Managing Acute Pain 101:
A Toolkit for Successfully Treating Pain In the Emergency Department

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Disclosures

I have no disclosures.

Objectives

- Identify the common barriers and biases in treating acute pain
- List the major classes of analgesics used in the ED and describe their mechanisms of action
- Discuss the advantages, disadvantages, and routes of administration of various analgesics and anesthetics
- Recognize the value of nonpharmacologic therapeutics in the ED
- Describe the necessary safety precautions when using parental opioids and performing procedural sedation

Warm Up

8am lecture on a Monday ® Pain Rating Scale

0

Caffeinated and ready to go

2

Happy to be at AAPA and learn

4

Awake but friends dragged me here

6

Alive. *checks pulse

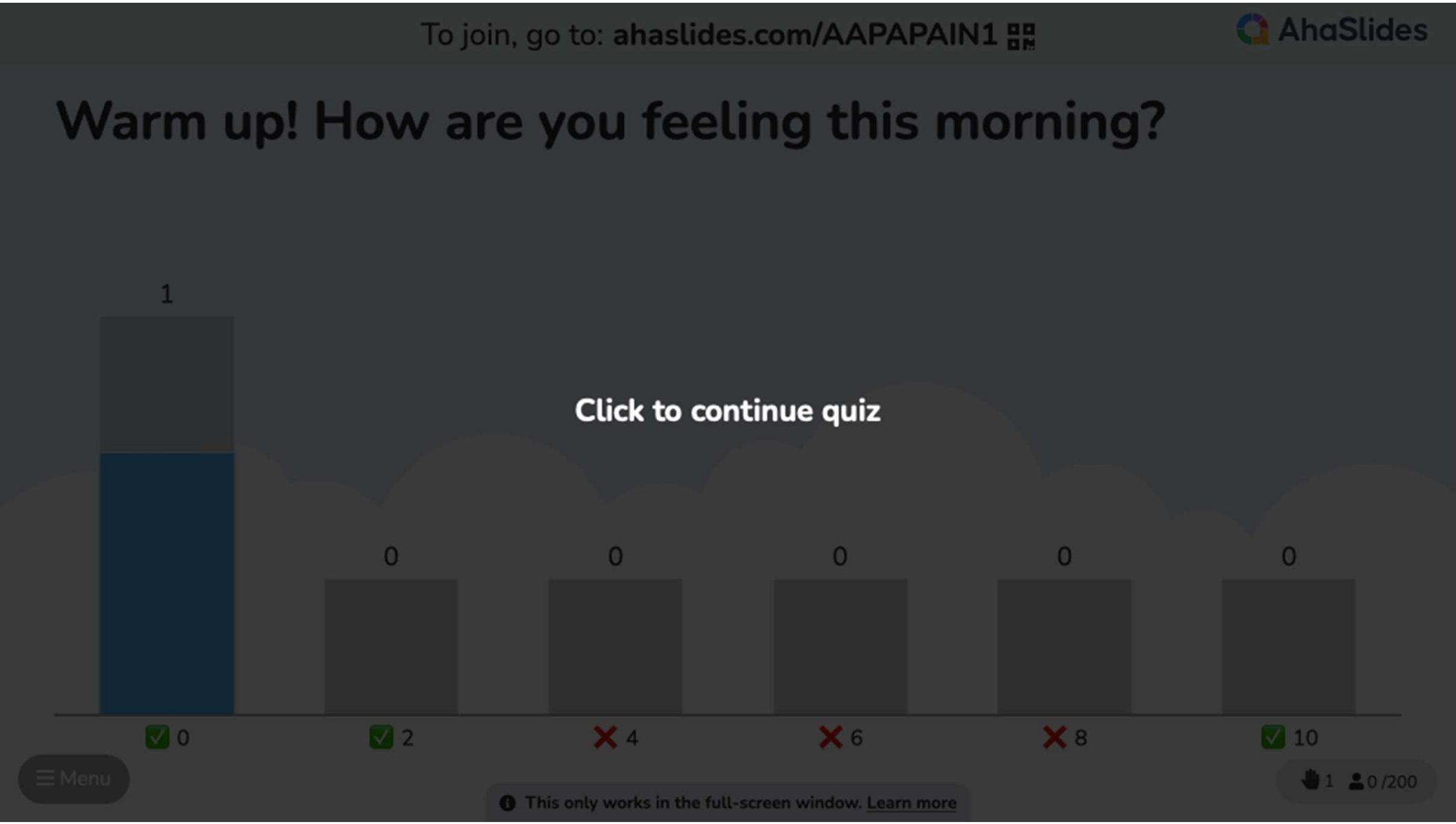
8

Too much partying this weekend

10

This lecture is going to be so good it pains me

Join the quiz: www.ahaslides.com/aapapain1


To join, go to: ahaslides.com/AAPAPAIN1
AhaSlides
Warm up! How are you feeling this morning?
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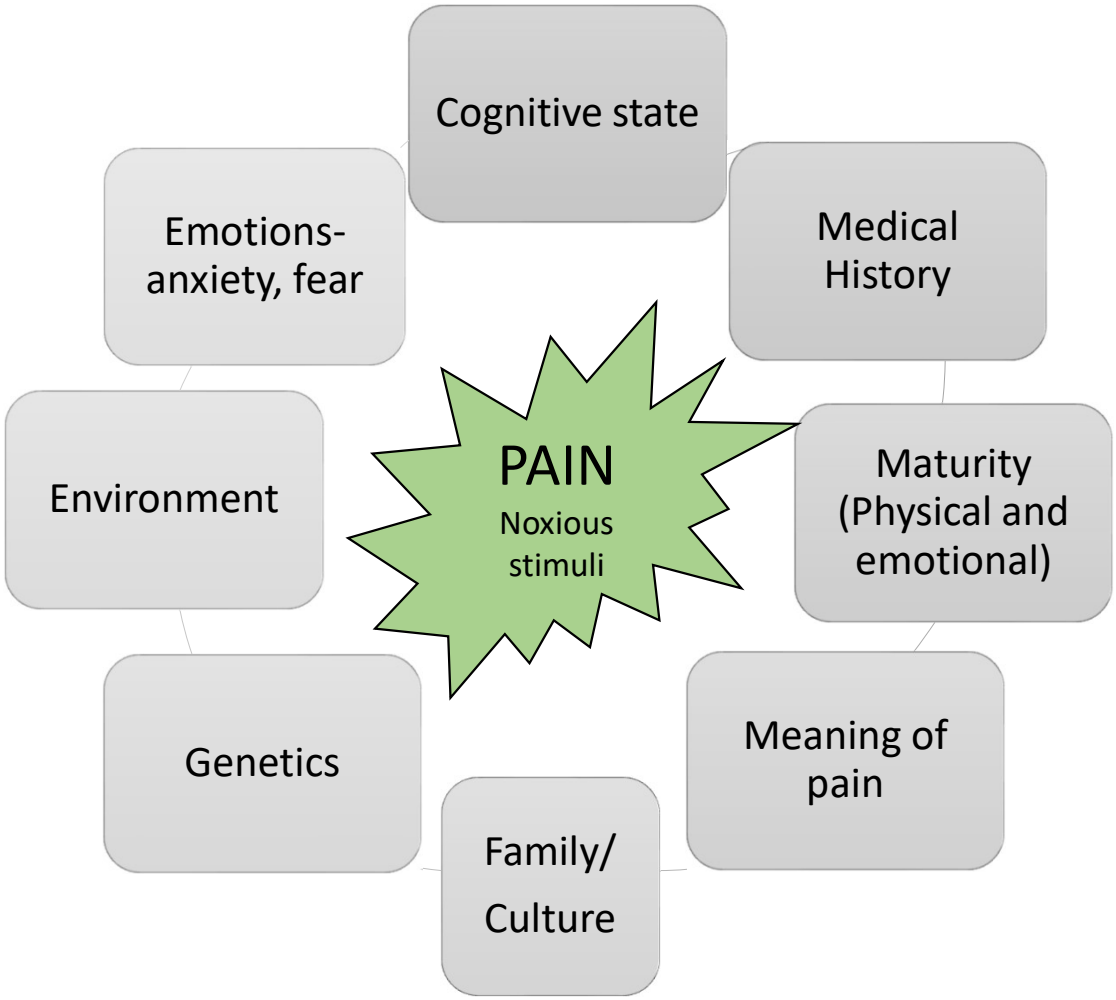
Pain is the most common presenting symptom for patients coming to the ED, with **75% to 80%** of all patients having pain as their primary complaint.

Todd KH, et al. J *Pain*, 2007


STOP
Oligoanalgesia
undertreatment of pain

Approach to Managing Pain in the Emergency Department

Pain and Contributing Factors



Importance of Treating Pain

Untreated pain has a profound impact on quality of life and can have physical, psychological, social, and economic consequences.

Clinical outcomes can include increased risk of atelectasis, respiratory infection, myocardial ischemia/infarct, and thromboembolic disease

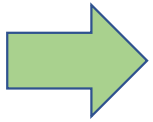
Common sequelae = decreased mobility, impaired immunity, decreased concentration, anorexia, and sleep disturbances

King, NB, et al. PLoS Med, 2013

Acute Pain

Life sustaining symptom

- **Adaptive** by eliciting motivation to minimize harm and allow healing
- Inappropriately managed acute pain can result in **immunological and neural changes**, which can progress to chronic pain if untreated



Chronic Pain

Can be a disease in itself

- **Maladaptive**, pathologic, disorder of the somatosensory pain signaling pathways influenced by genetic and epigenetic factors
- Associated with higher risk of fatal and nonfatal suicide attempts

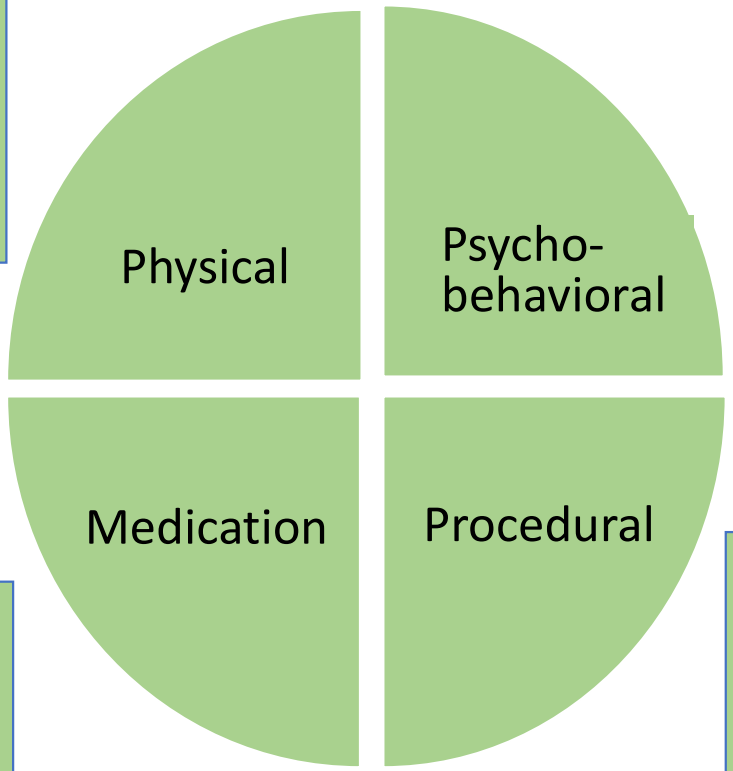
Dzau VJ, Pizzo PA. *JAMA*. 2014
Walk D, Poliak-Tunis M. *Med Clin N Am*. 2016
Argoff CE, et al. *Pain Med*. 2009

Petrosky E, et al. *Ann Intern Med.* 2018
Ilgen MA, et al. *JAMA Psychiatry*. 2013
Tang NK et al. *Psychol Med*. 2006


Sedatives
Procedures
Topicals
Psycho-behavioral
Medications
Nerve blocks
Infusions

Multidimensional Approach to Pain

Exercise and movement
Brace/ sling/ wrap
Food and drink
Other modalities *(heat, cold, stretch)*



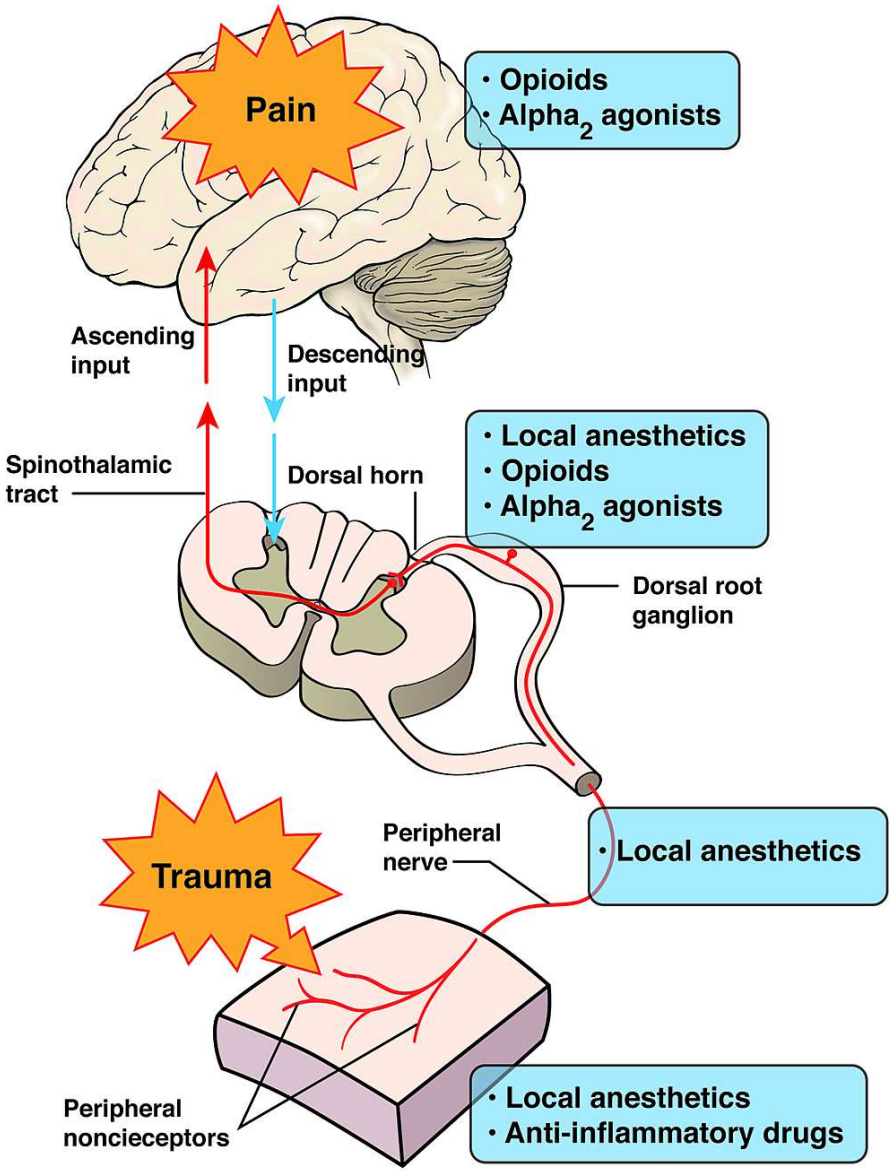
CBT/ACT
Treat anxiety
Acknowledge trauma
Environment *(noise, lights)*

NSAIDs
Anticonvulsants
Topical agents
Opioids
Others

Nerve blocks
Steroid injections
Trigger point injections
PCA/ Pumps
Acupuncture

Multimodal approaches are more cost-effective than single modality options

Flor H, et al. Pain 1992
Roberts AH, et al. Clin J Pain. 1993
Patrick LE, et al. Spine. 2004
Kamper SJ, et al. Cochrane Review. 2014



Physiology of pain transmission and pain management interventions

Khalid S, Tubbs R. Neuroanatomy and Neuropsychology of Pain. Cureus. 2017;9(10):e1754. Source: https://www.cureus.com/articles/9165-neuroanatomy-and-neuropsychology-of-pain

Barriers to Adequate ED Pain Control

Patient Related	Provider Related	System Related
• Ethnicity, gender, age (very young, very old) • Diminished cognitive function • Fear of medications: addiction, side effects • Acceptance of pain as being inevitable • Unwillingness to bother healthcare providers	• Inadequate education • No objective measuring tool for pain • Accepting only pain reports that conform to expectations • Concerns of opioid addiction and drug-seeking behavior	• Lack of clearly articulated standards • Paucity of treatment guidelines • Fear of regulatory sanctions • Lack of healthcare provider accountability

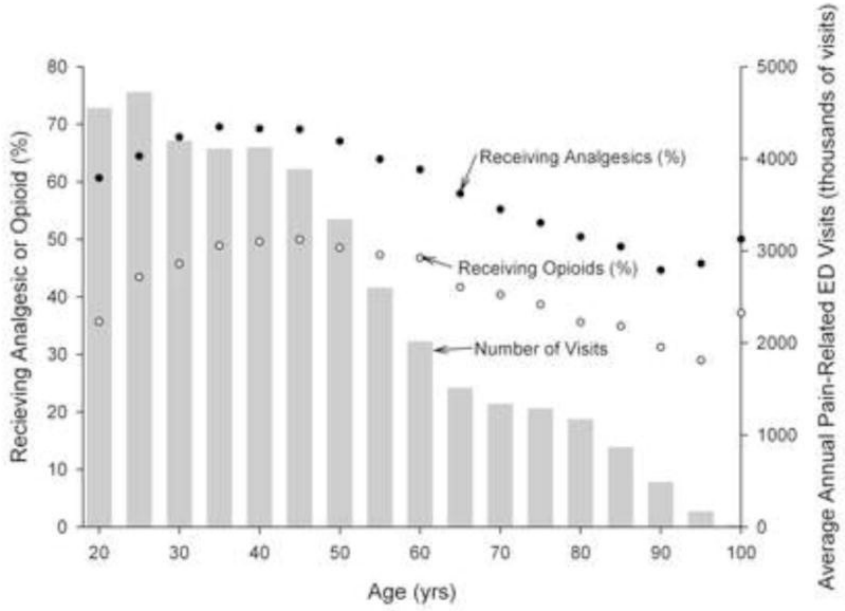
Tintinalli JE, et al. Tintinalli's Emergency Medicine: A Comprehensive Study Guide: 9e. McGraw Hill; 2020.

Age Bias in Treating Pain

Undertreatment of pediatric pain because: "difficulty in **recognizing and assessing pain** in the pediatric patient, a **fear of dependency** or overprescribing, or the **myth** that children experience pain differently than adults" (Samina, A, et el. Paediatr Child Health, 2014)

"Children younger than 2 years of age receive **disproportionately less analgesia** than school age children, despite having obviously painful conditions." (Alexander, J et al. Ann Emerg Med, 2003)

"Patients aged 75 years and older with pain-related ED visits are less likely to receive pain medication than patients aged 35 to 54 years"



Platts-Mills, T, et.al. Ann Emerg Med, 2012

Racial Bias in Healthcare

Pediatricians who had a high degree of implicit pro-white bias were **significantly less likely to prescribe post-surgical opioids** (the standard of care) **to black patients.** Sabin JA, et al. Am J Public Health, 2012

Hispanic patients were **seven times less likely to receive opioids** in the emergency room than non-Hispanic patients with similar injuries associated with pain. These findings were duplicated in black patients. Todd KH et al. JAMA, 1993

Buprenorphine prescriptions for OUD treatment were received at **considerably more visits by white patients** than by patients of other races or ethnicities. Lagisetty PA, et al. JAMA Psychiatry, 2019

Racial Bias in Emergency Medicine

ELSEVIER

The American Journal of Emergency Medicine

Volume 37, Issue 9, September 2019, Pages 1770-1777

Review

Racial and ethnic disparities in the management of acute pain in US emergency departments: Meta-analysis and systematic review

Paulyne Lee [a], Maxine Le Saux [b], Rebecca Siegel [b], Monika Goyal [c], Chen Chen [d], Yan Ma [d], Andrew C. Meltzer [b]

763 articles were screened for eligibility and fourteen studies

Total study population included 7070 non-Hispanic White patients, 1538 Hispanic, 3125 Black

“Black and Hispanic patients are less likely to receive the equivalent analgesia medication as non-Hispanic White patients”

Recognize YOUR Implicit Biases

PROJECT IMPLICIT HEALTH

Find out your implicit associations about exercise, anxiety, alcohol, eating, marijuana, and other topics! GO!

PROJECT IMPLICIT SOCIAL ATTITUDES

Log in or register to find out your implicit associations about race, gender, sexual orientation, and other topics!

https://implicit.harvard.edu/implicit/

Non-Opioid Analgesia

Non-Opioid Analgesics/ NSAIDS

Mechanism of action targeting a key source of pain for many acute painful processes, as opposed to only interfering with pain signaling

There are tremendous benefits to employing anti-inflammatories and few good reasons to withhold them in the management of acute pain

NSAIDs/Celebrex frequently outperform opioids for managing acute painful states when compared directly in randomized, double-blind trials

Avoid NSAIDs in renal dysfunction, PUD, CHF, < 6 mo of age, >20 wks. pregnant. Use with caution in elderly & those with CV risks.

Non-Opioid Analgesics

Generic (Brand)	Adult	Pediatric (<12 yo)
Acetaminophen (Tylenol®)	325-650 mg PO q 4-6 h Max: 4 g/day	15 mg/kg PO q 4-6 h Max: 75 mg/kg/day
Acetaminophen IV (Ofirmev®) *Use only if not tolerating PO*	1 g IV q 6 h Max: 4 g/day or 650 mg q 4 h prn pain	<50 kg = 15 mg/kg IV q 6 h or 12.5 mg/kg IV q 4 h prn pain Max: 75 mg/ kg/day
Celecoxib (Celebrex®)	100-200 mg PO daily to q 12 h Max: 400 mg/ day	≥ 2 yo to adult 10-25 kg: 50 mg PO BID; > 25 kg: 100 mg BID
Ibuprofen (Motrin®)	400-800 mg PO q 6 to 8 h Max: 3200 mg/ day	10 mg/kg PO q 6 to 8 h Max: 40 mg/ kg/day or 2400 mg/day *Only > 6 month
Ketorolac (Toradol®)	15 mg IV or 30 mg IM q 6 h Max: 120 mg/d x 5 day	0.5 mg/kg IM/IV q 6 h up to 72 h Max: 30 mg/ dose IM, 15 mg/ dose IV
Naproxen (Naprosyn®)	250-500 mg PO q 12 h	≥ 2 yo 10 mg/kg/day PO div q 8-12 h
Meloxicam (Mobic®)	7.5-15 mg PO daily	≥ 2 yo 0.125 mg/kg/ dose NTE adult dose

Avoid NSAIDs in renal dysfunction, PUD, CHF, < 6 mo of age, >20 wks. pregnant. Use with caution in elderly & those with CV risks.

SPECIFIC- Nontraumatic Primary Headaches

NSAIDS- ibuprofen, naproxen, meloxicam and ketorolac + **Tylenol**

Dopamine antagonists- prochlorperazine (Compazine), metoclopramide (Reglan), haloperidol (Haldol), --> *consider pretreating with Benadryl to avoid akathisia*

Steroids- dexamethasone (Decadron) *can be effective in preventing recurrence*

Triptans- (Sumatriptan)- high side effect profile and contraindications, consider in teens or children, less effective for severe migraine

Dihydroergotamine (DHE)- ergo derivative, typically inpatient infusion or IM at home

Oxygen- 100% O2 on non rebreather mask at 7 liters/min for 15 minutes

Greater occipital nerve blockade/ cervical myofascial trigger point injections

Giamberardino MA, et al. *Intern Emerg Med 2020*

Nontraumatic Headaches

Emily's "Migraine Cocktail"

- 1L bolus of IV Lactated Ringer's solution
- 5 or 10 mg of IV prochlorperazine
- 15 mg of IV ketorolac
- 1000mg of oral acetaminophen

+/- 12.5-25mg of diphenhydramine and
10 mg of IV dexamethasone

SPECIFIC- Undifferentiated Abdominal Pain

*not abdominal catastrophes or acute abdomen

EMRA Pain Management Guide, 2020

Treatment for Mild to Moderate Gastric-Related Abdominal Pain	
Antacids (give one: either PO, chewable, or liquid suspension)	Aluminum/magnesium hydroxide (Maalox) 1,200/1,200 mg PO
	Calcium carbonate 2,000 mg PO
Oral (topical) anesthetic	Viscous lidocaine solution 2% 15mL PO
H2 Blocker	Famotidine 20 mg PO or IV
	Cimetidine 400 mg PO
Proton Pump Inhibitor (PPI)	Omeprazole 20 mg PO or IV
	Pantoprazole 40 mg PO or IV
Selective Serotonin (5-HT3) Receptor Antagonists	Ondansetron 4–8 mg PO or IV
Dopamine Receptor Antagonists	Droperidol or haloperidol 2.5–5 mg IV
	Metoclopramide 10 mg PO or IV

Treatment for Severe Gastric-Related Abdominal Pain	
Opioid Receptor Agonists	Fentanyl 0.5–1.0 mcg/kg IV
	Morphine 0.05–0.1 mg/kg IV
	Hydromorphone 0.5 mg IV
Selective Serotonin (5-HT3) Receptor Antagonists	Ondansetron 4–8 mg IV
Dopamine Receptor Antagonists	Droperidol or haloperidol 2.5–5 mg IV
	Metoclopramide 10 mg IV
NMDA and Glutamate Receptor Antagonists	Ketamine 0.1–0.3 mg/kg IV (or 0.5–1 mg/kg IN) over 15–30 min followed by 0.1 mg/kg/hr infusion

Despite the historical misconception that analgesia interferes with the surgical evaluation of the acute abdomen, research has shown that **analgesia does not increase the risk of diagnosis error** or the risk of failure in assessing these patients[1].

Manterola C, et al. Analgesia in patients with acute abdominal pain. *Cochrane Database Syst Rev*. 2011

SPECIFIC- Trauma

Shock, trauma, burns, and hemodynamic or respiratory instability = judicious use of opioids

Fentanyl, first as a bolus and then as an infusion, may be the opioid of choice due to its **lesser impact on hemodynamic function and shorter duration of action**. *(*also consider ketamine)*

Use of regional analgesia is encouraged

NSAIDs should not be given to patients with major trauma due to the risks of excessive bleeding from platelet dysfunction and gastric stress ulcers and the potential for acute renal failure in a volume-depleted patient

Tintinalli JE, et al. Tintinalli's Emergency Medicine: A Comprehensive Study Guide: 9e. McGraw Hill; 2020.

SPECIFIC- Muscle Relaxers *Do they work?*

ELSEVIER

The Journal of Emergency Medicine
Volume 62, Issue 4, April 2022, Pages 455-461

Original Contributions

The Relative Efficacy of Seven Skeletal Muscle Relaxants. An Analysis of Data From Randomized Studies

Lorena Abril *, Cristian Zamora †, Maria Cordero ‡, Andrew R. Williams *, Benjamin W. Friedman *

- **Patients** were considered for inclusion if they were 18– 69 years of age and presented to the ED primarily for management of acute LBP. **N= 887**
- **Intervention:** One of seven skeletal muscle relaxants (metaxalone, tizanidine, baclofen, diazepam, orphenadrine, methocarbamol, or cyclobenzaprine)
- **Primary outcome** - Improvement in the **Roland Morris Disability Questionnaire (RMDQ)** between ED discharge and the 1-week follow-up.
- **Secondary-** medication side effects

"Among patients in the ED with acute LBP treated with a nonsteroidal anti-inflammatory drug, SMRs do not improve outcomes more than placebo. Neither age, sex, nor baseline impairment impacts these results."

Abril et al. The Relative Efficacy of Seven Skeletal Muscle Relaxants. An Analysis of Data From Randomized Studies. J Emerg Med May 2022

SPECIFIC- Muscle Relaxers

Table 3. One Week Outcomes

Skeletal Muscle Relaxant	Mean Improvement in RMDQ (95% CI)
Placebo	10.5 (9.5–11.5)
Baclofen	10.6 (8.6–12.7)
Metaxalone	10.3 (8.1–12.4)
Tizanidine	11.5 (9.5–13.4)
Diazepam	11.1 (9.0–13.2)
Orphenadrine	9.5 (7.4–11.5)
Methocarbamol	8.1 (6.1–10.1)
Cyclobenzaprine	10.1 (8.3–12.0)

"There were no statistically significant differences among the groups (p = 0.37)"

"Adverse medication effects were more common with cyclobenzaprine than with placebo."

Abril et al. The Relative Efficacy of Seven Skeletal Muscle Relaxants. An Analysis of Data From Randomized Studies. J Emerg Med May 2022

SPECIFIC- Gabapentinoids

- Sparse evidence exists to support their efficacy for emergency department use
- Contraindicated in patients with impaired renal function
- Binding to the alpha-2-delta subunit of N-type calcium channels, which are widely expressed in the hippocampus and cerebellum= gabapentinoids **cause dizziness, balance disorders, ataxia, visual disturbances, sedation, somnolence, and cognitive impairment**
- Variable interindividual bioavailability with saturable oral absorption

Table 6. Overview of Nonpharmacologic Pain Management

Therapy	Evidence Base in Trauma/Burn Care	Expertise Required	Associated Cost
Cognitive Strategies			
Animal-assisted therapy	Low	Moderate	Moderate
Cognitive behavioral therapy	Moderate[A,B]	Moderate	Low
Hypnosis	Moderate[C,D]	High	Moderate
Mindfulness	Low[B,C]	Moderate	Low
Music therapy	Moderate[C]	Low	Low
Virtual reality	High[D]	Low	High
Physical Strategies			
Acupuncture	Moderate[D,E]	High	High
Aromatherapy	Moderate[D,E]	Low	Low
Iontophoresis	Moderate[E]	High	High
Immobilization	Moderate[E]	Low	Low
Massage therapy	Moderate[A,D]	Moderate	Low
Temperature therapy (cold)	Low	Low	Low
Temperature therapy (heat)	Moderate[E]	Low	Low
Transcutaneous electrical nerve stimulation (TENS)	High[E]	Moderate	High
Ultrasound	Moderate[F]	High	High

Key: [A]Spinal cord injury, [B]Chronic pain, [C]Extremity/orthopaedic trauma, [D]Burn, [E]Perioperative/acute pain, [F]Muscle/tendon injury.

(ACS TRAUMA QUALITY PROGRAMS. BEST PRACTICES. GUIDELINES FOR ACUTE. PAIN MANAGEMENT IN. TRAUMA PATIENTS. Released November 2020).

Opioid Analgesia and Sedation

Opioid Analgesia in Adults

Drug	Typical Initial Adult Dose	Pharmacokinetics	Comments
Morphine	2–6 milligrams IV 0.1-0.2mg/ mg 10–30 milligrams PO IR tab	*Onset*: 1–2 min IV, 10–15 min IM/SC, and 30 min PO IR tablet *Duration*: 1–2 h IV, 3–4 h IM/SC, and 3–5 h PO IR tablet	Histamine release may produce transient hypotension or nausea and emesis or itching; neither requires routine adjunctive treatment.
Hydromorphone (Dilaudid)	0.5–2 milligrams IV 1–2 milligrams IM	*Onset*: 5–15 min IV *Duration*: 2–4 h IV	More euphoria but less itching and nausea than morphine
Fentanyl	50–100 micrograms IV/ IM Or 1mg/ kg	Onset: <1 min IV Peak effect: 2–5 min IV *Duration*: 30–60 min IV	Less cardiovascular depression than morphine. High doses (>5 micrograms/kg IV) can cause chest wall rigidity.
Oxycodone (Percocet w Tylenol)	5–10 milligrams PO	*Onset*: 10–15 min PO *Duration*: 3–6 h PO	Lower incidence of nausea than other opioids. Possible inadvertent acetaminophen overdose with combination agents.
Hydrocodone/acetaminophen	5/325–10/325 milligrams PO	*Onset*: 30–60 min PO *Duration*: 4–6 h PO	Lower incidence of nausea than other opioids. Only available as hydrocodone-acetaminophen combination
Codeine	30–60 milligrams PO 30–100 milligrams IM	*Onset:* 30–60 min PO and 10–30 min IM *Duration*: 4–6 h PO and IM	High incidence of GI side effects Some patients cannot convert to codeine-6-glucuronide and morphine.
Tramadol	50–100 milligrams PO	Onset: 1 h PO *Duration*: 4–6 h PO	CNS side effects common.

Tramadol, or Tramadon't

What's the Bottom Line?

Tramadol is a **weird drug** with **unpredictable kinetics** and a litany of **dangerous toxicities** and **drug interactions**.

- Can it sometimes help people with pain? Yes.
- Is it a rational drug to initiate? No.
- Do you understand why Emily dislikes this drug? Yes

Sources: *"Tramadont"* from EMCrit; "*Tramadol: When to Avoid It*" from Academic Life in EM

Opioid Analgesia in Infants ≥ 6 Months and Children

Drug	Route	Dose	Frequency
Codeine	Oral	0.5–1.0 mg/kg	Q3–4hrs
Fentanyl	Intravenous	0.5–1.0 mcg/kg	Q1–2hrs
Fentanyl	Intranasal	1.5 mcg/kg	May repeat x1 at 10 min
Fentanyl	Intranasal 2nd dose	0.75–1.5 mcg/kg	
Hydrocodone	Oral	0.1–0.15 mg/kg	Q3–4hrs
Hydromorphone	Oral	40–80 mcg/kg	Q3–4hrs
Hydromorphone	Intravenous	10–20 mcg/kg	Q2–4hrs
Methadone	Oral	0.1–0.2 mg/kg	Q6–8hrs
Methadone	Intravenous	0.1 mg/kg	Q6–8hrs
Morphine	Oral	0.3 mg/kg	Q3–4hrs
Morphine	Intravenous	0.1 mg/kg	Q2–4hrs
Oxycodone	Oral	0.1–0.2 mg/kg	Q3–4hrs

(Berde CB, et al. *New Engl J Med.* 2002)

Neonate Analgesia Medications

Acetaminophen- 15 mg/kg/dose (preterm infants= q12 hours instead of q6)

Fentanyl

- <28 weeks GA – 1-2 mcg/kg per dose
- 28 to 32 weeks GA – 2-3 mcg/kg per dose
- >32 weeks GA – 3-4 mcg/kg per dose

Ketamine- 1 to 2 mg/kg per dose over 2-3 minutes, prefer > 3 months old

Morphine: IM, IV (preferred), SUBQ: Initial: 0.05 to 0.1 mg/kg/dose every 4 to 8 hours as needed

Adjuncts	Route	Onset	Comments
Vapocoolant spray	Topical	Immediate	Max 5 mg/kg
Sucrose	PO	2 mins	
Buffered lidocaine	SQ	1 min	
J-tip lidocaine	SQ	1 min	Use on intact skin
LET gel	Topical	> 30 min	Use on intact skin
LMX 4% cream	Topical	30 mins	
EMLA cream	Topical	> 60 mins	

Procedural Sedation Medications

Generic (Brand)	Adult	Pediatric	Comments
Ketamine (Ketalar®)	IV 0.5-1.0 mg/kg IM 4-5 mg/kg	>3 mo: IV 1-2 mg/kg; additional doses 0.5 mg/kg IV q 10-15 min prn; IM 4 - 5 mg/kg	Small risk of laryngospasm, vomiting is common, emergence agitation
Midazolam (Versed®)	IV 0.05-0.1 mg/kg IV slow push over 1-2 min	IV 0.05-0.1 mg/kg IN 0.2-0.3 mg/kg (IN max 10 mg)	Initial max dose 2 mg. Max total dose in >60 yo is 0.1 mg/kg Decrease dose by 33-50% when given with opioid
Propofol (Diprivan®)	IV 0.5-1 mg/kg slow push (1-2 min); additional doses 0.25-0.5 mg/kg over 1-3 min	IV 1 mg/kg slow push (1-2 min); additional doses 0.5 mg/kg	Risk of apnea, hypoventilation, respiratory depression, rapid changes in sedative depth, hypotension; provides no analgesia
Etomidate (Amidate®)	IV 0.1 - 0.2mg/kg; additional doses 0.05mg/kg	IV 0.1 - 0.2mg/kg; additional doses 0.05mg/kg (infants and children > 6mo)	Risk of myoclonus (premedication w/ benzo or opioid can decrease), pain with injection, nausea and vomiting, risk of adrenal suppression; provides no analgesia
Dexmedetomidine (Precedex®)	IV 1 mcg/kg loading dose (over 10 min) followed by 0.5 to 2 mcg/ kg/h continuous infusion. Use 0.5 mcg/kg for geriatric patients	IV 0.5–2 mcg/kg loading dose (over 10 min) followed by 0.5 to 2 mcg/kg/h continuous infusion IN 2-3 mcg/kg	Risk of bradycardia, hypotension, especially with loading dose or rapid infusions, apnea, bronchospasm, respiratory depression

Sedation case

85-year old woman presents to your ED with a traumatic, left-sided posterior hip dislocation. You need to reduce the hip, but how should you sedate her?

To join, go to: **ahaslides.com/AAPAPAIN1**

AhaSlides

Question 2 of 2

Start the Quiz!

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Sedation case

85-year old woman presents to your ED with a traumatic, left-sided posterior hip dislocation. You need to reduce the hip, but how should you sedate her?

Answer= there is no perfect medication

Opioids and Benzodiazepines- generally tolerated well in older adults (watch for hypoventilation/desaturation)

Propofol- good for orthopedic procedures due to muscle relaxation, quick on and off, can cause respiratory depression and hypotension

Ketamine- not the best first choice in certain older adults (increased BP/ cardiac index)

Etomidate- not first line for procedural sedation, high risk myoclonus

Sedation in the Elderly

Procedural sedation is generally safe in older adults, though they may be at **higher risk for oxygen desaturation**.

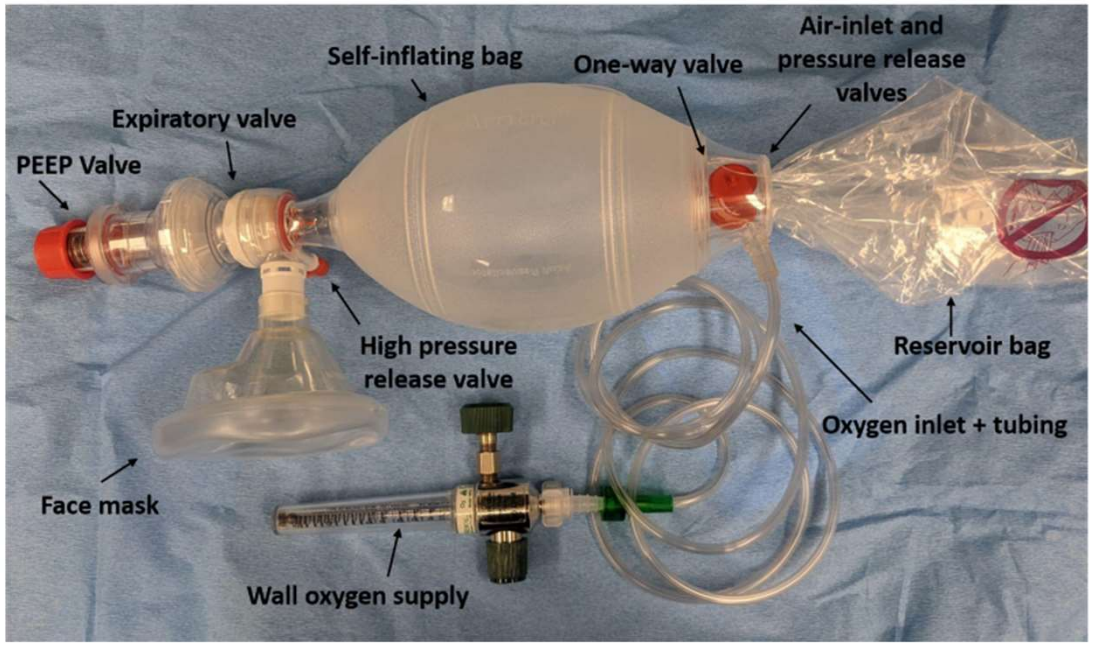
Older patients usually require **lower doses of medications**. They tend to be more sensitive to medications, with slower metabolism, less physiologic reserve to handle side effects, and a smaller volume of distribution

Medication	Typical Adult Starting Dose and Repeat Doses Titrating to Effect	Dose Suggestions in Older Adults (age 65 and over)
Fentanyl	1-2 mcg/kg followed by 0.5-1 mcg/kg	1 mcg/kg followed by 0.5 mcg/kg
Midazolam	0.02-0.03 mg/kg followed by 0.01-0.02 mg/kg	0.02 mg/kg, followed by 0.01 mg/kg
Propofol	0.5-1 mg/kg over 1 min followed by 0.5 mg/kg	0.5mg/kg over 3min followed by 0.25 mg/kg
Ketamine	1-2 mg/kg followed by 0.25-0.5 mg/kg	1 mg/kg followed by 0.25 mg/kg (see caveats on ketamine use in text)
Etomidate	0.1-0.15 mg/kg over 30-60 sec, followed by 0.1 mg/kg if needed	0.1 mg/kg followed by 0.1 mg/kg
"Ketofol"	0.5 mg/kg ketamine and 0.5 mg/kg propofol	More data needed. Consider 0.3-0.5 mg/kg ketamine and 0.3-0.5 mg/kg propofol.

Table 1: Typical adult medication doses and suggestions for older adults. Agents are typically given as a bolus dose, followed by additional doses if needed, titrating to needed level of sedation and monitoring for adverse side effects. For most medications, in older patients consider starting at 50-75% of the usual adult dose. This will vary depending on the patient's overall health and status at the time of sedation. There is a paucity of evidence on the subject, so these are general suggestions. Individual patients may require higher or lower doses.[13]

https://epmonthly.com/article/procedural-sedation-in-the-elderly/

Always be prepared



https://www.emra.org/emresident/article/bvm/

- Signed consent
- Updated patient weight
- Suction
- Intubation equipment
- Reversal agents (Narcan)
- Respiratory technician available
- Atropine/ Epi
- Antiemetics, benzos
- IVF
- Two working PIVs

Nerve Blocks and Regional Anesthesia

Regional Nerve Blocks

Type of Block	General Distribution of Anesthesia
Interscalene Plexus Block	Shoulder, upper arm, lateral 2/3 clavicle
Supraclavicular Plexus Block	Upper arm, elbow, wrist and hand
Infraclavicular Plexus Block	Upper arm, elbow, wrist and hand
Axillary Plexus Block	Forearm, wrist and hand. Elbow if including musculocutaneous nerve
Median Nerve Block	Anterior forearm, lateral hand and digits 1-4 ½
Radial Nerve Block	Lateral arm, posterior forearm, dorsal hand, digits 1-4 ½
Ulnar Nerve Block	Medial Forearm, medial hand and digits 4 ½ to 5
Femoral Nerve Block	Anterior thigh, femur, knee and medial leg distal to the knee
Popliteal Nerve Block	Posterior lateral leg distal to knee, ankle and foot
Tibial Block	Plantar surface of foot
Superficial Peroneal Block	Dorsal surface of foot
Deep Peroneal Block	Web space between 1st and 2nd toes
Saphenous Nerve Block	Distal medial thigh, medial knee, medial ankle and medial foot
Sural Nerve Block	Lateral ankle and foot

Nerve Block Anesthetics

Local Anesthetics	Onset	Duration without Epi (h)	Duration with Epi (h)	Max Dose without Epi, mg/kg	Max Dose with Epi, mg/kg
Lidocaine (1%)	Rapid	0.5–2	1–6	4.5 (300 mg)	7 (500 mg)
Bupivacaine (0.5%)	Slow	2-4	4-8	2.5	3
Mepivicaine (1.5%)	Rapid	2-3	2-6	5	7
2-Chloroprocaine (3%)	Rapid	0.5-1	1.5-2	10	15
Ropivacaine (0.5%)	Medium	3	6	2-3	2-3

Nerve Block Case

You have a 14 year old male patient who sustained complex lacerations to his palm and third finger on the palmer side from using the lawn mower for the first time.

What nerve block would you choose and which medication?

Ahmad, Tawheed, et al. 'Management of Flexor Tendon Injuries in Hand'. Tendons, IntechOpen, Dec. 2019. Crossref, doi:10.5772/intechopen.83483.

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To join, go to: ahaslides.com/AAPAPAIN1

AhaSlides

What nerve block would you chose and which medication?

Click to open word cloud

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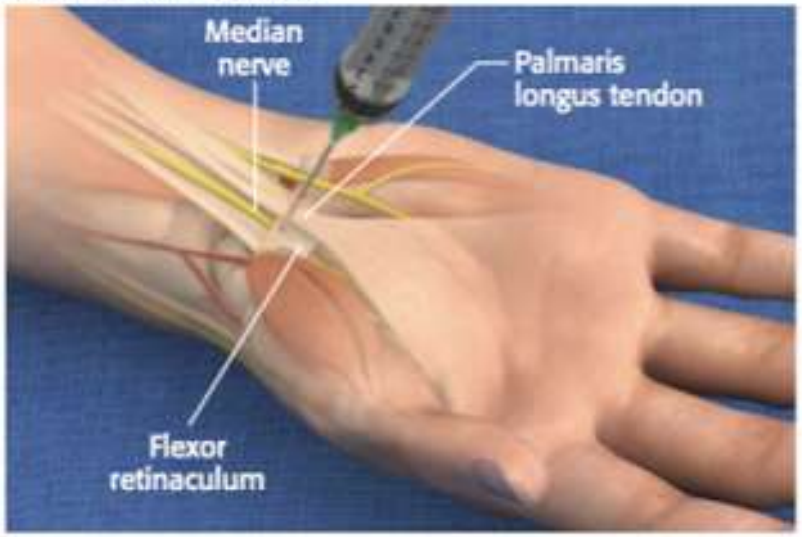
Nerve Block Case

Median Nerve

Distribution

A

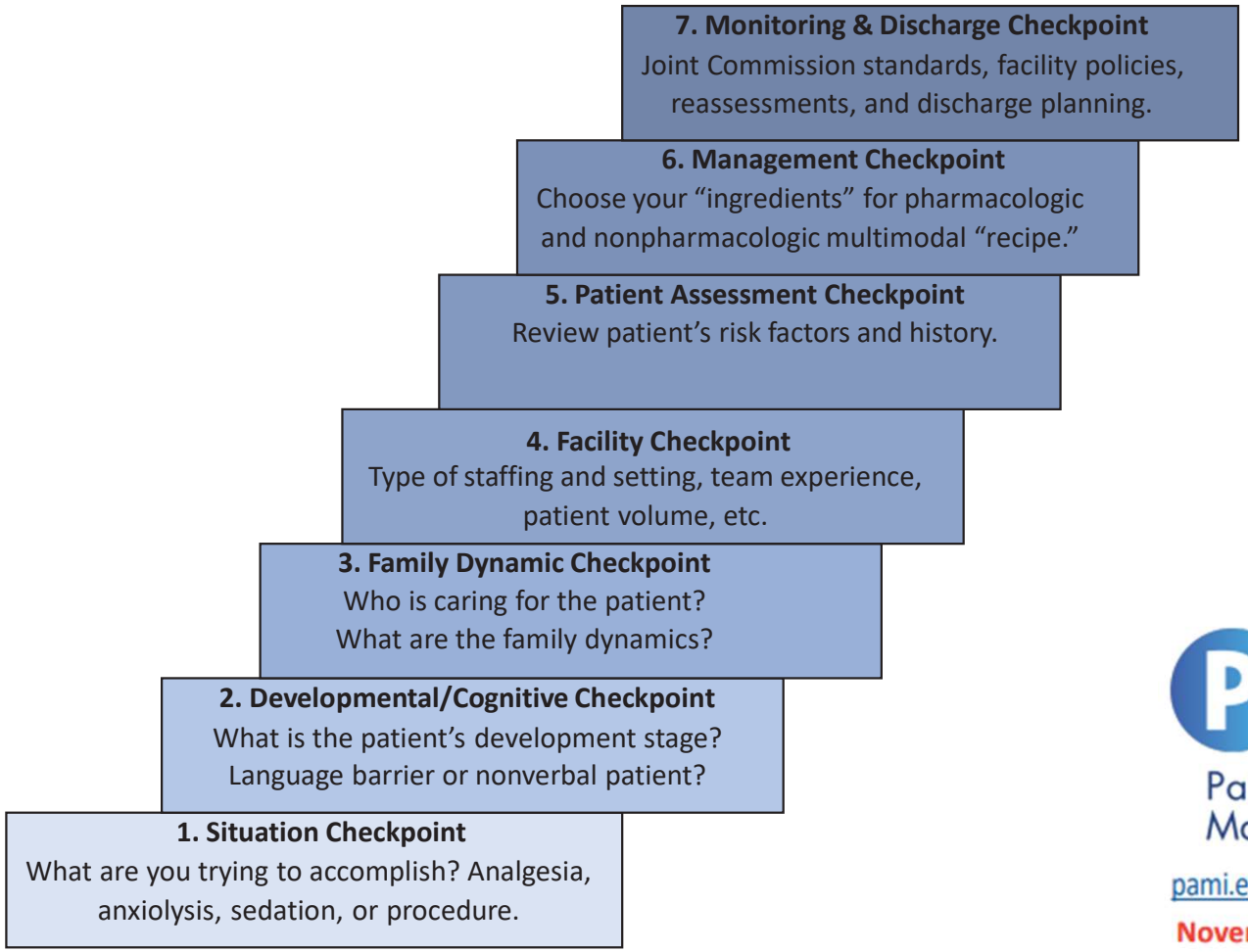
Anatomy and Technique



Locate the palmaris longus tendon (see Fig. 31-7). Insert the needle on the radial side of the tendon just proximal to the volar wrist crease. Feel for a "pop" as the needle penetrates the retinaculum, and inject 3 to 5 mL of anesthetic.

Pearls

Pearl 1: Stepwise Approach



PAMI™
Pain Assessment and Management Initiative
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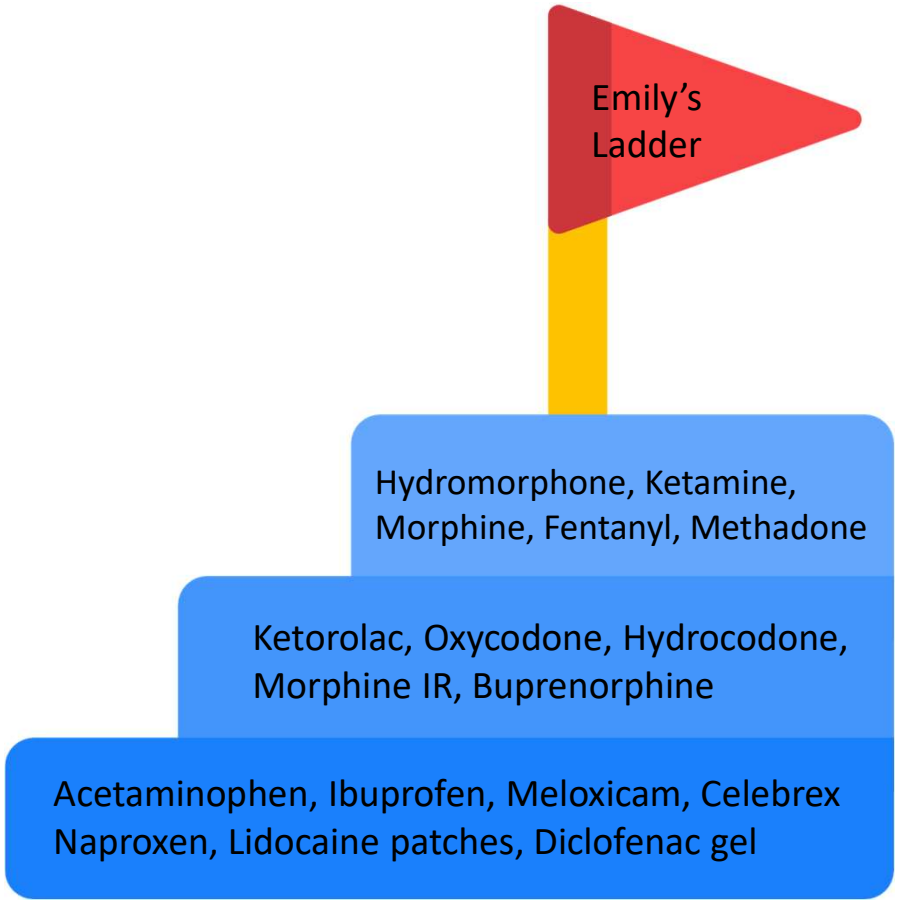
November 2020

Pearl 2: Know your medications/resources



Can they eat? Are they hungry?
Do they need a warm blanket?
Can I elevate their extremity?
Can I give them an ice pack or hot pack?
Can I update them with results?
Can I call their family to give an update?

"Not every patient is an ideal candidate for every medication, but every patient in pain is a candidate for **multimodal analgesia optimization**"

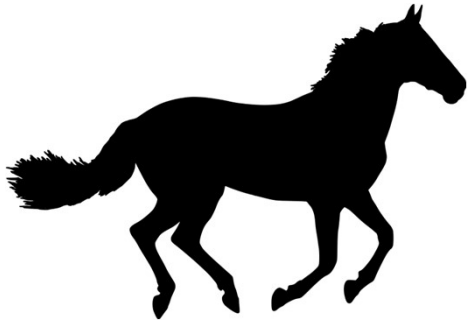
Hyland SJ, et al. Acute Pain Management Pearls: A Focused Review for the Hospital Clinician. *Healthcare*. 2023

Pearl 3: Black Box or Dark Horse?

1. **Droperidol**- *"Droperidol is an effective and safe medication in the treatment of nausea, headache, and agitation. The literature search did not support mandating an electrocardiogram or telemetry monitoring for doses < 2.5 mg given either IM or IV." 2015 American Academy of Emergency Medicine (AAEM) Position*

2. **Haldol**- *"Haloperidol has demonstrated efficacy in acute behavior control, cannabinoid hyperemesis syndrome, and abdominal pain" (Lentz, S et al. Ann of Emergency Med, 2022)*

3. **Ketamine**- dissociative amnesia and analgesia; multiple routes- intravenous (IV), intramuscular (IM), intranasal (IN) and oral (PO)



Pearl 3: Black Box or Dark Horse?

Ketamine Myths… Busted?

"Shouldn't be used in cases with increased ICP"

- Numerous studies have debunked this myth
- Best evidence: meta-analysis with over 900 trauma patients showing no difference in CPP or any patient centered outcomes (Cohen *et al.* 2015)

"Shouldn't be used in cases with increased IOP"

- A number of studies suggest no change in IOP at doses used in the ED (Dravna *et al.* 2012; Halstead *et al.* 2012)

"Shouldn't be used in patients with schizophrenia"

- At least one study shows ketamine can precipitate lasting psychosis in patients with schizophrenia (Lahti *et al.* 1995)

"Should only be used in patients on a monitor"

- No. No. No.
- Depends on the dose, at analgesic doses this is safer than opioids

EM Ottawa Blog, "Update from the K-Hole: Ketamine in the ED", 2018

Pearl 4: Consider your special populations

How to assess pediatric pain:

- Child's report
- Family reports
- Your own observation
- Pain assessment tools

Other interventions: involve play specialists, comfort , immobilize/elevate limbs, ice lollies (oral injuries), and distraction(screens, VR, guided imagery , blow bubbles)

PAIN ASSESSMENT SCALES BY AGE GROUP	
Age Group	**Pain Scale**
Neonates	CRIES
Infant/Toddlers	<1 year: NIPS >1 year: FLACC
Preschool and School-age	Wong-Baker FACES Scale
Adolescents	Adult Pain scale (NRS and VAS)

Pediatric Pain: EMRA Pain Management Guide, 2022

Pharmacologic Analgesic Modalities		
Route	**Consideration**	**Examples**
Topical	Mucosal or cutaneous wounds or anesthesia prior to the procedure	LET, EMLA, ethyl chloride
Oral (PO)	Mild to moderate pain, tolerating PO	Acetaminophen, NSAIDs (ibuprofen), oral sucrose
Per rectum (PR)	Unable to tolerate PO or establish IV access	Acetaminophen, NSAIDs (diclofenac)
Intranasal (IN)	Unable to tolerate PO, fast-acting, safe/needleless	Opioids, ketamine, dexmedetomidine
Inhaled, Nebulized (NEB)	Unable to tolerate PO, fast-acting, safe/needleless	Opioids, ketamine, nitrous oxide, methoxyflurane (not available in U.S.)
Intravenous (IV)	Severe pain, unable to tolerate PO, need for multiple doses or admission	Acetaminophen, NSAIDs, Opioids
Subcutaneous (SQ)	Severe pain, unable to tolerate PO, need for multiple doses or admission	Opioids, ketamine

Pearl 4: Consider your special populations

Elderly Patients- consider Cr/Cl, avoid benzos/tramadol for discharge, consider NSAIDS or Celebrex with clear stop date

Patients with Opioid Use Disorder- methadone and buprenorphine should almost always be continued throughout acute pain episodes, but naltrexone should be stopped

Patient with Sickle cell disease- frequently subjected to biases and stigmas that have affected their care, which then leads to them experiencing greater pain and a lower quality of life

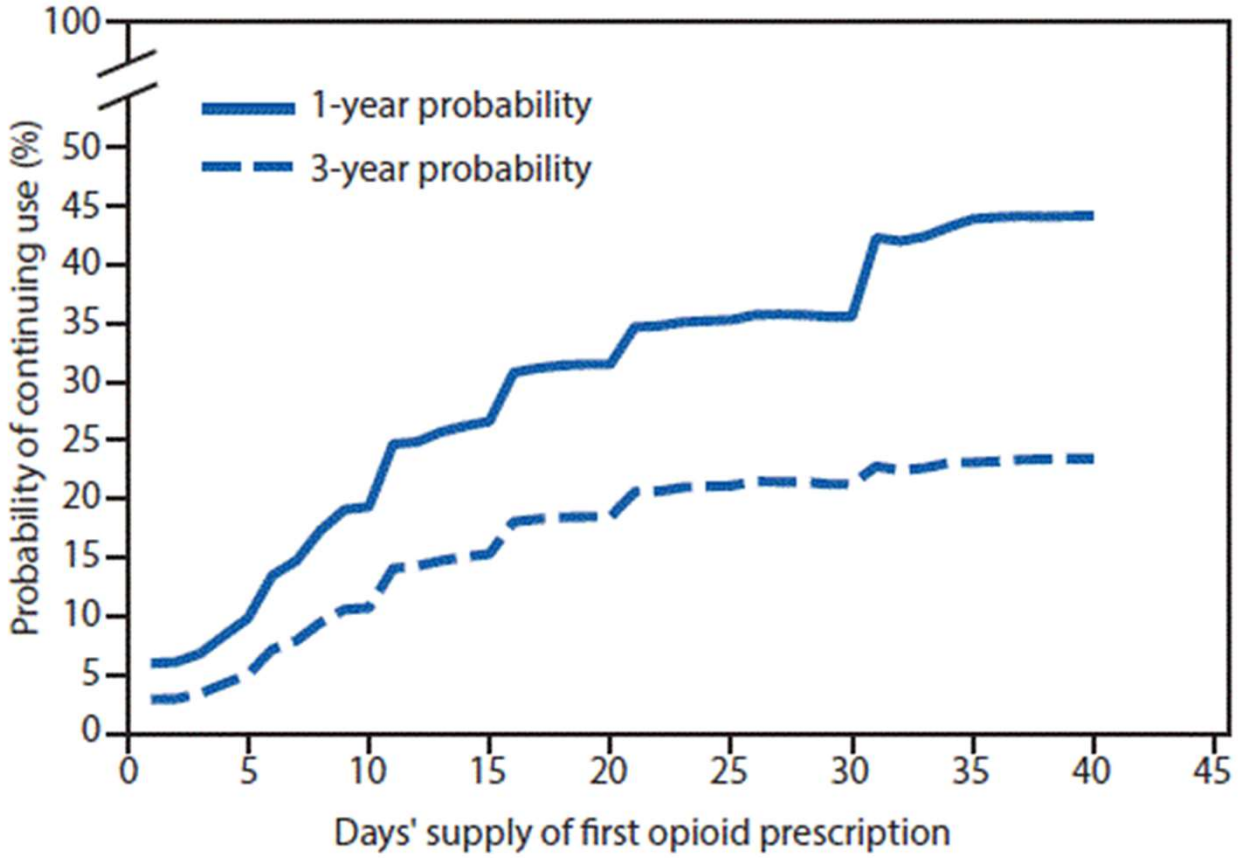
Ethnicity/race/ language/culture- know your biases, use interpreters, be antiracist

Pearl 5: Safe Discharge

- Assess and counsel regarding falls, driving, work safety, overdose, and medication interactions
- Bowel regimen for opioid induced constipation
- Vital signs and oral intake before discharge
- Document all pain medications administered and response at time of disposition
- Consider OTC and nonpharmacologic options
- Can patient implement pain management plan?
    - insurance coverage, transportation, etc.

FIGURE 1. One- and 3-year probabilities of continued opioid use among opioid-naïve patients, by number of days' supply* of the first opioid prescription

United States. 2006–2015



Shah A, et. Al. Characteristics of Initial Prescription Episodes and Likelihood of Long-Term Opioid Use — United States, 2006–2015. MMWR Morb Mortal Wkly Rep 2017

Risk Factors: Overdose, Addiction & Misuse

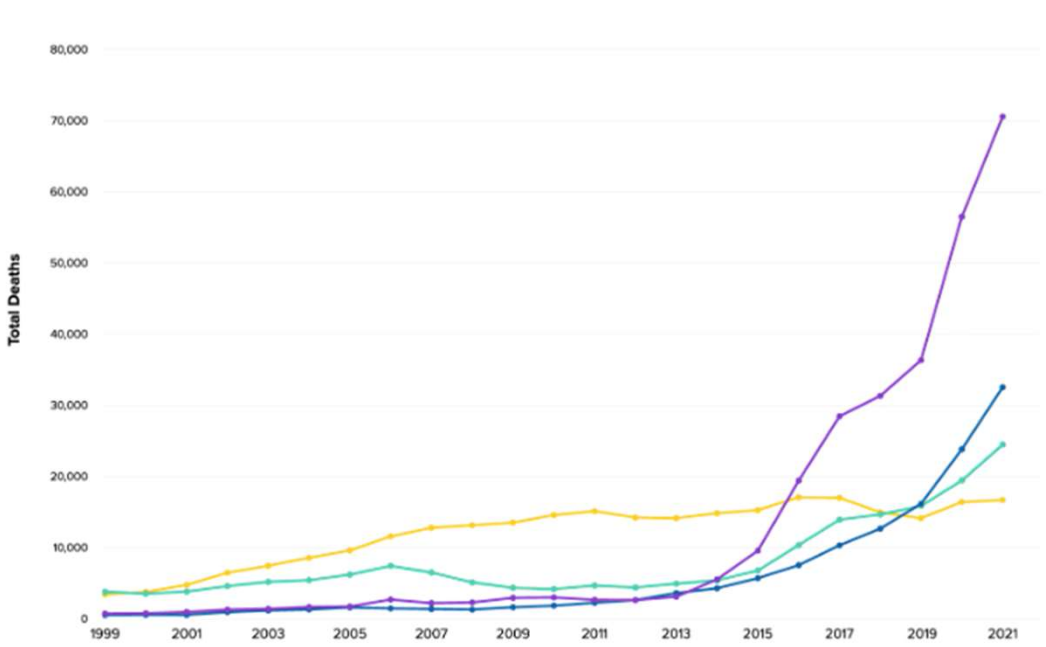
Patient-related Factors	Risk	
Mental health disorder (e.g. depression, anxiety)	overdose	addiction
Substance use disorder (e.g., alcohol, nicotine, illicit & prescription drug)	overdose	addiction
Family history of substance use disorder		misuse
Adolescent		addiction
Age >65	overdose	
Sleep-disordered breathing	overdose	
Legal history (e.g., DUI, incarceration)		misuse
History of sexual trauma		misuse
History of overdose	overdose	

Akbik H, et al. *J Pain Symptom Manage*. 2006
Ives J, et al. *BMC Health Serv Res*. 2006
Liebschutz JM, et al. *J Pain*. 2010
Michna E, et al. *J Pain Symptom Manage*. 2004
Reid MC, et al. *J Gen Intern Med*. 2002
Volkow ND et al. *N Engl J Med* 2016

National Opioid Trends

Trends in U.S. Drug Overdose Deaths (1999 - 2021)

The overdose crisis has evolved over time and is now largely characterized by deaths involving illicitly manufactured synthetic opioids, including fentanyl, and, increasingly, stimulants.



Synthetic opioids excluding methadone overdose deaths increased **97-fold**

Psychostimulants with abuse potential (primarily methamphetamine) overdose deaths increased **59-fold**

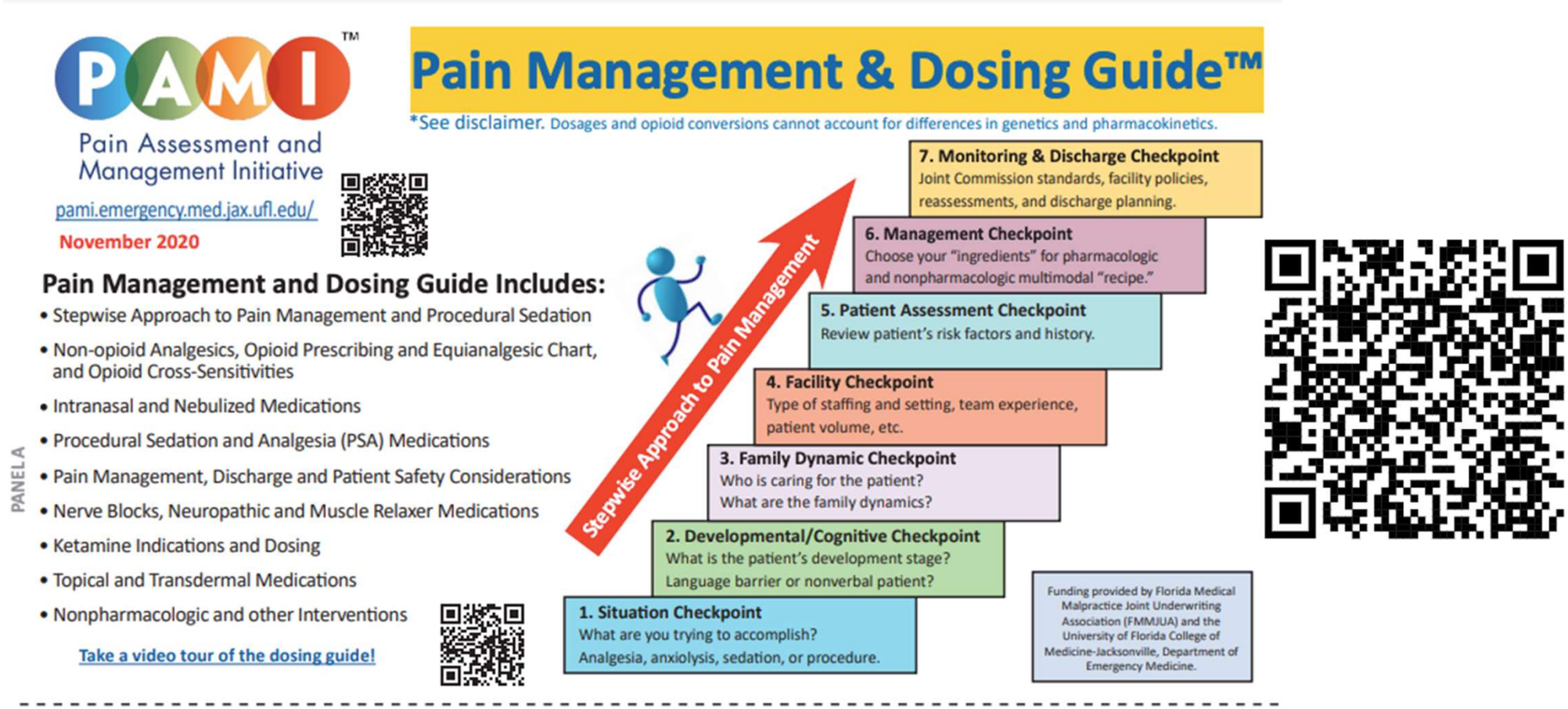
Cocaine overdose increased **6.4-fold**

Rx opioid overdose deaths increased **4.9-fold**

This graph shows the total number of drug overdose deaths in the United States from 1999 to 2021 (the 2021 are provisional).The data shows that overdose deaths involving synthetic opioids excluding methadone have increased 97-fold. Overdose deaths involving psychostimulants (primarily methamphetamine) with abuse potential have increased 59-fold.,. Overdose deaths involving cocaine have increased 6.4-fold. And overdose deaths involving prescription opioids have increased 4.9 -fold. *Source: National Vital Statistics System Mortality File*

Conclusion

Go check this out….



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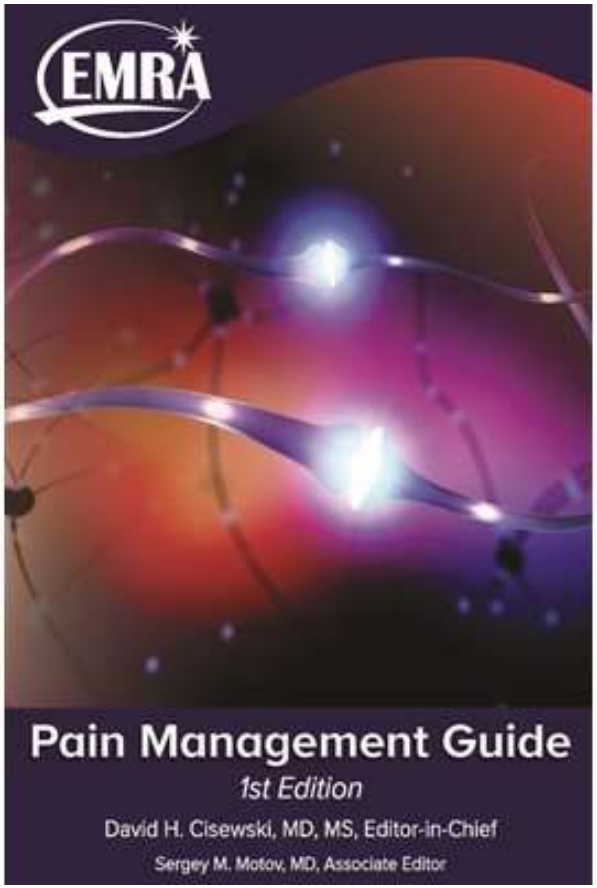

Go check this out....

ACS TRAUMA QUALITY PROGRAMS

BEST PRACTICES GUIDELINES FOR ACUTE PAIN MANAGEMENT IN TRAUMA PATIENTS

This lecture is dedicated to Erin Thatcher, my sister who fights daily with severe chronic pain.
Photo: Picking her up from inpatient treatment center for psychiatry and pain, February 2023.

Conclusion

Please reach out with questions, comments,
or for networking.

Emily Thatcher, MPAS, PA-C
emilycthatcher@gmail.com