



February 22, 2016

“Monday Morning Pearls of Practice by Bobby Baig”

baig@buildyoursmile.com

Prosthodontic Associates
2300 Yonge St, Suite 905
Toronto, M4P1E4
www.buildyoursmile.com

Acute Dental Pain: Strategies for Management **By Bobby Baig**

Introduction:

Strategies for the management of pain from the orofacial region can be grouped into **three** general **categories**.

1. **Blocked** of **perioperative pain** to permit performance of a procedure that would otherwise be too noxious.
2. **Control** of **acute pain** following a surgical procedure that produces tissue injury and subsequent inflammation.
3. **Interventions** for chronic pain.
4. **Increased use** of **opioid** analgesics for pain management has also contributed to **increased misuse** of analgesics that contributes significantly to problems of drug safety.
5. More than 40,000 deaths are attributed annually to adverse drug reactions and overdoses. Approximately 11 percent of opioids prescribed annually in the U.S. are by dentists, suggesting that a significant number of deaths each year are due to opioid drugs prescribed for dental indications.
6. **NSAIDs** administered for acute pain are not only **more effective than acetaminophen** or acetaminophen-opioid **combinations**, but also have greater safety.
7. **Most** acute dental **pain** is **inflammatory** in **origin** and NSAIDs are extremely effective for inhibiting inflammatory pathways, while opioids are devoid of anti-inflammatory activity and cause significant morbidity.

Pain Prevention Paradigm: P-A-I-N

The **acronym** P.A.I.N signifies **four evidence-based** steps that a dentist can use to delay the onset of postoperative pain in the first few hours following a procedure producing tissue injury and minimize the intensity of pain over the two to three days when acute inflammation normally augments pain perception.

P = Prevention:

Pain in the orofacial region can be **prevented** by **attenuating** the development of hyperalgesia due to the development of sensitization in pain-sensing neurons at the site of injury and in the central nervous system that can lead to increased pain

for days after the initial tissue injury.

The phenomena of peripheral and central sensitization are probably additive and contribute to both the intensity and duration of postoperative pain

1. The use of a long-acting local anesthetic for a dental procedure results in less pain over the first four to eight hours postoperatively in comparison to lidocaine with epinephrine that subsequently results in less pain over the 48 hours after the procedure.
2. The combination of NSAID pretreatment before pain onset and a long-acting local anesthetic additively reduces pain following oral surgery, as a model of acute dental pain, such that patients report little pain over the first six to seven hours postoperatively.
3. Preventive administration of NSAIDs results in less postoperative pain than traditional opioid- containing analgesic combinations with fewer side effects and no potential for opioid abuse or misuse.

A = Anti Inflammatory Drugs:

Administration of an NSAID in the preoperative period allows sufficient time for drug absorption during the procedure and the one to two hours of local anesthetic duration postoperatively.

1. Preoperative administration of 400mg of ibuprofen was demonstrated to increase time to the first request for postoperative analgesic medication by approximately two hours.
2. Preoperative administration of 800 mg of ibuprofen significantly lowered pain intensity over the first few hours after oral surgery as the effects of local anesthesia dissipated.
3. Administration of a second dose four hours after the initial dose extended this preventive analgesic effect to result in less pain than placebo and acetaminophen given pre- and postoperatively or acetaminophen plus 60 mg of codeine administered postoperatively.
4. Opioids do not have any acute anti-inflammatory effects and allow inflammation to be initiated in the immediate postoperative period, leading to acute pain and inflammation.
5. NSAIDs are generally more efficacious than aspirin, acetaminophen or combinations of these two drugs with an opioid, presumably due to the inflammatory cause of most dental pain and the NSAIDs’ prominent anti-inflammatory effects. When used as directed for OTC dosing regimens, ibuprofen, ketoprofen and naproxen sodium are both safe and effective for most patients across a wide variety of dental pain conditions.

I = Individualize

| | |
|-------------------------------------|--|
| <p>1. MEDICAL HISTORY</p> | <ul style="list-style-type: none"> • Avoid opioid if any previous drug abuse or alcoholism. • Avoid opioid if history of nausea or vomiting from previous opioid administration. • Avoid acetaminophen if current or previous liver disease. • Avoid NSAID if history of ulcers, irritable bowel disease, renal disease or cardiovascular disease. • Avoid any drug in same class if previous history of allergy. |
| <p>2. FAMILY HISTORY</p> | <ul style="list-style-type: none"> • Avoid opioid exposure if family history of drug abuse. |
| <p>3. BODY WEIGHT</p> | <ul style="list-style-type: none"> • Consider greater analgesic dose if BMI > 30. • Consider lower analgesic dose if BMI < 18. |
| <p>4. CLINICAL PROCEDURE</p> | <ul style="list-style-type: none"> • Premedication with NSAID and use of long-acting local anesthetic indicated if surgical procedure makes severe postoperative pain likely. • Pre-existing infection may interfere with local anesthetic efficacy, carefully test for signs of anesthesia before initiating procedure. |

| | |
|--------------------------------------|---|
| 5. PATIENT APPREHENSION | <ul style="list-style-type: none"> • Patient self-report of “somewhat nervous” about the procedure, consider use of nitrous oxide to minimize intraoperative pain perception. • Patient self-report of “moderately nervous” about the procedure, consider use of enteral sedation with a benzodiazepine to minimize pain perception and recall. • Patient report of “very nervous” or “terrified” about procedure, consider use of parenteral sedation or general anesthesia. |
| 6. RISK FACTOR FOR DRUG ABUSE | <ul style="list-style-type: none"> • Avoid any opioid if patient identifies necessity or personal perception for oxycodone or hydrocodone containing combinations. • Avoid opioid if any history of drug rehabilitation or previous arrest related to drug-seeking behavior. • Avoid opioid if family history of drug abuse due to high heritability of abuse. |

N = Narcotics

Selected Clinical studies evaluating the additive effects of ibuprofen and opioids.

1. Ibuprofen + Codeine

| Drug combination | Indications/Outcome | Citation |
|---------------------------------|---|----------------------|
| 400 mg ibuprofen + 60mg Codeine | Post operative dental pain NS additive analgesia | Cooper at al 1982. |
| 400 mg ibuprofen + 60mg Codeine | Post operative dental pain Additive analgesia Increase adverse effects | Petersen at al 1993. |
| 400 mg ibuprofen + 20mg Codeine | Post operative dental pain Additive analgesia No Increase adverse effects | McQuay at al 1989. |

NS: non significant statistically

1. The **combination** of 400 mg of ibuprofen plus 20-60 mg of codeine in comparison to ibuprofen alone results in modest additive analgesia for one to two hours.
2. The **genetic variability** of **codeine metabolism** results in a wide range of blood levels that can result in effects ranging from no detectable analgesic effect to respiratory depression in children.

2. Ibuprofen + Oxycodone

| Drug combination | Indications/Outcome | Citation |
|------------------------------------|---|--------------------|
| 400 mg ibuprofen + 2.5mg Oxycodone | Post operative dental pain No additive analgesia | Dionne at al 1993. |
| 400 mg ibuprofen + 5mg Oxycodone | Post operative dental pain NS Additive analgesia NS Increase adverse effects Longer time to remedication | Derry at al 2015. |
| 400 mg ibuprofen + 10mg Oxycodone | Post operative dental pain Additive analgesia at one and two hrs. Increase adverse effects | Dionne at al 1993. |

NS: non significant statistically

1. Analgesic combinations containing oxycodone have generally been perceived to be **more effective than codeine**-containing combinations based on the ten- to twelve fold greater potency attributed to oral oxycodone in comparison to oral codeine.
2. If the recommended dose of oxycodone in these **combinations, (5 mg every six hours)** is administered this should result in the **same** analgesia as **50-60 mg of codeine**.

- The results of several clinical trials and two systematic reviews indicate that **5 mg of oxycodone produces analgesia** that is additive to **400 mg of ibuprofen**.
- A 10 mg dose of oxycodone provides even greater additive analgesia but with a dose-related increase in side effects.
- In order to provide **additive analgesia using 400-600 mg of ibuprofen** prior to pain onset, and with continued preventive dosing every four to six hours, an **additional dose of 5-10 mg oxycodone** may provide additional therapeutic benefit but with a problematic incidence of opioid side effects in ambulatory patients, including drowsiness, nausea and vomiting.

2. Ibuprofen + Hydrocodone

| Drug combination | Indications/Outcome | Citation |
|---|--|------------------------|
| 400 mg ibuprofen + 5mg Hydrocodone | Periodontal surgery pain Additive analgesia | Betancourt et al 2004. |
| 200 mg ibuprofen + 7.5mg Hydrocodone | Abdominal or gynecological surgery pain | Wideman et al 1999. |
| 400 mg ibuprofen + 15mg Hydrocodone | Additive analgesia | Wideman et al 1999. |

NS: non significant statistically

- The combination of **200 mg ibuprofen plus 7.5 mg hydrocodone** (Vicoprofen) produces an additive effect than either of the drugs alone at these doses, but there is no evidence that the level of analgesia provided is **greater than 400-600 mg of ibuprofen alone**.
- The therapeutic advantage of this combination is the ability to administer the hydrocodone in addition to preventive ibuprofen in patients who still report sufficient unrelieved pain to justify the adverse effects and abuse risk of this commonly abused opioid drug.
- Combining one tablet of the marketed fixed-dose combination with 200-400 mg ibuprofen would result in a combined dose of 400-600 mg of ibuprofen plus 7.5 mg hydrocodone.
- Only a **limited number of tablets (N=10- 12) should be prescribed** without any refills and patients should be instructed on the appropriate use and storage of the drug to avoid diversion or misuse.

Conclusion:

- Clinical procedures that warrant postoperative analgesic use will likely produce less discomfort for the patient and a more predictable postoperative course by shifting from traditional acetaminophen- or aspirin-oral opioid combinations to a preventive strategy.
- Administration of 400- 600 mg ibuprofen or a similar NSAID that the patient tolerates prior to the procedure or immediately afterward will result in delayed onset and less intensity of pain due to the suppression of inflammatory mediators released by tissue injury.
- Use of a long-acting local anesthetic should attenuate the development of hyperalgesia by blocking the afferent nociceptive barrage that results in greater pain that can persist for two to three days.
- Combining these two preventive strategies results in additive effects that can minimize pain following surgical procedures with minimal adverse effects.
- Due to the wide individual variability that exists across the patient population, some individuals will still report pain that warrants intervention.
- Administration of an opioid-containing NSAID combination such as oxycodone or hydrocodone without lowering the NSAID dose can result in additional relief for the two- to three-day postoperative period when pain is maximal.
- Only a limited amount of the opioid-combination should be prescribed and parents or a significant other should manage the dosing and frequency of administration.
- All unused opioid-containing drug supplies should be destroyed or returned to the pharmacy as the pain subsides.
- Any continued requests for opioids should be met with concern and require an exam to confirm the nature of the problem and to rule out complications such as infection that are not appropriately treated with an opioid.

Reference:

1. Changing Paradigms for Acute Dental Pain: Prevention is Better Than PRN; Raymond A. Dionne, DDS, PhD, and Sharon M. Gordon, DDS, MPH, PhD; CDA Jr, Vol 43; No 11, Nov 2015.
2. Institute of Medicine. (2011). Relieving pain in America: A blueprint for transforming, prevention, care, education and research. The National Academies Press.
3. Centers for Disease Control and Prevention. Opioids drive continued increase in drug overdose deaths. www.cdc.gov/media/releases/2013/p0220_drug_overdose_deaths.html. Accessed May 25, 2015.
4. Jones CM, Mack KA, Paulozzi LJ. Pharmaceutical overdose deaths, United States 2010. *JAMA* 2013; 309:657-9.
5. Executive Summary: The role of dentists in preventing opioid abuse. Tufts Health Care Institute Program on Opioid Risk Management. 12th Summit Meeting. March 11-12, 2010. www.thci.org/opioid/mar10docs/executivesummary.pdf. Accessed May 18, 2015.
6. Derry S, Wiffen PJ, Moore RA. Relative efficacy of oral analgesics after third molar extraction — A 2011 update. *Brit Dent J* 2011; 211:419-420.
7. McQuay HJ, Derry S, Eccleston C, Wiffen PJ, Moore RA. Evidence of analgesic effects in acute pain — 50 years on. *Pain* 2012; 153:1364-67.
8. Kim H, Mittal D, Iadarola MJ, Dionne RA. Genetic predictors for acute experimental cold and heat pain sensitivity in humans. *J Med Gen* 2006; 46:e40.
9. Kim H, Neubert JK, Rowan J, Brahim J, Iadarola MJ, Dionne RA. Comparison of experimental and acute clinical pain responses in humans as pain phenotypes. *J Pain* 2004; 5:377-384.
10. Aubrun F, Langeron O, Quesnel C, Coriat P, Riou B. Relationships between measurement of pain using visual analog score and morphine requirements during postoperative intravenous morphine titration. *Anesthesiology* 2003; 98:1415- 21.
11. Cooper SA, Precheur H, Rauch D, Rosenheck A, Ladov M, Engel J (1980). Evaluation of oxycodone and acetaminophen in treatment of postoperative dental pain. *Oral Surg Oral Med Oral Pathol* 50: 496-501.
12. Derry S, Deery SJ, Moore RA. Single dose oral ibuprofen plus oxycodone for acute postoperative pain in adults (review). *Cochrane Database Syst Rev* 2013; issue 6. doi: 10.1002/14651858.CD010289.pub2.
13. Oldfield V, Perry CM. Oxycodone/ibuprofen combination tablet. *Drugs* 2005; 65:2337-2354.
14. Betancourt JW, Kupp LI, Jasper SJ, Farooqi OA. Efficacy of ibuprofen-hydrocodone for the treatment of postoperative pain after periodontal surgery. *J Periodontol* 2004; 75:872-876.
15. Sunshine A, Olson NZ, O'Neill E, Ramos I, Doyle R. Analgesic efficacy of a hydrocodone with ibuprofen combination compared with ibuprofen alone for the treatment of acute postoperative pain. *J Clin Pharmacol* 1997; 37:908- 15
16. Wideman GL, Keffer M, Morris E, Doyle RT, Jiang JG, Beaver WT. Analgesic efficacy of a combination of hydrocodone with ibuprofen in postoperative pain. *Clin Pharmacol Ther* 1999; 65:66-76.