

Sedation & Analgesia

Special



This session will be recorded

- ❑ We are recording this Zoom session so that it can be watched again at your convenience, and so that we can share it with your colleagues who were not able to join us today.
- ❑ If you would prefer that this recording **not** be shared with your EM colleagues, please email amcknight@ghem.ca within 24 hours of the session.
- ❑ We will share the presentation slides and other materials (journal articles, etc.) by email; you will have access to all materials regardless of whether the recording is shared.



Please also note:

- ❑ The information in this presentation and the video recording is up to date as of the date it was recorded (insert date here).
- ❑ It has not been updated to include any subsequent advances in practice, and the information presented in this video does not replace hospital, health centre, or governmental guidelines.





ouchless PEM



Maxim Ben-Yakov, MDCM, FRCPC, FACEP, dABEM
Assistant Professor of Pediatrics/Medicine
Division of Emergency Medicine
[@docmaximum](#)

A family of five is seen from behind, standing on a sandy beach looking out at the ocean. They are all wearing superhero-style capes with large stars on the back. From left to right: a girl in a purple cape with a white star, a girl in a red cape with a yellow star, a man in a blue cape with a red star, a boy in a red cape with a blue star, and a boy in a green cape with a yellow star. The background is a soft-focus view of the sea and sky.

UofT DISCLOSURE

I have no relationships with commercial interests
I treat adults & kids (and adults who act like kids)

Complete the sentence: "Kids are not little adults, but _____"

"pediatricians often are"

"They kind of are"

"little monsters"

"Adults are just big children"

"theyre made by them"

"Sometimes they are"

"are very little adults"

"MONSTROSITIES"

FNN

FAKE NEWS NETWORK

tru·thi·ness \ˈtrü-thē-nəs\ *n*

1 : truth that comes from the gut, not books (*Stephen Colbert, Comedy Central's "The Colbert Report," October 2005*)

2 : the quality of preferring concepts or facts one wishes to be true, rather than concepts or facts known to be true (*American Dialect Society, January 2006*)



Truthiness

Fact or Myth

Young infants don't feel pain because it's a learned perception!

Pediatric pain is impossible to measure, they're always crying and tachycardic!

You can't use opioids in young children – they are too sensitive and will have apnea!

If you suspect a fracture – never give NSAID's, it won't heal well!

Tramadol and Codeine shouldn't be use in kids- high risk for side effects!

Fact or Myth

Young infants don't feel pain because it's a learned perception!

Pediatric pain is impossible to measure, they're always crying and tachycardic!

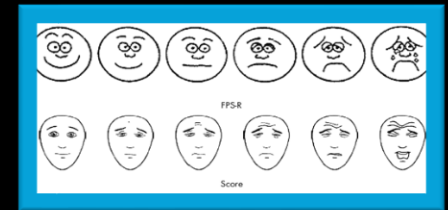
You can't use opioids in young children – they are too sensitive and will have apnea!

If you suspect a fracture – never give NSAID's, it won't heal well!

Tramadol and Codeine shouldn't be use in kids- high risk for side effects!

- Myth - Young infants, and newborn have fully developed pain receptors & have measurable pain perception

- Myth - many different scales



- Myth – opioids are safe and effective- weight based dosing!



- Myth - single dose NSAIDs (ibuprofen or ketorolac) safe & effective pain reduction (30%)

- Fact – FDA and Health Canada warning against use for <18 year olds



Broken Elbow Park







What analgesia modality would you pick for her?

Tylenol 15mg/kg PO/PR **A**

Advil 10mg/kg PO **B**

Morphine 0.2-0.5 mg/kg PO or
Fentanyl 1.5 mcg/kg IN **C**

iPad and a freezie-pop - kids (& some
adults) just need to be distracted **D**

All of the above **E**



59% Ibuprofen only

12% any med before x-ray

29% splint before x-ray

56% any med before D/C



Ketamine IN/IV

Morphine PO/IV

Fentanyl IN

Ketorolac PO/IM/IV

Tylenol PO/PR

ibuprofen PO



Fentanyl IN
1.5 mcg/kg

Limits:

Volume 0.5mL or 1mL per nostril

Dose 50 mcg Q5Min x3

Safety of Intranasal Fentanyl in the Out-of-Hospital Setting:

A Descriptive Observational Study

THE PRACTICE OF EMERGENCY MEDICINE/REVIEW ARTICLE

When to Pick the Nose: Out-of-Hospital and Emergency



Cochrane
Library

Cochrane Database of Systematic Reviews

The intranasal route is used in the out-of-hospital setting because of the limited resources available in these situations in which the patient is often in pain. Several small studies have shown that intranasal fentanyl is effective for seizures. Intranasal fentanyl appears to be an effective alternative to intravenous ketamine and dexmedetomidine.

Intranasal fentanyl for the management of acute pain in children (Review)

A **podcast** for this article

0196-0644/\$-see front matter
Copyright © 2017 by the American
<http://dx.doi.org/10.1016/j.jamcoll>

Murphy A, O'Sullivan R, Wakai A, Grant TS, Barrett MJ, Cronin J, McCoy SC, Hom J, Kandamany N

IN Ketamine?

Research

JAMA Pediatrics | [Original Investigation](#)

Effect of Intranasal Ketamine vs Fentanyl on Pain Reduction for Extremity Injuries in Children The PRIME Randomized Clinical Trial

Theresa M. Frey, MD; Todd A. Florin, MD, MSCE; Michelle Caruso, PharmD, BCPS;
Nanhua Zhang, PhD; Yin Zhang, MS; Matthew R. Mittiga, MD

IMPORTANCE Timely analgesia is critical for children with injuries presenting to the emergency department, yet pain control efforts are often inadequate. Intranasal administration of pain medications provides rapid analgesia with minimal discomfort. Opioids are historically used for significant pain from traumatic injuries but have concerning adverse effects. Intranasal ketamine may provide an effective alternative.

OBJECTIVE To determine whether intranasal ketamine is noninferior to intranasal fentanyl for pain reduction in children presenting with acute extremity injuries.

DESIGN, SETTING, AND PARTICIPANTS The Pain Reduction With Intranasal Medications for Extremity Injuries (PRIME) trial was a double-blind, randomized, active-control, noninferiority trial in a pediatric, tertiary, level 1 trauma center. Participants were children aged 8 to 17 years presenting to the emergency department with moderate to severe pain due to traumatic limb injuries between March 2016 and February 2017. Analyses were intention to treat and began in May 2017.

INTERVENTIONS Intranasal ketamine (1.5 mg/kg) or intranasal fentanyl (2 µg/kg).

MAIN OUTCOMES AND MEASURES The primary outcome was reduction in visual analog scale pain score 30 minutes after intervention. The noninferiority margin for this outcome was 10.

RESULTS Of 90 children enrolled, 45 (50%) were allocated to ketamine (mean [SD] age, 11.8 [2.6] years; 26 boys [59%]) and 45 (50%) to fentanyl (mean [SD] age, 12.2 [2.3] years; 31 boys [74%]). Thirty minutes after medication, the mean visual analog scale reduction was 30.6 mm (95% CI, 25.4-35.8) for ketamine and 31.9 mm (95% CI, 26.6-37.2) for fentanyl. Ketamine was noninferior to fentanyl for pain reduction based on a 1-sided test of group difference less than the noninferiority margin, as the CIs crossed 0 but did not cross the

[+ Supplemental content](#)

[+ CME Quiz at
jamanetwork.com/learning
and CME Questions page 203](#)

Calling MD: "we're sending a kid... ortho aware, NVI, monkey bars, etc."

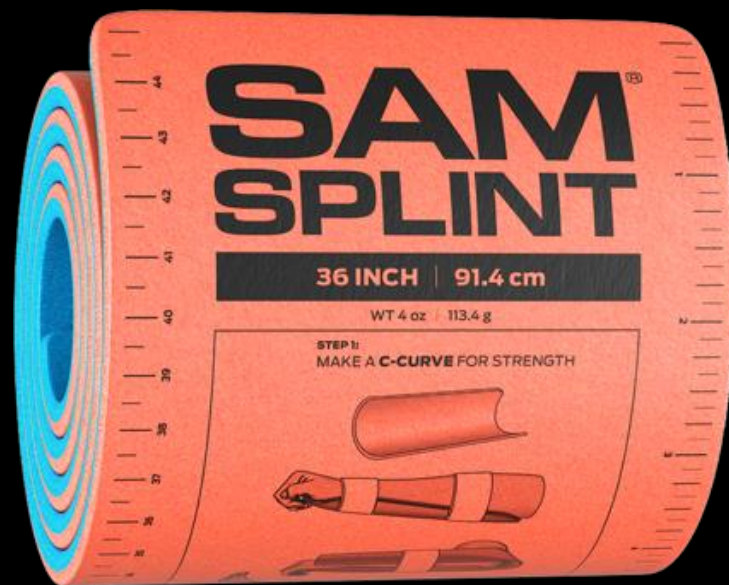
Receiving MD: "he got pain meds?"

Calling MD : "oh yeah"











Waiting room





Cochrane
Library

Cochrane Database of Systematic Reviews

Psychological interventions for needle-related procedural pain and distress in children and adolescents (Review)

Uman LS, Birnie KA, Noel M, Parker JA, Chambers CT, McGrath PJ, Kisely SR

“Overall, there is strong evidence supporting the efficacy of distraction and hypnosis for needle-related pain and distress in children and adolescents...”



Virtual Reality for Pediatric Needle Procedural Pain: Two Randomized Clinical Trials

Evelyn Chan, MBBS, MSc, DCH^{1,2}, Michael Hovenden, BSc, MBBS³, Emma Ramage, BN⁴, Norman Ling, MD⁵, Jeanette H. Pham, BPharm, MD⁵, Ayesha Rahim³, Connie Lam³, Linly Liu³, Samantha Foster³, Ryan Sambell³, Kasthoori Jeyachanthiran, BSc⁶, Catherine Crock, MBBS⁷, Amanda Stock, MBBS⁸, Sandy M. Hopper, MBBS^{8,9}, Simon Cohen, BSc, MBChB¹⁰, Andrew Davidson, MBBS, MD, GradDipBioEpi⁶, Karin Plummer, MS⁶, Erin Mills, MBBS⁴, Simon S. Craig, MBBS, MPHE, MPH^{3,4}, Gary Deng, BEcon, MEcon, PhD¹¹, and Paul Leong, MBBS, MPHTM^{3,12}

Objective To assess the efficacy and safety of a virtual reality distraction for needle pain in 2 common hospital settings: the emergency department (ED) and outpatient pathology (ie, outpatient laboratory). The control was standard of care (SOC) practice.

Study design In 2 clinical trials, we randomized children aged 4-11 years undergoing venous needle procedures to virtual reality or SOC at 2 tertiary Australian hospitals. In the first study, we enrolled children in the ED requiring intravenous cannulation or venipuncture. In the second, we enrolled children in outpatient pathology requiring venipuncture. In the ED, 64 children were assigned to virtual reality and 59 to SOC. In pathology, 63 children were assigned to virtual reality and 68 to SOC; 2 children withdrew assent in the SOC arm, leaving 66. The primary endpoint was change from baseline pain between virtual reality and SOC on child-rated Faces Pain Scale-Revised.

Results In the ED, there was no change in pain from baseline with SOC, whereas virtual reality produced a significant reduction in pain (between-group difference, -1.78 ; 95% CI, -3.24 to -0.317 ; $P = .018$). In pathology, both groups experienced an increase in pain from baseline, but this was significantly less in the virtual reality group (between-group difference, -1.39 ; 95% CI, -2.68 to -0.11 ; $P = .034$). Across both studies, 10 participants experienced minor adverse events, equally distributed between virtual reality/SOC; none required pharmacotherapy.

Conclusions In children aged 4-11 years of age undergoing intravenous cannulation or venipuncture, virtual reality was efficacious in decreasing pain and was safe. (*J Pediatr* 2019;209:160-7).

Trial registration Australia and New Zealand Clinical Trial Registry: ACTRN12617000285358p



Virtual Reality (VR) Pain Relief UCSF Benioff Children's Hospital Oakland

True or False? Compared to opioids, NSAID's offer equivalent analgesia with less side effects.

CMAJ 2017

Oral morphine versus ibuprofen administered at home for postoperative orthopedic pain in children: a randomized controlled trial

Naveen Poonai, Natasha Dattoo, et al



What did they do?

77 kids 5-17 years of age
Outpatient minor surgery
Ibuprofen vs Morphine

What did they find?

Neither meds resulted in
adequate pain control
More adverse effects with
morphine 69% vs 39%

Pediatrics 2017

Oral Analgesics Utilization for Children With Musculoskeletal Injury (OUCH Trial): An RCT

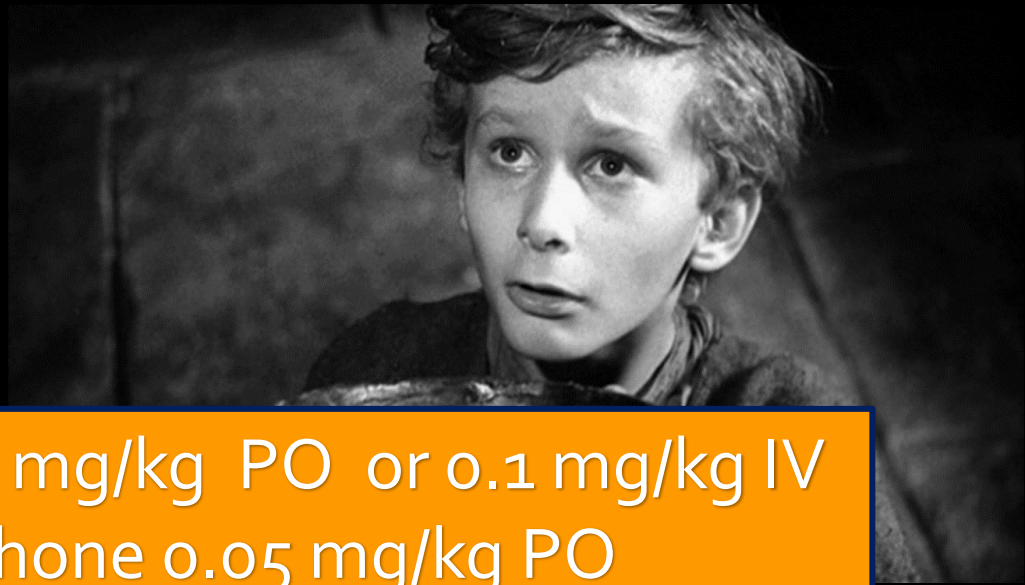
Sylvie Le May, Samina Ali et al on behalf of Pediatric Emergency Research Canada (PERC)

What did they do?

501 kids 6-17 years of age
ED MSK injuries
Ibuprofen vs Morphine vs
combination

What did they find?

Adequate pain control:
30% combination
29% morphine alone
33% ibuprofen alone
No Serious adverse effects



Morphine 0.2 – 0.5 mg/kg PO or 0.1 mg/kg IV

Hydromorphone 0.05 mg/kg PO

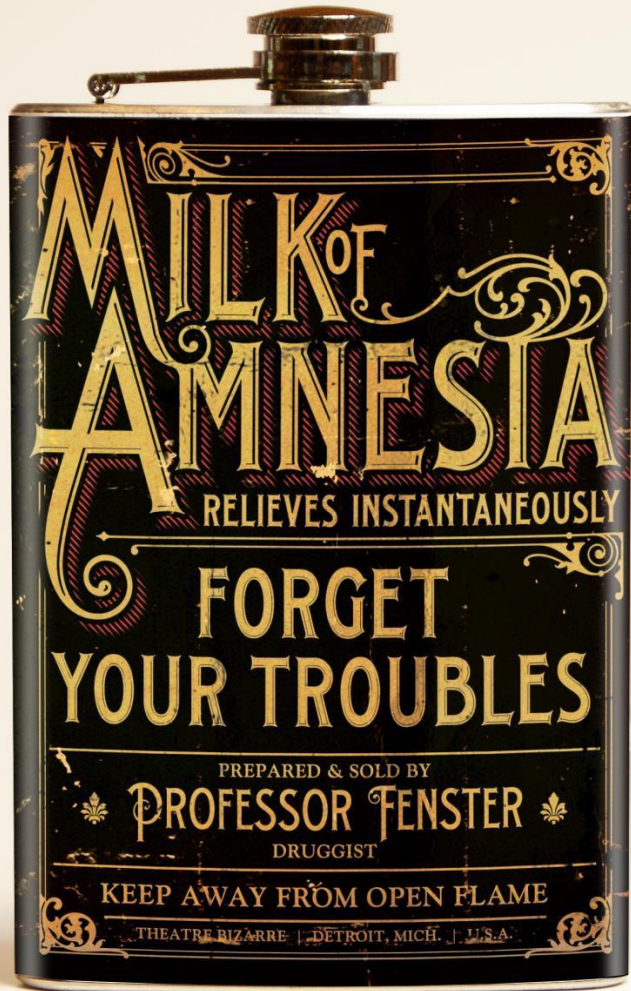
Fentanyl 1-2 mcg/kg Intranasal or IV

Midazolam 0.3-0.5 mg/kg Intranasal

Ativan 0.05 mg/kg SL

Ketorolac 0.5mg/kg IV





MILK OF
AMNESIA
RELIEVES INSTANTANEOUSLY

FORGET
YOUR TROUBLES

PREPARED & SOLD BY
PROFESSOR FENSTER
DRUGGIST

KEEP AWAY FROM OPEN FLAME

THEATRE BIZARRE | DETROIT, MICH. | U.S.A.





Unconscious
Sedation

Options for sedation? Name one agent and reason for choice.

Rosen's EM

Commonly Used Sedatives for Procedural Sedation in Children and Infants

SEDATIVE ^c	ROUTE	DOSE ^a	USUAL DOSE ^b	MAXIMUM DOSE	ONSET	DURATION	SIDE EFFECTS	ADVANTAGES/COMMENTS ^c	
Etomidate	IV	0.3 mg/kg	0.2 mg/kg PSA (0.3 mg/kg RSI)	0.6 mg/kg	<1 minute	3 to 10 minutes	Pain on injection, myoclonic movements, adrenal insufficiency (prolonged use)	Minimal CV/respiratory depression	
Ketamine ^d	IV	1 to 2 mg/kg initial (repeat 0.5 to 1 mg/kg for longer procedures)	1.5 mg/kg initial PSA (2 mg/kg RSI)		1 minute	15 minutes	Sympathomimetic effects (↑HR, ↑BP) Nausea, vomiting Emergence reaction Laryngospasm (rare)	Also has analgesic effect CV/respiratory stability bronchodilator (use in asthmatics) Battlefield use/disasters	
Ketamine	IM	4 mg/kg	4 mg/kg 2 mg/kg if <2 years old		5 minutes	30 minutes	(Same as above) Higher risk of nausea	(Same as above)	
Midazolam ^e	IV	0.05 to 0.1 mg/kg (6 months to 5 years old or adult) 0.025 to 0.05 mg/kg (≥ 6 years old) If midazolam alone, 0.05 mg/kg IV unless at-risk patient	If giving with fentanyl, may dose at 0.02 mg/kg	6 mg/kg if ≤5 years old 10 mg/kg if >6 years old or adult	3 minutes	60 minutes	Paradoxical agitation, vomiting, coughing, hiccups, respiratory depression, apnea so use lower dose if given with other opioids or respiratory depressants, reversed by antagonist flumazenil	↑ Seizure threshold (used to treat seizure patients) ↓ ICP, CBF, ↓ LV filling pressure may benefit cardiac patients Mild CV effects unless hypovolemic Use in CAD patients	
Midazolam	IM	0.05 to 0.1 mg/kg (6 months to 5 years old) 0.025 to 0.05 mg/kg (≥6 years old)	If giving with fentanyl, may dose at 0.02 mg/kg	6 mg/kg if ≤5 years old 10 mg/kg if >6 years old or adult	5 to 30 minutes	60 to 90 minutes	(Same as above)	(Same as above)	
Midazolam	IN	0.3 to 0.5 mg/kg			3 to 5 minutes		(Same as above)	(Same as above)	
Methohexital ^f	IV	1 to 3 mg/kg	1 to 1.5 mg/kg	3 mg/kg	1 minute	10 minutes	CV/respiratory depression, paradoxical agitation, extravasation can cause tissue necrosis Contraindication: Porphyria	↓ IOP, ↓ ICP (but don't use if patient has temporal lobe epilepsy) Use in head injury patients Can use if malignant hyperthermia	
Pentobarbital ^g	IV	1 to 6 mg/kg		1 to 2 mg/kg initial, repeat 3 to 5 min to desired effect or max dose		100 mg/dose	1 to 2 minutes	15 to 60 minutes	CV/respiratory depression, paradoxical agitation, extravasation can cause tissue necrosis Contraindication: Porphyria
Propofol	IV	0.5 to 1.5 mg/kg (repeat 0.5 mg/kg every 3 to 5 minutes for longer procedures)		Variable, may be 1.5 to 2 mg/kg	None		<1 minute	5 to 15 minutes (mean 8 minutes)	CV/respiratory depression Use with caution if shock/low BP/impaired cardiac function Don't use if allergy to eggs, soybean oil, EDTA
Nitrous oxide	Inhalation	Dose is 30% to 70% mixture		Commercially available in 50%:50% mixture	70%		1 to 2 minutes	15 to 20 minutes	Contraindications: Trapped air (bowel obstruction, pneumothorax, emphysema, air emboli)

Jama 2017

Risk Factors for Adverse Events in Emergency Department Procedural Sedation for Children

Maala Bhatt, David Johnson et al Sedation Safety Study Group of Pediatric
Emergency Research Canada (PERC)

What did they do?

Prospective, multicenter
observational cohort

6 PEM ED's

6295 children

What did they find?

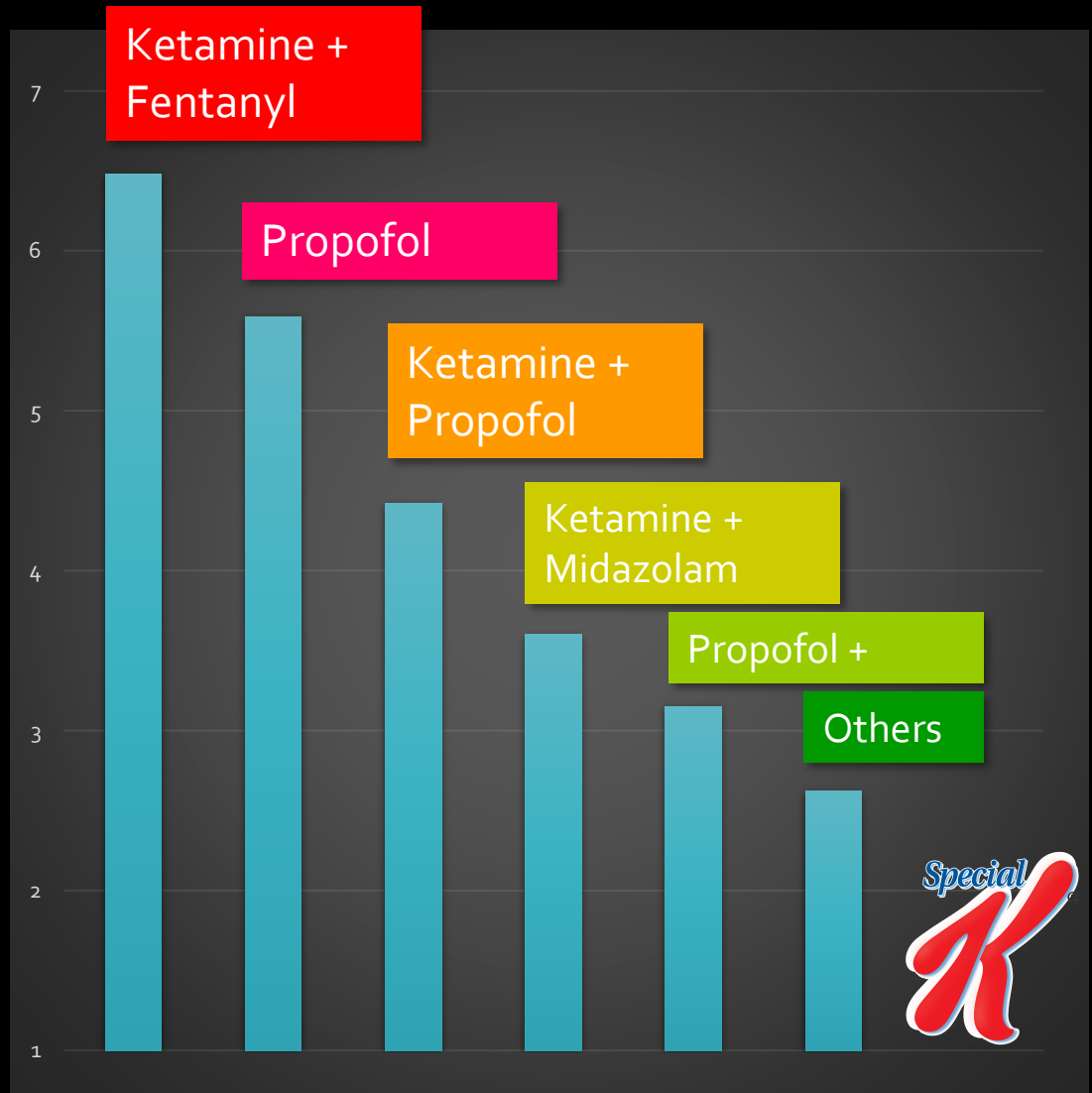
No Cardiac or Respiratory Arrest

736 (12%) with Adverse Events

69 (1.1%) with Serious Adverse
Events

86 (1.4%) with significant
intervention

Odds of Serious Adverse Events



Bottom Line







L

Clinical Policy: Procedural Sedation and Analgesia in the Emergency Department

From the American College of Emergency Physicians Clinical Practice Guidelines for Emergency Sedation and Analgesia:


Steven A. Godwin, MD (Subcommittee Chair)
 John H. Burton, MD
 Charles J. Gerardo, MD
 Benjamin W. Hatten, MD
 Sharon E. Mace, MD
 Scott M. Silvers, MD
 Francis M. Fesmire, MD (Committee Chair)

Members of the American College of Emergency Physicians:

Francis M. Fesmire, MD (Chair)
 Douglas Bernstein, MD (EMF)
 Deena Brecher, MSN, RN, FAHA
 Representative 2012-2013
 Michael D. Brown, MD, MSc
 John H. Burton, MD
 Deborah B. Diercks, MD, MSc
 Steven A. Godwin, MD
 Sigrid A. Hahn, MD
 Jason S. Haukoos, MD, MSc
 J. Stephen Huff, MD
 Bruce M. Lo, MD, CPE, RDM
 Sharon E. Mace, MD
 Edward R. Melnick, MD

Policy statements are published in the *Annals of Emergency Medicine* and, as space permits, in the *Journal of Emergency Medicine*. Policy statements are also available on the American College of Emergency Physicians website.

This is a CONTROLLED document for internal use only. Any documents appearing in paper form are not controlled and should be checked against the electronic SharePoint version prior to use.

	Document Scope: Hospital-wide Patient Care	
	Document Type: Guideline	
	Approved on 2013-08-01	
		Next Review Date: 2016-08-01
<div style="border: 2px solid orange; padding: 5px; display: inline-block;"> <p style="color: red; font-weight: bold; font-size: 1.2em;">You shall do this!</p> </div>		Version: 1

Original Date of Issue: November 24, 2006

1.0 Introduction

It is recognized that in order to maintain the safety of patients, staff and visitors at The Hospital for Sick Children (SickKids), timely access to expert assistance and skilled personnel in life-threatening situations is essential. The purpose of this document is to outline the hospital's Code Blue response and the responsibilities of staff in Code Blue situations.

2.0 Definitions

Cardiopulmonary Resuscitation (CPR): The term used to describe measures taken to support failing or arrested cardiac and respiratory function, including airway protection, external chest compressions and artificial ventilation. CPR may also include advanced life support techniques such as endotracheal intubation, mechanical ventilation, intravenous infusions of resuscitation fluids and/or medication, cardiac defibrillation and/or cardioversion, and cardiac massage.

CCRT: Critical Care Response Team

Code Blue: The emergency colour code designation and term used to alert staff of an actual or potential respiratory and/or cardiac arrest. A Code Blue initiates a response from the hospital-wide Code Blue Team (i.e. resuscitation event).

Code Blue Crash Cart: A moveable cart that contains a collection of equipment and supplies that may be immediately required during a resuscitation event.



ofol:

Krauss, MD, EdM

department procedural
 new research warrant
 monitoring, dosing,
 0.]

advisory update
 with clinical experience
 propofol, including the
 limited the panel to
 ED setting is the

propofol as an ultrashort-acting agent, its rapidly increasing popularity despite being a relatively new agent in the ED setting, and widespread practice variation in its use, a clinical practice advisory was published in 2007 to provide evidence-based recommendations for its use.²

An updated clinical practice guideline (Figure) is warranted for 3 reasons. First, the initial advisory focused on the use of propofol in the ED across all ages, with limited focus on pediatric patients. Use of propofol in the ED for sedation

To perform this update, we searched PubMed from January 2007 to July 2016 for literature on the use of propofol in children and adults. We primarily focused on the ED setting, but also reviewed relevant anesthesia literature from both inside and outside the operating room setting. We subsequently searched the reference lists of identified articles for additional relevant articles.

EXPLANATION OF CLINICAL PRACTICE

Jama Peds 2018

Association of Preprocedural Fasting With Outcomes of Emergency Department Sedation in Children

Maala Bhatt, David Johnson et al Sedation Safety Study Group of Pediatric
Emergency Research Canada (PERC)

Bottom Line



Odds of any adverse event, serious adverse event, or vomiting did not change with each hour of fasting

Dogmasphere



meghan Gilley

@gilley_meghan

RT @DrJFriedman: need procedural sedation in ED; not fasting, no problem...Association of Preprocedural Fasting With Outcomes of Emergency...

06 Jul 2018



Syed Shahrul Naz

@drshahrul80

RT @DrJFriedman: need procedural sedation in ED; not fasting, no problem...Association of Preprocedural Fasting With Outcomes of Emergency...

06 Jul 2018



Deepa Kattail, MD

@DeepaKattail

RT @DrSCBrown: All it takes is one bad aspiration to alter your view of those conclusions - suggest sticking to your fasting guidelines @Ca...

06 Jul 2018



Pediatric Sedation

@pedsedation2018

RT @DrJFriedman: need procedural sedation in ED; not fasting, no problem...Association of Preprocedural Fasting With Outcomes of Emergency...

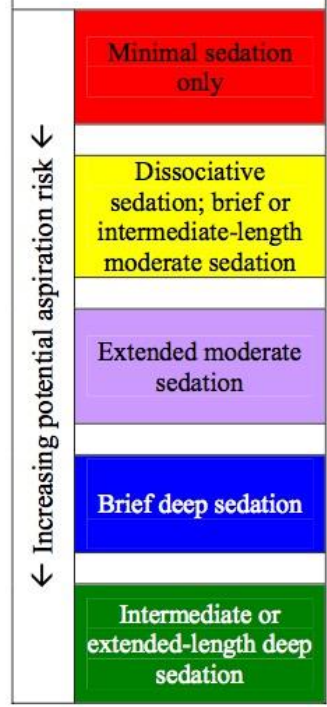
Standard-risk patient^a

Oral intake in the prior 3 hours	Procedural Urgency ^b			
	<i>Emergent Procedure</i>	<i>Urgent Procedure</i>	<i>Semi-Urgent</i>	<i>Non-Urgent</i>
<i>Nothing</i>	All levels of sedation	All levels of sedation	All levels of sedation	All levels of sedation
<i>Clear liquids only</i>	All levels of sedation	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation
<i>Light snack</i>	All levels of sedation	Up to and including brief deep sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only
<i>Heavier snack or meal</i>	All levels of sedation	Up to and including extended moderate sedation	Minimal sedation only	Minimal sedation only

Higher-risk patient^a

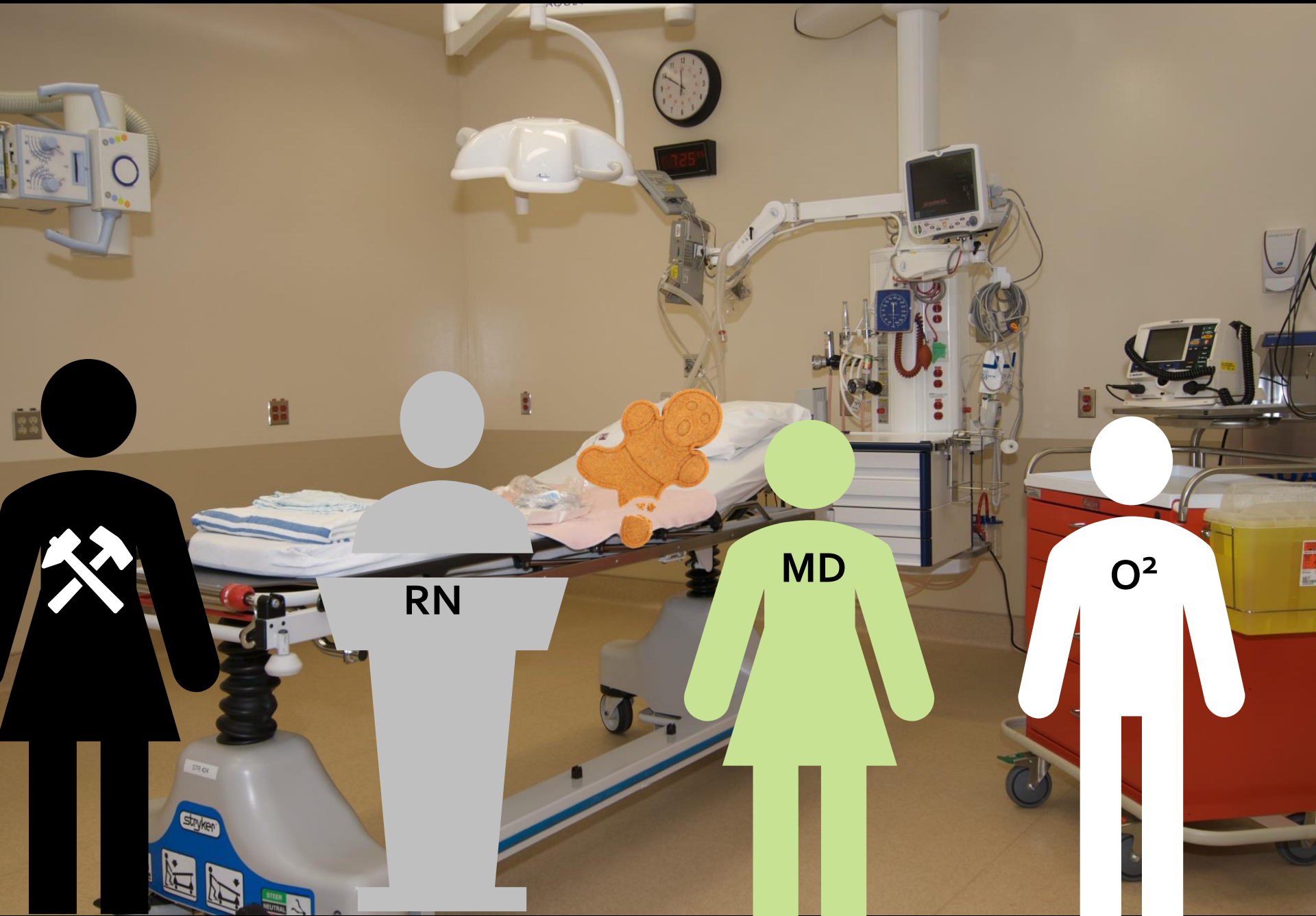
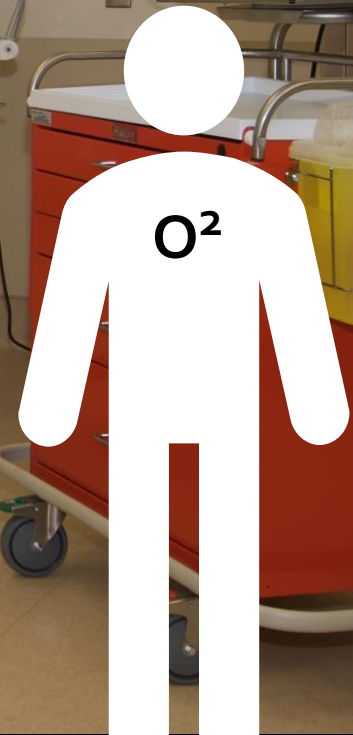
Oral intake in the prior 3 hours	Procedural Urgency ^b			
	<i>Emergent Procedure</i>	<i>Urgent Procedure</i>	<i>Semi-Urgent</i>	<i>Non-Urgent</i>
<i>Nothing</i>	All levels of sedation	All levels of sedation	All levels of sedation	All levels of sedation
<i>Clear liquids only</i>	All levels of sedation	Up to and including brief deep sedation	Up to and including extended moderate sedation	Minimal sedation only
<i>Light snack</i>	All levels of sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only	Minimal sedation only
<i>Heavier snack or meal</i>	All levels of sedation	Up to and including dissociative sedation; non-extended moderate sedation	Minimal sedation only	Minimal sedation only

Procedural sedation and analgesia targeted depth and duration^c



Brief: <10 minutes
 Intermediate: 10-20 minutes
 Extended: >20 minutes

Figure. Prudent limits of targeted depth and length of ED procedural sedation and analgesia according to presedation assessment of aspiration risk



Conscious
Anxiolysis
Analgesia

Conscious Anxiolysis Analgesia

1



2



3



Name techniques to reduce pain on injection of local anesthetics.

“warm lidocaine”

“mix with bicarb, inject slowly”

“virtual reality”

“slow injection.”

“Distraction”

“emlat”

“Teletubbies”

“Netflix and candy”

“Emla”

Local techniques pain reduction

- Topical first
- Smallest guage needle
- Warmed solution
- Inject into SQ not dermal space
- Less pokes
- Slow infiltration
- Buffer 1% lido w/ Bicarb 8.4% (9:1 ratio)

LOL - LET on Laceration

LET



dose 1 mL/cm or up to 5 mL
safe to reapply once



effective by 30 min
lasts up to 2 hours



safe for lacerations < 1 cm deep
and < 5 cm long
safe for fingers, toes, noses, ears



stops pain

Don't forget to
document on
eMAR!



stops bleeding



contraindications: mucous membranes

LET 🧐 ON LACERATIONS SickKids



Are you a pediatrician?



Truthiness vs Truth



Truthiness

- “Infiltration with lidocaine provides immediate analgesia but may obscure bony landmarks in neonates and young infants, making the procedure more difficult to perform”
- “Topical anesthetics anesthetize the skin (but not the subcutaneous tissues) “
- “...require 30 to 60 minutes to be effective”
- Sucrose is all they need

Truth

- Local and topical anesthetics:
 - 2x more likely to be successful on 1st attempt
 - 1.6x less likely to be traumatic
 - 100x less likely to be cruel
 - 200x more humane
 - Local infiltration does NOT alter tissues
 - Risk of methemoglobinemia is negligible
- Lidocaine onset time <5min

**What's your max dose (per kg) of Lidocaine
1% with epinephrine SQ?**

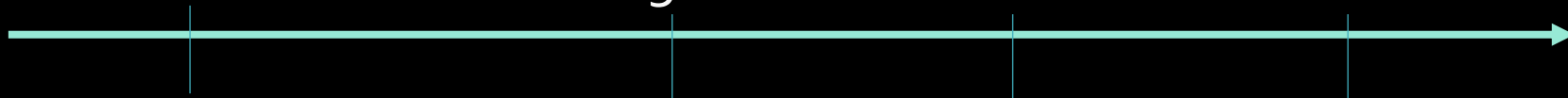
My LP timeline

t -1hr

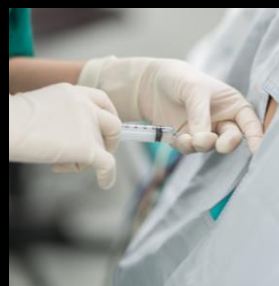
t -5min

t -1min

t

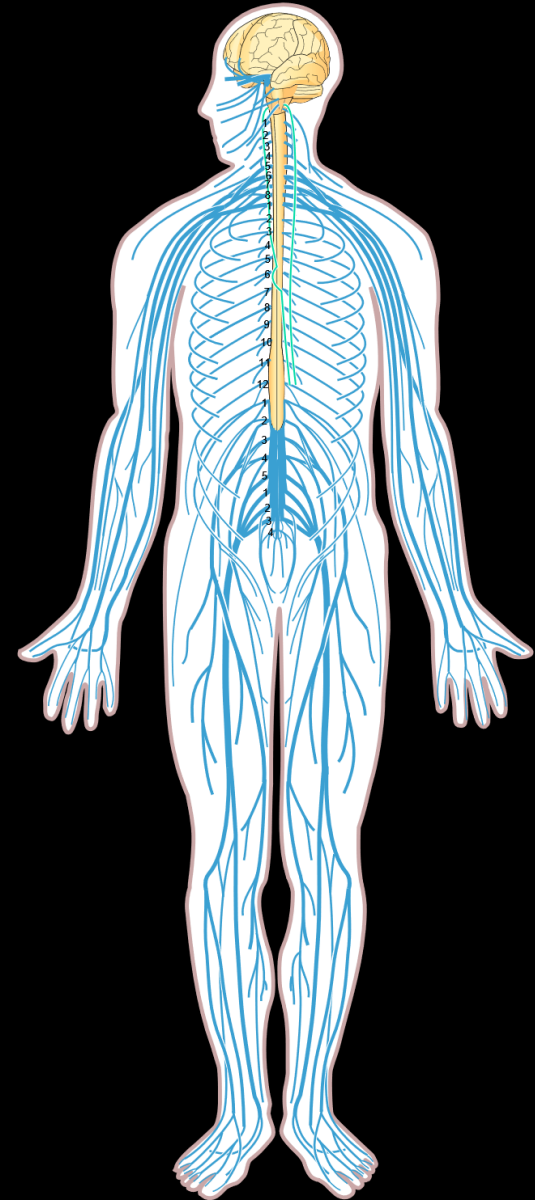


OR



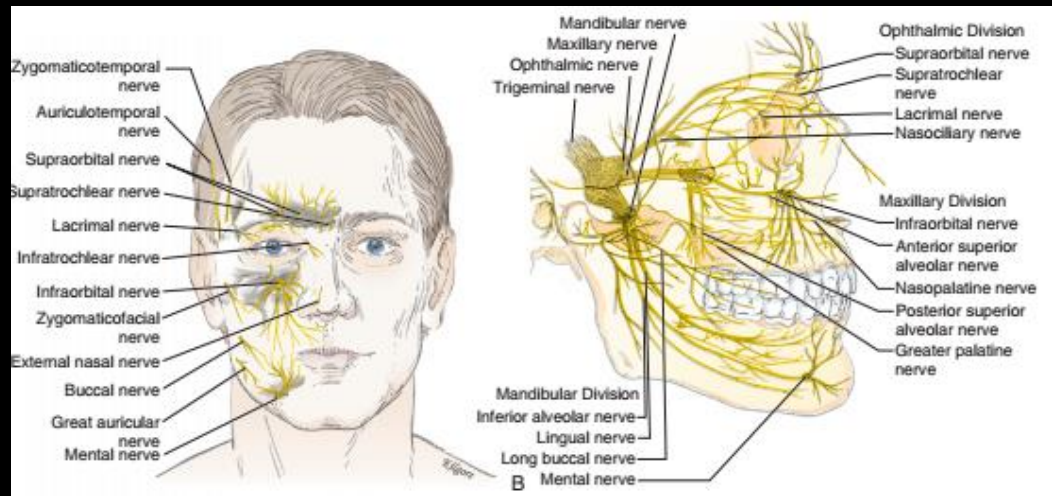
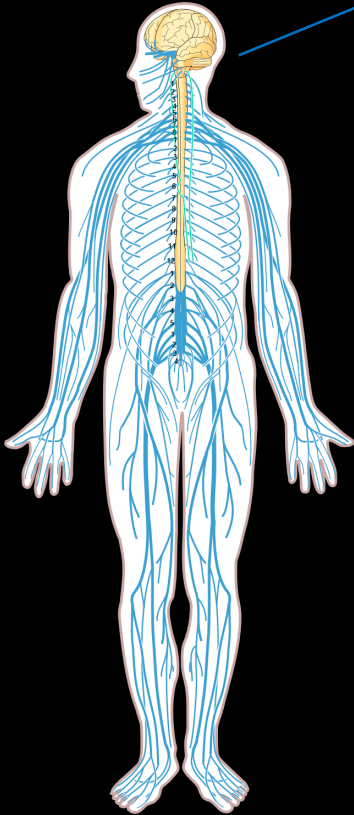
Analgesia/Sedation Summary





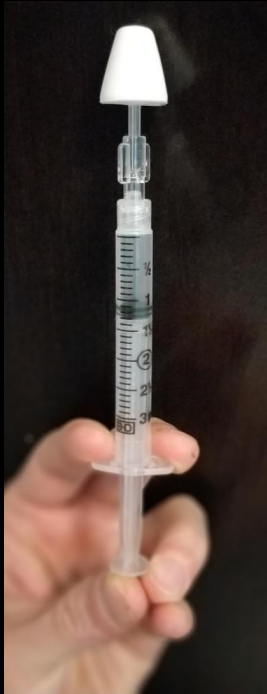
Select Regional Anesthesia

Head and Neck



Block facilitated by intranasal

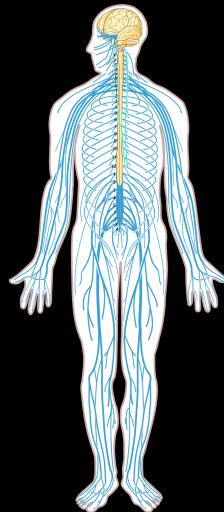
1



2



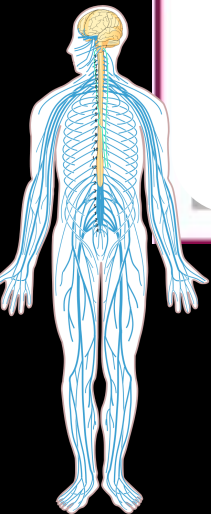
3



HEAD AND NECK REGIONAL ANESTHESIA: GENERAL TECHNIQUE



Confirm relevant local anatomy (in this example, the infraorbital nerve block is depicted).



Infraorbital—Intraoral Approach



The infraorbital foramen is directly under the pupil when the patient is looking forward

Infraorbital ridge
Infraorbital foramen
Second bicuspid

B

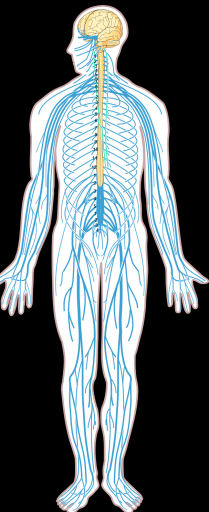


Mental



Second premolar
First premolar
Mental foramen
Mental nerve

B

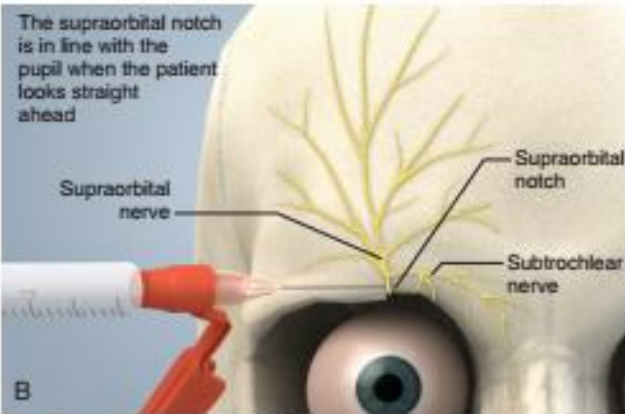


Supraorbital



A

The supraorbital notch is in line with the pupil when the patient looks straight ahead



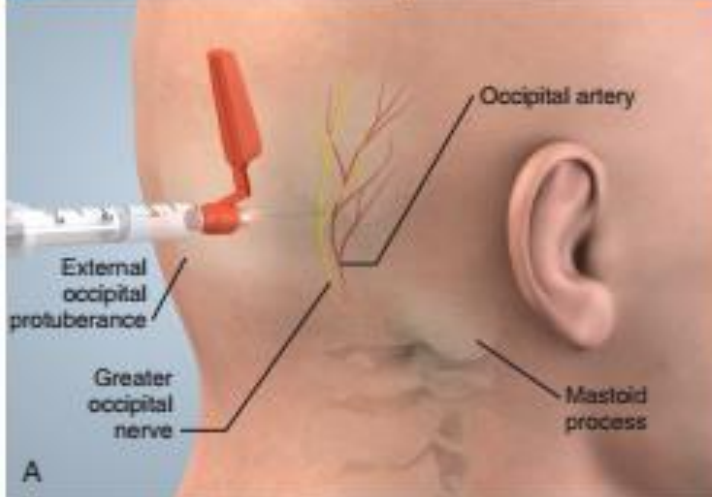
B



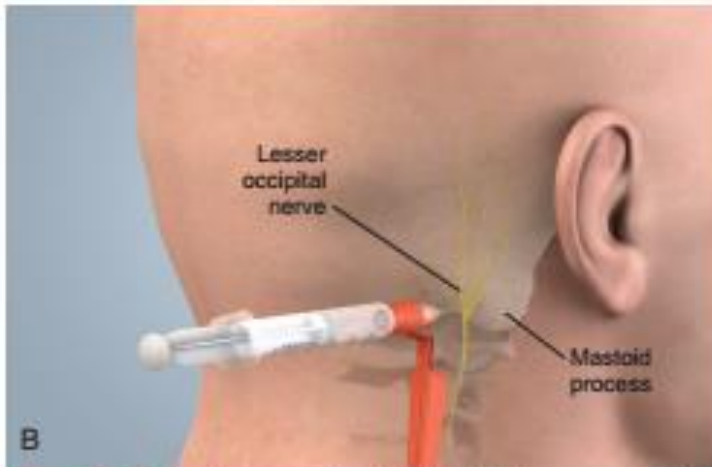
C

'Headache Block'

Greater and Lesser Occipital

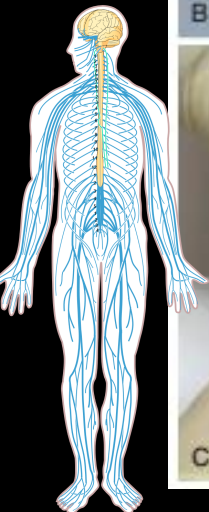


A

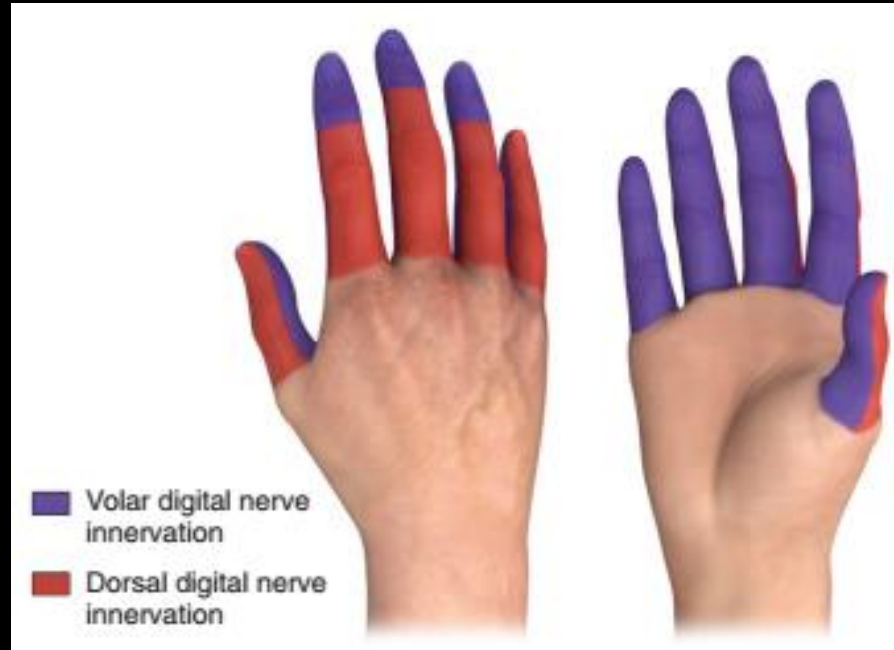
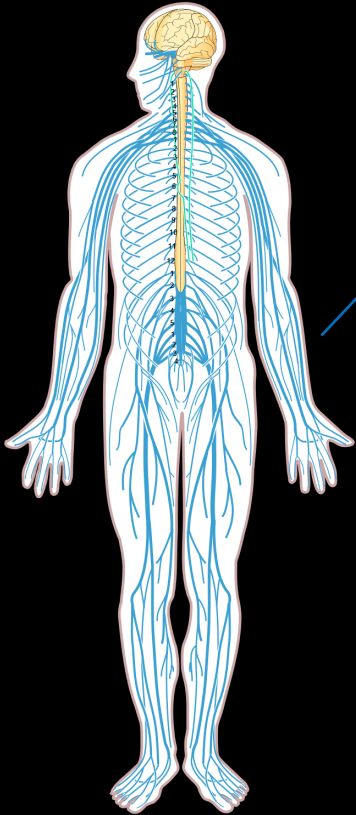


B

Figure 30-18 Occipital nerve blocks. **A**, Block the greater occipital nerve on a line 3 cm lateral to the external occipital protuberance and the base of the occipital bone. **B**, Block the lesser occipital nerve by injection of 2 to 3 mL of anesthetic solution along the posterior border of the mastoid process of the temporal bone.



Upper Extremities



What's your preferred digital nerve(s) block method?



DIGITAL NERVE BLOCKS

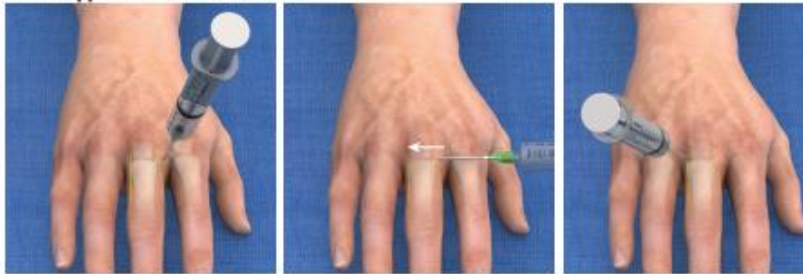
Dorsal Approach



1. Insert the needle at the web space, just distal to the knuckle at the edge of the bone. Once the needle tip is subdermal, inject 0.5 to 1 mL of anesthetic to block the dorsal digital nerve.
2. Advance the needle along the bone toward the palmar surface until the palmar skin begins to tent. Inject another 0.5 to 1 mL of anesthetic to block the volar digital nerve.
3. Repeat steps 1 and 2 on the opposite side of the finger. The result is a circumferential band of anesthetic around the base of the finger. Firmly massage the area for 30 seconds to enhance diffusion of the anesthetic.

A

Dorsal Approach—Alternative Method

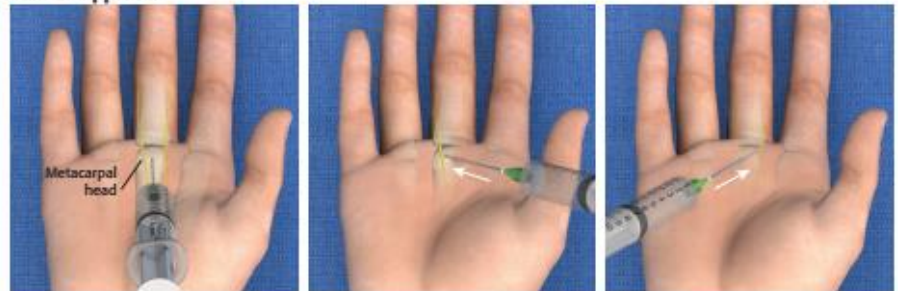


1. Block both the dorsal and volar digital nerves on one side of the finger as described above. Do not fully remove the needle after blocking the volar nerve.
2. Without removing the needle, redirect it across the top of the finger to anesthetize the skin on the opposite side. After injecting the opposite side, remove the needle.
3. Insert the needle at the site that was anesthetized in step 2, and block the other side of the finger. The presumed benefit of this technique is that it minimizes pain at the second skin puncture site.

B

DIGITAL NERVE BLOCKS, CONT'D

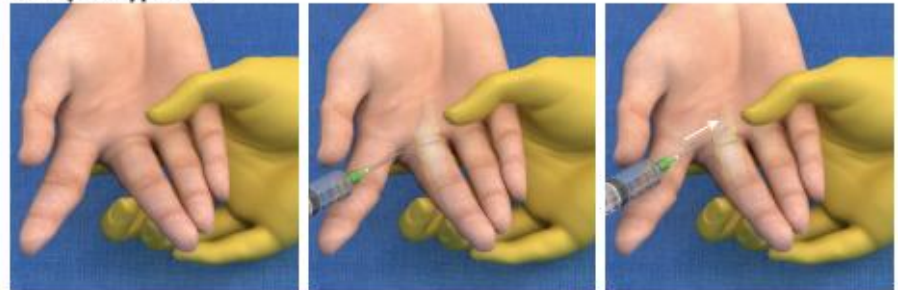
Palmar Approach



1. Insert the needle directly over the center of the metacarpal head and slowly inject anesthetic while advancing the needle to the bone.
2. Withdraw the needle 3 to 4 mm (without completely removing it) and slightly angle it to the right or left of center to block one of the volar digital nerves.
3. Repeat on the other side of the digit. To be successful, a palpable soft tissue fullness should be appreciated. Usually 4 to 5 mL of anesthetic is required.

C

Web-Space Approach



1. Hold the patient's hand with your thumb and index finger over the metacarpal, and spread the fingers to expose the web space.
2. Insert the needle into the web space and inject 1 mL of anesthetic. Slowly advance the needle until it is next to the volar surface of the metacarpal head and inject additional anesthetic.
3. Withdraw the needle slightly and redirect it across the midline of the metacarpal head to the opposite digital nerve. Inject additional anesthetic at this location. You will be able to feel the tissue distention by the anesthetic with your thumb, but be careful to avoid passing the needle through the skin and puncturing your thumb.

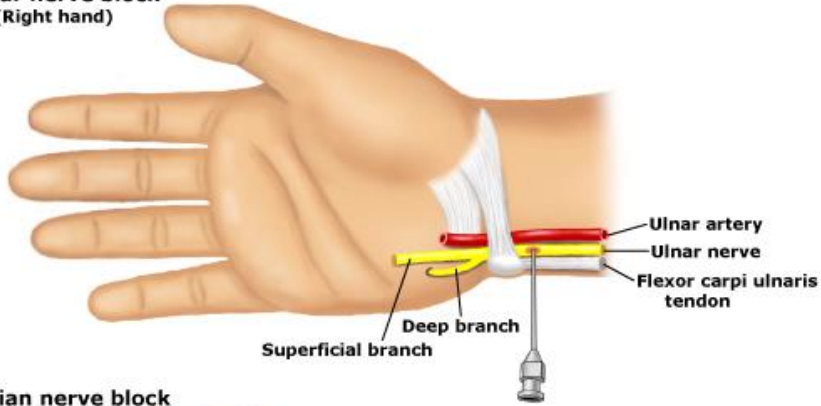
D



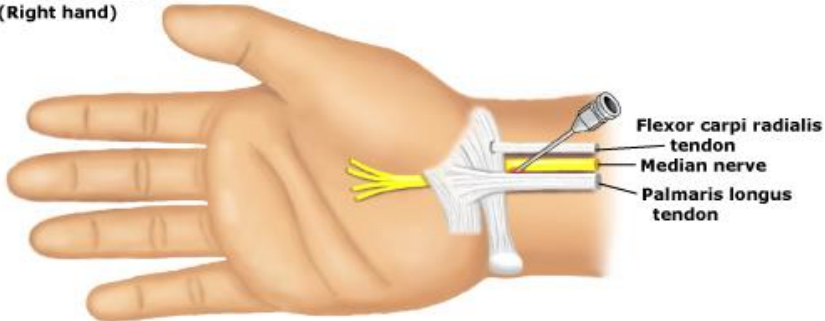
Metacarpal head block



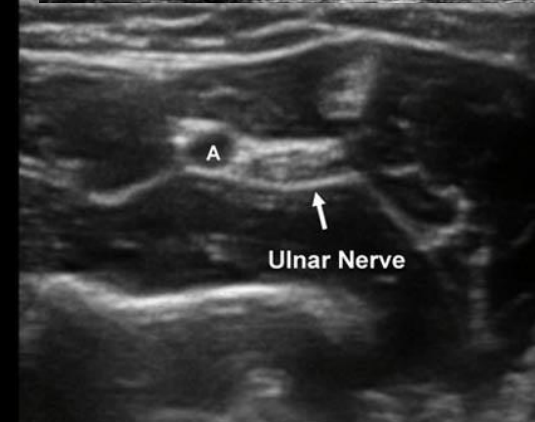
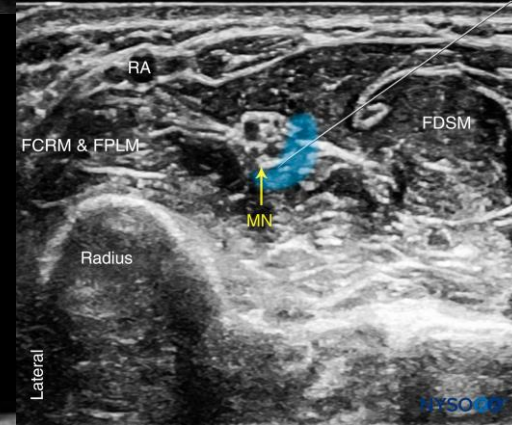
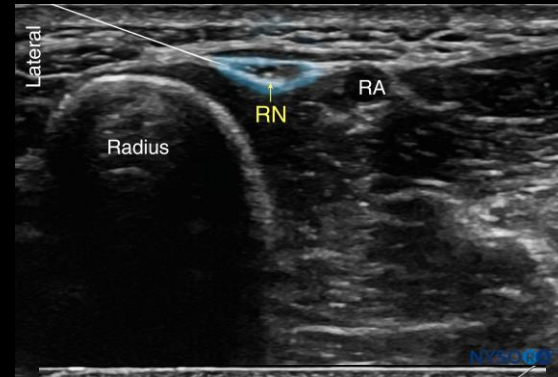
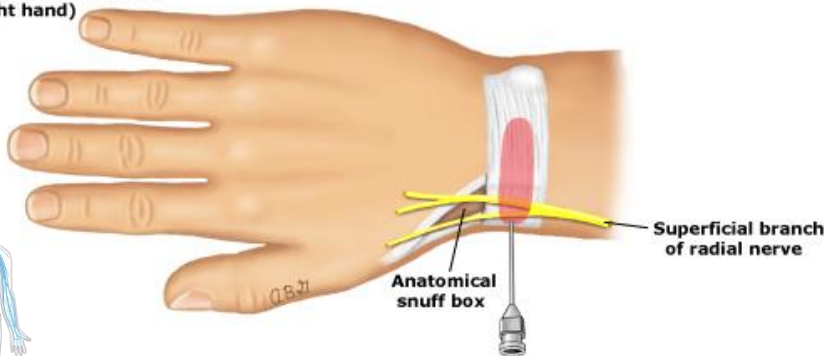
**Ulnar nerve block
(Right hand)**



**Median nerve block
(Right hand)**

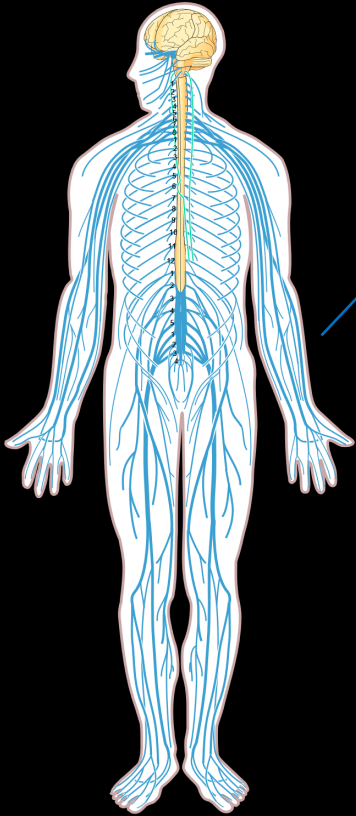


**Radial nerve block
(Right hand)**



- Nrv
L25
98%
MI
0.8
A
B

Lower Extremities



NERVE BLOCKS AT THE ANKLE

Posterior Tibial

Distribution



A

Anatomy and Technique



Palpate the tibial artery posterior to the medial malleolus. Insert the needle 1 cm superior to this point, perpendicular to the skin. At a depth of 1 cm, inject 3 to 5 mL of anesthetic. See text for additional details.

Sural Nerve

Distribution



B

Anatomy and Technique



Palpate the Achilles tendon and lateral malleolus. Inject 3 to 5 mL of anesthetic subcutaneously in a band between the Achilles tendon and lateral malleolus, about 1 cm superior to the malleolus.

Superficial Peroneal

Distribution



C

Anatomy and Technique



Palpate the extensor hallucis longus tendon and the lateral malleolus. Inject 4 to 10 mL of anesthetic subcutaneously in a band between the tendon and the malleolus.

NERVE BLOCKS AT THE ANKLE, CONT'D

Deep Peroneal

Distribution



D

Anatomy and Technique



Palpate the extensor hallucis longus and anterior tibial tendons while the patient dorsiflexes the foot and big toe. Insert the needle at a level 1 cm superior to the medial malleolus, and direct it laterally under the EHL tendon until it strikes the tibia. Inject 3 to 5 mL of anesthetic.

Saphenous

Distribution

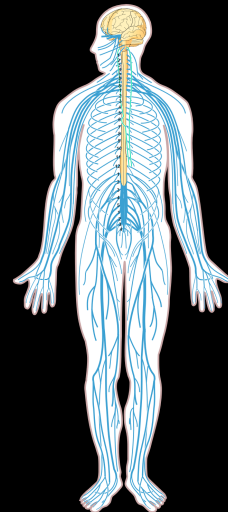


E

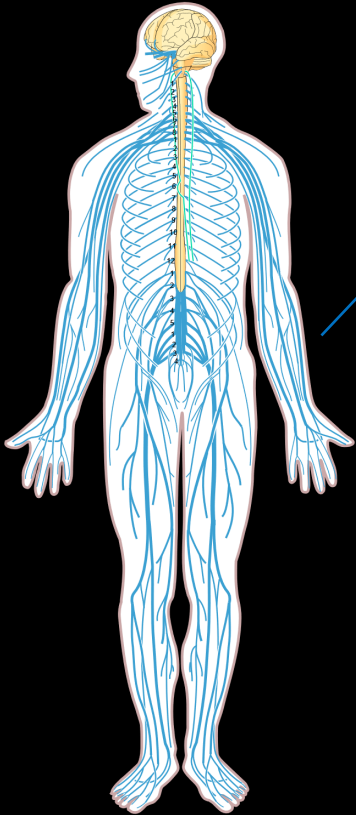
Anatomy and Technique



First, inject 2 to 5 mL of anesthetic immediately lateral to the radial artery at the level of the proximal palmar crease (not shown). Then inject another 5 to 6 mL from the initial injection point to the dorsal midline.



Lower Extremities



Special



Analgesia/Sedation Summary



Lidocaine max toxic doses:

- 3mg/kg w/o Epi
- 5-7mg/kg w/ Epi
- Buffer Lido 9:1 with Bicarb 8.4%



LOL – LET on lacs

Topical anesthesia might be all the 'block' you need



Successful Nerve block

- Anxiolysis first
- Topicalize second
- Block last



Thank you

Resources:

- Books
- NYSORA
- NEJM Peripheral Nerve Block series

SEVENTH EDITION

Roberts and Hedges'
**CLINICAL
PROCEDURES**

in Emergency Medicine
and Acute Care

ROBERTS
CUSTALOW
THOMSEN
CHANMUGAM
CHUDNOFSKY
DEBLIEUX
MATTU
SWADRON
WINTERS

ELSEVIER



Enhanced
**DIGITAL
VERSION**
Included.
Details inside.

