Attribution Key

for more information see: http://open.umich.edu/wiki/AttributionPolicy

Use + Share + Adapt

{ Content the copyright holder, author, or law permits you to use, share and adapt. }

Public Domain – Government: Works that are produced by the U.S. Government. (17 USC § 105)
Public Domain – Expired: Works that are no longer protected due to an expired copyright term.
Public Domain – Self Dedicated: Works that a copyright holder has dedicated to the public domain.
Creative Commons – Zero Waiver
Creative Commons – Attribution License
Creative Commons – Attribution Share Alike License
Creative Commons – Attribution Noncommercial License
Creative Commons – Attribution Noncommercial Share Alike License
GNU – Free Documentation License

Make Your Own Assessment

{ Content Open.Michigan believes can be used, shared, and adapted because it is ineligible for copyright. }

Public Domain – Ineligible: Works that are ineligible for copyright protection in the U.S. (17 USC § 102(b)) *laws in your jurisdiction may differ

{ Content Open.Michigan has used under a Fair Use determination. }

Fair Use: Use of works that is determined to be Fair consistent with the U.S. Copyright Act. (17 USC § 107) *laws in your jurisdiction may differ

Our determination DOES NOT mean that all uses of this 3rd-party content are Fair Uses and we DO NOT guarantee that your use of the content is Fair.
To use this content you should do your own independent analysis to determine whether or not your use will be Fair.
Critical outcome

• The emergency nurse assesses, identifies and manages acute and chronic pain within the emergency setting.
Specific Outcomes

• Define the types of pain and complications of pain management.
• Delineate pain physiology and mechanisms of addressing pain with medications.
• Define the general assessment of the patient in pain.
• Delineate the nursing process and role in the management of the patient with acute and chronic pain.
Specific Outcomes

• Apply the nursing process when analyzing a case scenario/patient simulation
• Predict differential diagnosis when presented with specific information regarding the history of a patient
• List and know the common drugs used in the emergency department to manage painful conditions and conduct procedural sedation.
• Consider age-specific factors.
• Discuss medico-legal aspects of care of patients with pain related to emergencies.
Definitions

• Pain
  – An unpleasant sensory and emotional experience
  – Associated with actual or potential tissue damage or described in terms of such damage
  – Personal and subjective experience
    • Can ONLY be described by person experiencing pain
    • Exists whenever the person says it does
Tolerance

• Greatest level of discomfort a person is prepared to endure
• Person requires increased amount of substance to achieve desired effect
Dependence

• Reliance on a substance
• Abrupt discontinuance would cause impairment of function
Addiction

• Behavioral pattern characterized by compulsively obtaining and using a substance
• Results in physical, social, and psychological harm to user
Allodynia

• Pain caused by a stimulus not normally causing pain
• Mechanical:
  – Static mechanical allodynia- pain in response to a light touch/pressure
  – Dynamic mechanical allodynia- pain in response to brushing
• Thermal:
  – (Hot or Cold) allodynia- pain in response to mild skin temperatures in the affected area
• Can be from neuropathy, fibromyalgia, migraines or spinal cord injuries
Pain Management

• Comprehensive approach to patient needs when experiencing problems associated with acute or chronic pain
Pain Threshold

• Least level of stimulus intensity perceived as painful
Suffering

• Physical or emotional reaction to pain
• Feeling of helplessness, hopelessness, or uncontrollability
Pain Physiology

• Emergency nurses need an understanding of basic physiology of pain to effectively assess, intervene, and evaluate patient outcomes.
A. Physiology

A. Neuroanatomy

1. Afferent pathway
   a) Nociceptors (pain receptors) in the tissues respond to pleasant and painful stimuli
      1) Stimulation of nociceptors produces impulse transmission through fibers
         a) Small C fibers: unmyelinated; transmit burning and aching sensations; relatively slow
         b) Larger A-delta fibers: myelinated; transmit sharp and well-localized sensations; relatively fast
      2) Terminate in the dorsal horn of the spinal cord
      3) Modulate pain patterns in the dorsal horn
      4) Transmit impulses to the midbrain via the neospinothalamic tract (acute pain) and to the limbic system via the paleospinothalamic tract (dull and burning pain)
Central nervous system (CNS)

• Includes all the limbic system, reticular formation, thalamus, hypothalamus, medulla, and cortex

• Arousal, discrimination, and localization of pain; coping response; release of corticosteroids; cardiovascular response; modulation of spinal pain transmission
C fiber, A delta, dorsal horn
Efferent pathway

• Fibers connecting the reticular formation, midbrain, and substantia gelatinosa in the dorsal horn of the spinal cord
• Afferent fibers stimulate the periaqueductal gray matter in the midbrain, which then stimulates the efferent pathway
• Modulates or inhibits pain impulses
Neuromodulation

A. Endorphins: A group of neuropeptides that inhibit pain transmission in the brain and spinal cord
   1) Beta-Lipotropin: responsible for feeling of well-being
   2) Enkephalin: weaker than other endorphins but longer lasting and more potent than morphine
   3) Dynorphin: generally impedes pain impulse
   4) Endomorphin: very antinociceptive
   5) Opiate receptors: mu receptors on the membrane of afferent neurons, inhibit the release of excitatory neurotransmitters; beta receptors react with enkephalins to modulate pain transmission; kappa receptors produce sedation and some analgesia; sigma receptors cause pupil dilation and dysphoria
Effects of medications on modulating pain

• Stimulation of afferent pathways results in activation of circuits in supraspinal and spinal cord levels. Each synaptic link is subject to modulation

• Mechanisms of drug action
  – ASA and Acetaminophen: inhibit prostaglandin synthesis in the CNS
  – NSAIDs: synthesized at the site of injury; inhibit prostaglandin synthesis, which reduces hyperalgesia
  – Opiates: interact with mu and kappa receptors; powerful effect on the brainstem and the periphery
  – Local anesthetics: block sodium channels and thus prevent transmission of nerve impulses
Specific theory

– A specific sensation that is independent of other sensations. Experiments on animals provided clinical evidence of separate spots for heat, cold, and touch
Gate control theory

– Modulations of inputs in the spinal dorsal horns and the brain act as a gating mechanism

– With a stimulus, the following sequence of events occurs:
  • The pain impulse is transmitted via nociceptors fibers in the periphery to the substantia gelatinosa through large A-delta and small C fibers
  • A gating mechanism regulates transmission from the spinal cord to the brain, where pain is perceived
  • Stimulation of large fibers closes the gate and thus decreases transmission of impulses unless persistent
  • Stimulation of small fibers opens the gate and enhances pain perception
..more on the gating mechanism

– The spinal gating mechanism is also influenced by fibers descending from the brain
  – The conducting fibers carry precise information about the nature and location of the stimulus
  – Through efferent pathways the CNS may close, partially close, or open the gate
  – Descending fibers release endogenous opioids that bind to opioid receptor sites that thereby prevent the release of neurotransmitters such as substance P, this inhibiting transmission of pain impulses and producing analgesia
  – Cognitive function can also modulate the pain perception and the individual’s pain response
Neuromatrix theory

• A widespread network of neurons consist of loops between the thalamus and cortex and between the cortex and limbic systems; neural processes are modulated by stimuli from the body but can also act in the absence of stimuli
  – Stimuli trigger neural patterns but do not produce them
  – Cyclic processing of impulses produces a characteristic pattern in the entire matrix that leaves a neurosignature
  – Signature patterns are converted to awareness of the experience and activation of spinal cord neurons to produce muscle patterns for action
Neuromatrix theory

• Neural inputs modulate the continuous output of the neuromatrix to produce a wide variety of experiences felt by the individual
  – Awareness of the experience involves multiple dimensions (e.g., sensory, affective, and evaluative) simultaneously
  – Pain qualities are not learned; rather, they are innately produced by the neurosignatures and interpreted by the brain
Types of pain

• Acute
• Chronic
• Nociceptive
• Neuropathic
Acute

• Elicited by injury to body tissues
• Typically seen with trauma, acute illness, surgery, burns, or other conditions of limited duration; generally relieved when healing takes place.
Acute pain
Chronic

• Elicited by tissue injury
• May be perpetuated by factors remote from the original cause and extend beyond the expected healing time; generally lasts longer than 3 months
Chronic pain
Nociceptive

- Elicited by noxious stimuli that damages tissues or has the potential to do so if the stimuli are prolonged.
  - Somatic pain: arises from skin, muscle, joint, connective tissue, or bone; generally well localized and described as aching or throbbing.
  - Visceral pain: arises from internal organs such as the bladder or intestine; poorly localized and described as cramping.
Somatic pain
Visceral pain
Neuropathic

• Caused by damage to peripheral or central nerve cells
  – Peripheral:
    • Arises from injury to either single or multiple peripheral nerves
    • Felt along nerve distributions
    • Burning, shooting, stabbing or like an electric shock
    • Diabetic neuropathy, herpetic neuralgia, radiculopathy, or trigeminal neuralgia
  – Central:
    • Associated with autonomic nervous system dysregulation
    • Phantom limb pain (peripheral) or complex regional pain syndromes (central)
Peripheral neuropathic pain
Central neuropathic pain

J.H. Shepherd/Mütter Museum, Wikimedia Commons
General strategy

• Assessment
• Analysis
• Planning and Implementation/Intervention
• Evaluation and Ongoing monitoring
• Documentation
Assessment

• Primary and secondary assessment
• Focused assessment
  – Subjective data collection
  – Objective data collection
Subjective data

1. HPI (history of present illness/injury) or Chief Complaint
   • History of pain (PQRST)
     – Pain
     – Quality
     – Region/Radiation
     – Severity
     – Timing
   • Efforts to relieve symptoms
Subjective data

2. Past medical history
   a) Current or preexisting diseases/illness
   b) New or recurring problem
   c) Substance and/or alcohol use/abuse
   d) LNMP
   e) Current medications
   f) Non-pharmacologic interventions
   g) Food or drink
   h) Coping mechanisms
   i) Allergies
Subjective data

3. Psychological/social/environmental factors:
   a) Anxiety, Depression
   b) Aggravating or alleviating factors
   c) Expressions of pain
   d) Pain behavior is learned, yet adaptive, and it r/t pain threshold and pain tolerance
   e) Pain expressions can be verbal, behavioral, emotional, and physical
Objective data

1. General appearance
   a) Psychological
   b) Observations of behavior and vital signs should not be used solely in place of self-report
   c) Positioning and movement
   d) Physiologic
   e) Level of distress/discomfort
Objective data

2. Obtain pain rating
   a) Adults
      1. Visual analog scale
      2. Numeric rating scale
      3. Graphic rating scale
      4. Thermometer-like scale
Visual Analog Scale

Task ________________________________

Date ____________ Start _______ End _______

http://0.tqn.com/d/ergonomics/1/0/C/-/-/-/painscale.jpg
Numeric Rating Scale

http://0.tqn.com/d/pain/1/0/S/-/-/-/PainScale.gif
Graphic Rating Scale

The visual analogue scale (VAS) consists of a line, usually 100 mm long, whose ends are labeled as the extremes (‘no pain’ and ‘pain as bad as it could be’); the rest of the line is blank. The patient is asked to put a mark on the line indicating their pain intensity (at the present time, over the past week, or over the past 2 weeks, etc.). The distance between that mark and the origin is measured to obtain the patient’s score.

Sometimes descriptive terms, such as ‘mild’, ‘moderate’ and ‘severe’, or numbers are provided along the scale for guidance, as shown below, and the scale is then referred to as a graphic rating scale.

---


Thermometer-like Scale

PAIN DISTRESS/INTENSITY SCALE

- Agonizing
- Horrible
- Dreadful
- Uncomfortable
- Annoying
- None

Worst Possible Pain
Very Severe Pain
Severe Pain
Moderate Pain
Mild Pain
No Pain

http://img.medscape.com/fullsize/migrated/574/105/574105.fig1.gif
Objective data

2. Obtain pain rating
   b) Pediatric
      1. FACES scale
      2. Poker chip
      3. Numeric rating scale
      4. Color matching
FACES / Numeric combined

No pain  Minor pain  Moderate pain  Severe pain  Worst pain of my life
Objective data

2) Obtain a pain rating
   
c) Infant
      1. Neonatal Infant Pain Scale (NIPS)
      2. Neonatal Pain, Agitation, and Sedation Scale (NPASS)
      3. Pain Assessment Tool (PAT)
# NIPS

The Neonatal Infant Pain Scale (NIPS) is a tool used to assess pain in neonates. It comprises several components, each scored on a scale of 0 to 2 points.

<table>
<thead>
<tr>
<th>Component</th>
<th>0 point</th>
<th>1 point</th>
<th>2 points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facial expression</td>
<td>Relaxed</td>
<td>Contracted</td>
<td>-</td>
</tr>
<tr>
<td>Cry</td>
<td>Absent</td>
<td>Mumbling</td>
<td>Vigorous</td>
</tr>
<tr>
<td>Breathing</td>
<td>Relaxed</td>
<td>Different than basal</td>
<td>-</td>
</tr>
<tr>
<td>Arms</td>
<td>Relaxed</td>
<td>Flexed/stretched</td>
<td>-</td>
</tr>
<tr>
<td>Legs</td>
<td>Relaxed</td>
<td>Flexed/stretched</td>
<td>-</td>
</tr>
<tr>
<td>Alertness</td>
<td>Sleeping/calm</td>
<td>Uncomfortable</td>
<td>-</td>
</tr>
</tbody>
</table>

Maximal score of seven points, considering pain ≥ 4.
### N-PASS: Neonatal Pain, Agitation, & Sedation Scale

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Sedation</th>
<th>Normal</th>
<th>Pain / Agitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crying Irritability</td>
<td>No cry or painful stimuli</td>
<td>Meets or exceeds minimally painful stimuli</td>
<td>Appropriate crying or irritability</td>
</tr>
<tr>
<td>Behavioral State</td>
<td>No arousal to any stimulus</td>
<td>Minimal spontaneous movement</td>
<td>Appropriate for gestational age</td>
</tr>
<tr>
<td>Facial Expression</td>
<td>Expression of pain</td>
<td>Minimal expression with stimulus</td>
<td>Relaxed</td>
</tr>
<tr>
<td>Extremity Tone</td>
<td>No group reflex</td>
<td>Weak group reflex</td>
<td>Relaxed hands and feet</td>
</tr>
<tr>
<td>Vital Signs</td>
<td>No variability with stimulus</td>
<td>Hyperventilation or apnea</td>
<td>Within normal for gestational age</td>
</tr>
</tbody>
</table>

#### Assessment of Sedation
- Sedation is scored in addition to pain for each behavioral and physiological criteria to assess the infant's response to stimuli.
- Sedation does not need to be assessed/scored with every pain assessment.
- Sedation is scored from 0 = 0 to 2 for each behavioral and physiological criteria, then summed and noted as a total score (0 = 0-2).
- A score of 0 is given if the infant's response to stimuli is normal for their gestational age.
- Deemed levels of sedation vary according to the situation.
  - "Deep sedation" = score of 2 to 5 as goal
  - "Light sedation" = score of 1 to 2 as goal
- Deep sedation, if not recommended unless infant is receiving ventilatory support, related to the high potential for stress and hyperventilation.
- A negative score without the administration of sleep or sedative may indicate:
  - The presence of infant's response to prolonged or persistent pain/stress.
  - Neurologic depression, aspasia, or other pathology.

#### Assessment of Pain / Agitation
- Pain assessment is the first vital sign - assessment for pain should include every vital sign assessment.
- Pain is scored from 0 = 0 to 2 for each behavioral and physiological criteria, then summed.
- Pain scores are added to the premature infant's score based on their gestational age to compensate for their limited ability to behaviorally or physiologically communicate pain.
- Pain score is documented as a positive number (0 = 0-10).
- Pain scores are indicated for scores 3:
  - Interventions for lesions pain/painful stimuli are indicated before the score reaches 3.
  - The goal of pain treatment/intervention is a score ≤ 3.
  - More frequent pain assessment indications:
    - Indicating tube or lines which may cause pain, especially with movement (e.g., chest tube) ≥ at least every 2-4 hours.
    - Receiving analgesic and/or sedatives ≥ at least every 2-4 hours.
    - 30-60 minutes after an analgesic or sedative is given for pain behaviors to assess response to medication.
    - Post-operative ≥ at least every 4 hours for 24-48 hours, then every 4 hours until off medication.

#### Premature Pain Assessment
- Premature Pain Assessment: ≥ 3 if < 28 weeks gestation / corrected age ≥ 2 if 28-31 weeks gestation / corrected age ≥ 1 if > 30-35 weeks gestation / corrected age

http://www.anestesiarianimazione.com/Immagini/npass%208-01.jpg
<table>
<thead>
<tr>
<th>Categories</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>No particular expression or smile</td>
<td>Occasional grimace or frown, withdrawn, disinterested</td>
<td>Frequent to constant frown, quivering chin, clenched jaw</td>
</tr>
<tr>
<td>Legs</td>
<td>Normal position or relaxed</td>
<td>Uneasy, restless, tense</td>
<td>Kicking or legs drawn up</td>
</tr>
<tr>
<td>Activity</td>
<td>Lying quietly, normal position, moves easily</td>
<td>Squirming, shifting back and forth, tense</td>
<td>Arched, rigid, or jerking</td>
</tr>
<tr>
<td>Cry</td>
<td>No cry (awake or asleep)</td>
<td>Moans or whimpers; occasional complaint</td>
<td>Crying steadily, screams or sobs, frequent complaints</td>
</tr>
<tr>
<td>Consolability</td>
<td>Content, relaxed</td>
<td>Reassured by occasional touching, hugging, or being talked to; distractible</td>
<td>Difficult to console or comfort</td>
</tr>
</tbody>
</table>

**Note:** Each of the five categories Face (F), Legs (L), Activity (A), Cry (C), and Consolability (C) is scored from 0-2, which results in a total score between 0 and 10.


Objective data

• Inspection
  – Position, skin color, external bleeding, skin integrity, obvious deformity, edema

• Auscultation
  – Breath sounds, bowel sounds

• Palpation
  – Areas of tenderness: light, deep
  – Save painful part until last
Diagnostic procedures

• Laboratory studies
• Imaging
• Electrocardiogram

• Purpose: TO FIND THE CAUSE OF THE PAIN
Analysis: Differential diagnosis

- ACUTE PAIN
- CHRONIC PAIN
Planning and Implementation/Interventions

1. Determine priorities of care
   a) Maintain ABC
   b) Provide supplemental oxygen
   c) IV access
   d) Obtain and set up equipment
   e) Prepare/assist with medical interventions
   f) Provide measures for pain relief
   g) Administer pharmacological therapy as ordered
Administer pharmacological therapy as ordered

1. The World Health Organization (WHO) recommends the use of the analgesic ladder as a systematic plan for the use of analgesic medications.
   1. Step 1: use non-opioid analgesics for mild pain
   2. Step 2: adds a mild opioid for moderate pain
   3. Step 3: use of stronger opioids when pain is moderate to severe
Patient-controlled analgesia (PCA)

- Used for patients with acute or chronic pain who are able to communicate, understand explanations, and follow directions
- Assess vital signs and pain level
- Explain the use of the pump
- Collaborate with the physician, patient, and family about dosage, lockout interval, basal rate, and amount of dosage on demand
- Assist the patient to use the PCA pump
Planning and Implementation/Interventions

2. Relieve anxiety and apprehension
3. Allow significant others to remain with patient if supportive
4. Educate patient and significant others
   • about the efficacy and safety of opioid analgesics
Evaluation and Ongoing Monitoring

1. Continuously monitor and treat as indicated
2. Monitor patient response/outcomes, and modify nursing care plan as appropriate
3. If positive patient outcomes are not demonstrated, reevaluate assessment and/or plan of care
Documentation

• Document vitals and pain score before and after intervention along with patient response
Age-related concerns

1. Pediatrics: Growth or development related
   • Children’s pain tolerance increases with age
   • Children’s developmental level influences pain behavior
   • Localization of pain begins during infancy
   • Preschoolers can anticipate pain
   • School age children can verbalize pain and describe location and intensity
Children may not admit to pain to avoid injection

Distraction techniques can aid in keeping the child’s mind occupied and away from pain

Opioids are no more dangerous for children than for adults
Age Related concerns

2. Geriatrics: Age related

• Pain is not a normal aging consequence
• Chronic pain alters the person’s quality of life
• Chronic pain may be caused by a myriad of conditions
Geriatric “Pearls”

- Adequate treatment may require deviation from clinical pathways
- Administer pain relieving medications at lower dose and increase slowly
Barriers to effective pain management

1. Attitudes of emergency health care providers
2. Hidden biases and misconceptions about pain
3. Inadequate pain assessment
4. Failure to accept patients’ reports of pain
5. Withholding pain-relieving medication
6. Exaggerated fears of addiction
7. Poor communication
Improving pain management

• Changing attitudes
• Continuing education related to the realities and myths of pain management
• Evidence-based practice
• Cultural sensitivity
Procedural sedation

• The Joint Commission (TJC) has standard definitions for four levels of sedation and anesthesia:
  1. minimal sedation
  2. moderate sedation/analgesia
  3. deep sedation/analgesia (pt not easily aroused)
  4. anesthesia (requires assisted ventilation)
Procedural sedation

• Indications: suturing, fracture reduction, abscess incision and drainage, joint relocation
• Assessment: Allergies, Last oral intake
Procedural Sedation

• Procedure:
  – Baseline VS and LOC
  – Explain procedure to patient and family
  – Obtain venous access
  – Equipment: cardiac monitor, blood pressure monitor, pulse oximeter, suction, oxygen equipment, endotracheal intubation equipment and capnography device, IV supplies, reversal agents.
  – Assist with medications
  – Maintain continuous monitoring during procedure
  – Document vital signs, LOC, and cardiopulmonary status every 15 min.
  – Post procedure discharge criteria
Medication review

• Non-narcotic
• Narcotics
• Sedatives / anesthetics
• Local anesthetics
Non-narcotic

- Acetaminophen
- Salicylates
- NSAIDs
Narcotic

• Codeine
• Fentanyl
• Hydromorphone
• Morphine sulfate
• Oxycodone
Sedatives / Anesthetics

- Diazepam
- Ketamine
- Lorazepam
- Midazolam
- Propofol
- Etomidate
Local anesthetics

- Lidocaine
- Mepivacaine
- Procaine
- Tetracaine
- LET (lidocaine, epinephrine, tetracaine)
- EMLA cream
THE END