MANAGING ACUTE PAIN AFTER INJURY

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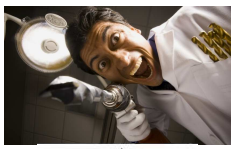
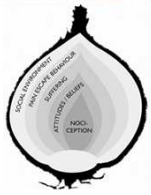
Objectives:

1. Describe methods for acute pain management in the inpatient setting using a multimodal approach
2. Discuss the role of providing nonopioid and nonpharmacological interventions for trauma related pain

But what is pain really?

It is now generally accepted that the experience of pain does not solely rely on noxious inputs, but many variables interplay with the experience, including memory, mood, environment, attention and expectation

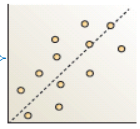




Shared Neural Networks of Physical and Social Pain

Trait Consequences

- Social phobia
- Anxious attachment
- Rejection sensitivity
- Social pain to social exclusion



Physical pain sensitivity

State Consequences	Type of Pain	
	Social	Physical
Type of manipulation	Early social trauma	Sickness/injury
Increase pain	Failure Social exclusion	Inflammatory pain Experimental pain
Decrease pain	Social support	Opioids Acetaminophen

Eisenberger NI Nat Rev Neurosci 2012 May 3;13(6):421-34

Motivation, Action, Learning

- Expectation (predicted intensity) of future pain
  - ↓ With early effective intervention
  - ↑ With each ineffective intervention
- Words matter

Fields HL Science 2014;345:513-4
Navratilova e et al Proc Natl Acad Sci 2012;109:20709-13
Fields HL Reg Anesth Pain Med 2007;32(3):242-6

What pain is not

- Preventable
- A number
- Completely controllable
- Controllable with medicine alone

"If we cannot assess pain, we will never be able to treat pain."

Betty Ferrell RN, PhD, FAAN

Not all Pain is the same

- Intensity (mild-moderate-severe)
- Time course (acute, chronic)
- Pathophysiology (nociceptive, neuropathic)
- Type of tissue involved (muscle, bone, viscera, nerves)
- Syndromes (compartment, fibromyalgia, migraine, others)
- Special considerations (psychological state, age, gender, culture)

Comprehensive Pain Assessment

Q	**Quality (what it feels like)**
I	Impact on physical and emotional function
S	Site
S	Severity (0-10 rating)
T	Temporal Characteristics (when did it start, is it constant or intermittent)
A	Aggravating & Alleviating Factors
P	Past Treatment & Response, Patient Preferences
E	Expectations, Goals, Meaning
D	Diagnostics, physical exam

Nociceptive pain
- Achy, throbbing, stabbing, stinging
- Well localized

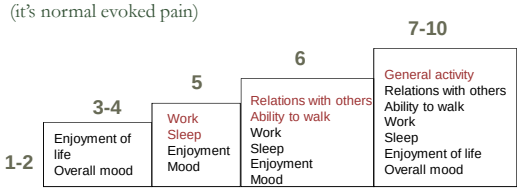
Neuropathic Pain
- Tingling, burning, electric, pins and needles, numbness, hurts to touch
- May include both positive and negative sensory and motor signs and symptoms
- No single symptom is diagnostic. High degree of interpatient variability in presentation
- Allodynia= normally non-painful stimuli are painful
- Hyperalgesia= intensified pain sensation

Use history and physical exam to determine the cause or mechanisms of the pain (e.g. inflammatory, neuropathic, visceral, myofascial, etc.). Get accurate history of analgesic use prior to admission.

Caution on Use of 0-10 VAS

In acute pain obtain at **rest** and with **activity**

Let's stop naming pain with movement "breakthrough" (it's normal evoked pain)



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Tan G et al., *J Pain* 2004;5(2):133-7.
Keller S et al., *Clin J Pain* 2004;20(5):309-18.

PAIN

Pain 85 (2000) 457–463

www.elsevier.nl/locate/pain

Simple pain rating scales hide complex idiosyncratic meanings

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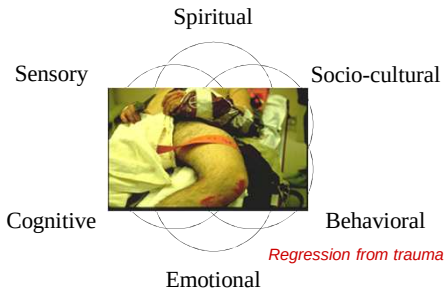
Abstract

Assumptions of reliability and consistency of self-report of pain by patients using visual analogue scales (VAS) and numerical rating scales (NRS) are based on narrow considerations of possible sources of error. This study examined patients' use of VASs and NRSs, by their own description, with particular attention to rating of multiple pains, of different dimensions of pain, and of interpretation and use of lower and upper endpoints and increments on the scales. These have implications for the approximation of the scales to psychometric requirements. An interview developed from a small pilot project was given to 78 volunteer chronic pain patients embarking on a pain management course, and consisted of both forced choice questions and free response. Data are described with reference to lack of concordance between patients and of consistency within patients; responses suggested that ratings incorporate multiple partially differentiated dimensions of pain, with particular importance placed on function or mobility. Labels assigned to scale endpoints by researchers, whether lexical or numerical, appeared to affect their use; however, covert relabelling of scale points was revealed in free response. The action of arriving at a rating is better conceptualised as an attempt to construct meaning, influenced by and with reference to a range of internal and external factors and private meanings, rather than as a task of matching a distance or number to a discrete internal stimulus. © 2000 International Association for the Study of Pain. Published by Elsevier Science B.V. All rights reserved.

Keywords: Pain rating scales; Reliability; Self-report of pain; Visual analogue scales

Dimensions of the Pain Experience



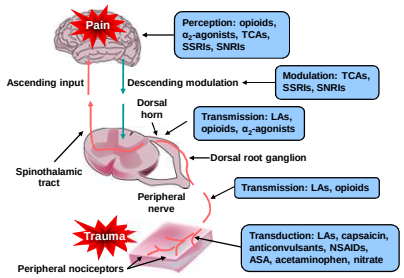
Regression from trauma

Patient Engagement in Goals and Treatment Plan

- Define a realistic aim with the patient, consider the pre admission pain and functional status
- Do not promise or chase a specific pain rating
- Emphasize functional goals and safety
- Communicate plan and expectations for (post-discharge) analgesic tapering
- Counsel patients and families
  - multimodal treatment plan (non-drug, prn vs scheduled)
  - safe use, storage and disposal of unused opioids
  - *Naloxone –why, when and how*

Balanced Rationale Multi-modal Analgesia

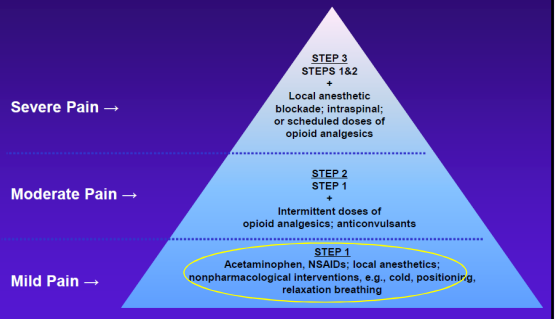
Although analgesics techniques are the mainstay, cognitive and physical strategies are essential



TCAs=tricyclic antidepressants; SSRIs=selective serotonin reuptake inhibitors; SNRIs=serotonin-norepinephrine reuptake inhibitors; LAs=local anesthetics; NSAIDs=nonsteroidal anti-inflammatory drugs; ASA=aspirin.

Adapted with permission from Kehlet H, Dahl JB. *Anesth Analg.* 1993;77:1048-1056.

Multimodal Approach to Nociceptive Pain Management[1,2]



1. Aubrun et al, 2003, 2. World Health Organization. Pain relief ladder, 1986.

WA 2019 Opioid Rules

Use of Alternative Modalities

- The practitioner SHALL consider multimodal pharmacologic and nonpharmacologic therapy for pain …
- …may combine opioids with other medications and treatments including, but not limited to, acetaminophen, acupuncture, chiropractic, cognitive behavior therapy, nonsteroidal anti-inflammatory drugs (NSAIDs), osteopathic manipulative treatment, physical therapy, massage, or sleep hygiene.

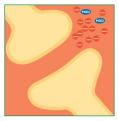
Nonopioid Analgesics

- Acetaminophen
- NSAIDs
- Anticonvulsants (gabapentin, pregabalin)
- Antidepressants (TCAs, SNRIs)
- Ketamine
- Local anesthetics
- Alpha-2 agonists (tizanidine, clonidine, dexmedetomidine)

NSAID=nonsteroidal anti-inflammatory drug
SNRIs = selective norepinephrine reuptake inhibitors
TCA = tricyclic antidepressants

Nonsteroidal Anti-inflammatory Drugs (NSAIDs)

- Anti-inflammatory, antipyretic and analgesic effects, affect uterine contractility
- Principle mechanism of action is inhibition of prostaglandin synthesis
- Side effects depend partly on whether drugs are selective (COX-2) or nonselective
  - Impaired hemostasis (nonselective)
  - GI irritation/bleeding (nonselective)
  - Cardiovascular risk
  - Renal toxicity



- Insufficient evidence to recommend against NSAIDS in fracture, spinal fusion or colorectal surgery but acknowledge uncertainty of harms

Gabapentin and Pregabalin Perioperatively

- > 79 RCTs and multiple systematic reviews
- Small reduction in pain in (acute hyperalgesia) "pronociceptive" models
  - Spine, arthroplasty, amputations
- Opioid sparing with single dose
  - 9-21%
- Number-needed-to-harm 35 sedation/12 dizziness
- Dose defining study for gabapentin in diskectomy = 600mg
  - ? pregabalin 150mg

Tippana EM, et al. *Anesth & Analg* 2007;104(6):1545-1556.
Buvanendra, A, et al. *Pain Medicine* 2010;110(1):199-207.
Eipe N, et al. *Pain* 2015 156(7):1284-1300.
Rai AS et al *J Plast Reconstr Aesthet Surg* 2017;70(10):1317-1328.
Hu J et al. *J Pain Res* 2018;11:2633-2643.

Ketamine

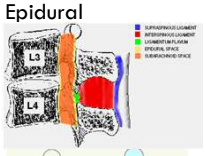
- N-methyl-D-aspartate (NMDA) antagonist that can inhibit induction and maintenance of central sensitization ("wind-up") after painful stimuli
  - Pain Reduction (rest 0.6-1.3cm; mobilization 0.4-0.5)
  - Analgesic sparing (5-20mg)
  - Risk reduction PONV (NNT 11)
- Mind-altering effects rarely problematic (RR 1.27)

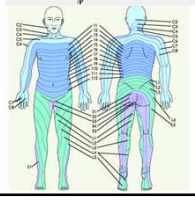
A relative risk [RR] of 1.0 means you are average - [there is no difference in risk between the control and experimental groups]

Snijdelaar DG et al, *Anaesthesia* 2004;59(3):222-228.
Unlugenc H et al, *European Journal of Anaesthesiology* 2003;20:416-21.
Wang L, et al, *Canadian Journal Anaesthesia* 2016;63(3):311-325.

Regional Analgesia

- Epidural

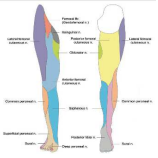




Questions to Consider

- What kind of nerve block does the patient have?
- What is the extent of the motor & sensory block?
- Will this block affect ability to ambulate?
- How long will this block last?
- Is it likely that other nerves were blocked too?
- What about anticoagulation?

- Peripheral Nerve Block



Non-pharmacologic Strategies

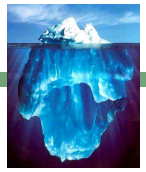
Purpose is to augment pharmacologic therapy, not replace it

1. **Basic comfort measures**
2. **Cognitive-behavioral** strategies help patients understand pain, alter pain behavior, coping skills and change perception of pain
3. **Physical techniques** provide comfort, correct physical dysfunction, and alter physiologic responses

Important Steps In Teaching Nonpharmacologic Treatments

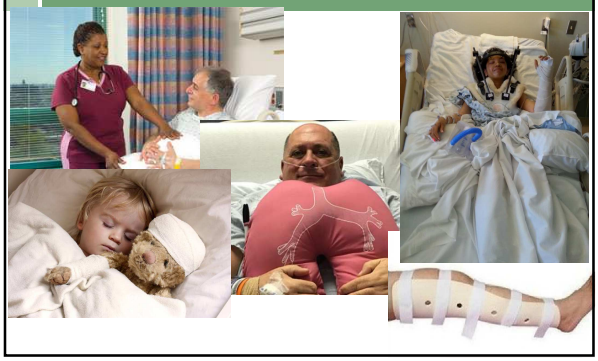
- Patient preferences, coping styles, physical and cognitive abilities
- Provide rationale and simple verbal instructions
- Coach the patient as they practice

Physical Modalities



- Applications of heat and cold
- Positioning
- Massage
- Exercise Physical Therapy and movement therapies
  - Stretch
  - Mobilization (myofascial release including effleurage, pétrissage, friction and tapotement)
  - Yoga, Tai chi, Feldenkrais, others
- Transcutaneous electrical nerve stimulation
- Ultrasound (deep-heating)

Splinting/Positioning/Comfort



Transcutaneous Electrical Nerve Stimulation (TENS)

- >41 RCTs in postoperative pain
  - Thoracic/cardiac, abdominal/pelvic, knee, spine hip, hernia, or mixed
- Pooled reduction of 36% in postoperative analgesic use compared with sham (p = 0.005)
- A few with decreased pain intensity
- Effects stronger with "optimal" settings
  - Strong or subnoxious, and/or maximal tolerable, or >15mA and pulse freq 25-150 Hz
- Used with movement

Freynet A, Falcoz PE. *Interact Cardiovasc Thorac Surg* 2010;10(2):283-288.
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Chou R, et al. *J Pain* 2016;19(2):131-157.

Cognitive Behavioral Strategies

- Education/instruction
- Distraction
- Imagery
- Music (humming)
- Relaxation
- Meditation and mindfulness (prayer)
- Cognitive-behavioral psychotherapy
- Biofeedback
- Virtual reality

Imagery

- Goal is to develop sensory images that decrease the intensity of pain or make it more acceptable
- Use multiple senses in developing images
- Images may affect the physiological functioning of the body
- Dramatic and long-lasting pain relief may occur, however highly unpredictable
- Imagery that focuses on pain may increase pain or distress
- ***Examples:*** subtle conversation, simple brief symptom substitution, standardized imagery techniques

Cognitive-behavioral strategies

- Health Psychology
- Biofeedback
- Guided Imagery
- Relaxation

Age	Sample Diversion Techniques
0 - 2 years	Touching, stroking, patting, skin-to-skin, rocking, playing music, using mobiles over the crib, electronics
2 - 4 years	Puppet play, storytelling, reading books, peek-a-boo, blowing bubbles, electronics
4 - 6 years	Deep breathing, storytelling, puppet play, talking about favorite places, TV shows, activities, electronics
6 - 11 years	Music, deep breathing, counting, eye fixation, thumb squeezing, talking about favorite places, activities on TV shows, humor, electronics

Nursing Intervention

"Never administer a pharmacologic intervention without a Nursing intervention"

Julie Griffie RN, MS