Anesthesia and Intradermal Injections

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- Lumenis – Speaker

- All relevant relationships have been mitigated

Objectives

- Definition
- Anesthesia vs. analgesia
- Forms of anesthesia
- Focus on local anesthesia
- Medications, allergies, and contraindications
- Anaphylaxis
- Approaching supplies and set up
- Ways to minimize pain
- Performing
- Post-injection

Anesthesia

- Temporary loss of sensation for medical purposes in a controlled environment

- Concisely, “without feeling or sensation”

Anesthesia

- "an", as a Greek prefix means "without" or "lacking"

- "esthesia", as a Greek suffix means "feeling" or "sensation"

Analgesia

- Temporary alleviation of pain through chemical means usually without loss of consciousness

- Concisely, without pain or capacity to feel pain

Analgesia

- "an", as a Greek prefix means "without" or "lacking"

- "algesia", as a Greek suffix means "pain"

Anesthesia vs. Analgesia

- Anesthesia is with a lack of total sensation
  - Where analgesia is with a lack of pain sensation
    - *All anesthetics provide analgesia
      - While <u>not all</u> analgesics provide anesthesia*

Anesthesia vs. Analgesia

- Patients are often awake while utilizing analgesics aside from certain scenarios, combination with other drugs, or cases of overdose
- While patients under anesthesia may be conscious or often unconscious, depending on the category of anesthesia being employed
- Many analgesics are patient controlled
- While anesthetics are controlled by qualified providers, not patients

Features of Anesthesia

- Suppression of autonomic and skeletal responses to stimuli
- Suppression of voluntary motor response
- Analgesia
- Amnesia

Heidi Shafford, DVM. "Minimizing the Risks of Anesthesia in Dogs." *Preventive Vet*, 14 June 2014, https://www.preventivevet.com/dogs/minimizing-the-risks-of-anesthesia-in-cats-and-dogs.

Types of Anesthesia

- General anesthesia:
  - "What most people think of"
  - Patients are unconscious and lack awareness and sensation
  - Many different options of drugs
  - May be given as a gas or IV
  - Side effects may be numerous and adverse events may occur
  - Care must be taken in administration, monitoring, and paying attention to allergies and contraindications
    - (That goes for all types of anesthesia aside from general)

"Anaesthesia: Types, Procedure, Side Effects and Risks." *Netmeds*, https://www.netmeds.com/health-library/post/anaesthesia-types-procedure-side-effects-and-risks.

Types of Anesthesia

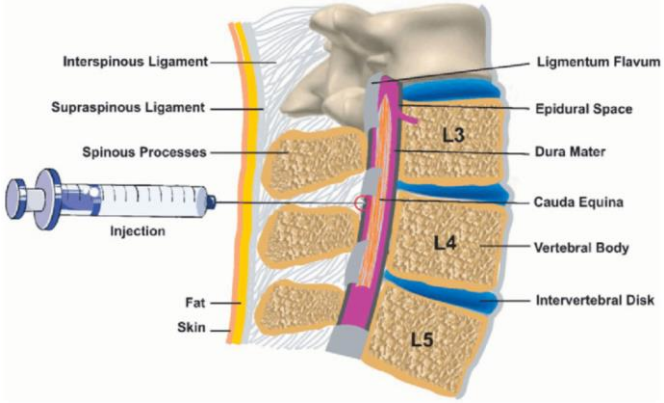
- IV monitored sedation:
  - "twilight"
  - Administered through IV
    - To induce drowsiness and relaxation
      - Deeper levels of sedation may be achieved
        - Depending on procedure type or patient preference

"Intravenous Sedation." *NY NJ Anesthesia, LLC*, http://www.nynjanesthesia.com/intravenous-sedation.

  - Sound familiar?
    - Milder sedation allows the patient to respond to questions or instructions
    - Moderate sedation may cause the patient to doze off, but awake if prompted
    - Deeper sedation, close to general anesthesia, but patient can self respirate

Types of Anesthesia

- Regional anesthesia:
  - A "local" anesthetic is applied to a specific area of the body, preventing all sensation and response
    - Like limbs, portions of limbs, etc.
    - Acts on a large nerve bundle, ganglion, branching point exiting a foramen, etc.



"Category:Epidural Anaesthesia." *Wikimedia Commons*, https://commons.wikimedia.org/wiki/Category:Epidural_anaesthesia.

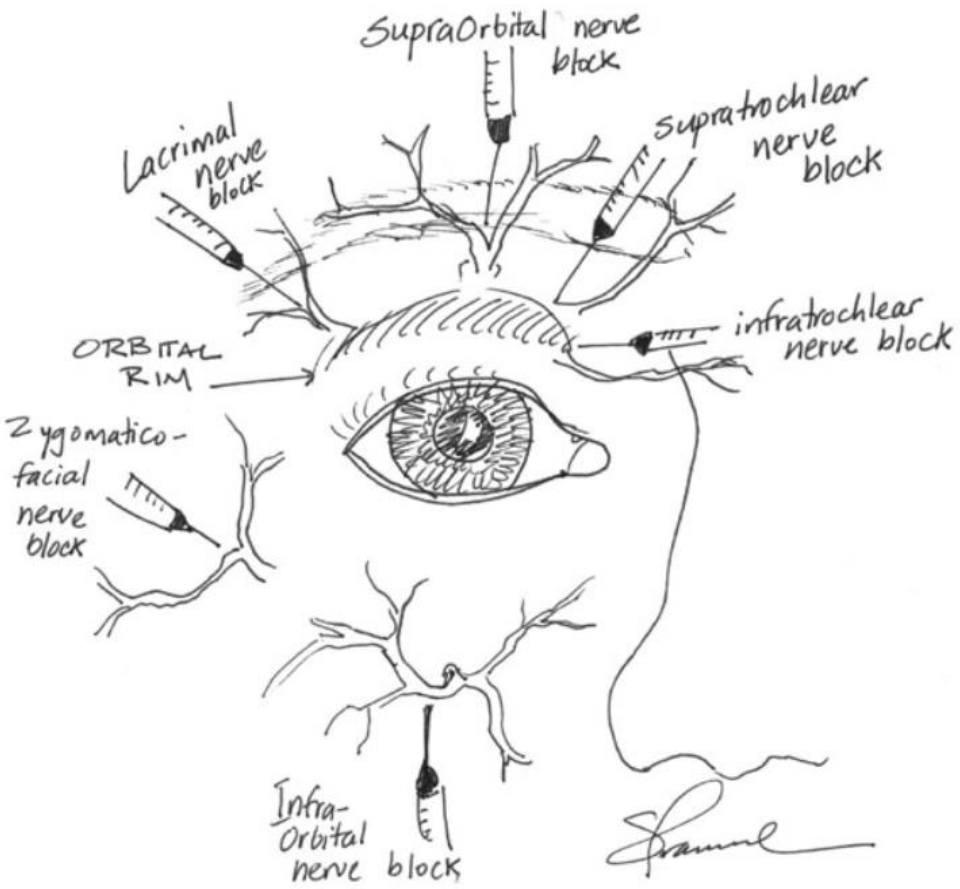
  - Spinal and epidural anesthesia are examples
    - Used in child birth or total knee replacement
    - Sometimes epidural catheters are left in place after surgery
      - To provide continues anesthesia for a determined period of time

Types of Anesthesia

- Regional anesthesia:
  - Nerve blocks are a type of regional anesthesia working on a smaller area
    - Local anesthetic is applied to a large nerve exiting a foramen at a branching point
      - Such as supra or infraorbital nerve blocks
    - Can consider this option as an optometrist if you want to prevent tissue distortion from a bolus, working on a larger area with multiple lesions, or involving much of the lid
    - May not be necessary in majority of instances
- Regional anesthesia may sometimes be used in combination with other types of anesthesia

Types of Anesthesia

- Regional anesthesia:
  - Nerve blocks



EyeRounds.org: Retrobulbar Block, Peribulbar Block and Common Nerve Blocks in Ophthalmology, https://webeye.ophth.uiowa.edu/eyeforum/tutorials/retrobulbar-nerve-blocks.htm.

Types of Anesthesia

- Local anesthesia:
  - Indications
    - *Pain prevention or relief in
      - *Procedures (incisions)
      - *Trauma (lacerations

"CME Activity: Eyelid Laceration: Osteopathic Medicine." *CME Activity | Eyelid Laceration | Osteopathic Medicine*, https://www.statpearls.com/physician/cme/activity/27007/?deg=DO.

    - Motor block
      - Diagnostic nerve block
      - To allow more accurate exam in setting of trauma or other disease

Types of Anesthesia

- Local anesthesia:
  - Anesthetics, such as lidocaine, injected locally to a focal area or applied topically
  - Often provides enough relief for many, if not most, out patient procedures
    - Especially optometric procedures
  - Utilized for making small incisions, lesions shaves, excisions, suturing, filling cavities, etc.
  - Around the eyes for dermatologic procedures:
    - Injected intradermally
    - A small bolus or "wheel" is created under the lesion
    - Typically safe and well tolerated
      - But care must be taken with allergies, other contraindications, signs of anaphylaxis and other complications

Types of Anesthesia

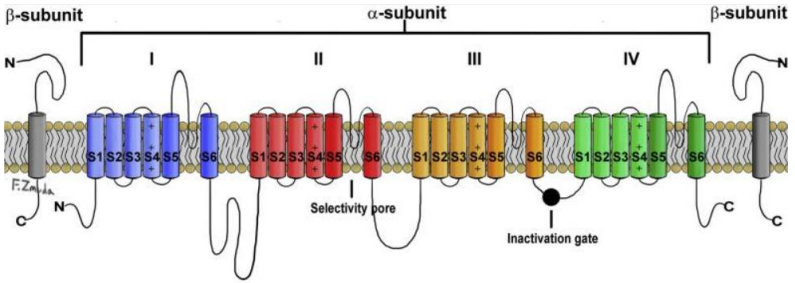
- Local anesthesia vs topical anesthesia (gels, creams, refrigerants, etc.)

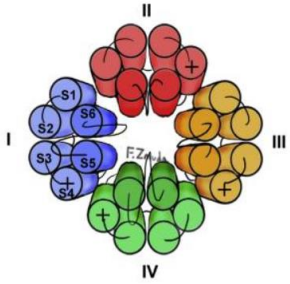
  - Local has good reliability and safety profile
    - Although may at times require larger amounts or multiple injections to cover an area
    - Process of injection may be painful and cause psychological discomfort
    - Wheel bolus may distort tissue

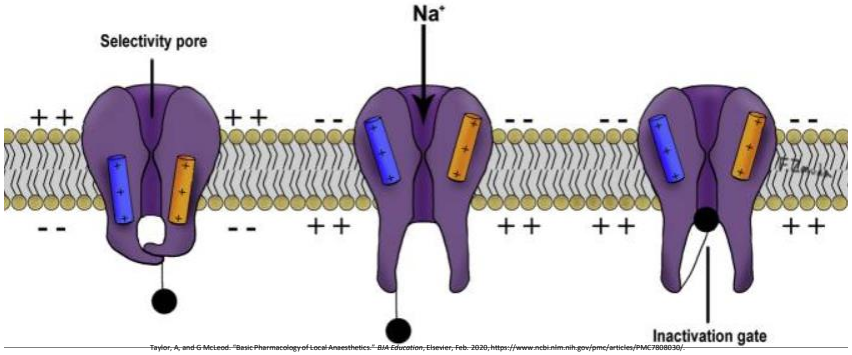
  - Topical has less reliability and safety profile
    - Often needs to be compounded
    - Should never be applied to an open wound
    - Does not distort tissue like an intradermal injection may
    - Refrigerants like ethyl chloride may be flammable

Local Anesthesia

- Mechanism of action of local anesthetics in the briefest sense is as follows:
  - Action potentials in excitable tissues are suppressed by blocking voltage-gated Na^+ channels
  - By this process they inhibit action potentials in nociceptive fibers and so block the transmission of pain impulses







Taylor, A, and G McLeod. "Basic Pharmacology of Local Anaesthetics." *BJA Education*, Elsevier, Feb. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808030/.

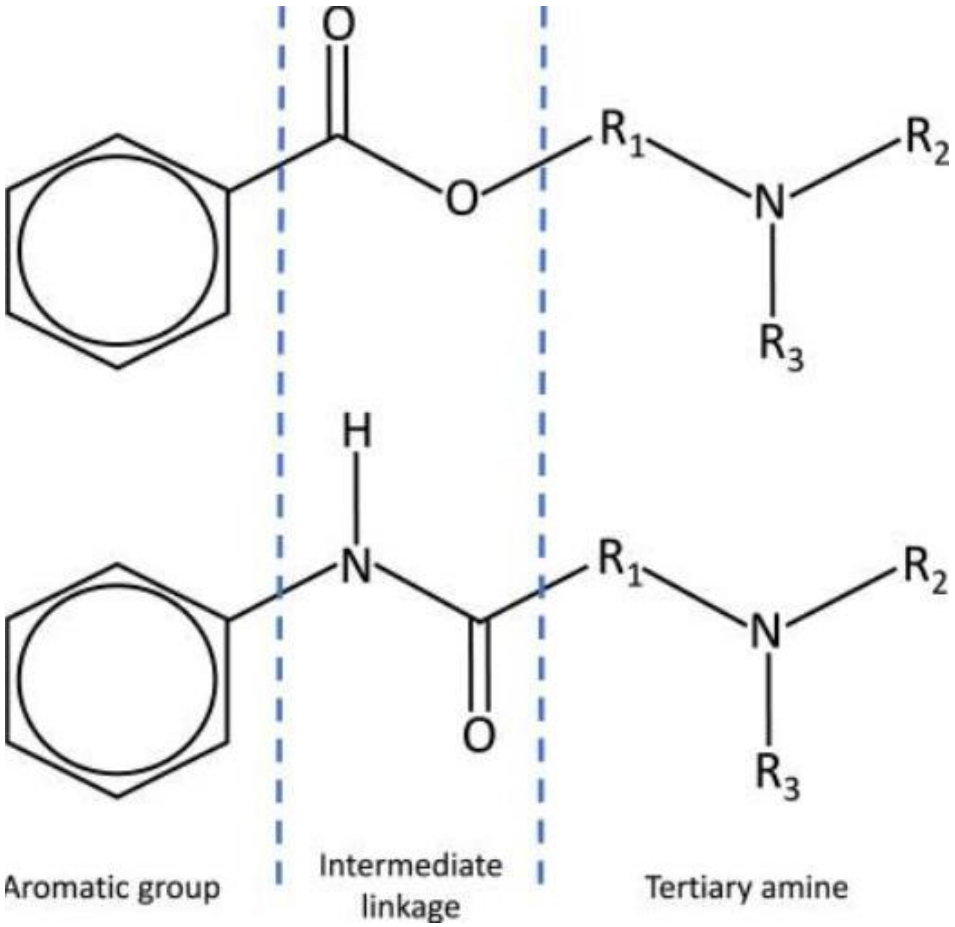
Amides vs. Esters

- Local anesthetic drugs are water-soluble salts of lipid-soluble alkaloids

- Structure of local anesthetics consists of three components:

  - Lipophilic aromatic group, an intermediary link and a hydrophilic amine group

  - The intermediary link categorizes local anesthetics into esters or amides



Taylor, A, and G McLeod. "Basic Pharmacology of Local Anaesthetics." *BJA Education*, Elsevier, Feb. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808030/.

Amides vs. Esters

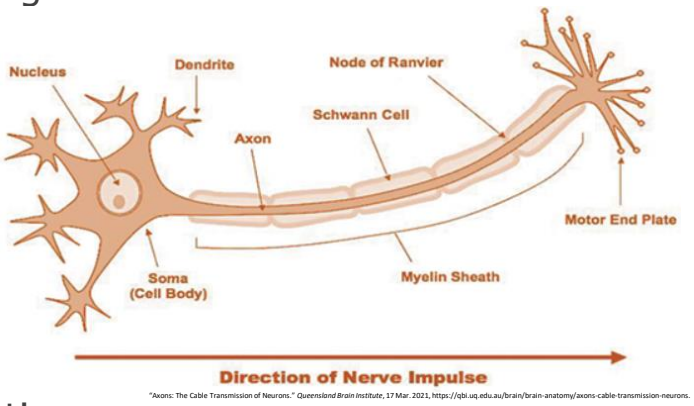
- Esters typically have fast onset and shorter duration
  - Metabolized locally, quicker than amides, into para-aminobenzoic acid, can cause allergy
- Amides typically have fast to slower onset and a longer duration
  - Metabolized in the liver, typically causes less allergic reaction

	Structural classification	MW	p*Ka*	Protein binding (%)	Partition coefficient	Onset	Elimination half-life (min)
Cocaine	Ester	311	8.6	95	–	Fast	100
Chloroprocaine	Ester	271	9.1	–	17	Fast	6
Prilocaine	Ester	220	7.7	55	50	Fast	100
Lidocaine	Amide	234	7.8	70	110	Fast	100
Mepivacaine	Amide	246	7.7	77	42	Fast	115
Bupivacaine	Amide	288	8.1	95	560	Moderate	210
Ropivacaine	Amide	274	8.1	94	230	Moderate	120
Levobupivacaine	Amide	288	8.1	95	–	Moderate	210

Taylor, A, and G McLeod. "Basic Pharmacology of Local Anaesthetics." *BJA Education*, Elsevier, Feb. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808030/.

Efficacy

- We need the local anesthetic to penetrate the cell membrane to get into the axon
- Anesthetics we use are typically weak bases
  - But are formulated in fairly acidic solutions
    - Contributes to a painful stinging sensation for the patient



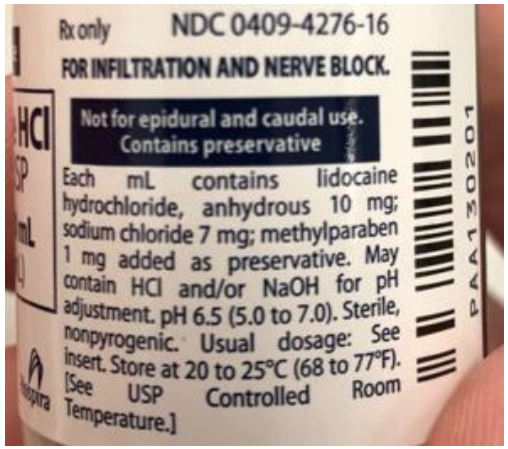
"Axons: The Cable Transmission of Neurons." *Queensland Brain Institute*, 17 Mar. 2021, https://qbi.uq.edu.au/brain/brain-anatomy/axons-cable-transmission-neurons.

- When using lidocaine for example,
  - There is ionized lidocaine and unionized lidocaine in the solution
  - Much more ionized form
    - But the unionized form is what actually penetrates into the axon

  - This leads us to consider increasing the pH of the solution through adding a buffer
    - Gets us more unionized lidocaine available
    - Gets us more penetration and less sting from acidity

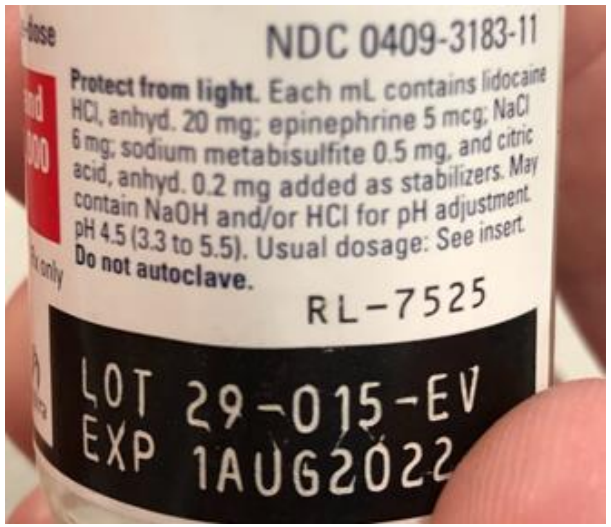
The Relevant Drugs

- The 2 anesthetics that are typically all you may need:
  - Lidocaine (0.5%, 1% or 2%)
    - Pretty much only one you need for what we do*
    - May or may not have epinephrine included



  - Bupivacaine (0.25%)
    - Acceptable to use, but has much longer duration and is generally unnecessary
    - May or may not have epinephrine included
    - Use is typical to mix 50/50 with lidocaine to achieve faster acting with longer duration

- Epinephrine (1:200,000 and 1:100,000)
  - Added in with anesthetic to promote
    - Vasoconstriction
    - Reduce bleeding
    - Slow anesthetic absorption into systemic circulation



The Relevant Drugs

Type	Name	Percent Concentration	Onset	Duration (minutes)	Max Single Dose	Dosing in mg/Kg
Amide	Lidocaine (Xylocaine)	0.5%, 1%, 2%	Fast ~30 seconds	30-120 60-400 w/epi	300mg 500mg w/epi	4.5 mg/Kg (Not exceeding max single dose)
Amide	Bupivacaine (Marcaine)	0.25%	Slow ~5 minutes	120-240 240-480 w/epi	175mg 225mg w/epi	2.5 mg/Kg (Not exceeding max single dose)

How Much Lidocaine?

- **60Kg** patient (132.277 lbs)

- Max dose for this patient using lidocaine without epinephrine (**not exceeding 300mg**) using **4.5mg/Kg**
  - $4.5\frac{mg}{Kg}x\ 60\ Kg = \mathbf{270}\boldsymbol{mg}$ **maximum allowable for this patient**

- How does this translate into how many mL we can use?
  - Depends on the concentration of lidocaine you use

  - Using your selected concentration, move the decimal 1 place to the right to get **mg/mL**
    - **0.5%** concentration = **5mg/mL** of your lidocaine solution

- So again, how many mL can we use?
  - $\frac{270mg}{5mg/mL} = \boldsymbol{54mL\ maximum\ allowable}$

How Much Lidocaine?

- To use 54mL of lidocaine on a patient for what we do would be **RIDICULOUS**

- We typically use 1mL tuberculin syringes to inject local areas for chalazions, papillomas, cysts, etc
  - May only use 0.3-0.6mL or so per intradermal injection per lesion to achieve an adequate wheel

- **In order to reach the maximum allowable dose for our example patient**
  - **You would need to inject 54 separate 1ml tuberculin syringes into the patient!!!**

- Patients often have multiple lesions, but it would be wildly unlikely for you to need this much medication for a patient

Contraindications to Local Lidocaine (other than allergy)

- Hx of central nervous system reactions with local anesthetic
  - Tremor/seizure
  - Visual disturbances
  - Tinnitus
  - Numbness around the mouth
- Hx of cardiovascular/pulmonary reaction with local anesthetic
  - Bradycardia
  - Hypotension
  - Arrhythmia
  - Hypoventilation
- Severe liver disease (amides)
- Pseudocholinesterase deficiency (esters)
- Medication:
  - Dihydroergotamine
  - Dronedarone
  - Saquinovir
  - Vernakalant

  (Miniscule intradermal amounts likely negligible, but preferable to avoid use)

Side Effects to Local Lidocaine and Signs of Adverse Events (other than allergy)

- If any, some redness or itch at the site of injection
- Can cause local vasodilation

- Small amounts of periocular intradermal lidocaine unlikely to find its way into the brain or cardiac tissue to cause an adverse event, but for some reason if it would, pay attention for:
  - Tremor/seizure
  - Visual disturbances
  - Tinnitus
  - Numbness around the mouth
  - Bradycardia
  - Hypotension
  - Arrhythmia
  - Hypoventilation

"5 Ways Quitting Drinking Affects Your Brain." *Renewal Lodge* |, https://www.renewallodge.com/5-ways-quitting-drinking-affects-your-brain/.

PhD, Patricia Silva. "Abdominal Muscles Involved in Cardiopulmonary Pathology in..." *Muscular Dystrophy News*, 13 Mar. 2015, https://musculardystrophynews.com/2015/03/13/abdominal-muscles-involved-in-cardiopulmonary-pathology-in-subjects-with-muscular-dystrophy/.

Contraindications to Local Epinephrine (other than allergy)

- Contaminated wounds***
- Insulin use (can counter-act)
- Tricyclic antidepressants and MAO inhibitors
- Beta blocker use
- Uncontrolled thyroid
- Oxytocic use
- Severe peripheral vascular disease (including diabetes)
- Uncontrolled HTN or malignant HTN levels
- Cardiovascular event in past 6 months and unstable
- Cerebrovascular event in past 6 months and unstable
- Unstable angina
- Refractory arrhythmia
- Uncontrolled congestive heart failure
- Coronary insufficiency
- Stimulant abuse
- Labor and delivery

Side Effects to Local Epinephrine and Signs of Adverse Events (other than allergy)

- If any, some irritation at the injection site
- Pallor around injection site due to vasoconstriction

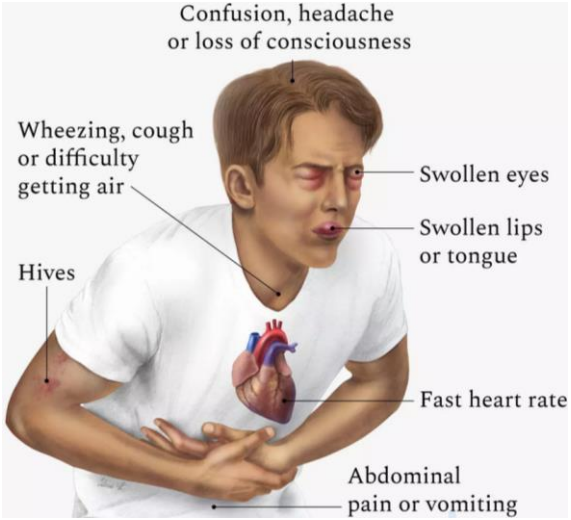
- Small amounts of periocular intradermal epinephrine unlikely to cause an adverse event, but nonetheless pay attention for:
  - Anxiousness
  - Tremors
  - Weakness
  - Dizziness
  - Sweating
  - Palpitations
  - Nausea or vomiting
  - Headache
  - Difficulty breathing

"5 Ways Quitting Drinking Affects Your Brain." *Renewal Lodge* |, https://www.renewallodge.com/5-ways-quitting-drinking-affects-your-brain/.

PhD, Patricia Silva. "Abdominal Muscles Involved in Cardiopulmonary Pathology in..." *Muscular Dystrophy News*, 13 Mar. 2015, https://musculardystrophynews.com/2015/03/13/abdominal-muscles-involved-in-cardiopulmonary-pathology-in-subjects-with-muscular-dystrophy/.

Anaphylaxis

- Severe, potentially life-threatening allergic reaction
  - Can occur within seconds or minutes
- Causes the immune mediated shock
  - Blood pressure drops suddenly and the airways narrow, blocking breathing



Chandra Manuelpillai, MD. "Allergic Reaction and Anaphylaxis." *Symptoms & Treatment*, Buoy Health, Inc., 30 Mar. 2022, https://www.buoyhealth.com/learn/allergic-reaction-anaphylaxis.

- Signs
  - Urticaria
  - Hypotension
  - Bronchospasm
  - Weak and rapid pulse
  - Nausea, vomiting, or diarrhea
  - Syncope
- If occurs:
  - Call 9-1-1
  - EpiPen
  - Benadryl for more local allergic reactions

CNS Toxicity/Cardiopulmonary Events and Other Rarities

- If occurs, as discussed on previous slides:
  - Call 9-1-1
  - Oxygen mask for CNS toxicity if available
  - BLS until paramedics arrive

Vetriciyaart. "Download Medical Ambulance in a Flat Cartoon Style on a Light Blue Background. Vector Image, Icon for Free." *Vecteezy*, Vecteezy, 20 Apr. 2021, https://www.vecteezy.com/vector-art/2299542-medical-ambulance-in-a-flat-cartoon-style-on-a-light-blue-background-vector-image-icon.

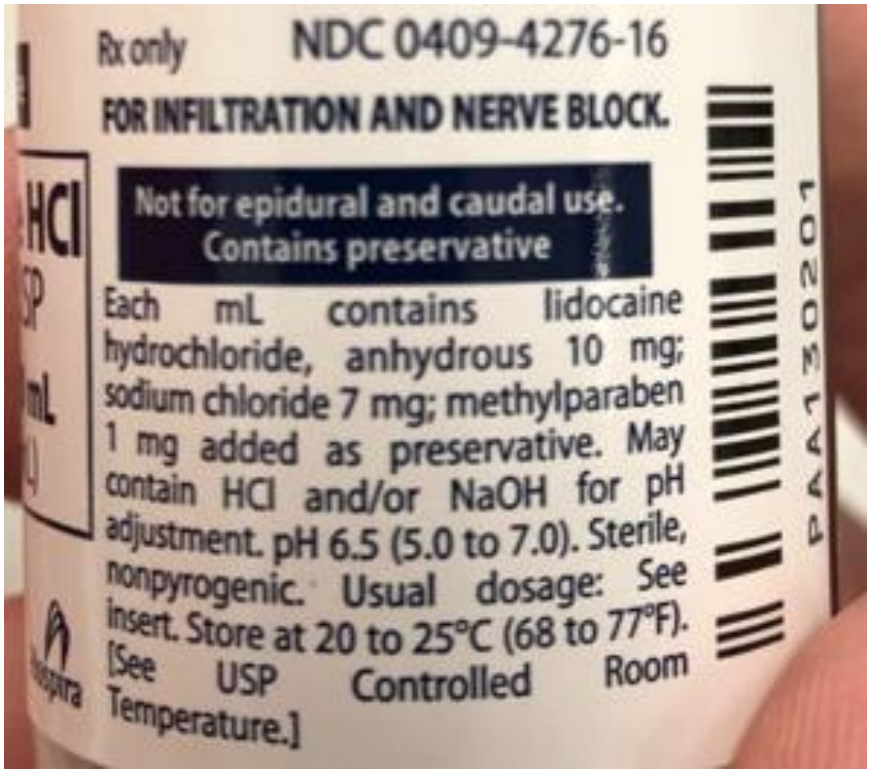
- Methemoglobinemia
  - Extremely rare association with local anesthetic
    - (Incredibly unlikely or even possible with such small amounts)
  - Oxidizes hemoglobin
  - Prevents oxygen carrying
  - Causes refractory cyanosis
  - Treated with methylene blue

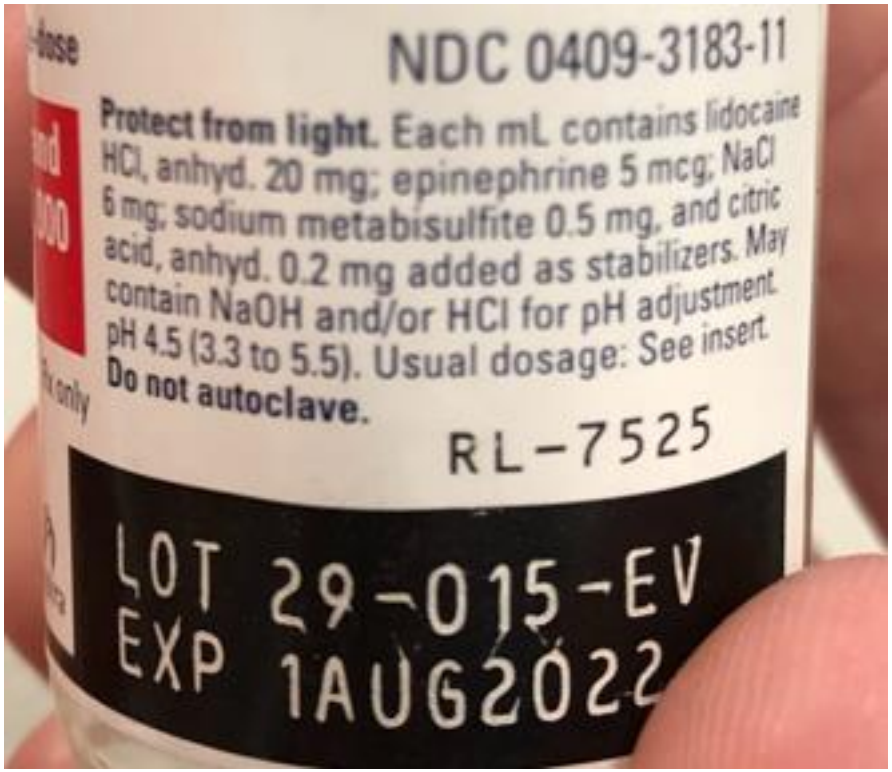
Farkas, Josh. "Methemoglobinemia." *EMCrit Project*, 30 Nov. 2021, https://emcrit.org/ibcc/methemoglobinemia/.

Allergic Patients

- *Most problems with local anesthetic is mostly due to the epinephrine, in general
- Regarding allergy, an actual epinephrine allergy is overwhelmingly improbable
  - *Any allergic reaction is likely due to bi-sulfite preservative in epinephrine formulation
- *If any contraindication to epinephrine…just use lidocaine without epinephrine*
- Local anesthetic allergies are also very uncommon
  - *Esters and amide classes have minimal cross reactivity
    - Esters more prone to allergic reaction
- Most allergic reactions to local anesthetic is due to methylparaben preservative
  - *Can obtain preservative single dose vials of lidocaine for these people
- What if they are allergic to amides and you don't have (or want to try) an ester???

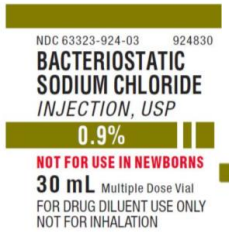
Allergic Patients



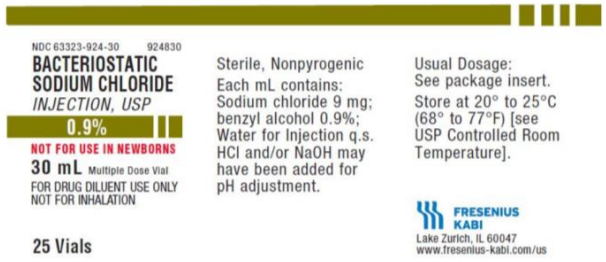


Allergic Patients

- What if they are allergic to amides and you don't have (or want to try) an ester???
- If procedure is very simple like a single stalked smaller papilloma…consider no anesthetic?
- Liquid diphenhydramine has been documented to have some anesthetic properties
- <u>Bacteriostatic 0.9% saline preserved with benzyl alcohol</u>
  - Very short duration, but works to similar level as lidocaine



"Bacteriostatic Sodium Chloride Injection, USP." *U.S. National Library of Medicine*, National Institutes of Health, https://dailymed.nlm.nih.gov/dailymed/fda/fdaDrugXsl.cfm?setid=e5e325d1-0d58-40c9-9645-3ae402ff9d92&type=display.



Allergic Patients

The ROYAL COLLEGE of OPHTHALMOLOGISTS

www.nature.com/eye

REVIEW ARTICLE

Check for updates

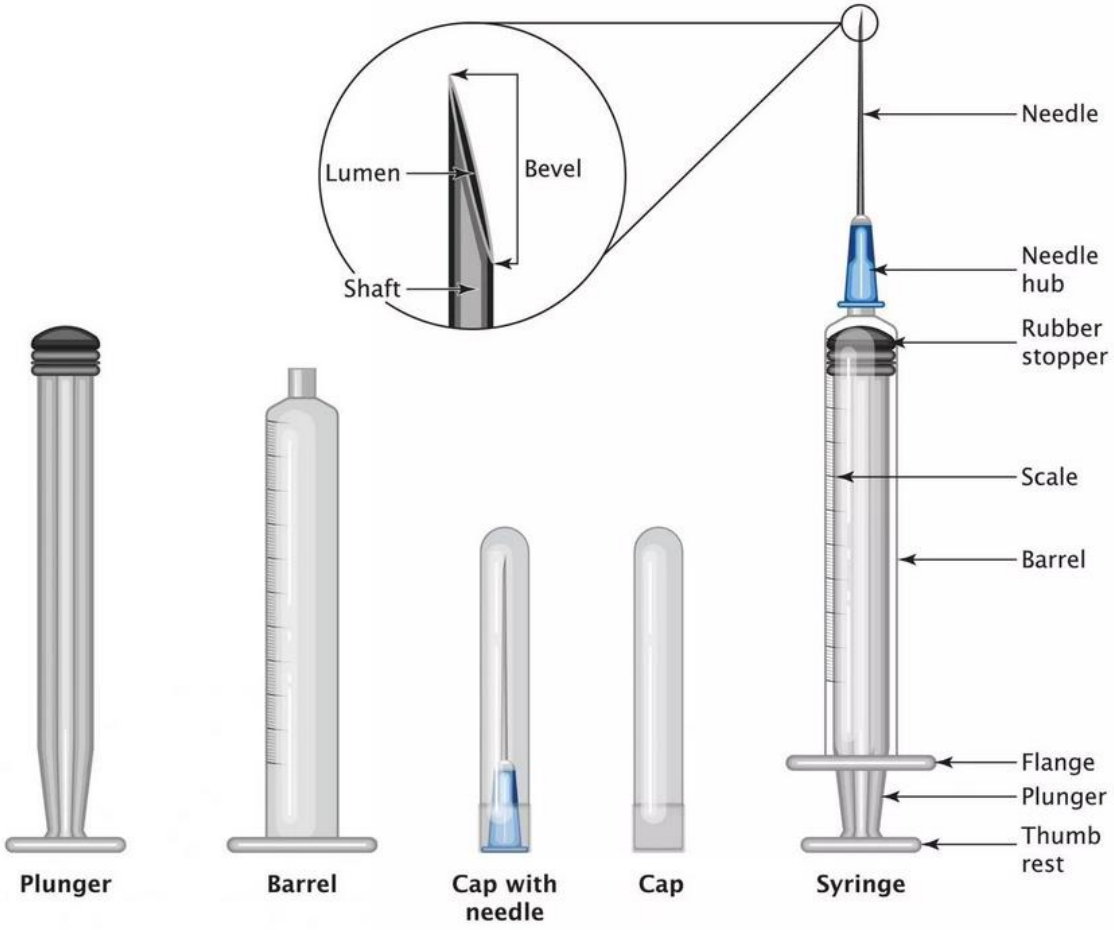
Bacteriostatic preserved saline for pain-free periocular injections: review

Samantha Vicki Hunt[1]✉ and Raman Malhotra[1]

We review evidence regarding the use of 0.9% benzyl alcohol in 0.9% sodium chloride solution for periocular injections ('preserved saline') including botulinum toxin A injections and local anaesthesia. A literature search was undertaken using search terms 'bacteriostatic saline', 'benzyl-alcohol saline', 'benzyl alcohol sodium chloride' and 'preserved saline'. Bibliographies identified further sources. There have been 62 studies published on the subject of preserved-saline since 1928. Significantly lower injection-associated pain levels for periocular/facial botulinum toxin injections reconstituted with preserved-saline rather than preservative-free saline are reported by 5 studies. Significantly lower injection-associated pain with preserved-saline diluted lidocaine and epinephrine solution for eyelid anaesthesia compared with unmodified or buffered lidocaine with epinephrine, and adequate anaesthesia, was reported by one study. Thirty-one studies have explored preserved-saline for anaesthetic and seven for bacteriostatic properties, with very low infection rates after periocular botulinum toxin injections, and reduced rates of infection in indwelling catheters when preserved saline is used to flush. A meta-analysis concluded that lidocaine-containing solutions are more effective at reducing pain from insertion of intravenous catheters. Patient-perceived pain related to periorbital injections of local anaesthesia is reduced when the anaesthetic is diluted with benzyl alcohol-preserved saline compared with other dilution or buffering options. Pain is similarly reduced for periocular botulinum toxin injections reconstituted with preserved saline compared with unpreserved saline. Benzyl-alcohol preserved-saline is inexpensive but costlier than unpreserved-saline, with minimal reported complications, particularly with periocular administration, and offers the opportunity to improve the patient experience.

Eye; https://doi.org/10.1038/s41433-021-01925-z

Other Supplies



Anna. "What Is a 3-Part Syringe? - KMED-Leading Infusion Set Manufacturer,Disposable Medicals Supplier." *Kmed*, Kmed, 12 July 2021, https://www.kmedhealth.com/what-is-a-3-part-syringe/.

Other Supplies

Types of Syringe Tips

Luer Lok Tip - secure screw type connection.

Slip Tip - slip or push-on connection.

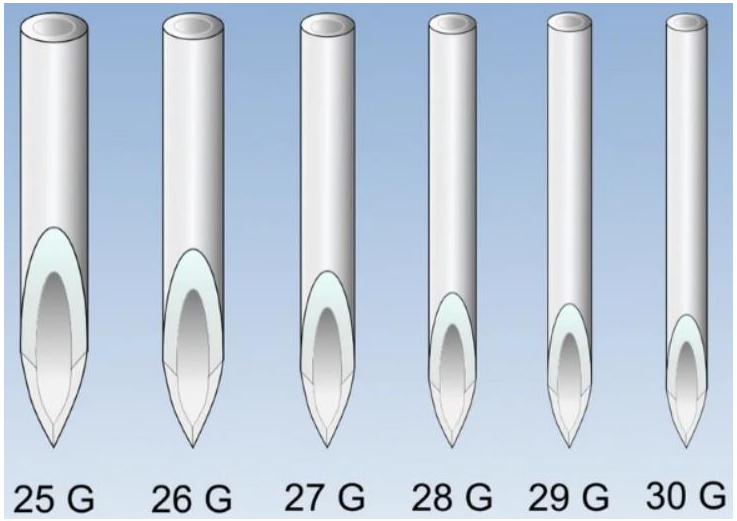
Eccentric Tip - off center tip used for surface veins or artery injections.

Catheter Tip - Longer and tapered slip tip design used for irrigation or with tubing.

Anna. "What Is a 3-Part Syringe? - KMED-Leading Infusion Set Manufacturer,Disposable Medicals Supplier." *Kmed*, Kmed, 12 July 2021, https://www.kmedhealth.com/what-is-a-3-part-syringe/.

Other Supplies

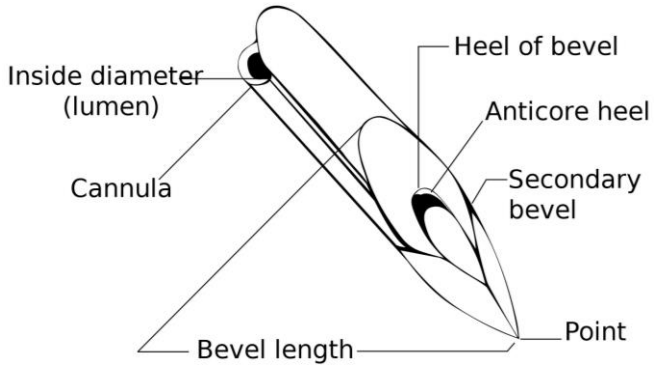
ISO Hub Color Standards for safety-engineered needles

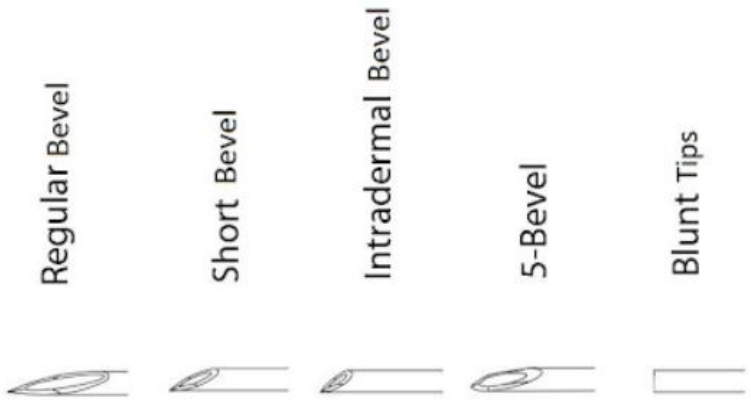


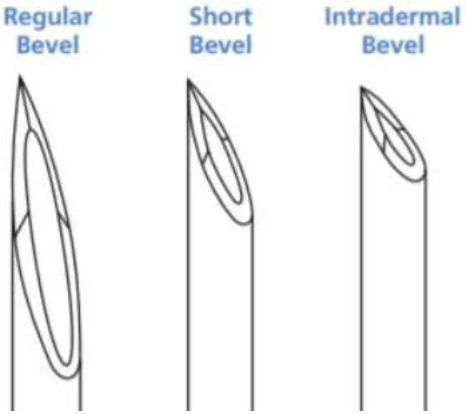
Health, Medilog Bio. "Medical Needle Types, Sizes, Color-Coding and Uses." *MediLog Bio Health*, Blogger, 16 Feb. 2022, https://www.medilogbiohealth.com/2021/03/types-of-medical-needles.html.

Other Supplies

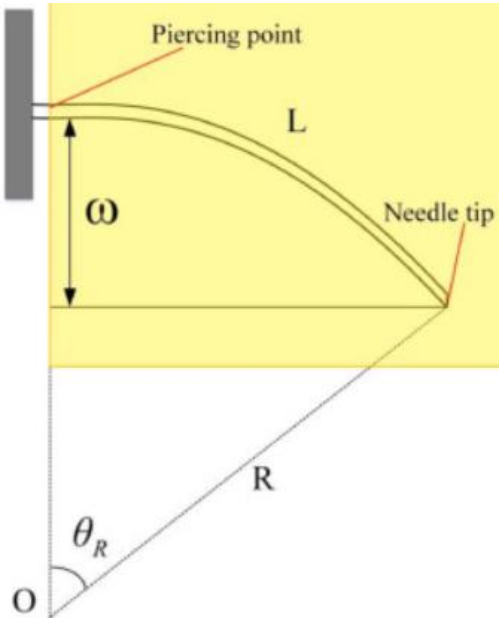
"BD 305155 - Needle Reg Bevel 22gx1." *CIA Medical – Central Infusion Alliance*, https://www.ciamedical.com/bd-305155-case-needle-reg-bevel-22gx1.

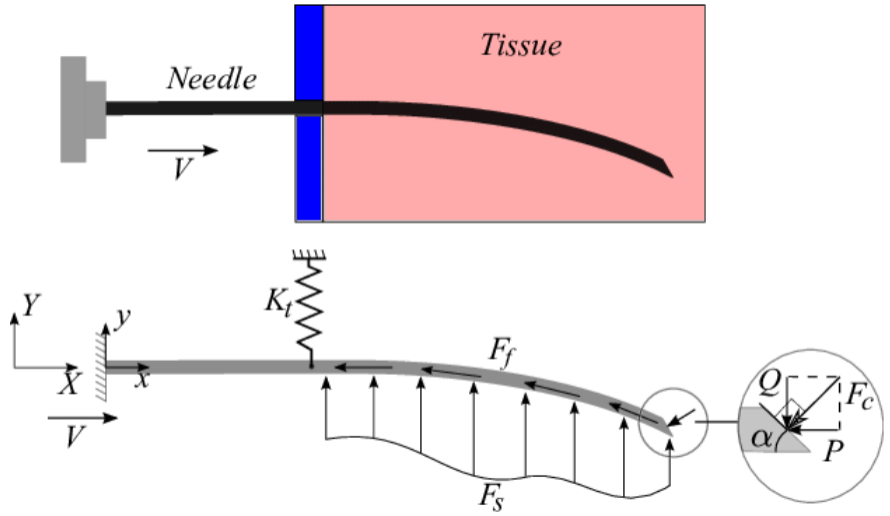






Other Supplies



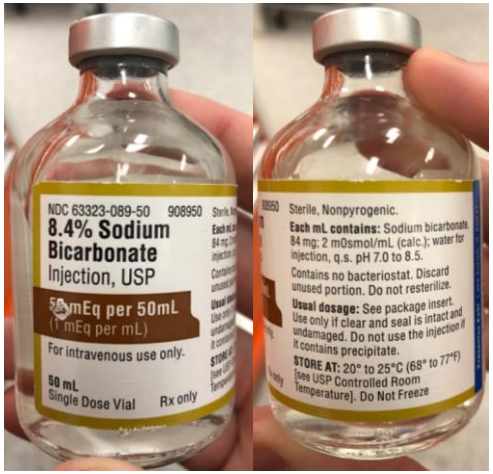


- Typically use ½”- 1 ½” for optometry procedures
- ~ ¾” is probably most useful
- *Use shorter length when learning

Helpful Tips For Minimizing Patient Pain

- Make sure they are comfortable with you and talk to them calmly

- Raise the pH with 8.4% sodium bicarbonate buffer to create more unionized lidocaine
  - Will also reduce sting
  - Use 9 parts anesthetic to 1 part sodium bicarbonate



- Bacteriostatic 0.9% saline preserved with benzyl alcohol may also be an effective buffer
  - While having its own intrinsic anesthetic properties

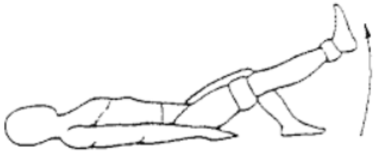
"Bacteriostatic Sodium Chloride Injection, USP." *U.S. National Library of Medicine*, National Institutes of Health, https://dailymed.nlm.nih.gov/dailymed/fda/fdaDrugXsl.cfm?setid=e5e325d1-0d58-40c9-9645-3ae402ff9d92&type=display.

Helpful Tips For Minimizing Patient Pain

- Warm the medications with a baby bottle warmer

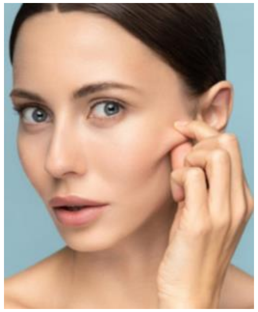
Amazon.com : Philips Avent Fast Baby Bottle Warmer with ... https://www.amazon.com/Philips-Temperature-Control-Automatic-Shut-Off/dp/B0876T9DQZ.

- Have patient raise their leg



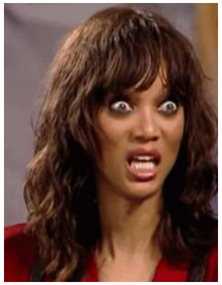
"Lumbar Activities Booklet." *Lumbar Activities Booklet: Strengthening Exercises*, https://brain-spine.com/lumbar_activities/strengthening_exercises.html.

- Pinch the patient's skin to reduce ability to discriminate the location of the pain



"Test the Elasticity of Your Skin with a 'Pinch Test.'" *Healthy Skin & Beauty Treatment Center*, 25 Oct. 2021, https://healthy-skin.me/test-the-elasticity-of-your-skin-with-a-pinch-test/.

- Have patient keeps their eyes open



"Shooting Daggers Crazy Eyes." *Zimbio*, https://www.zimbio.com/18+Photos+That+Prove+Tyra+Banks+Is+the+Real+'Crazy+Eyes'/articles/n9p8UcWxzMx/Shooting+Daggers+Crazy+Eyes.

Helpful Tips For Minimizing Patient Pain

- Use smaller gauge needles to inject
  - 27g or 30g*

"Selecting Syringes and Needles." Vitality Medical, 22 Apr. 2015, https://www.vitalitymedical.com/blog/selecting-syringes-and-needles.html.

- Inject medication slowly

"Slow Sign." Depositphotos, https://depositphotos.com/121271512/stock-illustration-slow-sign.html.

- Insert needle quickly

Grebeshkovamaxim. "Fast Icon Vector Image on Vectorstock." VectorStock, 5 Aug. 2019, https://www.vectorstock.com/royalty-free-vector/fast-icon-vector-26611534.

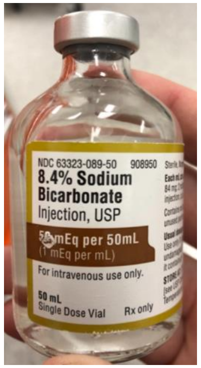
- Can consider a topical anesthetic
  - Really not necessary

Performing

Amazon.com: MedPride Powder-Free Nitrile Exam Gloves ... https://www.amazon.com/MedPride-Powder-Free-Nitrile-Gloves-Medium/dp/B00GS8W3T4.

Foot-Operated Stainless Steel Mayo Stand with Extra-Large ... https://www.amazon.com/Foot-Operated-Stainless-Steel-Stand-Extra-Large/dp/B00T57SFI8.

Amazon.com : Philips Avent Fast Baby Bottle Warmer with ... https://www.amazon.com/Philips-Temperature-Control-Automatic-Shut-Off/dp/B0876T9DQZ.



Anna. "What Is a 3-Part Syringe? - KMED-Leading Infusion Set Manufacturer,Disposable Medicals Supplier." *Kmed*, Kmed, 12 July 2021, https://www.kmedhealth.com/what-is-a-3-part-syringe/.

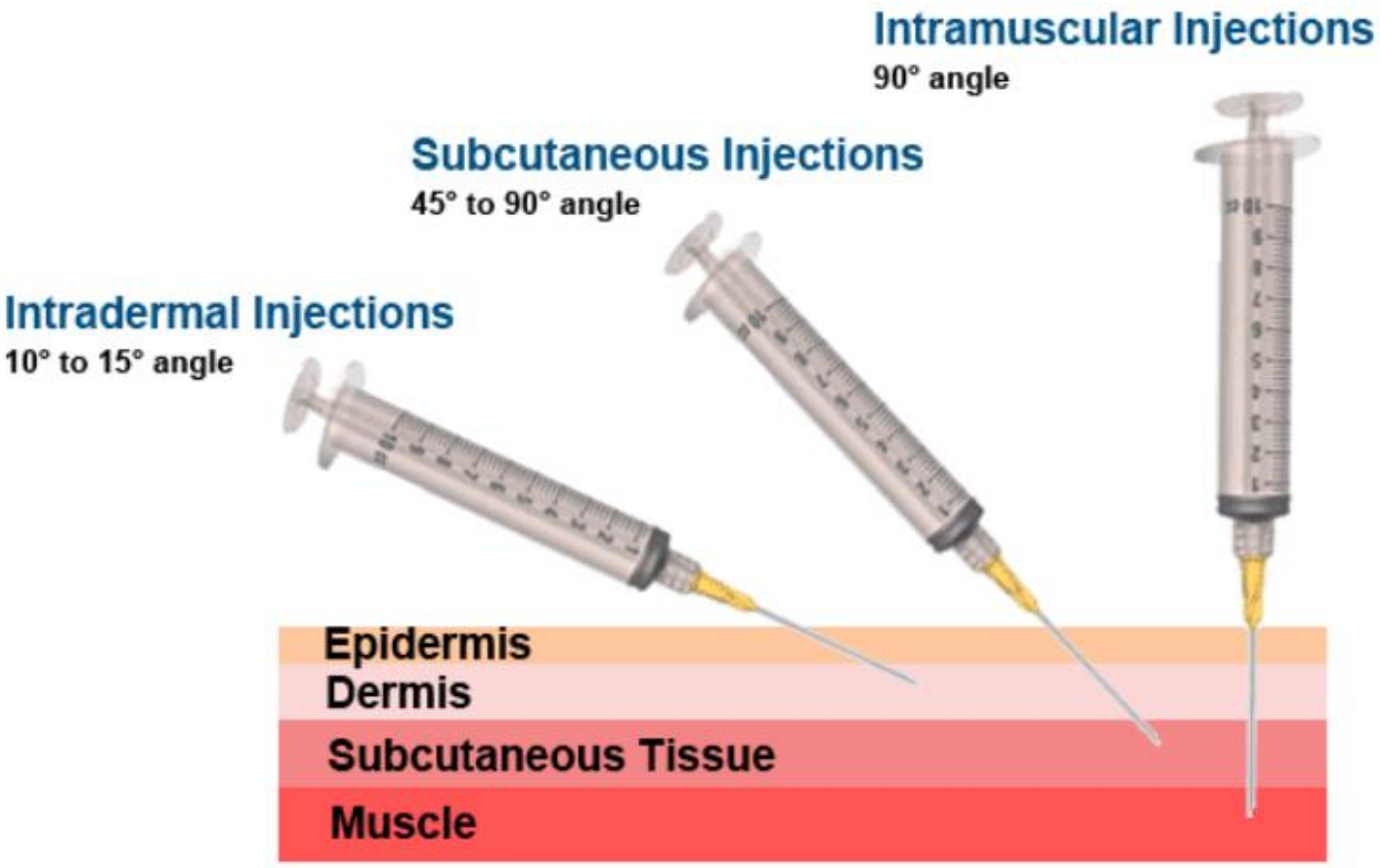
"Selecting Syringes and Needles." *Vitality Medical*, 22 Apr. 2015, https://www.vitalitymedical.com/blog/selecting-syringes-and-needles.html.

Amazon.com : Philips Avent Fast Baby Bottle Warmer with ... https://www.amazon.com/Philips-Temperature-Control-Automatic-Shut-Off/dp/B0876T9DQZ.

"Dr. Sudeep Roy - Hollow Eye Filler." *YouTube*, YouTube, 13 Oct. 2020, https://www.youtube.com/watch?v=vkRoeRHNwPo.

"Human?" *Are You a Human?*, https://www.newegg.com/medline-first-aid-medical-supplies/p/N82E16848063134.

Performing



Health, MedBlog Bio. "Medical Needle Types, Sizes, Color-Coding and Uses." MedLog Bio Health, Blogger, 16 Feb. 2022, https://www.medlogbiohealth.com/2021/03/types-of-medical-needles.html.

Performing

Technical Tips

- Always be aware of your angle of approach
- Tighten skin in the direction parallel to your needle approach
- Always try to approach with the needle NOT facing the globe
- Insert 1-2mm in front of the lesion
- Don’t need to aspirate, because eyelid vessels are too fine to have needle inside of a vessel
- Get under the lesion or just slightly past, and inject as you retract the needle
  - Always inject while retracting

Post-injection

- Tamponade any bleeding with sterile CTA/gauze pad
- Mechanical deturgescence
- Monitor patient for signs of adverse reaction
- Prep yourself for the remainder of the procedure

Cognitive Tips

- Always make sure you assess patients for level of risk
- Always pay attention for adverse reactions
- Always make sure you are drawing and injecting the right medications
- Always make sure your informed consent forms cover risk of anesthetic/epinephrine

Questions?

- Thank you

works cited

"100PCS 9 Models Glue Liquid Dispenser Needles Pinhead Steel for Syringe." *Bonanza*, https://www.bonanza.com/listings/100PCS-9-Models-Glue-Liquid-Dispenser-Needles-Pinhead-Steel-for-Syringe/1166661896?goog_pla=1&gpid=294505072980&keyword=&pos=&ad_type=pla&gclid=Cj0KCQjw8_qRBhCXARIsAE2AtRZHNnPYBAX6EKaQsdHBy-ExV3jIZsBtAy6SyedrwIyDfck6nnrWLpkaAsUbEALw_wcB.

Anna. "What Is a 3-Part Syringe? - KMED-Leading Infusion Set Manufacturer,Disposable Medicals Supplier." *Kmed*, Kmed, 12 July 2021, https://www.kmedhealth.com/what-is-a-3-part-syringe/.

"BD 305155 - Needle Reg Bevel 22gx1." *CIA Medical – Central Infusion Alliance*, https://www.ciamedical.com/bd-305155-case-needle-reg-bevel-22gx1.

Cai, Chenxu, et al. "Clinical Flexible Needle Puncture Path Planning Based on Particle Swarm Optimization." *Computer Methods and Programs in Biomedicine*, Elsevier, 5 May 2020, https://www.sciencedirect.com/science/article/abs/pii/S0169260719322576.

Castillo, Richard. "Office Based Local Anesthesia Video Series." *Asos Speakers Bureau - American Society of Optometric Surgeons*, https://asos.clubexpress.com/content.aspx?page_id=22&club_id=19363&module_id=341026.

"Epinephrine Therapy in Patients Receiving Beta Blocker Treatment." *American Academy of Allergy Asthma & Immunology*, https://www.aaaai.org/allergist-resources/ask-the-expert/answers/old-ask-the-experts/epi.

EyeRounds.org: Retrobulbar Block, Peribulbar Block and Common Nerve Blocks in Ophthalmology, https://webeye.ophth.uiowa.edu/eyeforum/tutorials/retrobulbar-nerve-blocks.htm.

Farkas, Josh. "Methemoglobinemia." *EMCrit Project*, 30 Nov. 2021, https://emcrit.org/ibcc/methemoglobinemia/.

GERLACH, Raquel Fernanda, et al. "The Use of Epinephrine-Containing Anesthetic Solutions in Cardiac Patients: A Survey." *Revista De Odontologia Da Universidade De São Paulo*, Universidade De São Paulo, 1 Oct. 1998, https://www.scielo.br/j/rousp/a/hY7Dc5NtXft7xsvwRtFNRts/?lang=en.

Health, Medilog Bio. "Medical Needle Types, Sizes, Color-Coding and Uses." *MediLog Bio Health*, Blogger, 16 Feb. 2022, https://www.medilogbiohealth.com/2021/03/types-of-medical-needles.html.

Ian K McLeod, MD. "Local Anesthetics: Introduction and History, Mechanism of Action, Chemical Structure." *Local Anesthetics: Introduction and History, Mechanism of Action, Chemical Structure*, Medscape, 23 Dec. 2021, https://emedicine.medscape.com/article/873879-overview#a3.

works cited

"Iowa Head and Neck Protocols." *Maximum Recommended Doses and Duration of Local Anesthetics | Iowa Head and Neck Protocols*, https://medicine.uiowa.edu/iowaprotocols/maximum-recommended-doses-and-duration-local-anesthetics.

Khadem, Moshen. *(PDF) a Mechanics-Based Model for Simulation and Control ...*, https://www.researchgate.net/publication/277557906_A_Mechanics-based_Model_for_Simulation_and_Control_of_Flexible_Needle_Insertion_in_Soft_Tissue.

Lee, Ji Min, and Teo Jeon Shin. "Use of Local Anesthetics for Dental Treatment during Pregnancy; Safety for Parturient." *Journal of Dental Anesthesia and Pain Medicine*, The Korean Dental Society of Anesthsiology, June 2017, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5564152/.

"Lidocaine (Intradermal Route) Side Effects." *Mayo Clinic*, Mayo Foundation for Medical Education and Research, 1 Feb. 2022, https://www.mayoclinic.org/drugs-supplements/lidocaine-intradermal-route/side-effects/drg-20137337?p=1.

McConnell, Arneshia. "Analgesia vs Anesthesia." *SlideShare a Scribd Company*, https://www.slideshare.net/arneshia22/analgesia-vs-anesthesia.

"Selecting Syringes and Needles." *Vitality Medical*, 22 Apr. 2015, https://www.vitalitymedical.com/blog/selecting-syringes-and-needles.html.

Taylor, A, and G McLeod. "Basic Pharmacology of Local Anaesthetics." *BJA Education*, Elsevier, Feb. 2020, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808030/.

Torp, Klaus D. "Lidocaine Toxicity." *StatPearls [Internet].*, U.S. National Library of Medicine, 4 Feb. 2022, https://www.ncbi.nlm.nih.gov/books/NBK482479/.

"Types of Anesthesia - Made for This Moment." *Made For This Moment | Anesthesia, Pain Management & Surgery*, https://www.asahq.org/madeforthismoment/anesthesia-101/types-of-anesthesia/.

"Types of Anesthesia." *UCLA Anesthesiology & Perioperative Medicine*, https://www.uclahealth.org/anes/types-of-anesthesia.

Whyte, John. "FDA Implements New Labeling for Medications Used during Pregnancy and Lactation." *American Family Physician*, 1 July 2016, https://www.aafp.org/afp/2016/0701/p12.html.

works cited

"5 Ways Quitting Drinking Affects Your Brain." *Renewal Lodge* |, https://www.renewallodge.com/5-ways-quitting-drinking-affects-your-brain/.

Amazon.com : Alcohol Prep Pads, Medium 2-Ply - 400 Alcohol ... https://www.amazon.com/Alcohol-Prep-Pads-Medium-2-Ply/dp/B07SNV2K4J.

Amazon.com : Philips Avent Fast Baby Bottle Warmer with ... https://www.amazon.com/Philips-Temperature-Control-Automatic-Shut-Off/dp/B0876T9DQZ.

Amazon.com: MedPride Powder-Free Nitrile Exam Gloves ... https://www.amazon.com/MedPride-Powder-Free-Nitrile-Gloves-Medium/dp/B00GS8W3T4.

"Anaesthesia: Types, Procedure, Side Effects and Risks." *Netmeds*, https://www.netmeds.com/health-library/post/anaesthesia-types-procedure-side-effects-and-risks.

"Axons: The Cable Transmission of Neurons." *Queensland Brain Institute*, 17 Mar. 2021, https://qbi.uq.edu.au/brain/brain-anatomy/axons-cable-transmission-neurons.

"Bacteriostatic Sodium Chloride Injection, USP." *U.S. National Library of Medicine*, National Institutes of Health, https://dailymed.nlm.nih.gov/dailymed/fda/fdaDrugXsl.cfm?setid=e5e325d1-0d58-40c9-9645-3ae402ff9d92&type=display.

"Category:Epidural Anaesthesia." *Wikimedia Commons*, https://commons.wikimedia.org/wiki/Category:Epidural_anaesthesia.

Chandra Manuelpillai, MD. "Allergic Reaction and Anaphylaxis." *Symptoms & Treatment*, Buoy Health, Inc., 30 Mar. 2022, https://www.buoyhealth.com/learn/allergic-reaction-anaphylaxis.

"CME Activity: Eyelid Laceration: Osteopathic Medicine." *CME Activity | Eyelid Laceration | Osteopathic Medicine*, https://www.statpearls.com/physician/cme/activity/27007/?deg=DO.

"Dr. Sudeep Roy - Hollow Eye Filler." *YouTube*, YouTube, 13 Oct. 2020, https://www.youtube.com/watch?v=vkRoeRHNwPo.

EyeRounds.org: Retrobulbar Block, Peribulbar Block and Common Nerve Blocks in Ophthalmology, https://webeye.ophth.uiowa.edu/eyeforum/tutorials/retrobulbar-nerve-blocks.htm.

Foot-Operated Stainless Steel Mayo Stand with Extra-Large ... https://www.amazon.com/Foot-Operated-Stainless-Steel-Stand-Extra-Large/dp/B00T57SFI8.

Grebeshkovmaxim. "Fast Icon Vector Image on Vectorstock." *VectorStock*, 5 Aug. 2019, https://www.vectorstock.com/royalty-free-vector/fast-icon-vector-26611534.

Heidi Shafford, DVM. "Minimizing the Risks of Anesthesia in Dogs." *Preventive Vet*, 14 June 2014, https://www.preventivevet.com/dogs/minimizing-the-risks-of-anesthesia-in-cats-and-dogs.

"Human?" *Are You a Human?*, https://www.newegg.com/medline-first-aid-medical-supplies/p/N82E16848063134.

"Intravenous Sedation." *NY NJ Anesthesia, LLC*, http://www.nynjanesthesia.com/intravenous-sedation.

"Lumbar Activities Booklet." *Lumbar Activities Booklet: Strengthening Exercises*, https://brain-spine.com/lumbar_activities/strengthening_exercises.html.

PhD, Patricia Silva. "Abdominal Muscles Involved in Cardiopulmonary Pathology in..." *Muscular Dystrophy News*, 13 Mar. 2015, https://musculardystrophynews.com/2015/03/13/abdominal-muscles-involved-in-cardiopulmonary-pathology-in-subjects-with-muscular-dystrophy/.

"Shooting Daggers Crazy Eyes." *Zimbio*, https://www.zimbio.com/18+Photos+That+Prove+Tyra+Banks+Is+the+Real+'Crazy+Eyes'/articles/n9p8UcWxzMx/Shooting+Daggers+Crazy+Eyes.

"Slow Sign." *Depositphotos*, https://depositphotos.com/12127150/stock-illustration-slow-sign.html.

"Test the Elasticity of Your Skin with a 'Pinch Test.'" *Healthy Skin & Beauty Treatment Center*, 25 Oct. 2021, https://healthy-skin.me/test-the-elasticity-of-your-skin-with-a-pinch-test/.

Vetriciyaart. "Download Medical Ambulance in a Flat Cartoon Style on a Light Blue Background. Vector Image, Icon for Free." *Vecteezy*, Vecteezy, 20 Apr. 2021, https://www.vecteezy.com/vector-art/2298542-medical-ambulance-in-a-flat-cartoon-style-on-a-light-blue-background-vector-image-icon.