

Management of Pediatric Pain in the Field: the Old, the New, and the Future

CLINCON July 15, 2016

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What do I know about pain?

- Practicing PEM since 1989
- Former Medical Director of a regional pediatric hospice and palliative care program
- Site PI: CRASH studies (UNC)
 - *Multisite study to determine whether information collected in the ED immediately following MVC can predict development of chronic pain or psychological sequelae*
- PI: Pain Assessment and Management Initiative (PAMI) since July 2014
- Subscribe to 6 pain journals
- I don't like to see kids or adults in pain



M

M A T T H E W ' S



french pear

grey goose poire vodka/st. germain elderflower
liqueur/louis perdrier brut excellence

14



painkiller

bacardi 8yr rum/lime/orange/pineapple/
house-made crème de coconut

12



green cucumber





Pain Assessment and
Management Initiative

Free access patient safety educational website with resources and learning modules with goal to improve pain management and pediatric care in ED and EMS settings. No commercial products.



Pediatric Emergency Care Safety Initiative

Funded by:

FMMJUA

*Florida Medical Malpractice
Joint Underwriting Association*



Pediatric biased

DISCLOSURES



Division of Emergency Medicine Research

Department of Emergency Medicine

College of Medicine – Jacksonville



Pain Assessment and Management Initiative

Pain Assessment and Management Initiative (PAMI): A Patient Safety Project

PAMI is a free access online educational and patient safety project. The goal of PAMI is to improve pain recognition, assessment and management in patients of all ages, including special populations.

PAMI products are multidisciplinary and can be used by hospitals, EDs, EMS and other providers. Resources and tools are designed to be used, or adapted by any health care facility or agency based on specific needs. PAMI materials can be utilized for resident, fellow, and student education.

Collaborators include Florida College of Emergency Physicians, Florida Hospital Association, Florida Society for Healthcare Risk Management & Patient Safety, American Pain Society and other state and national organizations.

Website: <http://pami.emergency.med.jax.ufl.edu/>



Module Registration: <https://goo.gl/KcKcuI>

PAMI Topics & Modules

Basics of Pain Recognition, Assessment and Management	Patient Safety, Risk, Legal and Transitions of Care in Pain Management
Acute Pain Management	Chronic Pain Management
Procedural Sedation and Analgesia	Prehospital Pain Management for Adults, Children, and Special Populations
Pediatric Pain Management	
Pharmacological Management	Non-pharmacological Management

Funded by Florida Medical Malpractice Joint Underwriting Association (FMMJUA)



PAMI Facebook

Learning Modules with Free CME/CEUs

Resources for patient safety and pain management

Newsbriefs and case scenarios

Free downloadable *Pain Management and Dosing Guide* for adults and pediatrics



Scan the QR code to learn more information.

Email your feedback and how you improved patient care and safety!

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PAMI Website



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Pain Management & Dosing Guide



pami.emergency.med.jax.ufl.edu/dosing-guide

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Management of Pediatric Pain in the Field: the New, the Old, and the Future

Phyllis Hendry, MD

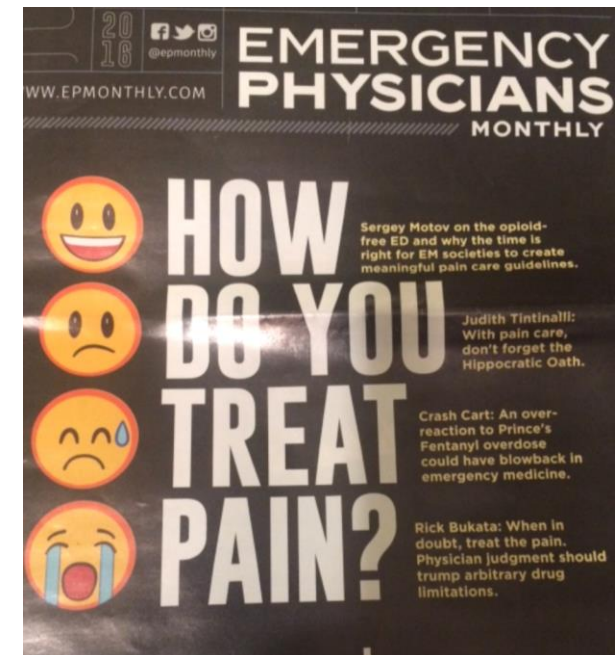
No one wants to see a child in pain. This session will discuss methods of recognizing, assessing and treating pain in children of all ages and developmental stages from the crying infant to the surly teen. Old and new non-pharmacologic and pharmacologic options for pediatric pain management will be discussed, including a free access pain management and medication guide. Intranasal, IV, and IM medications will be reviewed. The session will use case scenarios to review a 7 step approach to managing pain. Patient safety aspects regarding medications, high risk populations, and monitoring will also be discussed. The session will conclude with a summary of the latest pain related research.

Objectives:

1. Describe a stepwise approach to pediatric analgesia and/or sedation
2. Discuss current and upcoming non-pharmacologic and pharmacologic options for pediatric pain management
3. Review patient safety aspects of pediatric pain management

Pain as of July 2016

- Total upheaval in the world of pain management
 - *New research regarding the neurobiological complexity of pain and the long term consequences of untreated acute pain.*
- Opioid epidemic has everyone pointing fingers and outcry for reducing opioids
 - *CDC, The Joint Commission*
 - *Serious “Blame Game” among specialties*
 - *“Throwing out the baby with the bath water”*
- Explosion of new research and new methods of treating pain
- **Pain MCI!**



Basic Tenants

- Can't talk about pediatric pain management without first talking about pain management in general and yes those pesky adults!
- Not a lot of publications specific to pediatric EMS pain management so must extrapolate from ED, pediatric and adult pain resources
 - *Canadian and Australian literature* * *
- Pain and anxiety are twins!
- Understand the basics of pain and treat it like any other abnormal VS
- Approach to pain has dramatically changed over the past 3 years
- Pain has long-term consequences on a child's behavior and reaction to future painful experiences

Pain in the ED and EMS Settings: “Factoids”

- Pain is the most **common** reason for seeking health care and as a presenting complaint accounts for up to 78% of ED visits.
- Pain affects more Americans than diabetes, cancer, and heart disease combined!
- Acute pain is a common reason for 911 calls.
- The overall prevalence of prehospital pain is variable with ranges from 20-53%
 - US studies have found that about 30% of all EMS transports have moderate to severe pain.
- Only 1 in 2 patients experience pain relief prior to ED arrival.
- Pediatric prehospital pain management in top ten research priorities for PEM.
- PECARN: trauma accounts for 28% of pediatric calls and <1% received pain meds.

Why Aren't We Managing Children's Pain? NY Times April 2016

“One of the best ways to address the epidemic of chronic pain in this country is to stop it before it starts.... If we could reduce painful experiences in childhood we might be able to reduce chronic pain in the next generation”



*.....medical training in pain management is scant. **Veterinary schools require “at least five times more education on how to handle pain” than medical schools**, Nora D. Volkow, the director of the National Institute on Drug Abuse, said earlier this year in testimony before a Senate committee.*

EMS Pain Management: Summary Statement



Timely management of pain *affects the entire emergency medical experience and continuum* and can have lasting effects on the patient and family's reaction to current and future medical care.

This is especially true for children.

Top Take Away Points

- You are the first line
 - *Your pain report sets the tone for triage and the rest of the ED visit*
- Your actions are what the child and family will remember
 - *Effect on future pain experiences*
 - *Effect on development of chronic pain*
- Start managing pain in the field no matter the transport time
 - *Pharmacologic- consider nasal and oral routes*
 - *Nonpharmacologic methods*
 - *You are hereby appointed as an honorary child life specialist and “pain warrior”*

Why EMS pain management is important?

- Significantly decreases waiting times for pain reduction or relief.
- Pre-hospital pain management aids in improved ED triage, patient comfort, vital signs, and patient assessment.
- Early management in the field provides long-term benefits:
 - decreased long-term sequela in children
 - ***prevention of chronic pain*** through the development of hypersensitized pain pathways
 - uncontrolled acute pain may have a link to post traumatic stress disorder and if inadequately treated can lead to chronic pain
 - prevents reduced response to appropriate analgesia dosages

What's Old

- Doing nothing
- Brutocaine, barbiturates, chloral hydrate
- Simplified, ineffective approach
- Demerol and codeine
- IM and rectal routes
- Treating all types of pain and all types of people with the same regimen
- Sticking our heads in the sand and saying that's the PCP's problem, the ED's problem.....
- Me



What's New

- Tons of new pain related research and information
- Opioid addiction issue
 - *They will find a new drug*
- Focus shifting to those that abuse the system versus those in real pain
- The pain scales we are using just don't cut it
 - *-need rapid assessment and risk prediction tools for ED and EMS*
- Growth of pain specialists and procedures
- State prescription drug monitoring programs
- Seeing different types of pain due to MVCs, sports, technology, ...
 - *Increase in back and neck pain, decreased vision and hearing*



What's
new?

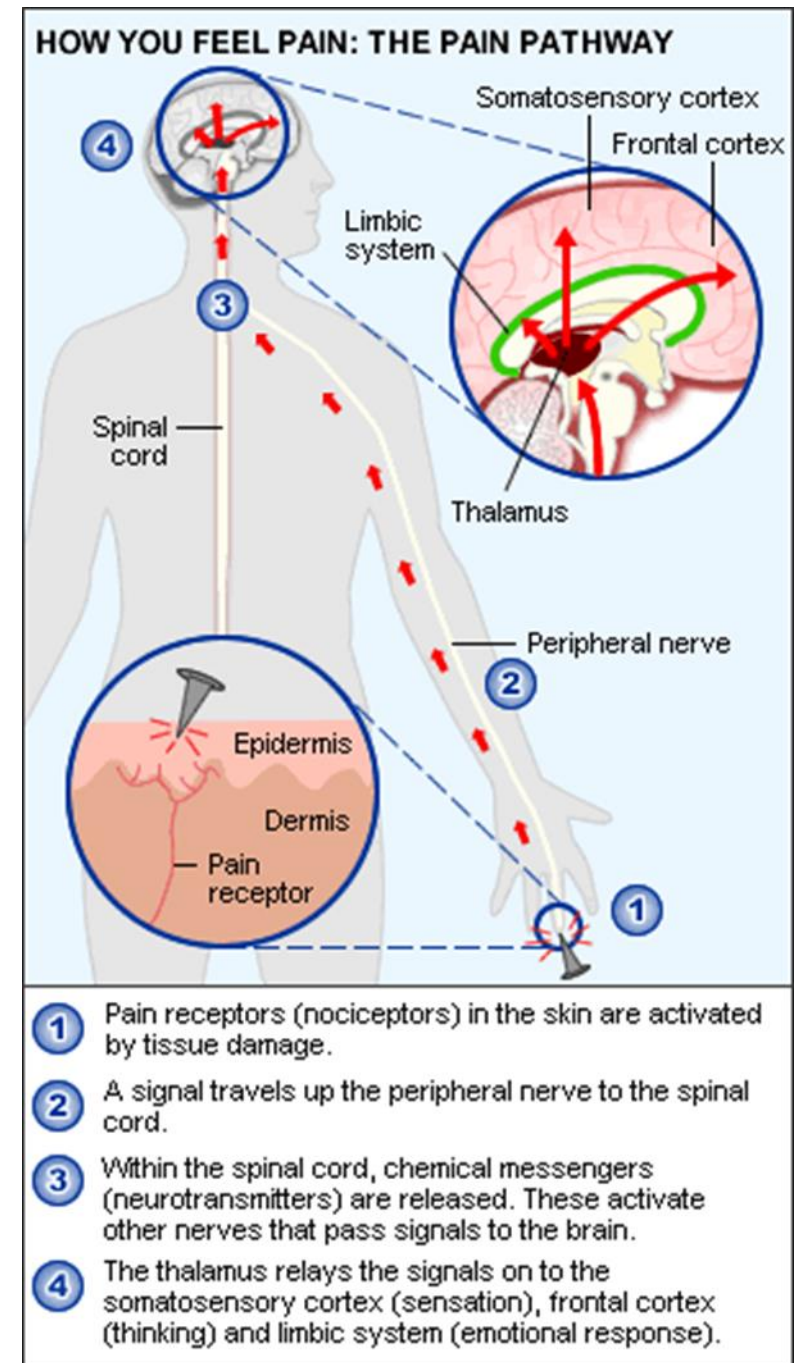
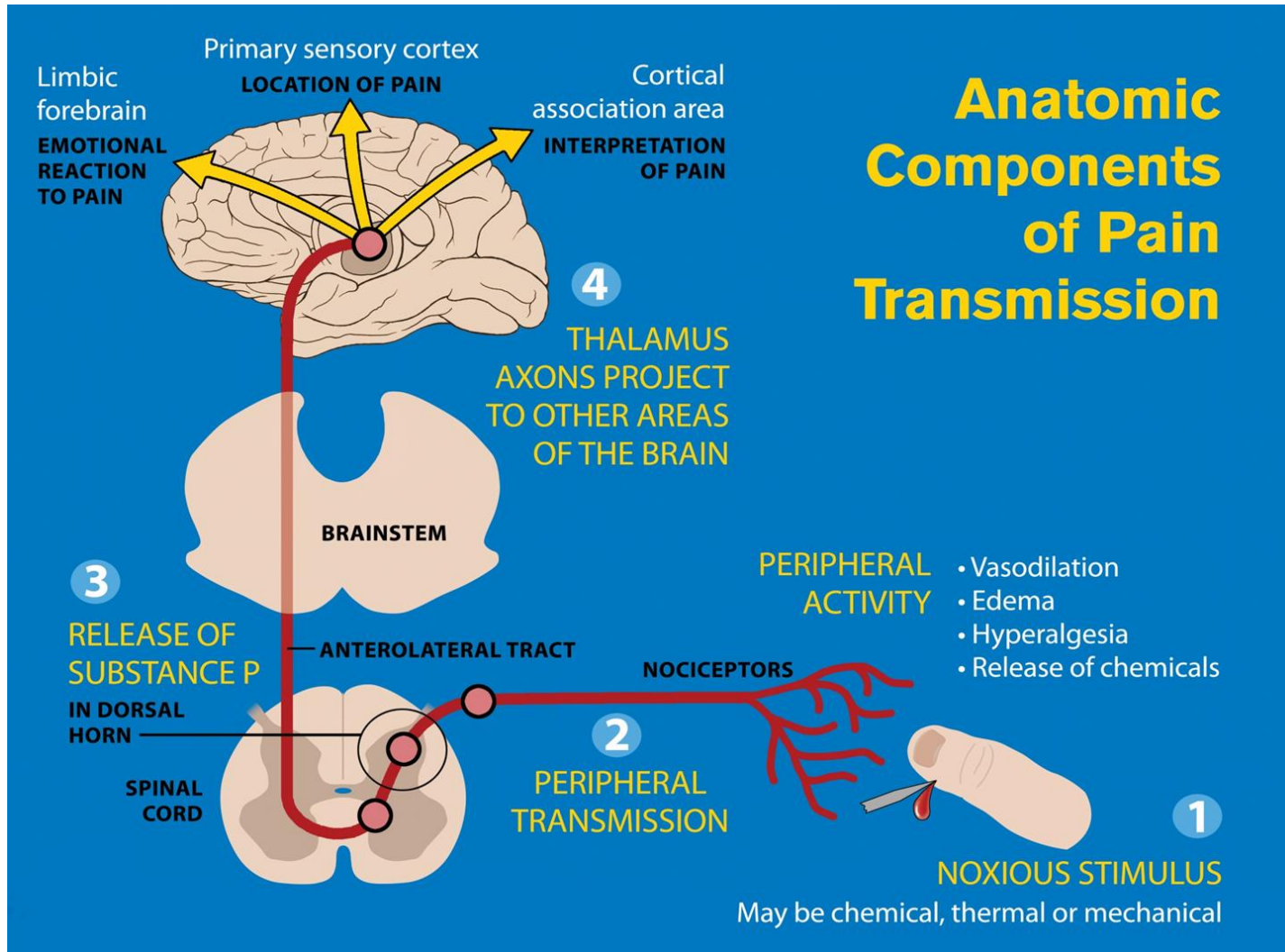


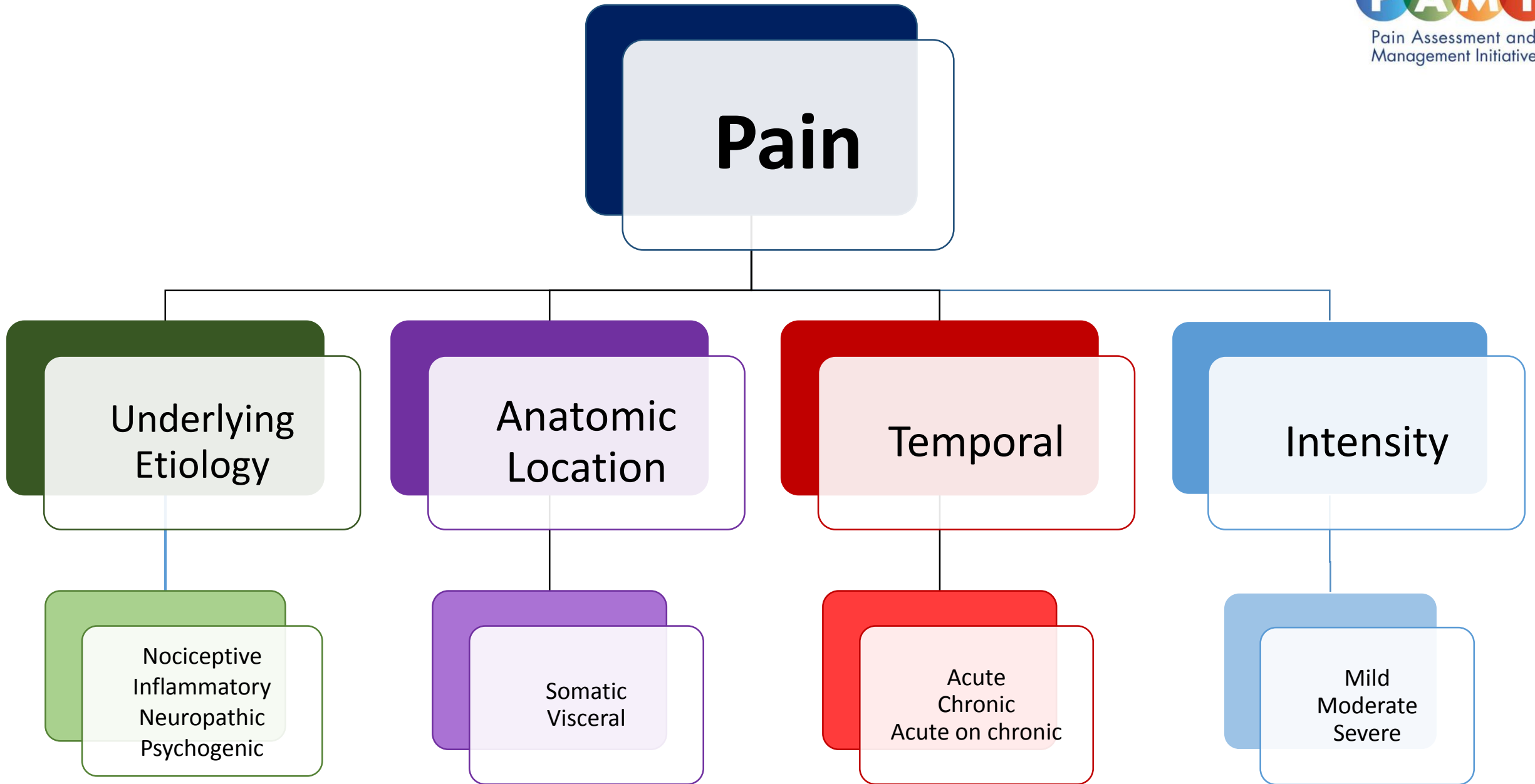
The Future

- Genetic factors related to pain and analgesics
 - *Personalized or individualized medicine*
 - *Genetic cytochrome and receptor defects*
- Multimodal therapy
- Channel enzyme receptor-targeted analgesia (CERTA)
- Old drugs used in new ways- ketamine, lidocaine, MSIR.....
- Race for new pain medications
- Emphasis on nonpharmacologic methods of managing pain
- ED Ultrasound-guided regional nerve blocks and other procedures
- Focus on multidisciplinary pain education
- Intranasal medications



Pain 101- Context and Basics





Factors Affecting Response to Painful Stimuli

- Age, gender, ethnicity
- Socioeconomic and psychiatric factors
- Culture and religion
- **Genetics**
- Previous experiences
- Patient perceptions
- Patient expectations and perceived care by the treating provider(s)



Studies have noted that **Hispanic** and **black individuals** with long-bone fractures were less likely to receive analgesics than were non-Hispanic white individuals. **Children** are also less likely to receive analgesics when compared to adults with fractures.

Pain Assessment in the Field

The OPQRST-ASPN method can be utilized to help with initial patient assessment with input from child and caregiver.

O: Onset (when did it start)

P: Provocation or Palliation (what makes it better or worse)

Q: Quality (sharp, dull, crushing)

R: Region and Radiation

S: Severity (pain score)

T: Timing (type of onset, intermittent, constant)

AS: Associated Symptoms

PN: Pertinent Negatives

Pain Assessment: SOCRATES

The second pain history assessment that will be reviewed is **SOCRATES**:

Site - Where is the pain? Or the maximal site of the pain.

Onset - When did the pain start, and was it sudden or gradual? Include also whether if it is progressive or regressive.

Character - What is the pain like? An [ache](#)? Stabbing?

Radiation - Does the pain radiate anywhere? (See also [Radiation](#).)

Associations - Any other signs or [symptoms](#) associated with the pain?

Time course - Does the pain follow any pattern?

Exacerbating/Relieving factors - Does anything change the pain?

Severity - How bad is the pain?

Key Components

- Current pain medications (NSAIDs, opiates, OTC, herbal, etc.)
- Last dose of pain medication
- Recent pain relieving procedures or therapies
- Recent surgeries
- Allergies
- Bring information with patient



Patient Assessment: Pain Assessment Scales

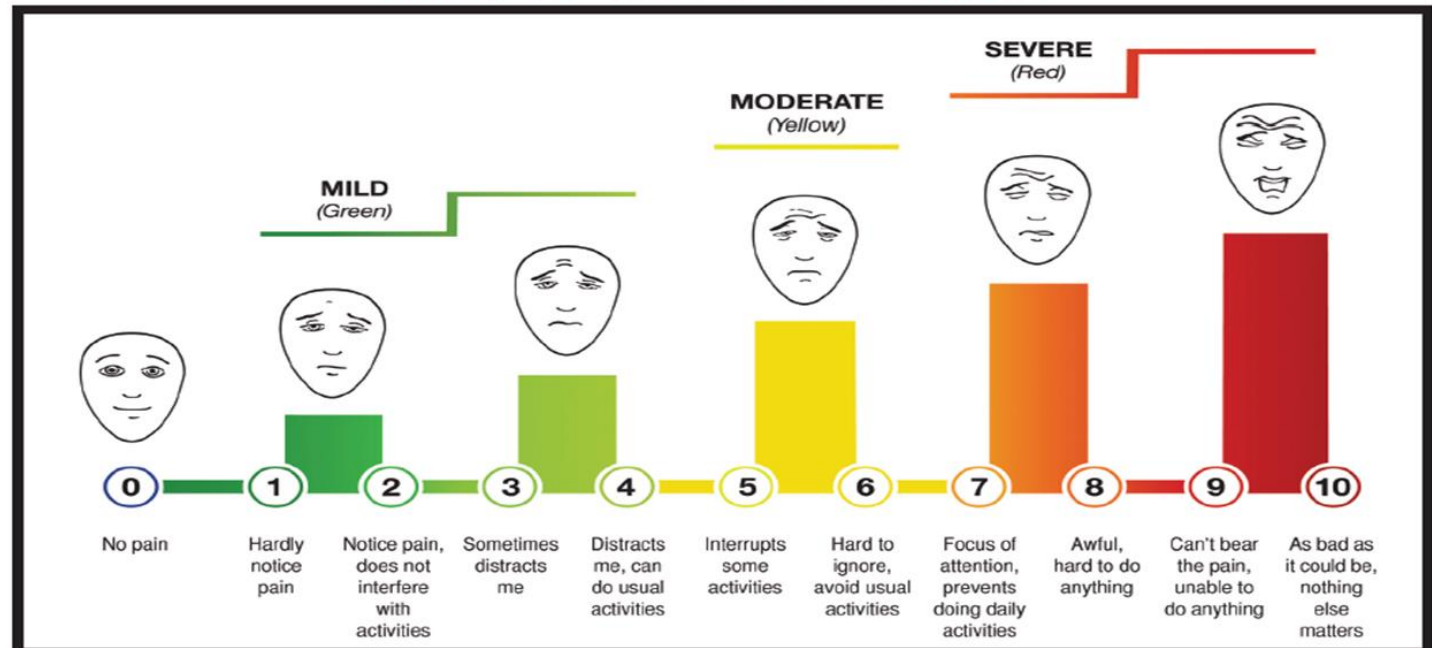
Adult

Pediatric

Special Situations

Sedation scales

Defense and Veterans Pain Rating Scale*



*The PMTF recommended a Department of Defense and VHA Pain Assessment Tool to improve actionable information for patient encounters across Military Treatment Facilities. (Line of Action 1, Standards and System Improvements)

Examples of Pain Scales

Pain Scales*	Verbal, Alert and Oriented	Non-verbal, GCS <15 or Cognitive Impairment
<u>Adult</u>	<ol style="list-style-type: none"> Verbal Numeric Scale (VNS)/ Numeric Rating Scale (NRS) Visual Analogue Scale (VAS) Defense and Veterans Pain Rating Scale (DVPRS) 	<ol style="list-style-type: none"> Adult Non-Verbal Pain Scale (NVPS) Assessment of Discomfort in Dementia (ADD) Behavioral Pain Scale (BPS) Critical-Care Observation Tool (CPOT)
<u>Pediatric</u>	<p>3 yo and older</p> <ol style="list-style-type: none"> Wong Baker Faces Oucher (3-12yrs) Numerical Rating Scale (NRS) (7-11yrs) <p>8 yo and older</p> <ol style="list-style-type: none"> Visual Analogue Scale (VAS) Verbal Numeric Scale (VNS)/ Numeric Rating Scale (NRS) 	<p>Birth – 6 mos</p> <ol style="list-style-type: none"> Neonatal Infant Pain Scale (NIPS) Neonatal Pain Assessment and Sedation Scale (N-PASS) Neonatal Facial Coding System (NFCS) CRIES <p>Infant and older</p> <ol style="list-style-type: none"> Revised Faces, Legs, Activity, Cry, and Consolability (r-FLACC) Non Communicating Children’s Pain Checklist (NCCPC-R) Children’s Hospital of Eastern Ontario Pain Scale (CHEOPS) (ages 1-7)

*This is a short list of pain scales. Determine which pain assessment tools are used by your agency or facility.

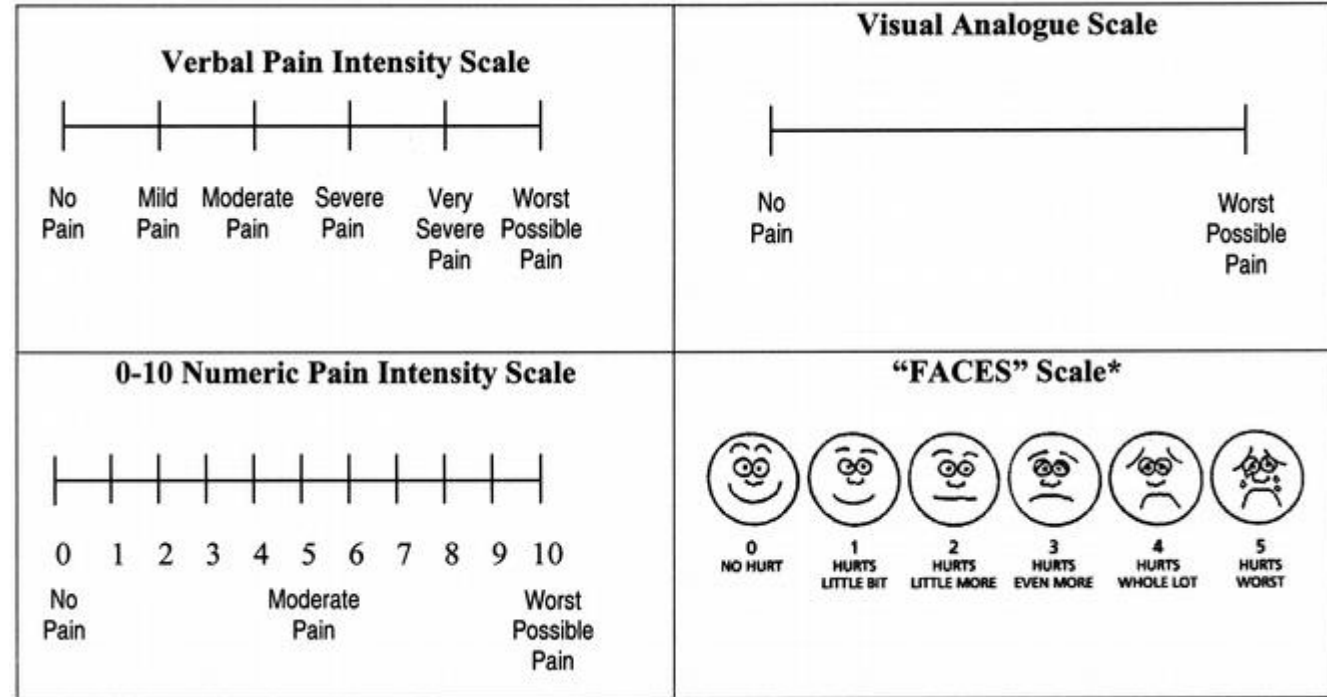
Pain Assessment Scales

- No pain scale validated for pre-hospital use
- Most pediatric pain scales were originally developed to measure procedural-related pain.
- Pain scales fall into 2 general categories:
 - Observational-behavioral scales require provider to assess patient on multiple behaviors and rank them.
 - Self-report scales include selection of a face or color or number to represent pain.

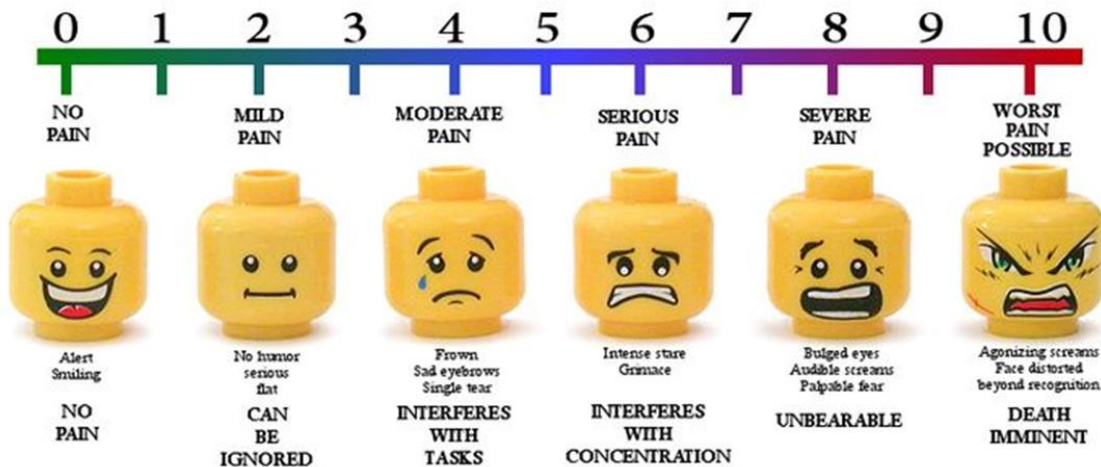


Pain Assessment Scales

- [The National Association of EMS Physicians \(NAEMSP\)](#) made recommendations in 2013 for scales to be used in patients with acute traumatic pain.



LEGO PAIN ASSESSMENT TOOL



*An Evidence-based Guideline for Prehospital Analgesia in Trauma: Pain Scales

From 2009-2013 a stakeholder group used the National Prehospital Evidence-Based Guideline (EBG) model process to develop a guideline for prehospital pain management in **trauma** patients. The guideline includes using an age-appropriate pain scale to assess traumatic pain as follows:

- **<4 years:** Consider using an **observational** scale such as Faces, Arms, Legs, Cry, Consolability (FLACC) or Children's Hospital of Eastern Ontario Pain Scale (CHEOPS)
 - Weak recommendation, very low quality evidence

- **4–12 years:** Consider using a **self-report** scale such as Wong Baker Faces, Faces Pain Scale (FPS), or Faces Pain Scale Revised (FPS-R)
 - Weak recommendation, very low quality evidence

- **>12 years:** Consider using a self-report scale such as the Numeric Rating Scale (NRS)
 - Weak recommendation, moderate quality evidence

FLACC Scale²

		0	1	2
1	Face	No particular expression or smile.	Occasional grimace or frown, withdrawn, disinterested.	Frequent to constant frown, clenched jaw, quivering chin.
2	Legs	Normal position or relaxed.	Uneasy, restless, tense.	Kicking, or legs drawn up.
3	Activity	Lying quietly, normal position, moves easily.	Squirming, shifting back and forth, tense.	Arched, rigid or jerking.
4	Cry	No crying (awake or asleep).	Moans or whimpers; occasional complaint.	Crying steadily, screams or sobs, frequent complaints.
5	Consolability	Content, relaxed.	Reassured by occasional touching, hugging or being talked to, distractible.	Difficult to console or comfort.

Pain Reduction Clinical Outcomes

- The minimal clinically significant difference (MCSD) in pain severity has been found to be 1.5 on an 11 point NRS or a proportional change of 25%.
- It is important to determine if EMS and ED interventions significantly decrease pain severity over time.



One challenge in determining outcomes is translating the pain scale measurement(s) into a data point that can be tracked in EMS data systems or registries. This is complex because different scales have different point ranges from 6-13 points. Additionally, pain is often addressed in the narrative portion of the EMS report versus a separate data point.

Physiologic and Psychologic Effects of Pain

- Pain can cause
 - tachycardia,
 - hypertension
 - increased myocardial oxygen consumption
- Pain due to chest trauma may inhibit respiratory effort and therefore decrease oxygenation and ventilation.
- Abnormal vital signs in the presence of pain may be misconstrued as another disease process or lead to an incorrect assessment or treatment
- Be cautious in using vital sign abnormalities as a sole indicator-patients can still be in a great deal of pain with normal vital signs.
- Look for other subtle clues such as facial grimacing and patient position.

So How Are We Doing?

- At best 50% of patients in pain are getting treatment
- Minimal reassessments
- **Long ED delays in providing analgesia**
 - **pain treatment deferred to receiving facilities by EMS led to pain medication delays of 90-120 minutes**
- Over 50% patients discharged home in pain
- Women, children and blacks less likely to get treated



Pain Management *Barriers and Myths*

- Other emergent treatment priorities
- Difficult vascular access
- Concern for delayed transport or short transport time
- Fear of adverse events or masking serious underlying disorders
- Perception of possible drug seeking behavior or creation of addiction
- Most patients exaggerate or over-report pain.
- Pediatric dosing concerns
- Criticism from the receiving hospital
- Lack of pre-existing patient relationships or knowledge of past medical history
- Failure to recognize pain or differentiate pain from anxiety
- Lack of initial and continuing pain assessment and management education

Strategies to Overcome Barriers and Improve EMS Pain Management



- ✓ Development of offline protocols/guidelines
 - Standing orders for adult and pediatric patients
 - Include pharmacologic and non-pharmacologic measures
- ✓ Targeted education and training specific to pain assessment and management with improvement of paramedic confidence and performance (self-efficacy)
- ✓ Ability to administer pain medication without the need to first start an IV in children
 - Nasal or other routes
- ✓ Required pain assessment
- ✓ **Provide “orienting information”**
- ✓ Coordination with and education of receiving facilities



Scenario.....



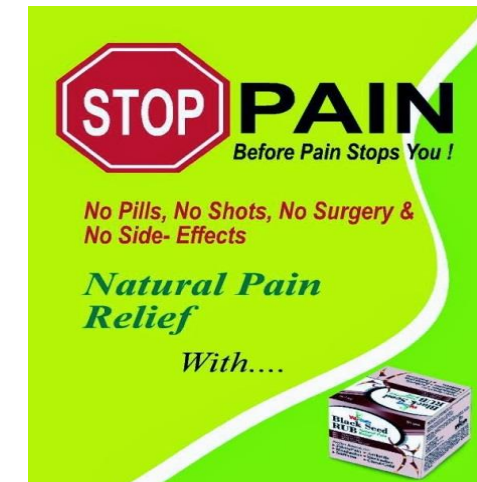
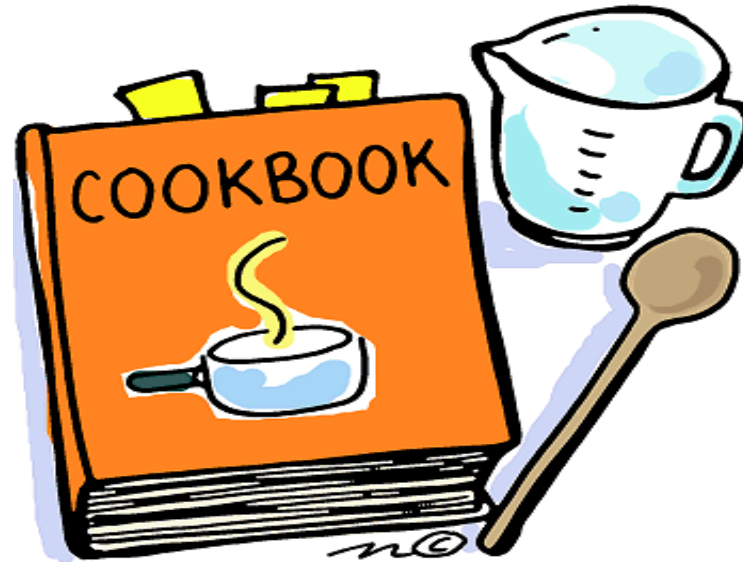
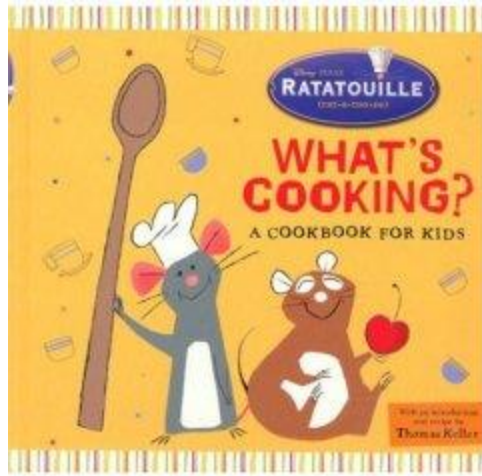
- Transporting a nine year old with obvious fractures after a fall from his father's ATV which he got out of garage without permission....
 - Secure to a hard plastic board
 - Wrap collar around neck
 - Place in back of ambulance without a family member and drive over bumpy roads to a strange unknown place
 - Arrive at the hospital and leave child on a backboard until after triage and ED physician evaluation
 - Don't start an IV or give only 1 mg of morphine for pain relief
 - Throw in some autism or other underlying problems

Treatment of Pain

Non-pharmacologic

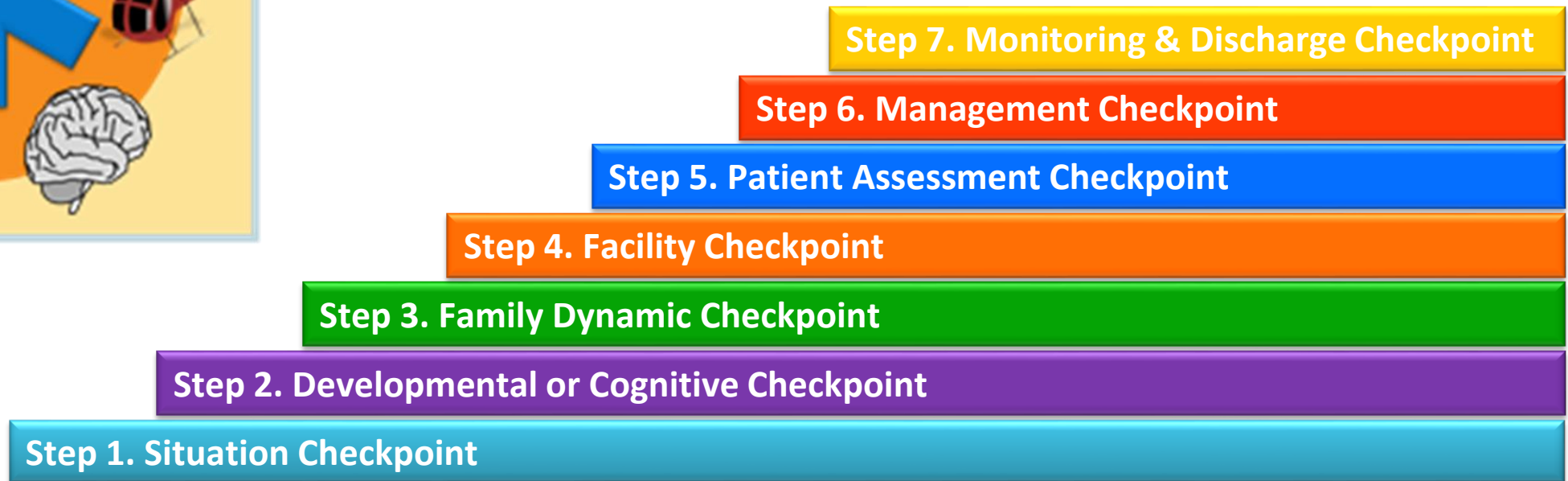
Pharmacologic

No Perfect Recipe or “Cookbook” - No universal *kid* recipe



Overview of PAMI Stepwise Approach to Pediatric Pain (Adapted for EMS)

Ideal approach not always possible



Step 1: Determine the Situation: What are you trying to accomplish or manage?

Step 1. Situation Checkpoint

- Pain only
- Pain and anxiety or agitation
- Anxiety only
- Agitation only
- Procedure that will induce pain or anxiety
- Chronic pain condition exacerbation

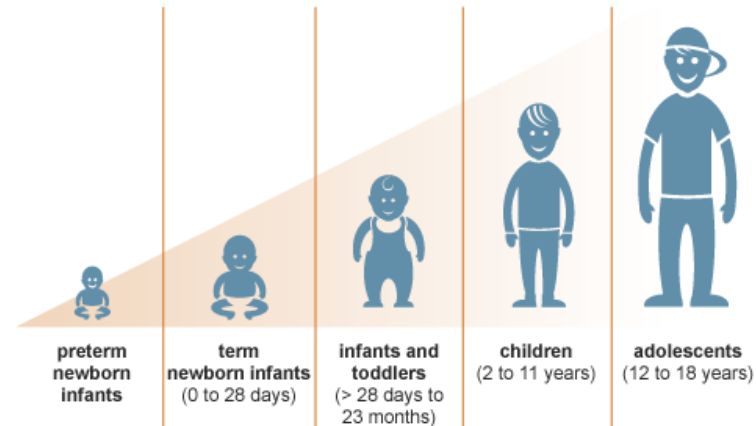


Determination accomplished after a brief triage, history and/or exam

Step 2: Perform a Developmental Checkpoint

Step 2. Perform a Developmental or Cognitive Checkpoint

- What is the developmental stage
- Is development normal for age
 - Developmental delay
 - Autism
 - Special health care needs
 - Mental health concerns
 - Recent traumatic events



**What are characteristics of this developmental stage in response to pain?
How do you adapt your approach based on developmental level?
Kids and teens don't always follow the charts!**



Step 3: Family Dynamic Checkpoint

Step 3. Family Dynamic Checkpoint

- Who is with the child?- parents, siblings.....
- Who is the legal guardian?
- Who actually cares for the child?
- Who do you want to deal with?
- Culture, past experience
- What can they tolerate
- Other priorities- another injured child, etc.
- Family personality
- Family stress level



Step 4: Facility (Agency/Community) Checkpoint

Step 4. Facility Checkpoint

- Staffing and setting
 - Community, rural, children's hospital
- Experience
 - Pediatric
 - Team capabilities and expertise
- Existing agency policies regarding pain
- Acuity and overcrowding of the ED
- Other priorities- MCI, etc.
- Equipment, monitoring, backup



Step 5: Patient Assessment Checkpoint

Step 5. Patient Assessment Checkpoint

- Review risk factors from history and assessment
- CSHCN, genetic syndromes,...
- Chronic illness
- Psychiatric and mental considerations
- Injury severity, +/- contraindications to opioids or sedation, recent surgery
- Body habitus
 - Weight- ideal or real?
 - Sleep apnea



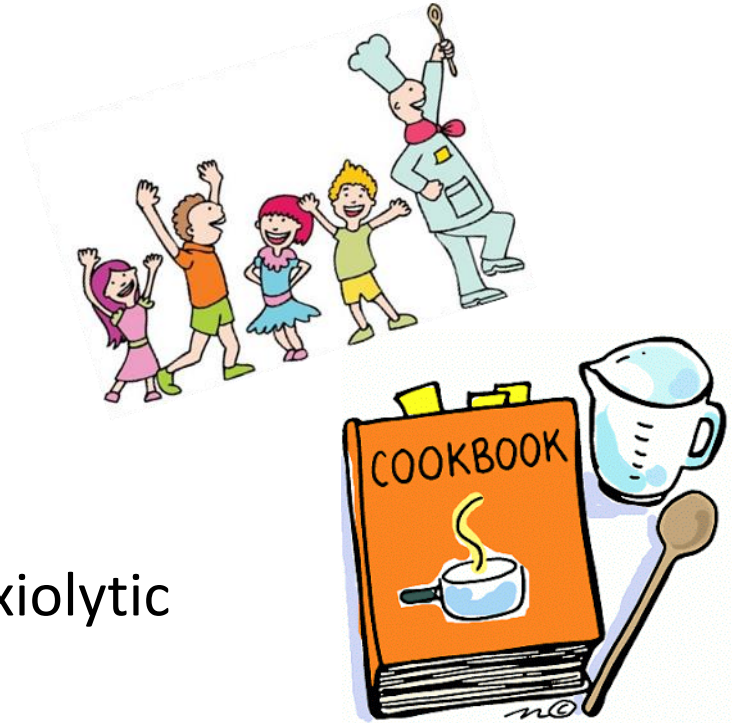
High Risk Considerations

- History of sleep apnea, adverse events during surgery or anesthesia
- Obesity
- Congenital airway, facial and lung disorders- Down syndrome, Goldenhar syndrome, etc.
- CSHCN
- Technology dependent children
- Post tonsillectomy and adenoidectomy
- Calls to a dentist office

Step 6: Management Checkpoint: Choose Your “Recipe”

Step 6. Management Checkpoint

- No magic recipe, must individualize and adjust “Ingredients”
- Pharmacologic “ingredients”
 - ~~Topical, local anesthetics or blocks~~
 - Route: oral, nasal, or IV
 - Type: sucrose, NSAID, opioids (fentanyl or morphine), anxiolytic
- Non-pharmacologic “ingredients”
 - Everyone needs a little child life 101 course- distraction, music, swaddling
 - Engage caregivers and parents



Usually need both pharmacological and non-pharmacological options



Step 7: Monitoring And Transfer of Care Checkpoint

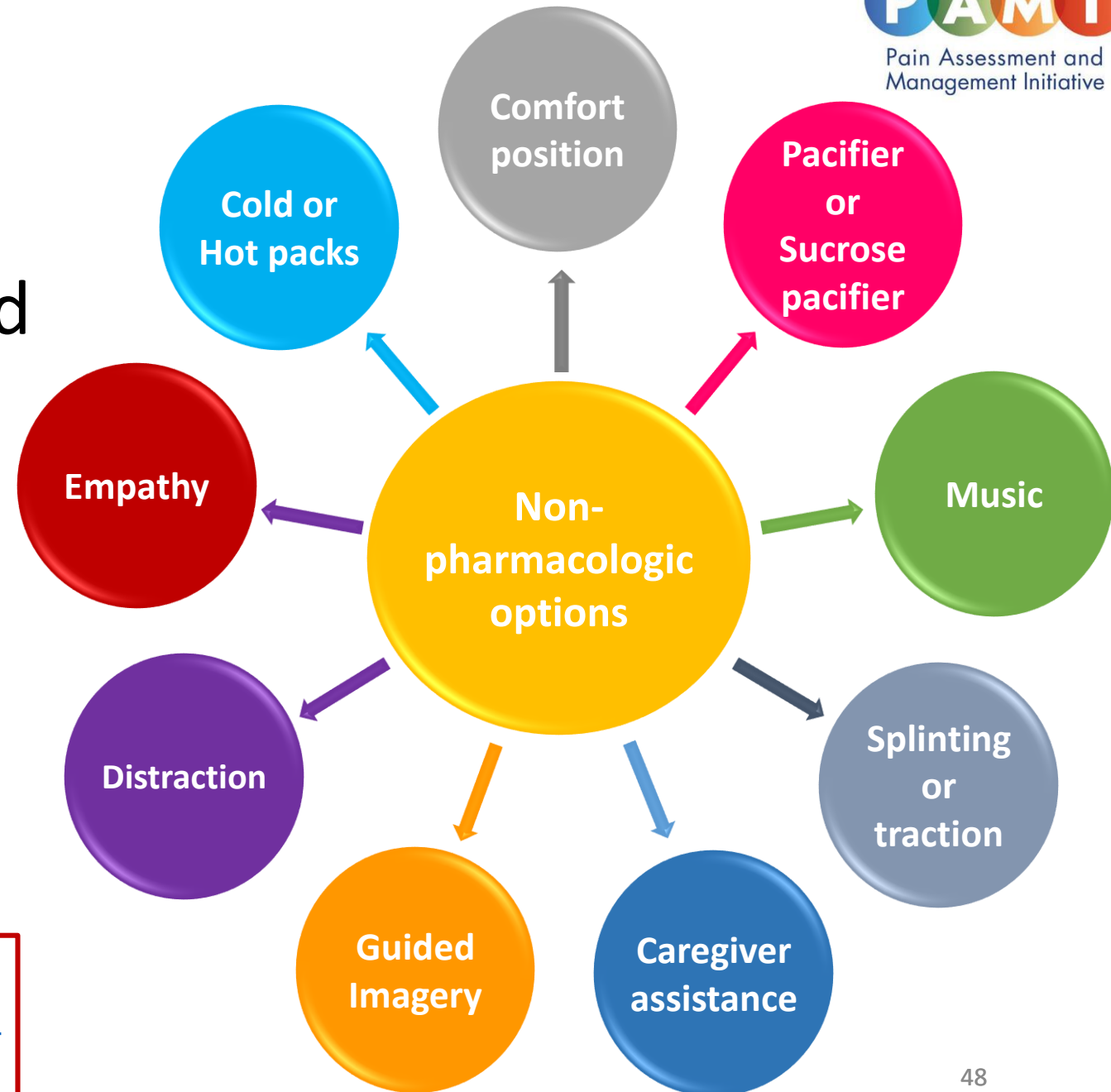
Step 7. Monitoring & Discharge Checkpoint

- Document reassessments and pain scores after intervention(s)
- Make necessary adjustments
- Communicate, communicate.....
- Run sheets, handoffs
- Hospital Joint Commission standards and EMRs
- Falls prevention



Non-pharmacologic options for managing pain.

Most of these can be utilized
in **children** and **adults**.



For more information about non-pharmacologic options
review PAMI module [Non-pharmacologic Treatment and
Management of Pain in the Emergency Setting.](#)

Nonpharmacologic Categorization

cognitive-behavioral and physical (sensory) interventions

Cognitive-Behavioral Interventions

Psychologic preparation, education, information

Distraction (passive or active): Video games, TV, movies, phone

Relaxation techniques (breathing, meditation, etc)

Music

Guided imagery

Training and coaching

Coping statements: “I can do this”

Physical (Sensory) Interventions

Positioning

Cutaneous stimulation

Nonnutritive sucking

Pressure

Hot and cold treatments

Transcutaneous electrical nerve stimulation (TENS)

Adapted from: Murray KK, Hollman GA. Non-pharmacologic interventions in children during medical and surgical procedures. In: Tobias JD, Cravero JP, eds. *Procedural Sedation for Infants, children, and adolescents*; Section on Anesthesiology and Pain Medicine. American Academy of Pediatrics ; 2016.

Physical (Sensory) Interventions:

usually inhibit nociceptive input and pain perception

Physical (Sensory) Interventions

Positioning

Cutaneous stimulation

Nonnutritive sucking

Pressure

Hot and cold treatments

Transcutaneous electrical nerve
stimulation (TENS)

Comfort Positioning

Comfort positions are used to reduce stress and anxiety

- Why use positioning for comfort?
 - Sitting position **promotes sense of control**
Reduces anxiety which promotes better cooperation
 - Puts child in a secure, comforting hold
 - Promotes close, physical contact with a caregiver
 - **Provides caregiver with an active role in supporting child in a positive way**
 - Comfort positioning may be prohibited in trauma patients requiring spine immobilization and during transport

Get Comfy
with comfort positions

Bear Hug

- Best for small children who need distraction and prefer not to watch procedure
- Allow the child to straddle parent or staff and have a secure "hug"

Side Sitting

- Great for older children who may want to watch while feeling secure
- Use when child can't straddle parent or staff

Waddle

Best for infants and young toddlers

- Provide TootSweet® if child is not NPO
- Encourage parent to remain in eyesight of child

Side Sitting

- Great for older children who may want to watch while feeling secure
- Use when child can't straddle parent or staff

Back to Chest

- Safe and comforting position with child's feet secure in parent's legs
- Great for older children who want independence, but need to be held

Back to Chest: Port Access

- Child remains secure and easily distracted
- Use when child cannot sit still but wants to remain sitting up

Wolfson Children's Hospital
Changing Health Care for Good®

Comfort Positioning

ONE VOICE

EMS transport is a “procedure”!

One voice should be heard during the procedure.

Need for parental involvement.

Educate the patient before the procedure about what is going to happen.

Validate a child with your words.

Offer the patient the most comfortable, non-threatening position.

Individualize your game plan.

Choose appropriate distraction/coping techniques to be used.

Eliminate unnecessary staff who are not actively involved with the procedure.

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Comfort positioning may be prohibited in trauma patients requiring spine immobilization and during transport

Positioning for Comfort

Control is Key to Cooperation

Positions can maximize the child's sense of control and cooperation during procedures. Combining the appropriate position with a comforting hold by a parent is always preferable.



Two-Person Hold for IV Start
Position if the child prefers not to watch. Allows the child to cradle parent or staff. Secure the child's arms and head by giving a hug.



Side Sitting Position
Use when the child cannot cradle the parent/staff. Allow the child to swing legs out. Offer children feet warmers and feet covered.



NG Tube Placement Position
The child is braced against parent's shoulder or chest. Allow for movement of the head and secure placement of tube.



IV Start in a Sitting Position
Allow child to watch. Guide child throughout procedure. Encourage deep breathing and imagery techniques.



Positioning for Leg Injections
Leg is bent over the table and muscle is relaxed. Kicking is more likely only. Child gains a sense of control in choosing to watch or not.



Positioning for Catheter Placement
Allows child's head to be held in parent's lap. The child cannot see upward during insertion.



IV Placement in Foot
Sitting position increases the ability to kick and move the leg. Coughing/crying is less and able to comfort.



Infant Swaddle for IV Start
Use warm blanket to swaddle infant. Hold child in arms or lay child on the bed with parent holding from the side. Use Sacrocaudal reflex to minimize discomfort.



Positioning for Port Access
Hold child against you with one arm supporting child's arms and the other used to help control their head. Child's face is able to provide distraction/looking interventions. Nurse is able to assess port without looking to restrain child on bed which increases anxiety level.



Positioning for Sutures
Allows parent to hold the child against them in a secure hug. Legs and head are able to be secured. Child is able to be distracted while face is straight in front of them.



Two Person Hold for Nasal Swabs
Parent is able to provide a hug hold and arms and head are controlled. If needing double nasal swabs it is important to utilize two nurses and do them both at the same time. Sweet Ease (Dexam) can be used with children under 6 months.

How to Help Children Cope During a Procedure

- Talk in a calm voice.
- Praise your child.
- Rub your child's arm, forehead or back.
- Position yourself so that your child can see or touch you.
- Be honest.
- Hold your child's hand.
- Provide coping/distraction as appropriate.

Pharmacological Pain Management

- Sweet Ease (Sucrose) for infants 6 months or younger.
- EMLA or LMX4 Topical Anesthetic (use with children over the age of 1 month).
- Ethyl Chloride Medium Jet Stream Spray (topical anesthetic Skin Refrigerant).
- Lidocaine
- LAT
- Use Buzzy if available (www.buzzy4kids.com)

ONE VOICE

- One voice should be heard during the procedure.
- Need for parental involvement.
- Educate the patient before the procedure about what is going to happen.
- Validate a child with your words.
- Offer the patient the most comfortable, non-threatening position.
- Individualize your game plan.
- Choose appropriate distraction/coping techniques to be used.
- Eliminate unnecessary staff who are not actively involved with the procedure.

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Musculoskeletal Injuries

Rest

Ice

Compression

Elevate

Splinting

Dressing

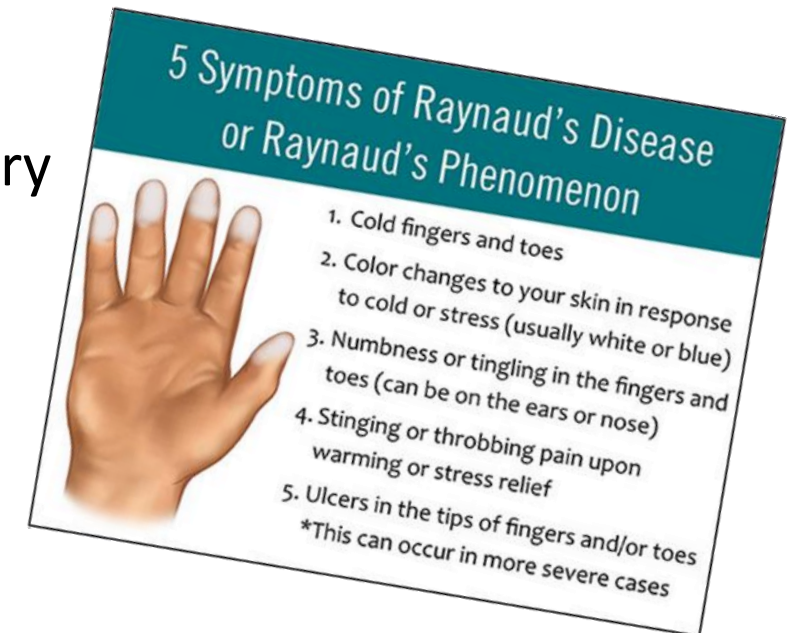
Positioning



Ice or cold packs reduce swelling and pain in strains, sprains and fractures. Do not put directly on bare skin.

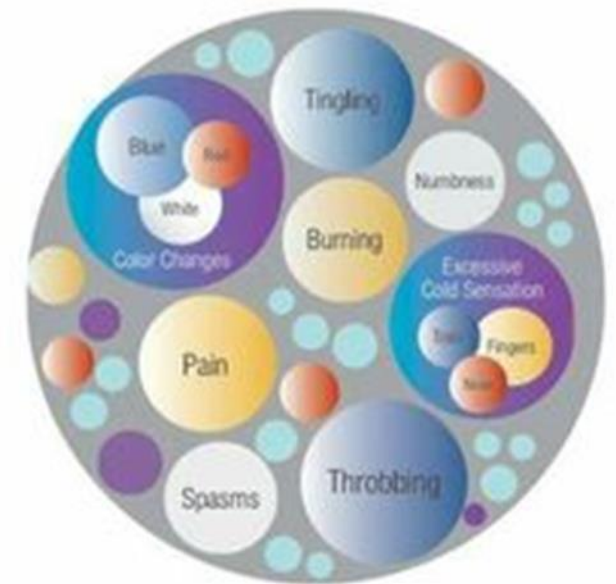
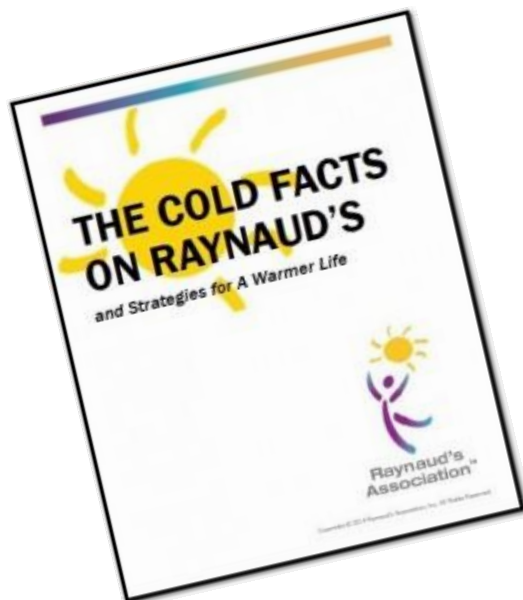
Benefits Of Keeping Patients Warm

- All patients prefer to be at a comfortable temperature. EDs and ambulances often are cold, drafty, and without blankets
- Cold exposure is especially detrimental in patients with Raynaud's syndrome or disease, collagen vascular diseases like Lupus and Scleroderma, and those on cardiovascular and blood thinning medications.
- 5-10% of the general population has primary or secondary Raynaud's Disease or symptoms.
- Consider warm blankets or warmed fluids.



Raynaud's Disease and Pain

- Raynaud's disease is a condition that causes blood vessels in the fingers, toes, nose, and ears to go into vasospasm and become constricted in response to cold temperatures or stress or even by a shift in temperature from warm to cool.
- A cold-induced Raynaud's attack can be very painful and lead to further chronic disease, damage to digits and anxiety.
- Patients may need access to warm water and blankets.



Common Raynaud's Symptoms

Cognitive-Behavioral Techniques

Types of Cognitive-Behavioral Interventions
Psychologic preparation, education, information
Distraction (passive or active): Video games, TV, movies, phone
Relaxation techniques (breathing, meditation, etc.)
Music
Guided imagery
Training and coaching
Coping statements: “I can do this” or “this will be over soon”

Distraction

Distraction is the most common type of cognitive-behavioral method.

Used to guide attention away from painful stimuli. *It is most effective when adapted to the patient's developmental and cognitive level.*

Current research indicates that distraction can lead to **reduction** in procedure times and number of staff required for procedures, especially in children. Researchers hypothesize that children **“cannot attend to more than one significant stimulus at a time.”**



Why use distraction?

Does not require advanced training for providers.

Works with all developmental levels.

Involves parents and caregivers during stressful times.



Tips

Distraction is most effective when pain is mild to moderate
(it is difficult to concentrate when pain is severe)

Conversation and Distraction



Conversation is a proven method of patient management and helps reduce anxiety and pain through distraction. Pain can be reduced by up to 25% by distraction alone.

Distraction can change the physiological response of pain transmission in the spinal cord.

Interactive distraction is better for managing pain and anxiety than passive distraction.

Conversation topic ideas: family, hobbies, vacation, sports

To learn more visit

<http://www.jems.com/articles/print/volume-38/issue-7/patient-care/10-conversation-starters-alternative-pai.html>

Child Life 101 for Emergency Care Providers

Distraction Toolboxes for EDs and EMS



Parents/kid will remember the Wikki Stix before they will remember your new monitor, truck, uniform, etc.

EMS Distraction Toolbox or Pain Toolkit

“Toolbox” of distraction toys or supplies - must be easy to disinfect or disposable with no small parts.

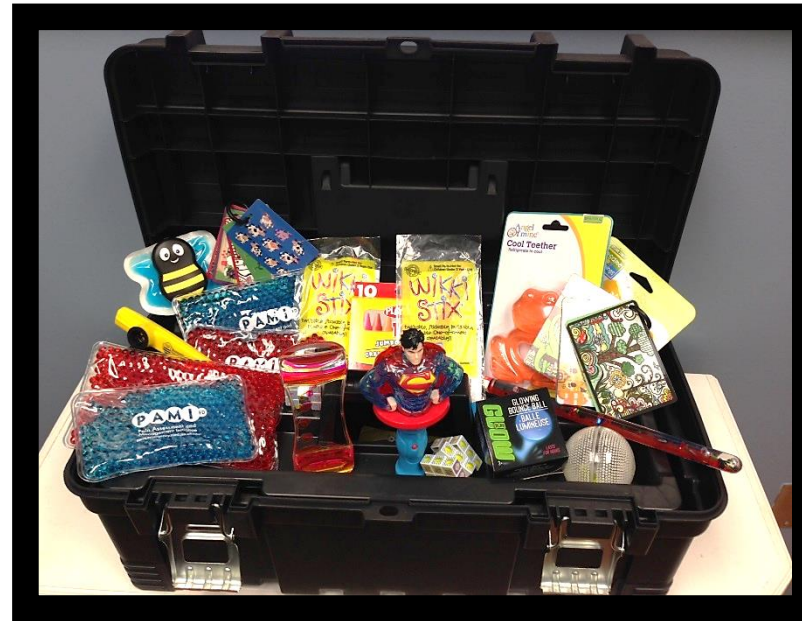
Lighted & motion toy



Glitter wand



Buzzy – cold and numbing for shots & IV



Wikki Stix



Rubik's cube

Hot/cold packs



DistrACTION Cards



Liquid-in-motion



Guided Imagery

Guided imagery helps use imagination to divert thoughts from the pain or procedure to a more pleasant experience.

Imagery provides distraction and reduces perception of pain by eliciting descending signals from the brain that can help block the pain signals.

Suggestions:

- Help the child use imagination to create a descriptive story
- Ask questions about a favorite place, upcoming events, friends, or hobbies to keep the child engaged in technique
- Guide the child through an experience that will tell him/her what to imagine and what it will feel like (i.e., a magic carpet ride or a day at the beach)



Guided Imagery: Options

- Option 1- Instruct patient to visit a “relaxing” place, and change the image of pain or turn off pain with a “pain switch” in the brain. Ask the patient to locate the pain switch and turn down the level of pain to a more comfortable level.
- Option 2- Ask the patient to identify a “pain” color and a “comfort” color. Then, ask to the patient to breathe in the “comfort” color and breathe out the “pain” color. Or-Ask the patient to associate their pain with a color. Instruct the patient to view the painful part of their body in that color. Tell the patient to imagine shrinking, fading or dispersing the painful color, or even sending it away in a balloon.
- Option 3- Symbolic imagery can be used in adults and adolescents. For example, if a patient with severe arthritis pain presents complaining of pain in one joint, ask them to think about how the pain feels. Does it feel like a knife? If so, ask them to imagine pulling the knife out and throwing it away. Focusing on an affirmation can also help. “I am removing the knife and throwing it away”.

Non-pharmacologic Therapies: Infants

- Swaddling
- Holding
- Rocking
- Sucking
 - Sucrose pacifier (Sweet-Ease 24% sucrose solution)
 - Non-nutritive sucking
- Dim lighting
- Music
- Toys
 - Key chains
 - Rattles
 - Blocks



Non-pharmacologic Measures: Adolescent

- Apply cold or hot pack
- Suggest repositioning or positions of comfort
- Encourage talking about favorite places or activities
- Provide light touch or massage
- Listen to music or video
- Read
- Coach about EMS process and procedures
- Discuss preferred relaxation techniques
- Demonstrate relaxation techniques, if unfamiliar
- Use squeeze balls
- Encourage making choices
- Play with electronic games or tablets



Suggested language for caregivers, parents and healthcare providers

Language to Avoid	Language to Use
You will be fine; there is nothing to worry about (reassurance)	What did you do in school today? (distraction)
This is going to hurt/this won't hurt (vague; negative focus)	It might feel like a pinch (sensory information)
The nurse is going to take some blood (vague information)	First, the nurse will clean your arm, you will feel the cold alcohol pad, and next... (sensory and procedural information)
You are acting like a baby (criticism)	Let's get your mind off of it; tell me about that movie...(distraction)
It will feel like a bee sting (negative focus)	Tell me how it feels (information)
The procedure will last as long as... (negative focus)	The procedure will be shorter than... (television program or other familiar time for child); (procedural information; positive focus)
The medicine will burn (negative focus)	Some children say they feel a warm feeling (sensory information; positive focus)
Tell me when you are ready (too much control)	When I count to three, blow the feeling away from your body (coaching to cope; distraction limited control)
I am sorry (apologizing)	You are being very brave (praise; encouragement)
Don't cry (negative focus)	That was hard; I am proud of you (praise)
It is over (negative focus)	You did a great job doing the deep breathing, holding still... (labelled praise)

Pharmacologic Treatment of Pain

Pain Management and Dosing Guide
Updated 12/16/2015

Pain Management and Dosing Guide Includes:

- Principles of Pain Management, Discharge and Patient Safety Considerations, Analgesic Ladder
- Non-opioid Analgesics, Opioid Prescribing Guidelines and Equianalgesic Chart, Opioid Cross-Sensitivities, Intranasal Medications
- Nerve Blocks, Neuropharmacologic Pain Medications, Muscle Relaxant Medications
- Topical and Transdermal Medications
- Procedural Sedation and Analgesia (PSA) Medications
- Stepwise Approach to Pain Management and PSA

Send your feedback on all PAMI materials and how you use them to improve patient safety and clinical care. If you would like to adapt this guide for your institution or have recommendations contact PAMI at emergency@pami.usf.edu or 904-244-4966.

Disclaimer: This guide is for informational purposes only. It does not constitute a medical recommendation or endorsement of any product or service. The information in this guide is for informational purposes only and should not be used as a substitute for professional medical judgment. The information in this guide is for informational purposes only and should not be used as a substitute for professional medical judgment. The information in this guide is for informational purposes only and should not be used as a substitute for professional medical judgment.

Principles of Pain Management

- Establish realistic pain goals
- Educate patients/caregivers on pain management goals and regimen
- Consider pharmacologic and non-pharmacologic treatment options and initiate therapy
- Continuously reassess patient's pain and monitor for medication efficacy and side effects

Pain Management Considerations

- Type of pain: nociceptive, neuropathic, inflammatory
- Acute vs. chronic, acute on chronic pain exacerbation
- Pain medication history: OTC and Rx
- Patient factors: genetics, culture, age, comorbidities, previous pain experiences

Treatment Options

- Pharmacotherapy: systemic, topical, transdermal
- Non-pharmacologic modalities
- Refer to pain, palliative or other specialists for advanced treatment

Non-pharmacological modalities

- Spinal, distraction, hot/cold therapy, massage, acupuncture, etc.

Discharge and Patient Safety Considerations

- Assess and educate regarding driving, working ability, and medication interactions
- Identify signs and symptoms of overdose
- Discontinue all pain medications administered and document at time of discharge
- Consider OTC and non-pharmacologic options
- Clear patient's medication pain management plan - insurance coverage, transportation, etc.

Analgesic Ladder and Treatment Basics

- Step 1: Severe Pain (Step 1 and Step 2 Strategies: Scheduled Opioid Analgesics)
- Step 2: Moderate Pain (Step 2 Strategy: Intermittent Dose of Opioid Analgesics (PO) OR 2-3 Interventional (Blocks & Procedures))
- Step 3: Mild Pain (Non-opioid Analgesic (APAP, NSAIDs, COX-2 Inhibitors) or Local/Topical Anesthetics)

Ladder Basics

- Use oral route when possible
- Give analgesics at regular intervals
- Prescribe according to pain intensity
- Dosing must be adjusted to individual
- Analgesic pain must be refined and communicated with patient and staff

Generic (adult)	Generic (pediatric)	APAP (Adults)	APAP (Pediatrics)
Acetaminophen		325-650 mg PO q4-6h (max 4g/day)	10-15 mg/kg PO q4-6h (max 75mg/kg/day)
Ibuprofen		400-800 mg PO q6-8h (max 3.2g/day)	10 mg/kg PO q6-8h (max 40mg/kg/day)
Naproxen		250-500 mg PO q12h (max 1g/day)	5-7.5 mg/kg PO q12h (max 25mg/kg/day)
Cyclooxygenase Inhibitors (COX-2)		See specific drug dosing	See specific drug dosing
Local Anesthetics		See specific drug dosing	See specific drug dosing

Type of Block	General Considerations of Anesthesia	Max Dose
Intravenous Peace Block	Shoulder, upper arm, elbow and forearm	3.5 mg/kg (max 250 mg)
Spinal/Intrathecal Peace Block	Upper arm, elbow, wrist and hand	0.5 mg/kg (max 35 mg)
Infraclavicular Peace Block	Upper arm, elbow, wrist and hand	0.5 mg/kg (max 35 mg)
Radial Nerve Block	Forearm and wrist	0.5 mg/kg (max 35 mg)
Median Nerve Block	Forearm and wrist	0.5 mg/kg (max 35 mg)
Ulnar Nerve Block	Forearm and wrist	0.5 mg/kg (max 35 mg)
Brachial Plexus Block	Shoulder, upper arm, elbow and forearm	0.5 mg/kg (max 35 mg)
Deep Peroneal Block	Foot	0.5 mg/kg (max 35 mg)
Sciatic Nerve Block	Foot	0.5 mg/kg (max 35 mg)

Generic (adult)	Indication	Dose	Max Dose
Chlorhexidine	Acute pain from surgery, dental procedures	0.25-1 mg/kg IV	1 mg/kg
Propofol	Acute pain from surgery, dental procedures	0.1-0.2 mg/kg IV	1 mg/kg
Etomidate	Acute pain from surgery, dental procedures	0.1-0.2 mg/kg IV	1 mg/kg
Midazolam	Acute pain from surgery, dental procedures	0.05-0.1 mg/kg IV	0.5 mg/kg
Alfentanil	Acute pain from surgery, dental procedures	0.05-0.1 mg/kg IV	0.5 mg/kg
Fentanyl	Acute pain from surgery, dental procedures	0.05-0.1 mg/kg IV	0.5 mg/kg

Generic (adult)	Pediatric	Comments
Midazolam	0.05-0.1 mg/kg IV	See comments
Fentanyl	0.05-0.1 mg/kg IV	See comments
Propofol	0.1-0.2 mg/kg IV	See comments
Etomidate	0.1-0.2 mg/kg IV	See comments
Chlorhexidine	0.25-1 mg/kg IV	See comments

PAMI Pain Management and Dosing Guide for adults and pediatric patients. Download as a pdf or save to your smart phone. The guide includes IV, intranasal and oral dosing routes.

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Prehosp Emerg Care. 2014;18 Suppl 1:25-34. doi: 10.3109/10903127.2013.844873. Epub 2013 Nov 26. An Evidence-based Guideline for prehospital analgesia in trauma. Gausche-Hill M, Brown KM, Oliver ZJ, Sasson C, Dayan PS, Eschmann NM, Weik TS, Lawner BJ, Sahni R, Falck-Ytter Y, Wright JL, Todd K, Lang ES.

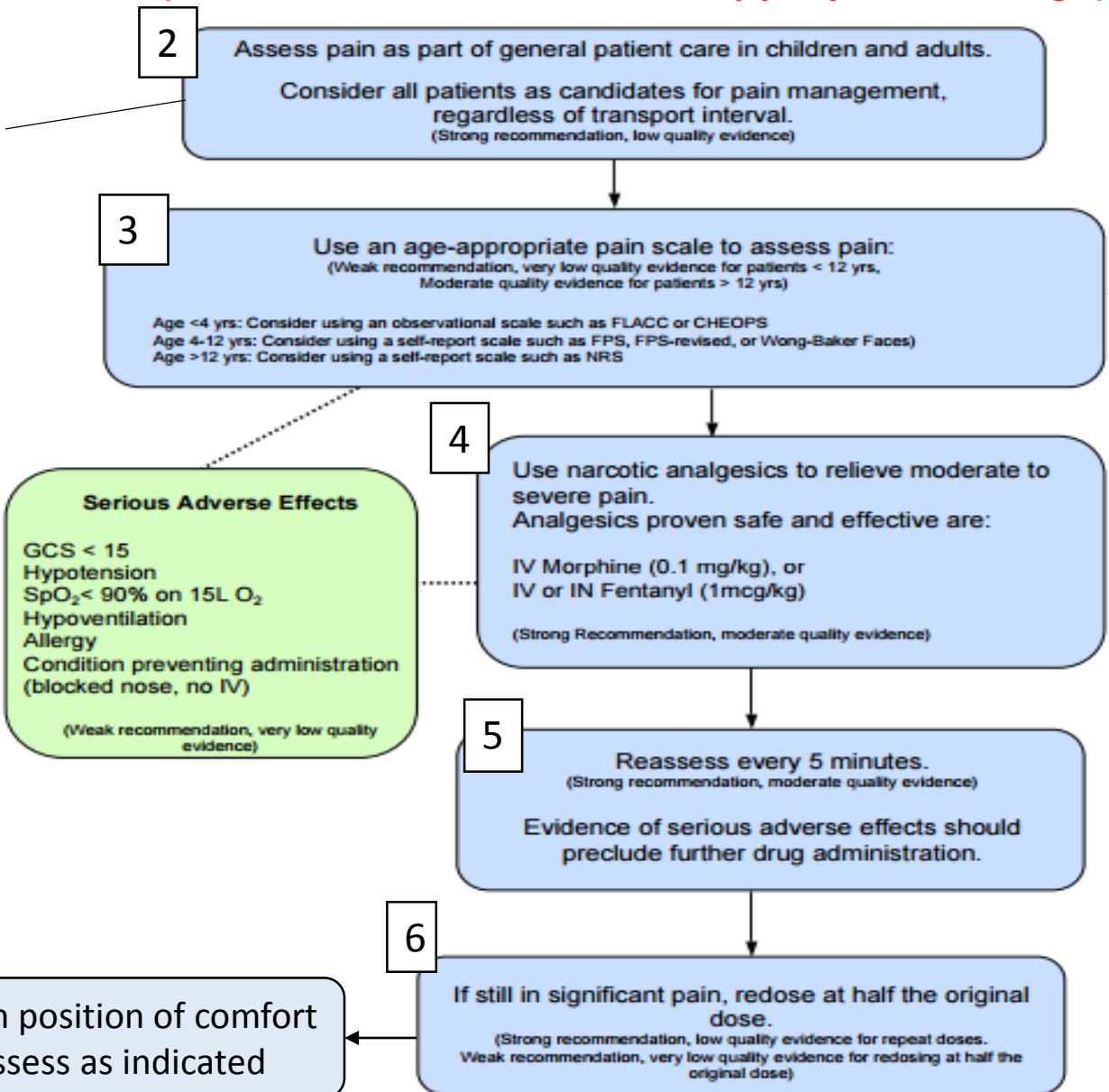
OBJECTIVE: To develop an evidence-based guideline (EBG) for the clinical management of acute traumatic pain in adults and children by advanced life support (ALS) providers in the prehospital setting. **Methods.** We recruited a multi-stakeholder panel with expertise in acute pain management, guideline development, health informatics, and emergency medical services (EMS) outcomes research. Representatives of the National Highway Traffic Safety Administration (sponsoring agency) and a major children's research center (investigative team) also contributed to the process. The panel used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) methodology to guide the process of question formulation, evidence retrieval, appraisal/synthesis, and formulation of recommendations. The process also adhered to the National Prehospital Evidence-Based Guideline (EBG) model process approved by the Federal Interagency Council for EMS and the National EMS Advisory Council.

RESULTS: Four strong and three weak recommendations emerged from the process; two of the strong recommendations were linked to high- and moderate-quality evidence, respectively. The panel recommended that all patients be considered candidates for analgesia, regardless of transport interval, and that opioid medications should be considered for patients in moderate to severe pain. The panel also recommended that all patients should be reassessed at frequent intervals using a standardized pain scale and that patients should be re-dosed if pain persists. The panel suggested the use of specific age-appropriate pain scales.

CONCLUSION: GRADE methodology was used to develop an evidence-based guideline for prehospital analgesia in trauma. The panel issued four strong recommendations regarding patient assessment and narcotic medication dosing. Future research should define optimal approaches for implementation of the guideline as well as the impact of the protocol on safety and effectiveness metrics.

This protocol excludes patients who are allergic to narcotic medications and/or who have altered mentation (GCS < 15 or mentation not appropriate for age).

- 1**
- ABCs and vital signs.
 - Apply a pulse oximeter and administer oxygen as needed to maintain a SPO2 of 94-99%.
 - Place patient on cardiac monitor per patient assessment
 - Establish IV of normal saline per patient assessment



- 4** If available, consider use of non-pharmaceutical pain management techniques
- Placement of the patient in a position of comfort.
 - Application of ice packs and/or splints for pain secondary to trauma.
 - Verbal reassurance to control anxiety.

Adapted from https://www.nasemso.org/Projects/ImplementationOfEBG/documents/Implementation-of-an-EBG-General-Toolkit_V1.0.pdf

Treatment of Pain by Pre-hospital Providers

A strong recommendation has been made to consider all patients with acute traumatic pain as candidates for analgesia, regardless of transport time*

Mild to Moderate Pain*
NSAIDS

Moderate to Severe Pain*
Consider an opioid analgesic
or ketamine
+/- NSAIDs or
nitrous oxide

*if no contraindications exist and if supported by your local protocols

Mild-to-Moderate Pain NSAIDs

Indications:

Mild-to-moderate pain such as mild pain from musculoskeletal sprain

Contraindications:

- Inability to swallow or take medications by mouth
- Respiratory distress
- Persistent vomiting
- Allergy to NSAIDs
- History of peptic ulcer disease or GI bleeding, renal failure, congestive heart failure, **< 6 months of age**
- Use with caution in elderly patients

Moderate to Severe Pain Opioids

Indications: patients in moderate to severe pain

Cautions: Reassess mental status and breathing

- Use **naloxone** for respiratory depression

Contraindications:

Hypersensitivity or known allergy to the medication morphine or fentanyl

Uncorrected respiratory distress or hypoxemia (SpO₂ < 90%) refractory to supplemental oxygen

Uncorrected hypotension, defined as a persistent systolic pressure < 90 mmHg.

GCS less than 15

Signs of hypoventilation

Condition preventing administration (blocked nose, no IV/IO access)

Exclusion Example.

12 yo with fall from tree, abrasions to forehead and right arm and bruising to wrist. Patient is not opening eyes except to verbal stimuli (GCS 13). She is moaning in pain.

This patient should be excluded based on GCS<15

Moderate to Severe Pain Opioids

OPIOIDS	INDICATION	DOSE/ROUTE*	ONSET	DURATION	MAX DOSE	COMMENTS
Morphine (Roxanol®)	Moderate - severe pain	<u>IV, SC, IM*</u> <6mo: 0.05-0.1 mg/kg ; 6 mo-12yo: 0.1 mg/kg >12yo: 0.1 mg/kg or 4- 10 mg	5-15 min	3-4 hr	10-15 mg or local protocol	<p>Advantages Moderately rapid and predictable onset. Consider for patients who need prolonged pain control (e.g., fracture reduction, multiple trauma, sickle cell disease)</p> <p>Risks Respiratory depression, hypotension, bradycardia, CNS depression</p>

- Administer 0.1 mg/kg, maximum single dose allowed may vary based on local protocol (range 10-20 mg).
- Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of morphine 0.05 mg/kg to a maximum additional dose of 10 mg.
- Obtain on-line medical direction for additional doses, if required.

Moderate to Severe Pain Opioids

OPIOIDS	INDICATION	DOSE/ROUTE	ONSET	DURATION	MAX DOSE	COMMENTS
Fentanyl (Sublimaze)	Moderate - severe pain	<u>IV</u> 1 mcg/kg initial dose (slow push over 3-5 minutes)	1-2 min IV	30-60 min IV	2 mcg/kg/dose	Advantages Rapid onset, short duration, potent analgesic; preferred for renal patients Risks Respiratory depression, apnea may precede alteration of consciousness chest wall rigidity if given too rapidly
		<u>IN</u> 1.5-2 mcg/kg (divide dose equally between each nostril)	10 min IN use with an atomizer	60 min IN		
		<u>IM</u> Not preferred	7-15 min IM	1-2 hr IM		

- Administer 1 mcg/kg to a maximum initial dose of 50 mcg for pediatric patients or 100 mcg for adults- may vary and be higher based on local protocols.
- Reassess in 5–10 minutes. If pain remains moderate to severe, then administer a second dose of fentanyl at half the initial dose.
- Obtain on-line medical direction for additional doses, if required.

Key Points

- Many sources recommend 1-2 mcg/kg of fentanyl or 0.1-0.2 mg/kg of morphine
- The dosages in this lecture are based on national guidelines; however, patients with severe injuries may require a higher initial dose or a second dose.
- Analgesic selection and dosages must be determined based on the individual patient, protocols, transport time and other factors.
- Nasal administration of analgesics and anxiolytics should be considered in pediatric patients or patients with difficult IV access.



**Consider intranasal administration of pain medications when IV access is not available.
Use an atomizer!**

Intranasal*			
Medication	Dose	Max Dose	Comments
Ketamine⁺	0.5-1.0 mg/kg Large range	Limited data	Use with caution until further studied
Fentanyl	1.5-2 mcg/kg q 1-2 h	3 mcg/kg or 100 mcg	Divide dose equally between each nostril
Midazolam (Versed)	0.3 mg/kg	10 mg or 1 ml per nostril (total 2 ml)	Divide dose equally between each nostril

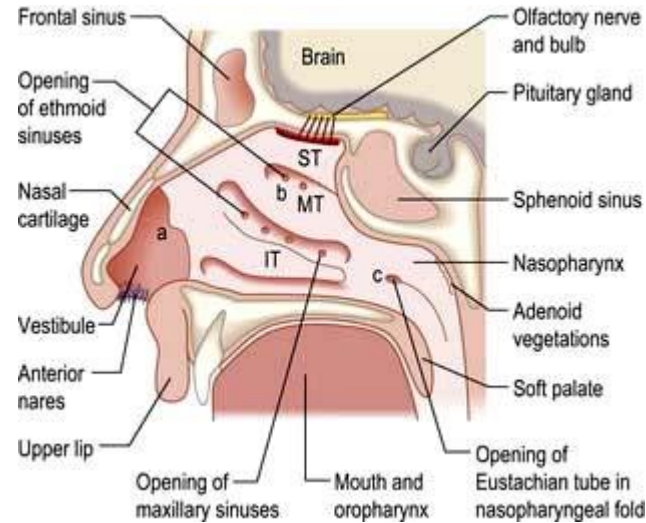
*Always use the MOST concentrated form of the medication available and always use an atomizer.

+ Dosing range not well established. Studies have used 0.5-9 mg/kg.

Intranasal Medications

- Use concentrated solution

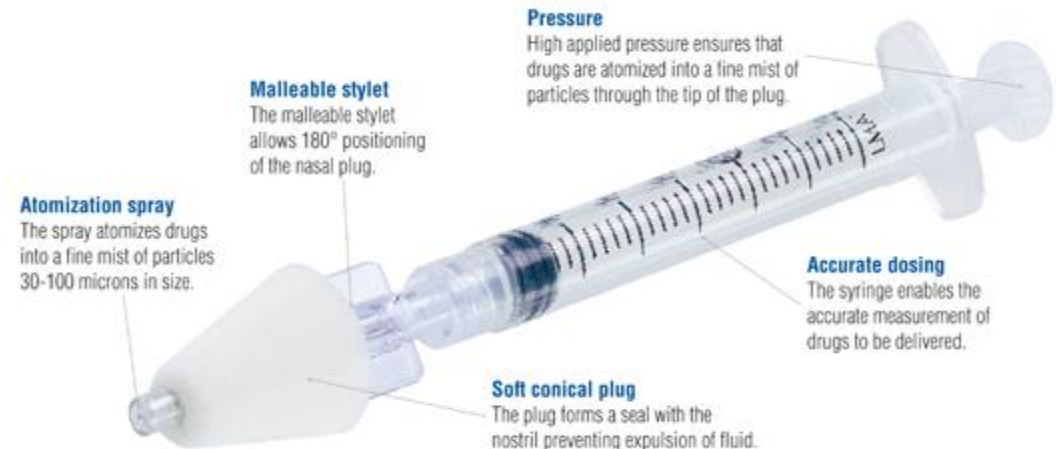
- Ketamine 50 mg/ml*
- **Fentanyl 50 mcg/ml***
- Midazolam 5mg/ml



- Use an atomizer

- If > 1ml divide between nares
- Aim spray toward turbinates/pinna

*Rapid CSF levels



Opioid Side Effects

- Constipation
- Bowel ileus
- Central nervous system sedation
- Respiratory depression
- Dizziness
- Drowsiness (continues for the duration of medication)
- Nausea
- Urinary retention
- Itching (may be treated with diphenhydramine)



Side Effects

Over-sedation (CNS and respiratory depression) may require stimulation, airway maneuvers, or use of the reversal agent **naloxone (Narcan)**.

If respiratory status does not improve with stimulation or BVM, administer naloxone titrated as needed.

Adult dose: 0.4 - 2 mg IV/IM/SC

Pediatric dose: 0.1 mg/kg IV/IM/SC

- maximum initial dose: 2 mg



Ketamine (Ketalar[®])

- A N-methyl D-aspartate (*NMDA*) *receptor antagonist* that blocks release of excitatory neurotransmitter glutamate and *provides anesthesia, amnesia, and analgesia*.
- Because of its high lipid solubility, ketamine rapidly crosses the blood-brain barrier, provides *quick onset of action* (peak concentration at 1 minute-IV) and *rapid recovery to baseline* (duration 5-15 minutes after IVP).
- Long used in ED and ICU settings for procedural sedation via dissociative amnesia and analgesia. In this setting higher doses are used than for analgesia alone
- Ketamine now being used in ED, EMS, and military settings in *subdissociative* doses either as an *adjunct to opioid analgesics* or as a *solo agent analgesic*.
- A more recent use of Ketamine is the treatment of delirium.

Ketamine (Ketalar[®])

- Provides good analgesia while preserving airway patency, ventilation, and cardiovascular stability.
- Small doses may increase the analgesic potency of opioids. These features have increased the popularity of ketamine in patients with opioid-resistant pain (vaso-occlusive pain crisis in sickle cell disease or patients with chronic pain) or trauma patients who are hemodynamically unstable.
- Can be given by intravenous (IV), intramuscular (IM), intranasal (IN) and oral (PO) routes.
- When reviewing the literature it is important to determine if the goal was dissociative or procedural sedation or analgesia only.
- May play a role in reduction of PTSD by blocking glutamate via NMDA receptor blockade.

Ketamine (Ketalar[®]) Indications

Indications	Starting Dose
Procedural Sedation	IV: <u>Adult</u> 0.5-1.0 mg/kg, <u>Ped</u> 1-2mg/kg; IM: 4-5 mg/kg
Sub-dissociative Analgesia	IV: 0.1 to 0.3 mg/kg, <i>max initial dose</i> ≤ 10 mg IM: 0.5-1.0 mg/kg; IN*: 0.5-1.0 mg/kg
Excited Delirium Syndrome	IV: 1 mg/kg; IM: 4-- 5 mg/kg

*Dosing not well established. Studies have used 0.5-9 mg/kg.

Moderate to Severe Pain

Nitrous Oxide

- The National Association of Emergency Medical Services Physicians NAEMSP published a position paper on the pre-hospital use of nitrous oxide in 1990.
- The NAEMSP reports that use of a 50:50 mixture of nitrous oxide and oxygen is within the scope of EMS medical directors and is safe for treatment of **mild to moderate** pain when used by well trained EMS providers.



Anxiolysis and Sedation

Benzodiazepines

Often patients may be experiencing anxiety along with pain.

For example, a restrained child from a MVC with a stabilized fracture is still in distress after an appropriate dose of morphine. His parents were also injured and are being transported by another service to a trauma center. Consider if administration of a sedative might be beneficial if no contraindications exist.

Contraindications:

- Hypersensitivity
- Shock
- Coma
- Acute alcoholism
- Depressed vital signs

	Dose	Comments
Diazepam	0.1 mg/kg IV (max 5mg/dose) every 5-10 min	May cause respiratory depression. Give by slow IV push over 3-5 min. May also cause hypotension.
Midazolam	0.05- 0.1 mg/kg IV/IM/IO 0.3 mg/kg IN use with an atomizer. 10 mg or 1 ml per nostril (total 2 ml)	

Pharmacologic Safety in Pediatric Patients

- Many medications are metabolized in the liver via **cytochrome P450 subtypes** which are not fully developed in newborns
 - Liver enzymes reach full maturity at varying rates but generally at *1-6 months of age*
- Newborns have a *higher percentage of body water* compared to adults resulting in a higher volume of distribution for water soluble drugs
- Due to immature respiratory symptoms *infants may develop apnea* or periodic breathing when given *even small opioid doses*.



Special Populations: Pregnancy

Treatment: Non-pharmacological options for treating pain should be tried first to reduce risk to the fetus.

Ketamine – Limited evidence has shown increase in uterine tone and decrease uteroplacental perfusion; increase maternal blood pressure and pulse up to 40%; and neonatal depression. *Currently the teratogenicity of ketamine is unknown.*

NSAIDs should not be used for routine pain control. In third-trimester pregnancy: increased risk of fetal cardiovascular, brain, kidney, lung, skeleton, and gastrointestinal tract defects, as well as miscarriage.

Ibuprofen (category B), indomethacin (B), naproxen (B), and ketorolac (C) may be options in first and second trimesters of pregnancy.

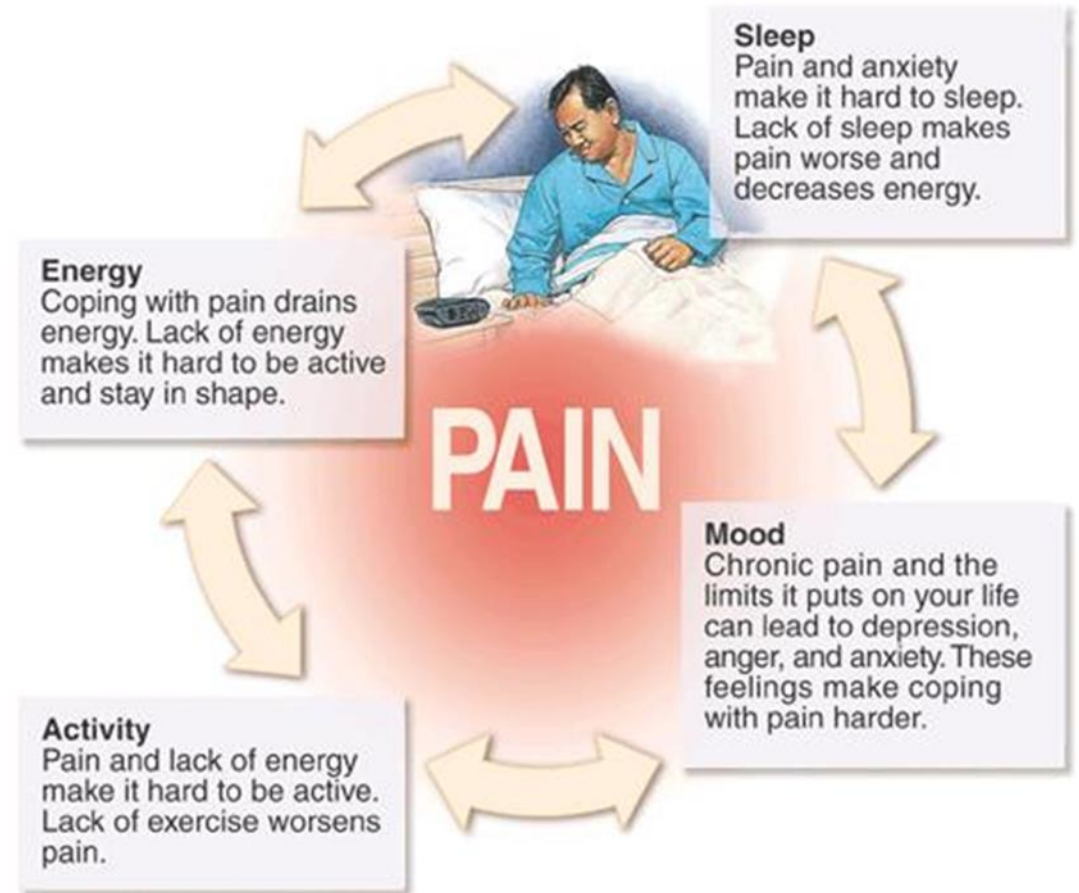
Opioids are considered category C when used for short term treatment.

Table 1. FDA Drug Risk Classification

Category	Description
A	Controlled studies in humans show no risk to the fetus
B	No controlled studies have been conducted in humans; animal studies show no risk to the fetus
C	No controlled studies have been conducted in animals or humans
D	Evidence of human risk to the fetus exists; however, benefits may outweigh risks in certain situations
X	Controlled studies in both animals and humans demonstrate fetal abnormalities; the risk in pregnant women outweighs any possible benefit

Chronic Pain in Children

- Growing population of adolescents with chronic pain and adult type diseases and medications
- Chronic regional pain syndrome
- Growth of pain specialists procedures (neurostimulators)
- Resources for children/young adults with chronic pain



What's New in the Literature

- Literature from pediatric pain and sedation services
 - Beware of extrapolating to EMS
- Devices to measure level of pain via imaging of facial expressions
- Studies regarding multimodal approaches
 - If we decrease opioids by combining with other modalities we decrease LOS and adverse events (DVT, constipation, falls, etc)
 - Opioid free vs. Alternatives to Opioid programs
- Comparisons of NSAIDs to oral opioids
- Very little specific to pediatric prehospital

Is pain really undertreated? Challenges of addressing pain in trauma patients during prehospital transport and trauma resuscitation

- Citation: Spilman SK, Lechtenberg GT, Hahn KD, et al. Is pain really undertreated? Challenges of addressing pain in trauma patients during prehospital transport and trauma resuscitation. *Injury*. 2016; March.
- Abstract: Prior research has documented the inadequacy of pain management for trauma patients in the ED, with rates of pain assessment and opioid administration averaging about 50%. Rates may be misleading and do not adequately capture the complexity of pain management practices in a trauma population. *The goal of the study was to determine if pain was undertreated at the study hospital or if patient acuity explained the timing and occurrence of pain treatment in the prehospital setting and the ED.*
- Methods: A retrospective study at a Level 1 adult trauma center in the Midwest. Using the first set of patient vitals and ISS, patients were grouped into three categories: physiologically stable with low injury severity (n = 132); physiologically stable with moderate to severe injury (n = 122); and physiologically unstable with severe injury (n = 56).
- Results: **Patients who were physiologically unstable were the least likely to receive a standardized pain assessment and the least likely to receive an opioid in the ED.** Patients who were physiologically stable but sustained a severe injury were most likely to receive an opioid. Time to first pain assessment and time to first opioid did not differ by patient acuity.
- Conclusions: Results confirm that **patient acuity greatly affects the ability to effectively and appropriately manage pain in the initial hours after injury.** This study contributes to the literature by explaining why delaying pain treatment may be appropriate in certain patient populations.

Intranasal fentanyl for the prehospital management of acute pain in children

- **Citation:** Murphy AP, Hughes M, Mccoy S, Crispino G, Wakai A, O'sullivan R. Intranasal fentanyl for the prehospital management of acute pain in children. Eur J Emerg Med. 2016;
- **Introduction:** Difficulty in establishing vascular access and fear of opiate administration to small children are recognized reasons for oligoanalgesia. Intranasal fentanyl (INF) has been shown to be as safe and effective as intravenous morphine in the treatment of severe pain in children in the ED.
- **Aim:** This study aimed to describe the clinical efficacy and safety of INF when administered by advanced paramedics in the prehospital treatment of acute severe pain in children.
- **Methods:** A 1-year prospective cross-sectional study of children (>1 year, <16 years) who received INF as part of the prehospital treatment of acute pain by the statutory national EMS in Ireland.
- **Results:** Ninety-four children were included in final analysis [median age 11 years (interquartile range 7–13)]; 53% males and 86% trauma. *Clinically effective reduction in the pain score was found in 78 children [83% (95% confidence interval: 74–89%)].* **Median initial pain rating score was 10. Pain assessment at 10 min after INF administration indicated a median pain rating of 5. No patient developed an adverse event as a result of INF.**
- **Discussion:** **INF at a dose of 1.5 µg/kg appears to be a safe and effective analgesic in the prehospital management of acute severe pain in children and may be an attractive alternative to both oral and intravenous opiates.**

Intranasal ketamine for the treatment of patients with acute pain in the emergency department

- **Citation:** Shrestha R, Pant S, Shrestha A, Batajoo KH, Thapa R, Vaidya S. Intranasal ketamine for the treatment of patients with acute pain in the emergency department. World J Emerg Med. 2016;7(1):19-24.
- **Background:** Pain in the emergency department (ED) is common but undertreated. The objective of this study was to examine the efficacy and safety of intranasal (IN) ketamine used as an analgesic for patients with acute injury with moderate to severe pain. **METHODS:** This study was a cross sectional, observational study of **patients more than 8 years old experiencing moderate to severe pain** [visual analog score (VAS) >50 mm]. **The initial dose of IN ketamine was 0.7 mg/kg with an additional dose of 0.3 mg/kg** if VAS was more than 50 mm after 15 minutes. Pain scores and vital signs were recorded at 0, 15, 30 and 60 minutes. Side-effects, sedation level and patient's satisfaction were also recorded. The primary outcome was the number of patients achieving " 20 mm reductions in VAS at 15 minutes. Other secondary outcome measures were median reduction in VAS at 15, 30 and 60 minutes, changes of vital signs, adverse events, satisfaction of patients, and need for additional ketamine. **RESULTS:** Thirty-four patients with a median age of 29.5 years (IQR 17.5–38) were enrolled, and they had an initial median VAS of 80 mm (IQR 67–90). The VAS decreased more than 20 mm at 15 minutes in 27 (80%) patients. The reduction of VAS from baseline to 40 mm (IQR 20–40), 20 mm (IQR 14–20) and 20 mm (IQR 10–20) respectively at 15, 30 and 60 minutes ($P<0.001$). No critical changes of vital signs were noted and adverse effects were mild and transient. **CONCLUSION: This study showed that IN ketamine is an analgesic choice for patients with acute injury in moderate to severe pain in an overcrowded and resource limited ED.**

Prehosp Emerg Care. 2016;20(1):59-65. doi: 10.3109/10903127.2015.1056897. **Prehospital Opioid Administration in the Emergency Care of Injured Children.** Browne LR, Studnek JR, Shah MI, Brousseau DC, Guse CE, Lerner EB.

METHODS: This was a retrospective cross-sectional study of pediatric patients aged 3-18 years assessed by a single EMS system between October 1, 2011 and September 30, 2013. Prior to October 2011, the EMS system had implemented 3 changes to improve pain treatment: (1) training on age appropriate pain scales, (2) protocol changes to allow opioid analgesia without contacting medical control, and (3) the introduction of intranasal fentanyl. All patients with working assessments of blunt, penetrating, lacerating, and/or burn trauma were included. We used descriptive statistics to determine the frequency of pain score documentation and opioid analgesia administration and logistic regression to determine the association of age, transport time, and the presence of intravenous access with opioid analgesia administration.

RESULTS: Of the 1,368 eligible children, 336 (25%) had a documented pain score. Eleven percent (130/1204) of children without documented contraindications to opioid administration received opioids. Of the children with no documented pain score and no protocol exclusions, 9% (81/929) received opioid analgesia, whereas 18% (49/275) with a documented pain score ≥ 4 and no protocol exclusions received opioids. Multivariate analysis revealed that vascular access (OR = 11.89; 95% CI: 7.33-19.29), longer patient transport time (OR = 1.07; 95% CI: 1.04-1.11), age (OR 0.93; 95% CI: 0.88-0.98) and pain score documentation (OR 2.23; 95% CI: 1.40-3.55) were associated with opioid analgesia.

CONCLUSIONS: Despite implementation of several best practice recommendations to improve prehospital pain treatment, few children have a documented pain score and even fewer receive opioid analgesia. Children with longer transport times, successful IV placement, and/or documentation of pain score(s) were more likely to receive prehospital analgesia.

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Out-of-Hospital Use of Analgesia and Sedation

Approved by the Board of Directors June 2015

The American College of Emergency Physicians (ACEP) believes that Advanced Life Support capable EMS systems should provide analgesia and sedation. This should be done in conjunction with close physician oversight and quality improvement programs reviewing the use of both pain and sedative medications. The relief of suffering is among the most common reasons for requesting EMS assistance. Pain and agitation are common causes of this suffering and are commonly encountered by EMS. There is a gap between the need for patient analgesia and the willingness of EMS personnel to provide it. There are a variety of medications available for the relief of both pain and agitation. Additionally, medical directors should ensure adequate education is provided on organic causes of, and physiologic response to, both pain and agitation as well as the mechanism of action and potential side effects of any medications utilized. EMS agencies should be equipped with and trained to use appropriate monitoring equipment when using these medications, including pulse oximetry, ECG

Related Links

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- » [Patient Experience of Care Surveys](#)
- » [Human Trafficking](#)
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- » [Out-of-Hospital Medical Direction and the Intervener Physician](#)

EMS >

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- » [Appropriate and Safe](#)

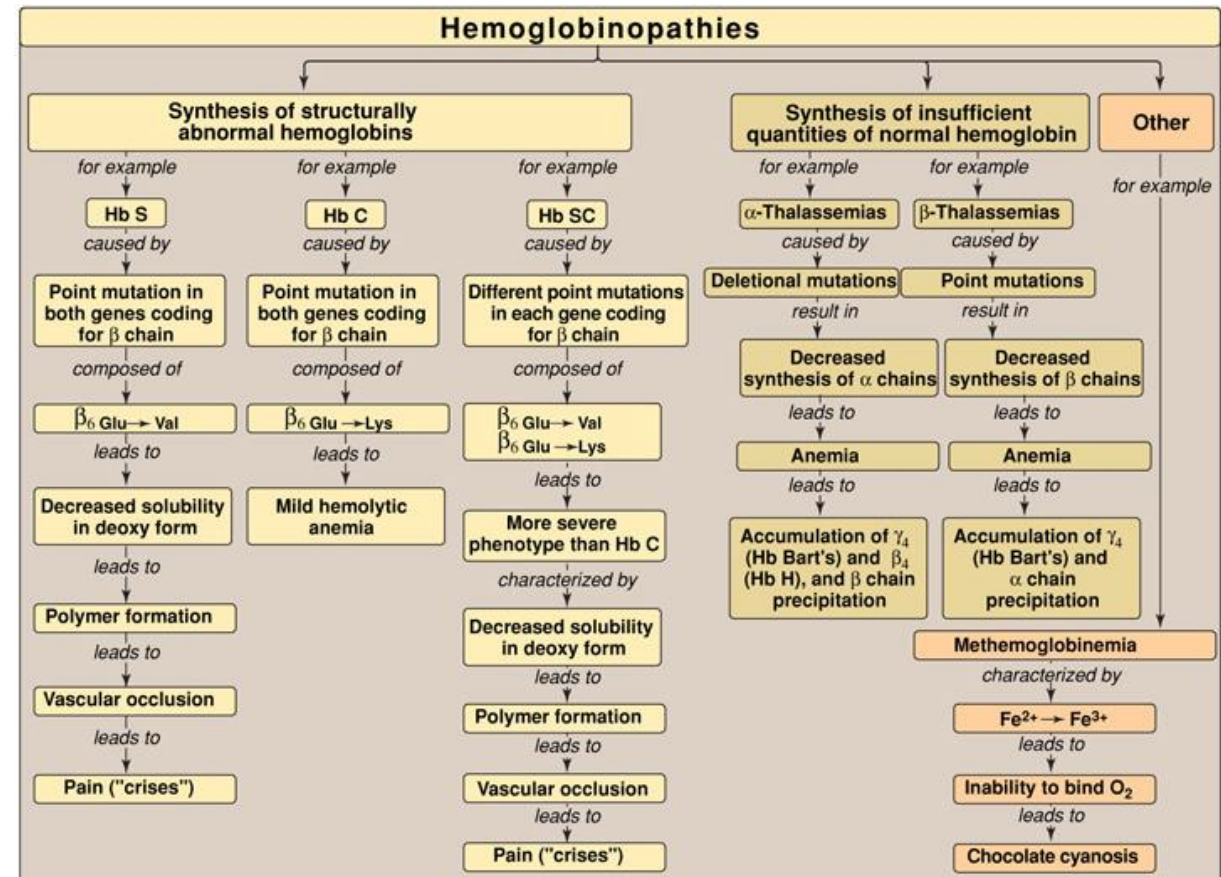
Case Scenarios

Case Scenario Examples

- You arrive on scene to find a 14 yo male who collided with another player during “football frisbee”. Obvious deformity and swelling of his lower leg. He is cooperative and polite during exam but his facial expressions indicate he is severe pain. Wants to know if this means he can’t play football this Fall. His father is at the scene wringing his hands. The patient’s mother arrives as you are preparing for transport and begins yelling at the father saying “ I knew I couldn’t leave him with you for even one weekend much less the whole summer”. The patient begins crying and asking why no one is helping him..... family meltdown!
- 5 year old female with 2 cm cut to her eyelid arrived via EMS from school. She is crying hysterically and saying “please don’t tell my momma I was a bad girl”. Father arrives ten minutes later and appears quiet and exhausted. ED/EMS staff is concerned that he doesn’t seem to be doing anything to comfort his daughter. You ask if he has notified the child’s mother of the accident. The child’s eyes light up but he shakes his head. Finally you ask why he has not called the girl’s mother- he responds “she died 3 months ago”

Case Scenario- Triage sets the tone

- 18 yo BM transported for SS pain. Took one dose of “Norco” about 6 hours ago. Didn’t even try anything else. You know the usual. Just looking for some IV meds. Hasn’t called his doctor.....
- Triage nurse to doctor- 18 yo SS patient in room 4 looking for drugs
- Resident to attending- SS drug seeker in room 4, doesn’t look like he’s in pain to me
- Attending physician: goes into room 4 with preconceived attitude
- The rest of the story: Patient is an honor student, has never been to ED before, has another hemoglobinopathy.....



You are called to the residence of a 3 year old female who pulled a pot of boiling water off the stove. She has second degree burns on her arms, chest and face. She is screaming and running away from you.

Questions to Consider

- How would you assess her pain?
- Which pain assessment scale would you use?
- What are your options for treating her pain?



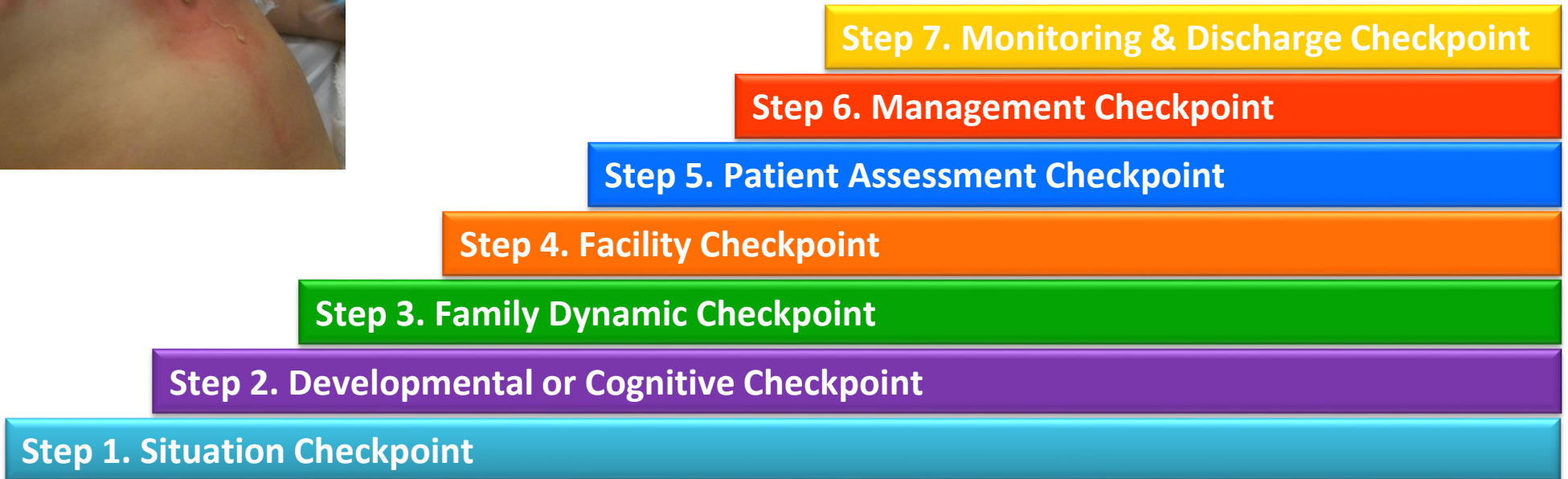
Case 2 Resolution

You decide to use the FLACC pain scale and determine she has a pain rating of 8. The patient likely would benefit from opioid medications.

FLACC Scale ²		0	1	2
1	Face	No particular expression or smile.	Occasional grimace or frown, withdrawn, disinterested.	Frequent to constant frown, clenched jaw, quivering chin.
2	Legs	Normal position or relaxed.	Uneasy, restless, tense.	Kicking, or legs drawn up.
3	Activity	Lying quietly, normal position, moves easily.	Squirming, shifting back and forth, tense.	Arched, rigid or jerking.
4	Cry	No crying (awake or asleep).	Moans or whimpers; occasional complaint.	Crying steadily, screams or sobs, frequent complaints.
5	Consolability	Content, relaxed.	Reassured by occasional touching, hugging or being talked to, distractible.	Difficult to console or comfort.



Stepwise Approach



Case Scenario Discussion

1. **Interactive distraction-** show a lighted toy
2. **Comfort positioning-** caregiver presence
3. **Using developmentally-sensitive language**— “*You are brave*” (offers praise and encouragement) instead of “*I am sorry*” (exacerbates distress) or “*Don’t cry.*”
4. Attempt IV x 1
5. Give IN fentanyl and cover burn
6. Pain level decreases to a 6 which makes it easier for trauma center staff to attempt IV access upon arrival

PAMI Module Topics- 2 hours CEU/CME each

Basics of Pain Management and Assessment	Pharmacological Treatment of Pain
Non-pharmacological Treatment of Pain	Management of Acute Pain
Procedural Sedation and Analgesia	Management of Chronic Pain
Prehospital/EMS Management of Pain	Patient Safety and Legal Aspects
Special Populations	Pediatric Pain Management



PAMI Stakeholders





Questions and Comments

References and resources can be found
on the main PAMI website

<http://pami.emergency.med.jax.ufl.edu/>

Email your challenging EMS pain
management cases, recommendations,
comments, and questions.

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Pain Assessment and
Management Initiative



PLEDGE

“I pledge allegiance to the children and to relieve their pain and suffering to the best of my ability” I will do this by_____.”

