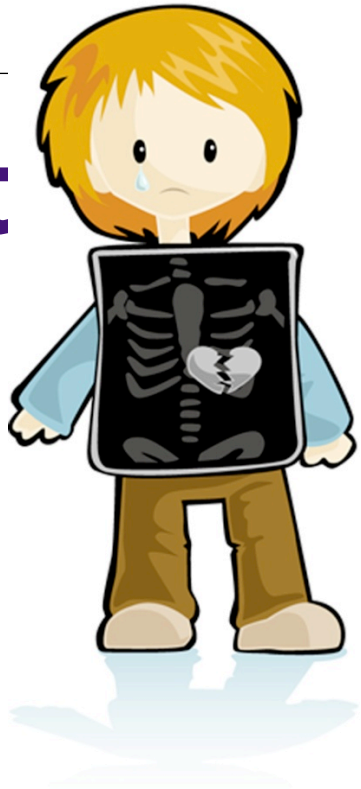
Pain Management

Cheryl Deters, CPNP

CHOC Children's Hospital

Pain Management



Objectives

- Define Pain
- Review basic principles of pain assessment
- Discuss Interventions
  - Non-pharmacological
  - Pharmacological
  - WHO Principles of Pediatric Acute Pain Management

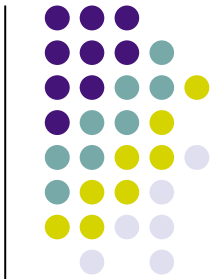
What is Pain?

For infants and children the provider should recognize the potential for pain and suspect that a child is in pain. AHCR Guidelines 1992

An unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage.

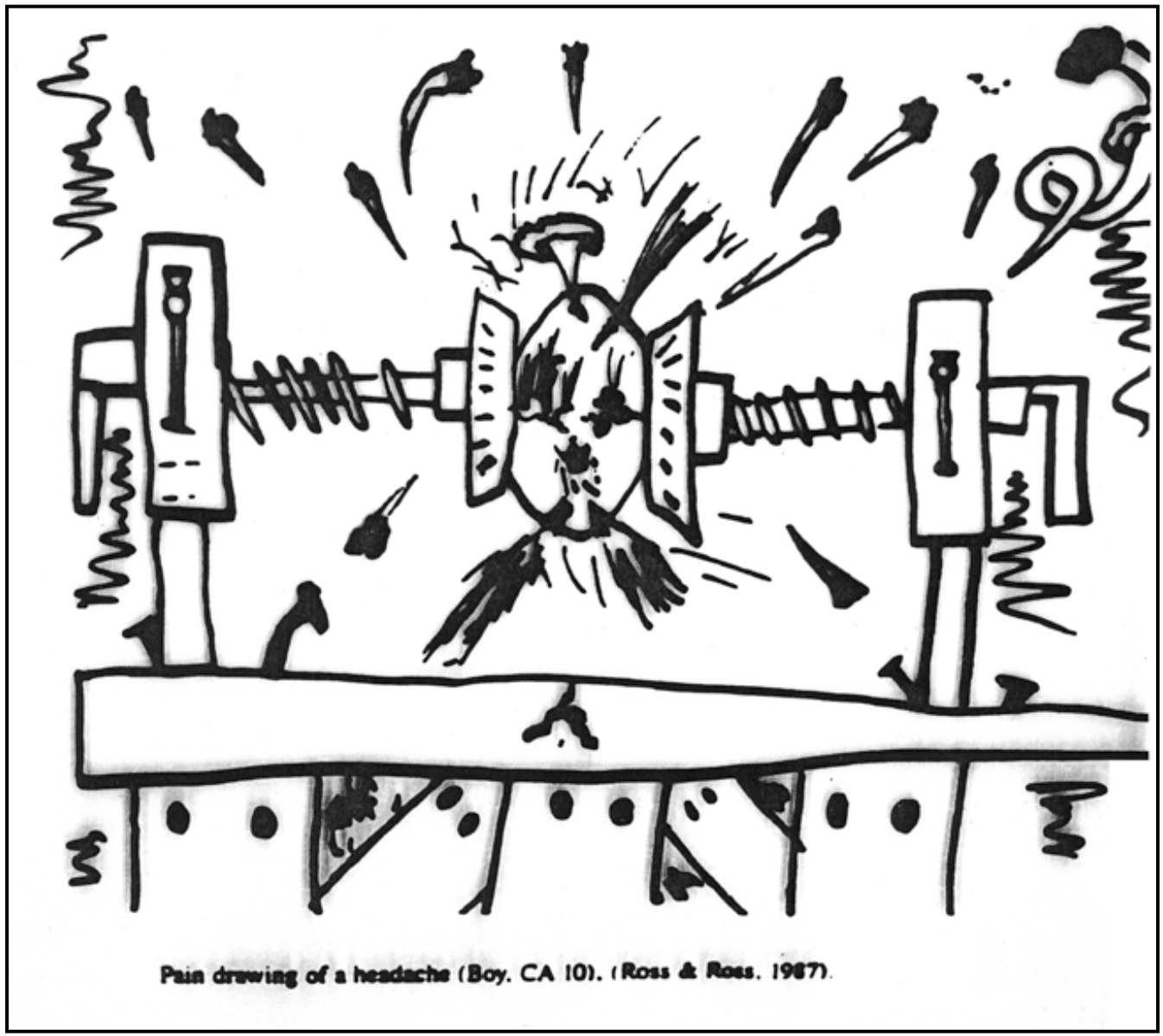
IASP Pain Definition (1994, 2008)

What is Pain?

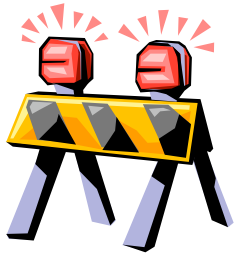


Pain is whatever the person experiencing it says it is, existing whenever the person says it does. (McCaffery, 1999)

Pain is a subjective experience and is probably the most bewildering and frightening experience kids will have.



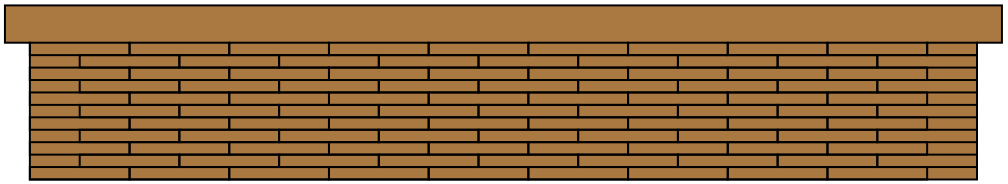
Pain drawing of a headache (Boy. CA 10). (Ross & Ross. 1987).



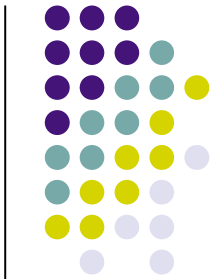
Barriers

- Myth that children and especially infants do not feel pain the same as adults
- No untoward consequences to not treating pain
- Lack of assessment skills
- Lack of pain treatment knowledge
- Notion that addressing pain takes too much time
- Fears of adverse effects of analgesia – respiratory depression, addiction
- Personal values and beliefs; i.e. pain builds character

AAP 2001 Task Force on Pain in Infants, Children and Adolescents



Consequences of Pain



Endocrine:

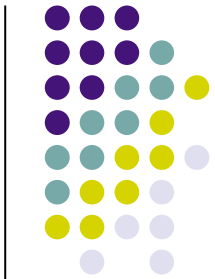
↑stress hormone, ↑metabolic rate,↑ heart rate & water retention

Immune:

Impaired immune functions

Pulmonary:

↓flow and ↓volume →retained secretions and atelectasis



Cardiovascular:

↑cardiac rate

↑systemic vascular resistance

↑peripheral vascular resistance

↑coronary vascular resistance →

↑blood pressure and ↑myocardial oxygen consumption

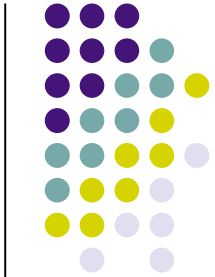
Gastrointestinal:

Delayed return of gastric and bowel function

Musculoskeletal:

Decreased muscle function, fatigue and immobility

Common Types of Pain



GENERAL

Acute
Cancer
Chronic, nonmalignant
Chronic, malignant
Procedural pain

INFERRED PATHOLOGY

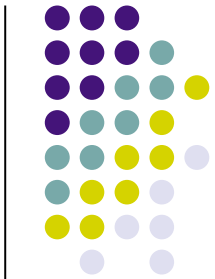
Nociceptive Pain
- Somatic
- Visceral

Neuropathic Pain
- Centrally generated
- Peripherally generated

ASSESSMENT

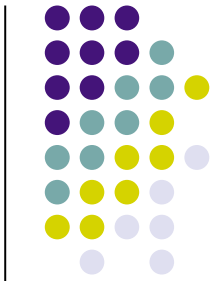
“ The single most reliable indicator of the existence and intensity of acute pain - and any resultant affective discomfort or distress- is the patient’s self-report”

PQRSTU mnemonic



- Provocative/Palliative factors (For example, "What makes your pain better or worse?")
- Quality (For example, use open-ended questions such as "Tell me what your pain feels like," or "Tell me about your 'boo-boo'.")
- Region/Radiation (For example, "Show me where your pain is," or "Show me where your teddy hurts.")
- Severity: Ask child to rate pain, using a pain intensity scale that is appropriate for child's age, developmental level, and comprehension. Consistently use the same pain intensity tool with the same child.
- Timing: Using developmentally appropriate vocabulary, ask child (and family) if pain is constant, intermittent, continuous, or a combination. Also ask if pain increases during specific times of the day, with particular activities, or in specific locations.
- How is the pain affecting you (U) in regard to activities of daily living (ADLs), play, school, relationships, and enjoyment of life?

Goal of Pain Rating Scale



Identify characteristics of pain

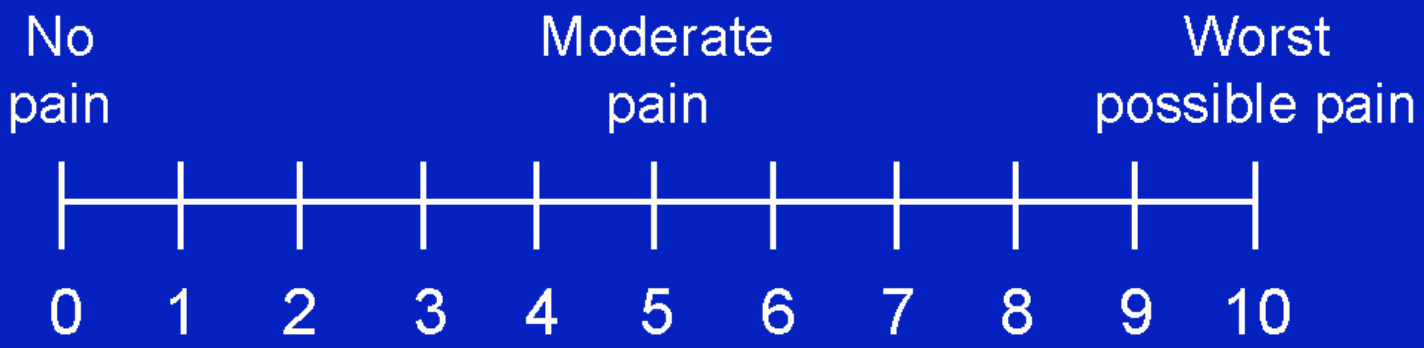
Establish a baseline assessment

Evaluate pain status

Effects of intervention

Wong Baker Faces

Numeric Pain Intensity Scale



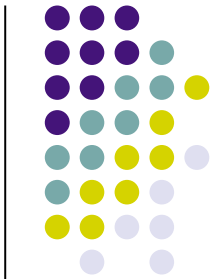
(AHCPR 1994)

Pre-Verbal & Non-Verbal 1 month–7 years FLACC Scale

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

Each of the five categories (F) Face; (L) Legs; (A) Activity; (C) Cry; (C) Consolability is scored from 0–2, which results in a total score between zero and ten. From Menkel, Lewis, Shayevitz, Malviya, 1997. Used with permission.

Interventions



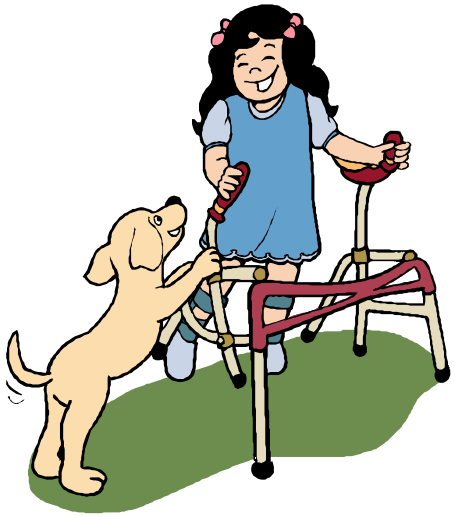
Guiding principles

Minimize intensity and duration of pain

Maximize coping and recovery

Break the pain-anxiety cycle

Non-pharmacological



No pharmacological intervention should be provided without a non-pharmacological intervention

Julie Griffiths

Pharmacological

World Health Organization (WHO) Principles of Pediatric Acute Pain Management

- By the clock
- With the child
- By the appropriate route
- WHO Ladder of Pain Management

By the Clock

Regular scheduling ensures a steady blood level

Reduces the peaks and troughs of PRN dosing

PRN = as little as possible???

With the Child

Analgesic treatment should be individualized according to:

- The child's pain
- Response to treatment
- Frequent reassessment
- Modification of plan as required

Correct Route

Oral

Nebulized

Buccal

Transdermal

Sublingual

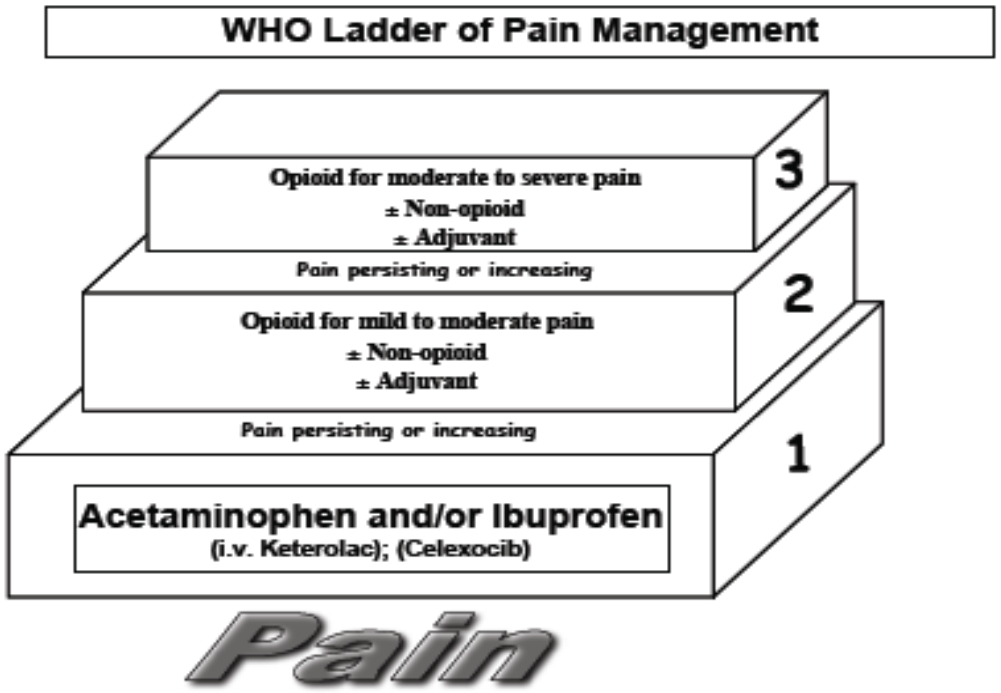
Intranasal

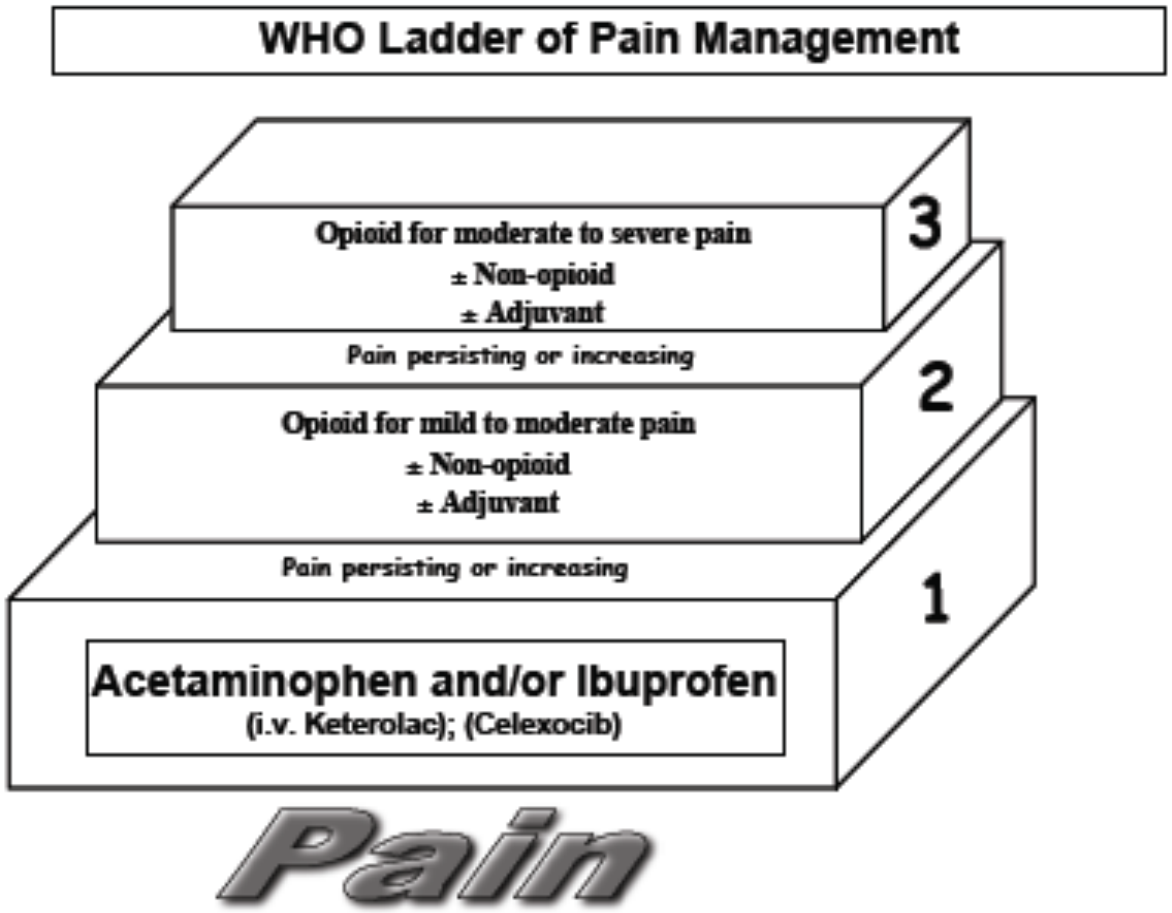
~~**IM**~~

IV / SC

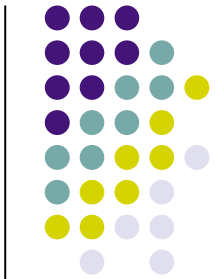
Rectal

World Health Organization (WHO) Principles of Pediatric Acute Pain Management




WHO Ladder of Pain Management
3
Opioid for moderate to severe pain
± Non-opioid
± Adjuvant
Pain persisting or increasing
2
Opioid for mild to moderate pain
± Non-opioid
± Adjuvant
Pain persisting or increasing
1
Acetaminophen and/or Ibuprofen
(i.v. Keterolac); (Celexocib)
Pain

Non-Opioids

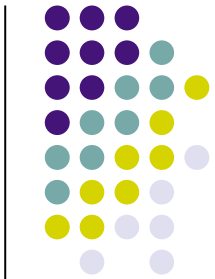


- **Acetaminophen**
- **(10-15 mg/kg PO/PR Q4-6h; dose limit: <2 years: 60mg/kg/day,**
- **>2 years: 90mg/kg/day, max. 4g)**
- **• Generally well tolerated**
- **• Lacks gastrointestinal and hematological side-effects**
- **• Has to be watched for rare hepatotoxic side effects**
- **[IV not available in USA yet]**
- **Mechanisms of antinociception unclear:**
- **• Stimulation of descending (inhibiting) serotonergic pathways [possibly endocannabinoid-dependent]**
- **• Cyclooxygenase inhibition**
- **• NO synthesis blockade**

Mallet C, Daulhac L, Bonnefont J, Ledent C, Etienne M, Chapuy E, Libert F, Eschalier A: Endocannabinoid and serotonergic systems are needed for acetaminophen-induced analgesia. Pain 2008. 139(1):190-200

- ***Original slide from Stefen J. Friedrichsdorf, MD***

Non-opioids



Ibuprofen

- (10mg/kg PO TDS-QID; dose limit 2400mg/day)
- Least gastrointestinal side effects among the NSAIDs
- Caution with hepatic or renal impairment, history of GI bleeding or ulcers
- May inhibit platelet aggregation
- Acetaminophen & Ibuprofen can usually be used in combination, e.g. scheduled Q6h administered at the same time

Ketorolac (Toradol®)

- (< 2 years: 0.25 mg/kg i.v.; > 2 years: 0.5 mg/kg i.v., max. 30mg, max of 5 days)
- Postsurgical pediatric patients: NSAID vs placebo, with Parenteral opioids as rescue analgesics, the NSAID groups typically show lower pain scores and 30 – 40 % reduction in opioid use.
- *Vetter T, Heiner E. Intravenous ketorolac as an adjuvant to pediatric patient-controlled analgesia with morphine. J Clin Anesth 1994;6:110– 3.*

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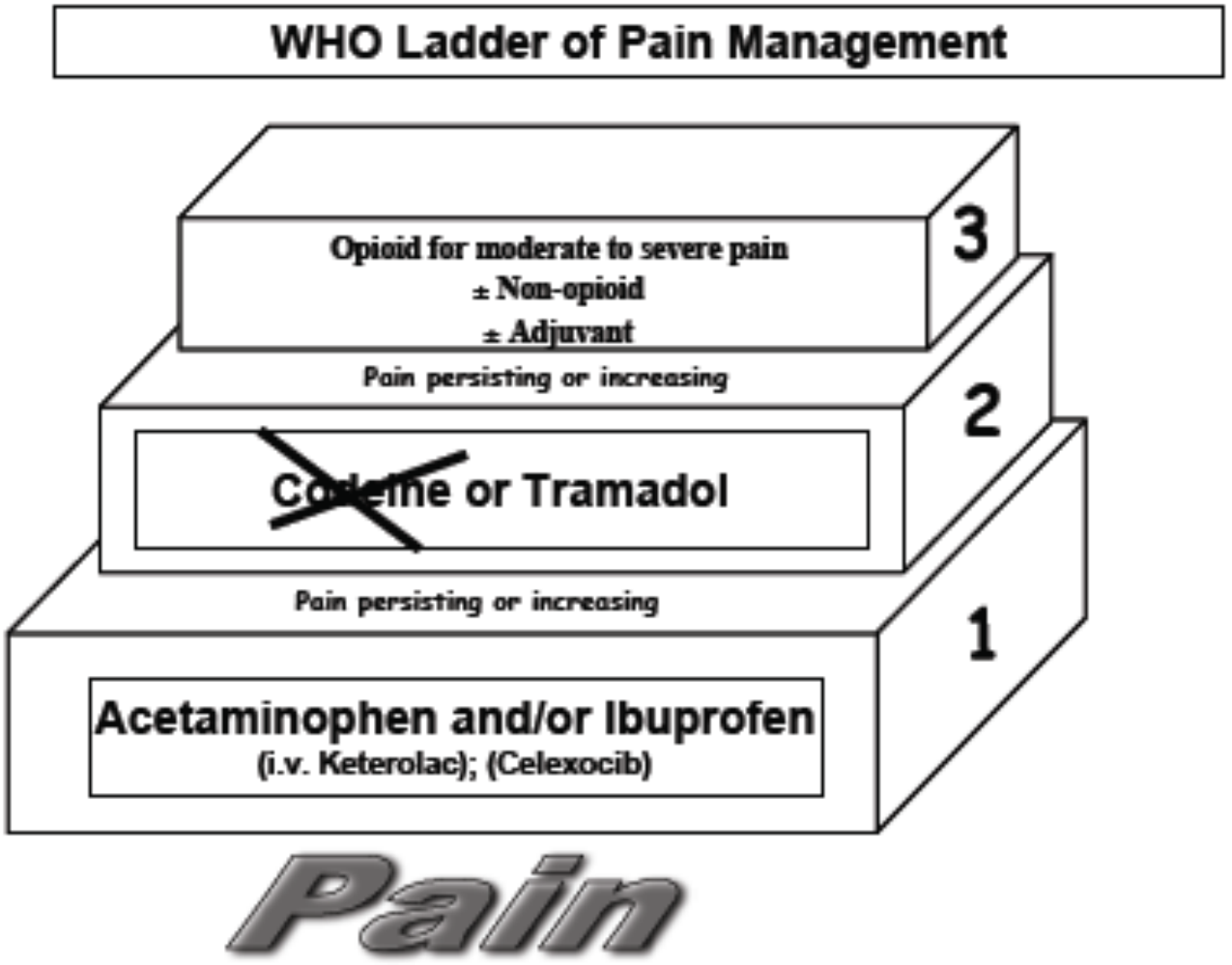
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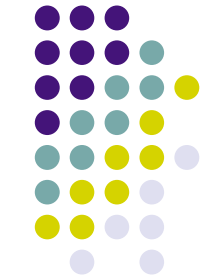
Opioids: mild to moderate pain



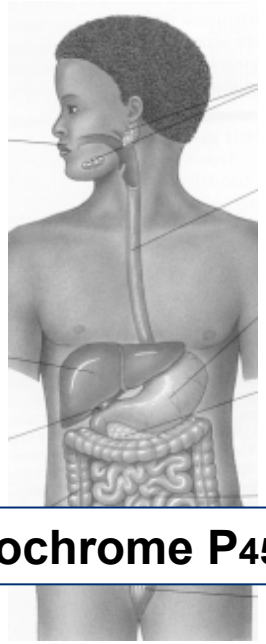
- **Weak Opioids**
  - **Codeine**
  - **Tramadol**

- **Codeine**
- **Ceiling effect**
- **Not effective**

- **Overall, codeine is a weaker analgesic than commonly believed: A standard dose of many NSAIDs produces more effective analgesia than 30 to 60 mg of codeine in adults after surgery.**
  - ***Moore A, Collins S, Carroll D, et al. Paracetamol with and without codeine in acute pain: a quantitative systematic review. Pain 1997;70:193– 201.***

- **•Acetaminophen/Codeine vs Acetaminophen: No difference in analgesia; non-significant: Nausea, emesis, constipation analgesia**
  - **Moir, Laryngoscope. 110(11):1824-7, 2000**

Codeine



Prodrug:
Codeine

Active Metabolite:
Morphine

Cytochrome P450 2D6

Poor Metabolizer
- **Caucasians 5-10 %**
- **Africans 2-17 %**
- **Asians 2-7 %**

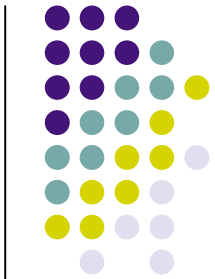
Williams DG, Patel A, Howard RF. Pharmacogenetics of codeine metabolism in an urban population of children and its implications for analgesic reliability. Br J Anaesth 2002; 89:839– 45.

Ultrarapid metabolism:
~ 5% have multiple copies = ultra rapid metabolizers
Williams, Br J Anesth 2001; 86:413-21

Ethiopia 29%
McLellan RA, Oscarson M, Seidegad J, Evans DA, Ingelman-Sundberg M: Frequent occurrence of CYP2D6 gene duplication in Saudi Arabians. Pharmacogenetics 1997. 7(3): 187-91

Original slide from Stefen J. Friedrichsdorf, MD

Tramadol

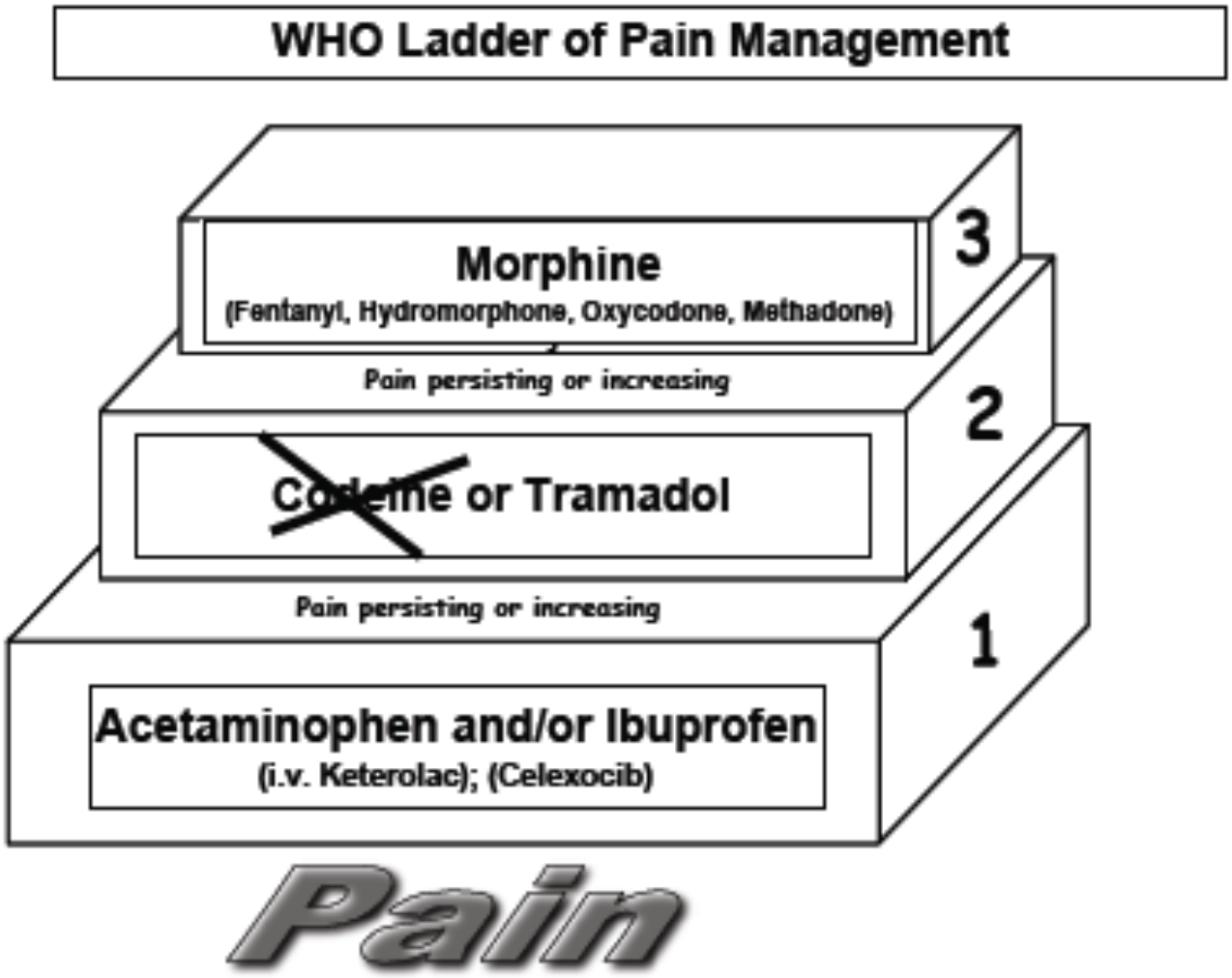


- Weak μ-receptor agonist (even weaker for δ and κ)
- Norepinephrine/serotonin reuptake inhibitor (similar to amitriptyline)

- Tramadol ⟶ O-desmethyltramadol
- Cytochrome P450 2D6
- [Cytochrome P450 3A4]

- Elimination: 90% kidney (30% unchanged)
- Adverse effects
- *Common*: Nausea, vomiting, dizziness, constipation, sedation
- *Severe*: Serotonergic syndrome
- Appears no increased risk of ideopathic seizures; but patients with seizure tendency or medication that lower seizure treshhold are at increased risk (TCA, SSRI, MAOI, antipsychotics, opioids)

- Respiratory depression?
- Overdose: No symptoms in children < 6 years ingested 10/mg/kg or less; in 87 patients only 2 with respiratory depression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(Fentanyl, Hydromorphone, Oxycodone, Methadone)
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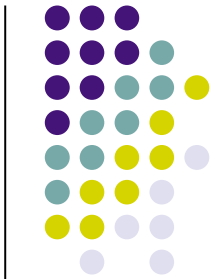
Pain

Physical Dependence

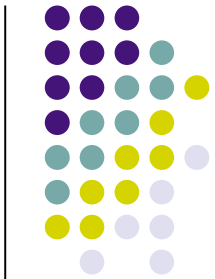


PHYSIOLOGICAL state in which the body develops a need for the opioid to maintain equilibrium.

Withdrawal syndrome occurs during abstinence

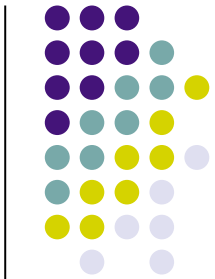
TOLERANCE - when more drug is required to produce a desired effect.

Addiction



- A compulsive preoccupation with and continued use of an agent despite no benefit and often in the face of harmful effects.
- A pattern of compulsive drug use characterized by continued craving for an opioid and the need to use the opioid for effects other than pain relief.

Opioids



- Watch for sedation and respiratory depression when 1st starting.
- Constipation can be significant. Mush and push.

- THINGS TO AVOID
- Extended or sustained release – Do NOT crush

- Do NOT combine weak & strong opioids
- Do NOT use Meperidine* (Demerol®) [*Pethidine]* *neurotoxic metabolites*
- Do NOT use Propoxyphene* (Darvocet®)
- Do NOT use Nalbuphine (Nubaine®)

- Always aim to combine opioids & non-opioids e.g. morphine plus acetaminophen.

- Weaning may be required if on opioids for 3 days (if continuous /routine) or 5 or more days of prn (3 or more doses/day).

Questions

J-TIP

Piston

Syringe

Plunger

Safety Ring

Pressurized Gas

Trigger