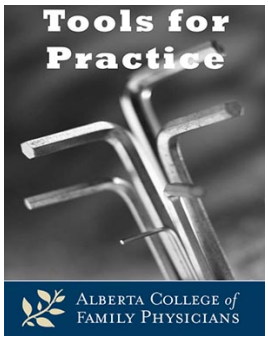
Tools for Practice is proudly sponsored by the Alberta College of Family Physicians (ACFP). ACFP is a provincial, professional voluntary organization, representing more than 4,000 family physicians, family medicine residents and medical students in Alberta. Established over fifty years ago, the ACFP strives for excellence in family practice through advocacy, continuing medical education and primary care research. www.acfp.ca

Reviewed: July 13, 2016
Evidence Updated: No new evidence
Bottom Line: No change
First Published: November 16, 2009



Optimal Pain Relief for Acute Pediatric Musculoskeletal Injuries – NSAIDs or Opioids?

Clinical Question: In children with acute musculoskeletal (MSK) injuries, what is the optimal approach to pain management?

Bottom-line: Current evidence suggests that ibuprofen provides better single-agent relief than acetaminophen or codeine, and is at least equivalent to both acetaminophen with codeine and morphine for acute injury related pediatric pain, with fewer adverse events.

Evidence:

- Single-agent comparisons:
  - Ibuprofen versus acetaminophen versus codeine: Randomized Controlled Trial (RCT)[1] of 336 children with MSK injuries (54% fractures):
    - At 60 minutes on 100mm pain scale, ibuprofen led to:
      - Greater mean reduction (-24mm) versus acetaminophen (-12mm) or codeine (-11mm).
      - More patients achieving adequate analgesia (<30 mm) versus acetaminophen [Numbers Needed to Treat (NNT)=7] or codeine (NNT=9).
  - Morphine versus ibuprofen: RCT[2] of 134 children with uncomplicated extremity fractures given ibuprofen or morphine, followed 24 hours:
    - No difference in pain score at any time point.
    - Less nausea with ibuprofen (NNT=5).
- Combinations: Two RCTs with arm fracture or MSK limb trauma:
  - Acetaminophen + codeine versus ibuprofen[3] (336 children), followed three days:
    - No difference in mean pain scores.
    - Ibuprofen resulted in significantly less pain-related functional limitation.
    - Less adverse events with ibuprofen (NNT=5).
  - Ibuprofen + codeine versus ibuprofen[4] (81 children), followed 120 minutes.
    - No difference pain score at any of four time points.
- Four smaller (underpowered) RCTs[5-8] with 60-72 patients found no difference in any comparison of ibuprofen, acetaminophen, oxycodone, or acetaminophen-codeine.

- Limitations of evidence: Small size,[2,4,5-8] high drop-out rates,[2] low pain scores at study entry (making it harder to show a difference),[2] and dosing of morphine (every six hours).[4]

Context:

- In one systematic review[9] of ibuprofen versus acetaminophen for any pediatric pain, ibuprofen was statistically significantly better in 6/18 trials (others showed no difference).
- Study doses[1-4] were ibuprofen 10 mg/kg (max 400-600 mg), acetaminophen 15 mg/kg (max 650 mg), codeine 1 mg/kg (max 60 mg) and morphine 0.5 mg/kg (max 10 mg).
- NSAIDS do not appear to impact fracture healing.[10]
- Health Canada warning 2013: Codeine can be (rarely) associated with serious side effects and thus should not be used in children <12 years.[11]

Original Authors:
Christina Korownyk MD CCFP, G Michael Allan MD CCFP

Updated:
Ricky D Turgeon BSc(Pharm) ACPR PharmD

Reviewed:
G. Michael Allan MD CCFP

References:

1. Clark E, Plint AC, Correll R, *et al*. Pediatrics. 2007; 119:460-7.
2. Poonai N, Bhullar G, Lin K, *et al*. CMAJ. 2014 Dec 9; 186(18):1358-63.
3. Drendel AL, Gorelick MH, Weisman SJ, *et al*. Ann Emerg Med. 2009; 54:553-60.
4. Le May S, Gouin S, Fortin C, *et a*l. J Emerg Med. 2013; 44:536-42.
5. Koller DM, Myers AB, Lorenz D, *et al*. Pediatr Emerg Care. 2007; 23:627-33.
6. Shepherd M, Aickin R. Emerg Med Australas. 2009; 21:484-90.
7. Friday JH, Kanegaye JT, McCaslin I, *et al*. Acad Emerg Med. 2009; 16:711-6.
8. Bondarsky EE, Domingo AT, Matuza NM, *et al*. Am J Emerg Med. 2013; 31:1357-60.
9. Pierce CA, Voss B. Ann Pharmacother. 2010; 44:489-506.
10. Taylor IC, Lindblad AJ, Kolber MR. Fracture healing and NSAIDs. Can Fam Physician. 2014; 60:817, e439-40.
11. Health Canada. *Health Canada's review recommends codeine only be used in patients aged 12 and over*. Ottawa: Health Canada; 2013. Available from: http://healthycanadians.gc.ca/recall-alert-rappel-avis/hc-sc/2013/33915a-eng.php?_ga=1.225644442.1625660531.1411482248. Accessed March 24, 2015.

Tools for Practice is a biweekly article summarizing medical evidence with a focus on topical issues and practice modifying information. It is coordinated by G. Michael Allan, MD, CCFP and the content is written by practicing family physicians who are joined occasionally by a health professional from another medical specialty or health discipline. Each article is peer-reviewed, ensuring it maintains a high standard of quality, accuracy, and academic integrity.

The ACFP has supported the publishing and distribution of the Tools for Practice library since 2009. If you are not a member of the ACFP and would like to receive the TFP emails, please sign up for the distribution list at http://bit.ly/signupfortfp. Archived articles are available at no extra cost on the ACFP website.