Local anesthesia 2

Common methods of producing local anesthesia

- • Surface (topical) anesthesia
- • Intrasynovial anesthesia
- • Infiltration anesthesia
- • Spinal anesthesia
- • Intravenous regional local anesthesia
- • Regional anesthesia

Surface (topical) anesthesia

- •   This refers to the use of local anesthetics in solution sprays as well as in various creams and ointments, on mucous membranes; drops into the eye; sprays or brush in laryngeal area, infuse into the nostrils, urethra, or rectum.
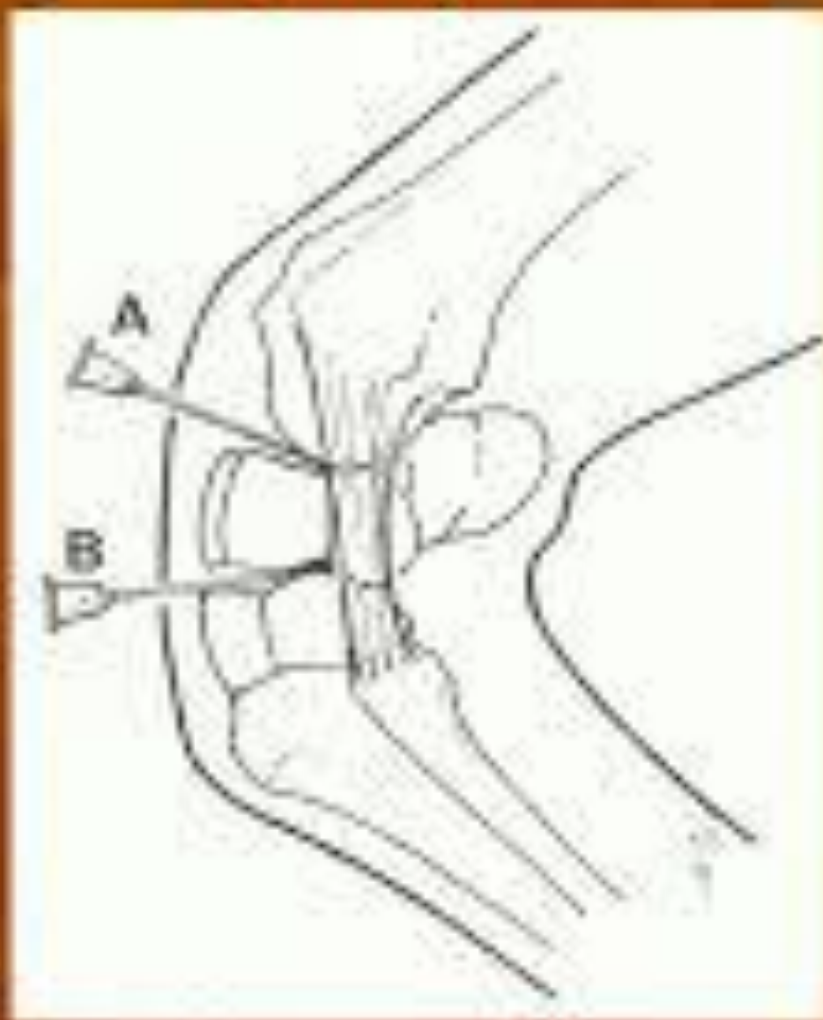
Intrasynovial anesthesia

- • In joints, bursa, and tendon sheaths.

- • Useful for both diagnosis of lameness, and for general pain relief.

- • The local anesthetic chosen must cause minimal irritation, and great care in sterility is necessary as infection in these sites occurs easily.

Intra articular injection of radiocarpal & intercarpal joints

Infiltration anesthesia

- • By this method the nerve endings are affected at the actual site of operation.

- • Most minor surgery can be done this way, excluding surgery on teats in cattle or small animal digits.

- • Problems occur through infection (never inject local analgesic through infected tissues), irritation, distortion of the wound, swelling and some delay in post-operative healing.

- • A variation of infiltration anesthesia designed to minimize these effects is **field anesthesia**. Here, walls of anesthesia are made by infiltrating the tissues around (rather than at) the surgical site.

- • Advantages include absence of distortion of the anatomical features in the line of incision; muscle relaxation and no interference to healing. An example of a field anesthesia technique which is widely used in cattle is the "Inverted L or 7 block" for anesthesia of the abdominal fossa.

- • Ring blocks whereby the tissue all around a distal organ is infiltrated with local anesthetic, is another form of field anesthesia : examples of where this is used is on the teats of cattle (**Do not use epinephrine here**, as vasoconstriction could lead to ischemic necrosis and sloughing of tissue) or around the limb of cattle.

L Block

- Used for standing **flank laparotomies**
- **Most common**
- Procedure
  - Complete surgical prep.
  - Place anesthetic in an **inverted L configuration** using a 18 × 1 1/2- to 3-in needle.
  - Anesthetic is placed: SQ, muscular layers
  - Amounts of anesthetic: 60 – 100 ml of 2% lidocaine for adult cattle
  - **Allow 10 to 15 minutes to take effect.**

Incision

Area of infiltration
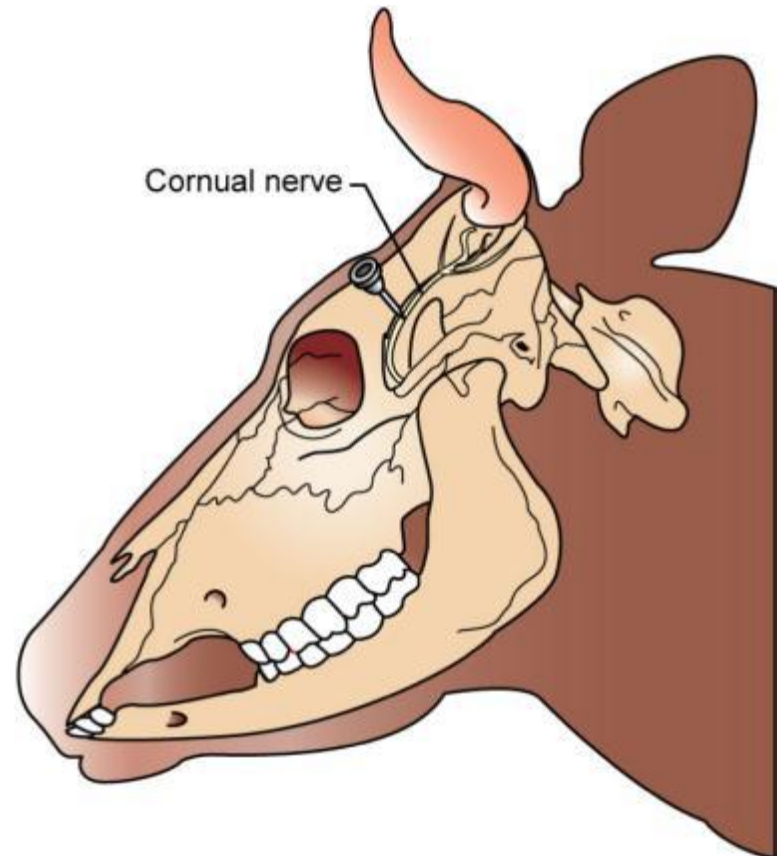
Infiltration of local anesthetic
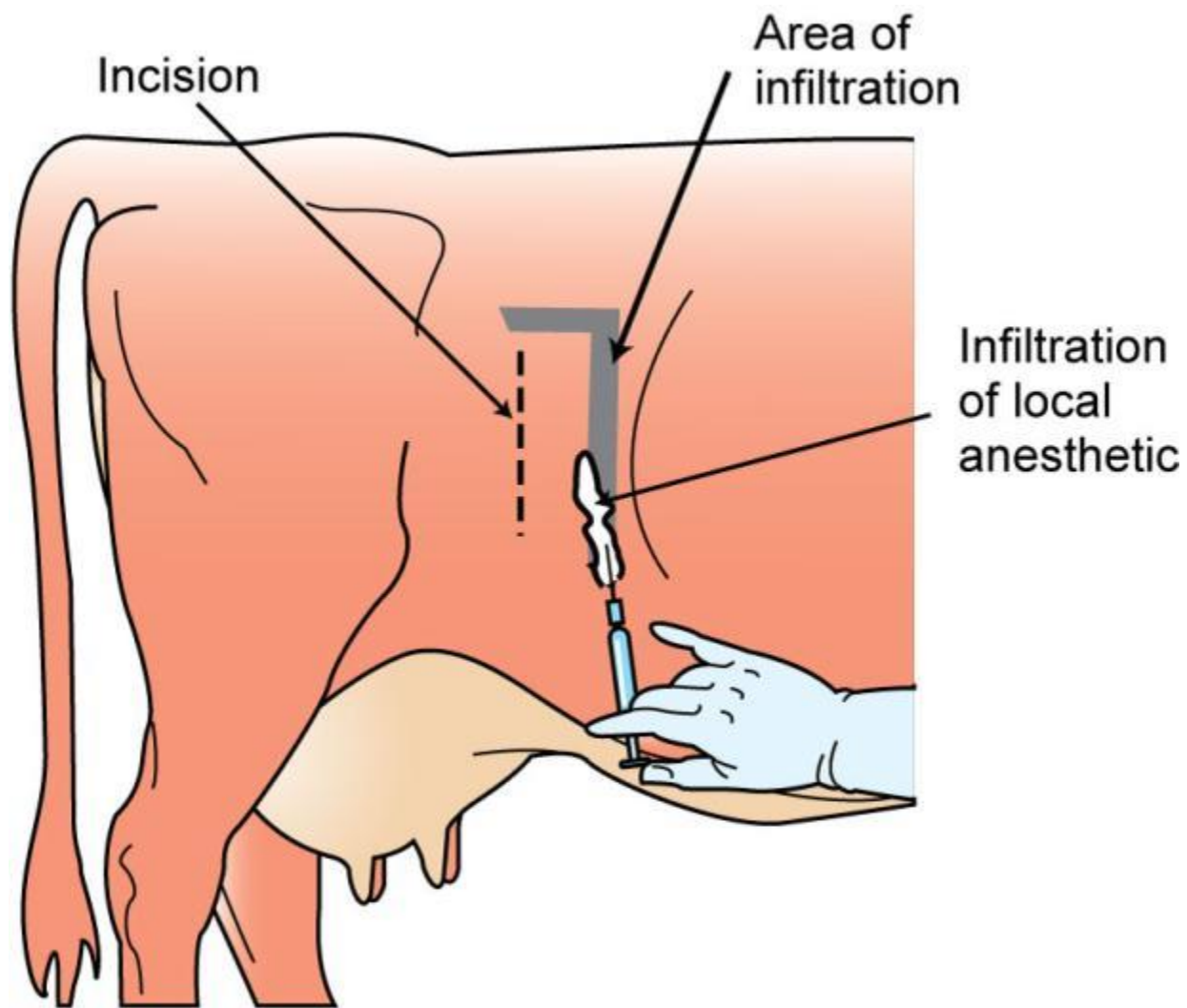
Cornual Nerve Block (cont'd)

- Single nerve
- **Amount and depth**
  - Calves: 3 to 5 ml, 1 cm
  - Adults: 5 to 10 ml, 2.5 cm (large adults)
- A 18- to 20-gauge × 1 to 1 1/2-in needle
- Well developed horns in adults: 2nd injection on base of horn and caudal aspect under the skin

Cornual Nerve Block

Cornual nerve: blocked halfway between the lateral horn base and the lateral canthus of the eye, horn is continuous with frontal sinus

- Use
  - Desensitization of the
  horn and horn base
- Preparation
  - Surgical preparation
- Procedure
  - Cattle
  - Goats

Cornual nerve

Modified from Muir WW III, Hubbell JAE, Skarda R, et al: Handbook of veterinary anesthesia, 3rd ed. St. Louis, Mosby, 2000.

Spinal anesthesia

- • Spinal anesthesia is the injection of local anesthetic around the spinal cord.

- • Spinal anesthesia is divided into two types; 'epidural' and 'true spinal'.
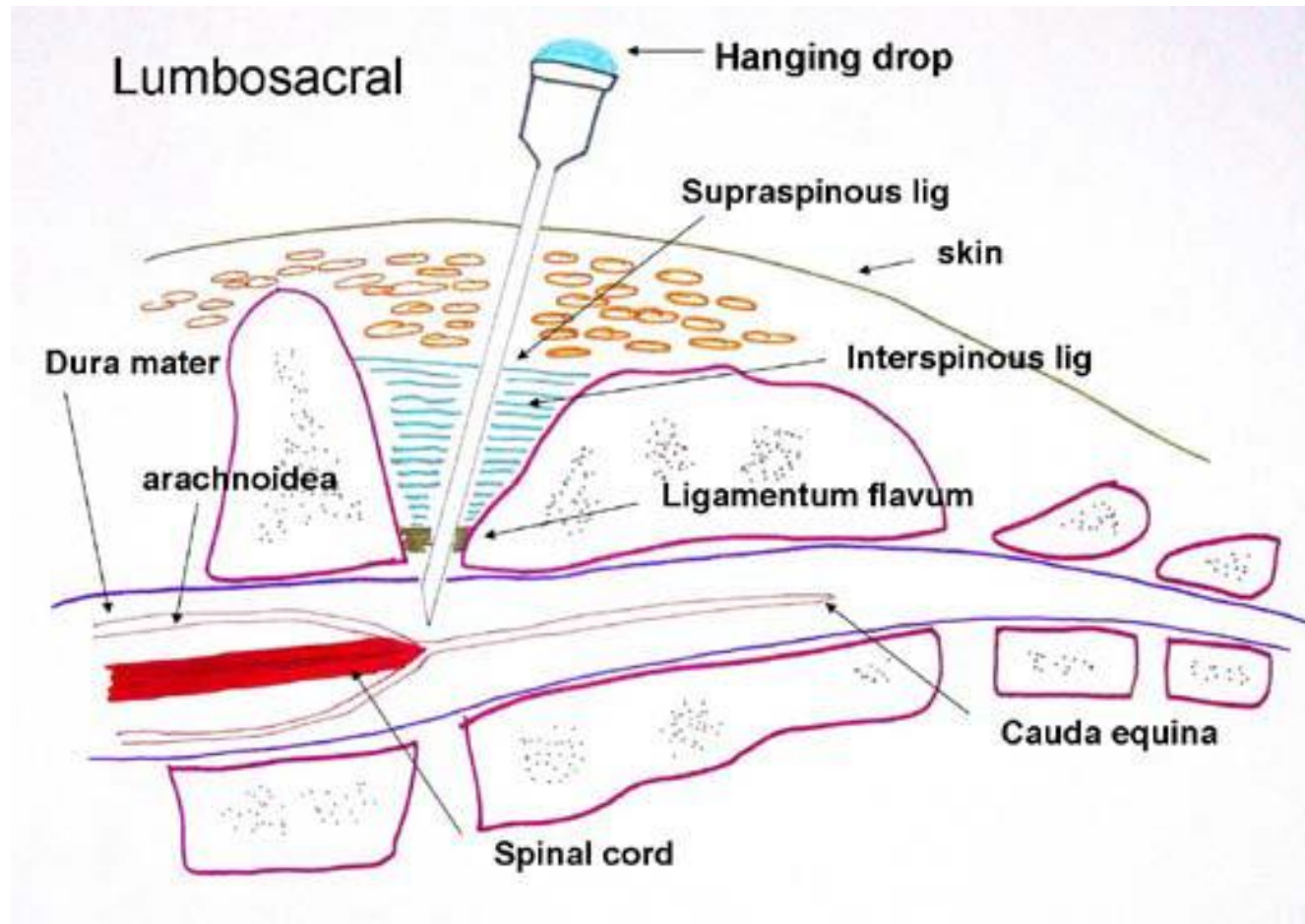
Spinal anesthesia

- • While epidural anesthesia refers to depositing of local anesthetics into the **extradural space**, the true spinal anesthesia refers to the **subarachnoid** access (usually known as 'spinal' anesthesia), which the needle penetrates the dura mater, and the analgesic is injected into the cerebrospinal fluid (CSF).
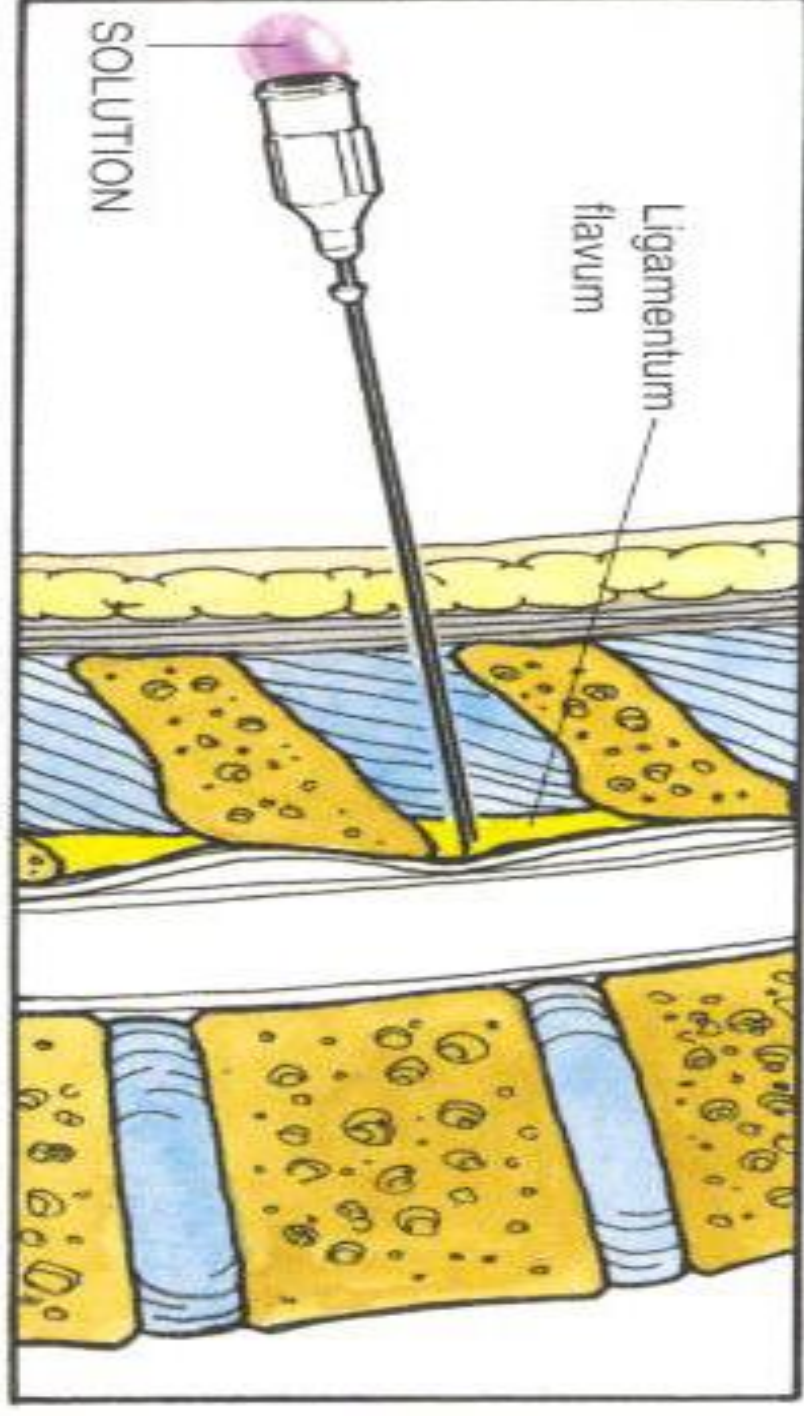
Spinal anesthesia

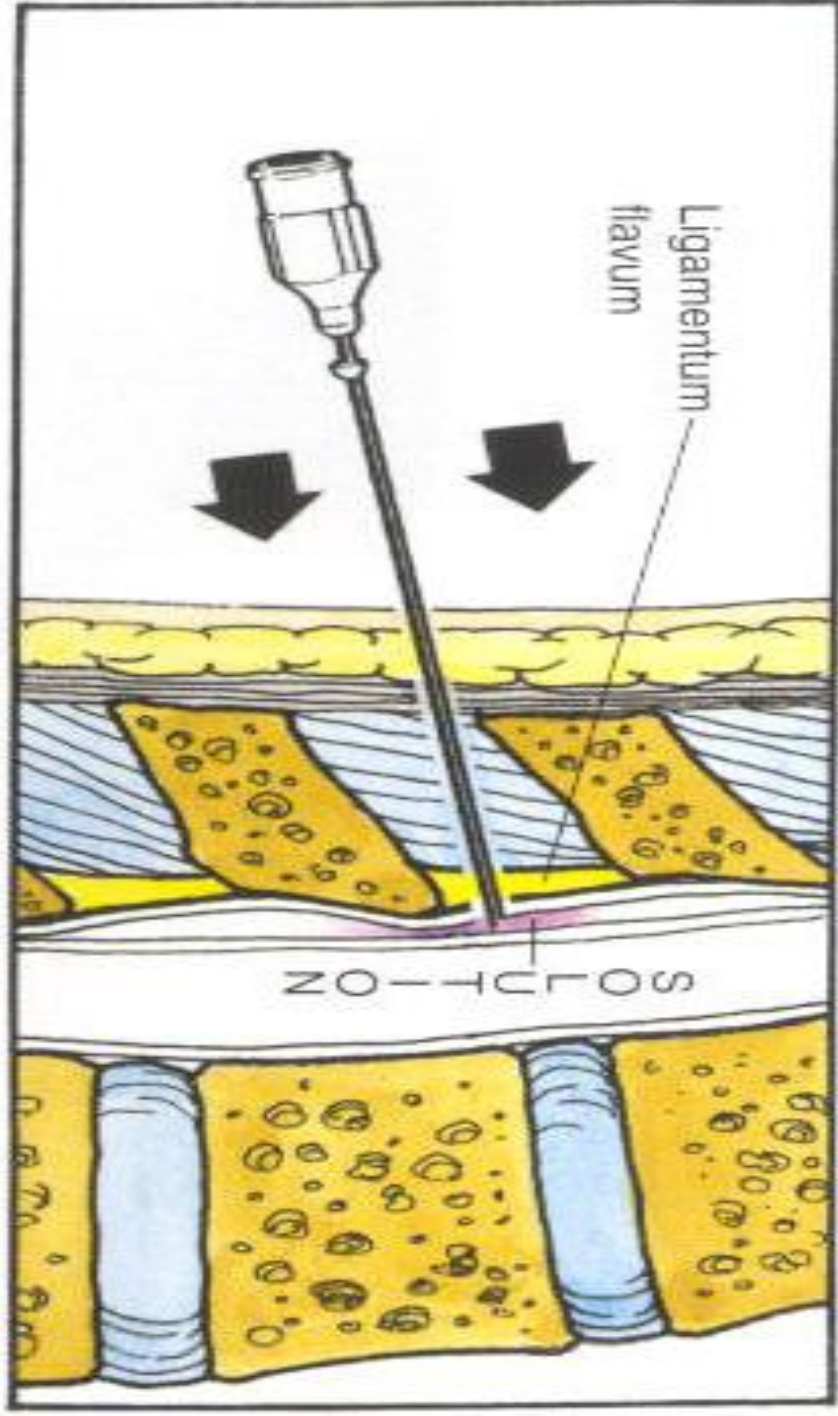- • In epidural (or extradural) anesthesia, the needle enters the spinal canal, but does not penetrate the meninges. The anesthetic is therefore limited to the canal outside the dura mater.

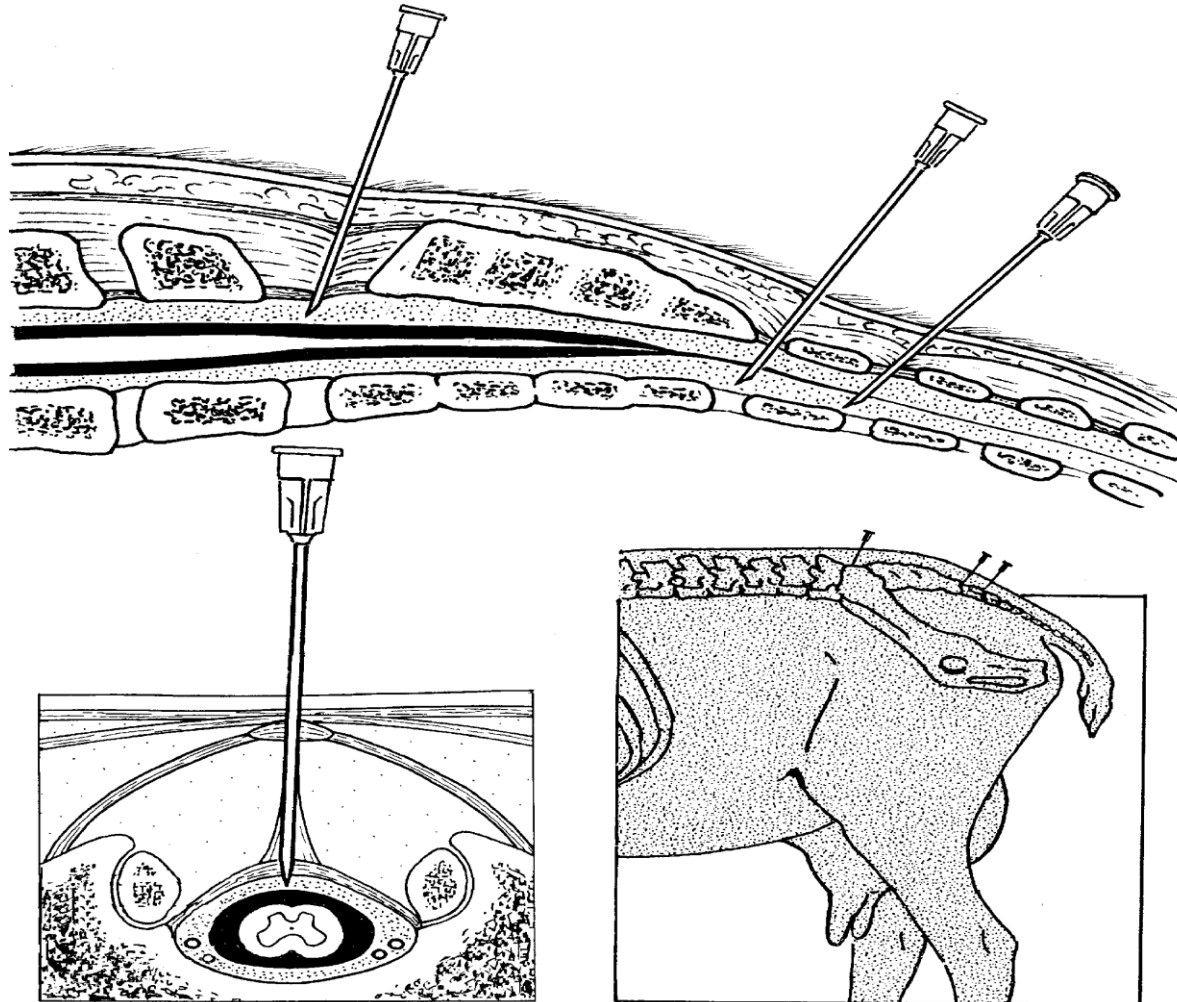# Epidural anesthetic techniques

- **The "hanging drop" technique**

Ligamentum flavum

SOLUTION

SOLUTION

Ligamentum flavum

Epidural anesthetic techniques
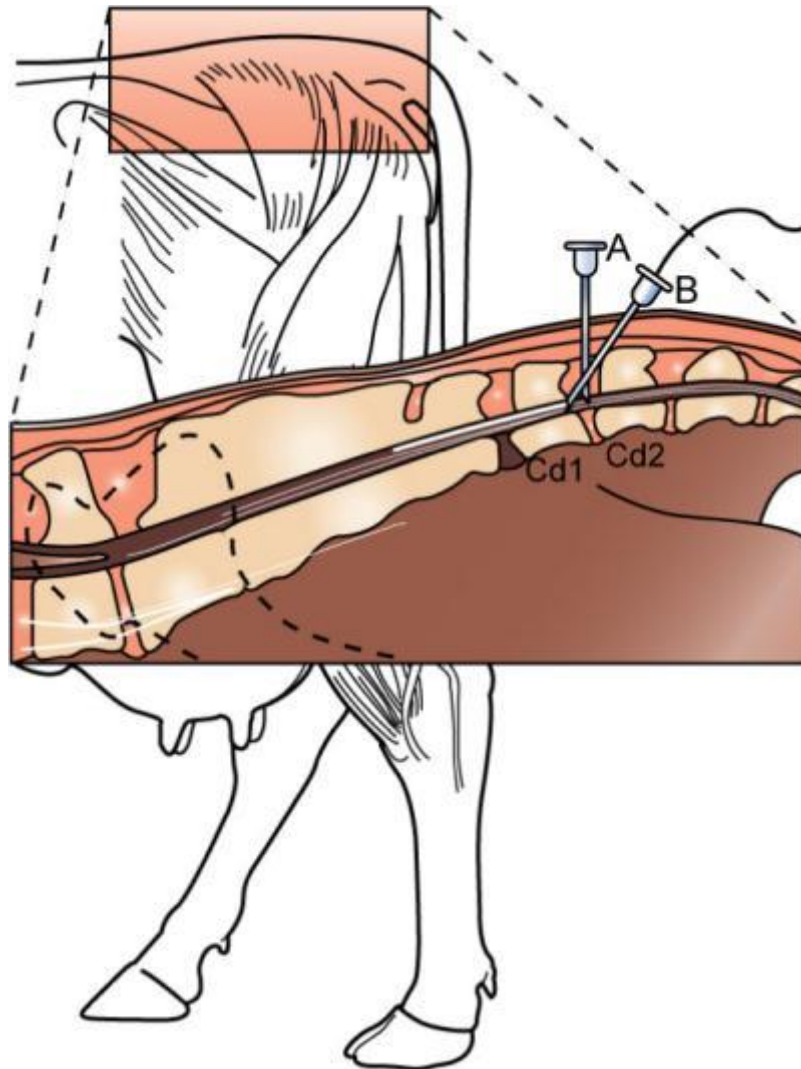
- **The "lack of resistance" technique**

Caudal Epidural Analgesia

- **Common** in obstetrics and prolapses: uterus, vaginal, rectum
- **Blocks**: anus, perineum, vulva, caudal vagina,caudal aspects - thighs
- **Preparation**
  - Surgical preparation
- **Procedure**
  - Placement on the dorsal aspect of the tail base at the first intercoccygeal space; the sacrococcygeal space is less common
  - Palpate tail up and down for proper placement.
  - A 18 × 1 1/2-in needle at **a 45-degree angle.**
  - Use 1 ml/100kg: 2% lidocaine, mepivacaine, xylazine
  - **Allow 10 to 20 minutes for effect; lasts 1 to 2 hours.**

CAUTION: can cause HL ataxia with too much anesthetic

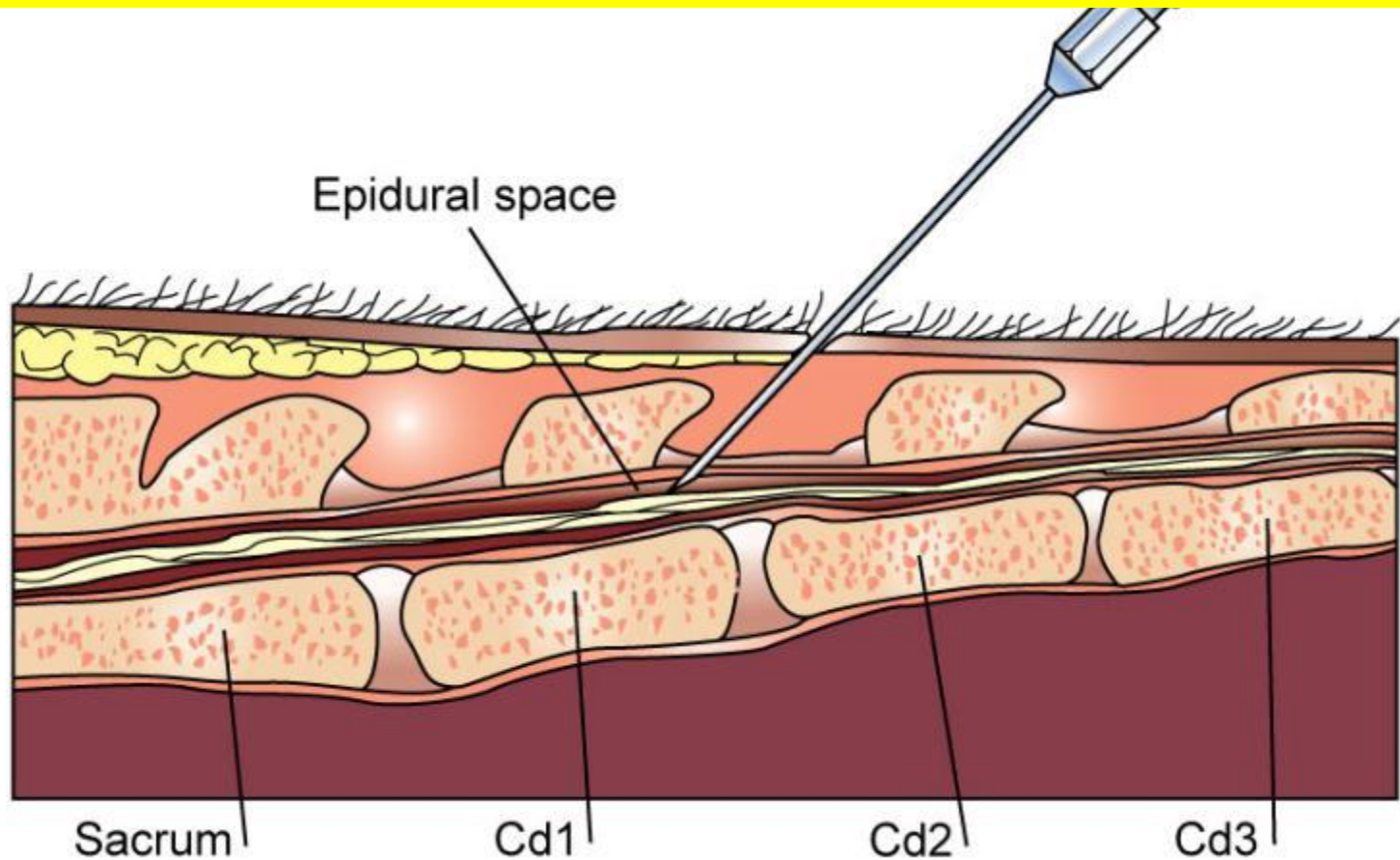- For prolonged anesthesia: small diameter epidural catheter
- DA: kinking catheter/ plugged with tissue/ fibrin

Cranial epidural: L-S space are not common: difficult to perform, posterior paralysis "splay legs"

Epidural space

Sacrum   Cd1   Cd2   Cd3

Intravenous regional local anesthesia (Bier's block)

- • The limb is catheterized then exsanguinated, and a tourniquet placed around the limb, at a pressure adequate to prevent arterial circulation (> 150 mmHg).

- • Local anesthetic (preferably without epinephrine) is then injected into the vein.

- • After a period of 15 minutes the area distal to the tourniquet is anesthetized until the tourniquet is removed

Intravenous Regional Analgesia (Bier Block)

- IV analgesia is **considered superior** to local nerve blocks/ ring blocks for most surgical procedures of the **distal extremities.**

- Preparation

  – Surgical preparation

- Procedure

  – Restrain, sedate, and cast.

  – Apply tourniquet: **Padding should be in place underneath.**

    - **Cotton/ foam padding**
    - For **feet procedures**, place at **midcarpus or midtarsus**.
    - For proximal procedures, place **just proximal to carpus or tarsus.**

Intravenous Regional Analgesia

- **Procedure**
  - Inject IV into any large superficial vein.
    - Dorsal metatarsal/ metacarpal vein
    - Plantar/ palmar MT/MC vein
  - Cattle: 18- to 20 G
  - Small ruminants: 22- to 25 G
  - Use 10 to 30 ml: 2% lidocaine/ mepivacaine
  - Wait for 10 to 15 minutes.
  - **Do not leave tourniquet in place for longer than 2 hours.**
  - Slowly release tourniquet: anesthetic wear off 5 to 10 min.

Tourniquet

Protective pad

Dorsal metacarpal (metatarsal) veins

Palmar (plantar) metacarpal veins (metatarsal)

A

B
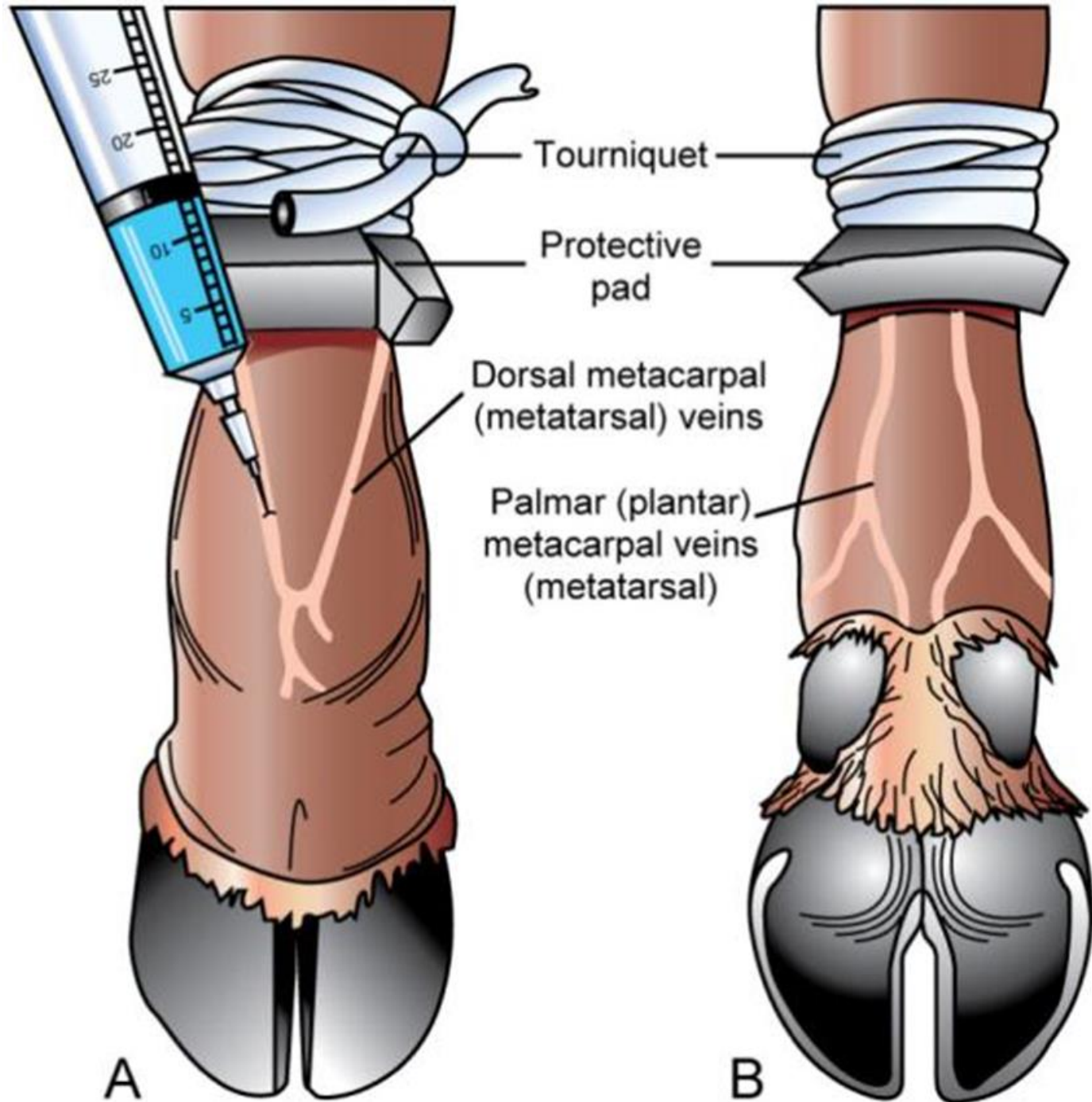
Regional anesthesia

- • This term is used where specific nerves to the area concerned are blocked.

- • Examples include specific nerve blocks to the limbs; paravertebral blocks; cornual N. block (for dehorning) and many others.
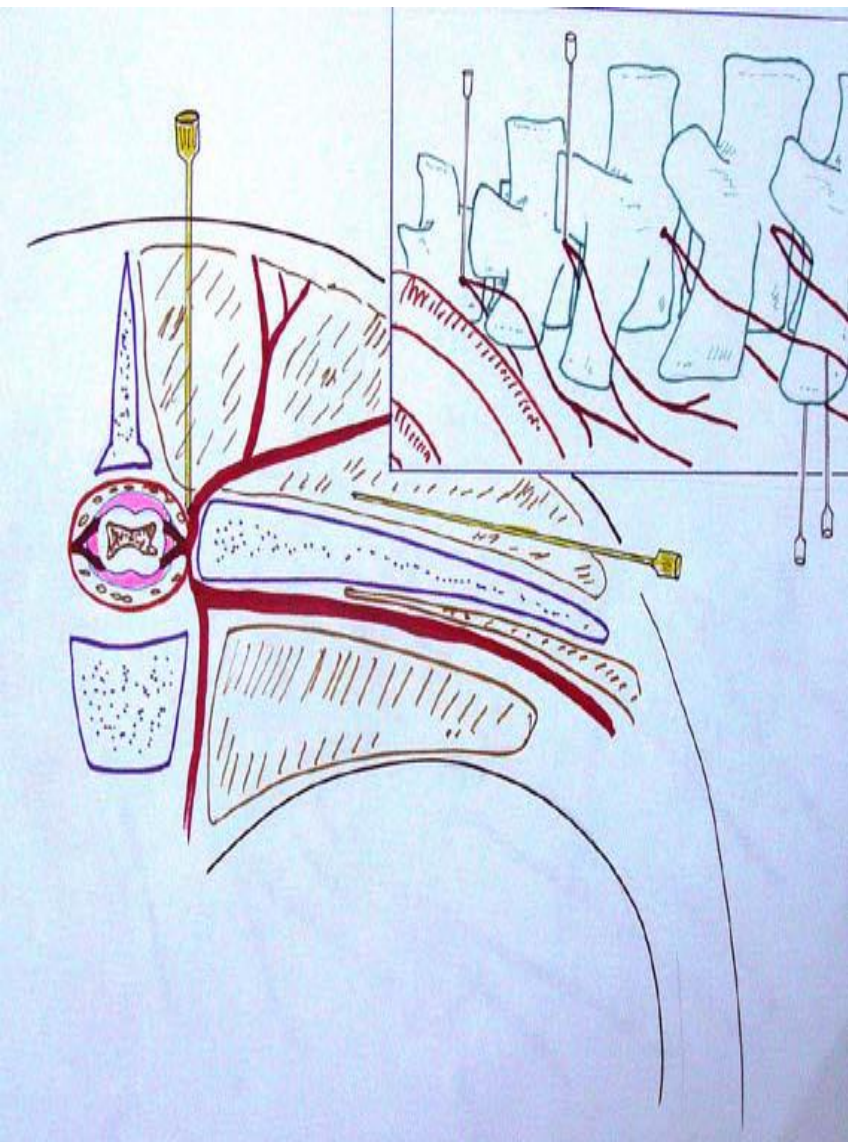
The proximal and distal paravertebral block at the T-13, L1 and L2 in cattle. This technique is one of the most commonly used regional analgesia in cattle for standing surgery (C-section, and laparotomy). (From Thurmon et al.

Paravertebral Block

- Use
  - To create **a large flank anesthetic zone**
    - **Skin to peritoneum**
  - Blocks **T13, L1, and L2**
- Prep
  - Surgical prep
- Procedure
  - Two approaches: **Dorsal and lateral**

Paravertebral Block (cont'd)

- **Dorsal approach/ Farquason or Cambridge method/ proximal paravertebral method**
  - Near the **intervertebral foramina**
  - A 16- or 18-gauge needle, 3 to 6 inches in length
    - A 18- or 20-gauge for smaller ruminants
  - Or placement of a 14-gauge × 1-in needle first and then insert an 18-gauge needle through the 14-gauge needle
  - Place **20 ml per injection site**
    - Use 2 to 5 ml for sheep and goats
  - **Block: skin to the peritoneum, including the longissimus muscle**
  - **Can create a temporary curvature of the spine (scoliosis, because of blocking lingissimus m.)** , making it difficult to close the incision

Paravertebral Block (cont'd)

- **Lateral approach/ distal paravertebral method/ Magda or Cornell method**
  - **Near the tips of the transverse processes** of the lumbar vertebrae
  - A 18-gague × 1 1/2- to 3-in needle
    - 20-22 gauge × 1 for sheep and goats
  - Use 10 to 20 ml per injection site
    - Use 2 to 4 ml for sheep and goats

Paravertebral Block (cont'd)

Dorsal site for deposition of anesthetic

Ventral site for deposition of anesthetic (N. T13)

Farquarson or Cambridge method

Dorsal branch of first lumbar nerve

Ventral branch of first lumbar nerve

Transverse process of third lumbar vertebra

Magda's method