



Local Blocks and Analgesia

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Pain Pathway

Pharmacological intervention of pain processing

Inhibit Perception

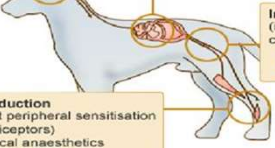
- Anaesthetics
- Opioids
- α_2 agonists
- Benzodiazepines

Modulation of Spinal Pathway
(inhibit central sensitisation)

- Local anaesthetics
- Opioids
- α_2 agonists
- NMDA antagonists
- NSAIDs

Inhibit Transmission
(inhibit impulse conduction)

- Local anaesthetics
- α_2 agonists



Transduction
(inhibit peripheral sensitisation of nociceptors)

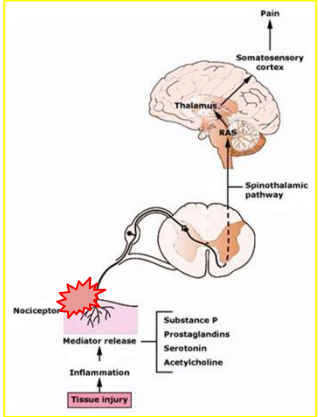
- Local anaesthetics
- Opioids
- NSAIDs
- Corticosteroids

Adapted with permission from 'Pain Management for the Small Animal Practitioner' (2nd edn.) by Drs. Tranquilli, Grimm, and Lamont

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Why Do We Do Nerve Blocks?

- Pain starts with stimulation of the nociceptors
 - Peripheral nerves that respond to painful stimuli
 - A δ fibers and C fibers--heat and mechanical stimuli
- Stimulation of nerve causes depolarization
 - Via Na channels
 - **This is where our local anesthetic is working!**
 - Release inflammatory mediators locally!
- Nociceptor synapses with secondary neuron
 - Dorsal root ganglia in dorsal horn of the spinal cord
 - Laminae I, V for A fibers I, II for C fibers
 - Substance P, glutamate, and CGRP
- Then moves to brain



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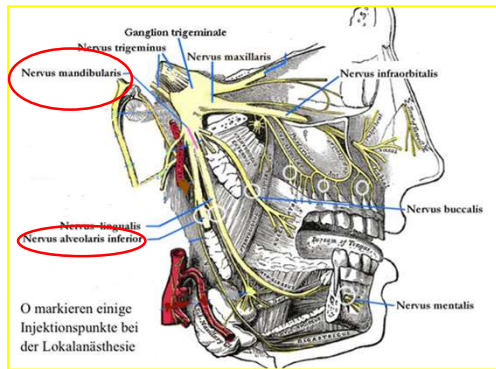
What Types of Blocks Can We Use?

- Head
 - Mandibular nerve/inferior alveolar nerve
 - Caudal maxillary nerve
 - Infraorbital nerve
 - Retrobulbar block
- Limbs
 - Femoral ischiadic
 - Epidural
 - Brachial plexus/RUMM
 - Declaw block/ring block

- Thorax/abdomen
 - Intercostal nerves
 - High volume epidural
 - Pudendal nerve
 - TAP block

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Mandibular/Inferior Alveolar Nerve



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Mandibular/Inferior Alveolar Nerve

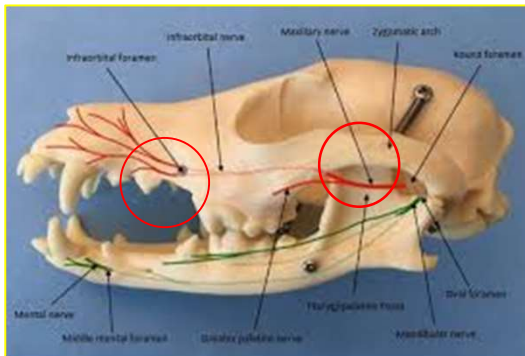
- Block of t
- Risk of lin
- Risk of he
- Uses
 - Denta
 - Mandi
 - Fractu



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bilateral

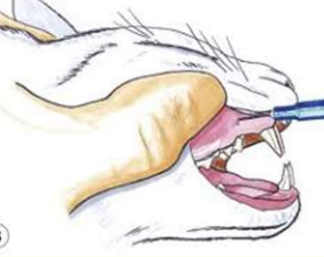
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Infraorbital/Caudal Maxillary Nerve



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Infraorbital/Caudal Maxillary



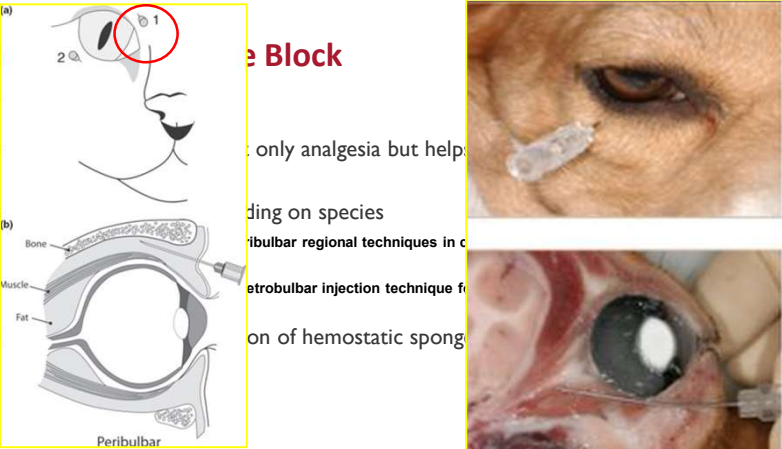
- Uses
 - Dental extractions
 - Maxillectomy or maxillary fractures
 - Rhinoscopy or nasal biopsies



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Peribulbar Block



only analgesia but help
 depending on species
 Peribulbar regional techniques in c
 Peribulbar injection technique fr
 on of hemostatic sponge

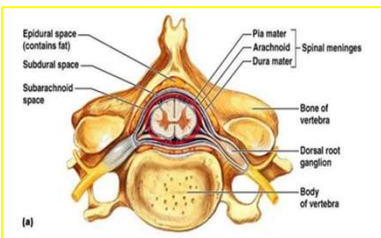
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Epidural

- L7-S1 or Cd1-Cd2
- Bilateral blockade of the femoral, ischiadic, pelvic nerve, and pudendal nerve
 - Cd1-Cd2: pudendal and pelvic nerves
- Contraindications
 - CHAINS
 - Coagulopathy
 - Hypotension
 - Anatomic changes (relative contraindication)
 - Infection (pyoderma)
 - Neuro (relative contraindication)
 - Sepsis

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Epidural



1. Skin
2. SQ/Fat
3. Dorsal ligaments
4. Ligamentum Flavum
 1. Yellow, firm ligament that sits above the epidural space
 2. "Pop"

Epidural space contains fat and lymphatics, ventral blood vessels. "negative space"---> hanging drop

- Urinary retention
 - Bilateral paralysis/paresis

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Epidural Volumes

- To the level of L1 (cats) L3 (dogs)
 - L4-L5 = femoral n.
 - L6-L7 = Ischiadic n.
 - 0.2 mL/kg
- To the level of T6 (cats) T9(dogs)
 - Will block the mid-caudal portion of the abdomen
 - 0.4 mL/kg
- Complete dying of the spinal cord in dogs at 0.6 mL/kg
- **Less than 0.2 mL/kg will not provide adequate caudal analgesia**

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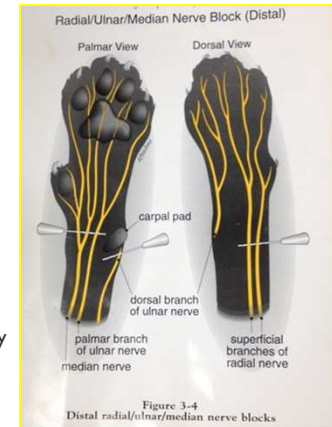
Declaw/Ring block

- Block of distal carpus/foot
- Uses
 - Declaw
 - Torn toenail
 - Toe amputation
- Easy to perform
 - Tent skin and inject in ring subcutaneously

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Declaw/Ring block

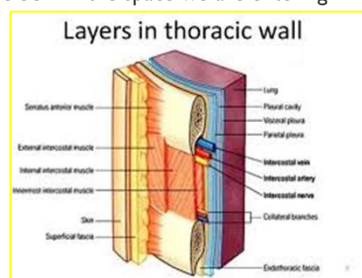
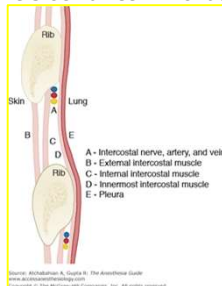
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Intercostal Nerve Blocks

- We block three in front and three behind the space we are entering



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Pudendal Nerve Block

- Blockade of the external genitalia and perineal region
- Uses:
 - Episiotomy
 - PU
 - Unblocking cats
- Approach
 - Nerve stimulator guided ideally but can be blind
 - 5 O'clock and 7 O'clock points on either side of anus
 - Halfway between pelvic rim and anus

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Drugs for Blocks

- Local anesthetics
 - DO NOT mix bupivacaine and lidocaine
 - Bupivacaine lasts longer, Nocita anywhere except epidural is great
 - I use 0.5 mg/kg bupivacaine--including with Nocita so I do not get too prolonged or marked of a motor blockade
- Opioids
 - Buprenorphine and morphine
 - Inflamed tissue= increased opioid receptors locally
- Ketamine
- Dexmedetomidine
 - Prolongs duration of block
- Midazolam

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CRIs and Boluses

- Outside of opioids we have a lot of choices
 - Ketamine
 - 1-2 mg/kg as bolus will last approximately 20 minutes
 - At this dose minimal catecholamine release
 - Great for ear flush, GI scope, surgical procedures, FNA/joint tap
 - Minimal CV depression
 - Dexmedetomidine
 - Nice as a CRI for short procedures or for anxious patients overnight
 - Good analgesia
 - Butorphanol CRI
 - CT, endoscopy, other non-painful procedures
 - 0.1-0.2 mg/kg/hour
 - Lidocaine
 - Miracle drug...only in dogs though
 - Decreases cough reflex at intubation
 - 30-40% MAC sparing
 - Free radical scavenger
 - 1-2 mg/kg loading dose
 - 1-2 mg/kg/hour (15-30 ug/kg/min)
 - CHEAP!
- Opioids
 - Buprenorphine 15-20 ug/kg IV
 - Needs 30 minutes for onset (give as you turn off fentanyl)!
 - Methadone q 6-8 h

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Anxiety?

- Don't discount nausea and anxiety as a source of discomfort
- Cerenia and pantoprazole (especially brachycephalics)
- Trazodone or gabapentin started for anxious patients either pre-procedure or start as post-procedure before the patient becomes more anxious.
- Acepromazine 0.01 mg/kg for brachycephalics and dysphoric/hyperthermic cats
- Dexmedetomidine
 - Short acting
 - Vasoconstrictive--not great for heat dissipation
 - Disinhibition?
- Dysphoria
 - Give 0.5-1 mg/kg of propofol (1/2 these doses of alfaxalone) this gives you time to decide what to sedate with!

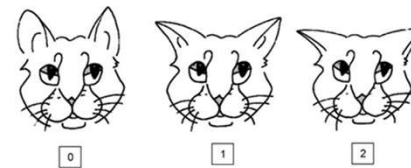
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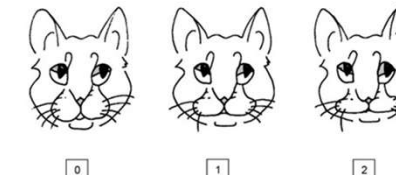
- Let's
- Tech
-
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Question 4

a) Look at the following caricatures. Circle the drawing which best depicts the cat's ear position?



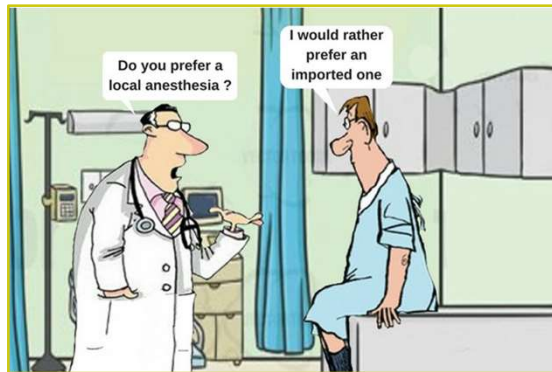
b) Look at the shape of the muzzle in the following caricatures. Circle the drawing which appears most like that of the cat?



Body Tension
Minimal
Mid
Mid to Moderate Reassess analgesic plan
Moderate Reassess analgesic plan
Moderate to Severe May be sign to avoid general anesthesia Reassess analgesic plan

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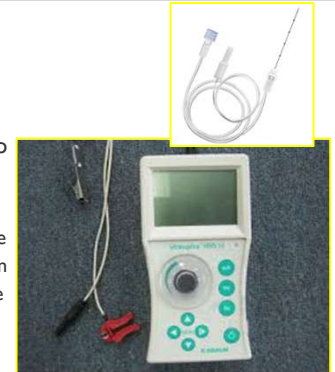
Questions?



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Nerve Stimulator

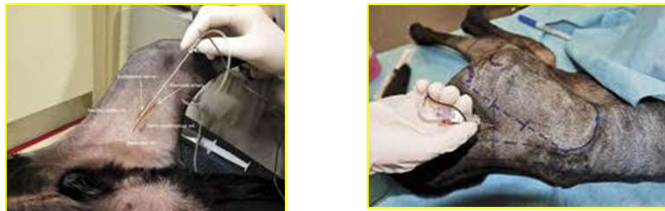
- Nerve stimulator needle is insulated except tip
- Electrical stimulation
 - Start with 0.8 mA → 0.4 mA → 0.2 mA
 - Locating nerve → checking for proximity to nerve → +/- checking that not too close before injection
 - Depolarization of nerve causes associated muscle Flexion
- Block of the nerve that is both motor and Sensory
 - Both motor and sensory blocked depending on drug used



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Femoral Ischiadic Nerve Block

- Femoral nerve innervates the cranial and medial portion of the hindlimb
- Ischiadic nerve innervates the caudal and lateral portion of the hindlimb



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Femoral Ischiadic Nerve Block

- Equivalent analgesia and duration of analgesia to epidural
- Blockade of mid-femur/stifle distally
 - No good for hip procedures
- Benefits
 - Analgesia
 - Unilateral does not result in bilateral HL paralysis like epidural
 - No urine retention
 - Less invasive than epidural

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Transversus Abdominis Plane Block

- Used in combination with intercostal nerve blocks
- Blocks entire abdomen and abdominal wall
- Uses
 - Pancreatitis
 - Peritonitis
 - CAN be used with septic patients!
 - Mastectomy
 - Intraabdominal procedures
- Can be done on awake sedated patients

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Transversus Abdominis Plane Block



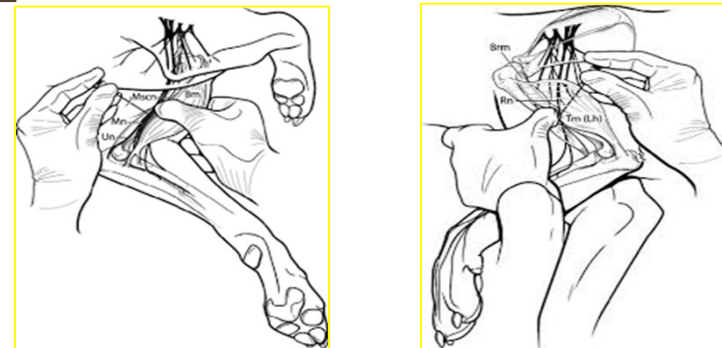
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Brachial Plexus vs RUMM

- Brachial plexus and RUMM block both provide analgesia distal to the mid-humerus/elbow
- Increased risk of Horner's syndrome and pneumothorax with brachial plexus block
- RUMM
 - Radial, ulnar, median, musculocutaneous

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Brachial Plexus vs RUMM



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