Adolescent Pain Management and NSAID Considerations

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Disclosure: Paul A. Moore

Over the last twenty years, Dr. Moore has served as a research consultant to several companies including Dentsply Pharmaceutical, Kodak Dental Systems, Septodont USA, St Renatus, Novalar Inc. and Novocol of Canada Inc. His consultations have involved pharmacovigilance of marketed products as well as research protocol development of new anesthetics for dentistry.

Dr. Moore currently has no Conflict of Interests regarding dental drug sales or research.
USS Homestead Mill - 1966

http://pgdigs.tumblr.com/
16 Year-Old’s Dream Car
16 Year Old’s Reality
Pain Management and Adolescents

- Opioid crisis: the second wave for overdose.
- Prescription opioid practices used in dentistry.
- Risks when prescribing to adolescents.
- Evidence for prescribing APAP + Ibuprofen.
- Professional recommendations/policies.
- Practitioner and patient responsibilities.
Managing Chronic Pain
Drugs, Guns and Cars

Among adults aged 24 to 35 years in 2016, 20% of deaths involved opioids.

*JAMA Network Open. 2018;1(2):e180217*
Opioid Epidemic: Why Now?

- Use of opioids to manage chronic noncancer pain.
- Purdue Pharma introduces OxyContin in 1996.
- Economics of opioid addiction.
  - One (1) OxyContin pill = $80
  - One (1) bag of heroin = $10
- Since 2010, overdose deaths decrease from prescription opioids and increase for heroin, fentanyl and now carfentanlyl.
Prescriptions vs Heroin

![Diagram showing the comparison between prescriptions and heroin deaths from 1995 to 2014. The y-axis represents the number of deaths, and the x-axis represents the years. The orange bars represent Heroin and/or Opioid Unspecified, and the dark blue bars represent Prescription Opioids. The graph shows an increasing trend in deaths related to both prescription opioids and unspecified opioids from 1995 to 2014.](image-url)

Paul A. Moore
Opioid Prescribing Culture

Standard daily opioid dose for every 1 million people

- United States
- Canada
- Germany
- Denmark
- Belgium
- Austria
- Switzerland
- Australia
- Holland
- Spain
- Luxembourg
- Norway
- Great Britain
- Ireland
- New Zealand
- Sweden
- Iceland
- Israel
- France
- Slovenia
Opioid Prescribing Culture

Hydrocodone: Vicodin®, Norco®, Lorcet®

Hydrocodone is prescribed predominantly within the United States.

99% of the worldwide supply of hydrocodone was consumed in the United States.

International Narcotics Control Board, 2007
Opioid Prescribing Culture

Opioid following third molar extractions

Great Britain:

“ We do not routinely prescribe opioid analgesics. Most often we prescribe diclofenac”.
Dr. John G. Meechan BDS, PhD, Oral Surgeon

China:

“Opioids are almost never prescribed following third molar surgery”
Dr. Harold Tu, U. Minnesota Oral Surgeon following visit to Chinghai.

Japan:

“Opioid analgesics are not on the national formulary in Japan”
Dr. Takora Suzuki, Japanese Dental Anesthesiologist
Examining national-level general population heroin data*, nearly 4 of 5 heroin users first abused prescription opioids.

* Includes those in and not in treatment

Jones, 2013; Muhuri et al., 2013
Fentanyl

As matter of reference it has been determined that it would only take 2-3 milligrams of fentanyl to induce respiratory depression, arrest and possibly death. When visually compared, 2 to 3 milligrams of fentanyl is about the same as five to seven individual grains of table salt.
Heroin, Fentanyl and Carfentany1
Pittsburgh/Allegheny County

Estimates for 2017: 750 overdose fatalities
Trends for Opioids: Overdose

- 130 deaths per day in the US resulting from opioid drug misuse and abuse.
- In 2015, 3,383 drug-related overdose deaths were reported in Pennsylvania, an increase of 23.4 percent from the total number of overdose deaths (2,742) reported in 2014.

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Opioid Prescriptions by Dentists

Primary care providers prescribe the most opioids

Opioid Prescriptions by Specialty, 2012
Opioid Prescriptions in Dentistry


Benjamin Levy et al.  
# Top Prescription in US

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong>*</td>
<td>4,014</td>
<td>4,155</td>
<td>4,236</td>
<td>4,325</td>
<td>4,368</td>
</tr>
<tr>
<td><strong>1. levothyroxine</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>105</td>
<td>112</td>
<td>117</td>
<td>120</td>
<td>121</td>
</tr>
<tr>
<td><strong>2. lisinopril</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>89</td>
<td>99</td>
<td>102</td>
<td>104</td>
<td>106</td>
</tr>
<tr>
<td><strong>3. APAP/hydrocodone</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>137</td>
<td>136</td>
<td>129</td>
<td>119</td>
<td>97</td>
</tr>
</tbody>
</table>

*millions of prescriptions

Medicines Use and Spending in the U.S.
IMS Institute for Healthcare Informatics, April 2016.
Trends: Opioid Prescribing in Dentistry

- Dentists prescribe about 8% of all immediate-acting opioids (Vicodin® or Percocet®).

- Dentists most often treat acute inflammatory pain that is either post-surgical or odontogenic/inflammatory.

- The need and effectiveness of opioid analgesics following dental surgery is difficult to predict.

- Dentists and OMFS’s may often be prescribing an opioid analgesics to adolescents and young adults for the first time in their lives (3-4 million wisdom teeth extractions).

Centrally-Acting Analgesics: South Carolina

South Carolina PDMP 2012-2013 by Dentists. 653,650 opioid prescriptions. 99.9% were for immediate release formulations. People younger than 21 year was 11.2%. Refills represent only 3.8%.

<table>
<thead>
<tr>
<th>Medicine</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocodone / APAP</td>
<td>76.1%</td>
</tr>
<tr>
<td>Oxycodone / APAP</td>
<td>12.2%</td>
</tr>
<tr>
<td>Codeine / APAP</td>
<td>6.8%</td>
</tr>
<tr>
<td>Hydrocodone / ibuprofen</td>
<td>3.0%</td>
</tr>
<tr>
<td>Meperidine</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

MacCauley JL et al, JADA 2016
Preferred Centrally-Acting Analgesics

“Please complete the following prescription for the centrally-acting analgesic you prescribed most often in the past month.”

<table>
<thead>
<tr>
<th>Analgesic Combination</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrocodone / APAP</td>
<td>64.0%</td>
</tr>
<tr>
<td>Oxycodone / APAP</td>
<td>20.2%</td>
</tr>
<tr>
<td>Hydrocodone / ibuprofen</td>
<td>4.6%</td>
</tr>
<tr>
<td>Codeine / APAP</td>
<td>4.3%</td>
</tr>
<tr>
<td>Promethazine / meperidine</td>
<td>3.7%</td>
</tr>
<tr>
<td>Propoxyphene / APAP</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Change in Opioid Selection 2010-2015

- Acetaminophen + Hydrocodone
  - 2010: 70.2%  
  - 2015: 63.4%
- Acetaminophen + Oxycodone
  - 2010: 10.9%  
  - 2015: 11.6%
- Acetaminophen + Codeine
  - 2010: 10.6%  
  - 2015: 14.3%
- Hydrocodone + Ibuprofen
  - 2010: 3.1%  
  - 2015: 1.89%
- Tramadol Hydrochloride
  - 2010: 1.8%  
  - 2015: 4.6%
Prescribing vs Utilization

- 1.7 million patients prescribed opioids following third molar extractions.
- The median milligrams of morphine equivalents was 120 MME's.
- This represents:
  - 24 tablets of hydrocodone 5 mg (Vicodin)
  - 16 tablets of oxycodone 5 mg (Percocet).

Opioid Prescribing After Surgical Extraction of Teeth in Medicaid Patients, 2000–2010
Prescribing vs Utilization

- Forty-eight patient interviews (1-day, 7-days).
- Age: 18.8 yrs. (15-30)
- Female = 22 / Males = 13
- 20 Vicodin® prescribed
- 12 (60%) pills unused at 7-days.
- Nausea/vomiting at 7-days interview: 24%.

Trends for Opioids Misuse

• From 1997-2007, use increased from 74 mg/person to 369 mg person (500% increase).
• Prescription opioid drugs rank second to marijuana in categories of abused drugs.
• For first time users, friends and family were the primary source: “the AT&T plan”.

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Developing Adolescent Brain

Balance between pleasure center (Nucleus Acumbens) and judgement center (Prefrontal Cortex) is not completely developed until 20-25 years of age.
Prefrontal Cortex is not completely developed until 20-25 years of age.
• Nationally representative sample of 6,220 individuals surveyed in high school in 12th grade.
• Followed up through age 23. Analyses are stratified by predicted future opioid misuse as measured in 12th grade on the basis of known risk factors. The main outcome is nonmedical use of a prescription opioid at ages 19 to 23.
• Predictors include use of a legitimate prescription by 12th grade, as well as baseline history of drug use and baseline attitudes toward illegal drug use.
• RESULTS: Legitimate opioid use before high school graduation is independently associated with a 33% increase in the risk of future opioid misuse after high school among low risk children.
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Ibuprofen vs APAP

Figure 1. Mean pain intensity difference scores vs time. Pain intensity was rated on a scale of 0 = none to 3 = severe.

Oral Surgery Model: Opioid Combinations

- Acetaminophen 1000 + Oxycodone 10mg (n=45)
- Acetaminophen 1000 + Oxycodone 5mg (n=40)
- Acetaminophen 500 + Oxycodone 5mg (n=45)
- Acetaminophen 500 mg (n=37)
- Oxycodone 5mg (n=42)
- Placebo (n=38)

N = 247

Pain Intensity Difference Scores

Hours
Ibuprofen and APAP

Paracetamol and APAP (Acetaminophen) are chemical names for Tylenol)

NNTs for Analgesic Agents

NNT for at least 50% maximum pain relief (95% CI)
# NNTs for Dental Analgesics

<table>
<thead>
<tr>
<th>Drug Formulation</th>
<th>Trials/Subjects</th>
<th>NNT (C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin 600/650 mg</td>
<td>45/3581</td>
<td>4.5 (4.0-5.2)</td>
</tr>
<tr>
<td>Aspirin 1,000 mg</td>
<td>4/436</td>
<td>4.2 (3.2-6.0)</td>
</tr>
<tr>
<td>Acetaminophen 1,000 mg</td>
<td>19/2157</td>
<td>3.2 (2.9-3.6)</td>
</tr>
<tr>
<td>Ibuprofen 200 mg</td>
<td>18/2470</td>
<td>2.7 (2.5-3.0)</td>
</tr>
<tr>
<td>Celecoxib 400 mg</td>
<td>4/620</td>
<td>2.5 (2.2-2.9)</td>
</tr>
<tr>
<td>Ibuprofen 400 mg</td>
<td>49/5428</td>
<td>2.3 (2.2-2.4)</td>
</tr>
<tr>
<td>Oxycodone 10 mg plus Acetaminophen 650 mg</td>
<td>6/673</td>
<td>2.3 (2.0-6.4)</td>
</tr>
<tr>
<td>Codeine 60 mg plus APAP 1000 mg</td>
<td>26/2295</td>
<td>2.2 (1.8-2.9)</td>
</tr>
<tr>
<td>Naproxen 500/550 mg</td>
<td>5/402</td>
<td>1.8 (1.6-2.1)</td>
</tr>
<tr>
<td>Ibuprofen 200 mg plus Acetaminophen 500 mg</td>
<td>2/280</td>
<td>1.6 (1.4-1.8)</td>
</tr>
</tbody>
</table>
Stepwise Guidelines

Mild Pain
Ibuprofen 200-400 mg
q 4-6 hours: as needed (p.r.n.) pain

Mild-Moderate Pain
Ibuprofen 400-600 mg
q 4-6 hours: fixed interval for 24 hours

Moderate - Severe Pain
Ibuprofen 400-600 mg plus APAP 500 mg
q 6 hours: fixed interval for 24 hours

Severe Pain
Ibuprofen 400 mg plus APAP 650/hydrocodone 10 mg
q 6 hours: fixed interval for 24-48 hours

Multimodal Opioid-Sparing Strategies

- Preventive NSAIDs (naproxen sodium 550 mg, or ibuprofen 600 mg).
- Long-acting local anesthetics: 0.5% bupivacaine.
- Corticosteroids (dexamethasone 8 mg i.m. or i.v.).
- NSAIDs analgesics as the first-line of therapy. (ADA, CDC)
- Combination of ibuprofen (400-600 mg) and acetaminophen (500 mg) as an opioid alternative.
- A 2 or 3 day supply of opioids analgesics is usually sufficient. (CDC)
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The CDC expert panel recognized that long-term opioid use often begins with treatment of acute pain.

“Three days or less will often be sufficient; more than seven days will rarely be needed.”

Extended release and long-acting opioids, such as methadone, fentanyl patches, or extended release versions of opioids such as oxycodone, oxymorphone, or morphine, should not be prescribed for the treatment of acute pain.

The American Dental Association revised its statement on the Use of Opioids in the Treatment of Dental Pain.*

“Dentists should consider nonsteroidal anti-inflammatory analgesics (NSAIDs) as the first-line therapy for acute pain management.

*Adopted by the House of Delegates 2016.

Available at ADA.org
The American Dental Association revised its statement on the Use of Opioids in the Treatment of Dental Pain.*

“Dentists should consider coordination with other treating doctors, including pain specialists when prescribing opioids for management of chronic orofacial pain.”

*Adopted by the House of Delegates 2016. Available at ADA.org
1. Continuing Education
“The ADA supports mandatory continuing education in prescribing opioids and other controlled substances.”

2. Dosage and Duration
“The ADA supports statutory limits on opioid dosage and duration of no more than seven days for the treatment of acute pain, consistent with the Centers for Disease Control and Prevention evidence-based guidelines.”

3. Prescription Drug Monitoring
“The ADA supports dentists registering with and utilizing Prescription Drug Monitoring Programs (PDMPs) to promote the appropriate use of opioids and deter misuse and abuse.”
PA State: Act 126

• Act 126: Prescribing to minors requires signed consent and limits to seven days, discuss risks of addiction and overdose.
• Act 125: Required curriculum for medical/dental schools. Licensure renewal requires two hours of CE.
• Act 124: requires a check of the PDMP for every prescription of an opioid or benzodiazepine. Dispenser input required within 24 hours.
• Act 122: Emergency departments limit to seven day prescriptions of opioids.
• No early refills.
Prescription Drug Monitoring Programs (PDMPs) have dramatically decreased “doctor shopping”.

New York State instituted a mandatory PDMP program for prescribing opioid analgesics in 2014.

Assessing the impact of the program within a dental urgent care center, during a three month period, investigators found a 78% reduction in the quantity of opioid pills.

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Provider Issues in Opioid Therapeutics

- Assess patients at risk for opioid use and misuse.
- Limiting prescriptions with fewer units of opioids. (No refills, 8 units?, 16 units?)
- Educate parents and patients of dangers.
  
  This may be our most important “teaching opportunity for first time users of anesthetics and analgesic drugs”

- With adolescents, parent responsibility as the “gatekeeper” to monitor pain and analgesia needs.
- Recommend strategies to secure prescriptions.
- Indicate DEA drug take-back programs.
- Describe procedures for disposal of unused drug.
Disposal of Prescription Drugs

Take them out of their original containers and mix them with an undesirable substance, such as used coffee grounds or kitty litter. The medication will be less appealing to children and pets, and unrecognizable to people who may intentionally go through your trash. Put them in a sealable bag, empty can, or other container to prevent the medication from leaking or breaking out of a garbage bag.

• Cat litter
• Coffee grinds
• Take back programs
• Flush it done!
Deterra® Drug Disposal Pouch

Working together to close the loop on safe prescription drug disposal.

Proven Mechanism of Action

- 99% success in deactivating drugs¹,²
  - Narcotics
  - Antibiotics
  - Transdermal Patches

- Proprietary activated carbon MAT12⁶ renders drugs non-retrievable³

- Works on all organic compounds

Environmentally Friendly

- Renders chemical compounds safe for landfills
- Eliminates the need for harmful incineration⁴,⁵,⁶,⁷
- Reduces watershed contamination⁷

Socially Responsible

- Closes the product lifecycle for pharmaceuticals
- Reduces accidental medical emergencies

Keep Out of the Reach of Children and Pets
Stericycle® Recycling Bags
DisposeRx®
Prescription Drug Disposal: Flushing

Fentanyl: Duragesic, patch (extended release)
Methylphenidate
Meperidine: Demerol, tablets
Diazepam
Hydromorphone HCl: Dilaudid, tablets, oral liquid
Methadone: Dolophine Hydrochloride, tablets
Morphine: Embeda, capsules (extended release)
Hydromorphone Hydrochloride
Methadose, tablets
Morphine Sulfate, tablets (immediate release)
Oxycontin, tablets
Percocet, tablets & Percodan, tablets
Focus of Opioid Education in Dentistry

- We are compassionate and risk averse.
- We manage acute pain almost exclusively.
- Solo practice and culture of independence.
- Our role in opioid addiction crisis is prevention.
- We may be the first to prescribe to adolescents.
Providers’ Clinical Support System (PCSS) Training

PCSS is a collaborative effort led by the American Academy of Addiction Psychiatry (AAAP) in partnership with: Addiction Technology Transfer Center (ATTC), American Academy of Neurology (AAN), American Academy of Pain Medicine (AAPM), American Academy of Pediatrics (AAP), American College of Physicians (ACP), American Dental Association (ADA), American Medical Association (AMA), American Osteopathic Academy of Addiction Medicine (AOAAM), American Psychiatric Association (APA), American Society for Pain Management Nursing (ASPMN), International Nurses Society on Addictions (IntNSA), and Southeast Consortium for Substance Abuse Training (SECSAT).

For more information visit: https://pcssnow.org/

For questions, email: pcss@aaap.org

Visit us on Twitter: @PCSSProjects

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Webinar Evaluations (Post and 30-Day)

Each PCSS-O partner organization is asked to distribute a post and 30-day evaluation to participants for their completion.

Participants in today’s webinar will be emailed the link to complete their evaluations.

Thank you for your feedback!
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