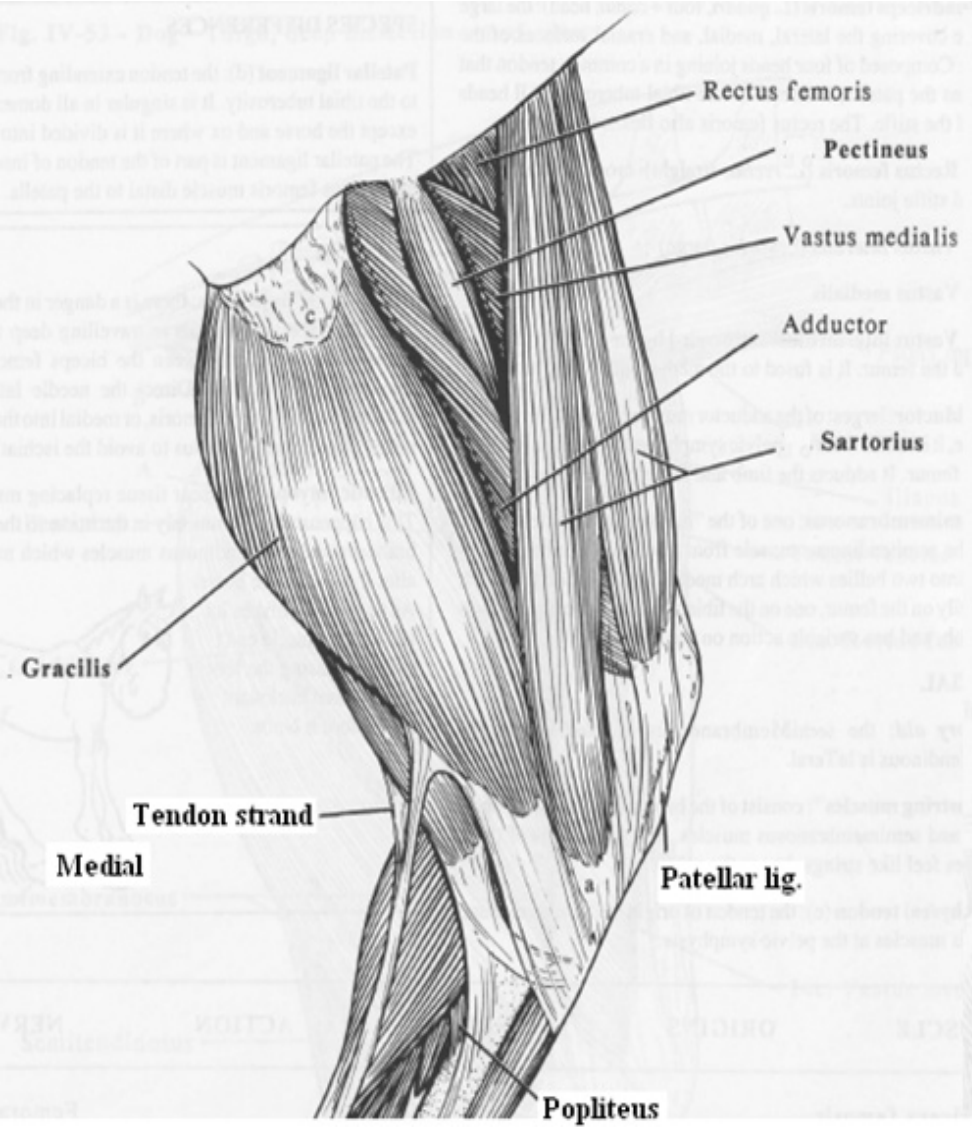
- **Indications**
  - To manage infectious or neoplastic lesions involving the proximal femur.
- **Anaesthesia and control:**
  - Control in lateral recumbency with the affected limb up under general anaesthesia.
  - Prepare the rear limb circumferentially from dorsal midline to tarsus.
  - Drape the limb out from a hanging position to allow maximal manipulation during surgery.

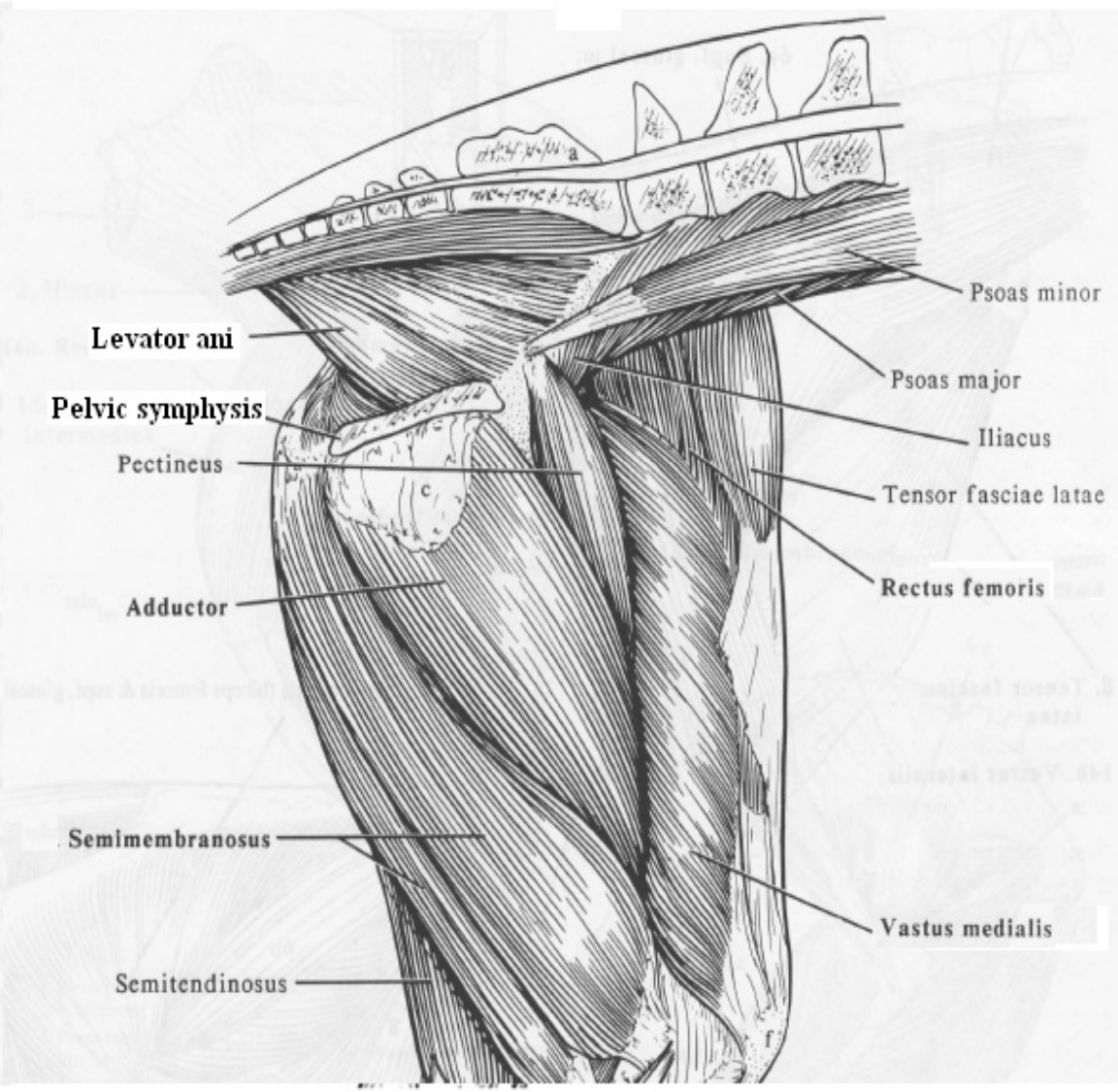
Coxofemoral disarticulation



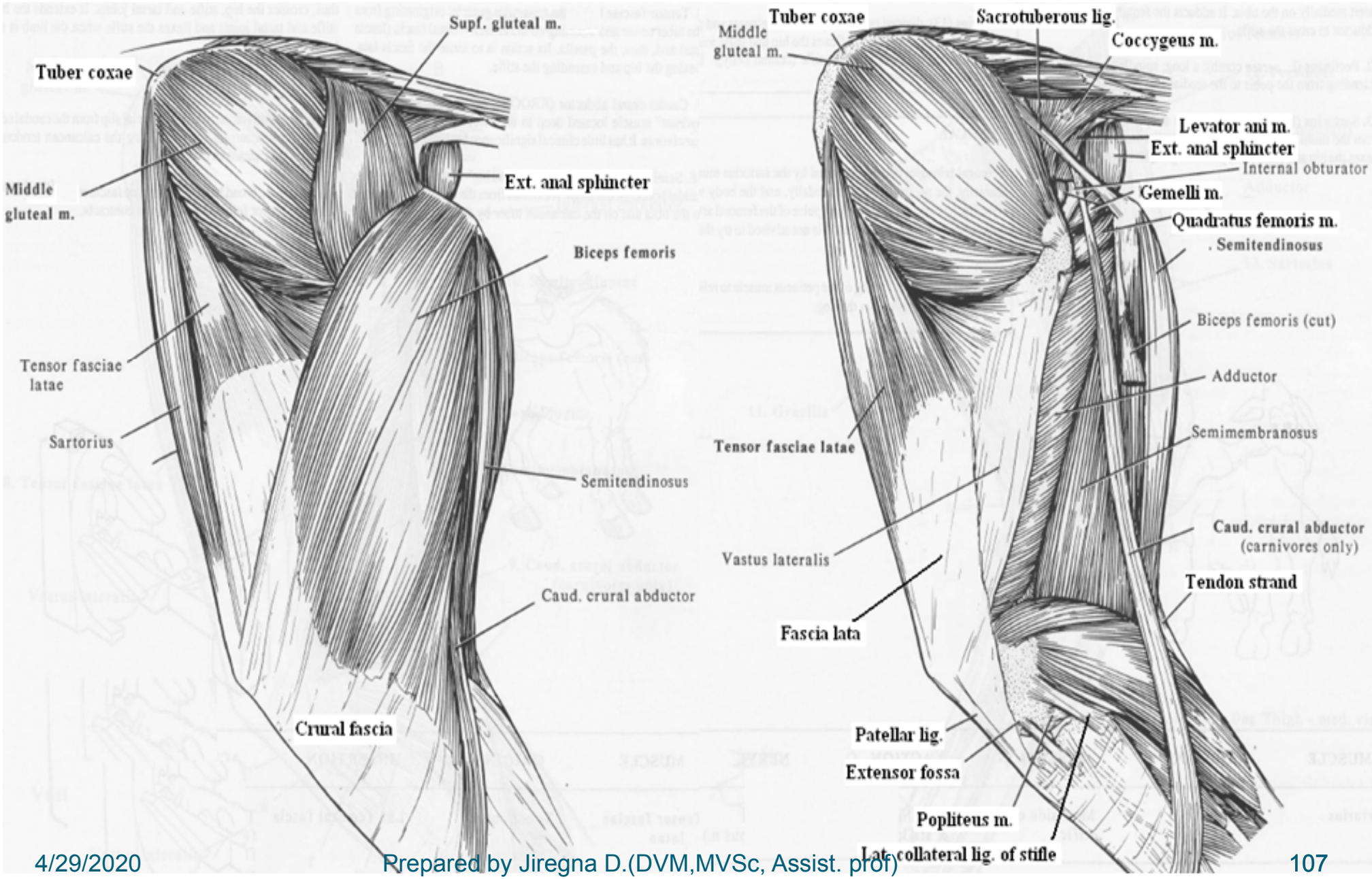


Coxofemoral disarticulation





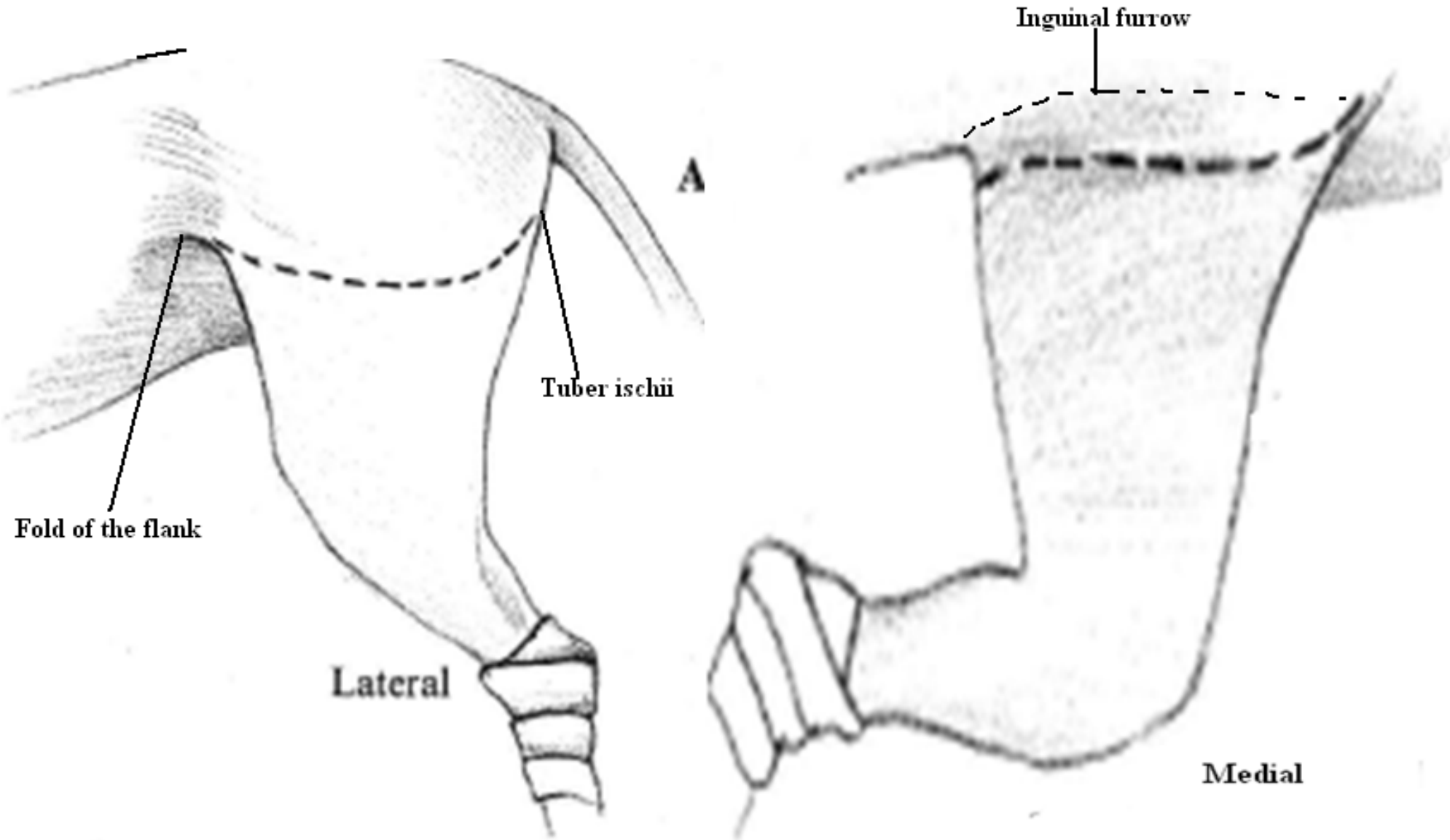
Coxofemoral disarticulation



Coxofemoral disarticulation

- **Surgical technique:**
  - A curved lateral skin incision is made
    - Begin at the fold of the flank
    - Extend it caudodistally to the midshaft of the femur then
    - Caudoproximally to the tuber ischii.
  - A medial skin incision is made
    - Beginning at the flank incision
    - Extend it caudally 1 to 2 cm distal to the inguinal furrow and connect with lateral skin incision at the tuber ischii.

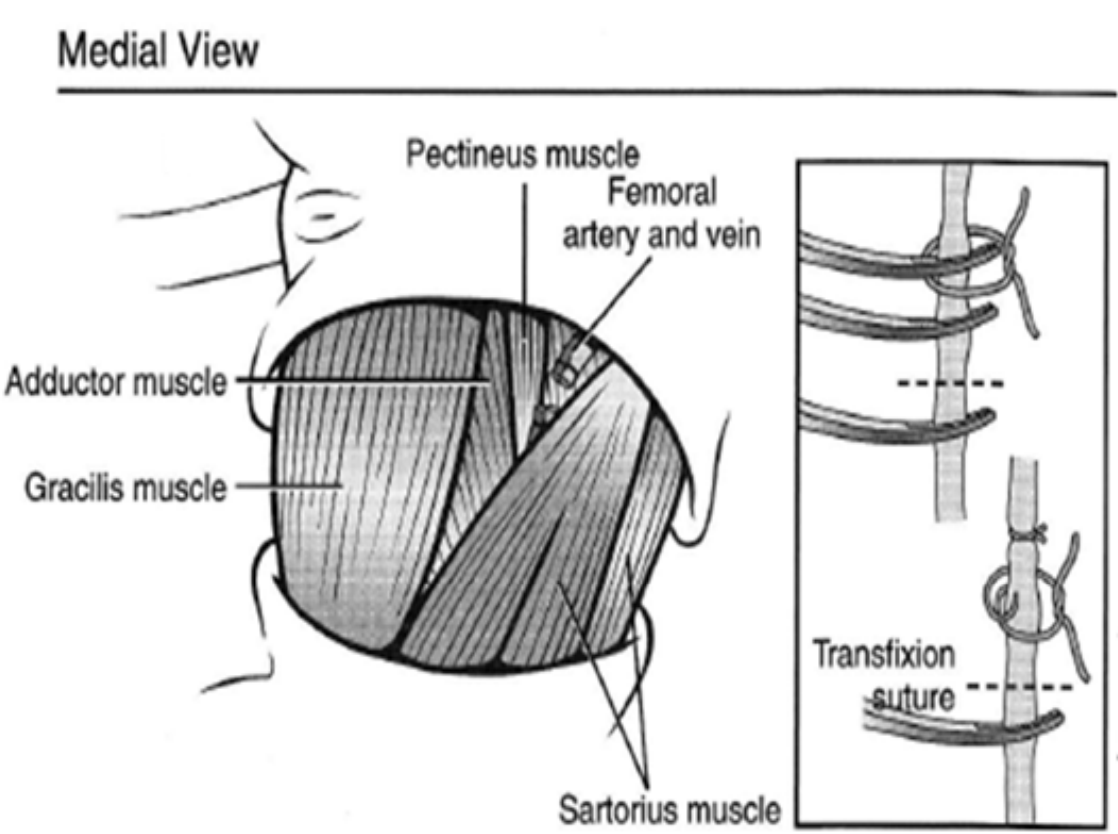
Coxofemoral disarticulation

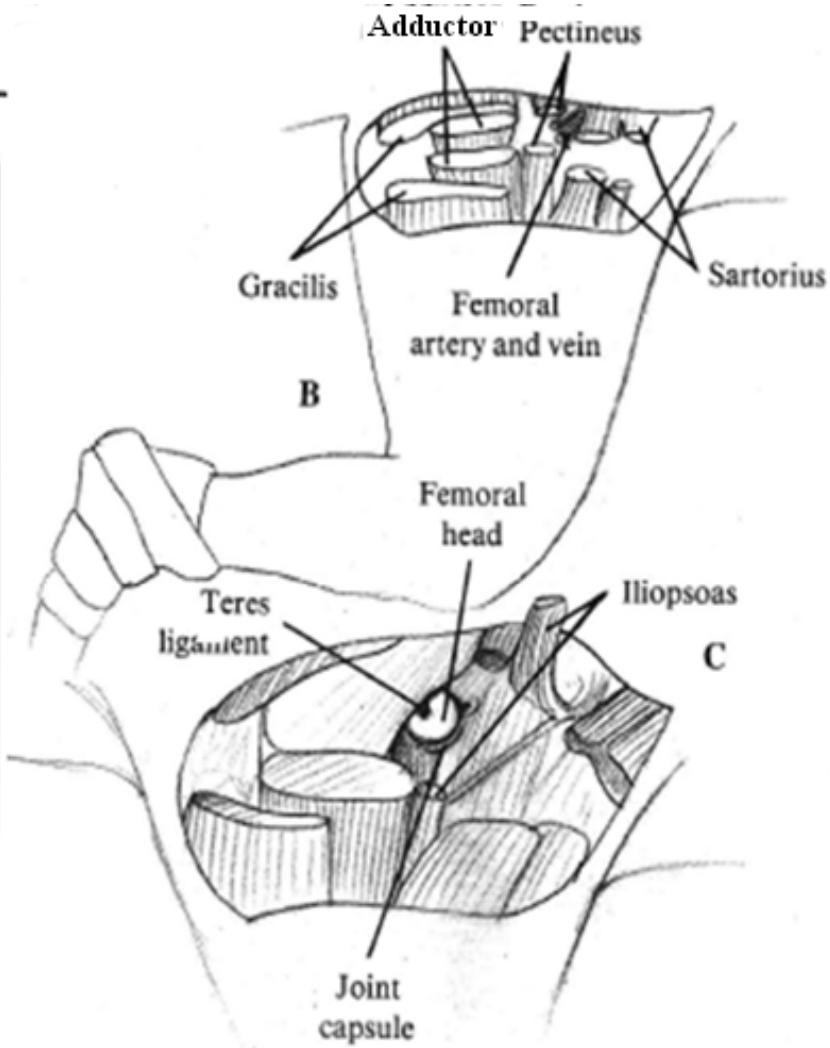


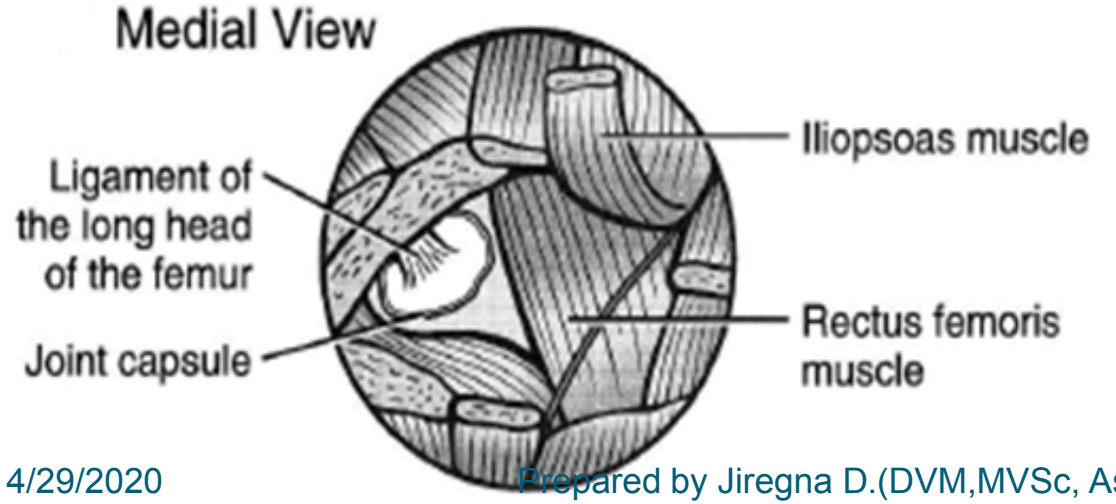
Coxofemoral disarticulation

- Begin medially and cranially transect
  - The following muscles 2 to 3 cm distal and parallel to the inguinal furrow.
    - The cranial and caudal bellies of the sartorius
- Pectinus
  - Adductor magnus et brevis and
  - Gracilis
  - Double ligate and transect
    - The femoral artery and vein
    - The medial circumflex femoral artery and vein
  - Cut the iliopsoas muscle at its insertion on the lesser trochanter and reflect it proximally.
  - Expose the joint capsule & transect teres ligament

Coxofemoral disarticulation



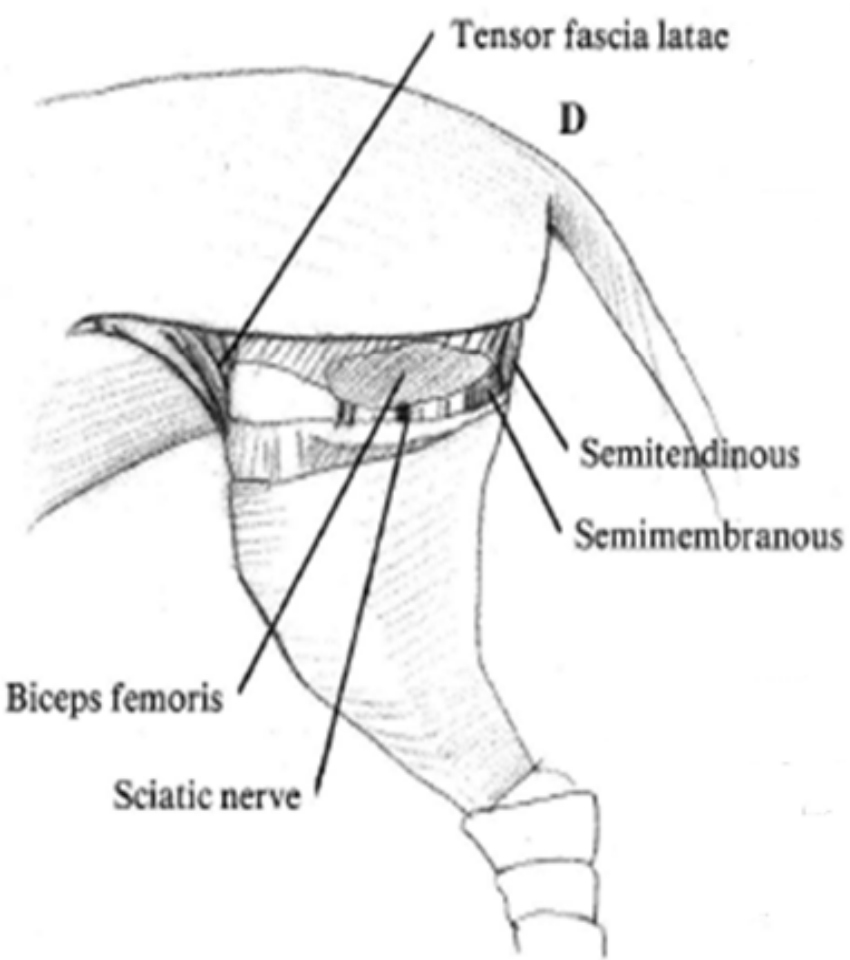


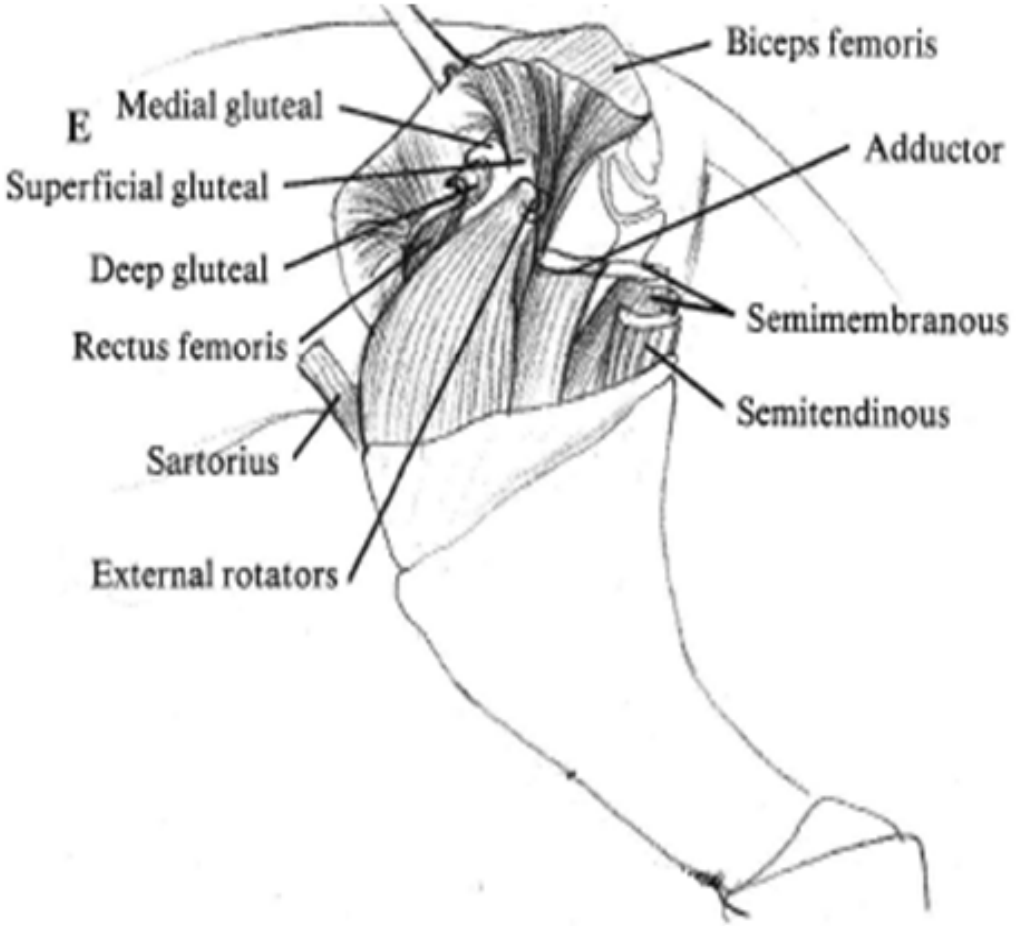


Coxofemoral disarticulation

- Laterally
  - Transect and reflect the following muscles proximally
    - The biceps femoris, abductor cruris caudalis, and tensor fascia latae at the level of the midfemur
    - Semitendinous and semimembranous muscles at the level of the proximal third of the femur.
  - Cut the sciatic nerve just distal to its muscular branches to the semimembranous, semitendinous, and biceps femoris muscles.

Coxofemoral disarticulation

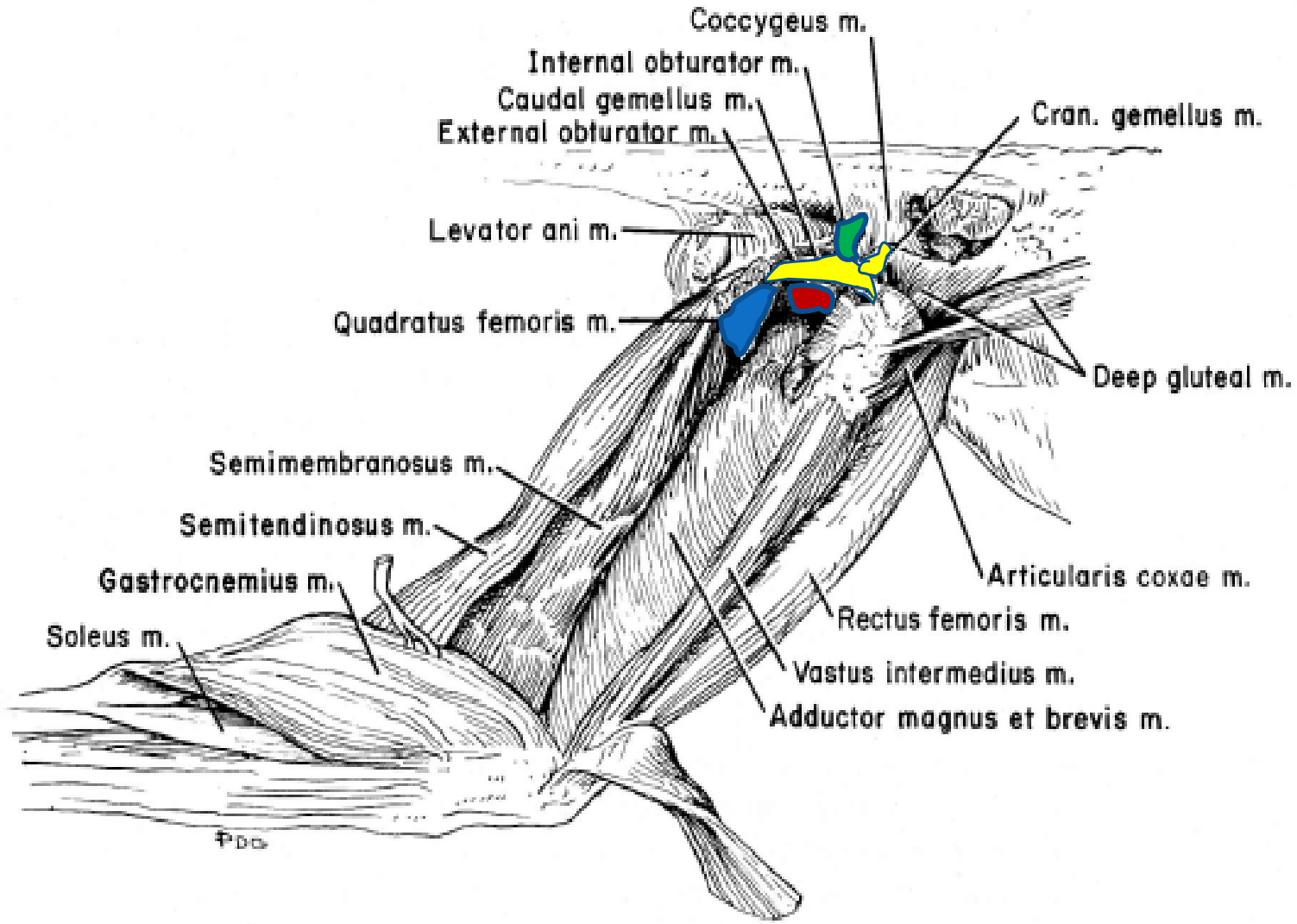




Coxofemoral disarticulation

- Laterally cont…
  - The quadratus femoris muscle is cut near its insertion on the third trochanter with limb flexed and abducted.
  - Cut the external rotators (external obturator, gemelli muscles and internal obturator) at the trochanteric fossa.

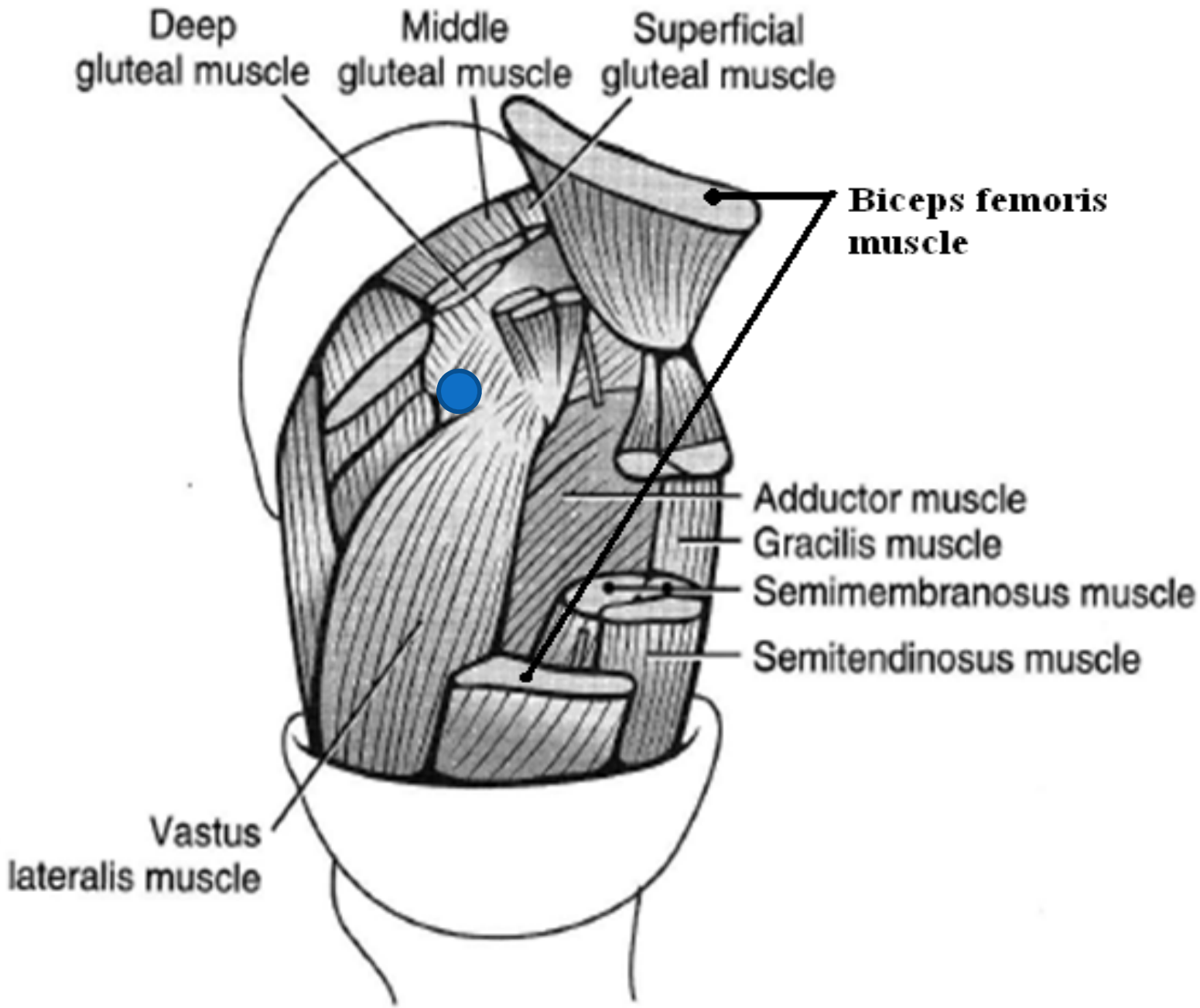
Coxofemoral disarticulation



Coxofemoral disarticulation

- Laterally
  - Cut the superficial, middle, and deep gluteal muscles near their insertion on the greater trochanter.
  - The joint capsule is exposed and incised dorsally
  - The rectus femoris muscle is removed from its origin on the ilium, **completing the amputation.**

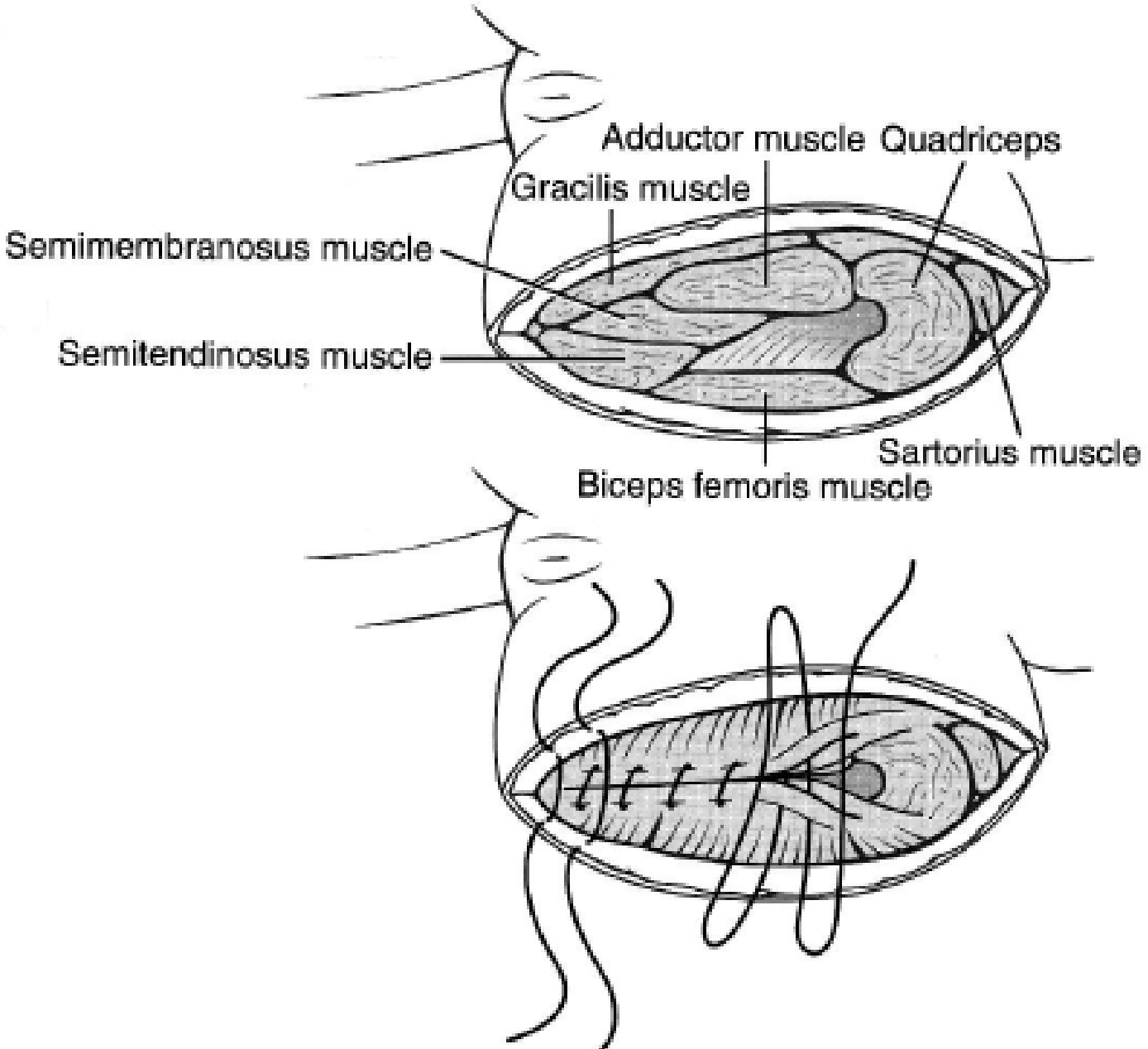
Coxofemoral disarticulation



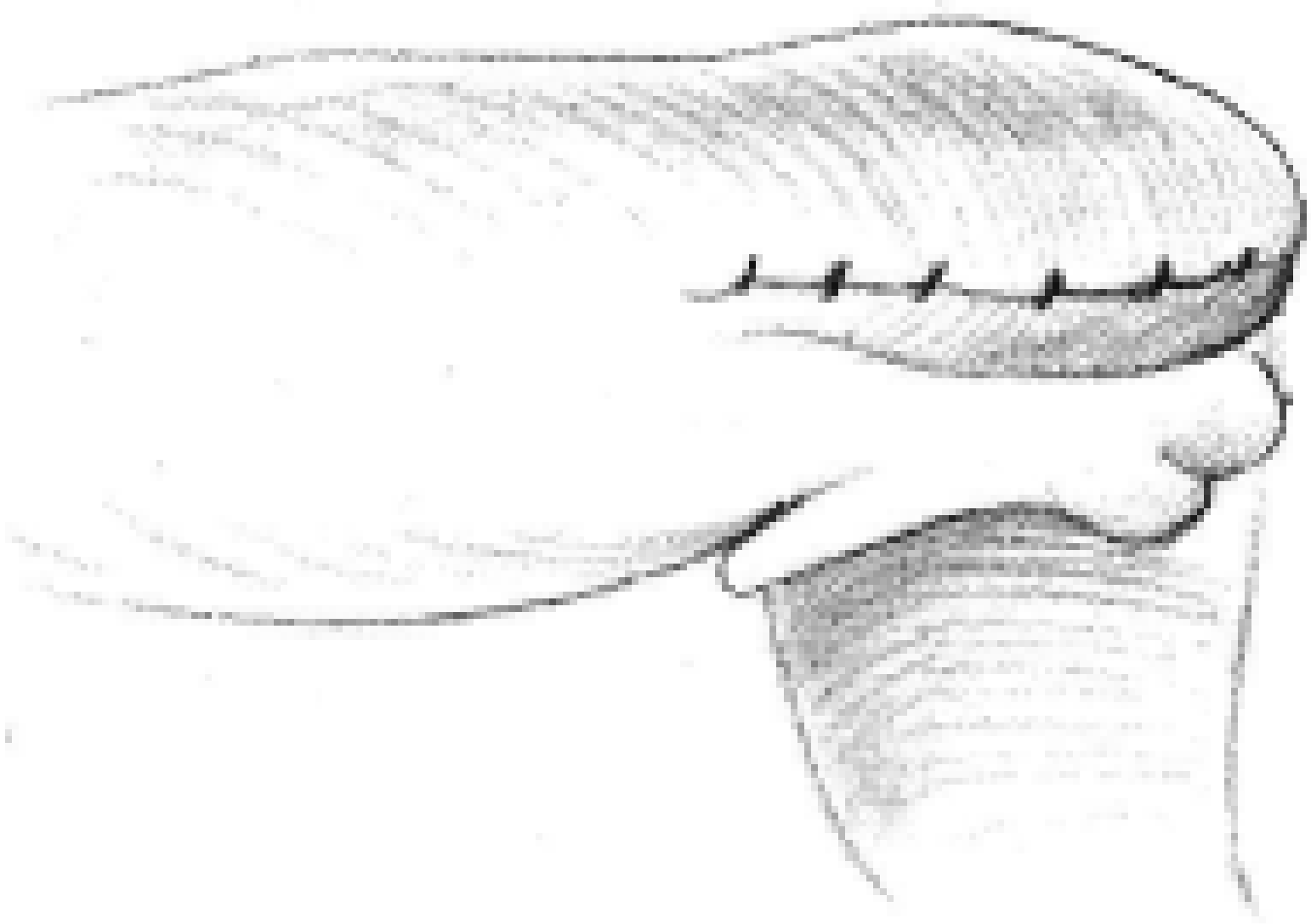
Coxofemoral disarticulation

- The wound is closed by suturing
  - The fascia of the gracilis muscle to
    - The biceps femoris, semitendinous, and semimembranous muscles.
  - The tensor fascia latae muscle is sutured to
    - The sartorius and iliopsoas muscles.
  - The subcutaneous tissues and skin are sutured routinely.

Coxofemoral disarticulation



Coxofemoral disarticulation



Coxofemoral disarticulation

- **Postoperative care**
  - Apply pressure bandage for 2 to 3 days
  - Analgesia given to all patients for the first 48 to 72 hours.
  - Prevent animals from licking or chewing at the incision

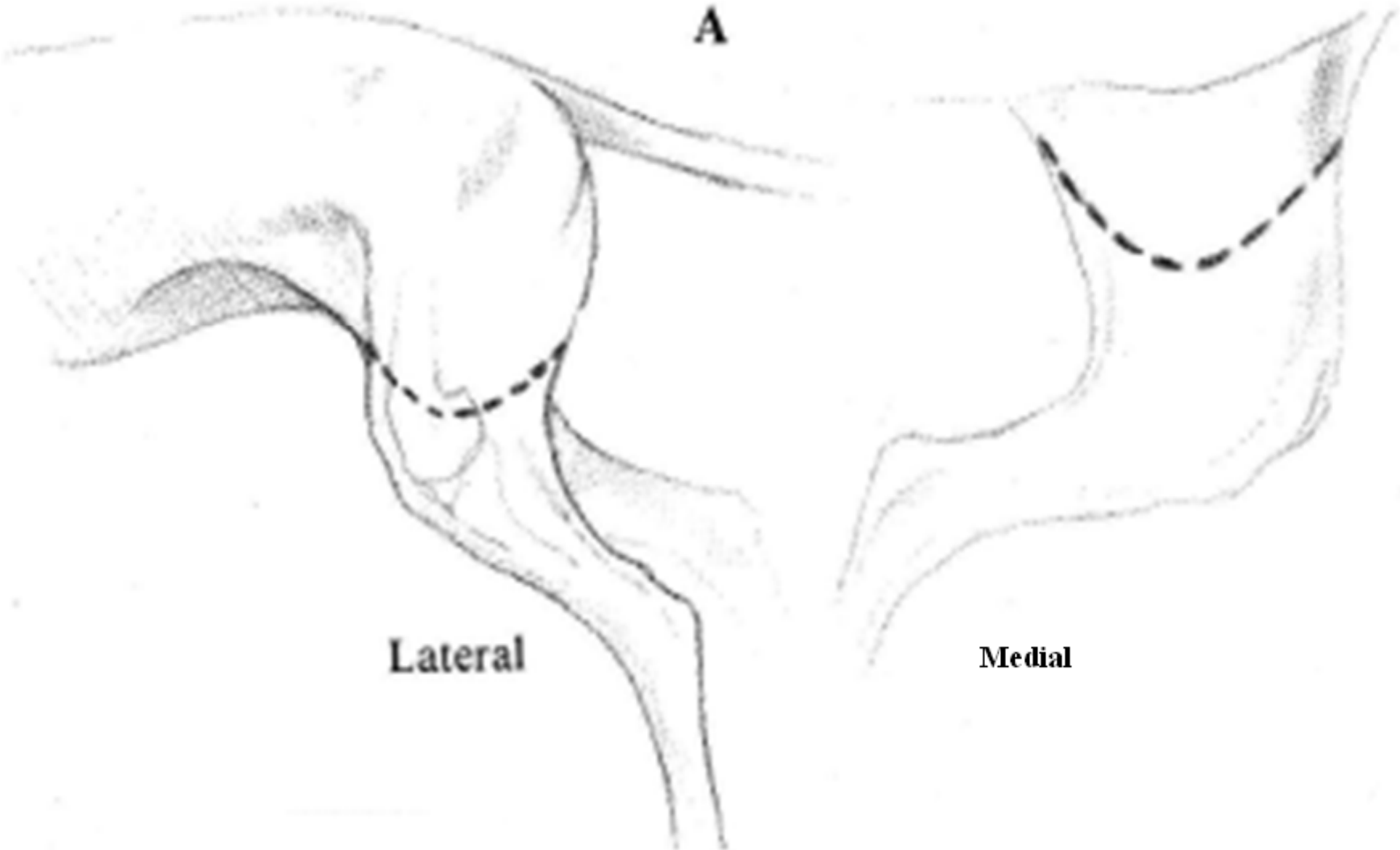
Midshaft Femoral Amputation

- **Indications**
  - Congenital deformities
  - Neoplasia
  - Osteomyelitis
  - Severe crushing injuries and necrosis
  - Chronic nonunion fractures and
  - Nerve damage resulting in limb paralysis
- Note:
  - Not to be used for neoplasms and infections involving the femur
  - Gives a good cosmetic appearance and provides protection to the external genitalia.

Midshaft Femoral Amputation

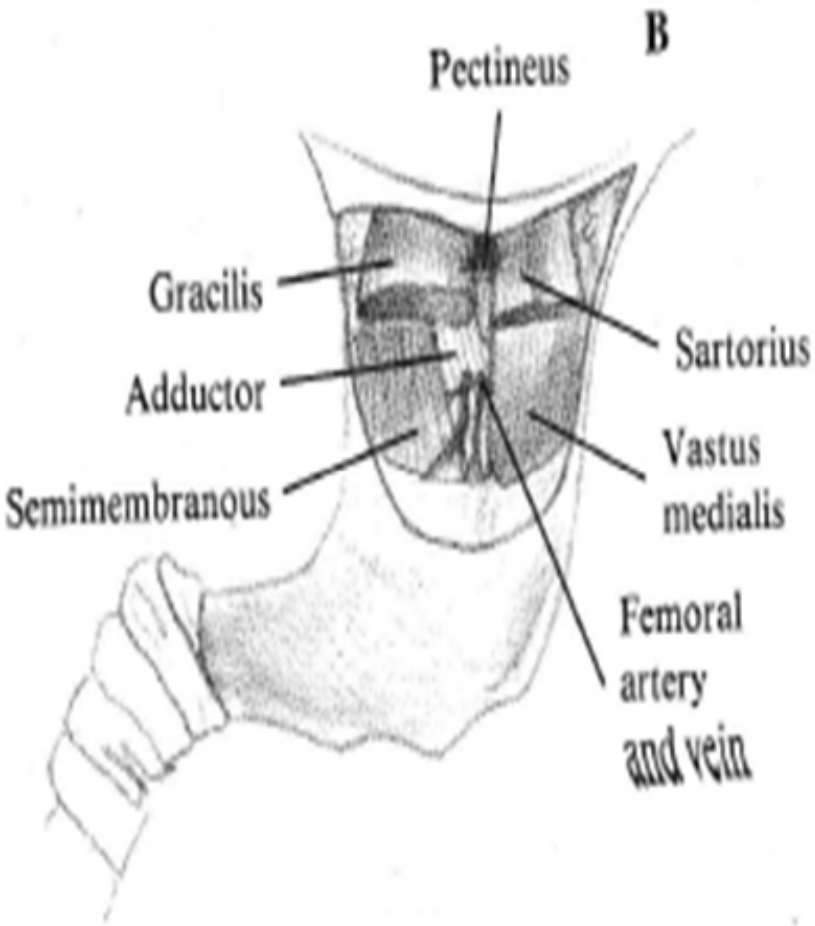
- **Surgical technique:**
  - The animal is placed in lateral recumbency with the affected limb up.
  - Make a lateral curved skin incision
    - Beginning at the fold of the flank
    - Extending caudoventrally to the distal third of the femur, then
- Caudodorsally to the tuber ischii.
  - Make a medial curved skin incision
    - Begins at the lateral flank incision
    - Extending caudoventrally to the midfemur, then
- Caudodorsally connecting with the lateral incision at the tuber ischii.

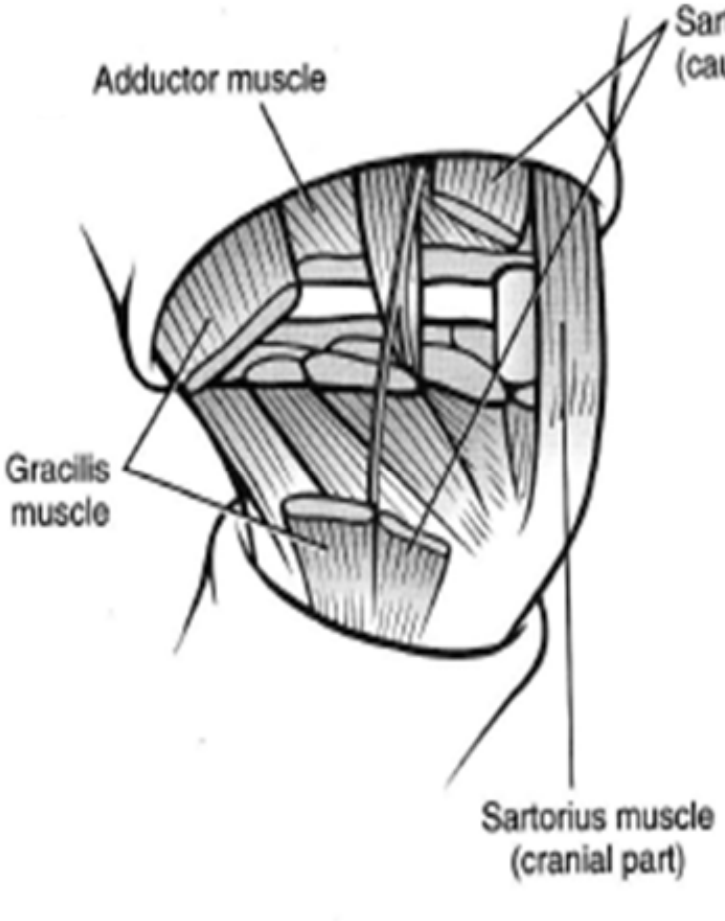
Midshaft Femoral Amputation

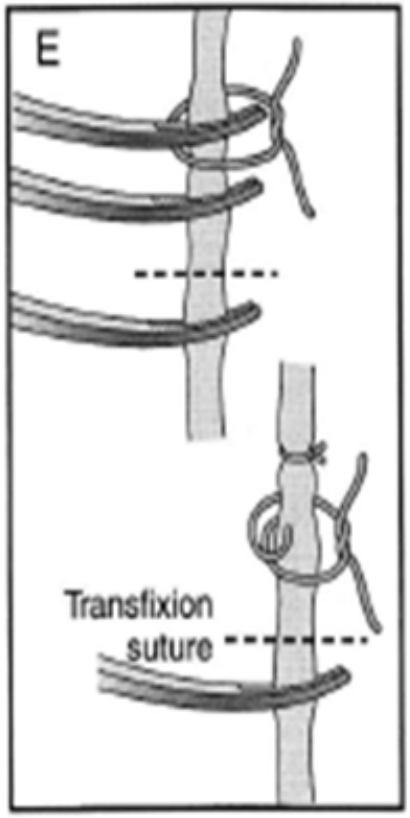


Midshaft Femoral Amputation

- On the medial aspect of the limb
  - Transect the gracilis muscle, and caudal belly of the sartorius muscle at the level of the midfemur.
  - Double ligate the femoral artery and vein and divide them between ligatures.


B
Pectineus
Gracilis
Adductor
Semimembranous
Sartorius
Vastus
medialis
Femoral
artery
and vein

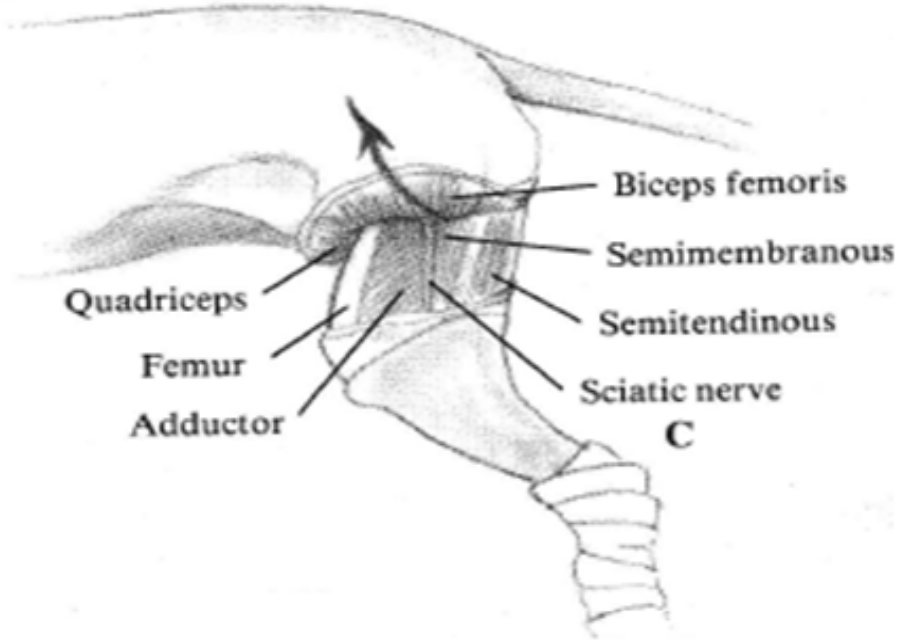

Adductor muscle
Sartorius muscle
(caudal part)
Gracilis
muscle
Sartorius muscle
(cranial part)

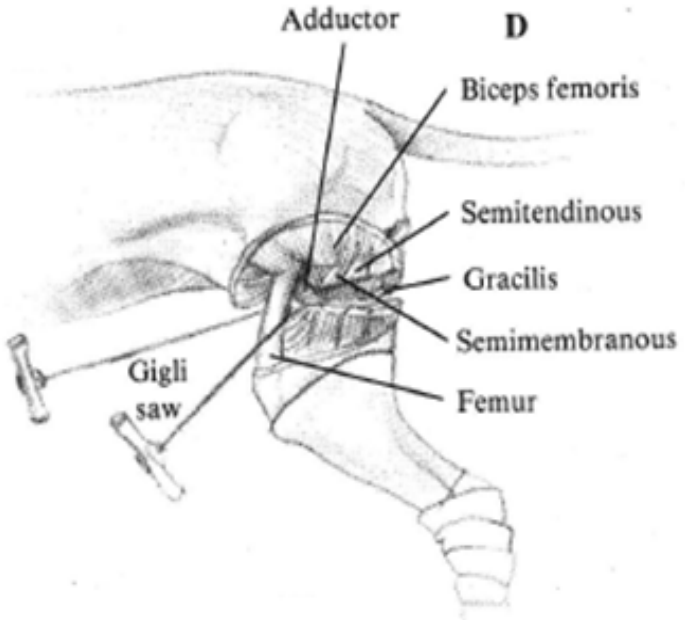

E
Transfixion
suture

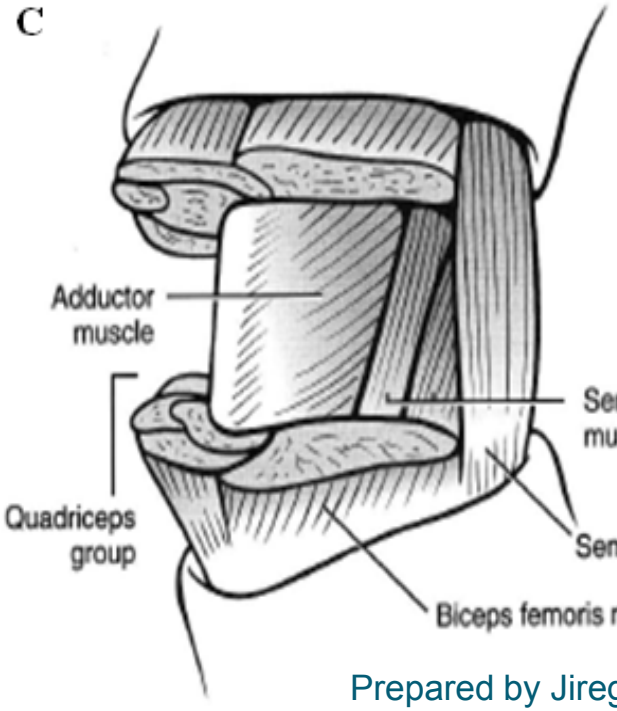
Midshaft Femoral Amputation

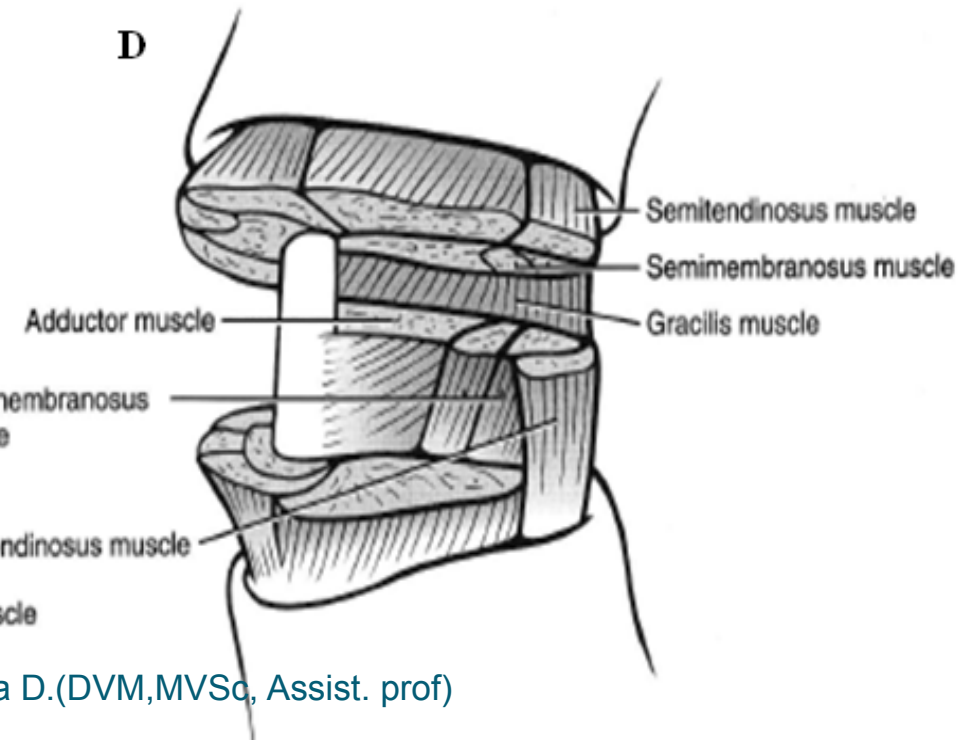
- On the lateral aspect of the limb
  - Transect
    - The cranial bellies of the sartorius and quadriceps muscles just proximal to the patella.
    - The biceps femoris and abductor cruris caudalis muscles.
    - the sciatic nerve at the level of the greater trochanter
    - the semimembranous, semitendinous, and abductor muscles at the level of the midfemur.

Midshaft Femoral Amputation



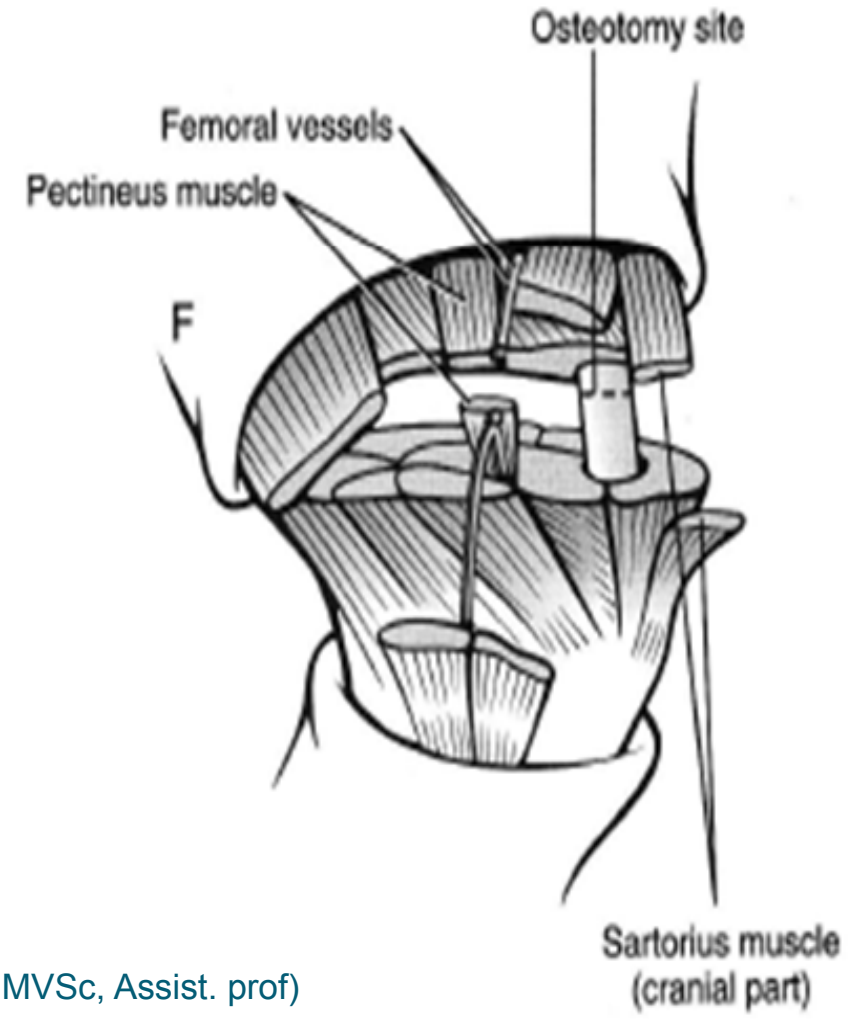






Midshaft Femoral Amputation

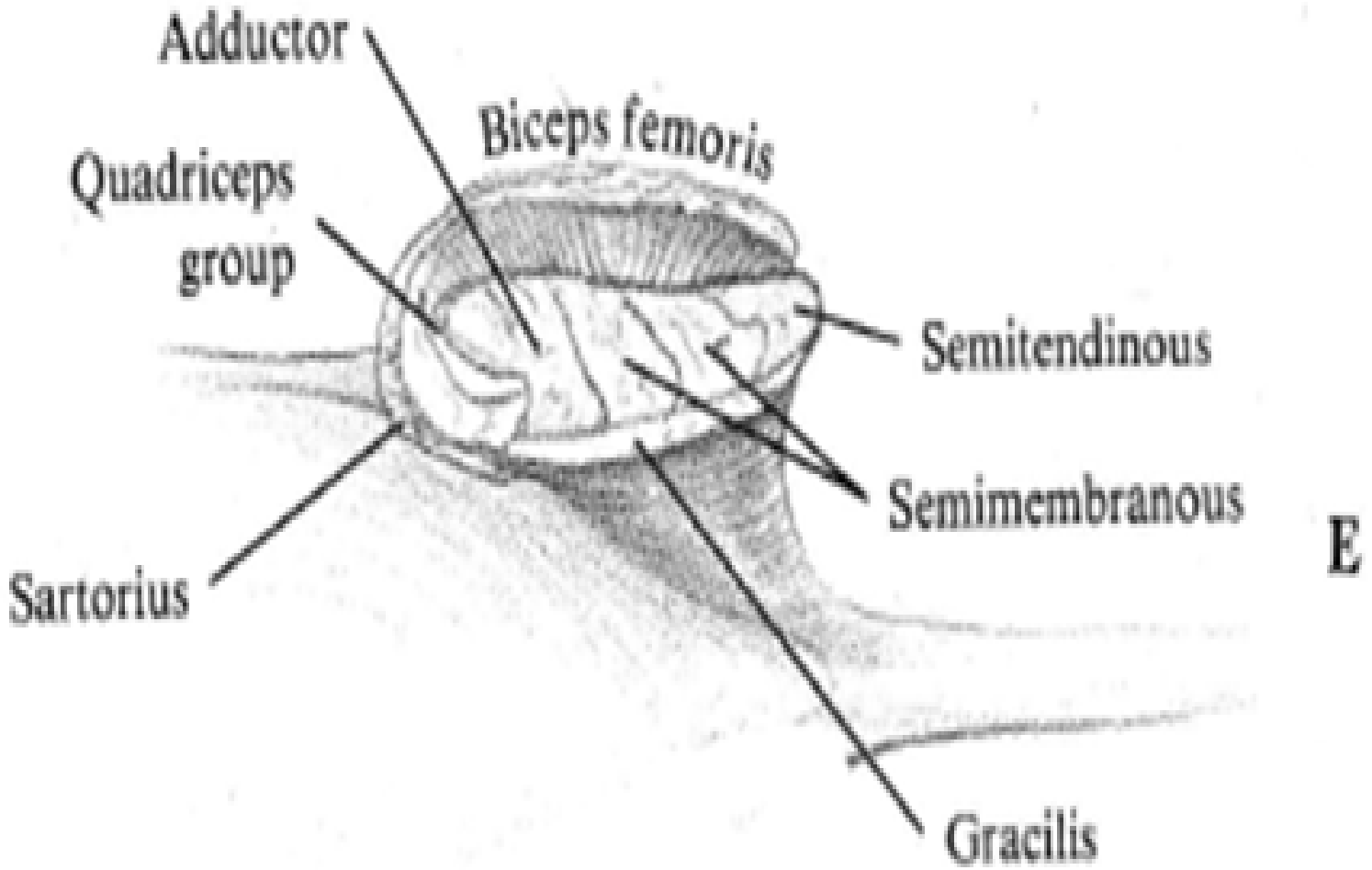
- Elevate the adductor proximally to the level of the proximal third of the femur and transect the bone with a Gigli saw.



Midshaft Femoral Amputation

- Wound closure
  - Bring the quadriceps muscles caudally and sutured to the adductor muscle.
  - Bring the biceps femoris muscle and fascia lata medially and suture to the gracilis and sartorius muscles.
- Close the subcutaneous tissue and skin routinely.
- **Postoperative care**
  - **Same as coxofemoral disarticulation**

Midshaft Femoral Amputation



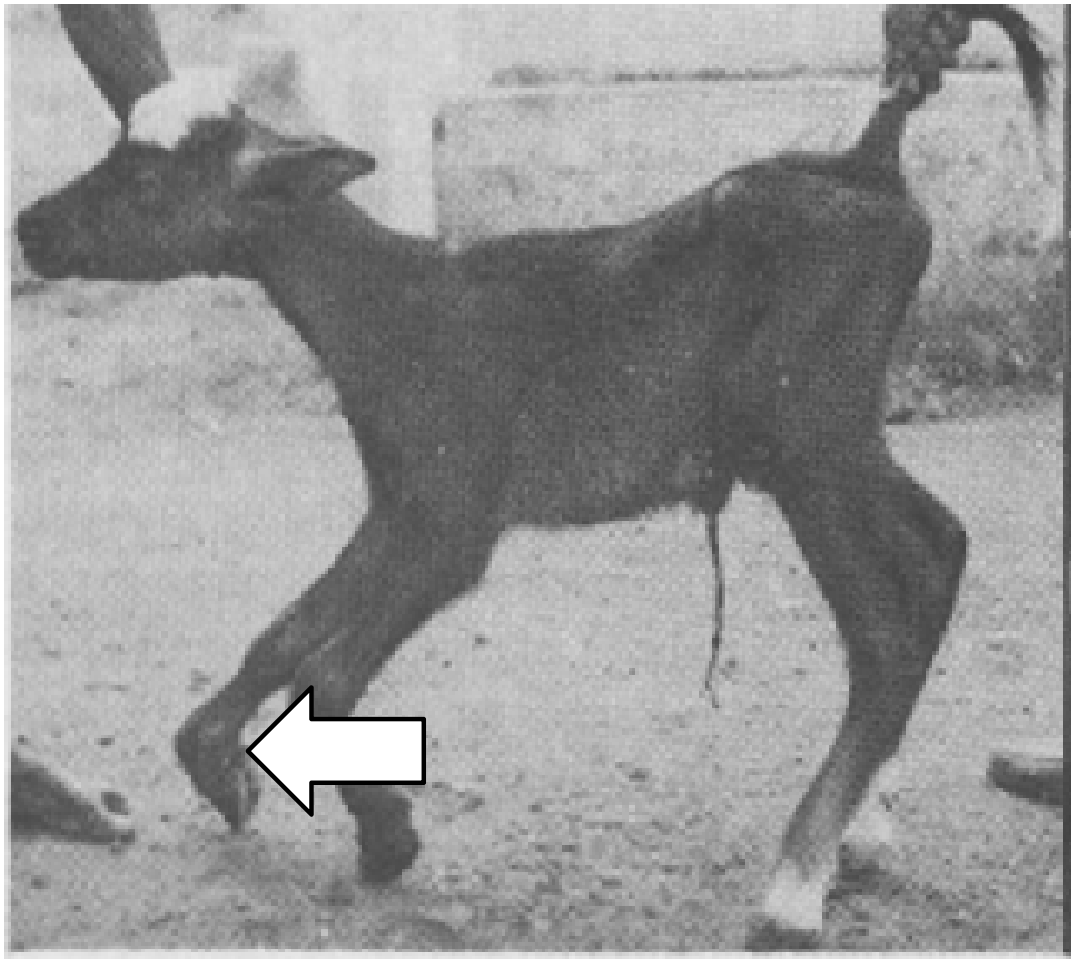
Superficial/deep flexor tenotomy in horse/cattle

- **Indications:**
  - Contraction of flexor tendons, or deformity due to partial or permanent flexion of the fetlock or interphalangeal articulations.
- **Note:**
  - Tenotomy should be performed if
    - The contraction of tendon or deformity cannot be corrected by stretching the limb under general anaesthesia.
  - Only the superficial tendon should be cut.
    - If the heel of the foot remains on the ground when the animal is standing,

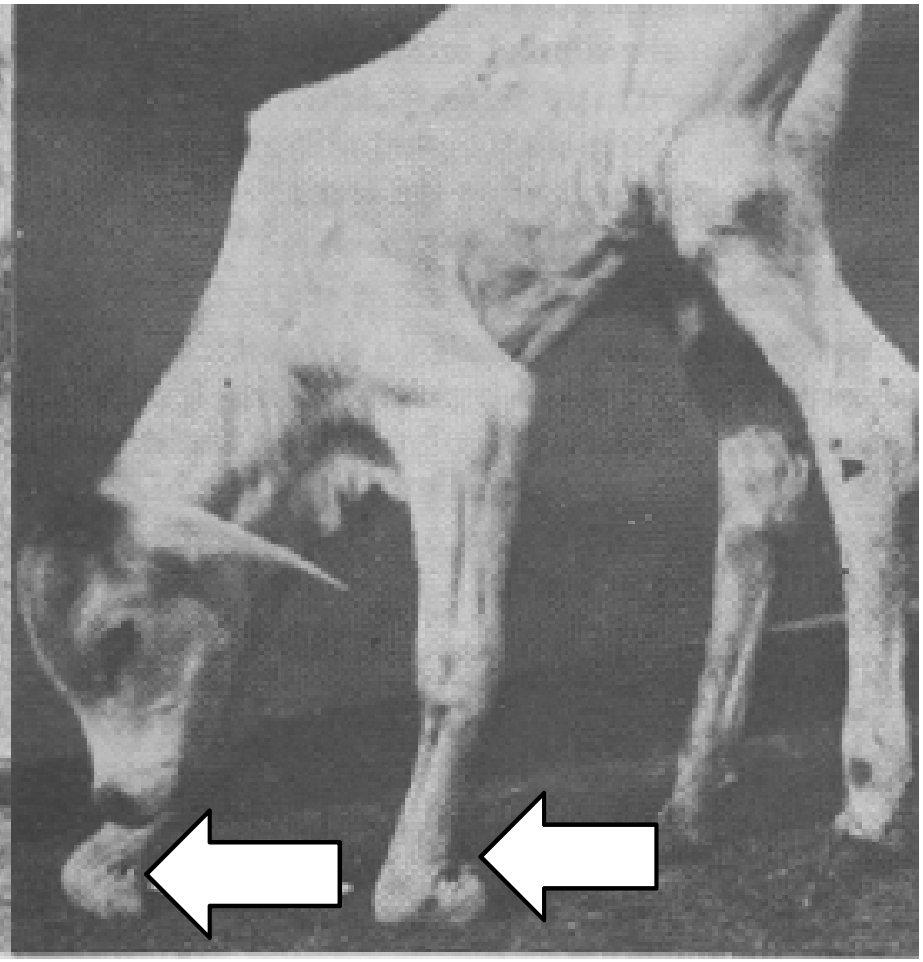
A calf with unilateral contraction of the tendons of the forelimb.

A calf with typical bilateral contracted tendons of the forelimbs.

Superficial/deep flexor tenotomy cont…



Bilateral knuckling at the fetlock and knee joint



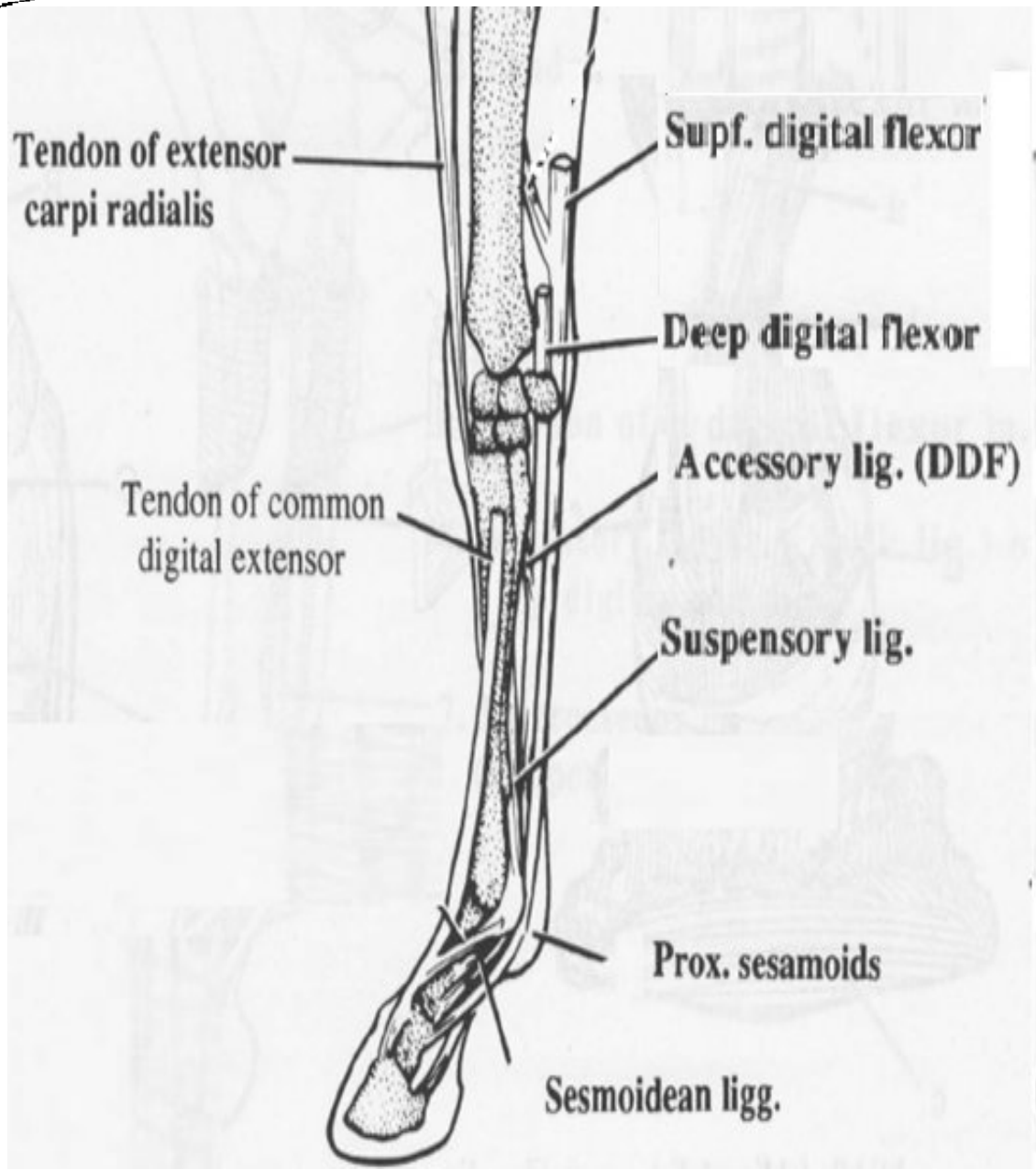
Bilateral knuckling at the fetlock joint

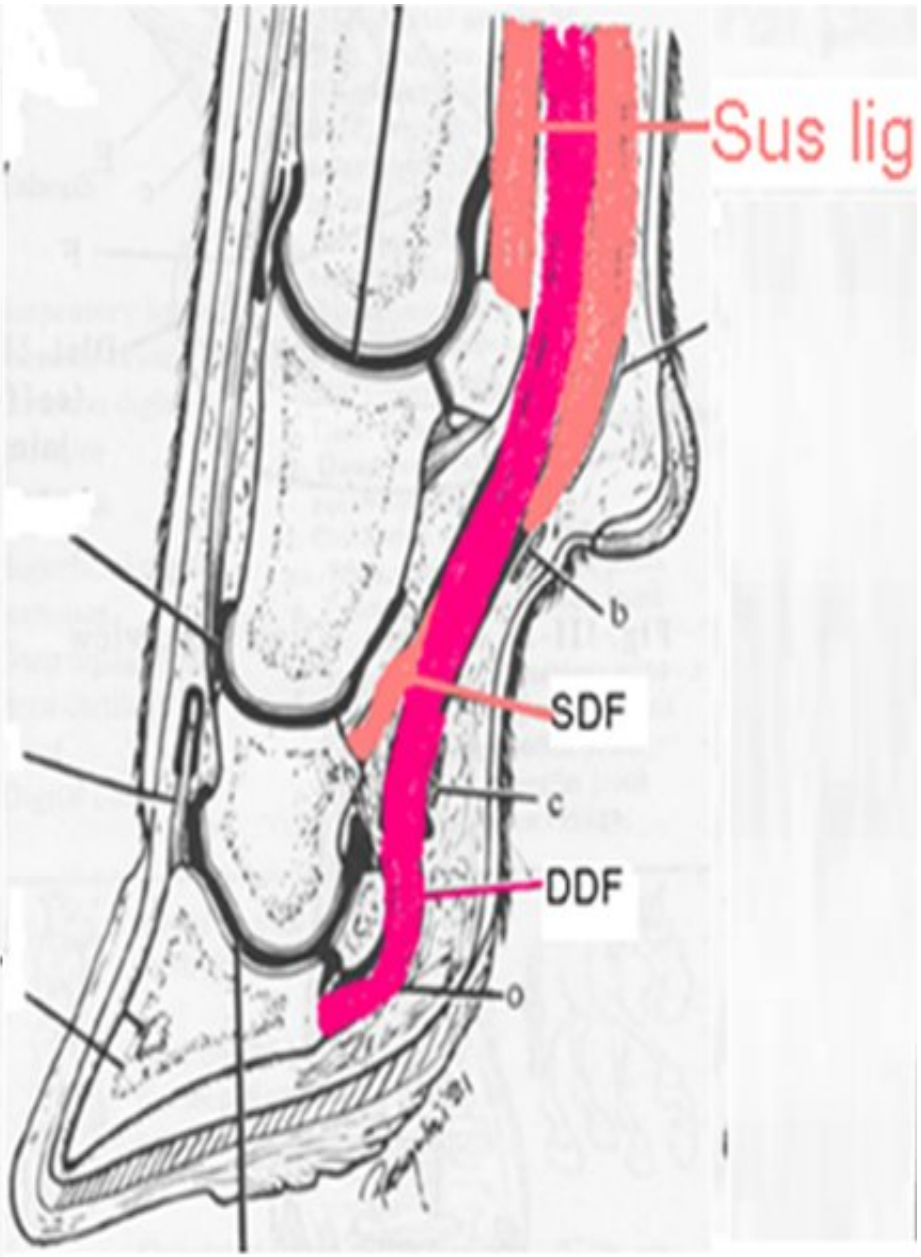
The above conditions require correction by tenotomy

Superficial/deep flexor tenotomy cont…

- **Anaestbesia and Control:**
  - The site of operation is anaesthetized with linear infiltration using 2% procaine hydrochloride or any other local anaesthetic agent.
  - The animal is cast and controlled in lateral recumbency

Superficial/deep flexor tenotomy

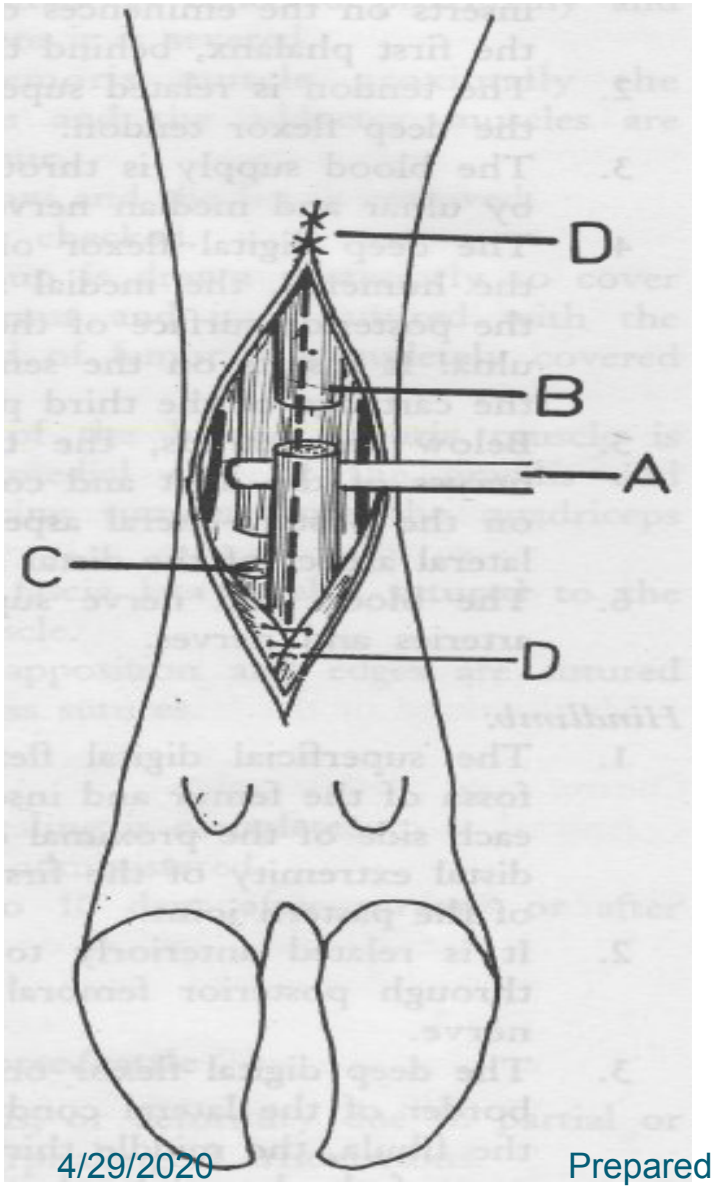




Superficial/deep flexor tenotomy cont…

- **Surgical technique:**
  - A 2 cm long incision is made in the skin between the two flexor tendons.
  - The subcutaneous tissues are separated by blunt dissection, and the blood vessels are identified and retracted
  - A small teat bistoury or tenotome or curved knife is pushed through the skin incision between the two tendons.
- If only the superficial tendon is to be cut, the edges of the knife should be turned out and the tendon is cut.

Superficial/deep flexor tenotomy cont…



A = Tenotome between tendons
B = Severed superficial flexor tendon
C = Severed deep flexor tendon
D = Interrupted sutures through skin & subcutaneous tissue

Superficial/deep flexor tenotomy cont…

- **Surgical technique cont ….**
  - Interrupted sutures using non-absorbable suture material are put on the skin.
  - If both tendons are to be cut,
    - The knife should be inserted under the deep flexor tendon through the skin incision and avoiding the large vessels
    - Both tendons are cut at two different places by turning the blade outward.
    - Subcutaneous tissue is sutured with interrupted or continuous sutures and skin using interrupted sutures.
    - The limb should be kept in extension to tighten the flexor tendons while they are being cut.

Superficial/deep flexor tenotomy cont…

- **Surgical technique cont ….**
  - The limb should be put under the plaster cast just below the carpus or tarsus to the coronary band with gauze and cotton pads.

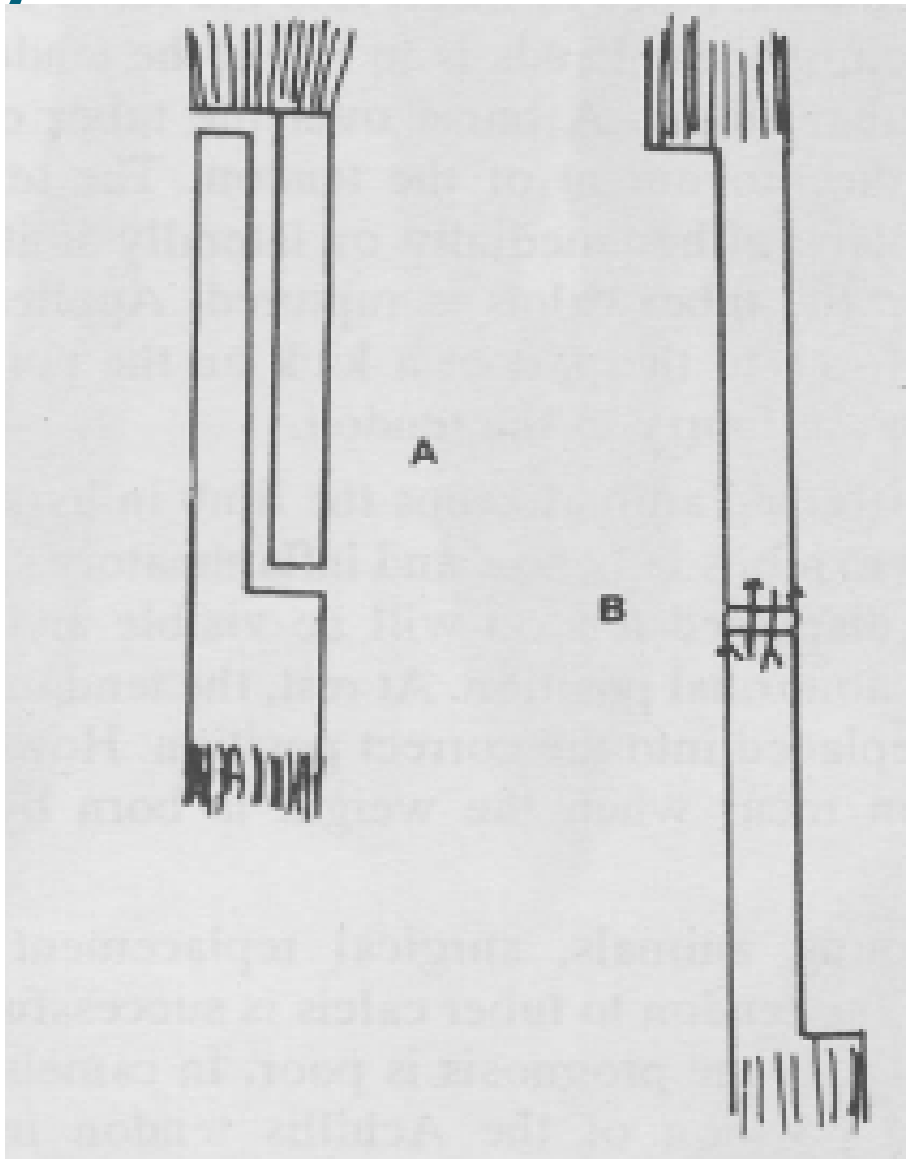
Superficial/deep flexor tenotomy cont…

- **Post-operative care:**
  - Tetanus toxoid should be administered immediately after the operation.
  - Antibiotic administration is desirable in cases when infection is suspected.
  - The plaster cast should be left for 10 to 14 days.
    - If necessary, it should be applied for extended period of a week or two.
  - Skin sutures should be removed 8 to 10 days after operation or after healing is complete and plaster cast is reapplied.

Z-tenotomy

- An Alternative technique to complete tenotomy
- Aim
  - lengthening of the tendon
- Surgical technique for Z-tenotomy
  - A longitudinal incision is made in the center of the exposed tendon.
  - At each end of the incision, a transverse incision is made but in opposite direction.
  - The ends are then sutured.
  - The skin incision is closed routinely.
  - The wound is protected by sterile bandage and a plaster cast is then applied.

Z-tenotomy

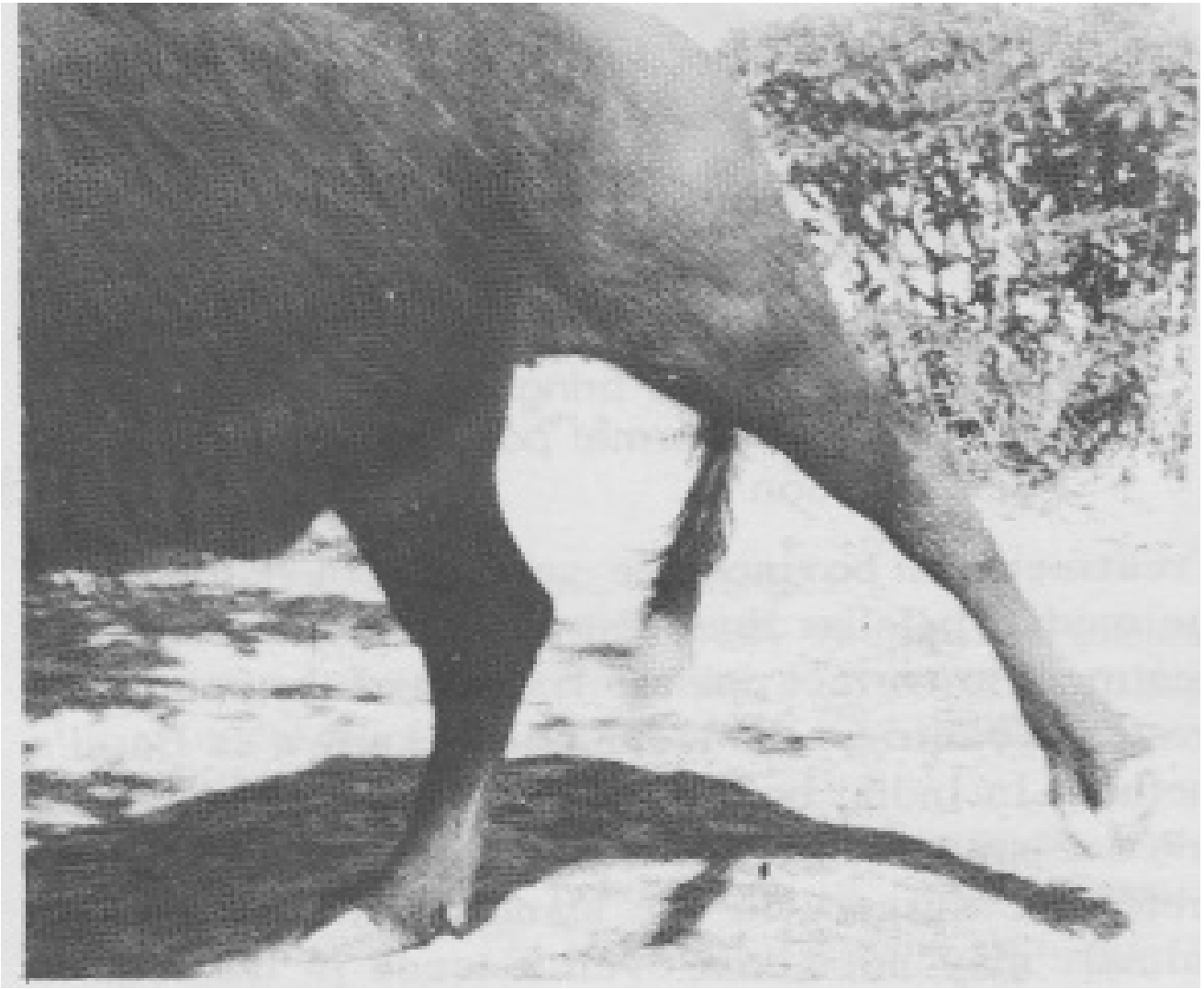


Medial patellar desmotomy in cattle

- **Indications:**Recurrent or permanent upward fixation of patella with locking.

This is a case of upward fixation of the patella.
The animal cannot voluntarily flex its stifle.

Medial patellar desmotomy in cattle

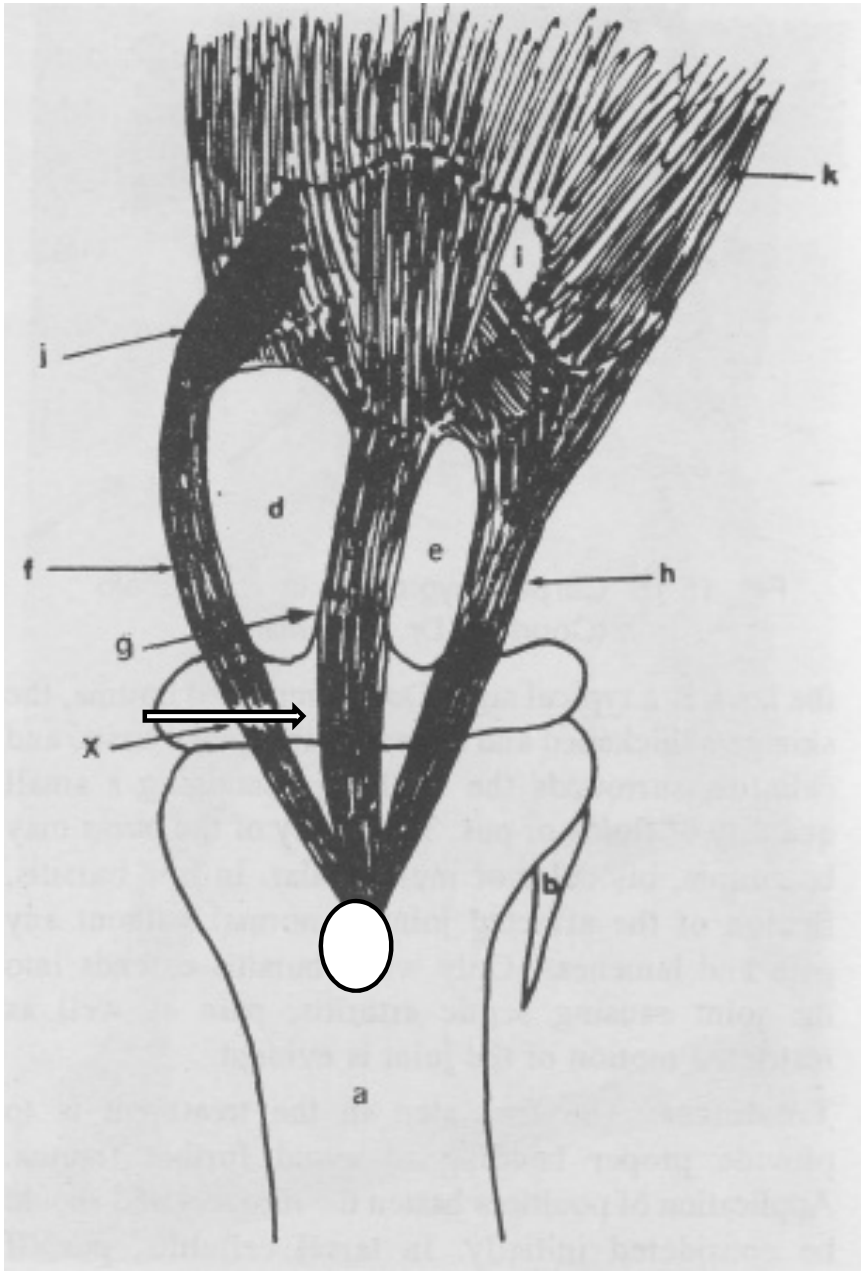


Complete extension of affected limb

Medial patellar desmotomy in cattle

- **Anaesthesia and control:**
  - Analgesia is achieved by infiltrating local anaesthetic at the site of operation.
  - The animal is controlled in lateral recumbency with
    - Affected limb towards the ground and
    - The upper unaffected hind leg drawn forward and tied with the forelegs
    - Affected hind leg which lies downward is dragged backward and is tied in order to expose the stifle joint and to tense the patellar ligaments.

Medial patellar desmotomy in cattle



a = tibia
b = fibula
c = Cranial tibial tuberosity
d = medial trochlear ridges
e = lateral trochlear ridges
f = medial patellar ligaments
g = middle patellar ligaments
h = lateral patellar ligaments
I = patella
j = fibrocartilage of the patella
k = quadriceps muscle
x = site for medial patellar desmotomy

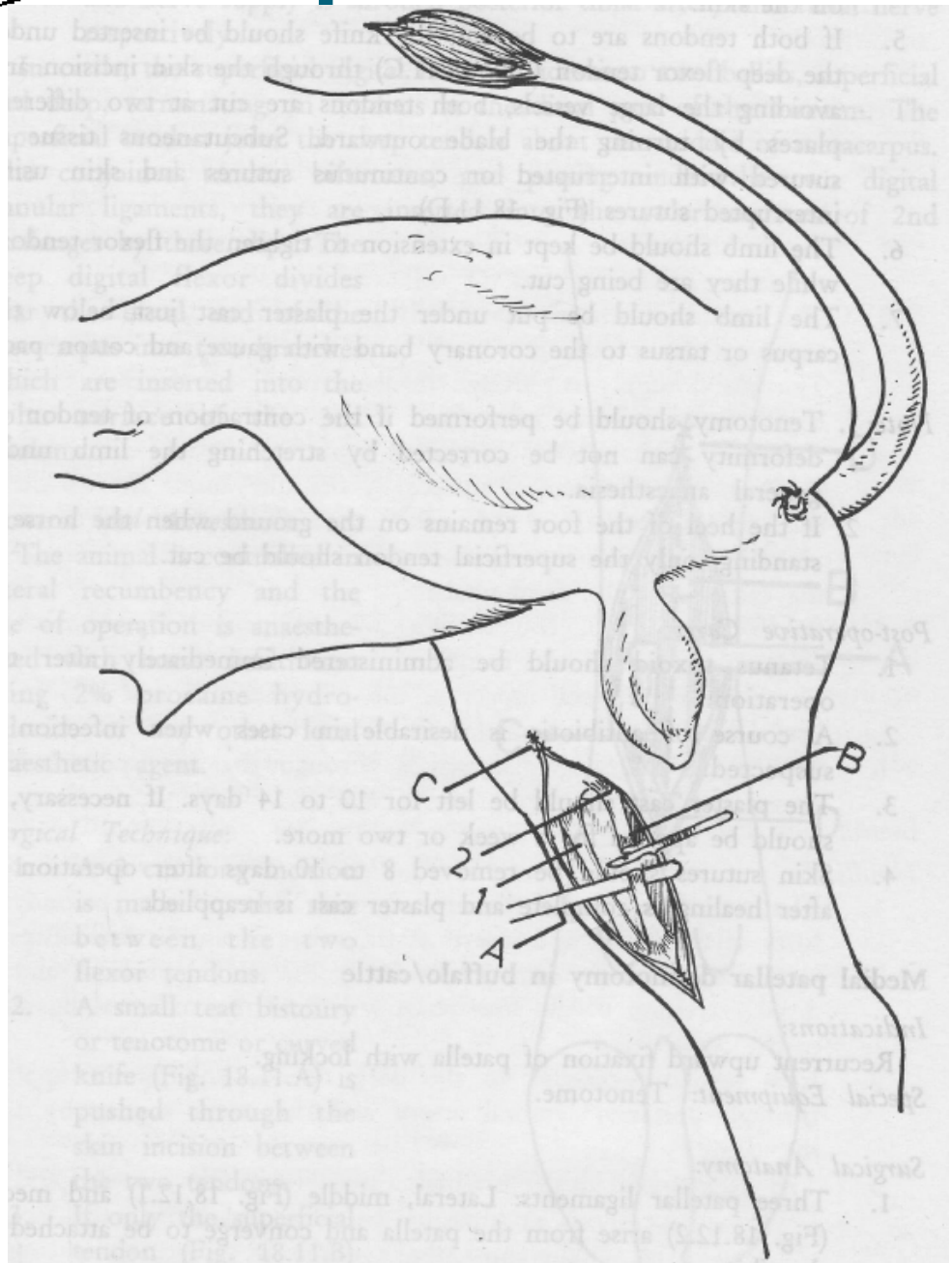
Medial patellar desmotomy in cattle

- **Surgical Technique:**
  - **Open method**
  - **Closed method:**

Medial patellar desmotomy in cattle

- **Surgical technique - open method:**
  - A skin incision of about 3 cm in length is made at the posterior border of the ligament in the medial aspect of stifle joint where medial patellar ligament inserts into the inner aspect of the anterior tibial tuberosity.
- A blunt instrument like B.P. blade handle is inserted under the medial ligament and the ligament is cut over the instrument.
- Skin incision is closed by three or four simple interrupted or mattress sutures.

Medial patellar desmotomy in cattle



1= Middle patellar ligament

2= Medial patellar ligament

A = Blunt instrument udder the ligament

B = Cutting of the ligament

C = Interrupted skin sutures

Medial patellar desmotomy in cattle

- **Surgical technique - Closed method:**
  - After locating the ligament, a point tenotome or fine point scalpel is inserted directly through the skin and fascia at the anterior border of the ligament.
  - The knife is held against the ligament and the ligament is divided in its entire width carefully towards the skin
  - After severing the ligament the scalpel is taken out. Few drops of Lugol's iodine are poured at the site.

Medial patellar desmotomy in cattle

- **Post-operative care:**
  - The animal should not be used for hard work for about 8 to 10 days.
  - Skin sutures should be removed on 7^{th} or 8^{th} Post-operative day or after complete skin wound healing.

CHAPTER FIVE
SURGERY ON UROGENITAL SYSTEM

a) Cystotomy and urethrotomy in dogs, cattle and bullock/ bull.

Cystotomy in dogs

- Cystotomy is a surgical procedure in which an incision is made into the urinary bladder. The procedure can be done for many reasons, the most common being to facilitate removal of stones from bladder and urethra.

- Other indications include helping to diagnose tumors and ruptured bladders

Procedure

- The procedure has *relatively few complications*.
- Dogs: general anesthesia.
- The cystotomy is performed through an incision on your dog's belly which is located towards the rear of the abdomen.
- Once the bladder has been accessed, the stones are removed after incision.
- Closure: suture and flush the abdomen to remove any urine that may have leaked.
- abdominal wall is routinely closed.

Post Operative Care

- Administer analgesics and antibiotics
- Restrict the exercise.

Urethrotomy in dogs

✓Urolithiasis (urinary stones) - dogs and cats.

✓The formation of bladder stones is associated with precipitation and crystal formation of a variety of minerals (magnesium, ammonium, phosphate hexahydrate, calcium oxalate, urates and others).

✓Location- mainly urinary *bladder or urethra* and kidneys or ureters(small).

- Pathogenesis: inflammation → predispose the animal to bacterial urinary tract infection – UTI.
- In addition it also physically block the urine flow →emergency treatment.

Causes and Risk Factors

- ✓ a high concentration of salts in urine
- ✓ retention of these salts and crystals for a certain period of time in the urinary tract;
- ✓ an optimal pH that favors salt crystallization;
- ✓ a scaffold for crystal formation;

- The diagnosis of urinary stones is based on the manifestation of clinical signs:

✓ hematuria (blood in the urine)

✓ low back or abdominal discomfort

✓ depression, anorexia (loss of appetite)

✓ vomiting, difficulties in urination

✓ (dysuria or stranguria), decreased frequent urination (pollakiuria), and cloudy urine.

- Pre-surgical management of metabolic derangements is the key to be success in patients with urethral obstruction.

❑ If hydropulsion is not rapidly successful at eliminating the obstruction, surgery treatment should be pursued.

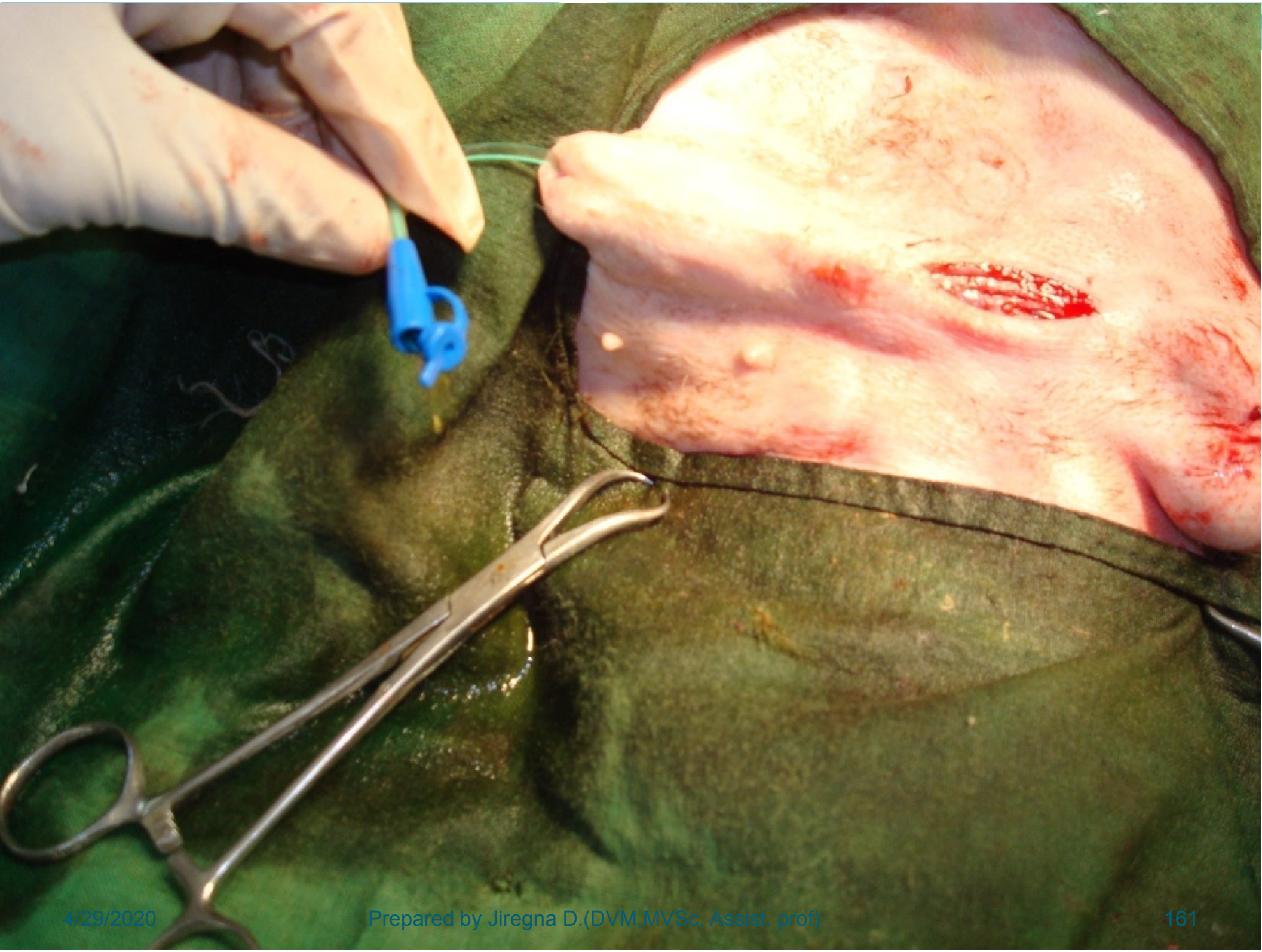
❑Surgical technique

- In urethrotomy: can be left open to heal by second intention.
- Alternately, the urethral incision can be closed in layers.

✓ urethral mucosa and tunica albuginea: interrupted or continuous pattern

✓ subcutaneous tissues: in a simple continuous pattern

✓Skin: use non absorbable monofilament suture.



Cystotomy in cattle

- Indications
  - ✓ Removal of calculi, cancerous growth etc from UB
  - ✓ Catheterization of UB

Materials required:

- Polyethylene catheter, with flexible stilette, catgut1 or 1-0

Site of operation:

- The UB in bovine can be approached through any one of the following sites
  - Vertical, posterior flank incision
  - Ischio rectal fossa
  - Pre pubic para median incision

Restraint and anesthesia:

- Animal is controlled in standing position/recumbent/
- Posterior epidural anesthesia is achieved by injecting 8-10 ml of lidocaine in the first inter-coccygeal space for *ischi orectal approach.*
- Para vertebral or local infiltration at the site of operation is used in *flank approach*
- The animal is controlled in the dorso ventral recumbency in pre-pubic para median approach and analgesia is achieved by *linear infiltration* of local anesthetic agent over the site of incision.

Surgical technique

Ischiorectal approach

- Anus is plugged with cotton and gauze bougie or purse string sutures applied on the anus to prevent contamination
- Tail should be wrapped with sterile drape or bandage and held on one side
- *A 12 to 15 cm* long skin incision is made in the ischio rectal fossa lateral to the anus.
- The underlying subcutaneous fascia, the coccygeus and retractor ani muscles and part of sacro sciatic ligament are reflected
- The peri anal fat is removed and separate the deep fascia and loose ariolar connective tissue.
- *The neck of the UB is approached and the attachment of the UB are loosened.*
- Urine is taken out by syringe or needle attached to the rubber tubing

- An incision is made on the dorsal aspect of the vertex of UB.
- Search for stones/calculi, neoplastic growth or any other abnormality.
- *The polyethylene catheter along with flexible stilette is passed through the urethral orifice of the bladder into the urethra to check the site of obstruction.*
- Straighten the sigmoid flexure of the penis by manual manipulation to assist the passage of the catheter.
- The stilette is removed.

- UB is repaired in two rows using chromic catgut (0 or 1)
- The retractor ani and coccygeus muscles are repaired by *simple continuous sutures* and the skin by simple interrupted sutures
- The purse string or the cotton bougie are removed.

Prepubic paramedian and flank approach

- The bladder is approached by adopting the surgical technique as for laparotomy and the wound is closed in the usual manner

Urethrotomy in bullock/ bull

Indications:

* *Urethral calculi*
* *Growth in the urethral lumen*

- It is not possible in cattle to locate the site of calculus lodgement on clinical examination because of the presence of sigmoid flexures which prevents catheterization from the external urethral orifice.

Control and anesthesia:

- Animal can be controlled in standing position or recumbent position under tranquilization or sedation.

- Analgesia of the site of operation is accomplished by infiltration of the local anesthetic or posterior epidural block

Site of operation:

- Any of the following sites can be chosen depending upon the location of obstruction:

1. **Prescrotal**: incision is made anterior to the scrotum over the urethra. This site is chosen when the obstruction is anterior to the SF (sigmoid flexure).

2. **Post-scrotal**: incision is given between the scrotum and Ischial arch.

➢ This site is chosen when the obstruction is b/n posterior part of SF and Ischial arch

3. Ischial: incision is given *on the midline* just below sphinctor ani and extended ventrally. This site is chosen when the obstruction is at the neck of the bladder

4.Para-anal: incision is made lateral to anus in the para rectal fossa. This site is chosen when the obstruction is at the neck of the bladder

- Since sigmoid flexure is the most common site of calculi lodgment, a post scrotal urethrotomy is recommended for location and removal of the calculus.

Surgical technique

- A flexible catheter is passed in the urethra to know the position of obstruction
- An incision about 8-10 cm long is made through the skin and subcutis exactly on midline either in the pre-scrotal, post-scrotal or ischial region.
- The incision is deepened through the fascia b/n the two retractor penis muscles (bulbo-cavernosus muscle and corpus caver nosum urethrea)
- Urethra is opened immediately *anterior or posterior* to the obstruction. Calculi if present are removed.
- The incision of the urethra is closed by suturing the mucous membrane and muscles of the urethra by continuous and interrupted sutures respectively in two layers.
- Skin is closed using interrupted sutures

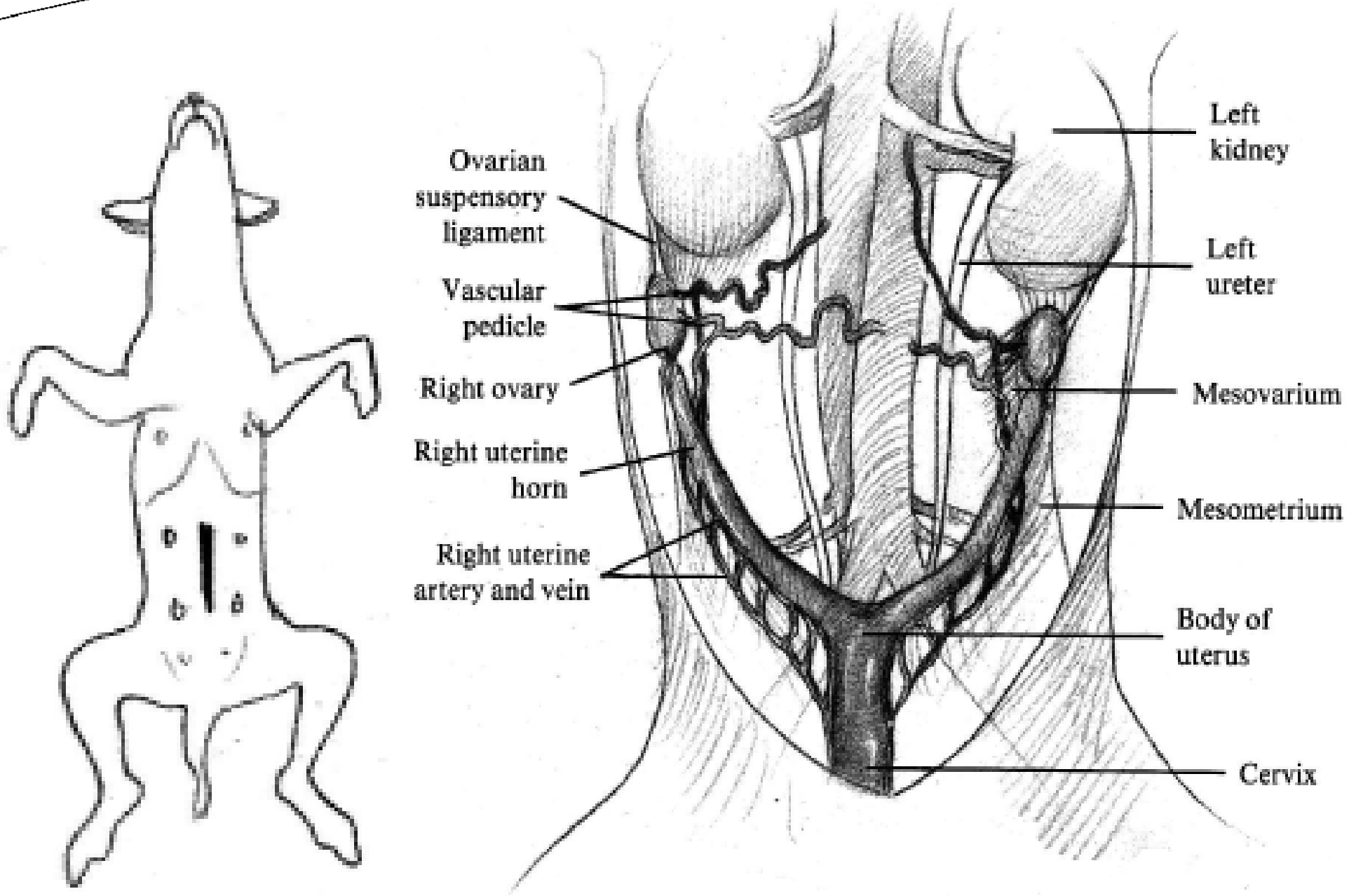
c) Ovariohysterectomy in dogs, caesarean section in dog and cow, episiotomy in dog and cow, Caslick's vulvoplasty in mares, Repair of vaginal and uterine prolapse in cow

Ovario hysterectomy in dogs

Indications

- **Definition**
  - It is the surgical removal of both ovaries, both uterine horns, and the body of the uterus cranial to the cervix.
- **Indications:**
  - To prevent estrous and pregnancy.
  - Endometritis, pyometra, neoplasia, and endocrine related diseases.
  - Dystocia patients with devitalized uterus.
  - Hyperplasia and neoplasia of mammary gland

***Site of operation*: midline abdominal incision starting at the edge of umbilicus for 6-8 cm caudaly(caudal midline).**


Ovarian suspensory ligament
Vascular pedicle
Right ovary
Right uterine horn
Right uterine artery and vein
Left kidney
Left ureter
Mesovarium
Mesometrium
Body of uterus
Cervix

- **A 6-8 cm long incision is made on the midline beginning over the umbilicus and extended caudally**
- **Skin, subcuit, linea alba, and peritoneum are incised**
- **An ovari ectomy hook is introduced towards the left flank in to the abdominal cavity and uterine horn and broad ligament is hooked and is withdrawn. Uterus and ovary are recognized and uterine horn grasped with gauze sponge**

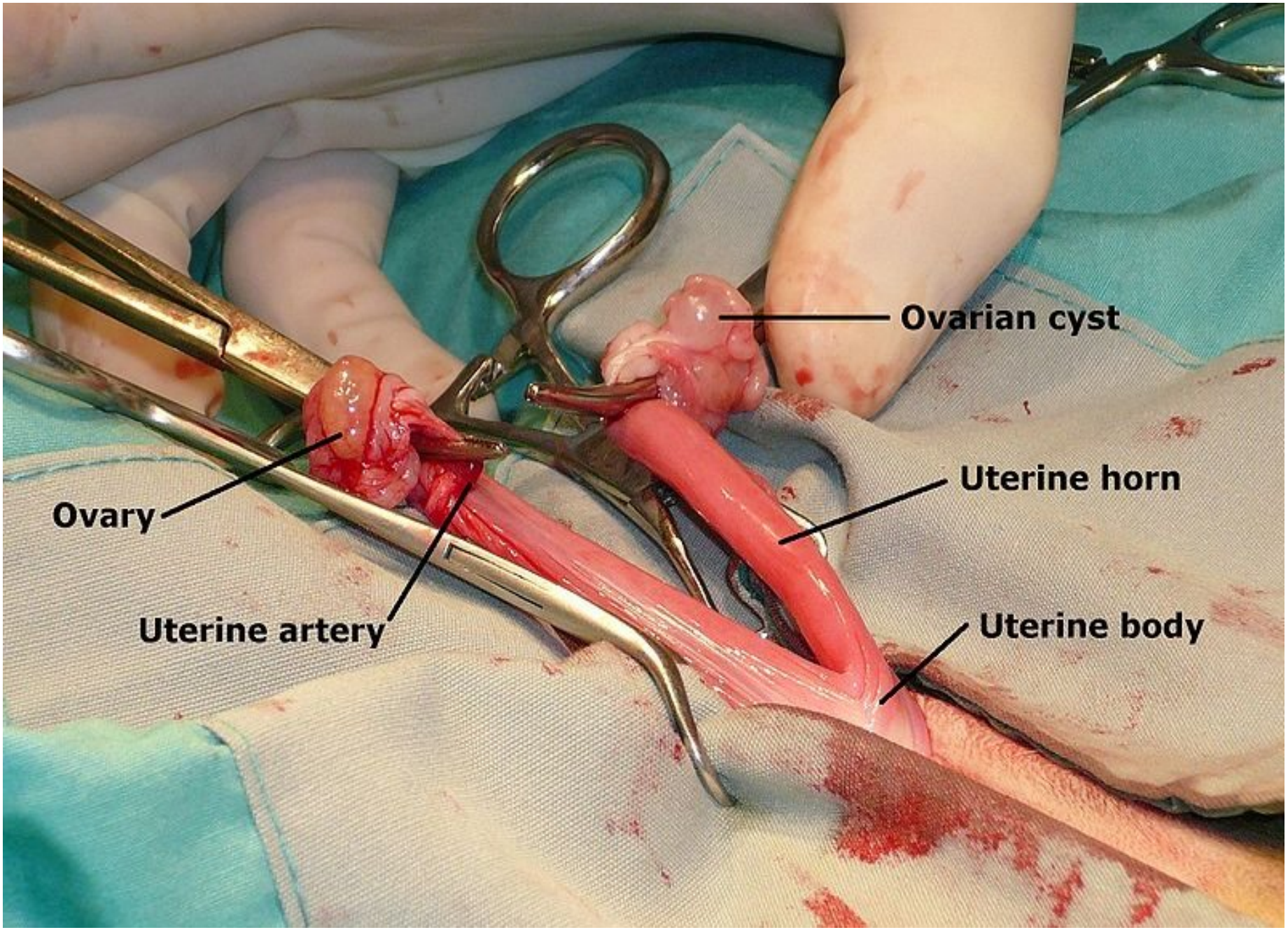
- **Ovarian bursa is clamped across by artery forceps. The ovary is grasped b/n thumb and index finger and withdrawn for ligation**

- ***The suspensor ligament* of the ovary is ruptured by traction or with forceps and ovary is withdrawn from the abdomen and a large opening is made in the broad ligament with forceps or finger to expose the ovarian attachment with its blood vessels**

- **A double ligature with chromic catgut (1-0) is used to ligate ovarian pedicles. The attachment b/n the ligature and the ovary is then severed. The severed stamp should be checked for hemorrhage before returning it to the abdomen.**

- **After removing one ovary, the other ovary is located and removed in similar manner**

- **The broad ligament is then severed. The body of the uterus is withdrawn from the abdomen. The 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 ligature.**
- **Uterine stamp is checked carefully for hemorrhage and returned to abdomen.**
- **Abdominal incision is closed in the usual manner**


Ovarian cyst
Uterine horn
Ovary
Uterine artery
Uterine body

Caesarean section in dog and cow

Indications:

- Sterilization or prevention of oestrous.
- Treatment of pyometra, cyst, infection, neoplasia of genital tract.
- Hyperplasia and neoplasia of mammary gland.
- Dystocia patients with devitalized uterus.

Site of Operation:

- **Dog:** Ventral abdominal midline behind the umbilicus.
- **Cow:** Vertical incision on *the left lower flank region*.

Surgical technique in dogs

- **The patient is positioned in dorsal recumbence with restraints placed on all limbs. A ventral midline laparatomy is made from the umbilicus to just cranial to the pubis.**

- **The linea alba should be elevated before incising it to avoid accidental penetration of the uterine wall. One gravid uterine horn and the uterine body are exteriorized.**

- The gravid uterus must be handled gently and with minimal traction to avoid avulsing the uterine vessels or tearing the uterine wall.
- The abdominal cavity is protected from spillage of uterine contents with moistened laparotomy pads placed under and around the uterus.
- A stab incision is made in the ventral aspect of the uterine body, and extended with Metzenbaum scissors.
- This incision should be large enough to fit each puppy through without tearing of the wall. Fig 1

- The puppies are then "milked" out of the hysterotomy, cranial to caudal.
- Each puppy should still be in its amniotic sac, and its placenta may be attached to the uterine wall.
- It is important to detach the placenta with gentle caudal traction, so as not to rupture any of the many blood vessels located superficially in the uterine wall (Photo 3).
- If the placenta does not detach readily, it is left in place until the end of the procedure. Each puppy is handed off to the recovery team as it is delivered.

- **When all the puppies are removed from the first horn, it is replaced into the abdomen and the other exteriorized.**

- **The puppies are then removed from the second horn via the same uterine body incision.**

- **Palpate the pelvic canal to ensure that no puppies remain at that site. When all the puppies have been removed and before closing the hysterotomy, any remaining placentas are removed.**

- **It is preferable that the number of placentas removed equal the number of pups. Otherwise, complications associated with retained fetal membranes can later arise, such as acute metritis.**

- **Hysterotomy is closed in two layers with continuous-suture patterns (lembert-cushing) using absorbable suture such as catgut (3-0 or 4-0)**

- **Local lavage is generally sufficient, unless gross contamination of the abdomen with uterine contents has occurred. If this is the case, the laparotomy pads are removed and the peritoneal cavity is copiously lavaged with warm, 0.9% saline.**
- **At this point it is appropriate to change contaminated gloves and instruments.**
- **It will now be easy to identify and arrest any persistent hemorrhage, such as from a traumatized uterine vessel.**
- **Inspect the other abdominal organs for evidence of disease or injury. Finally, the omentum should be drawn over the ventral aspect of the uterus.**
- **If the owners do not plan future breedings, an ovariohysterectomy can be performed after hysterotomy.**

- **The abdominal wall is closed routinely in three layers (rectus sheath, subcutaneous tissue and skin),**
- **It is preferential to close the skin with a subcuticular suture pattern with a synthetic absorbable monofilament suture material (such as Monocryl).**
- **External skin sutures are a source of irritation for the mother and the puppies, and puppies will frequently suckle or scratch at them, increasing the chance of incisional irritation or infection.**
- **This also obviates the need to remove the sutures at some point in the future.**

Caesarean section/CS in cow

Indications:

1. Uterine inertia.
2. Various types of obstructive dystocia.
3. Rupture or perforating wounds of gravid uterus.

- For CS in cows the uterus can be approached in various ways either in the standing or recumbent positions. In standing animals, the flank approach is used

Figure 1

- Standing left paralumbar celiotomy.
- The placement of the incision is indicated by the dashed line.

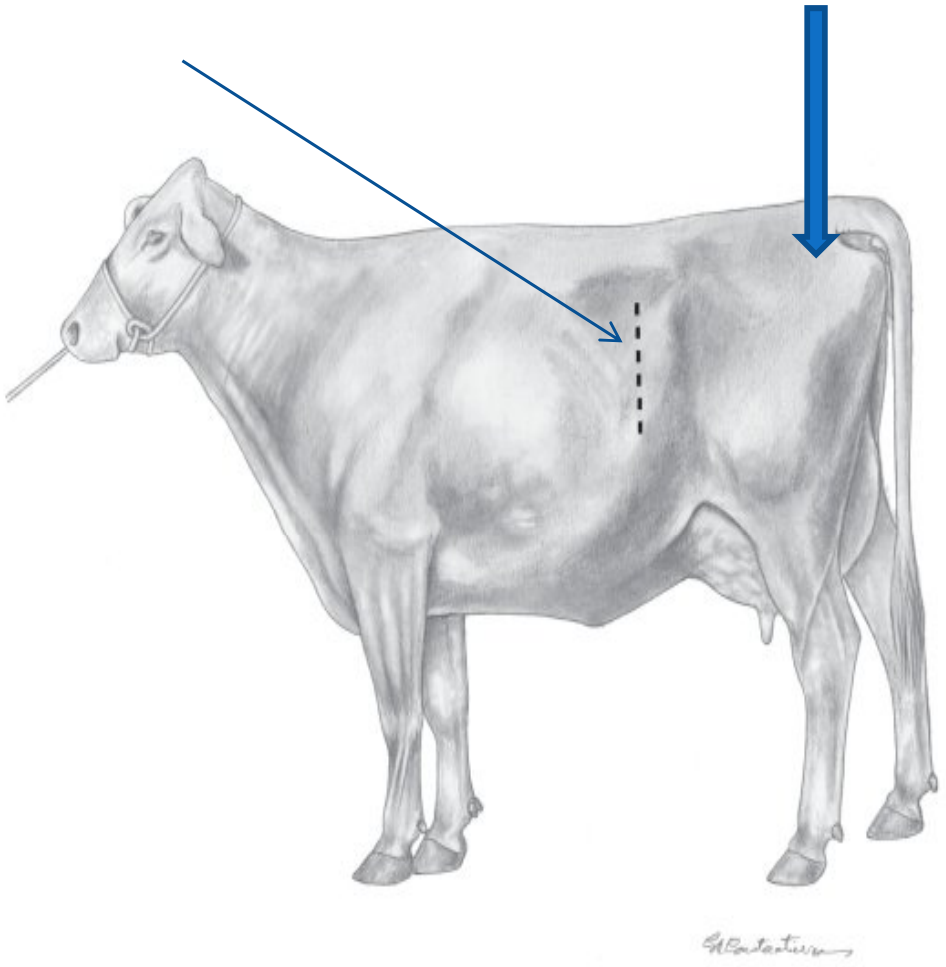
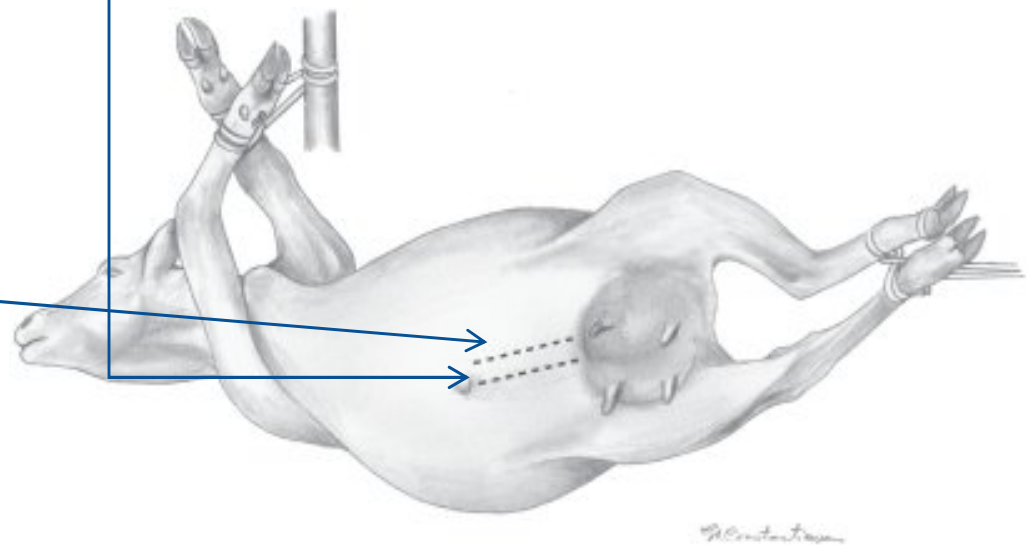


Figure 2.

- Recumbent ventral midline celiotomy.
- *ventral paramedian celiotomy*.
- The placement of the incision is indicated by the dashed line.



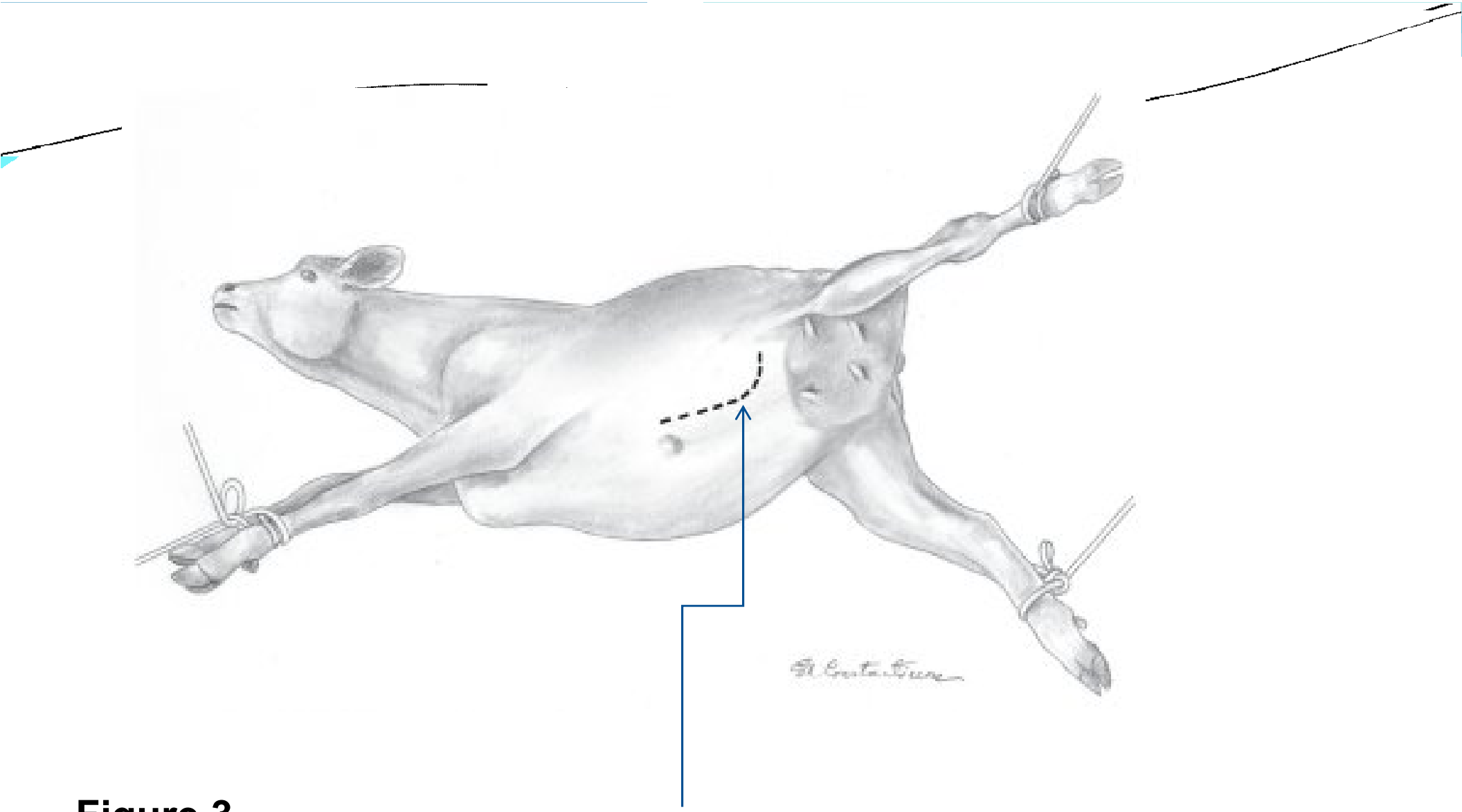
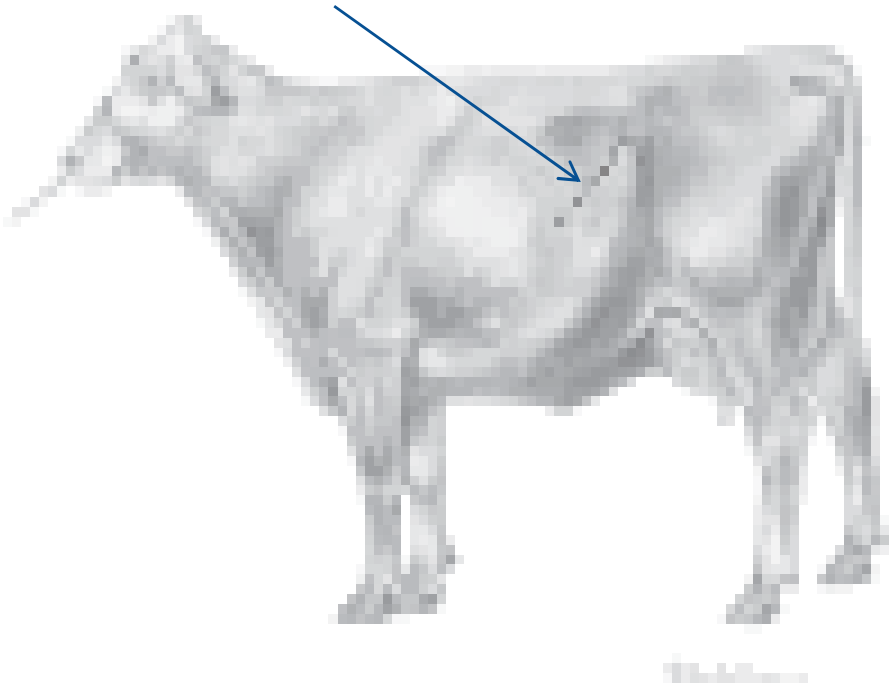


Figure 3.

The proper positioning of the cow and incision site for the ventrolateral celiotomy. The placement of the incision is indicated by the dashed line

Figure 4

- Standing left oblique celiotomy.
- The placement of the incision is indicated by the dashed line.



- ***Secure the head***. **The cow or heifer must have her head secured in a head-catch to prevent her from moving around.**

- ***Shave the area that the incision*: Most C-sections are performed on the left side of the cow, or according to whichever side the cow is laying on if she's laying down and won't get up to have the surgery performed on her. In this case with a standing cow, the left flank just behind the last rib is shaved.**

- ***Scrub shaved area*: Squirt Scrub onto the area that has been shaved, and rub down the area with hands or a sponge or scrub brush. Repeat until the area is clean**

- ***Apply 70% Alcohol***

- ***Anesthetisize*: Administer local anaesthetic to spinal area where incision will be done. Anaesthetic usually kicks in a few seconds after being administered, "deadening" or numbing the area.**

- ***Make the incision***. **Make an incision through the skin and into the abdominal cavity. The incision itself is usually no smaller than 12 to 16 inches long.**

- ***Reach inside the abdominal cavity to find the uterus***. **You should be able to feel the hard body of a calf around area that the incision was made.**

- ***After pulling the uterus to the outer incision, cut the uterine wall.***

- ***Grab one of the calf's hind feet*** **(if it's in normal presentation) and pull it through the incision.**
- ***Rupture the amniotic sac, and grasp the hind leg that was just pulled out in the previous step, holding the uterus in position against the outer incision***
- ***Reach in to find the other hind leg.***

- **Preparing to pull out the calf. Have someone put the calving chains on the calf's legs while you hold on to them, not allowing them to slip back into the cow's abdominal cavity.**

- ***Remove the placenta***. **Reach in the uterine cavity again and begin to remove the placenta from the uterine wall. This step is optional, since some vets like to remove the placenta while the uterine wall is still open.**

- ***Clean the cow's abdominal cavity***. **With a bucket of warm water with about 10 ml of Solution mixed in, wash out the abdominal cavity and the skin to clean it of amniotic fluid and blood from the incisions and pulling out the calf. Repeat until area is clean.**

- ***Suture up the uterine incision, then push it back into place.***

- ***Suture up the abdominal wall and skin incision***.

Episiotomy in cow and dog

- **Episiotomy -*involves incising the skin and underlying tissue of the labial a around the dorsal commissure of the vulva* slightly laterally.**

Indications:

- **Marginal fetal oversize, failure or incomplete relaxation of the constrictor vulvae muscles, juvenility or constriction of the vulva as a result of previous injuries.**

- **The procedure is used to avoid injuries and lacerations of the vulva and vagina during parturition**

Episiotomy in cow

- **Under epidural anesthesia, the incision begins from the free endges of the vulva, 3-5 cm below the dorsal commissure in dorsolateral direction for about 7-12 cm depending on the requirements**

- **After delivery of the fetus by traction, the wound is thoroughly cleaned and the incised edges apposed together using absorbable suture material and vertical mattress sutures**

Episiotomy in dog

Indications:

1. **Better visualization of vagina (removal of vaginal tumour).**
2. **Vaginal hyperplasia.**
3. **Vaginal prolapsed.**
4. **Congenital defects.**
5. **Dystocia due to inadequate vulvar opening.**

- **Caudal aspect of the dorsal horizontal vaginal wall ventral to external anal sphincter is incised between the forceps. Incision is extended to the dorsal commissure of the vulvar cleft.**
- **Thin musculature and mucosal tissue are incised with scissors to complete episiotomy. The edges of incision are retracted to expose interior of vagina. The haemorrhage can be controlled with haemostats, ligation or electro cautery.**
- **After exploring the vagina and accomplishing the work, the vaginal wall is reconstructed in two layers.**
- **First row of interrupted sutures using chromic catgut size 3-0 are placed through the mucosa. A simple interrupted pattern of 3-0 catgut is used to close musculature and subcutaneous tissue in one layer.**
- **It is followed by a another row of interrupted sutures, apposing the skin with non-absorbable suture.**
- **The purse string suture is removed after completion of surgery.**

Caslick's vulvoplasty in mares

- Vulvoplasty or episioplasty, is a surgical procedure conducted to correct a conformational (structural formation) such as recessed vulva.

Indications:

1. Pneumovagina.

✓Caused by faulty closure of lips as a result of poor conformation or injury

2. Faecal contamination of vestibule leading to cervicitis, endometritis and sub-fertility.

3. To prevent recurrence after vaginal prolapse repair

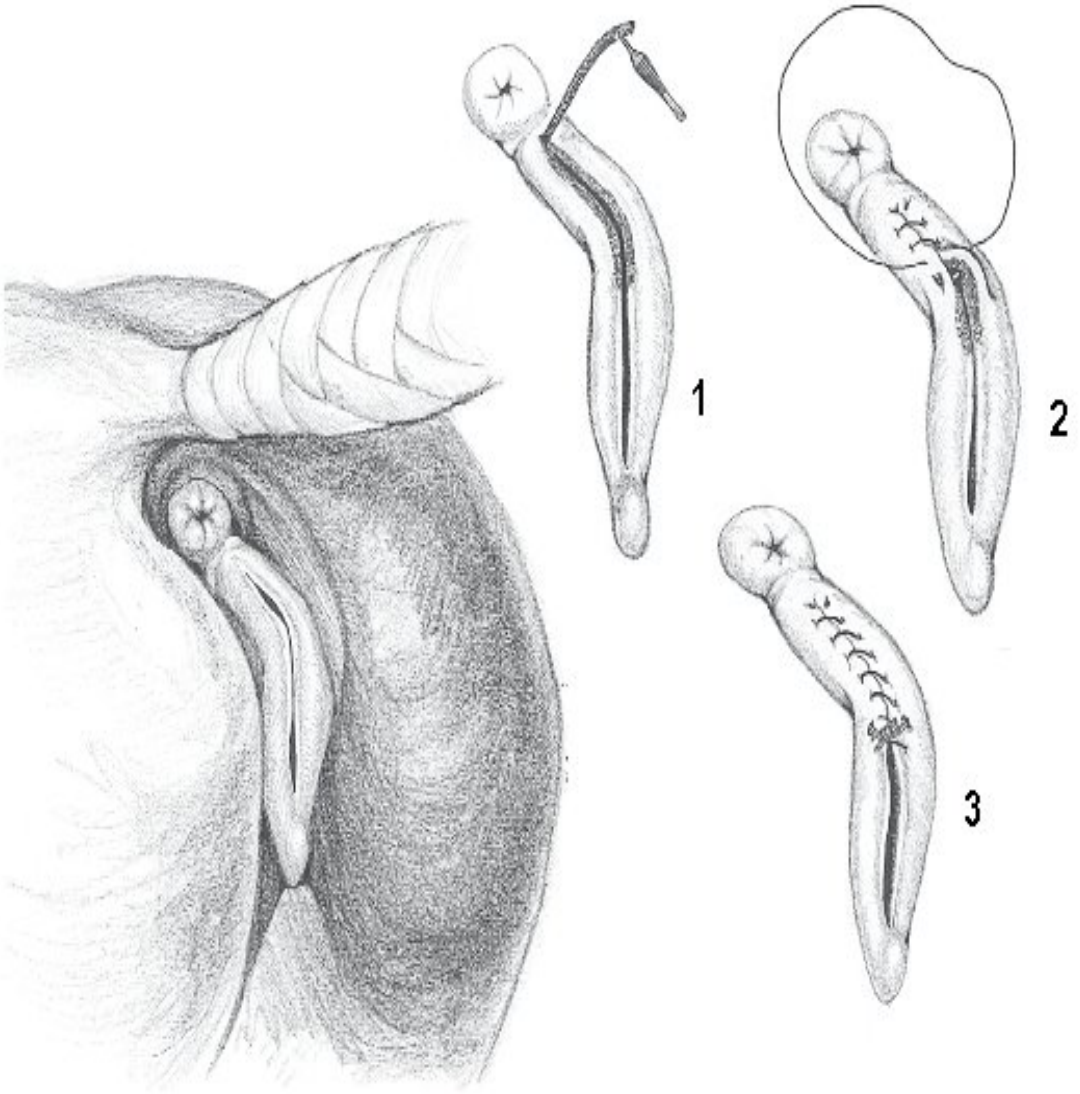
- **Anaesthesia and control:**
  - Application of ear twitch or proper tranquilization plus about 5 ml of local anaesthesia infiltration at each side on vulvar labial margin
  - Control in standing position

- **Site of operation: Musculo cutaneous junction of the vulva and labia.**
- **Surgical Technique:**

- **Proper cleaning of perineal region and manual removal of faeces from the rectum, the tail is bandaged and secured out of surgical field.**
- **A ribbon of mucosa about 3 mm wide is removed from vulvar labium using scissors.**
- **Thumb forceps is used to graft the ribbon of tissue to stretch the area by applying downward pressure, while removing the mucosa.**

- Depending upon the conformation of individual mare, upper 50 to as much as 70% of vulva length is sutured using a
  - Simple interrupted or
  - Simple continuous or
  - Vertical mattress or
  - Continuous interlocking suture pattern
- With
  - A non-absorbable non-capillary

Caslik's vulvoplasty



Post-operative Care:-

- **Systemic antibiotics are used for 3 or 4 days. Daily antibiotic irrigation may be administered post-operatively, if indicated.**
- **Antibiotic cream is applied at suture line. Sutures can be removed 7 to 10 days post-operatively or after complete healing.**
- **The vulvar labia should be surgically separated to prevent unnecessary damage at parturition. The operation for pneumovagina should be performed 1 or 2 days after foaling.**

- The labia may also have to be separated during manipulation of reproductive tract for examination or therapy.

- Once labia has been separated, the surgery should be redone as early as possible to prevent pneumovagina.

- When the operation is performed during the breeding season, removal of sutures may result in wound bread down at coitus.
- Sutures are thus often left in-situ until mare has been tested pregnant.

Repair of vaginal or uterine prolapse in cow

- **Indications: Vaginal and uterine prolapsed. .**

Site of Operation: ***Lateral to vulva at dorsal and ventral commissure.***

Control and Anaesthesia: The patient is controlled in standing position after sedation or tranquilization and/or posterior epidural blockade

Emergency ……?????

Vaginal Prolapse - cattle

Repair of vaginal or uterine prolapse in cow

- **Surgical technique:**
  - The prolapsed vagina and/or uterus are thoroughly cleaned with mild antiseptic and returned to the normal position.
  - In case of oedema of prolapsed organ
    - Apply non-irritant hygroscopic substance like sulpha urea powder, or sucrose to help in reducing the oedema before reducing prolapsed vagina and/or uterus.

Repair of vaginal or uterine prolapse in cow

Replacement in the Standing Cow.
It is best for the cow to stand during replacement of the prolapsed uterus. Epidural anesthesia is administered to abolish straining. The uterus is cleaned with soap and water. Inversion should be started at the end of the prolapsed mass.

Source: Risco CA (1984)

Repair of vaginal or uterine prolapse in cow

Treatment after Replacement of the Prolapse.
After the prolapsed uterus has been replaced, the uterus is infused with 8 to 10 liters of fluid to ensure complete redeployment of the tips of the uterine horns. Plain water may be used, after which 20 IU of oxytocin, calcium gluconate, and systemic antibiotics are administered.

Source: Risco CA (1984)

Repair of vaginal or uterine prolapse in cow

Replacement of a Prolapsed Uterus.
Use of a tray elevates the prolapsed uterus above the level of the pelvic floor for a gravity-assisted replacement.

Source: Hunnicutt BA (1995)

Repair of vaginal or uterine prolapse in cow

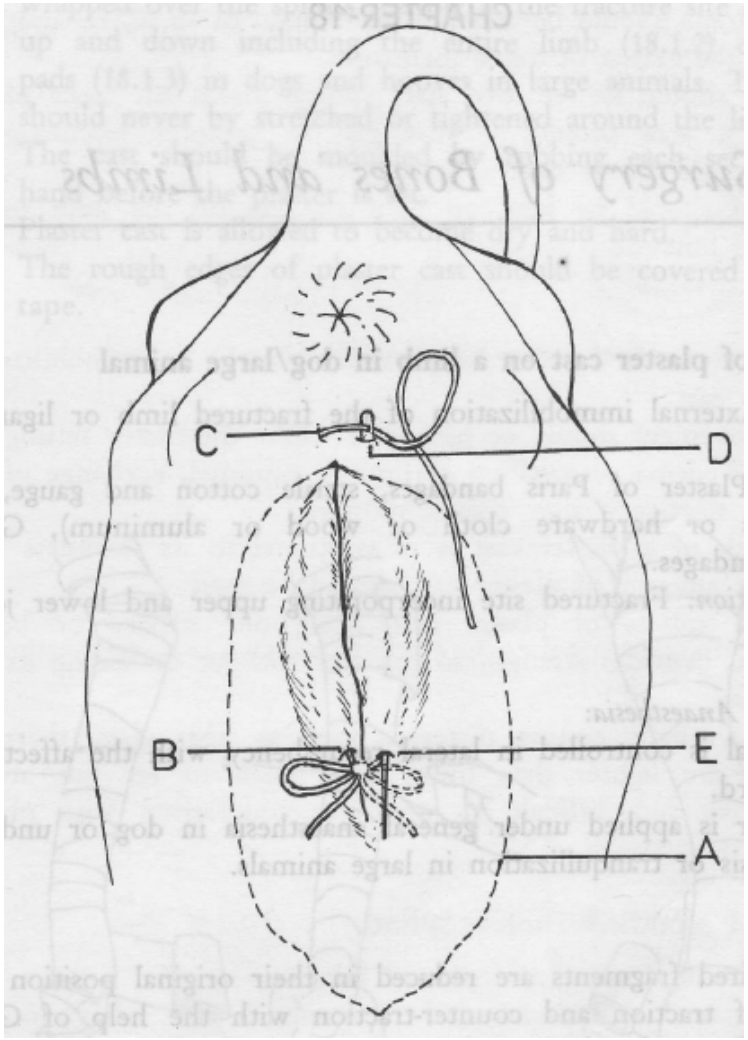
Prolapsed Uterus Replaced.
Once the prolapsed uterus has been replacement no retention sutures are needed. The cow is given oxytocin, calcium gluconate and antibiotics.

Source: Hunnicutt BA (1995)

Repair of prolapse in cow

- **Surgical technique:**
  - Prevent recurrence by Buhner's technique
    - A 14-15 cm long umbilical tape **needle** is threaded with 70 cm umbilical tape and
    - The needle is deeply inserted in a dorsal direction 6 cm lateral to the vulva and about 4 cm above the ventral commissure of the vulva
    - The needle is taken out 6 cm lateral to the dorsal commissure of the vulva.
    - The needle is similarly passed through the tissues on the opposite side of the vulva from dorsal to ventral side
    - Two ends of the umbilical tape are then tied at the ventral commissure of the vulva enough to prevent the prolapse

Repair of vaginal or uterine prolapse in cow



Buhner Technique

Caslicks vulpoplasty commissure

- **Postoperative care:**
  - To prevent recurrence
    - Treat vaginitis, cervicitis, traumatic wounds and other infection
    - Keep the animal on an inclined platform with hind quarters elevated in order to reduce recurrence.
  - The external area of vulva should be cleaned daily protected by daily Vaseline ointment.
  - Irritating cicatrized area of thickened mucosa should be excised
  - The suture is removed once straining has stopped and no chances for recurrence

THE END

!!!!!!!!!!!!!!!!!!!!!!!!!!

THANK YOU

Laparotomy

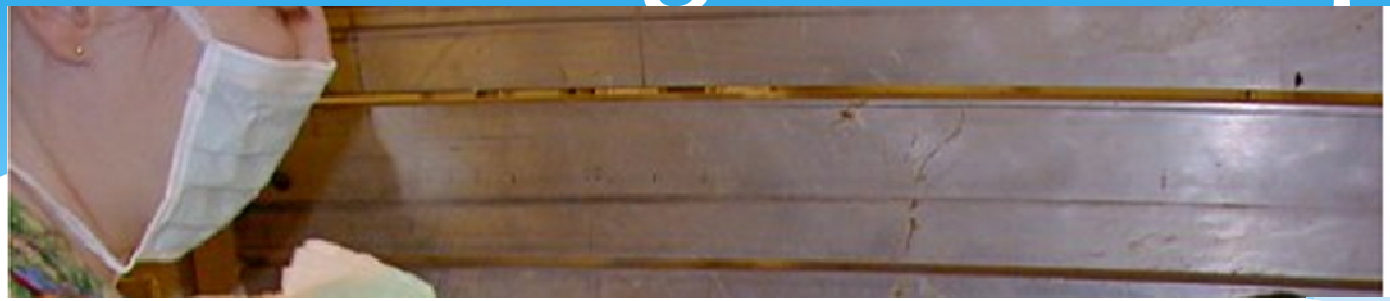
* Laparotomy means surgical opening of the abdominal cavity
* The incision is either made in the middle line of the abdomen, or through the flanks.
* The choice depend upon the procedure to be performed and, in some cases, on the preference of the surgeon.
* Laparotomy in cattle is most often carried out through a flank incision whereas through lenea alba in the case of dog.

* Flank laparotomy is carried out in the standing animal.
* Local analgesia is achieved by either infiltration, inverted L field block, or paravertebral nerve block.

Left flank Laparotomy

* **Indications**
* Specific indications are exploratory purposes,
* suspected left displaced abomasum (LDA),
* rumenotomy,
* traumatic reticulitis or
* caesarean section

Surgical Technique



Preparation of Surgical Site. The left paralumbar fossa is clipped, scrubbed, and disinfected. The approach used here is to scrub from

Local Anesthesia.
Local anesthesia is administered via an inverted L-block, or via a line block. Lidocaine 2% is injected subcutaneously as well as in the deeper layers. Epidural anesthesia to control, straining and movement of the tail is recommended.

Source: Prado TM (2007)

Internal Oblique Muscle Divided.
The fibers of the internal abdominal oblique muscle are bluntly dissected with the fingers, to minimize bleeding and to preserve their integrity and strength upon closure.
Source: Prado TM (2007)

Surgical Technique

* clip, scrub and surgically prepare a wide area of left flank including at least 30 cm around proposed incision site
* paravertebral analgesia (T13, L1 and L2) or
  local infiltration
* drape with sterile cloths
* make incision 15 -20 cm long
* Flank incision is made about 5 cm behind last rib, starting 10 cm below lumbar transverse processes

* Incise the skin in single movement and continue scalpel incision through subcutaneous fat and fascia to expose abdominal wall musculature
* The external and internal oblique muscle are transected in the same direction.
* The transversus muscle is then carefully incised vertically
* The transversalis fascia and peritoneum are elevated and lifted with thumb forceps and incised with a scalpel;

* care must be taken not to incise underlying viscera.
* Each incision in the separate layers of the abdominal wall is shorter than the preceding one.
* The incision is enlarged dorsally and ventrally with scissors
* Introduce the right hand arm to make systematic examination of the abdominal cavity
  * pass right hand ventrally to check for possible LDA, and also cranially for adhesions between reticulum and diaphragm or liver, or (rarely) between rumen and abdominal wall, suggestive of traumatic reticulitis

Closure of flank laparotomy incision

* Close the incision in three layers
* Appose peritoneum and transverse fascia with the transverses muscle with continuous suture
* Close external and internal oblique abdominal muscles separately or together simple interrupted sutures
* Commence suture at ventral commissure and tie off dorsally
* Avoid leaving any dead space
* Appose the skin

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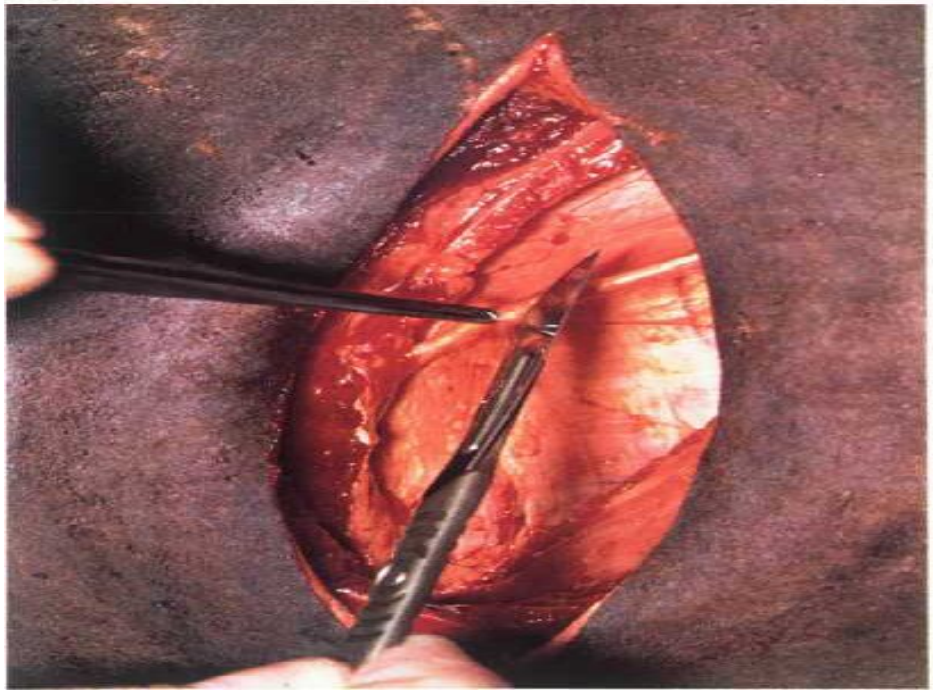

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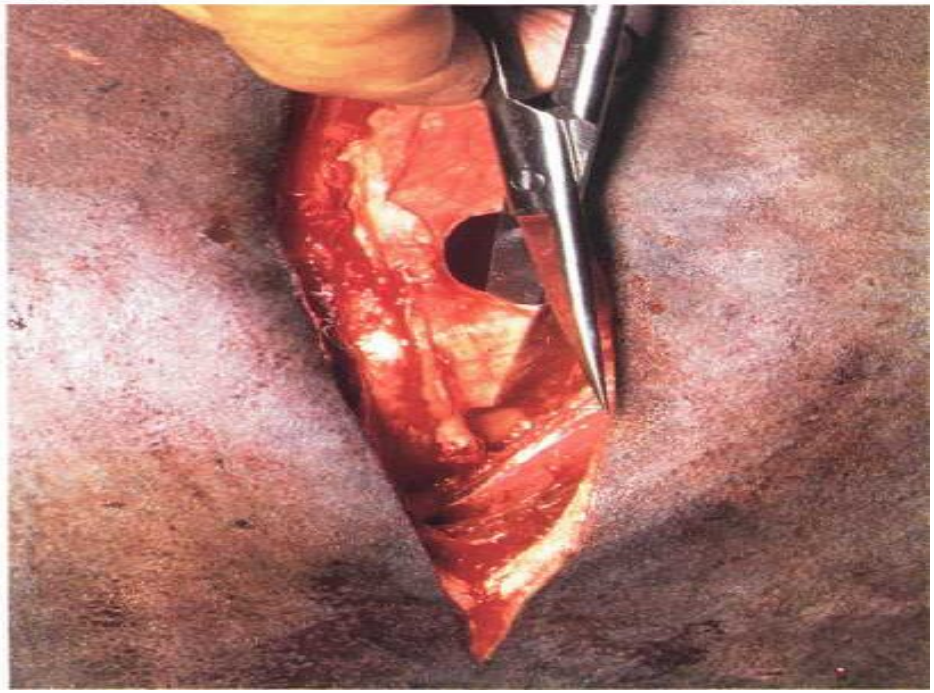


Post operative management

* Antibiotics for 3-5 days
* Suture may be removed at 2 to 3 weeks after surgery

Rumenostomy

Rumenostomy

Rumenostomy also called Rumen fistulization

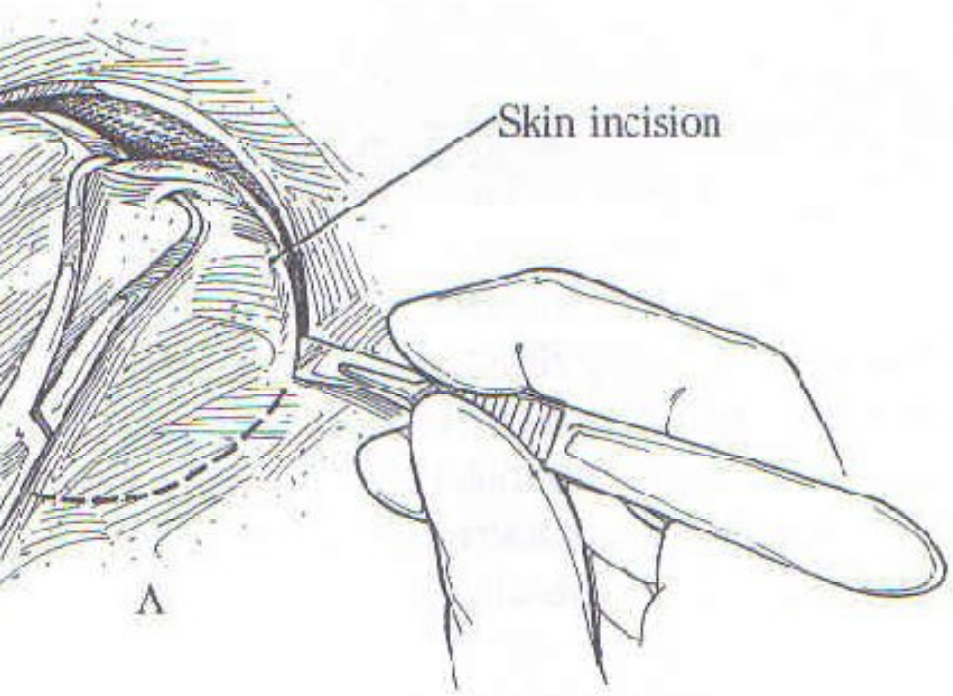
Indications

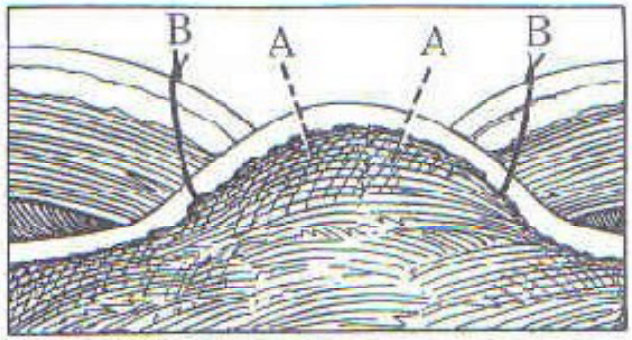
* Experimental purpose
* Relief of chronic bloat

* Standing position
* Paralumbar fossa
* Anesthesia and surgical preparation
* Remove a circular piece of skin (4 cm in diameter) around 5 cm caudal to the last rib and ventral to the transverse processes
* Blunt dissection of abdominal musculature and peritoneum that will act like a valve
* Grasp the rumen with rumen forceps and pull out of the incision

Cont'd

* Rumen anchored to the skin with 4 horizontal mattress
* Cut 2-3 cm in diameter on the exteriorized rumen and place four or eight simple interrupted sutures to overlap rumen and skin margin
* This ruminal incision usually heals in three to five weeks following fibrous tissue proliferation and stricture.
* A permanent fistula requires a ruminal incision at least 6 cm long

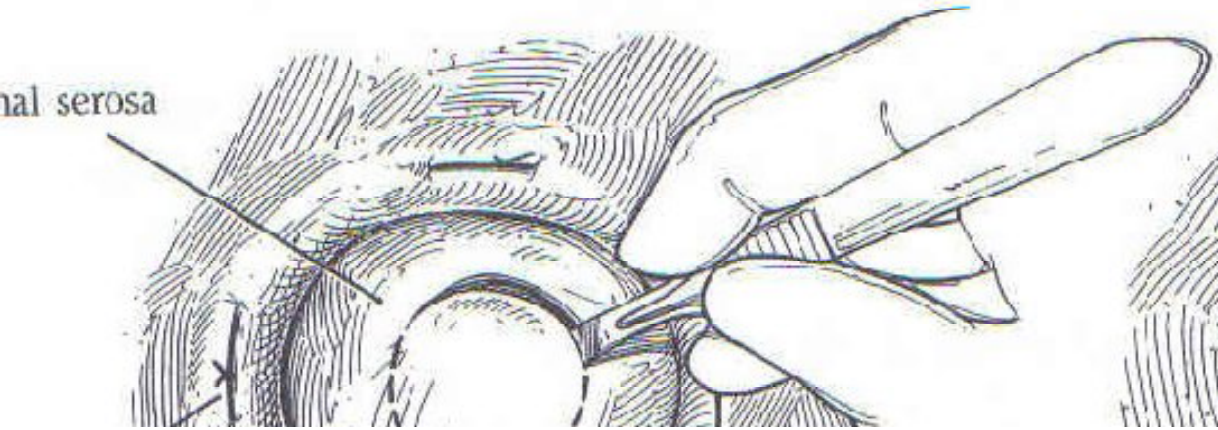


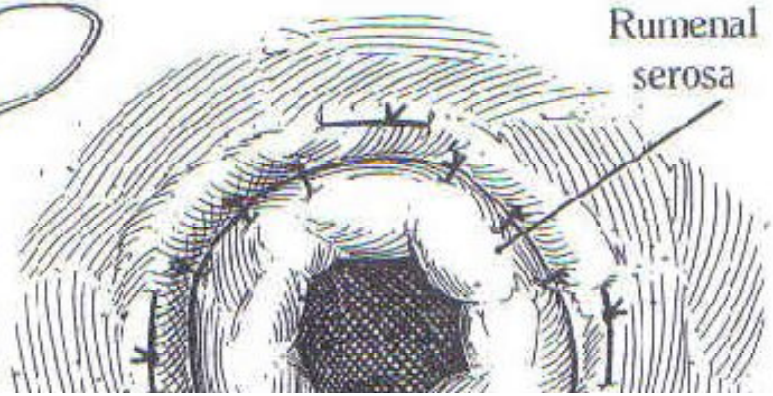


B

A — Excision sites in wall of rumen

B — Anchoring sutures



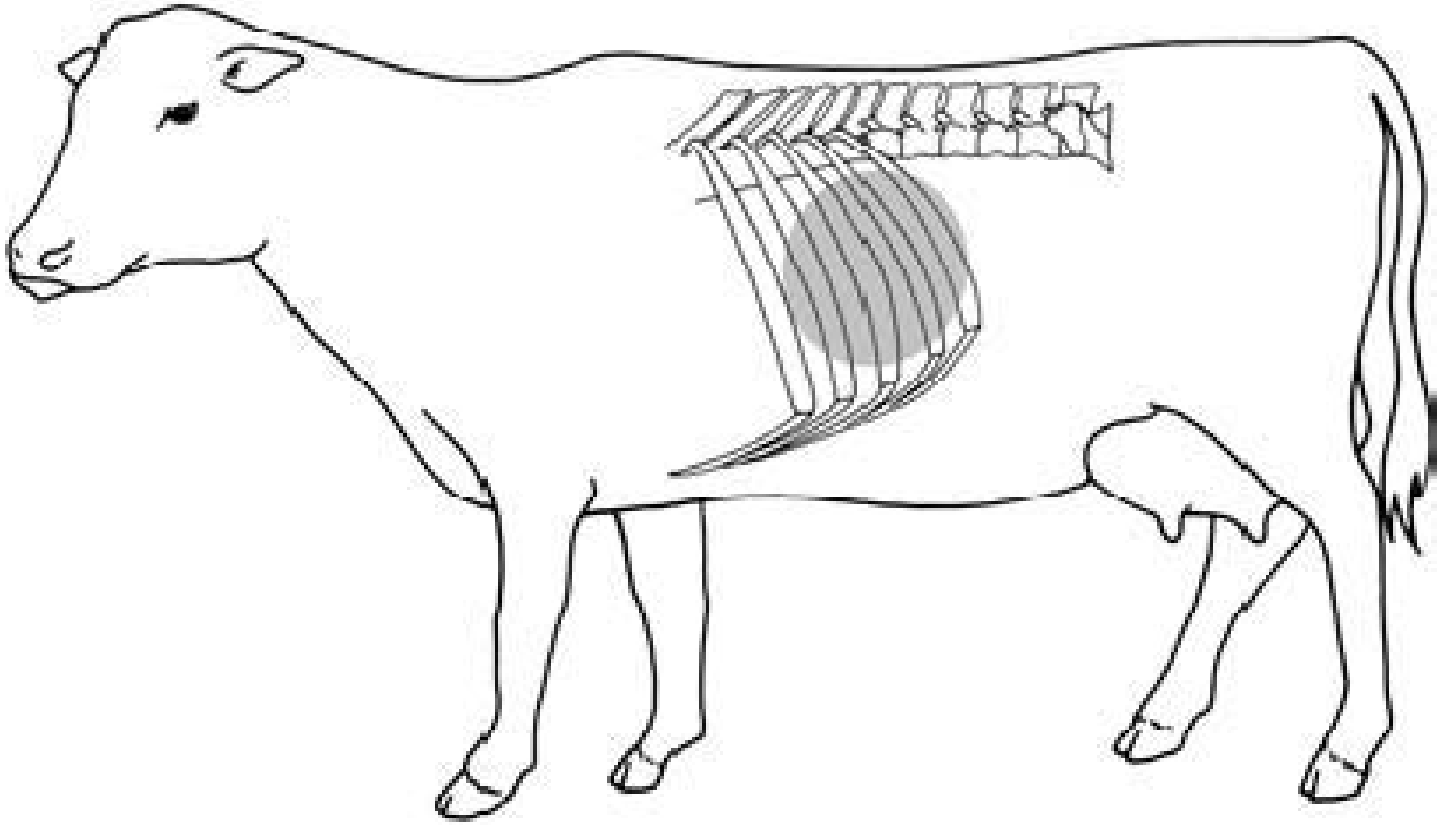


Postoperative management

* Antibiotics

Abomasal Displacements

* Left side displacement (LAD)-the most frequent
* Right side displacement (RAD)-rare



Left side abomasal displacement (LAD)

Etiology

* These involve abomasal fundus hypomotility and hypotonicity resulting in delayed emptying.
* Factors include:
  * Over-conditioning (fat) at parturition
  * Diet – high concentrate intake, often with high fat and/or protein, and relatively low percentage of fiber in diet

Cont'd

* Overeating or sudden change of feed, (e.g. absence of roughage), other stress factors (e.g. dystocia)
* Inherited factors in some strains
* Rearrangement of viscera associated with parturition
* Concurrent diseases (e.g. fatty liver and ketosis, metritis, mastitis, hypocalcaemia) are often associated with abomasal displacement

Signs

* Usually vague
* Dairy cattle usually within six weeks of parturition
* Relatively sudden drop in milk yield and selective anorexia, refusing most concentrates
* Reduced or absent ruminal movements and reduced rumination
* Animal fairly bright and without abdominal pain except in rare case

Cont'd

* Mild constipation initially
* Afebrile (except with secondary peritonitis or concurrent disease)
* Possible recent history of dystocia, milk fever, metritis or mastitis
* Progressive and accelerating loss of condition

Diagnosis

* History and physical examination
* Auscultation of left flank pathognomonic: high-pitched metallic tinkling sounds from left flank over middle area bounded by ribs 10–13.

Treatment

Conservative

* Cast cow on right side (Reuff's method, one person restraining head, two on ropes)
* Turnover on to left side and while turning ballots ventral abdominal wall firmly in an attempt to move abomasum into midline position, using knee to push anti-clockwise
* Alternatively cast cow on back in dorsal recumbence and move from 45° right lateral to 45° left lateral position, 'shaking' abomasum back into normal position

Cont'd

* Finally, in either rolling method, turn cow into left lateral recumbence and maintain in this position for five to ten minutes to permit organ to evacuate excessive gas
* Inject calcium and dextrose
* Re-introduce concentrates slowly over one week period
* Encourage maximal exercise in this period
* The prognosis following this treatment is variable

Surgical

* Returning the abomasum to its correct position and fixation to control recurrence
* Right paralumbar fossa omentopexy
* Left paralumbar fossa abomasopexy
* Right paramedian abomasopexy
* Percutaneous abomasopexy

Rumenotomy

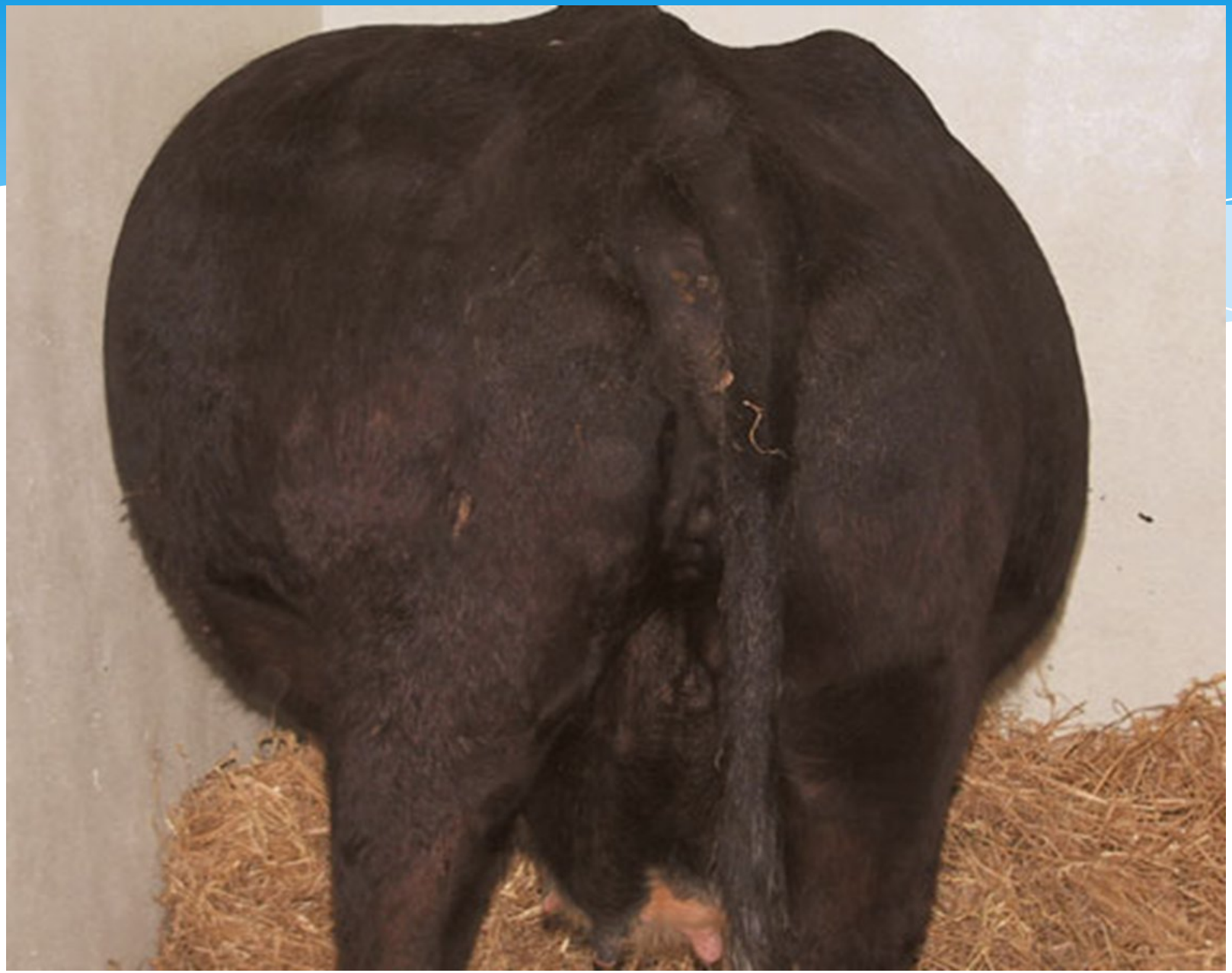
Discussion

* Indications
* Surgical site selection and preparation
* Anesthesia
* Opening
* **Palpable features**
* Closing
* Post operative care

Rumenotomy

Indications

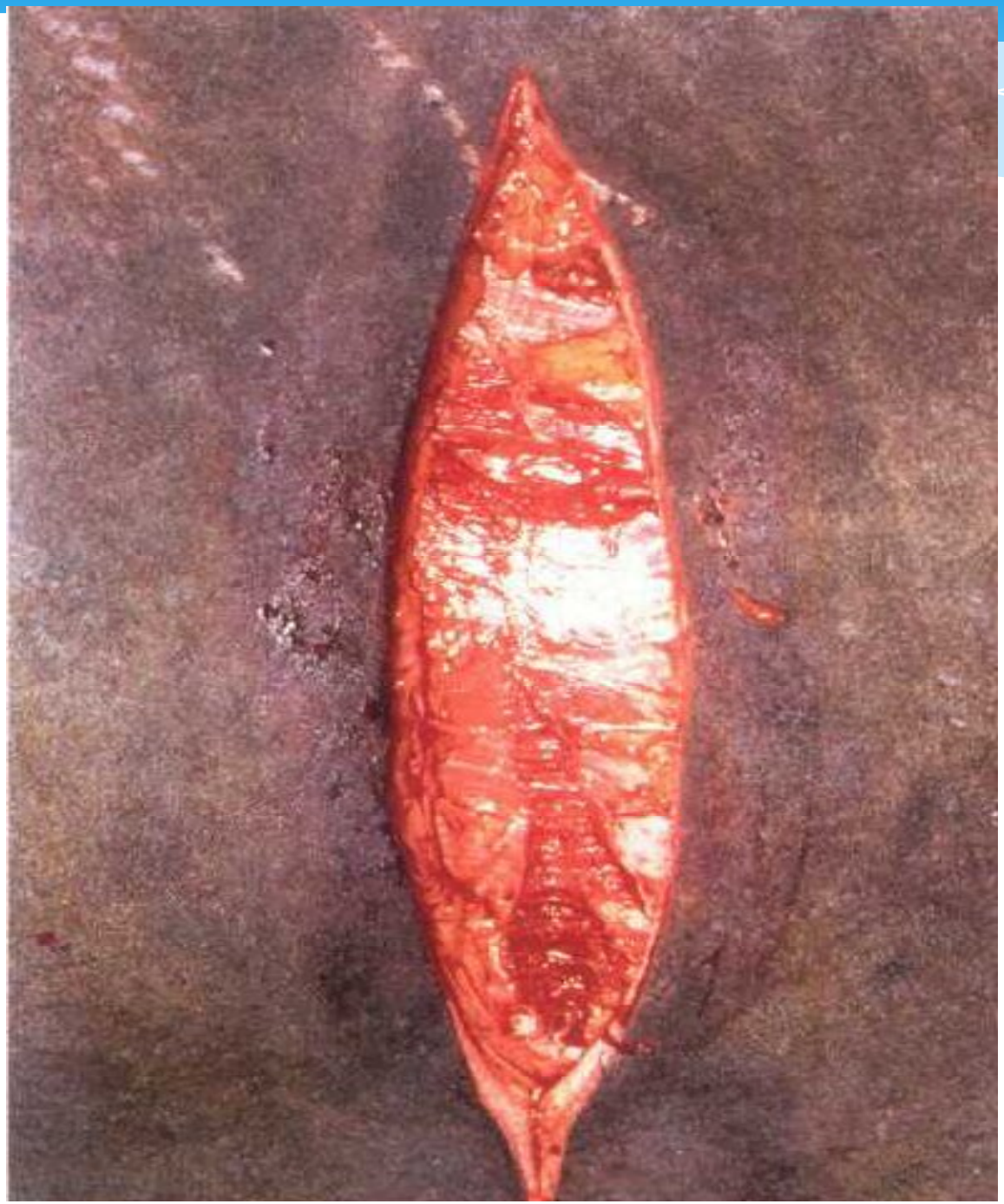
* Removal of foreign body (metallic, plastic, rope…).
* Gross severe rumen overload (‘grain overload’)
* Exploratory surgery, e.g. in chronic intermittent rumen tympany

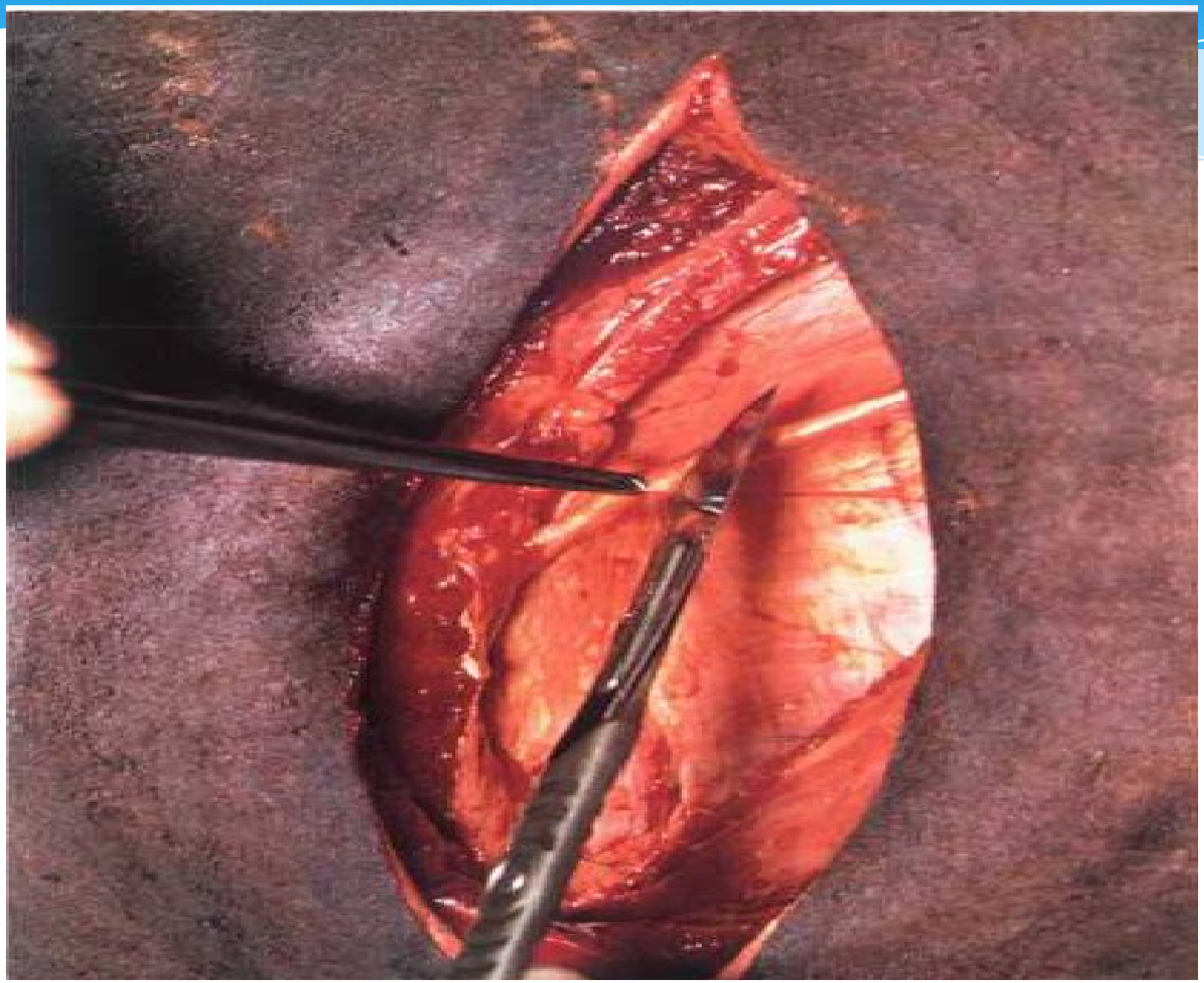


Surgical Technique

* Standing position
* Fasting for 12 hours
* Shave, scrub and surgical preparation
* Anesthesia (line block, inverted L block, paravertebral block)

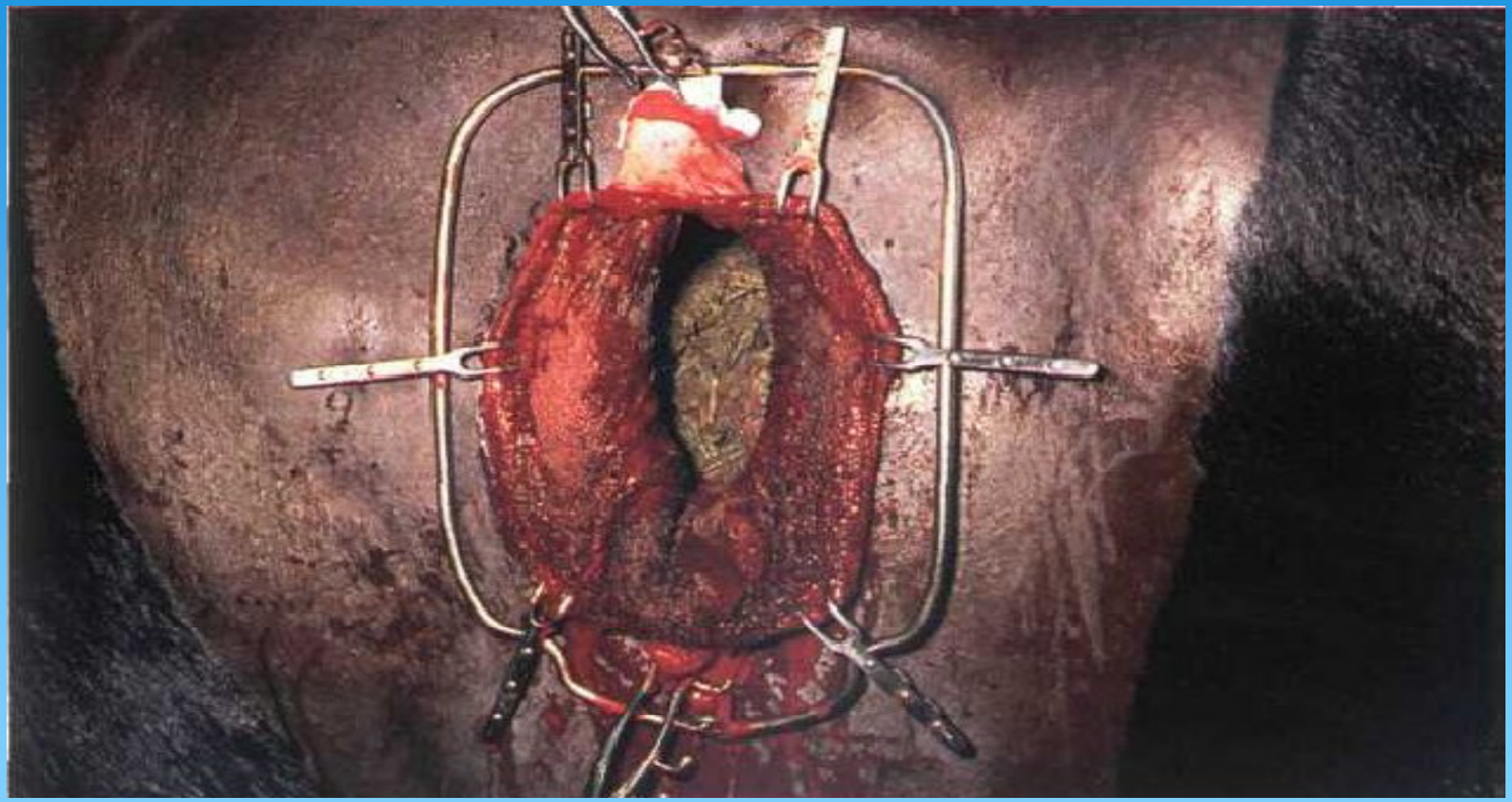
* Drape
* Laparotomy is performed in the upper left flank
* Make incision 15- 20 cm long about 5 cm behind last rib, starting 8-10 cm below lumbar transverse processes
* The abdomen is explored for the presence and extent of peritonitis and other possible disorders





Cont'd

* To prevent peritoneal contamination by ruminal contents use,
    - Rubber rumenotomy shroud
    - Weingart frame (Rumen fixation ring)
    - Stay Suture of ruminal wall to skin (a continuous inverting suture)
* Incise the Rumen
* Evacuate the content
* Explore the rumen and reticulum (abscesses, adhesion…)
* identify and examine the cardia, oesophageal groove, and the reticuloomasal opening
* Remove the foreign bodies



Stay Suture method

* suture ruminal wall to the skin by simple continuous Cushing-type pattern
* After suturing, check the site for a good seal between rumen and skin
* Incise rumen starting and ending 3cm far away to the skin commissure
* Dorsal and ventral parts of exteriorized rumen may be temporarily fixed to skin by towel clips (13 cm) for suturing purposes

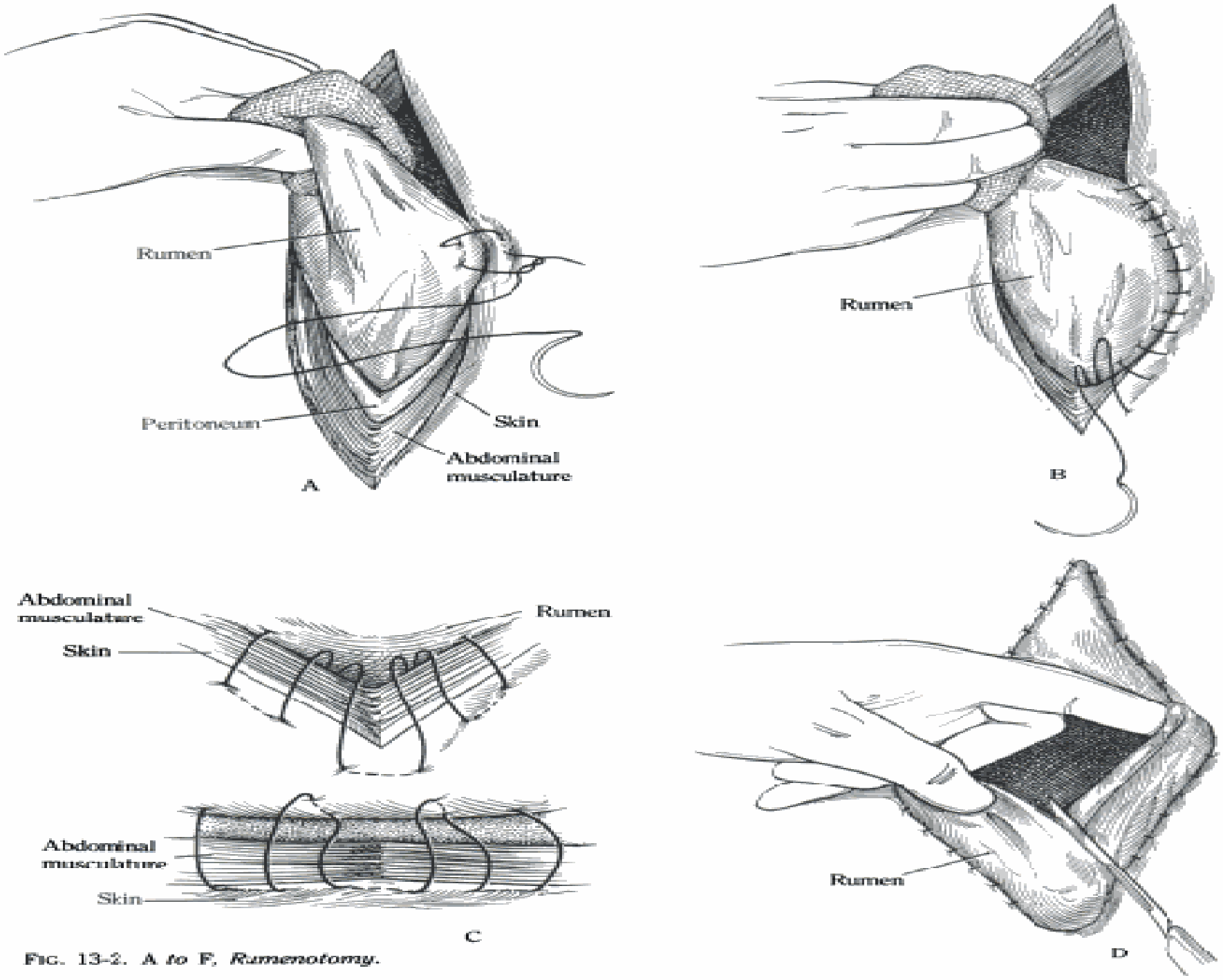
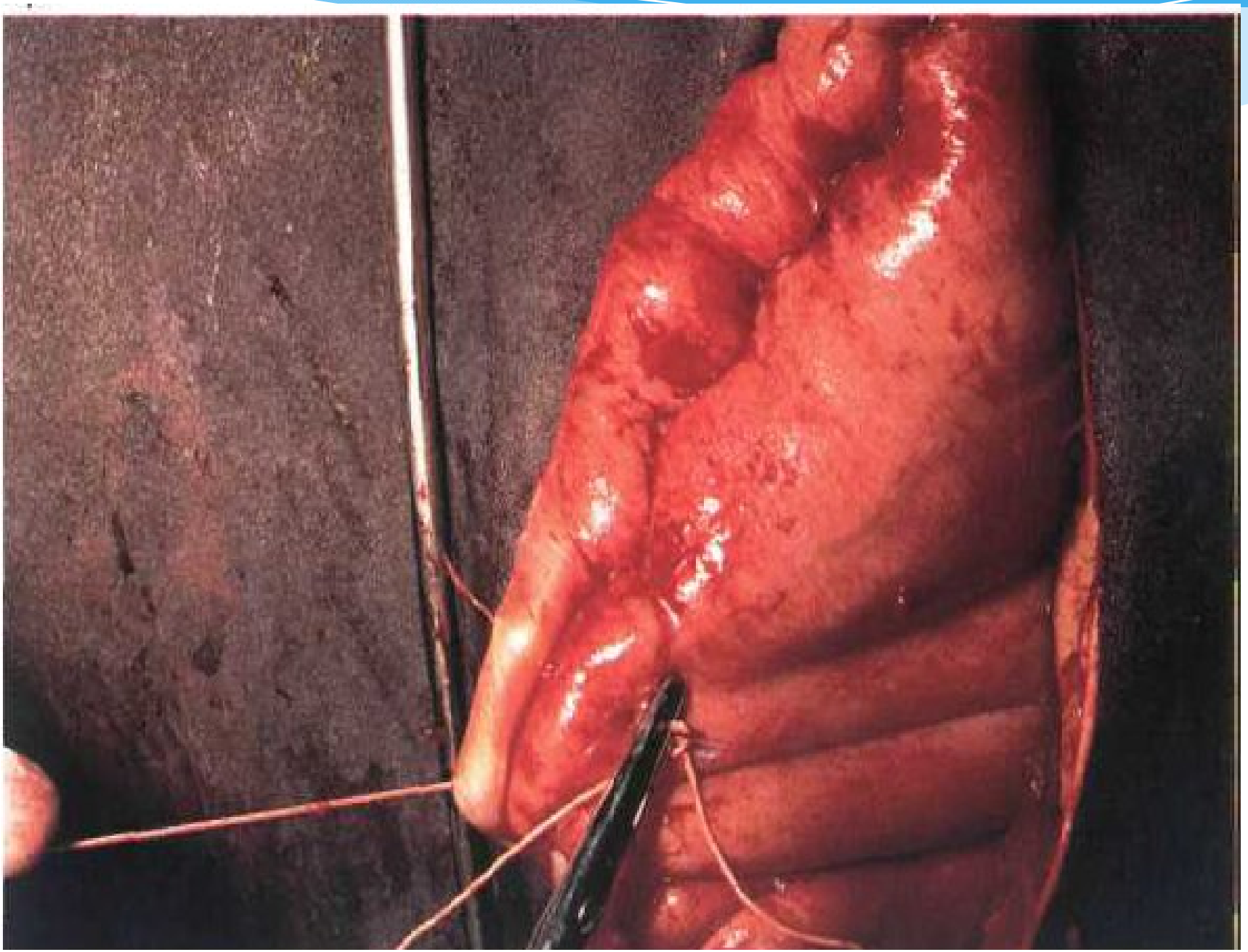


FIG. 13-2. *A to F, Rumenotomy.*

Wound closure

* Ingesta is removed from the edges of the rumen wound by flushing
* The rumen is closed with a continuous seromuscular suture (Lembert or cushing)
* The first suture line is oversewn with additional a continuous seromuscular suture
* Either absorbable or non-absorbable material may be used
* The rumen fold is replaced in the abdomen
* The laparotomy wound is closed in three layers as indicated



Postoperative management

* Administration of antibiotics is indicated (3-10 days)
* Dietary measures are taken routinely
* Skin suture removal after 14- 21 days

Surgery of male reproductive organs

- ✓ Castration
- ✓ Penil amputation

Castration

Indications

- To render the males docile
- Desirable male types can be encouraged and retained, and undesirable types eliminated
- meat-quality was the main reason advanced for doing the operation
- Castration of goats is in general indicated to reduce the odour originating from the horn glands.
- The most common reasons for canine castration are prevention of hormonally induced behavior, unwanted breedings, and testicular tumors, benign prostatic hyperplasia, traumatized testicles

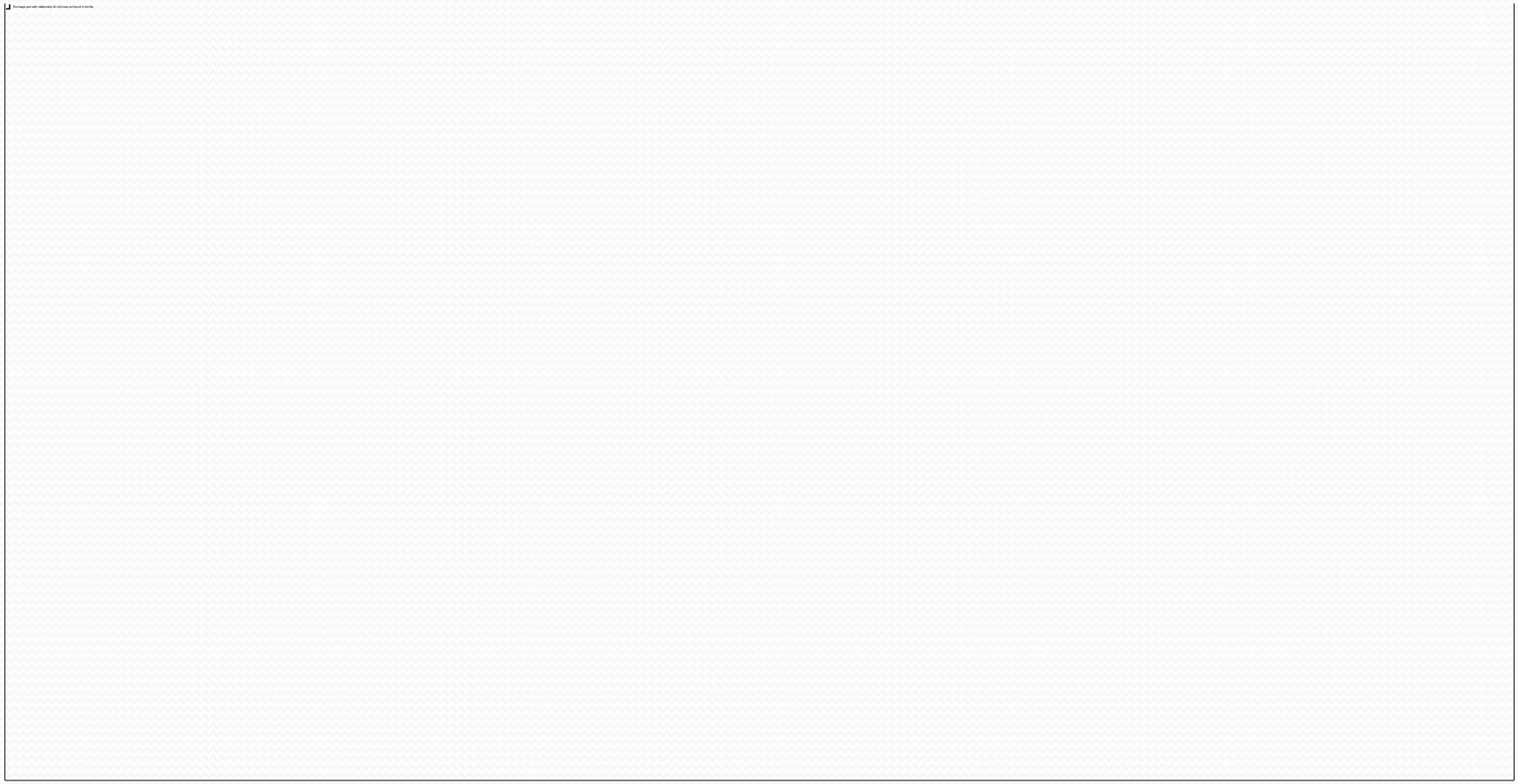
disadvantages of castration

- In all species, the entire male grows more quickly

Types of castration

Two forms of castration are available:

- Closed or Bloodless
- Open or semi open



Semi-Open method

- Aseptic preparation of the surgical site
- The scrotal skin and both spermatic cords are locally infiltrated with suitable analgesic solution.
- The tip of the scrotum is tightly stretched distally and is amputated
- The spermatic cord, covered by vaginal tunic, ligated with a ligature of absorbable suture material

Semi-Open method….

- The spermatic cord is then crushed by an emasculator 1 cm distal to the ligature and
- the stump checked for bleeding.
- The opposite testicle is removed in a similar manner.
- Tetanus prophylaxis must be provided.

Semi-Open method

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Open method

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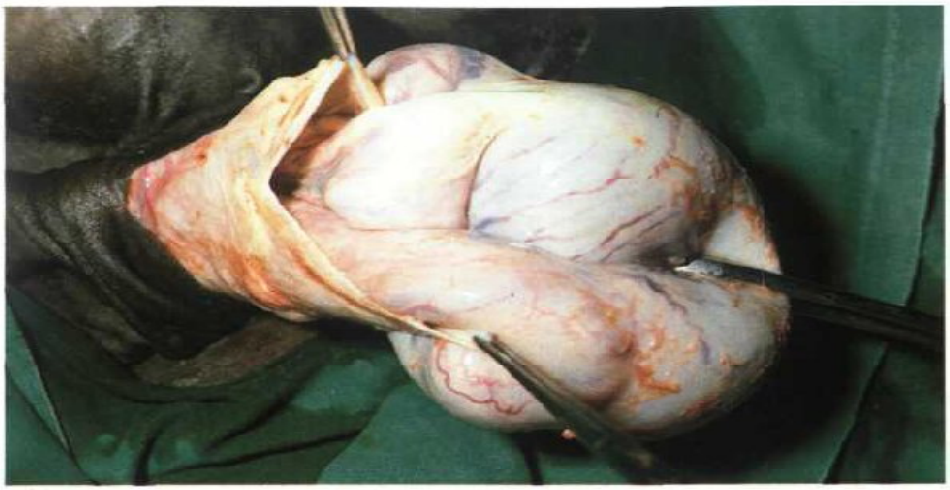

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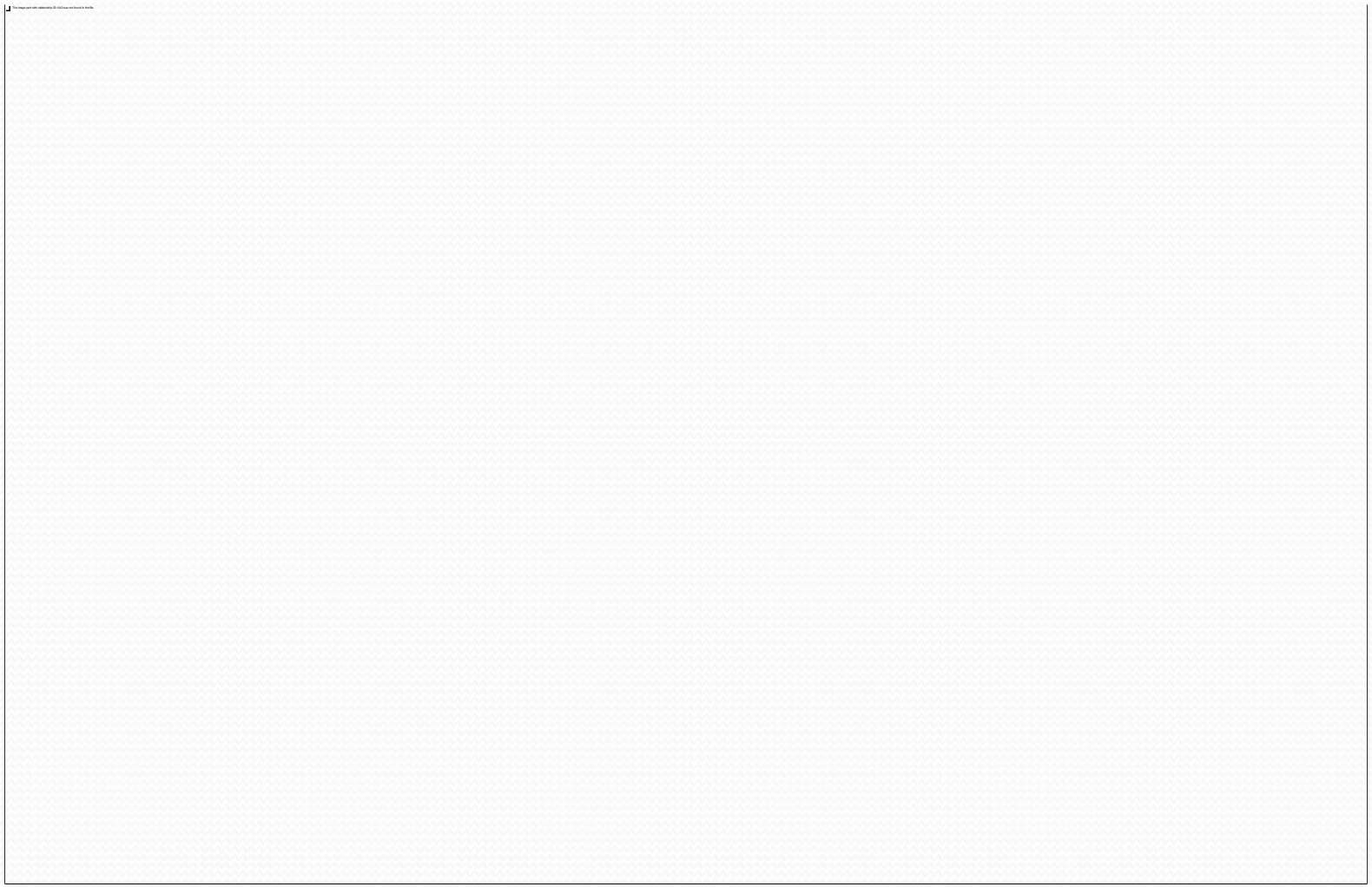
Penile Amputation (Urethrotomy)



Urethrotomy

- Involves creation of a permanent perineal urethrostomy from the proximal part of the transected penis.
- The distal penis is resected.
- It is a salvage operation.
- Amputation of the penis is indicated following urethral obstruction or rupture

Technique

- Caudal epidural analgesia
- Routine skin preparation from anus to scrotal neck and about 10 cm to each side of midline
- The skin incision should be located such that urine flow will be directed at an angle between the hooks and the tail
- The scrotum is grasped and is stretched cranial, and the distal flexure is located
- A 10- 15 cm skin incision is made on the midline directly on the penis

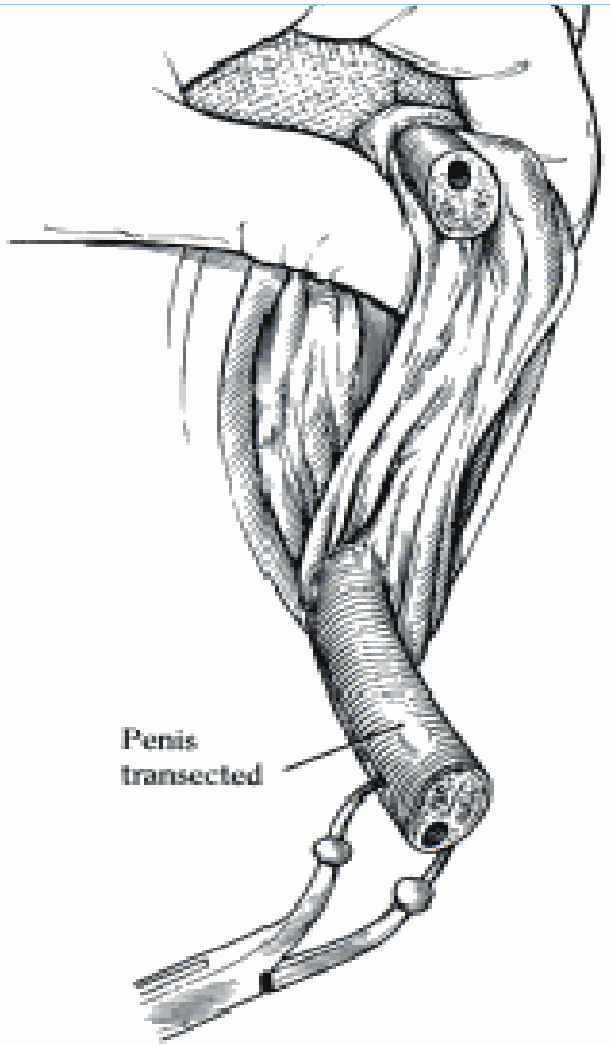
- Blunt dissection is performed to locate the penis which is firm fibrous structure
- identify the fine pink retractor penis muscles, and clamp proximally with artery forceps before sectioning distally
- Continue the dissection deep between the retractor penis muscles to locate the penis.
- Grasp the penis firmly and apply traction caudally and dorsally to bluntly dissect the penis from the surrounding tissue.
- If there is advanced necrosis of the elastic tissue the penis will separate from the prepuce and the entire penis can be pulled caudally through the incision

- Once the penis is exteriorized, ligate and transect the retractor penis muscles as far proximally as possible
- ligate the dorsal vessels of the penis proximal to the point of amputation
- Carefully, bluntly dissect the dorsal vessels from the penis and place hemostatic forceps between the dorsal vessels and the tunica albuginea of the penis.
- Dissect the penis starting from the dorsal arteries and veins to leave an 8 -12-cm proximal stump

- incise urethra proximally from cut end for 3 cm to produce a flared spatulate end to hinder stenosis
- the edges are sutured to the lateral aspects of the penis
- Suture the penile stump to the skin using non absorbable mono filament suture material.
- place initial sutures dorsally and ventrally, then suture laterally

- Place the suture through the skin and body of the penis and exit the skin on the opposite side of the incision
- suture penis into skin edges so that stump protrudes about 5 cm at angle of 30° to horizontal
- appose remaining subcutaneous tissues and skin by monofilament nylon sutures

- This suture will prevent the penile stump from retracting into the incision.
- Insert a 15-cm length of 1-cm diameter latex tubing into the urethra, and fix it in place with single suture through the tubing and penile stump.
- This tubing serves as a start to compress the corpus spongiosum penis and reduce hemorrhage in the early postoperative period.



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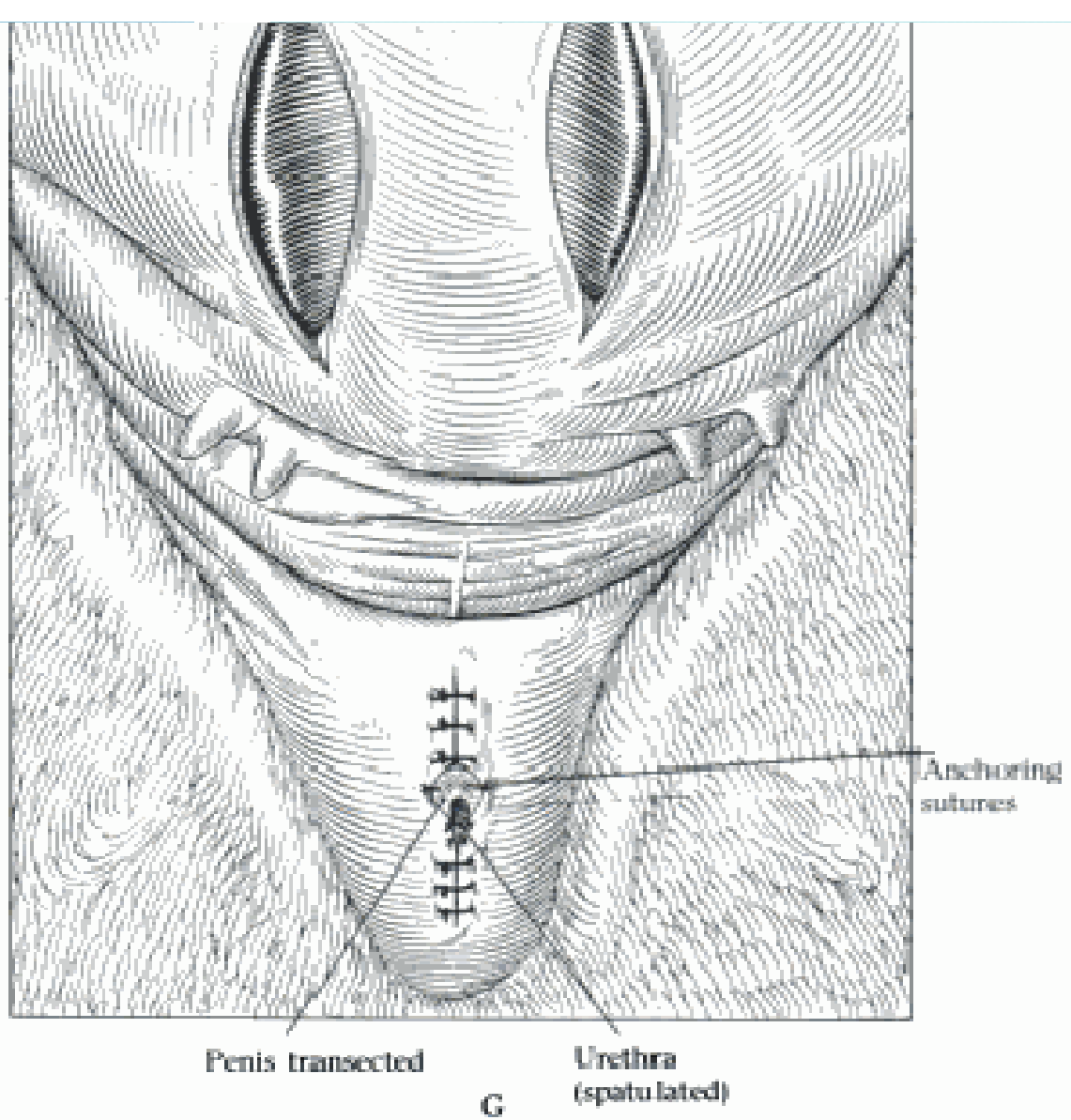

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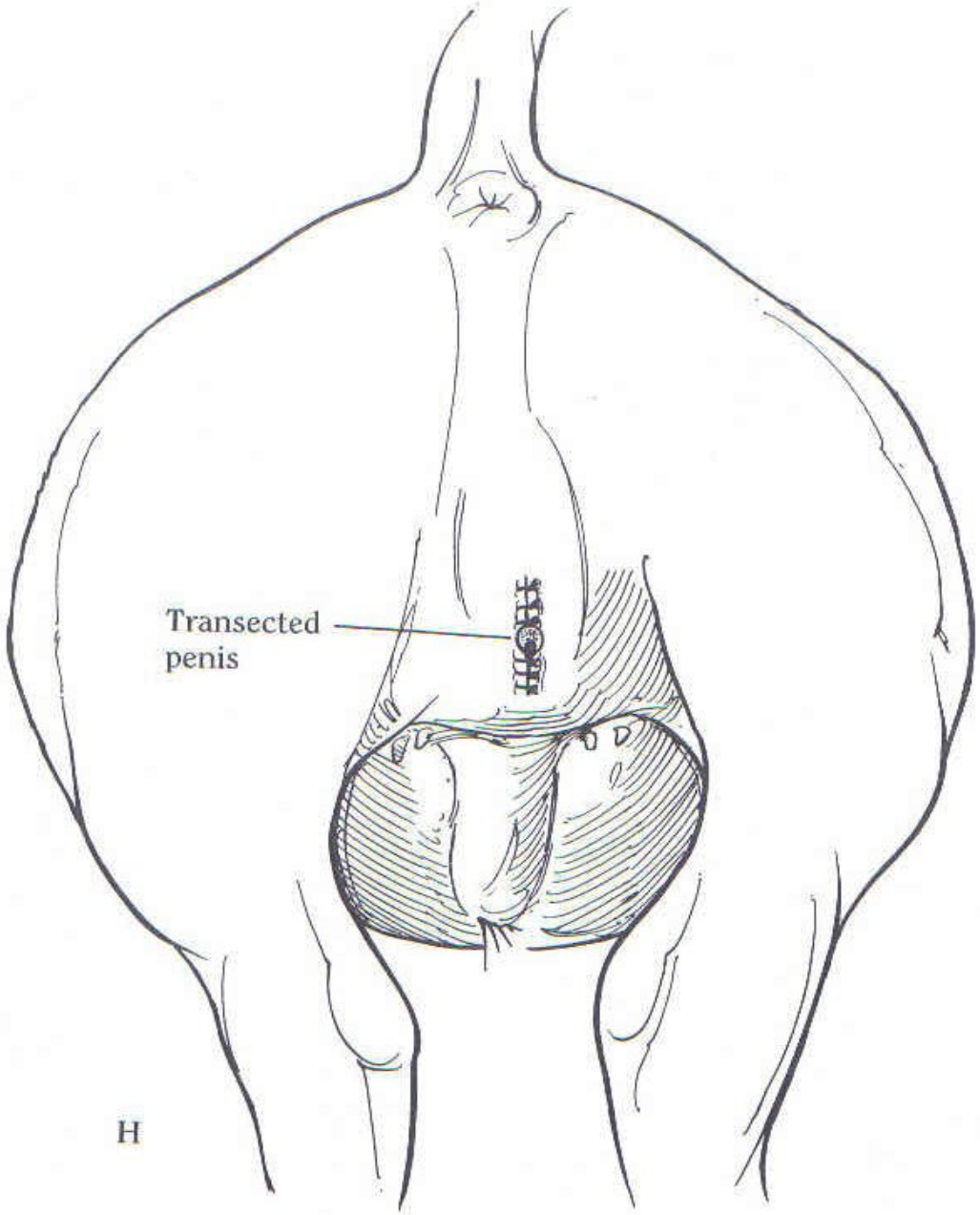
FIG. 14-2. *(continued)*



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Post operative care

- Remove the tube in 5 day after operation
- Give supportive care as indicated to treat toxemia and ensure that the animal remain hydrated.
- Administer systemic antibiotics for 5 days post operatively
- observe for hemorrhage from the penile stump and for the ability of the animal to urinate.
- The sutures may be removed in 10 days.

Post operative …..

- To facilitate drainage of accumulated urine make several bold, longitudinal incision lateral to prepuce
- One potential complication with this procedure is stenosis of the urethral opening in the penile stump.
- Observe the animal regularly following this procedure to ensure that the urethra remains open (patent)

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THANKS