2016 *CDA Presents* in Anaheim

No Pain, All Gain With a Better Analgesic Armamentarium

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Noon–2:30 p.m.

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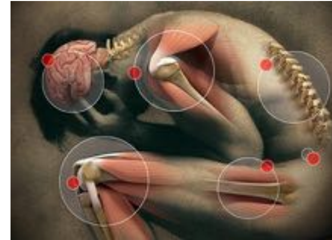
Analgesics and Dentistry

Bart Johnson, DDS, MS

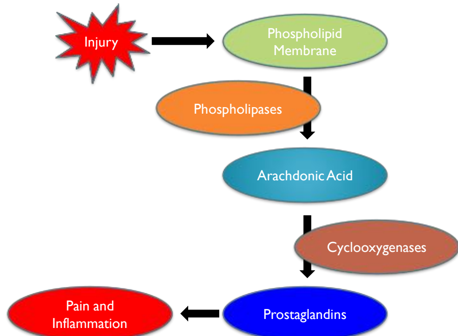
General Review

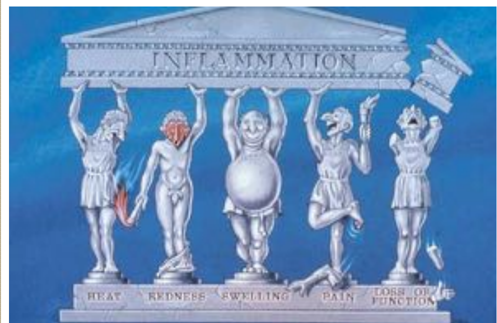


Pain:

- Warning system
- Very subjective
- Acute vs. Chronic
- Mediated by prostaglandins

Mechanism





Cyclooxygenase

- Three isoforms:
  - Cox-1
  - Cox-2
  - Cox-3
  - Cox-Swain?

COX-1

- Constitutive expression in most tissues
- "Housekeeping functions"
  - Gastric mucosal protection
  - Vascular homeostasis
  - Platelet function (thromboxane A_2)
  - Renal Function

COX-2

- Rapidly inducible
- Up-regulated with inflammatory stimuli
  - Endotoxins, cytokines
- Increases PG production
  - = vasodilation and pain

COX-3

- Post-translational modification of COX-1
- Acetaminophen may block here
- Has distinct characteristics separate from COX-1… and extra introns

So how do we blunt this response?

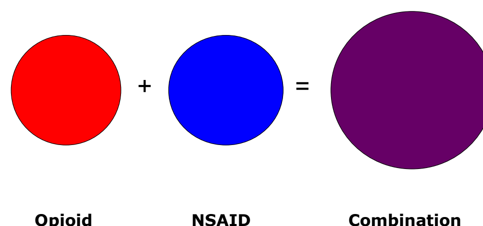
Analgesics!

- Peripherally acting
  - Mostly via blocking PG synthesis
  - Usually by inhibiting COX
- Centrally acting
  - Opioid receptors

Analgesic Definition

- Systemic drug reduces/eliminates pain
- Does not impair consciousness
- Peripheral and/or central effects
- Placebo effect: 35%

Combination Analgesics



Opioid **NSAID** **Combination**

Combinations may be manufactured or "DIY"

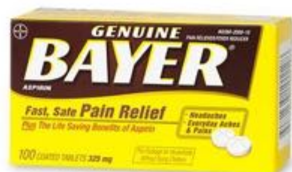
Classification of Analgesics

- NSAIDS
  - Aspirin family
  - Ibuprofen family
  - Ketorolac family
  - Coxib family
  - Acetaminophen
- Opiates/Opioids
  - Morphine derivatives
  - Semi-synthetics
  - Synthetics
  - "Non-narcotic narcotics"

NSAIDs

Salicylates

- Acetylsalicylic Acid (Aspirin)
  - Inhibits COX conversion of AA to PGG_2

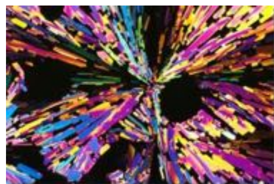


Acetylsalicylic Acid

- General Info:
  - Analgesic
  - Antipyretic
  - Anti-inflammatory
  - Anticoagulant
  - 20 tons used per day in America

Acetylsalicylic Acid

- Formulation:
  - "Aspirin" et al.
- Dose:
  - 650-1000 mg q4h



Acetylsalicylic Acid

- Side Effects:
  - Bleeding
  - Asthma
  - Salicylism
- Contraindications:
  - Ulcers
  - Asthma
  - Anticoagulation meds
  - Influenza: Reyes
- Important Note:
  - One of our most powerful drugs!
  - Suffers from "negative placebo effect"

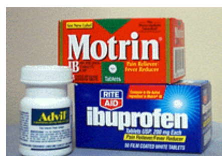
Diflunisal

- General Info:
  - "The Other Aspirin" - related to salicylates
  - Less GI irritation
  - Platelet inhibition: transient & reversible
  - Long $T_{1/2}$
- Form./Dose:
  - "Dolobid"
  - Diflunisal 500mg
  - 1000mg loading, then 500 mg q8-12h

Phenylpropionic Acid Derivatives

Ibuprofen

- General Info:
  - Cyclooxygenase inhibitor of PGs
  - Inhibits WBC migration
  - Serum half life 2h
  - Heavily plasma protein bound



Ibuprofen

- Formulations:
  - "Advil" et al.
    - 200mg tabs OTC
    - 400, 600 & 800mg Rx
  - IV Ibuprofen now available
    - "Caldolor"
    - 100 mg/mL

Ibuprofen

- Dose:
  - 400 – 600 mg q4-6h
    - (RARELY 800 mg)
  - Max 3200 mg per day

- Notes:
  - Analgesic ceiling at 400 mg
  - Anti-inflammatory effects 600 & 800mg

Ibuprofen

- Side Effects:
  - GI upset
  - Platelet aggregation
  - Nephrotoxicity

- Contraindications:
  - Pregnancy: Commonly used, but consult MD
  - Renal disease – Kidney Killer

Naproxen

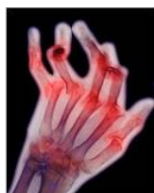
- General Info:
  - Na^+ salt; rapid GI absorption
  - Longer duration than ASA
- Formulations:
  - Many Rx forms exist, but most dentists use OTC
  - "Aleve"
    - Naproxen Na^+ 220 mg

Naproxen

- Dose:
  - Rx strengths are 250-500 mg q8-12h
  - Maximum dose:
    - 1.25 g 1st day
    - 1.0 g thereafter
  - OTC Aleve® suggests 220 mg q8-12h

Other PPA Derivatives

- Used more for chronic arthritis pain
  - Ketoprofen
    - 25, 50, 75 mg q6-8h
  - Fenoprofen
    - 200 mg q4-6h
  - Flurbiprofen
    - 50 mg q6h



Cyclic Propionic Acid Derivatives

Ketorolac

- General Info:
  - Cox-1 and Cox-2 inhibitor
  - Antipyretic
  - Analgesic
  - Anti-inflammatory effect
  - Clinical trials on 3rd molar extraction patients

Ketorolac

- Formulation:
  - "Toradol"

- Dose:
  - 15-30 mg IM/IV loading
  - 10-20 mg PO 2nd dose q6h later
  - 10 mg PO q4-6h thereafter
  - Use less than 5 days

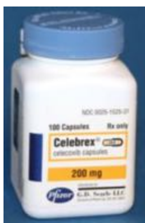
Ketorolac

- Side Effects:
  - Same as other NSAIDs
  - Especially renal
- Contraindications:
  - Impaired renal function
  - Impaired hepatic function

Cox-2 Inhibitors

Celecoxib

- General Info:
  - Cox-2 specific inhibitor
  - Usually used for arthritis pain
- Dental Use:
  - Approved for acute dental pain
- Formulation:
  - "Celebrex"
- Dose:
  - 100-200mg BID



Celecoxib

- Side Effects:
  - Renal/Hepatotoxicity

- Contraindications:
  - Sulfa Allergy
  - Asthma
  - Hepatic/Renal impairment
- Rofecoxib, Valdecoxib both pulled from the market

Figure 2: Relative Selectivity of NSAIDs for COX isoforms

Increasing COX-1 Selectivity

Increasing COX-2 Selectivity

*Not commercially available in the United States.

Other COX-2i's

- Etoricoxib
  - "Arcoxia", not available in U.S.
- Parecoxib
  - Converts to valdecoxib in liver
  - Under investigation
- Lumiracoxib
  - Not available in U.S.

there are some things in the pipeline...

Acetaminophen

- General Info:
  - Cox-3 antagonist?
  - More central, less peripheral activity
  - Reduced anti-inflammation

Acetaminophen

- Formulations:
  - "Tylenol" et al.
  - 325 ~~& (500)~~ mg tabs
  - Multiple combos
- Dose:
  - 325-650 mg q4-6h
  - Analgesic ceiling at 1 gm
  - 3 gm/d max
    - Recently dropped from 4 gm/d !

a3000

Acetaminophen

- Side Effects:
  - Heptotoxicity if OD
  - *THINGS BE CHANGIN' !!
- Contraindications:
  - Virtually none
  - Caution in liver compromised patients

FDA Controlled Substance Categories

FDA Categories

- Category I
  - Investigational Drugs
  - Naughty Drugs

"Our funding ran out again. Whip up another batch of crystal meth."

FDA Categories

- Category II
  - High abuse potential
  - Rx: written in ink or typed; signed
  - No renewals

Oxymoron

A painkiller for stupid people

FDA Categories

- Category III
  - Moderate abuse potential
  - Rx: oral or written
  - 5 renewals in 6 mos.

FDA Categories

- Category IV
  - Low abuse potential
  - Rx: same as CIII
- Category V
  - Subject to state/local laws
  - Rx: may not be required

Opiates/Opioids

Opiate/Opioid Classifications

- Phenanthrene derivatives
  - Morphine (IM/IV)
  - Codeine
  - Oxycodone
  - Oxymorphone (IM/IV)
  - Hydrocodone
  - Hydromorphone

Opiate/Opioid Classifications

- Phenylpiperidine derivatives
  - Meperidine
  - Fentanyl (IM/IV)
- Diphenylheptane derivatives
  - Methadone

Brief Review of Opiate Pharmacology

Endogenous Opioids

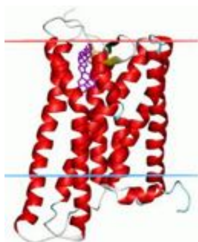
- Enkephalins:
  - Pentapeptides
  - NH_2-Tyr-Gly-Gly-Phe-Met-OH
    - Met-enkephalin
  - NH_2-Tyr-Gly-Gly-Phe-Leu-OH
    - Leu-enkephalin

Endogenous Opioids

- Endorphins
  - From β-lipotropin
  - α, β, γ, δ endorphins
  - Met-enkephalin amino termini
- Dynorphins
  - Leu-enkephalin amino termini

Opiate/Opioid Receptors

- Mu (μ)
  - Mostly supraspinal
  - Morphine Binds
  - μ_1 Subtype
    - Analgesia
    - Euphoria
  - μ_2 Subtype
    - Respiratory depression
    - Decreased GI motility



Opiate/Opioid Receptors

- Kappa (κ)
  - Spinal cord
  - Dynorphins and Agonists/Antagonists bind
  - Effects:
    - Analgesia and respiratory depression
      - Less than μ
    - Dysphoria
- Other receptors exist
  - Delta (δ)
  - Sigma (σ)

Opiate/Opioid Pharmacology

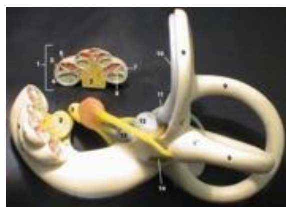
- Variable Binding:
  - Agonist
  - Partial agonist
  - Antagonist
- Gives some differences in drug effects
  - Absorption profile usually more important

Opiate/Opioid Pharmacology

- Primary Actions:
  - Analgesia
  - Euphoria
    - Via limbic system
    - Alters response
- Many Side Effects

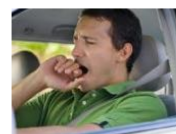
Opiate/Opioids – Side Effects

- Nausea
  - Chemoreceptor trigger zone stimulation
  - Increased nerve input from inner ear

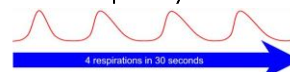


Opiate/Opioids – Side Effects

- CNS Secondary Effects
  - Drowsiness
  - Miosis
  - N & V



- Respiratory Secondary Effects
  - Diminished tidal volume
  - Decreased respiratory rate



Opiate/Opioids– Side Effects

- Cardiovascular Secondary Effects:
  - Vasodilation
  - Orthostatic hypotension
- Gastrointestinal Secondary Effects:
  - Inhibited peristalsis = Constipation
  - Xerostomia
- Genitourinary Secondary Effects:
  - Urinary retention

Phenanthrene Opiates

Morphine

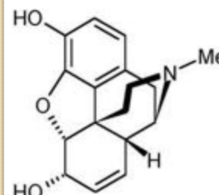
- General Info:
  - Prototypical Opiate
  - Named after Morpheus
    - God of dreams
    - Son of Hypnos, the God of Sleep
  - Excellent analgesic
  - Hospitals: "MS"

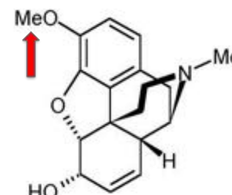
Morphine

- Formulations/Doses:
  - Morphine IM
    - 2-10 mg/70kg q4h
  - Morphine PO
    - 10-30 mg q4h
  - "MS Contin"
    - 10-30 mg q12h

Codeine

- General Info:
  - Methylated morphine
  - Slow absorption profile
    - Lower addictive potential
    - Slow to get tolerance
    - Peak effect: 1 hour
  - 10 mg Morphine ≅ 120 mg Codeine

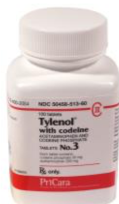




Morphine **Codeine**

Codeine

- Formulations:
  - "Tylenol 3" et al.
  - Acet 300 mg, codeine 30 mg
- Doses:
  - 30-60 mg q4h for analgesia
  - 12-20 mg q4h for antitussive
  - Max 60 mg per dose



Codeine

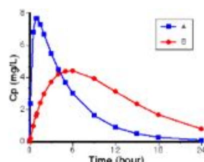
- Note:
  - *30 mg (1 tablet) proven to be no more efficacious than placebo = generally lousy drug*
  - Adult dose should therefore be 2 tablets
  - (600 mg acetaminophen, 60 mg codeine)

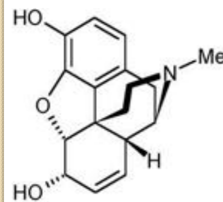
Time may be a great healer, but it's a lousy beautician.

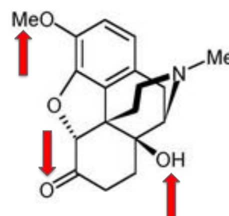
(Anonymous)

Oxycodone

- General Info:
  - Fast absorption profile
    - Greater addiction potential
    - Significant euphoria
    - Sought-after by patients
  - 5 mg morphine
    ≅ 5 mg oxycodone







Oxycodone

- Formulations:
  - Oxycodone
    - 5 mg plain
  - "Oxycontin"
    - 10, 20, 40, 80, 160 mg controlled release tabs
- Dose (Oxycodone):
  - 5 mg q 4-6h
  - 10 – 15 mg q 4-6 h (experienced)

Oxycodone

- Formulation/Dose:
  - "Percocet" et al.
    - Acet 325 mg, Oxycodone 2.5 mg
    - Acet 325 mg, Oxycodone 5 mg **
    - Acet 325 mg, Oxycodone 7.5 mg
    - Acet 325 mg, Oxycodone 10 mg

Oxycodone

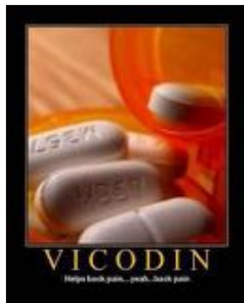
- Formulation:
  - "Combunox"
  - Ibuprofen 400 mg + Oxycodone 5 mg
- Dose:
  - 1-2 tabs q4-6h
- May be cheaper to do it yourself
  - OTC Ibuprofen + Oxycodone plain

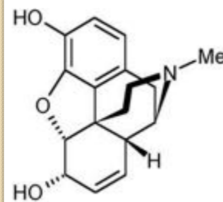
Oxycodone

- Formulations/Doses:
  - "Percodan"
  - ASA 325 mg + Oxycodone 2.5 mg
  - 1-2 tablets q4-6h
- "Roxicet Elixir"
  - Acetaminophen 325 mg + Oxycod. 5 mg / 5 mL
  - 5 mL q4-6h

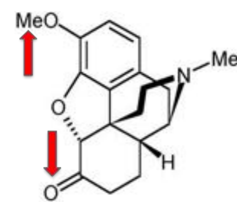
Hydrocodone

- General Info:
  - Medium absorption profile
    - Still good addiction potential
  - 5 mg morphine ≅ 10 mg hydrocodone





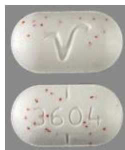
Morphine



Hydrocodone

Hydrocodone

- Formulations:
  - "Vicodin", "Norco", "Lortab", others
  - Commonly:
    - Acet 300/325 mg + Hydrocodone 5 mg
  - Many different combinations
- Doses:
  - 1 tab q4h
  - 2 tabs q6h
  - 1 tab +1 OTC Ibuprofen q6h



Hydrocodone

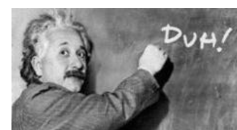
- Formulation:
  - "Vicodin E.S."
  - Acet 300 mg + Hydrocodone 7.5 mg
- Dose:
  - 1 tab q5-6h
  - 2 tabs are too much

Hydrocodone

- Formulation:
  - Elixir:
  - Acet 120 mg + Hydrocodone 2.5 mg /5 mL
- Not a lot of Acetaminophen in it
- Consider adding liquid ibuprofen

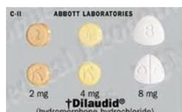
Hydrocodone

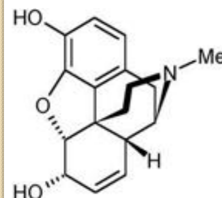
- Form./Dose:
  - "Vicoprofen"
  - Ibuprofen 200 mg + Hydrocodone 7.5 mg
- Dumb formulation… make it better:
  - 1 tab Vicoprofen plus 1 OTC (200 mg) Ibuprofen q6h

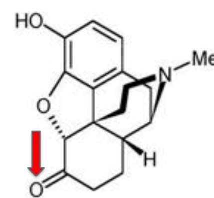


Hydromorphone

- General Info:
  - Rapid onset, short duration
  - Very powerful oral narcotic
  - Some MDs believe DDS "have no right to use it"
- 5 mg morphine ≅ 2 mg hydromorphone







Morphine **Hydromorphone**

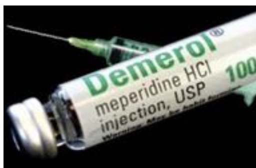
Hydromorphone

- Formulations:
  - "Dilaudid"
  - Hydromorphone 1, 2, 3, 4 mg
  - Not formulated as combination analgesic…
  - …but you can make your own!
- Dose:
  - 2-4 mg q4-6h

Phenylpiperidine Opioids

Meperidine

- General Info:
  - Erratic oral absorption
    - 2008: American Pain Society no longer recommends its use as an oral analgesic
    - Much better as a parenteral agent



Fentanyl

- History:
  - Sublimaze introduced in 1960
  - Duragesic patch developed in the mid-1990s
  - Actiq lollipop late 1990s
  - Fentora buccal tablets early 2000s
  - Ionsys Fentanyl iontophoretic transdermal system 2006
  - Onsolis BioErodible MucoAdhesive (BEMA) film introduced 2009

Fentanyl

- Non-IV forms generally are not a good choice for outpatient dentistry
- Only use in conjunction with a MD

Opioids – Diphenylheptanes

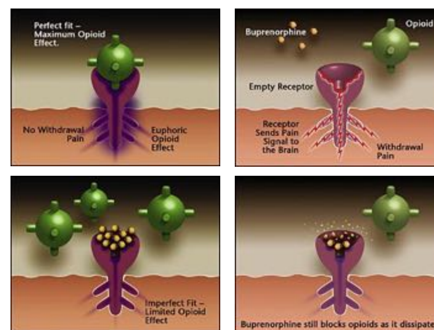
Methadone

- General Info:
  - Replacement therapy
    - It is a narcotic
  - High oral efficacy and persistence
- Dental Use:
  - None
  - Consult MDs if patient is on Methadone
    - Do you layer your analgesic over it?
    - Do you let the Methadone do the job?
    - Do you increase the Methadone dose?

Buprenorphine

- Binds mu receptor vigorously
- Some kappa receptor antagonism
- Slowly pushing methadone out
- Suboxone:
  - Buprenorphine + 25% naloxone
  - Used for replacement therapy

Buprenorphine



Opiate Agonists: Miscellaneous

Tramadol

- General Info:
  - Synthetic opiate agonist
  - Metabolized by CYP2D6 to active M1
    - Binds to μ receptor
    - M1 not completely displaced by Naloxone
  - Inhibits re-uptake of norepinephrine and serotonin
    - = Acts as analgesic and "NSSRI"

Tramadol

- Formulation:
  - "Ultram"
  - 50 mg tablets
- Dose:
  - 50 – 100 mg q4-6h max 400 mg/day
- Notes:
  - Roughly similar to codeine or hydrocodone
  - Not as effective as oxycodone

Tapentadol

- Opioid and NSSRI, similar to Tramadol
- Formulations:
  - 50 – 75 – 100 mg tablets
- Dose:
  - 1 tab q4-6 up to 600 mg/day

Sigh… need I say more?

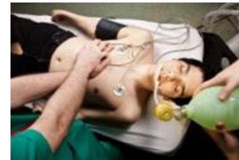
Cannibis

- Endocannibinoids are being researched
  - Cannibis has some medical use
  - Chronic use = widened synapses
    - = permanently dulled thinking
- Combustion temperatures are high
  - Suggest your patients use water pipe or vaporizer

R.I.P.

Propoxyphene

- Some of you may remember "Darvon" and "Darvocet"
- Pulled from the market in December, 2010
  - Why? Efficacy barely better than placebo and worrisome side effects… like sudden death



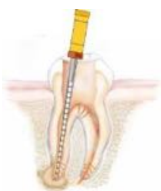
Pentazocine

- Some of you may remember "Talwin"
- Famous for T's and Blues
- Injectable 30 mg/mL only… tablets no longer available
- (Dose: 30 mg IV or IM)

Analgesic Recommendations

Analgesic Recommendations

- Treat source
- Masking pain with analgesics is generally unsuccessful



Analgesic Recommendations

- Choose Correct Analgesic
  - Anti-inflammatory activity?
  - Central?
  - Peripheral?
  - Both?
- Remember negative placebo effect is great – explain rationale to patients

Helpful Hints - Analgesics

- Timing of Administration
  - Give before procedure?
  - Give before anesthetic wears off?

Helpful Hints - Analgesics

- Scheduled Dosing
  - Take medication as per clock
  - Keep ahead of pain rather than chasing it
  - Do for the first 24-48 hours

Helpful Hints - Analgesics

- Combination Approaches
  - Add OTC Acetaminophen, Naproxen, or Ibuprofen
  - Increases analgesia without increasing narcotic

Helpful Hints - Analgesics

- Use Appropriate Meds
  - You will not create an addict on short-term therapy
  - Do not be afraid of Oxycodone
  - Trust Ibuprofen to be sufficient!
- Give sufficient numbers of pills
  - Many patients under-dosed
  - 12 vs. 30 vs. 60 tablets?
  - Do the math!

Helpful Hints - Analgesics

- However:
  - Be convinced to use Hydromorphone
  - Stay away from Fentanyl unless trained
  - What you do must make sense

What about Drug seekers?

Drug Seekers

- How do you identify them?
  - Most are VERY GOOD at their craft
    - Stories have been repeated and refined for years
  - My favorite tip-offs:
    - "Obstacle builders" to definitive care
    - Knows their pharmacology a bit too well
    - Less potent drugs and normal doses "never work"

So what do you do?

- First and foremost, it is YOUR house and YOUR rules
  - Establish this fact as soon as possible
- Listen to them carefully
  - Some people really do need 15 mg of oxycodone!
- Insist on definitive care
  - See "Bart's drug seeker rule", next slide

Bart's Drug Seeker Rule

- If I do not get body parts from them, they do not get narcotics from me
  - Tooth
  - Pulp
  - Pus

My "Story" I tell

- "Oh gosh, if this tooth is so painful that you need powerful doses of narcotics, we really need to properly address it before it lands you in the hospital."
  - (grump grump grump, excuse excuse)

My "Story" I tell

- Wow… those are impressive reasons not to get this taken care of tonight. Let me numb you up and get you on a powerful anti-inflammatory drug and let's get you to the oral surgeon or endodontist first thing tomorrow.
  - (grump grump grump, excuse excuse)

My "Story" I tell

- Note: If it is a Friday (well planned, of course) then say, "I'm sorry… this isn't going to last the weekend. Let's do it now."
- Be willing to do ANYTHING… extract, start endo, etc. You need the patient to submit to your rules!!!
- Do NOT send to Emergency Dept. Most are non-narcotic now.

My "Story" I tell

- Sure, I understand you want Oxycodone, but these are my terms. I'm advising you to get the problem addressed right now; unfortunately you are refusing. I'm offering to numb you tonight and help you first thing tomorrow; again, you are refusing. Narcotics are not a good solution.
- **(grump grump grump, excuse excuse)**

My "Story" I tell

- I am unwilling to give out prescriptions for large numbers of powerful narcotics when we have a real abuse problem out on the streets. So will you accept my terms?
- **GRUMP GRUMP WHINE BEG ANGER**

My "Story" I tell

- Please do not argue or get angry with me. I'm offering to help you in the best way possible and you are refusing. You may reconsider your decision or you may seek care elsewhere.
- **EXPLETIVE EXPLETIVE SLAM!**

A final word on real Pain…

- If someone is in real pain, they will let you do ANYTHING to get them out of pain
  - Geoff's story

Back to Helpful Hints:

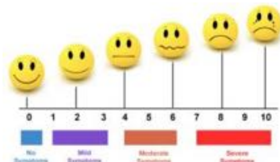
Helpful Hints - Analgesics

- Give analgesics time to work
  - *"45 minutes from ingestion to relief"*
- Listen to your patients:
  - Different pain perceptions
  - Different expectations of pain relief
  - I ask them what has worked well in the past

EXPECTATIONS = PAST EXPERIENCE + (HOPES - FEARS)

Helpful Hints - Analgesics

- Explain to patients that the pain will be diminished, but not eliminated
  - *"Your pain will be 7 or 8 out of 10 without the drugs, and 2 to 3 with them. Do not expect to go to zero"*



Helpful Hints - Analgesics

- "Help" options
  - Give stronger Rx, but do not fill until needed
  - Stay in touch:
    - Give patients ways to reach you
    - Most will never call, but appreciate the "parachute"
    - Call them the next day – big practice builder

GOT PAIN?

Helpful Hints - Analgesics

- Do not forget local anesthetic!
  - Articaine
  - Lidocaine
  - …and especially Bupivacaine

The Balancing Act

- Reasonable use of analgesics is very defensible
  - The law supports your clinical judgment
  - Record your thoughts in the chart!

The Balancing Act

- Excessive use becomes a problem
  - Too many Rx's
  - Too strong
  - Too much time
  - …Given to the assistant with whom you are having an affair (!)

The Balancing Act

- Your job is short-term pain control
- If your patients are still having symptoms after reasonable efforts, refer to a pain management center
- Explain: "I am beyond the scope of my practice"

It's not my job!

A last thought…

- We want our patients comfortable
  - Do your best
  - Use common sense
  - Ask for help when needed
  - You will be fine!

That's comfortable!

Are we feeling no pain?

Questions?

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www.seattlespecialcaredentistry.com

Thanks!

Analgesics for Dentistry Summary Sheet

Note: These are guidelines. Consult MDs or compendia for specific prescribing information!

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	Class/Medication	Indications	Route	Usual Adult Dose	Usual Child Dose	Cautions	Notes
NSAIDs	Salicylates						
	ASA	Mild-Moderate	PO	325-650 mg q4-6h Max 4g/D	10-15 mg/kg q4-6h Not for young kids	Ulcers, asthma, Platelet dysfxn	
	Diflunisal	Mild-Moderate	PO	1000 mg loading 250-500 mg q8-12h	Consult MD	Same as ASA	
	Phenylpropionic acid derivatives						
	Ibuprofen	Mild-Moderate	PO IV	400-800 mg q4-6h Max 3200 mg/D	5 mg/kg q4-6h Max 40-50 mg/kg/D	Nephrotoxic Reversible Plt dysfunction	800 mg generally unnecessary Analgesic ceiling at 400 mg
	Naproxen	Mild-Moderate	PO	200 mg q8-12h Max 400 mg q8h Max 600 mg q24h	5 mg/kg q12h	Same as ASA	OTC Naproxen is in the sodium form; tablets are 220 mg = 200 mg Naproxen base
	Ketoprofen	Arthritis	PO	50 mg q6h 75 mg q8h			Not for acute pain
	Fenoprofen	Arthritis	PO	200 mg q4-6h Max 3200 mg/D			
	Flurbiprofen	Mild-Moderate	PO	100 mg q12h			Mostly for Arthritis; rare for dentistry
	Pyrrolo-pyrrole derivatives						
	Ketorolac	Moderate-Severe	IV	15-30 mg loading Followed by 10 mg PO q4-6h	Consult MD	Very nephrotoxic	Not to exceed 5 days duration
	Tolmetin	Moderate-Severe	PO	400 mg q8h Max 1800 mg/D	5-7 mg/kg q6-8h		Rarely used in dentistry
	Diclofenac	Mild-Moderate	PO	50 mg q8h Max 150 mg/D	Consult MD		
	Oxicams						
	Piroxicam	Arthritis	PO	10-20 mg qD	0.2-0.3 mg/kg/D Max 15 mg/D		
	Indole derivatives						
	Etodolac	Mild-Moderate Arthritis	PO	200-400 mg q6-8h Max 1000 mg/D	Consult MD		
	Sulindac	Arthritis	PO	200 mg q12h Max 400 mg/D	Consult MD		No more than 7 days acute pain tx
	Cox-2 inhibitors						
	Celecoxib	Mild-Moderate	PO	400 mg loading Then 200 mg q12h	50-100 mg q12h	Nephrotoxic Hepatotoxic	
	(Etoricoxib, Lumiracoxib and Parecoxib not available in USA. Rofecoxib and Valdecoxib pulled from the market)						
	Aniline derivatives						
	Acetaminophen	Mild-Moderate	PO	325-650 mg q4-6h Max 4000 mg/D *GUIDELINES CHANGED*	10-15 mg/kg q4-6h Max 5 doses/D See chart →	Hepatotoxic	0-3 mos 40 mg; 4-5 y 240 mg 4-11 mos 80 mg; 6-8 y 320 mg 1-2 y 120 mg; 9-10y 400 mg 2-3 y 160 mg; 11 y 480 mg

	Class/Medication	Indications	Route	Usual Adult Dose	Usual Child Dose	Cautions	Notes
Opiates/Opioids	Phenanthrene derivatives						
	Morphine	Moderate-Severe	PO IV	10-30 mg q4h 2.5-5 mg q3-4h	0.15-0.3 mg/kg q3-4h	N&V Resp Depressn	Prototypical opiate
	Slow-release Morphine	Moderate-Severe	PO	Consult MD			Not for acute dental pain
	Codeine + Acetaminophen	Mild-Moderate	PO	30/300 q4-6h	0.5-1mg/kg q4-6h		Adults generally need 2 tablets for efficacy
	Oxymorphone	Moderate-Severe	PO	10-20 mg q4-6h			Dosing complicated. Consult compendia
	Oxycodone	Moderate-Severe	PO	5-10 mg q4-6h	0.1-0.2 mg/kg q6h	Abuse potential	Fast absorption; most pts like it
	Slow-release Oxycodone	Moderate-Severe	PO	Consult MD			Not for acute dental pain
	Oxycodone + acetaminophen	Moderate-Severe	PO	5/325 mg q4-6h	0.1-0.2 mg/kg q6h (O)		Also available as 7.5/325 and 10/325 Elixir 5/325/5 mL
	Oxycodone + ASA	Moderate-Severe	PO	4.8/325 q6h	0.1-0.2 mg/kg q6h (O)		Hard to find
	Oxycodone + Ibuprofen	Moderate-Severe	PO	5/400 q6h Max 4 tabs/D			No more than 7D duration
	Hydrocodone + Acetaminophen	Moderate-Severe	PO	5/300 q4-6h 7.5/300 q6h	0.1-0.2 mg/kg q4-6h (H)		Elixir 7.5/300/15 mL
	Hydrocodone + Ibuprofen	Moderate-Severe	PO	7.5/200 q6h			Dumb formulation. May find 2.5/200's, 5/200's No more than 5 D duration
	Hydromorphone	Severe	PO	1-4 mg q4-6h	0.03-0.08 mg/kg q3-4h		Heavy hitter; rarely appropriate for dentistry. Can combine with NSAIDs
	Phenylpiperidine derivatives						
	Meperidine	Moderate-Severe	PO IM	50-150 mg q3-4h 50-75 mg q3-4h			Oral has erratic absorption; not recommended for acute pain
	Fentanyl	Moderate-Severe	IV	50-100 mcg q30-60m	0.5-2 mcg/kg q1-2h	Apnea	Also available: Buccal film (Onsolis®) 200 mcg/dose Buccal tablet (Fentora®) 100 mcg/Dose Lozenge (Actiq®) 200 mcg/Dose
	Sufentanil	GA use only	IV				GA use only
	Alfentanil	GA use only	IV				GA use only
	Remifentanil	GA use only	IV				GA use only
	Diphenylheptane derivatives						
	Methadone	Moderate-Severe Withdrawal	PO	2.5-10 mg q8-12h 20-30mg/D	0.1-0.2 mg/kg q4-8h		Not first line choice for acute pain Generally only use when already Rx'd
	Propoxyphene	Removed from Market Dec 2010					
	Propoxyphene + Acetaminophen						
	Miscellaneous "non-opioid opioid"						
	Tramadol	Moderate-Severe	PO	50-100 mg q4-6h Max 400 mg/D	1-2 mg/kg q4-6h		Has some SSRI and SNRI properties
	Tramadol + Acetaminophen	Moderate-Severe	PO	37.5/325			Adults generally need 2 tablets for efficacy
	Tapentadol	Moderate-Severe	PO	50-100 mg q4-6h Max 600 mg/D			Has some SSRI and SNRI properties
	Mixed agonists - antagonists						
	Pentazocine	Moderate-Severe	IV	30 mg q3-4h		Multiple	Not first choice… side effects
	Buprenorphine	Withdrawal	PO	Consult MD			Subutex; Suboxone has Naloxone