Hospital Based Pain Management

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Pain “Intensivist”

- Inherit other Drs patients
  - Complex pts, Crisis mode
- Multidisciplinary
  - ED, Lab, Attending physicians, Consulting physicians, Pharmacy, Nursing, PT/OT,
  - Patient Education
- Discharge planning

Role of Physiatry

- Multidisciplinary team required
  - Drs, nursing, pharmacy, lab, therapy,
  - Discharge planning
- Focus on FUNCTION
- Non-pharmacologic methods

- Medical vs. Surgical patients
  - Anesthesia

Prescription Drug Abuse

- 2000
  3.8 million

  2008
  7 million (↑ 80%)

- Prescription Drugs >

  Cocaine, Heroine, Hallucinogens, Ecstasy and Inhalants

- Overdose by opioid >

  Cocaine and Heroine

Adolescents and Opioids

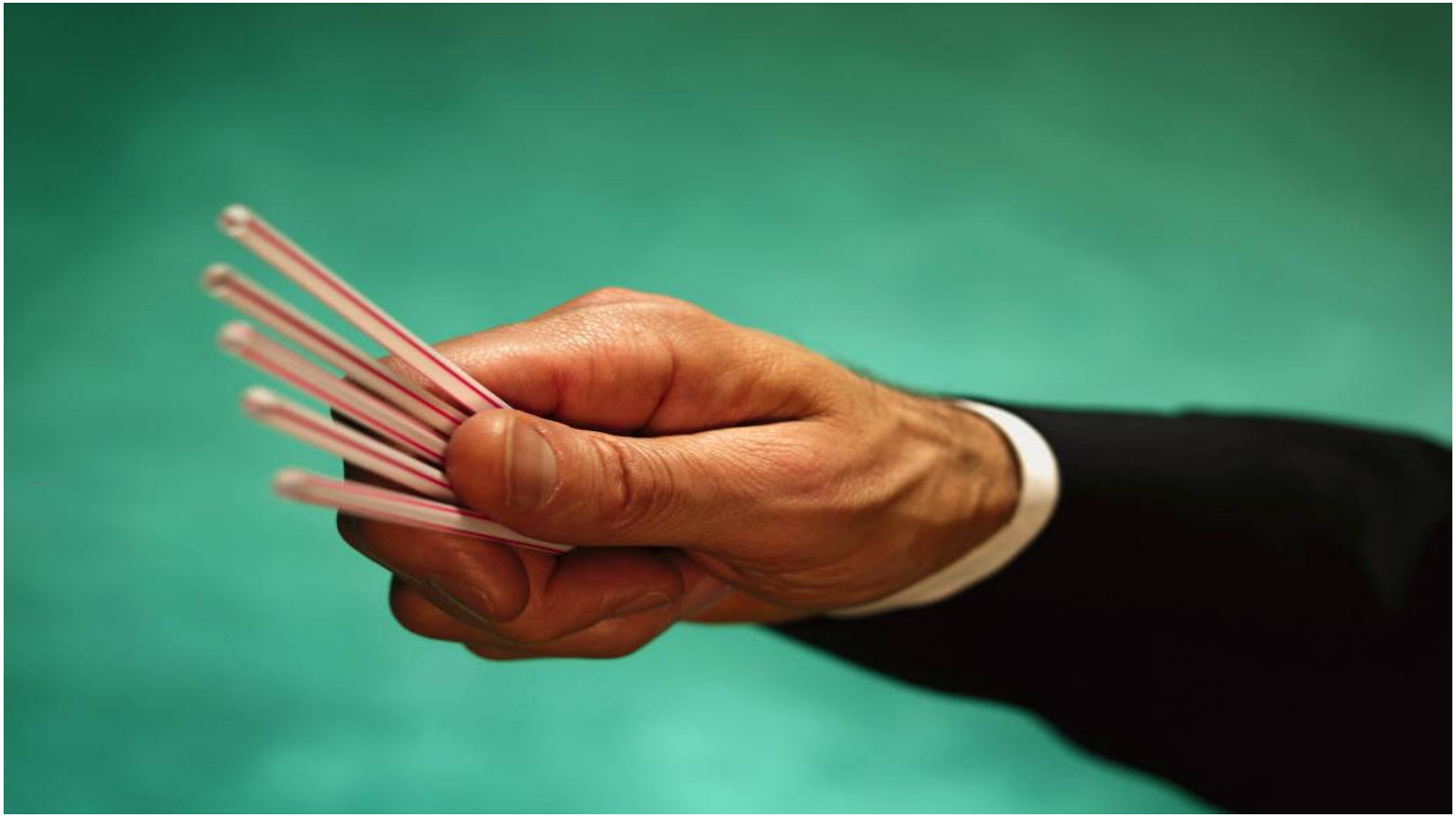
- Annual survey of High School Srs - *DEA 2008*
  - 60% have used illicit prescription drugs (Rx)
  - 10% abuse prescription meds
  - 40% think Rx safer than ‘street drugs’
  - 75% of misuse is ‘painkillers’
    - Hydrocodone products

	8th	10th	12th
hydrocodone	2.1%	6.7%	9.7%
oxycodone SR	2.1%	3.6%	4.7%

What's a 'Schedule' Anyway?

Schedule	Potential for Abuse	Current US Medical Use	Safety with Med Supn	Examples
I	High	No	No	Heroine, LSD, marijuana
II	High	Yes + restrictions	Abuse -> severe dependence	*Morphine, hydromorphone, oxycodone, methadone, fentanyl, oxymorphone,* methamphetamine, cocaine, PCP
III	Low	Yes	Low-Moderate dependence	*Codeine, hydrocodone,* butalbital, anabolic steroids
IV	Low	Yes	Limited dependence	Diazepam, alprazolam, modafinil, zolpida, zalepilon
V	Low	Yes		Pregabalin, diphenoxylate,

WHICH ORAL MEDICATION?



Media Coverage

- Consumer Reports April 2008
  - http://www.consumerreports.org/health/best-buy-drugs/opioids.htm
  - *Treating Chronic Pain: The Opioids - Comparing Effectiveness, Safety and Price*
  - USUALLY: post-surgical, trauma
  - POSSIBLY: chronic back pain
  - RARELY: headaches, migraines, muscle aches, osteoarthritis

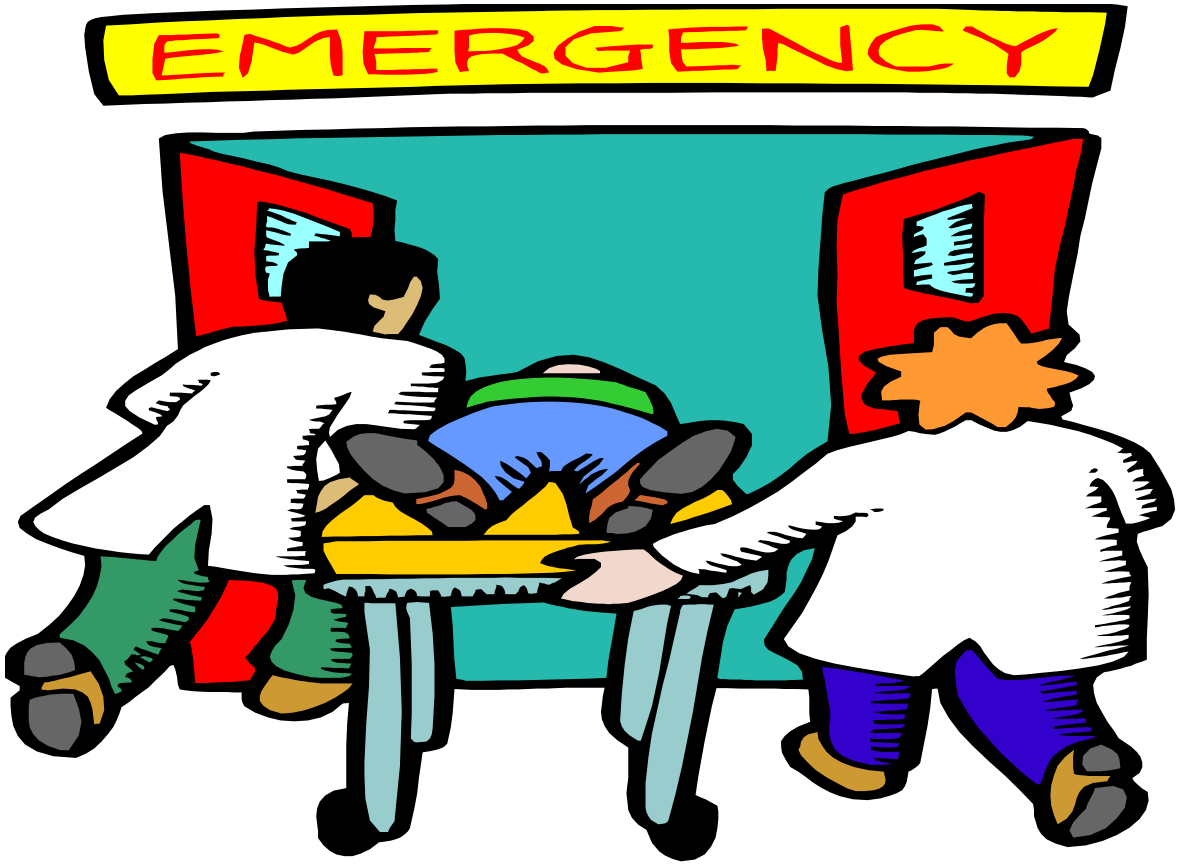
CR Best Buys

- codeine 60 APAP 300
- oxycodone 7.5 with acetaminophen 500
- morphine ER 30
- oxycodone ER 20

Patient Presentations

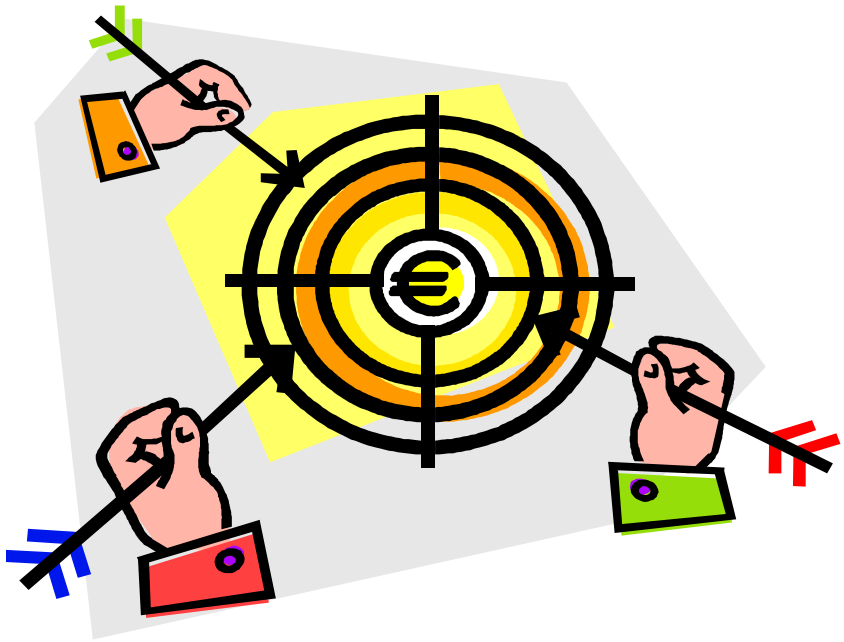
- Chronic Opioid Therapy
- NPO
- Medication misuse
- Opioid hyperalgesia

Where It All Begins ….



More, More, More

- Acute exacerbation with h/o chronic pain



Acute Back Pain

- 48 yo M with 15 yr h/o chronic LBP
  - Degenerative Disc dis, incomplete SCI?
- 2 day h/o progressively severe ↑ back pain
- s/p crushed between horse and stall
- Difficulty walking due to pain; + chest pain, SOB
- + radiation down legs, no sensory or B/B changes
- Currently 10/10 intensity, worse with movement

What now? VUE

- Evaluate for new etiology of pain.

- ***V*ERIFY** outpt meds and doses
  - Call Prescribing physician
  - Call Pharmacy
- ***U*RINE DRUG SCREEN**
- ***E*QUIANALGESIC** dosing

Acute Onset LBP

- Vertebral Compression Fracture
  - Osteoporosis vs malignancy

- Radiculitis

Usual Outpt Meds

VERIFY with pharmacy

Morphine SR 60 mg po BID
Oxycodone 10/APAP 325 #2 tabs q 4 prn (2x/day)

Diazepam 10 mg po tid

Baclofen 20 mg po q 8 hrs

Gabapentin 300 mg po q 8 hrs

Urine Drug Screen

Amphetamines	None detected
Benzodiazepines	***DETECTED***
Cannibinoids	None Detected
Cocaine	None Detected
Opiates	***DETECTED***

Acute Back Pain – Tx?

- ED – IV hydromorphone, ketorolac
- Xrays; MRI - no acute changes
- Admit to telemetry
- Diazepam 10 mg po tid, Baclofen 20 mg po q 8 hrs, Gabapentin 300 mg po q 8 hr

- IV Hydromorphone 1 mg q 4 hrs prn (6 mg/24 hours)

EQUIANALGESIC DOSE

24 hour usage	po morphine Equiv
• Morphine SR 60 q 12	120 mg/24 hr
• Oxycodone IR 20BID (40)	60 mg/24hr
• Morphine equivalents	***180 mg/day***
• Hydromorphone IV 6mg	***120 mg/day***

EQUIANALGESIC DOSE

Hydromorphone

1.5 mg IV

7.5 mg po

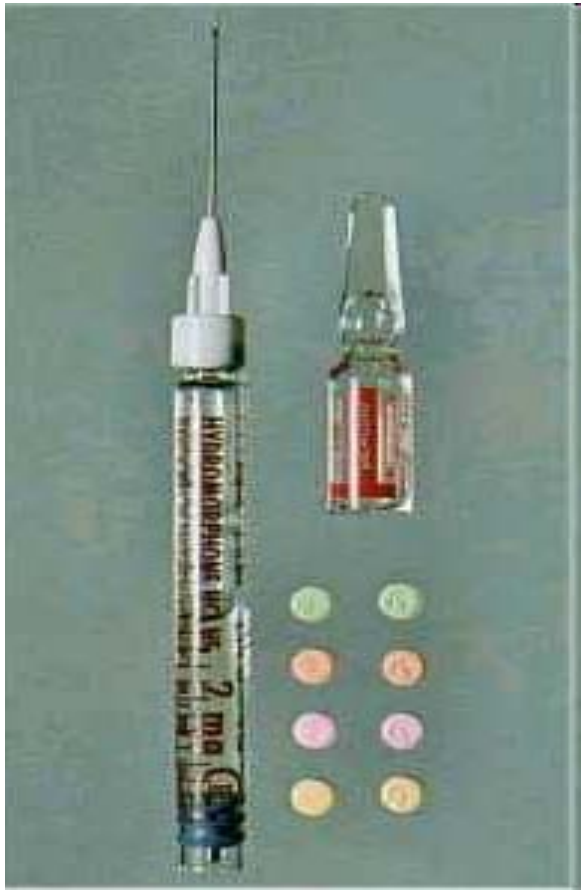
Morphine

10 mg IV

30 mg po

Oxycodone

20 mg po



20 x Potency

1 mg po morphine
1 mg po morphine
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1 mg po morphine
1 mg po morphine

1 mg IV Hydromorphone

Opioid Calculators

- www.globalrph.com/narcoticonv.htm

- www.globalrph.com/fentconv.htm
- www.medcalc.com/narcotics.htm
- Epocrates Med math

Acute & Chronic Back Pain

- Acute Lumbar Strain, Contusion
  - NSAIDS
  - Physical therapeutics – Ice, E stim, OMM
- Tolerating po meds and Diet
  - Why IV opiates?
- Equianalgesic dosing
  - Less than usual doses

Therapeutic Options

- Osteopathic Manipulation

- Injections

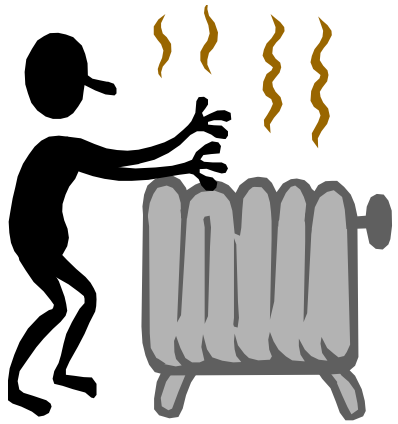
- Accupuncture

- Biofeedback, Relaxation

Physical Modalities

- ICE - 20 minutes

- HEAT – 20 minutes



- TENS (P.T.)

"PO or NPO?"

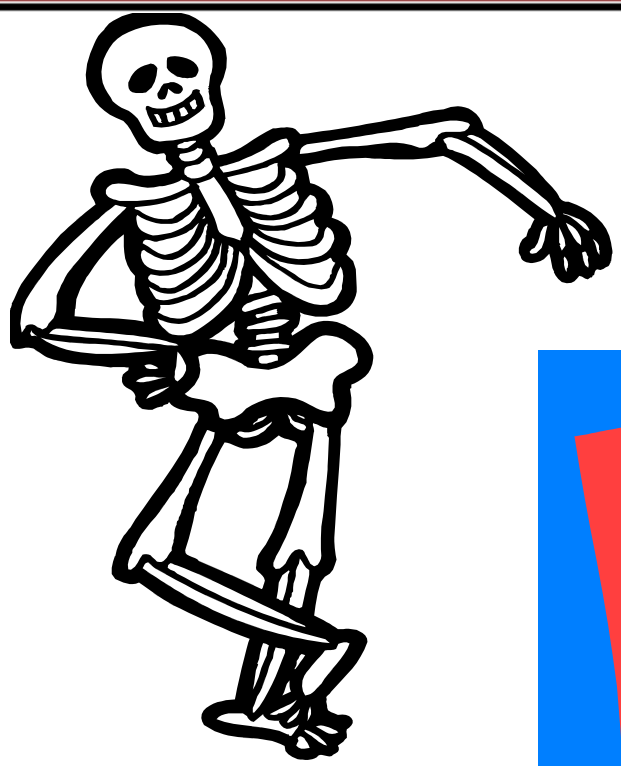
Diet order

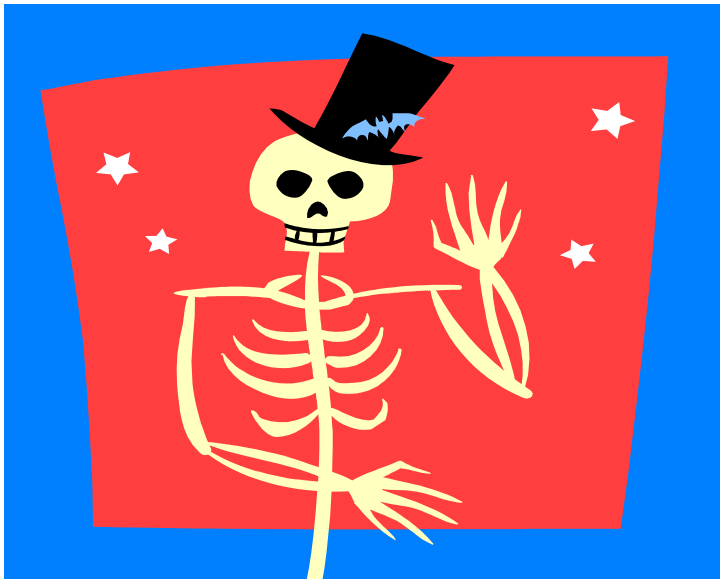
↓

PO meds

Chronic Opioid Therapy

- Don’t Stop!





Bone Pain with N/V/D

- 42 yo F with 3 day h/o generalized pain
  - Hips, knees, back, sternum
- PMH: sickle cell disease, bony infarcts, h/o salmonella sepsis, hypokalemia
- MEDS:***oxycodone SR 80mg po q 12 hrs, hydromorphone 4-8 mg po q 4 hrs prn, ativan 1 mg po q 8 hrs prn***

Bone Pain with N/V/D

- Verify – √

- UDS

Benzodiazepines	DETECTED
Opiates	None Detected

Potential diversion ?

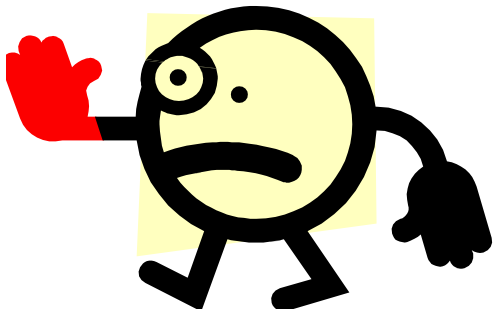
Not taking prn doses – N/V

Oxycodone not included in assay

Urine Drug Screen

- Evaluate for illicit substances

- Confirm pt usage of prescribed meds
  - Hospital lab cutoffs may be higher
    - 300 vs 2000ug
  - Not all opioids included in UDS
    - Oxycodone, fentanyl, methadone



Delivery Options

- **ORAL**
- Buccal
- Rectal
- Transdermal
- Intravenous
  - Patient Controlled Analgesia
  - Bolus

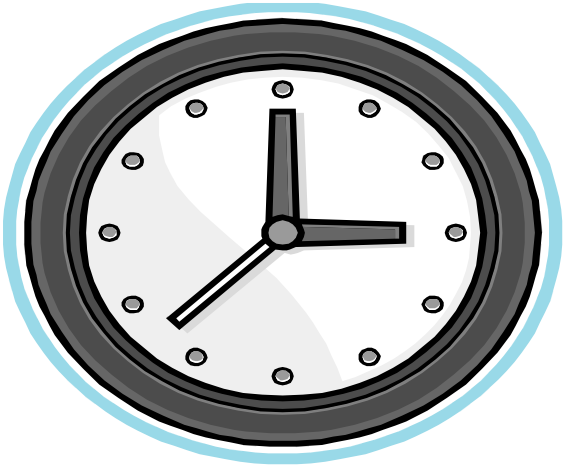
Therapeutic Options

- SHORT ACTING
  - Morphine
  - Hydromorphone
  - Oxycodone
  - Oxymorphone
  - Fentanyl
    - buccal swab or tablet
  - Tramadol
- LONG ACTING
  - Morphine
  - N/A
  - Oxycodone
  - Oxymorphone
  - Fentanyl
    - transdermal
  - Tramadol
  - Methadone

Buccal Delivery

EMERGENCY

- Short term IV Meds
  - i.e. Diuretics, antihypertensive
- 24 hour requirements



- CONSIDER PCA***

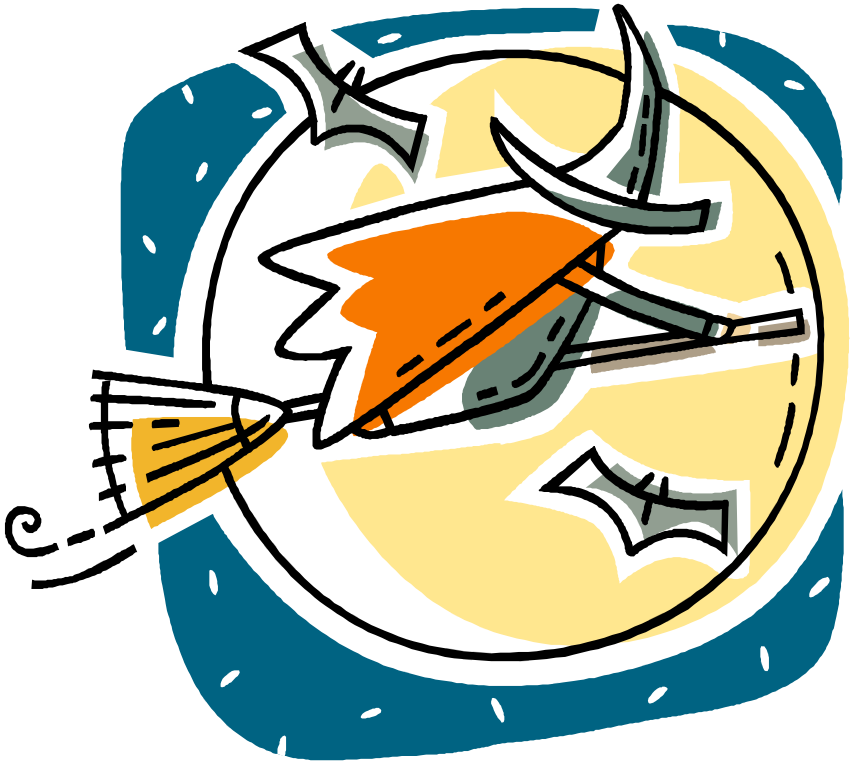
Bone Pain with N/V/D

- Equianalgesic Dose – NPO

  Oxycodone 160 mg/24 hrs - >
  Fentanyl ug.hr

  Oxycodone or hydromorphone ->
  fentanyl buccal swab (200ug, 400ug, 600ug)

  Consider Patient Controlled Analgesia (PCA)




HALLOWEEN

Acute Chest Pain

- 57 yo F with 1 d h/o acute onset SSCP
- Assoc with significant SOB
- Chronic back pain (degenerative)
- PMH: COPD, bipolar disease ?
- Meds: ***oxycodone SR 80 q 12 hrs, oxycodone IR 30 mg po q 4hrs, ritalin 20 mg po tid***

Acute Chest Pain

- Verify √ All correct
  - Multiple physicians, frequent scripts
  - Repeatedly overused, misused meds
- UDS

Amphetamines	***DETECTED***
Benzodiazepines	***DETECTED***
Cannibinoids	***DETECTED***
Cocaine	None Detected
Opiates	***DETECTED***

Acute Chest Pain

- ED – IV hydromorphone, ativan
- Admit telemetry, cardiac workup

- IV hydromorphone 4 mg q 3 hrs

- Taper down Ritalin dosage
- Psych/Substance Abuse consult

Breakthrough Meds

- Short acting
- Used as needed
- 0 – 3 x per day
- NOT every day

Opioid Withdrawal

- Insomnia
- Muscle and bone pain
- Diarrhea and vomiting
- Cold flashes, goosebumps
- Restlessness
- Involuntary leg movements

Arm and Abdominal pain

- 44 yo F with chronic abdominal pain, nausea, vomiting
- Pain 8-10/10
- Assoc with Right arm pain, edema
  - (h/o complex regional pain syndrome)
- “only 1 thing works”
  - IV hydromorphone 4mg q 4 hrs

Pain Issues

*** Complex Regional Pain Syndrome

* Acute DVT Right Arm

Gastro-Esophageal Reflux Disease

End Stage Renal Disease – HD (A-V graft)

Chronic pancreatitis

Hepatitis C

Anemia

Grave's Disease

Medication Regime

- Home Meds:

  Hydromorphone (***Dilaudid)***
  8mg by mouth every 3 h prn

  Fentanyl Transdermal 300 mcg/hr q 72 hrs
  Cyclobenzaprine (Flexeril) 10 tid

  Diazepam (Valium) 5-10 mg q 8 hrs prn

Equianalgesic Dose

Hydromorphone 8 mg po q 3 hours prn pain

8 possible doses / 24 hours

64 mg po hydromorphone x $\frac{\text{30 mg po morphine}}{\text{7.5 mg po hydromorphone}}$

Equivalent to **256 mg oral morphine**

Medication Regime

- Home Meds:

  Fentanyl Transdermal (Duragesic) 300 mcg/hr q 72 hrs

  Hydromorphone *8mg by mouth every 3 h prn*

  Cyclobenzaprine (Flexeril) 10 tid

  Diazepam (Valium) 5-10 mg q 8 hrs prn

Equianalgesic Dose

Fentanyl transdermal 100 ug/hr x 3 patches

300 ug/hr x 24 hours = 7200 ug fentanyl

$$7200 \text{ ug fentanyl} \times \frac{1 \text{ mg po morphine}}{13.33 \text{ ug fentanyl}} =$$

Equivalent to ~ **540 mg oral morphine**

Equianalgesic Dose

Hydromorphone 8 mg po q 3 hrs

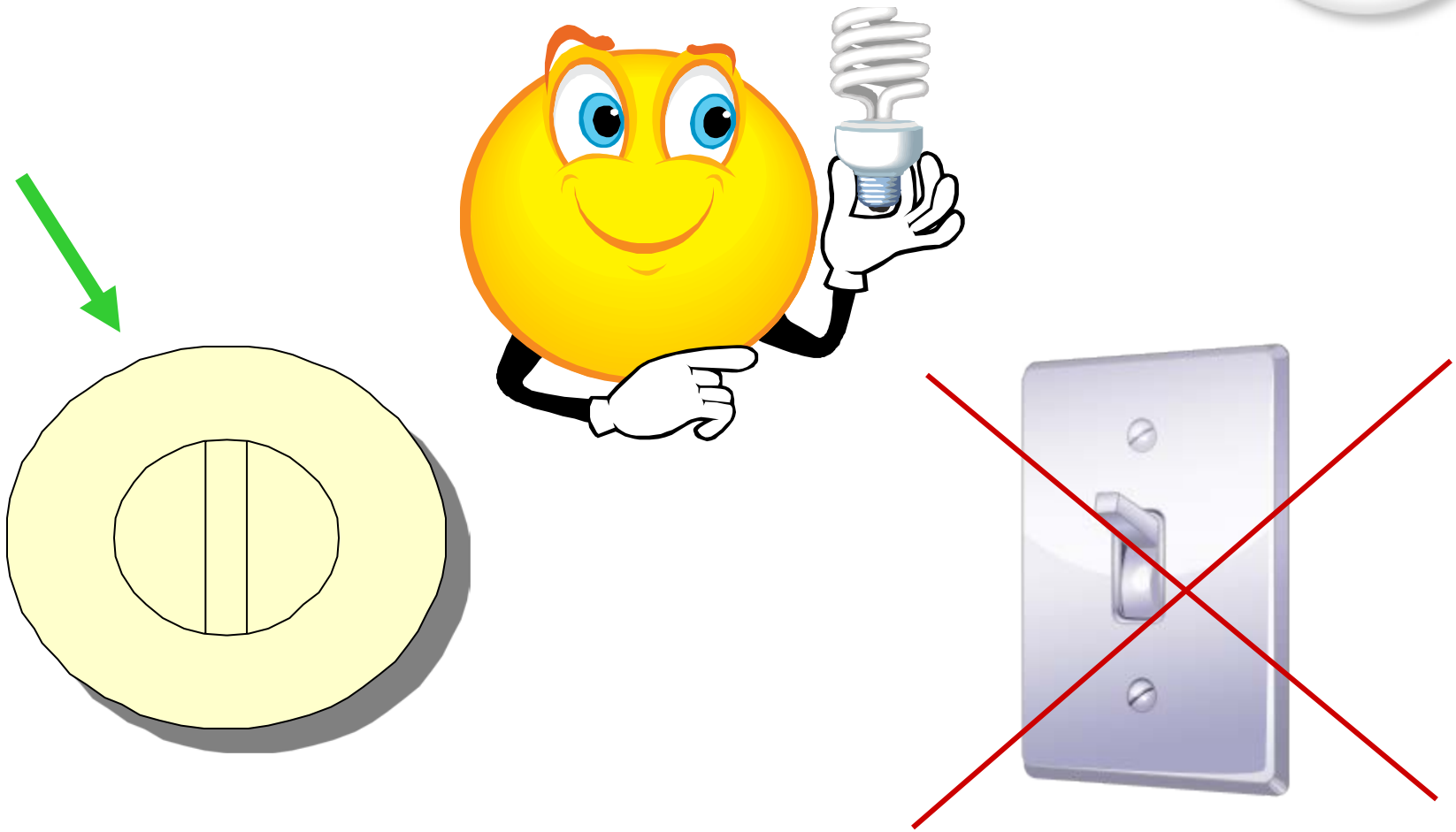
Fentanyl 300 ug patch q 72 hrs

256 mg po morphine

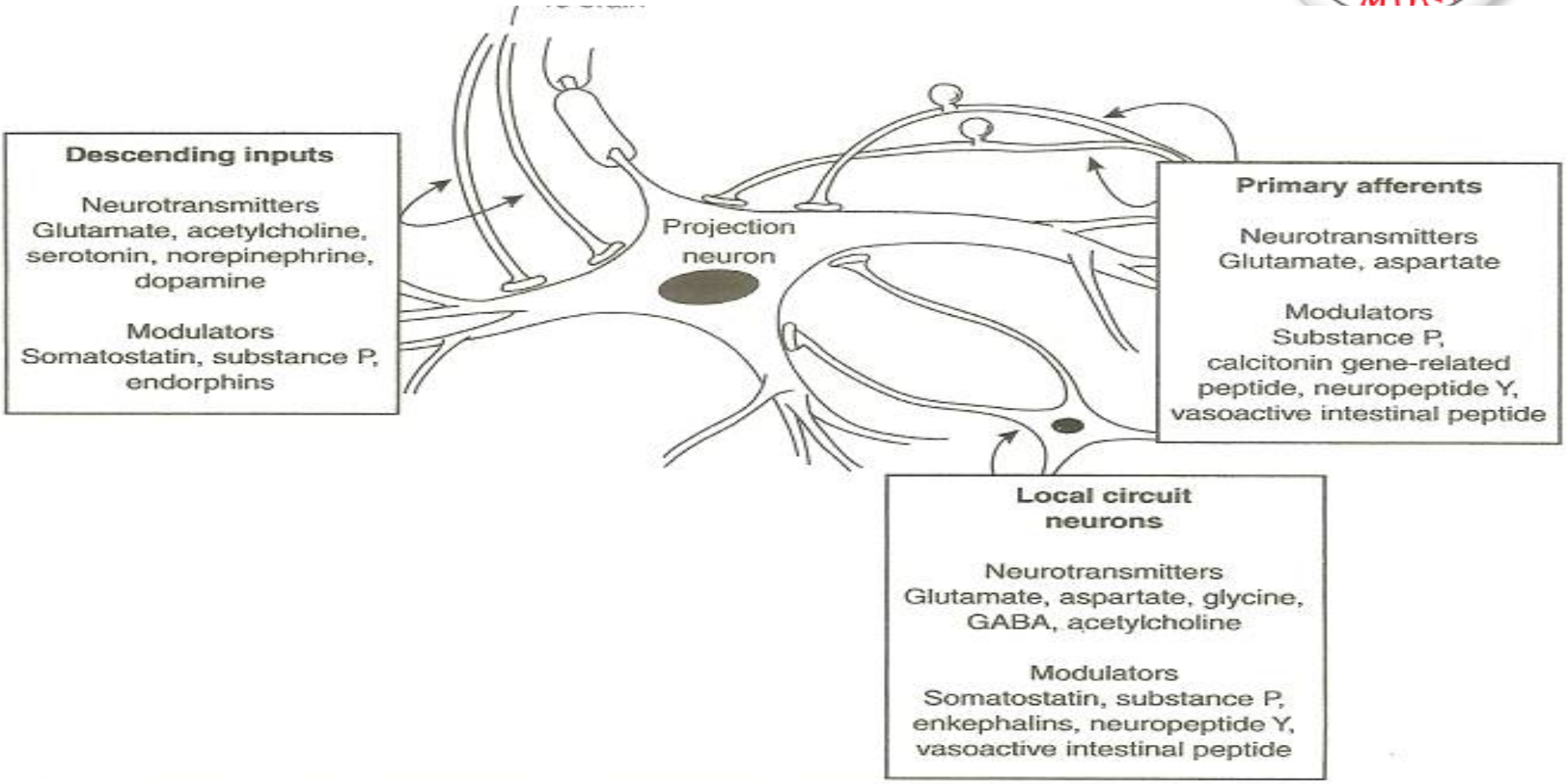
+ 540 mg po morphine

796 mg po morphine/24 hrs

Multimodal Pain Management



Ascending Dorsal Columns



URE 2-2. Schematic of the neurochemistry of somatosensory processing in the spinal dorsal horn.

Benson HT, et al. Essentials of Pain Medicine and Regional Anesthesia. 2nd ed. 2005.

Peripheral Sensory Nerve Ending

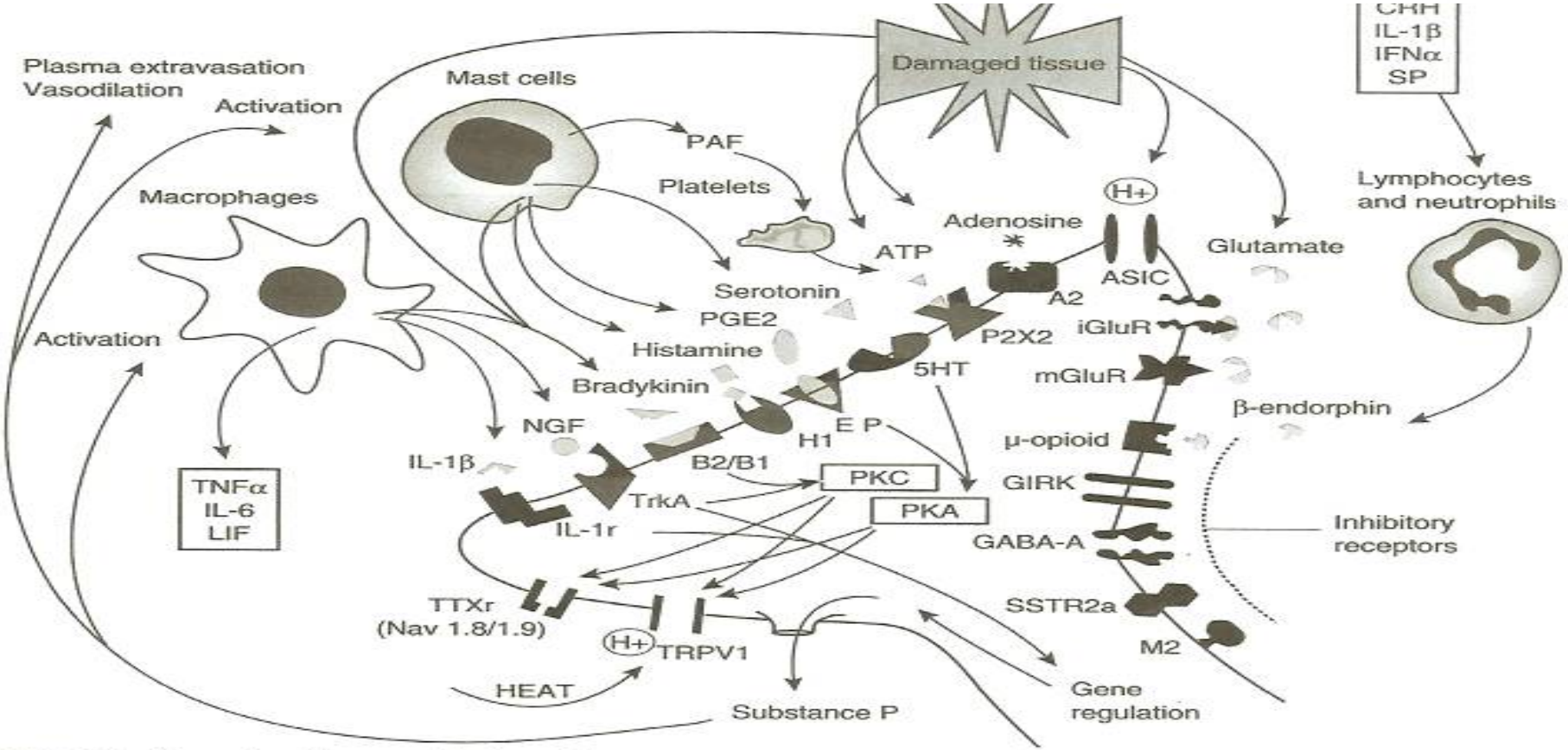


FIGURE 2-1. Schematic of the neurochemistry of somatosensory processing at peripheral sensory nerve endings.

Benson HT, et al. Essentials of Pain Medicine and Regional Anesthesia. 2nd ed. 2005.

Chronic Pain Management

NSAIDs and COX-2 Inhibitors

Opioids

Membrane stabilizers

Antidepressants

Anti-spasticity vs “muscle relaxants”

Anxiolytics (short term)

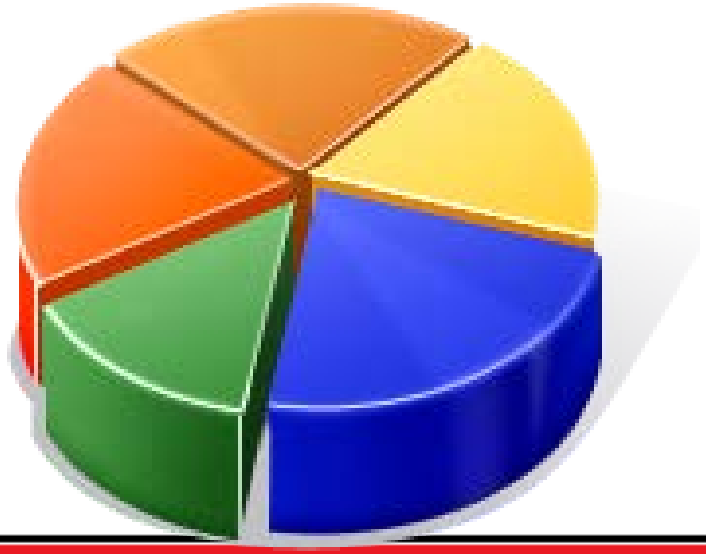
Mood stabilizers

Neuroleptics

Topicals

Non-pharmacologic methods

- OMT, PT, Biofeedback



So, What Now ??

- Fentanyl Patch 3/100mg q 72 hrs
- Dilaudid 8mg po q 3 hrs prn
- 796 mg po morphine equiv / 24 hrs

Opioid Tolerance

- Repeated exposure -> decreased effect

  OR

  need for higher doses for same effect.

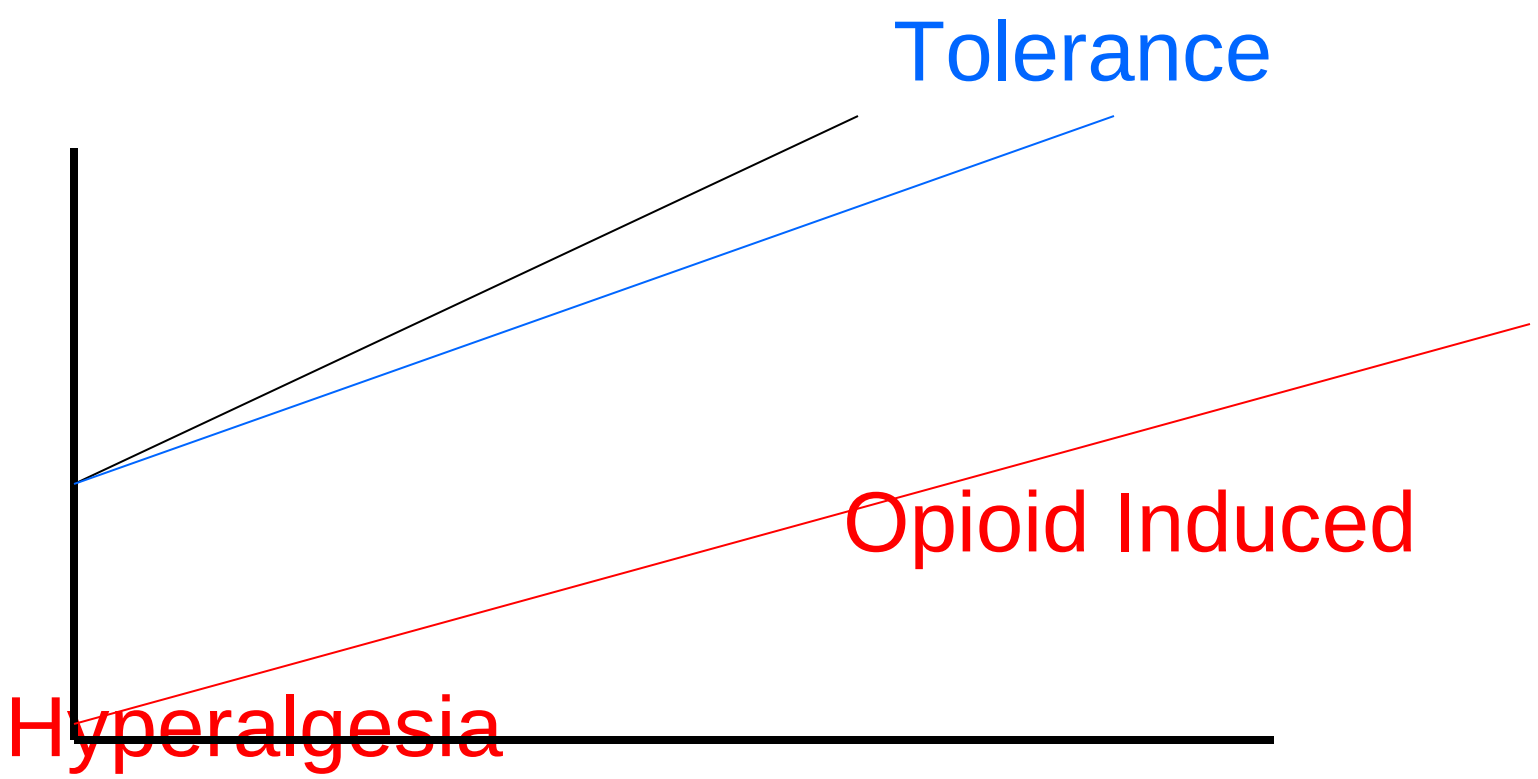
- Genetic and Developed Mechanisms
  - Receptor changes
  - Distribution/metabolism changes
  - Associative (reflex counteraction)

Opioid Induced Hyperalgesia

- Nociceptive sensitization

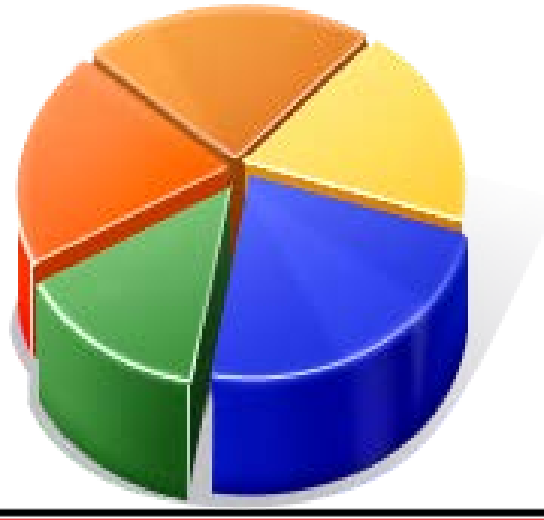
- Exposure to opioids
  - Former opioid addicts on methadone
  - Acute opioid exposure
    - Peri-operative, *healthy volunteers
  - Chronic opioid therapy
    - Glycine receptor, NMDA receptor

Opioid Dose Response

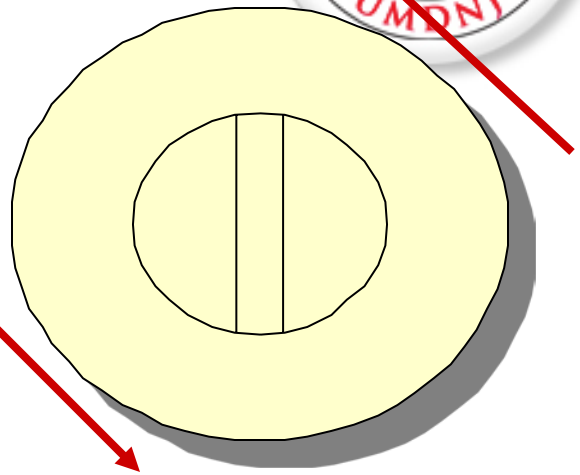


Opioid Induced Hyperalgesia

- ↑↑↑ Adjuvant pain medications
  - NSAIDs and COX-2 Inhibitors
  - Membrane stabilizers
  - Antidepressants
  - Anti-spasticity vs “muscle relaxants”
  - Anxiolytics (short term)
  - Mood stabilizers
  - Neuroleptics
- Non-pharmacologic methods
  - OMT, PT, Biofeedback



Medication Regime



fentanyl transdermal	*mu opiod receptor*
hydromorphone po	*mu opioid receptor*
Ropinirole (Requip)	Dopamine agonist
Venlafaxine (Effexor)	↓ reuptake NEpi, SER, Dop
Levetiracetam (Keppra)	unknown
Topiramate (Topamax)	unknown
Zalepam (Sonata)	GABA agonist ?
Diazepam (Valium)	pre-synaptic GABA-A agonist
Cyclobenzaprine (Flexeril)	central (brainstem) NEpi agonist?

Opioid Induced Hyperalgesia

WEAN OFF OPIOIDS!

Opioid Induced Hyperalgesia

- Opioid rotation
  - methadone
    - Incomplete cross tolerance
    - Weak NMDA receptor blocker
- $\alpha 2$ agonist - clonidine
- COX-2 Inhibitors - celecoxib
- GABA-a receptors – propofol
- Buprenorphine/naloxone

So, What now?

Therapeutic Options

NSAIDs and COX-2 Inhibitors

Opioids

Antidepressants (SSRIs, TCAs, Other)

- SSRIs (sertraline, citalopram, fluoxetine, paroxetine)
- TCAs (amitriptyline, nortriptyline, doxepin)
- Other (buproprion, duloxetine, venlafexine, trazodone)

Membrane stabilizers

- carbapazepine, gabapentin, topiramate, lamotrigene, levitiracetam

Topicals

- lidocaine, NSAIDs, capsaicin

Therapeutic Options

Anti-spasticity vs "muscle relaxants"

- baclofen, tizanidine, dantrolene
- cyclobenzaprine, carisoprodol, methocarbamol

Anxiolytics (short term)

- diazepam, clonazepam, alprazolam, lorazepam

Mood stabilizers

- lithium, valproic acid

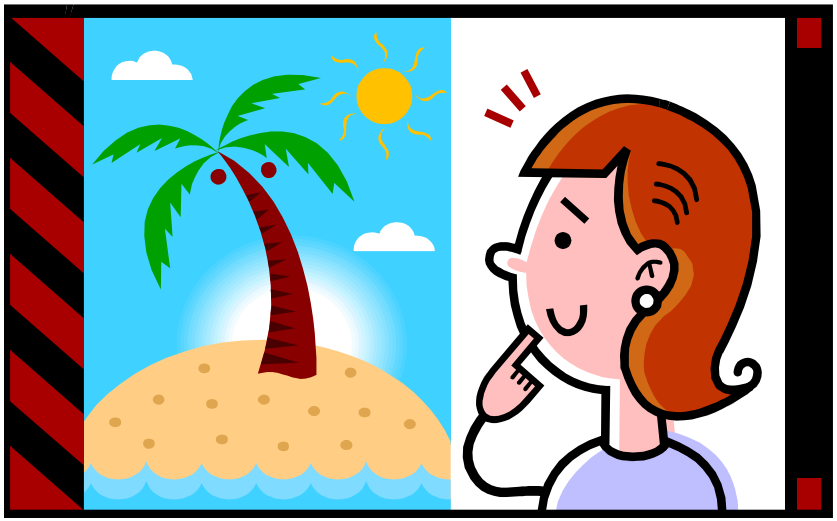
Neuroleptics

- quitiepine, olanzapine, risperidone

Non-pharmacologic methods

Empowering the Patient

- Patient Education
- Pain Diary
- Self-Efficacy



- Consistent Medical follow-up