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Local Anaesthetic Techniques Mini Series

Session 2: Every Local Technique You Ever Need to Know

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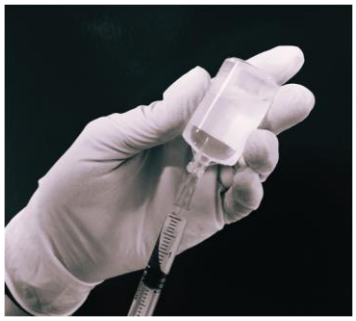

Local Anaesthetic Techniques in Small Animal Practice
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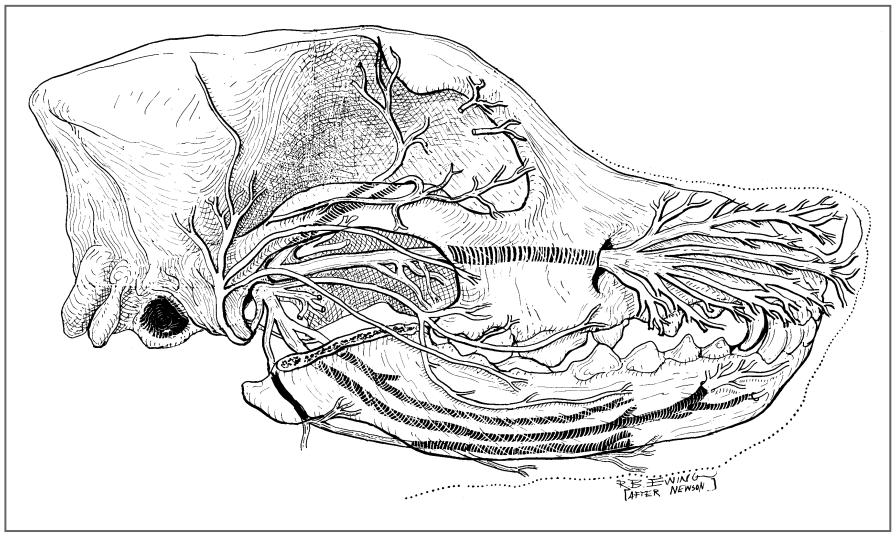
Local Anaesthetic Techniques

Head Techniques

Considerations for dental cases

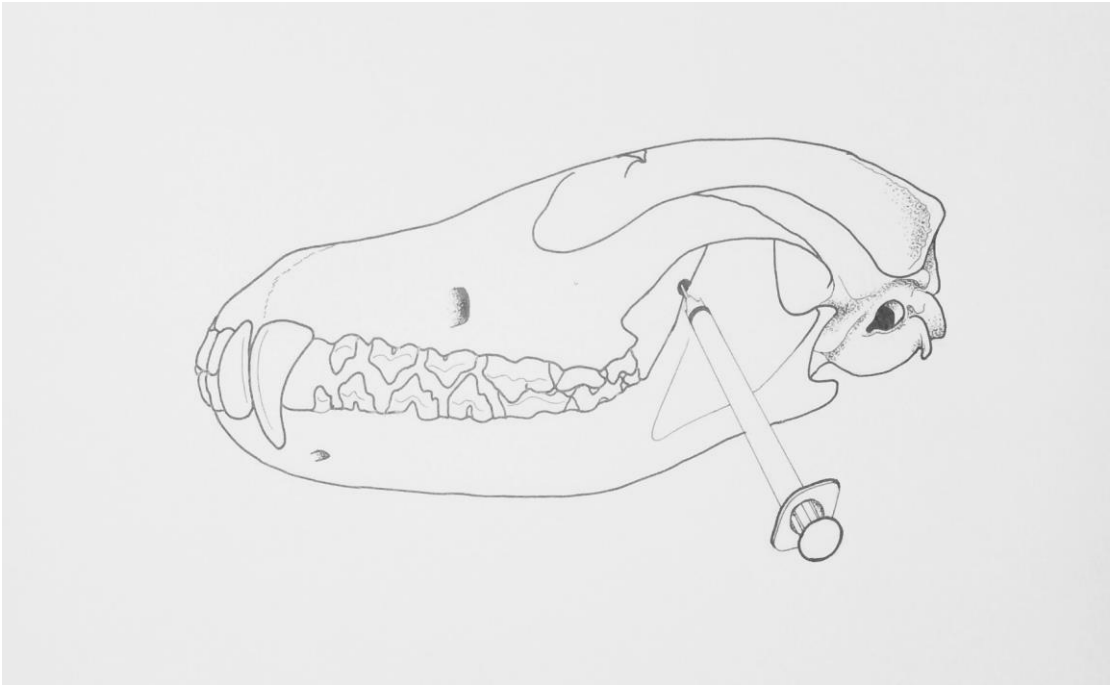
- Rapid onset
- Long duration – encourage eating
- Toxicity – multiple blocks
- Bilateral blocks –concern?
- Not much space to inject into
- Avoid injecting into canals

Maxillary and inferior alveolar (mandibular) nerve blocks with lidocaine and bupivacaine administered prior to dental extractions resulted in a reduction in heart rate and blood pressure while allowing for a reduction in isoflurane. Cats receiving nerve blocks had lower postoperative pain scores than the group without nerve blocks (Aguiar et al 2014).

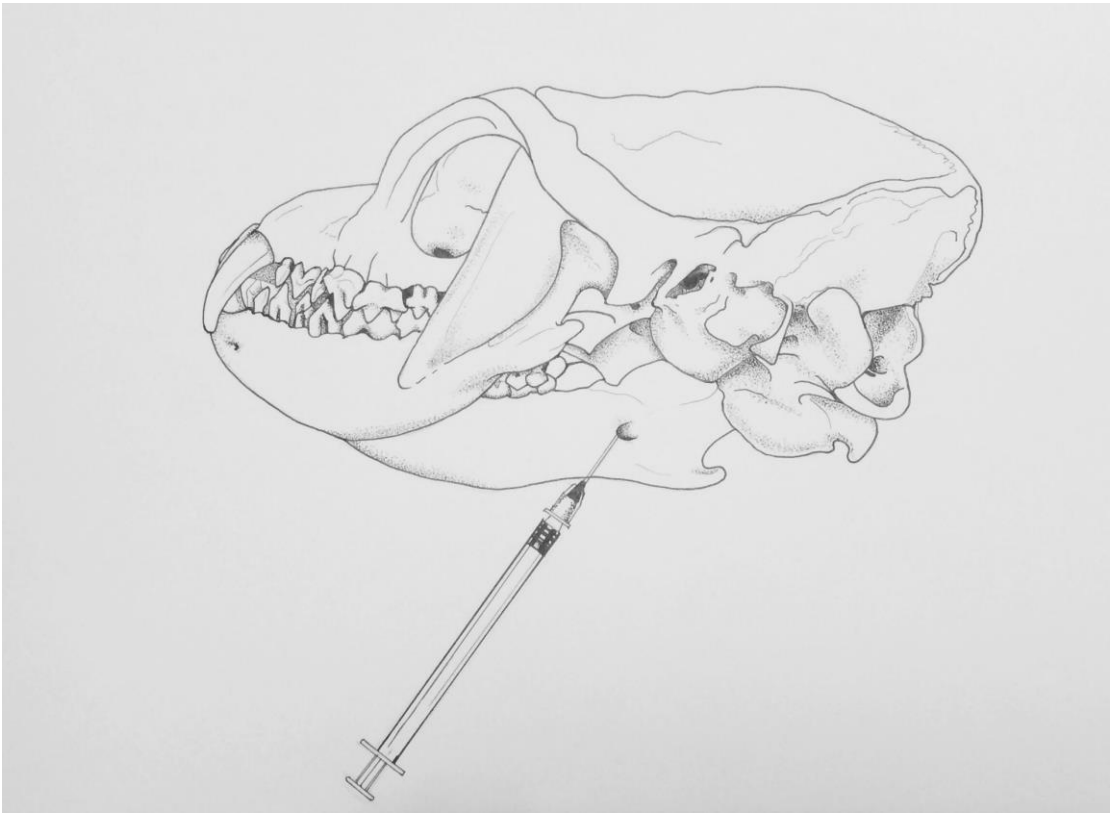


The main nerves you should become familiar with blocking are the maxillary and mandibular as these will be of most use for dental work.

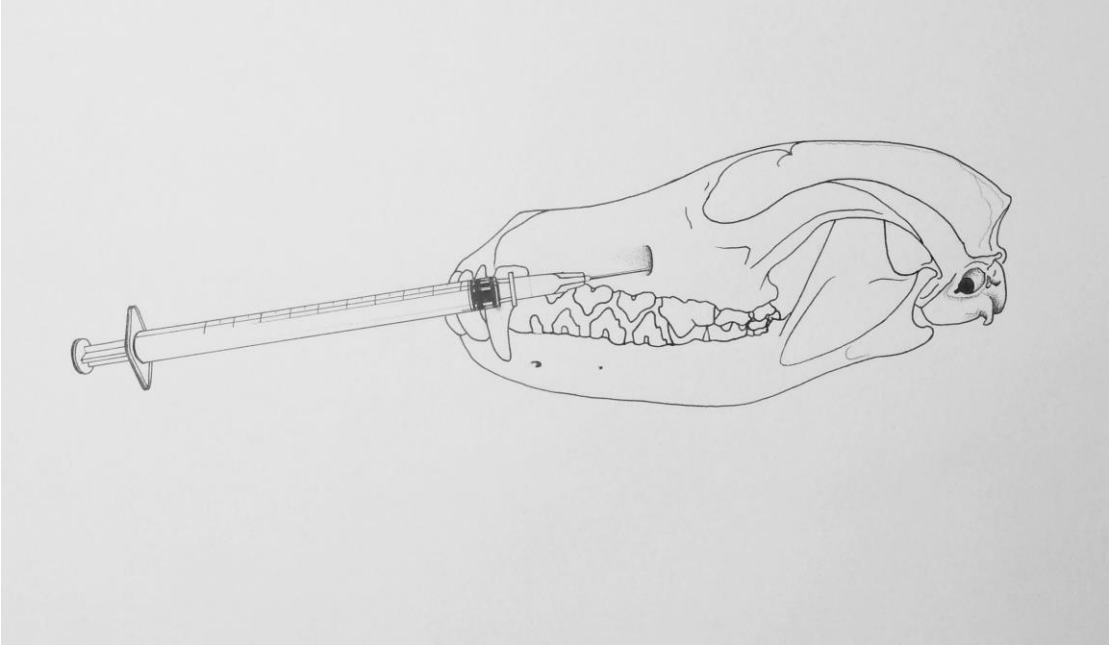
Maxillary Nerve
Area desensitised- maxillary teeth, nasal planum, skin over maxilla, upper lip, palate
Indications- maxillary tooth removal, maxillectomy, mass excision, palate surgery
Volume to inject 0.1ml/kg.
Needle size 23G 5/8”
Site for injection- caudal to the zygomatic arch, around 1cm caudal to the lateral canthus direct the needle into the pterygopalatine fossa as indicated until bone is contacted. Place your needle. Aspirate. Inject. Do not move the needle excessively as you may hit the venous plexus.
There is an infraorbital approach which involves advancing an IV catheter through the IO foramen to the level of the maxillary foramen and injecting a similar volume. This will be discussed.
An intraoral approach via the palate just caudal to the last molar is reported. The risk of infection may be higher?



Mandibular (Inferior alveolar) Nerve
Area desensitised- mandibular teeth rostral to block, mandible, skin, lower lip
Indications- mandibular tooth removal, mandibulectomy, mass excision
Volume to inject – enough to make a bleb to surround the nerve 0.01ml/kg as a guide.
Needle size 23G 1”
Site for injection- from the lower angle of the jaw direct the needle on the medial aspect of the mandible towards the mandibular foramen which is located by intra-oral palpation.
Alternatively direct a needle intra-orally towards the mandibular foramen by palpation – difficult to do with limited space.
If local diffuses to the lingual nerve, the rostral 2/3’s of the tongue will be anaesthetised.

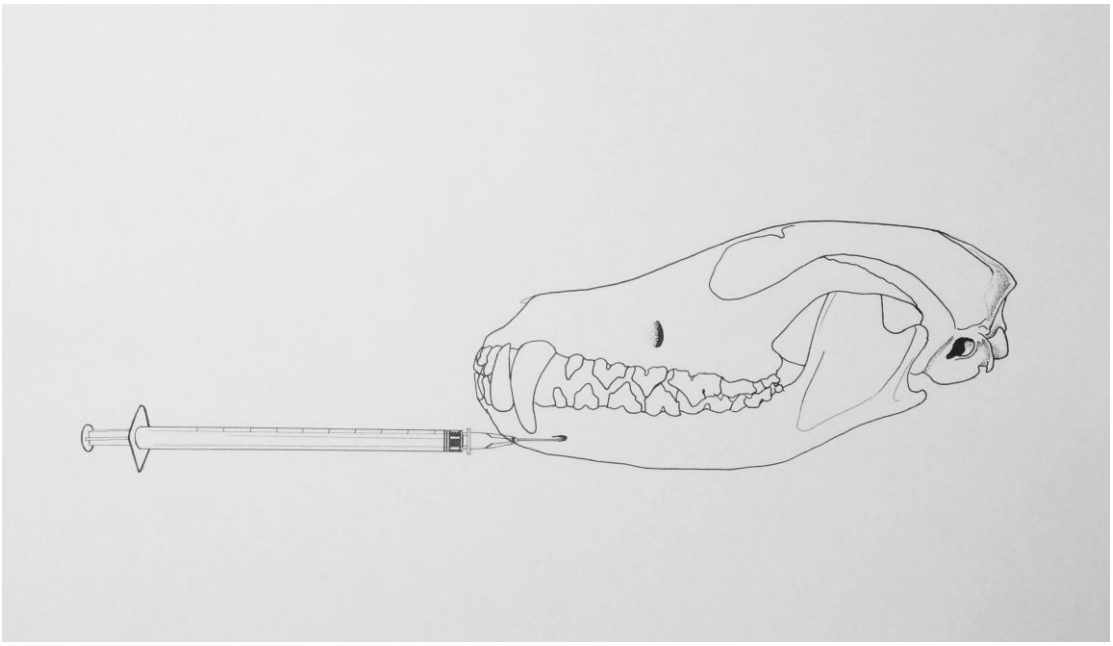


Infraorbital Nerve
Is a rostral extension of the maxillary nerve.
Area desensitised- nose, upper lip skin of the muzzle rostro-ventral to injection site
Indications- tooth removal, mass excision, surgery to the nostrils.
For most dental work a maxillary block provides more extensive coverage.
Volume to inject 0.05-0.1ml 10kg.
Needle size 25g 5/8" – or use an IV catheter – less traumatic for the nerve in the canal. Avoid sliding needles into the canal as the cutting bevel may damage the nerve. The local should be injected around the nerve as it leaves the foramen.
Site for injection- palpate the foramen half way between the zygomatic arch and the root of the canine tooth.
Do not inject into the IO canal under pressure – this may cause nerve damage.
Alternative – maxillary nerve block.

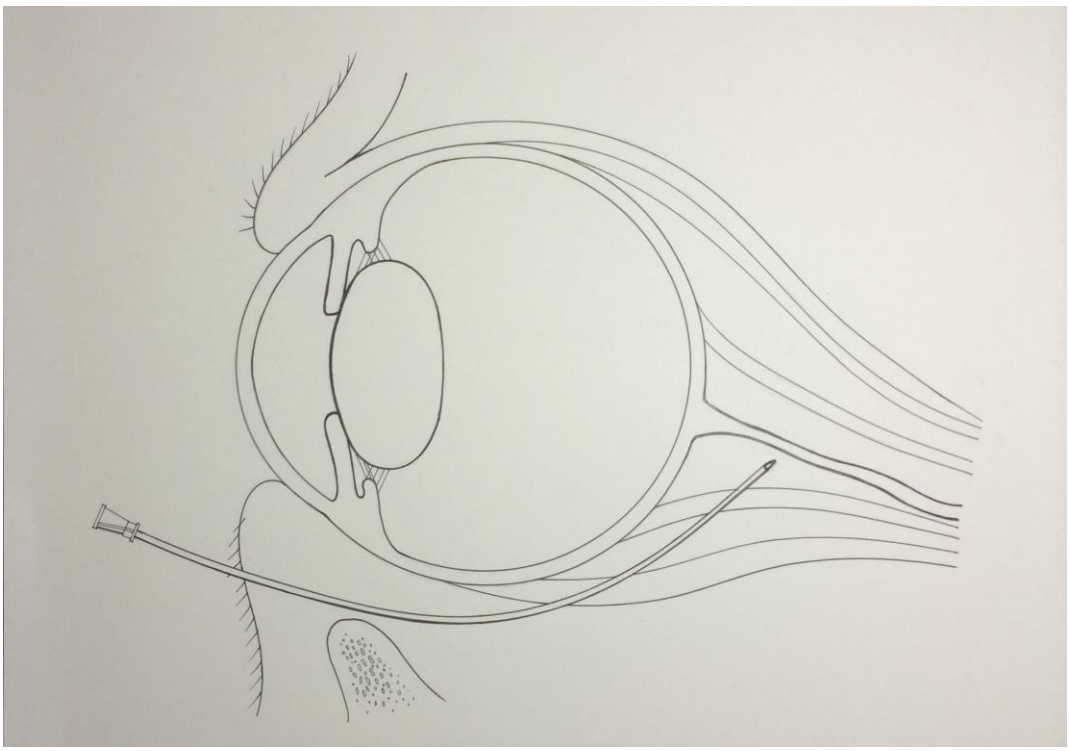


Palatine Nerve Blocks
Area desensitised- major palatine nerve runs w palatine artery to supply mucosa of the hard palate. It originates from the maxillary nerve in the pterygopalatine fossa. The major palatine nerve exits the major palatine foramen – unable to palpate because of thick palate.
Alternative – perform a maxillary nerve block
Indications – palate sx. Teeth are not anaesthetised.
Volume to inject 0.1-0.3ml
Needle size – insulin syringe
Site for injection- halfway between the midline of the palate and the dental arcade at the level of the fourth premolar.

Mental Nerve
Area desensitised- teeth rostral to the mental foramen
Indications- tooth removal
Volume to inject 0.1-0.3mL
Needle size 25G 5/8"
Site for injection- palpate the mental foramen caudal to the mandibular canine tooth on the lateral mandible, as pictured. Retract the lip and inject through the gum.
Can be difficult to do and of limited use in small animals– easier to perform a mandibular block.



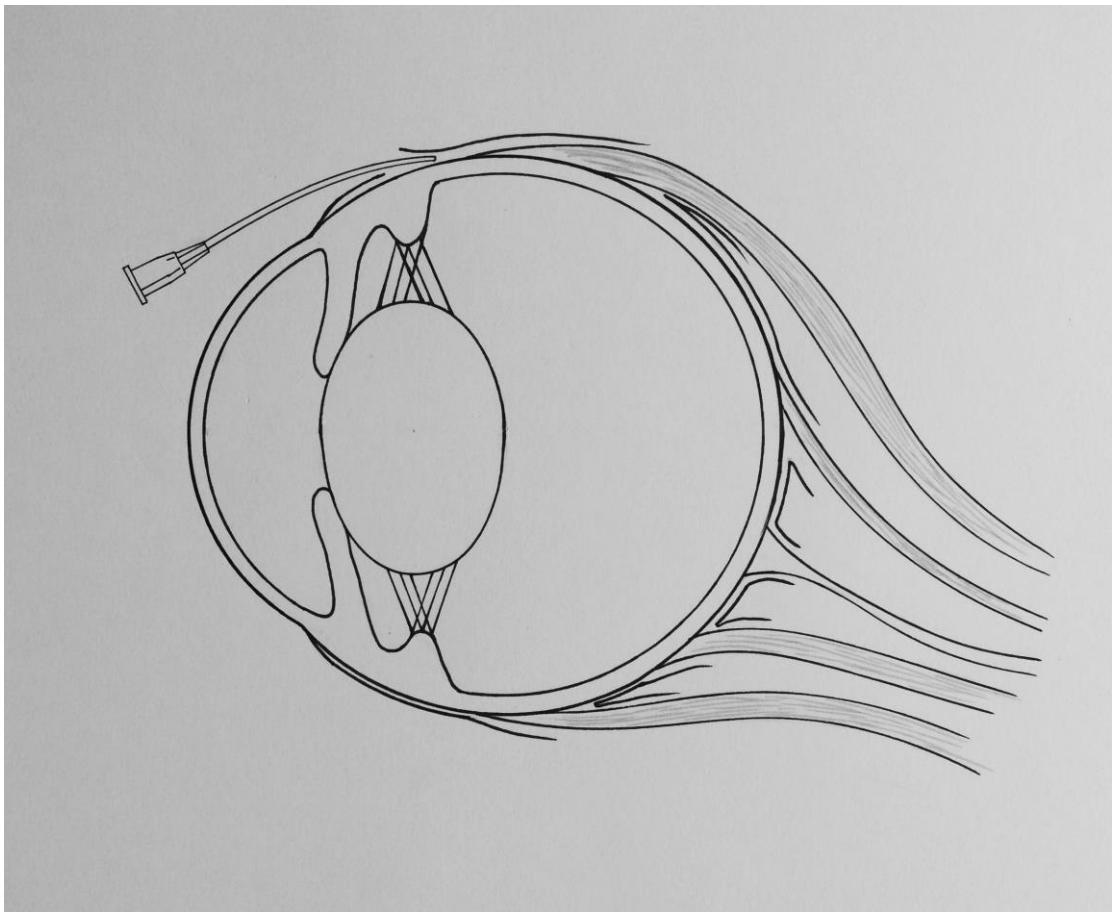
Ocular Blocks
Retrobulbar Block
Area Desensitised- cranial nerves II, III, IV, V & VI
Indications- enucleation
Volume to inject 1-4mL
Needle size 23G 1” (pre-curved needles are available from Visitec)
Site for injection- inject either through the eyelid or the conjunctiva. Needle insertion point is half way between the lateral canthus and mid lower lid. The needle should be walked around the bony orbit with the aim to position it caudal to the globe, where the local anaesthetic solution is then deposited.
To be avoided in neoplasia where there is a risk that neoplastic cells may be seeded.
An alternative would be infiltration around the eyelids followed by a splash block once the eye has been removed.



Peribulbar technique
This is an alternative technique to retrobulbar block and may be more suited for providing anaesthesia for the globe in cats. A short needle (23G 1") needle is passed through the bulbar conjunctiva (avoiding the 12, 3, 6 and 9 O'Clock positions) along the bony orbit, but unlike the retrobulbar technique is not curved to end caudal to the globe. Local anaesthetic solution (2-4ml) is injected after aspiration. Gentle massage of the globe should be performed following this technique to encourage spread of local anaesthetic into the intraconal space. This technique requires a larger volume than retrobulbar block to ensure sufficient spread, but avoids the risk of penetrating the optic nerve sheath.

A 2014 study by Shilo-Benjamini, titled comparison of peribulbar and retrobulbar regional anesthesia with bupivacaine in cats demonstrated better deposition of local anaesthetic using this technique compared to retrobulbar injection. Peribulbar injection may therefore be a more suitable technique in the cat.

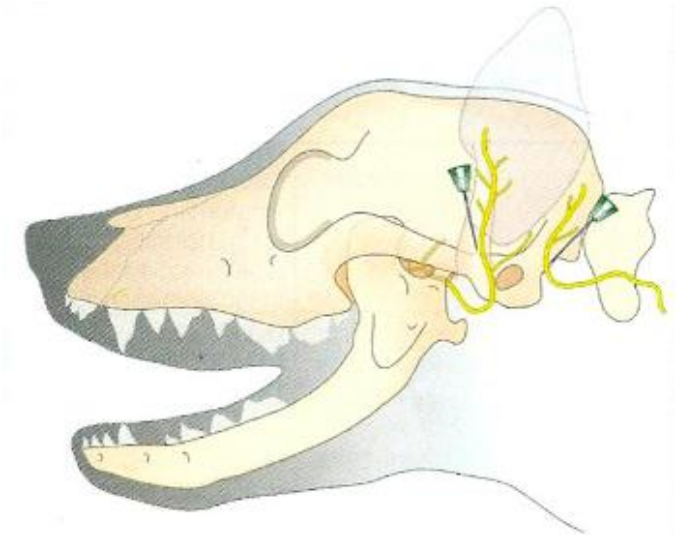
Sub-Tenon capsule block
Desensitised area as for retrobulbar block but improved safety on retrobulbar technique (Ahn et al. 2013, Shilo-Benjamini et al. 2013). Utilising this technique produces good desensitisation for enucleation or for corneal surgery. Skin sensation may not be completely eliminated though and additional analgesia may be required for skin closure. This technique requires additional equipment and is technically more challenging than the retrobulbar technique.
The patient should be positioned in dorsal recumbency and a sterile prep performed. After application of topical anaesthesia the mediodorsal portion of the bulbar conjunctiva (approx 5 mm from the limbus) is incised with tenotomy scissors, and the conjunctiva and sub-Tenon capsule are bluntly dissected from the underlying sclera. Sub-Tenon injection is performed through the incision with a 19-gauge, curved, blunt spatulated cannula. The sub-tenon cannula often requires gentle tissue dissection as it is passed to allow it to be positioned caudal to the globe.
Volume 1-5mL



Peri-ocular blocks
Used for desensitising the skin around the eyes. Useful for mass removal, eyelid surgery or as part of enucleation. Landmarks are not particularly well defined in small animals and therefore their use is limited. Eyelid infiltration of local anaesthetic post-surgical procedure may be considered for post-operative analgesia. Care should be taken to minimise post-operative swelling which may result from local anaesthetic injection. Use of carefully placed cold packs may prove to be useful.

> Infiltrative blocks
> Provides analgesia (V)
> Immobilise eyelids (VII) & balance anaesthesia
> infratrochlear
> zygomaticotemporal
> frontal
> lacrimal

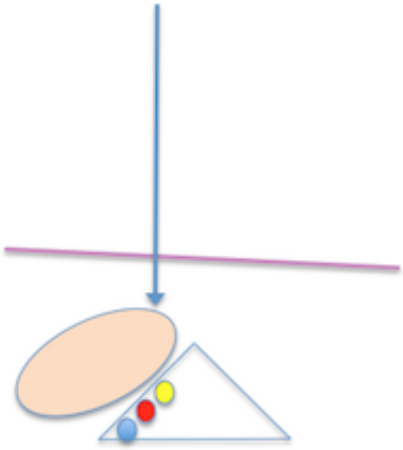
Ear Surgery
Techniques for blocking the auriculotemporal and auriculopalpebral nerves are described in dogs. (BSAVA Manual AA). These nerves serve the inner surface of the auricular cartilage and the external ear canal.
Personally I find these nerves difficult to locate and therefore block accurately and opt instead for local infiltration techniques for surgeries such as a total ear canal ablation.
Surgeons are concerned that they may cause facial nerve damage with this surgery and if you infuse large volumes near the facial nerve your local block may mimic facial nerve damage this until the local wears off.
The use of wound catheters has been described in two separate studies post TECA. When compared to systemic morphine the dogs in which lidocaine wound soakers were used compared favourably.
Volume 0.5ml/10kg split over the two sites.



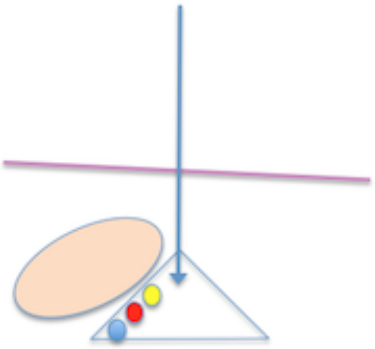
Techniques for the trunk

Intercostal nerve blocks
Useful for thoracotomy, rib fractures, chest drains, flail chest.
The artery, vein and nerve run off the back of the rib. So whilst you walk your chest drain off the front of the rib, you walk your needle for local deposition off the back.
The two sites cranially and two sites caudally to the site of block should also be desensitized because of the pattern of innervation.
The vein, artery and nerve lie tucked under the rib, caudal to the rib.
Volume – 0.5-1.0ml per site

The rib is contacted with the needle and the needle walked off the back of the rib;



The local should be injected into the intercostal space as such;



Incisional blocks
Local anaesthetic can be infiltrated in the region of the incision post surgery or in the area of the planned incision pre-surgery. Studies in rabbits have confirmed that such techniques do not impair would healing. Although other studies have reported that histological changes are evident which suggest a detrimental effect to healing, this is rarely appreciated clinically and should not be a reason to avoid locoregional techniques.

Inter-pleural nerve blocks
Analgesia is via blockade of splanchnic nerves and thoracic sympathetic chain. Spread to intercostal nerves also occurs. Blockade of sympathetic ganglia points to the role of sympathetically medicated pain in conditions such as pancreatitis. Analgesia is not due to thoracic epidural spread.
Application of local anaesthetic via a chest tube can provide analgesia following thoracotomy and also decrease the discomfort associated with thoracic drains. You need to know the volume of your chest drain –up to 30% of dose can be 'lost' by being left in the drain. Flush a volume of saline equal to the drain volume to ensure deposition of the whole dose.
Patient positioning is important due to fluid pooling – which may be away from the site of desired action. For thoracotomy wound/chest drain analgesia lie the patient with the wound down after application.
This technique is suitable post-pericardectomy; concerns about cardiotoxicity following pericardectomy were resolved in a study in dogs.

If the patient has a pleural effusion this will dilute the local. If production is >1-2ml/kg/day this technique may have limited effect.
Dose – calculate the maximum dose – ie: 2mg/kg bupivacaine in dogs – repeat q8h.
1.5mg/kg bupivacaine IP q4h has been shown to be comparable to buprenorphine IV q6h in dogs. For chest drains I use 1mg/kg bupivacaine q8h.

Splash blocks
Describes the application of local anaesthetic directly to the site of surgery. This has been examined in dogs undergoing spinal surgery. Morphine 0.1mg/kg applied extradurally at the time of sx was effective in reducing postoperative analgesic requirement.

Intra-testicular injection
Reduces isoflurane requirements in dogs undergoing castration. (McMillan, Seymour, & Brearley, 2012), however does not have any effect on pain scores post procedure (Stevens, Posner, L.P., Jones, & Lascelles, 2013)

Lidocaine patch
Lidocaine patches (Versatis, Grunenthal) are used in people with chronic pain and in dogs and cats for acute pain management. Evidence to date is anecdotal in dogs and cats. It is advised that patches are cut and placed either side of the surgical incision.
I change the patches each day and usually use for 2-3 days post surgery. Anaesthesia is local rather than systemic with plasma lidocaine levels being very low.