Balancing Comfort and Safety in Pain Management

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Presentation from Joseph R. Hsu, MD
Vice Chair of Quality, Atrium Health Musculoskeletal Institute
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Disclosures

• Stryker – Consulting, Speaker
• Smith & Nephew – Consulting, Speaker
• Deupuy Synthes – Speaker
• Integra Lifesciences – Speaker

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• Guidelines Decision Support
  • Funding from CDC (102114-1)

• CDC R01: Implementing a Multimodal Path to RecOVEry (IMPROVE): Primary and Secondary Prevention of Opioid Overdose in Acute Care (Mental Health, Substance abuse, OUD)
  • 1 R01 CE003001-01
Prescription rates down, deaths still up
Balance

Safety  Comfort
CDC Clinical Practice Guideline for Prescribing Opioids for Pain — United States, 2022

Recommendations and Reports / November 4, 2022 / 71(3);1–95

Deborah Dowell, MD1; Kathleen R. Ragan, MSPH1; Christopher M. Jones, PharmD, DrPH2; Grant T. Baldwin, PhD1; Roger Chou, MD3 (VIEW AUTHOR AFFILIATIONS)
The Dream Team!

Clinical Practice Guidelines for Pain Management in Acute Musculoskeletal Injury

Joseph R Hsu, Hassan Mir, Meghan K Wally, Rachel B Seymour, Orthopaedic Trauma Association Musculoskeletal Pain Task Force

Collaborators, Affiliations — collapse

Collaborators

Orthopaedic Trauma Association Musculoskeletal Pain Task Force: Kristin R Archer, Basem Attum, Chad Coles, Jarrod Dumpe, Edward Harvey, Thomas Higgins, Joseph Hoegler, Jane Z Liu, Jason Lowe, Christiaan Mamczak, J. Lawrence Marsh, Anna N Miller, William Obremskey, Michael Ransone, William Ricci, David Ring, Babar Shafiq
Our Intent

- Practical
- Make real recommendations
- Open access
- Publish methodology
  - ID gaps
True Multimodal

Pharmaceutical
- Opioids
- NSAIDs
- Acetaminophen
- Gabapentin
- Ketamine
- Topical agents

Physical
- Field blocks
- Peripheral blocks
- Neuraxial blocks
- Cryotherapy
- Electrical Stimulation (ie; TENS)

Unknown
- Acupuncture
- Massage
- Reiki

Cognitive
- Aromatherapy
- Distraction therapy
- Music/Animal therapy
- Meditation/Guided imagery
- Mindfulness/Biofeedback
- Psychotherapy
• Recommendation 1

Nonopioid therapies are at least as effective as opioids for many common types of acute pain. Clinicians should maximize use of nonpharmacologic and nonopioid pharmacologic therapies as appropriate for the specific condition and patient and only consider opioid therapy for acute pain if benefits are anticipated to outweigh risks to the patient. Before prescribing opioid therapy for acute pain, clinicians should discuss with patients the realistic benefits and known risks of opioid therapy (recommendation category: B; evidence type: 3).

• Recommendation 2

Nonopioid therapies are preferred for subacute and chronic pain. Clinicians should maximize use of nonpharmacologic and nonopioid pharmacologic therapies as appropriate for the specific condition and patient and only consider initiating opioid therapy if expected benefits for pain and function are anticipated to outweigh risks to the patient... consider how opioid therapy will be discontinued if benefits do not outweigh risks (recommendation category: A; evidence type: 2).
Clinical Practice Guidelines for Pain Management in Acute Musculoskeletal Injury

Joseph R. Hsu, MD,* Hassan Mir, MD,† Meghan K. Wally, MSPH,* and Rachel B. Seymour, PhD,*
the Orthopaedic Trauma Association Musculoskeletal Pain Task Force

APPENDIX 1. Members of the Orthopaedic Trauma Association Musculoskeletal Pain Task Force

Kristin R. Archer, PhD, DPT: Department of Physical Medicine and Rehabilitation, Vanderbilt University Medical Center, Nashville, TN. Basem Attum, MD: Department of Orthopaedic Surgery, University of Louisville School of Medicine, Louisville, KY. Chad Coles, MD: Department of Orthopaedic Surgery, Dalhousie University School of Medicine, Halifax, Nova Scotia, Canada. Jarrod Dume, MD: Department of Orthopaedic Surgery, Navicent Health, Macon, GA. Edward Harvey, MD: Division of Orthopaedic Surgery, McGill University Health Centre, Montreal, QC, Canada. Thomas Higgins, MD: Department of Orthopaedic Surgery, University of Utah, Salt Lake City, UT. Joseph Hoegler, MD: Department of Orthopaedic Surgery, Henry Ford Hospital; Detroit, MI. Jane Z. Liu, MD: Department of Orthopaedic Surgery, Case Western Reserve University, Cleveland, OH. Jason Lowe, MD: Department of Orthopaedics, Banner Health University of Arizona, Tucson, AZ. Christiaan Mamczak, DO: Orthopaedics and Sports Specialists, Beacon Health System; South Bend, IN. J. Lawrence Marsh, MD: Department of Orthopaedics and Rehabilitation, University of Iowa Health Care, Iowa City, IA. Anna N. Miller, MD: Division of Orthopaedic Trauma, Washington University Orthopaedics, St. Louis, MO. William Obremskey, MD: Orthopaedic Surgery and Rehabilitation, Vanderbilt University Medical Center, Nashville, TN. Michael Ransone, MD: Department of Orthopaedic Surgery, Carolinas Medical Center, Charlotte, NC. William Ricci, MD: Orthopaedic Trauma Service, Hospital For Special Surgery, New York City, NY. David Ring, MD: Institute of Reconstructive Plastic Surgery of Central Texas, Austin, TX. Babar Shafiq, MD: Department of Orthopaedic Surgery, Johns Hopkins School of Medicine, Baltimore, MD.
Does this apply to children?
Pediatric Surgical services


• 4 tiers of increasing invasiveness for 28 common pediatric orthopaedic procedures
• 91% of all prescriptions were within the guideline parameters
• significantly decrease the quantity of opioids prescribed

• Recommendation 5
• …already receiving opioid therapy… **optimize nonopioid therapies** while continuing… If benefits do not outweigh risks of continued opioid therapy… gradually taper to lower dosages… should **not be discontinued abruptly**, not rapidly reduce opioid dosages from higher dosages (recommendation category: B; evidence type: 4).

• Recommendation 6
• When opioids are needed for acute pain, clinicians should prescribe **no greater quantity than needed** for the expected duration of pain severe enough to require opioids (recommendation category: A; evidence type: 4).
Cognitive

Multimodal Pain Management

Pharmaceutical
- Opioids
- NSAIDs
- Acetaminophen
- Gabapentin
- Ketamine
- Topical agents

Physical
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- Peripheral blocks
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- Cryotherapy
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- Massage
- Reiki

Unknown
- TCA/SNRIs
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- Music/Animal therapy
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- Mindfulness/Biofeedback
- Psychotherapy

Cognitive

Atrium Health
Musculoskeletal Institute

Wake Forest University
School of Medicine
Cognitive

Atrium Musculoskeletal Institute
Dr. Joseph Hsu

Guided Imagery

Guided Imagery is the use of relaxation and positive thoughts to improve physical well-being, health, and mood. It’s a technique used to tap into your inner strength—you are stronger than you think. It helps you take control of a situation that may seem to be out of your hands. It is a good technique that is beneficial for you, your family and friends to use as you collectively navigate your path to recovery.

Below is a simple, yet effective technique:

1. Find a quiet place to sit or lie down and become relaxed. You can use the Deep Breathing or Tenen & Relax methods to first become more relaxed.

2. Clear all thoughts out of your mind and begin to imagine something. You can imagine any of the following, or come up with your own image:
   - Imagine your favorite place (real or imaginary) or a place you would like to go to, like a peaceful lake, a sunny beach, or a beautiful mountain stream.
   - Imagine that your pain or discomfort is an electric current and you can turn it off by turning off the switch.
   - Imagine any pain you have can dissolve into a cloud and it can float away.
   - Imagine having a conversation with your pain or disease; pretend it can talk and imagine what it would say and what you could say back.
   - Imagine you can feel clean water or another liquid flowing through your body and cleansing out all the pain and discomfort.
   - Imagine you are a flower or the sun and you can feel your petals or rays flowing in the air.
   - Imagine you find a key and then a door that enters a room where you can leave all your pain and discomfort.

Whatever you imagine, try to imagine it with all your senses. How warm or cold is it? What do you smell in your image? If you could imagine touching something, how would it feel? What sounds do you hear in your image? What colors do you see? What would you say? How could you feel? There is no right or wrong way to do this! If using this technique does not feel natural at first, give it time—you will get better with practice. Just relax and use your imagination. Start with just 5 minutes and work your way up over time.

Source: charpsoclinic.org

Meditation, Relaxation, Cognitive Behavioral Therapy & Guided Imagery:

Additional Resources

Websites & Apps (available for iOS & Android devices)
- Calm: www.calm.com
- Headspace: www.headspace.com
- Insight Timer: https://insighttimer.com
- American Academy of Orthopaedic Surgeons: https://www.aaos.org/quality/painrelieftools2/?tsopc=1

YouTube
- 10 Minute Self-Healing Meditation for Relief from Injury, Illness, Pain & Negative Thoughts: https://www.youtube.com/watch?v=47Esk9kFEGQ
- 20 Minute Guided Mindfulness Meditation on Coping with Pain: https://www.youtube.com/watch?v=plGte3l1Dh4
- STOPP Relaxation Technique: https://www.youtube.com/watch?v=SMDxXu3Y7xs
- Progressive Relaxation for Stress Relief & Pain Management: https://www.youtube.com/watch?v=PUmDQTingWo
Web based

- Psychological therapies via the Internet reduced pain, disability, depression, and anxiety post-treatment. The positive effects on disability were maintained at follow-up.

Cell phone app

"The more you use Headspace to meditate, the easier it will be to be mindful in everyday life — including eating and diet."
Music Induced Analgesia

• 51 studies
• 3663 subjects
• reduced pain
• increased the number of patients who reported at least 50% pain relief
• reduced requirements for morphine-like analgesics
• Small effect size

Music Induced Analgesia – chronic pain

• Reduced self-reported chronic pain and depressive symptoms
• Found music had greater effect when the patient chose music

Music Induced Analgesia – post op

- Reduced postoperative pain (SMD -0.77 [95% CI -0.99 to -0.56]), anxiety (-0.68 [-0.95 to -0.41]), and analgesia use (-0.37 [-0.54 to -0.20]), and
- Increased patient satisfaction (1.09 [0.51 to 1.68]), but length of stay did not differ (SMD -0.11 [-0.35 to 0.12])

MIA – Ortho?

• Reducing pain [standard mean difference (SMD) = -0.27; p = 0.002] and anxiety (SMD = -0.40; p = 0.0009).

• No statistically significant difference opioids

Music for kids?

• Positive effect was demonstrated postop pain (SMD -1.07; 95% CI -2.08; -0.07) and on anxiety and distress (SMD -0.34 95% CI -0.66; -0.01 and SMD -0.50; 95% CI -0.84; -0.16.

GetWellNetwork – Help With My Comfort

Main Benefits include but are not limited to:

- Comfort
- Relaxation
- Pain Management
A Systematic Review on the Anxiolytic Effects of Aromatherapy in People with Anxiety Symptoms

Yuk-Lan Lee, BSc; Ying Wu, BSc; Hector W.H. Tsang, PhD; Ada Y. Leung, MA; and W.M. Cheung, PhD

THE JOURNAL OF ALTERNATIVE AND COMPLEMENTARY MEDICINE
Volume 17, Number 2, 2011, pp. 101–108

- 16 RCTs
- Anxiolytic effects of aromatherapy
- Anxiety
- Pain
- Nausea
The Effectiveness of Aromatherapy in Reducing Pain: A Systematic Review and Meta-Analysis

Shaheen F. Lakhan,1,2 Heather Shearer,1 and Deborah Tenner3
Pain Research and Treatment
Volume 2016, Article ID 8158693, 13 pages

• Better for acute than chronic
• Strongest effect: postoperative
Guided meditation

https://www.youtube.com/watch?v=krKXXmnlQ80
Nociception vs. Pain

• Nociception
  • sensory nervous system's response to certain harmful or potentially harmful stimuli

• Pain
  • cognitive and emotional response to nociception


https://www.youtube.com/watch?v=Tt52qS5Zttk&feature=youtu.be
Physical

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Cryo

Cryotherapy

Also known as cold therapy, cryotherapy uses cold temperatures to help with pain following an injury or a surgical procedure by decreasing swelling and delaying nerve conduction which basically "numbs the nerves". Using a bag of ice or an ice pack is fine, but it can sometimes be messy or difficult to apply to certain parts of the body.

Below are resources where you could purchase or rent various forms of cold therapy to use at home. They are available at various online retailers including Amazon. In some instances, these can also be ordered through a home health agency or a DME (durable medical equipment) company, our office will be happy to assist you with this if needed.

*Dr. Jiau or Atrium Musculoskeletal Institute is not affiliated with any of the listed products

- Chattanooga Cold Pac Wraps
  - Reusable, polyurethane. Available in many shapes and sizes to use on upper and lower extremities, neck and back
- Donjoy Durabond Therapy
  - Wraps for the shoulder, knee, wrist, foot & ankle, neck and back
  - www.donjoyglobal.com
- OZ Compression/Cold Supports
  - Provides both compression and cryotherapy. Available for use with the knee, shoulder, ankle, wrist and back
- Polar Ice Products
  - Cooling machines and wraps. Available for use with various parts of the body
  - www.polariceproducts.com
- My Cold Therapy
  - Personal cooling units
  - www.mycoldtherapy.com
Cryotherapy

- Can decrease pain & opioids
  - Variable effect size


- Standard cryo effective
TENS: Transcutaneous electrical nerve stimulation

https://youtu.be/epJkK__nibU
TENS Handouts

By Elaine Shing, MD, PhD

TENS Unit Guidelines for Patients

Introduction:
- You, or a family member, may have been offered a TENS machine to wear after surgery or injury.
- The TENS machine works by sending small electrical signals through sticky pads attached to the skin. This is NON-INVASIVE. We encourage you to think of it as a message.
- Our hope is that the TENS machine will help reduce your pain after surgery or injury.

* You can use your own TENS machine if you want. These are step-by-step instructions for the machine we provide. Use these instructions as general guidelines to set up your own machine. *

If You Choose to Use Our Machine:

How to Use the Machine:
1. Turn it on using the power button (red arrow). Make sure the knobs on top are also turned on.
2. Press and hold MODE (blue arrow) until the machine says MANUAL. Press MODE again; keep pressing and releasing until you reach the setting F2. Make sure your machine is on F2 every time you use it.
3. F1 lets you change how strong the electrical signals are so that it fits your body.
4. VERY IMPORTANT: Set the signals to be as strong as you can tolerate before it becomes painful. You might find that your body gets used to one signal setting, and you will have to increase it.
   a. To increase or decrease the signal strength, use the UP and DOWN ARROW arrows (green circles). This changes the Hz (frequency), which you will feel as MORE or LESS intense electricity. Adjust to your comfort.
   b. We recommend staying in the 40-100 Hz range.
5. Select TIME (yellow) and set the duration to the amount of time you desire. The machine will turn off automatically after this amount of time.

How Often to Use the Machine:
We recommend using 3-4 times day for 30 minutes every time. You can use the machine more than 4 times per day if needed.

If You Choose to Use Your Own Machine:
- Set your machine to MANUAL, MODE, or you can adjust the strength of the electrical signals.
- Set the signals to be as strong as you can tolerate before it becomes painful. You might find that your body gets used to one signal setting, and you will have to increase it.
- We recommend using the machine 3-4 times day for 30 minutes every time. You can use it more than 4 times per day if needed.
Gate Control Theory

Pain Stimulus

Small Peripheral Nerve Fibers (Aδ & C)

Large Peripheral Nerve Fibers (Aα & Aβ)

T = Transmission Cell
I = Inhibitory Interneuron

Attenuate pain signal
Distraction signal

Attenuate pain signal

Wake Forest University School of Medicine
Atrium Health
PACU: Cryo + TENS
Pharmaceutical

Multimodal Pain Management

**Pharmaceutical**
- Opioids
- NSAIDs
- Acetaminophen
- Gabapentin
- Ketamine
- Topical agents

**Physical**
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- Reiki

**Unknown**
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- Music/Animal therapy
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- Mindfulness/Biofeedback
- Psychotherapy

**Cognitive**
• Recommendation 3
• When starting opioid therapy for acute, subacute, or chronic pain, clinicians should prescribe **immediate-release opioids** instead of extended-release and long-acting (ER/LA) opioids (recommendation category: A; evidence type: 4).

• Recommendation 4
• When opioids are initiated for opioid-naïve patients with acute, subacute, or chronic pain, clinicians should prescribe the **lowest effective dosage**. If opioids are continued for subacute or chronic pain, …should carefully evaluate individual benefits and risks when considering increasing dosage, and should **avoid increasing dosage above levels likely to yield diminishing returns in benefits relative to risks to patients** (recommendation category: A; evidence type: 3).
Prescribe with Precision

• Hydrocodone 5mg
  • 1po q6h = 20 MME/d (4 pills)
  • 2 po q4h = 60 MME/d (12 pills)

• Oxycodone 5mg
  • 1 po q6h = 30 MME/d (4 pills)
  • 2 po q4h = 90 MME/d (12 pills)

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Table 1: Opioid equianalgesic doses

<table>
<thead>
<tr>
<th>Opioid</th>
<th>Approximate equianalgesic dose (oral and transdermal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine (reference)</td>
<td>30 mg</td>
</tr>
<tr>
<td>Codeine</td>
<td>200 mg</td>
</tr>
<tr>
<td>Fentanyl transdermal</td>
<td>12.5 μg/h</td>
</tr>
<tr>
<td>Hydrocodone</td>
<td>30 mg</td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>7.5 mg</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>20 mg</td>
</tr>
<tr>
<td>Oxymorphone</td>
<td>10 mg</td>
</tr>
</tbody>
</table>

*aThis table should only be used for calculating daily morphine equivalent dose from all sources of opioids, not for conversion from one opioid to another."32

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How much is 50 or 90 MME/day for commonly prescribed opioids?

50 MME/day:
- 50 mg of hydrocodone (10 tablets of hydrocodone/acetaminophen 5/300)
- 33 mg of oxycodone (~2 tablets of oxycodone sustained-release 15 mg)
- 12 mg of methadone (~3 tablets of methadone 5 mg)

90 MME/day:
- 90 mg of hydrocodone (9 tablets of hydrocodone/acetaminophen 10/325)
- 60 mg of oxycodone (~2 tablets of oxycodone sustained-release 30 mg)
- ~20 mg of methadone (4 tablets of methadone 5 mg)
## Inpatient medication recommendations

<table>
<thead>
<tr>
<th>Status</th>
<th>Opioid</th>
<th>Nonopioid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient</td>
<td>Oxycodone/acetaminophen 5 mg/325 mg 1 tab po q 4 h PRN moderate pain 5 mg/325 mg 2 tabs po q 6 h PRN severe pain (hold next acetaminophen scheduled dose) Hydromorphone 1 mg IV q 3 h PRN for severe breakthrough pain</td>
<td>Ketorolac 15 mg IV q 6 h × 5 doses, followed by ibuprofen 600 mg po q 8 h Gabapentin 100 mg 1 tab po TID Scheduled acetaminophen 500 mg po q 12 h</td>
</tr>
<tr>
<td>Postdischarge</td>
<td>Oxycodone/acetaminophen 5 mg/325 mg 1 tab po q 4 h PRN Dispense #42 (1 time Rx, no refills) Hydrocodone/acetaminophen 5 mg/325 mg or tramadol 50 mg (only if necessary—3 Rx Max)</td>
<td>Ibuprofen 600 mg po q 8 h × 7 d (Rx given) Gabapentin 100 mg 1 tab po TID × 7 days (Rx given) Scheduled acetaminophen 500 mg po q12 h × 7 d (can increase as combined opioid analgesic decreases) NSAIDs PRN as directed Gabapentin if necessary (up to 1800 mg/d)</td>
</tr>
<tr>
<td>Week 1 (at discharge)</td>
<td>1 tab po q 4 h PRN Dispense #42</td>
<td>Scheduled acetaminophen 500 mg po q12 h (can increase as combined opioid analgesic decreases)</td>
</tr>
<tr>
<td>Week 2</td>
<td>1 tab po q 6 hours PRN Dispense #28</td>
<td>Scheduled acetaminophen 1000 mg po q12 h (can increase as combined opioid analgesic decreases)</td>
</tr>
<tr>
<td>Week 3</td>
<td>1 tab po q 8 hours PRN Dispense #21</td>
<td>Scheduled acetaminophen 1000 mg po q12 h (can increase as combined opioid analgesic decreases)</td>
</tr>
<tr>
<td>Weeks 5+</td>
<td></td>
<td>NSAIDs PRN as directed Acetaminophen PRN as directed Gabapentin if necessary (then wean)</td>
</tr>
</tbody>
</table>

Dosage and duration can be less if tolerated.  
*In conjunction with other best practice recommendations and individualized per treating physician discretion according to patient characteristics, local practice preferences, and state law.*  
PRN, pro re nata, “as needed”; TID, ter in die, three times per day.
OTA Acute MSK Pain Task Force Taper

- Major MSK surgery

<table>
<thead>
<tr>
<th>Week Discharge</th>
<th>Oxycodeone/Acetaminophen 5mg/325mg 1 tab po q 4 hours PRN Dispense - #42 (1 time Rx, No Refills)</th>
<th>Ibuprofen 600mg po q 8 hours x 7 days (Rx Given) Gabapentin 100mg 1 tab po TID x 7 days (Rx given) Scheduled Acetaminophen 500mg po q12 hours x 7 days (can increase as combined opioid analgesic decreases)</th>
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OTA Acute MSK Pain Task Force Taper

- Minor MSK surgery

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<tr>
<th>Status</th>
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<th>Non-opioid</th>
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</thead>
<tbody>
<tr>
<td>Post Discharge</td>
<td>Hydrocodone/Acetaminophen 5mg</td>
<td>Ibruprofen 600mg po q 8 hours x 7 days (Rx Given)</td>
</tr>
<tr>
<td></td>
<td>325mg or Tramadol 50mg 1 tab po q 6 hours PRN</td>
<td>Gabapentin 100mg 1 tab po TID x 7 days (Rx given)</td>
</tr>
<tr>
<td></td>
<td>Dispense - #28 (1 time Rx, No Refills)</td>
<td>Scheduled Acetaminophen 1000mg po q 12 hours (can increase as combined opioid analgesic decreases)</td>
</tr>
<tr>
<td>Week 1</td>
<td>Hydrocodone/Acetaminophen 5mg</td>
<td>NSAIDs PRN as directed (up to 1800mg day)</td>
</tr>
<tr>
<td></td>
<td>325mg or Tramadol 50mg (Only IF Necessary – 2 Rx Max)</td>
<td>Gabapentin if Necessary</td>
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<td></td>
<td>1 tab po q 8 hours PRN Dispense - #21</td>
<td>Scheduled Acetaminophen 1000mg po q 8 hours (can increase as combined opioid analgesic decreases)</td>
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<tr>
<td>Week 2</td>
<td>Scheduled Acetaminophen 1000mg po q 12 hours PRN Dispense #14</td>
<td>NSAIDs PRN as directed (can increase as combined opioid analgesic decreases)</td>
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OTA Acute MSK Pain Task Force Taper

- Non-operative

<table>
<thead>
<tr>
<th>Injury Category</th>
<th>Opioid</th>
<th>Non-Opioid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minor Injury (e.g. small bone fracture, sprain, laceration, etc.)</td>
<td>Tramadol 50mg (Only If Necessary - 2 Rx Max)</td>
<td>NSAIDs PRN as directed Scheduled Acetaminophen 1000mg po q8 hours, then PRN as directed</td>
</tr>
<tr>
<td></td>
<td>1 tab po q 6 hours PRN Dispense - #20, then #10</td>
<td></td>
</tr>
<tr>
<td>Major Injury (e.g. large bone fracture, rupture, etc.)</td>
<td>Hydrocodone/Acetaminophen 5mg/325mg or Tramadol 50mg (Only If Necessary - 2 Rx Max)</td>
<td>NSAIDs PRN as directed Scheduled Acetaminophen 1000mg po q12 hours, then PRN as directed</td>
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NSAID’s

- They work after surgery


Postoperative Opioid Administration Inhibits Bone Healing in an Animal Model

Jesse Chrestil MD, Christopher Sampson BS, Kevin B. Jones MD, Thomas F. Higgins MD

Percent Strength Ratio

- Control
- Morphine

P = 0.048

4-Week % Strength Ratio
8-Week % Strength Ratio

Fig. 2 Micro-CT images at 4 weeks and 8 weeks postoperatively. Gross evaluation of μCT images reveals immature callus surrounding the osteotomy site, lack of bridging bone, and persistence of osteotomy lucency. The control and morphine groups have a qualitatively similar appearance at the 4-week time point. More notable differences can be seen at the 8-week time point. Callus resorption and interval cortical bridging are seen in the control group, whereas this is less apparent in the morphine group. There is less evidence of remodeling and persistent fibrous interposition at the osteotomy site.
Ketorolac (Toradol)

IV Ketorolac trometamol: as effective as morphine for surgical pain and pain related to cancer, and it has fewer side effects.


GI haemorrhage risk only slightly higher with ketorolac than morphine (odds ratio 1.17 (95% CIs 0.991.13)); risk rises sharply more than five days or in patients older than 75

What about bleeding??

• RCT pediatric tonsillectomy
• Desaturation events increased substantially in the morphine group
  • average increase of 11.17 ± 15.02 desaturation events per hour (P < .01)
• no differences seen in analgesic effectiveness, tonsillar bleeding, or adverse drug reactions.

Morphine or Ibuprofen for post-tonsillectomy analgesia: a randomized trial.
Kelly LE, Sommer DD, Ramakrishna J, Hoffbauer S, Arbab-Tafti S, Reid D, Maclean J, Koren G.
OTA CPG in action

• 40 consecutive outpatients
  • peripheral nerve block and a multimodal pain protocol between September 2019 and March 2020
• 70 consecutive pre-protocol patients
  • peripheral nerve block and hydrocodone-acetaminophen.
• Reduced opioid consumption by >50% in the first 4 days, higher satisfaction scores

• Recommendation 9
• …state prescription drug monitoring program (PDMP) data to determine whether the patient is receiving opioid dosages or combinations that put the patient at high risk for overdose (recommendation category: B; evidence type: 4).

• Recommendation 10
• When prescribing opioids for subacute or chronic pain, clinicians should consider the benefits and risks of toxicology testing to assess for prescribed medications as well as other prescribed and nonprescribed controlled substances (recommendation category: B; evidence type: 4).
Prescription reporting with immediate medication utilization mapping (PRIMUM): development of an alert to improve narcotic prescribing

Rachel B. Seymour\textsuperscript{1,2*}, Daniel Leas\textsuperscript{1,2}, Meghan K. Wally\textsuperscript{1,2}, Joseph R. Hsu\textsuperscript{1,2} and the PRIMUM Group
PRIMUM triggers an alert when one of five risk factors is identified in a patient’s health record.

1. **Early Refill**
   - Of current opioid/benzodiazepine prescription (with >50% remaining)

2. **Multiple Visits**
   - Two or more visits in past 30 days to facilities with onsite opioid treatment

3. **Multiple Prescriptions**
   - Three or more opioid/benzodiazepine prescriptions in past 30 days

4. **Past Overdose**
   - On opioids or benzodiazepines

5. **Positive Toxicology Screen**
   - For blood alcohol, cocaine, or marijuana

Prescribers choose to either continue or cancel the prescription.

- **CANCEL**
  - Prescribers initiate appropriate follow-up care

- **CONTINUE**

*Risk factors identified in CDO’s 2018 Guidelines for Prescription Opioids for Chronic Pain.*
*Prescription Narcotic Alert*

Your patient has triggered a ***Prescription Narcotic Alert***

You are attempting to order a prescription narcotic. The following details of history need to be evaluated prior to completion of this order:

3 or more prescriptions in past 30 days
4Meds
tapentadol, 42, 07/08/2016 09:08
oxyCODONE-acetaminophen, 15, 06/23/2016 16:24
oxyCODONE-acetaminophen, 12, 06/22/2016 20:44
oxyCODONE-acetaminophen, 20, 06/17/2016 20:23

More than 50% of Rx remaining
tapentadol, 42, 07/08/2016 09:08

History of Positive toxicology screen
Cocaine, POSITIVE, 03/05/2016 08:06, CMC-NE
Marijuana, POSITIVE, 03/05/2016 08:06, CMC-NE
Marijuana, POSITIVE, 11/18/2015 16:45, CFM China Grove
Marijuana, POSITIVE, 06/22/2010 22:20, CMC-NE

Rule CH5_PRIMUM_HIGH_RISK

Alert Action

- [ ] Cancel prescription
- [ ] Continue prescription

OK
• Recommendation 11
  Clinicians should use particular caution when prescribing opioid pain medication and benzodiazepines concurrently and consider whether benefits outweigh risks of concurrent prescribing of opioids and other central nervous system depressants (recommendation category: B; evidence type: 3).

• Recommendation 12
  Clinicians should offer or arrange treatment with evidence-based medications to treat patients with opioid use disorder. Detoxification on its own, without medications for opioid use disorder, is not recommended for opioid use disorder because of increased risks for resuming drug use, overdose, and overdose death (recommendation category: A; evidence type: 1).
“Opiate naïve”/Extended Release Alert

Alert when extended release opioid is prescribed without a 30-day history of previous prescription.

Extended-release often contain higher doses of medication than immediate-release opioids.
Naloxone Alert

- Alert to prescribe naloxone if:
  - > 50 MME/day
  - Previous overdose
  - Concurrent benzodiazepine
• Recommendation 7

Clinicians should **evaluate benefits** and risks with patients **within 1–4 weeks** of starting opioid therapy for **subacute or chronic pain or of dosage escalation**. Clinicians should regularly reevaluate benefits and risks of continued opioid therapy with patients (recommendation category: A; evidence type: 4).

• Recommendation 8

Before starting and periodically during continuation of opioid therapy, clinicians should **evaluate risk for opioid-related harms** and discuss risk with patients. Clinicians should work with patients to incorporate into the management plan **strategies to mitigate risk**, including **offering naloxone** (recommendation category: A; evidence type: 4).
Discharge Instructions

Safe opioid use and disposal education automatically print on discharge instructions for all encounters with any opioid prescription of any dose or duration.

**How to Safely Use Opioids:**
- Take your drug only as ordered
- Do not share, give away, or sell your opioid. Do not use someone else's opioids
- Keep your opioid in a safe, locked place. Keep them away from children and others like guests, friends, loved ones
- Do not drink alcohol while using opioids
- Unless given by your doctor, do not take benzodiazepines (Xanax®, Valium®), muscle relaxants (Soma®, Flexeril®), Hypnotics (Ambien®, Lunesta®), or other opioids
- Do not drive or use heavy equipment while using opioids

**How to Get Rid of Opioids:**
- You should get rid of any pills you do not use. Your opioids were given to you for a certain problem. Once that problem is over it is against the law to use them for other reasons. Find your local drug "take-back" program or your pharmacy (drug store) mail-back program.
- Or use these steps:
  - Take drugs out of the pill bottle. Mix with cat litter or used coffee grounds
  - Put mixture into bag or a carton you can throw away. Make sure the bag can seal and the carton has a lid
  - Remove the label that has your name and date of birth. Remove the label that has the Rx number. If you can't remove the label, use a marker to cover it
  - Place sealed carton or bag and the empty pill bottle into trash
- For more info, visit: https://apps.deadiversion.usdoj.gov/pubdispsearch/spring/main?execution=e2s1
OUR CONTRIBUTION TO THE SOLUTION

In its first THREE YEARS of use

PRIMUM

Identified risk factors in 1 in 4 patients

This prevented nearly 43,000 high-risk prescriptions for controlled substances across Atrium Health
• 3.1% initiated a pain agreement
• 2.3% prescribed naloxone
As number of risk factors increased, odds of decision influenced increased.
“Decision Influenced” Over Time – 3 years

Among encounters who received alert, % of encounters with Response To Alert= Canceled or None Ordered
Jan 2016-Jul 2019

Filled in symbols represent special cause variation

1 in 5 encounters sustained over 42 months
Results

• Clinical decision support interventions sequentially launched
  • January 2016-July 2019
  • 2,368,118 encounters
• Alert triggered in 23.5% of encounters with prescription
• Prescriber decision influenced in 18.1% of encounters (n=100,301)
• Differences by drug, risk factor, specialty, and facility
What about Satisfaction Scores?

- Higher opioid doses post-op
  - Greater reported pain
  - Decreased satisfaction with pain relief


PRIMUM Satisfaction

- 7,232 comments
  - 10 (0.1%) expressed frustration for not receiving opioids

- Opioid prescriptions
  - minimal association with Press Ganey scores
Primary and Secondary Prevention of Opioid Overdose in Acute Care
(Mental Health, Substance abuse, OUD)

IMPROVE: Implementing a Multimodal Path to Recovery
Elements

- Reduction in opioid exposure and opioid monotherapy
- Pathways for intervention on modifiable risk factors
- Appropriate pain management while optimizing patient safety

Order sets to promote multimodal pain management
Targeted screening for depression and substance use
Compiling risk information in workflow view
“Opioid Sparing Pain Management Orders”
## Non-Pharmacologic Pain Management

<table>
<thead>
<tr>
<th>Opioid Sparing Pain Management</th>
</tr>
</thead>
<tbody>
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<td><strong>Non-Pharmacologic Pain Management</strong></td>
</tr>
</tbody>
</table>
| **TENS Unit**  
Routine, 3 times daily. First occurrence today at 1300  
3 times a day Mon Wed Fri PRN for 45 minute(s) |
| **Provide equipment / supplies at bedside**  
Routine, As needed, Small K-thermia pads K-thermia  
Cryotherapy machine Specify body part: *** |
| **Ice to affected area**  
Routine, Until discontinued, Starting today at 1133, Until Specified  
PRN (As needed) place 2 one-gallon, double-bagged, bags of ice in pillowcase and apply to injured area three times a day |
| **Inpatient consult to Music Therapy** |
| **Pet visitation allow**  
Routine, Continuous, Starting today at 1133, Until Specified  
Pet Therapy as needed for pain management |
| **Nursing communication**  
Encourage use of Pandora music streaming  
Routine, Until discontinued, Starting today at 1133, Until Specified  
Encourage use of Pandora music streaming |
Analgesics: Non-Opioids

- **Scheduled Options (For Pain Score Greater Than 0)**
  - **Analgesics: Non-Opioids**
  - **Acetaminophen (TYLENOL) tablet:** 325 mg (5)
    - 325 mg, oral, Every 6 hours, First dose today at 1135
  - **tramADol (ULTRAM) tablet**
    - 25 mg, oral, Every 6 hours
  - **NSAIDs**
    - Contraindicated if history of GI bleed or peptic ulcer disease. Avoid use in renal disease, HF patients, or CAD.
    - **Ibuprofen (MOTRIN) tablet:** 600 mg (5)
      - 600 mg, oral, Every 6 hours, First dose today at 1135
    - **Celecoxib (Celebrex) capsule**
      - 100 mg, oral, 1-2 times daily
    - **Diclofenac (Cataflam) tablet**
      - 50 mg, oral, 2-3 times daily with meals
    - **Naproxen (NAPROSYN) tablet**
      - 250 mg, oral, 2 times daily with meals
    - **Ketorolac Followed By Ibuprofen**
  - **PRN Options (For Pain Score Greater Than 0)**
    - Contraindicated if history of GI bleed or peptic ulcer disease. Avoid use in renal disease, HF patients, or CAD.
    - **Ibuprofen (MOTRIN) tablet** (5)
      - 600 mg, oral, Every 6 hours PRN, mild pain (1-3). May give for pain score 0-10
    - **Ketorolac (TORADOL) tablet** (5)
      - 10 mg, oral, Every 6 hours PRN, mild pain (1-3). May give for pain score 0-10

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Atrium Health
Wake Forest University
School of Medicine
### Analgesics: Moderate Pain

#### Opioid Sparing Pain Management

**Analgesics: Moderate Pain**

**Moderate Pain Options**

- **Administer in conjunction with other non-opioid pharmacologic agent for pain**
  - HYDROcodone-acetaminophen (NORCO) 5-325 mg per tablet ($)
    - 1 tablet, oral, Every 6 hours PRN, moderate pain (4-6)
  - oxyCODONE-acetaminophen (PERCOCET) 5-325 mg per tablet ($)
    - 1 tablet, oral, Every 6 hours PRN, moderate pain (4-6)
  - morphine injection ($$)
    - 2 mg, intravenous, Every 4 hours PRN, moderate pain (4-6)
  - traMADol (ULTRAM) tablet
    - 50 mg, oral, Every 6 hours PRN, moderate pain (4-6)
  - ketorolac (TORadol) injection - **DO NOT** exceed 15 mg for patients >65YO or with SCr > 1.5
    - 15 mg, intravenous, Every 6 hours PRN, moderate pain (4-6), Contraindicated if history of GI bleed or peptic ulcer disease. Avoid use in renal disease, HF patients or CAD.

**Moderate Pain Breakthrough Medications**

- **HYDROcodone-acetaminophen (NORCO) 5-325 mg per tablet ($)**
  - 1 tablet, oral, Every 6 hours PRN, moderate pain (4-6), Breakthrough Pain ONLY, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments
- **oxyCODONE-acetaminophen (PERCOCET) 5-325 mg per tablet ($)**
  - 1 tablet, oral, Every 6 hours PRN, moderate pain (4-6), Breakthrough Pain ONLY, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments
- **morphine injection ($$)**
  - 2 mg, intravenous, Every 4 hours PRN, moderate pain (4-6), Breakthrough Pain Only, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments
 Analgesics: Severe Pain

Administer in conjunction with other non-opioid pharmacologic agent for pain

- oxyCODONE (ROXICODONE) immediate release tablet
  10 mg, oral, Every 6 hours PRN, severe pain (7-10)

- morphine injection
  4 mg, intravenous, Every 4 hours PRN, severe pain (7-10)

- HYDROmorphine (DILAUDID) injection
  0.5 mg, intravenous, Every 4 hours PRN, severe pain (7-10)

Severe Pain Breakthrough Medications

- morphine injection
  4 mg, intravenous, Every 1 hour PRN, severe pain (7-10), Breakthrough Pain ONLY, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments

- HYDROmorphine (DILAUDID) injection
  0.5 mg, intravenous, Every 4 hours PRN, severe pain (7-10), Breakthrough Pain ONLY, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments

- HYDROmorphine (DILAUDID) injection
  1 mg, intravenous, Every 4 hours PRN, severe pain (7-10), Breakthrough Pain ONLY, for 3 doses, Page Physician or APP if pain score does not improve LESS THAN 4 after 3 repeat assessments
Pediatric order sets

- Reduction opioid prescription rates from 65.9% to 30.9%
- Requests outpatient opioid prescriptions did not increase
- No significant change in returns to the emergency ED for pain management

Toolkit
Multimodal Pain Resources

See our website and Supplementary Material in JOT Supplement:

• Patient Education Materials
• (English and Spanish)
  • Compression
  • Cryotherapy
  • Desensitization Therapy
  • Meditation/Guided Imagery
  • Pain Medications
• Pain agreement
• Opioid Tapers
• Multimodal Pain Orderset
Patient facing material
Acute Pain education/Prescribing Policy

CMC Orthopedic Surgery Outpatient Prescription Pain Medication Policy

The Orthopedic Surgery Team strives to provide outstanding care for your injuries and conditions. Our goal is to develop treatment plans that are specific to you. We also have the safety of you and your family first in our mind.

During your journey to improvement from your orthopedic condition, pain is often a part of the normal healing process. We make every effort to have you as comfortable as possible with a variety of methods. Some strategies include prescription pain medications.

"Opioid" pain medications (sometimes called prescription narcotics) have many side effects like constipation, depression, falls, and hyperalgesia (increased sensitivity to pain). They also have a risk of long-term use, addiction, and overdose. Federal and state guidelines for prescription opioid pain medications recommend low dose and using for a short time to minimize these risks for patients.

We used guidelines, medical evidence, and our experience to develop a prescription pain medication policy to manage your pain and comfort safely.

- A variety of strategies will be used to help you manage pain while we gradually step down your prescription pain medication. Please discuss these with our clinic Team. We have resources for you.
- Non-prescription pain medications and non-opioid prescription pain medications can be used to help step down your opioids and may be used after the prescription period. Some examples are acetaminophen (e.g., Tylenol) and ibuprofen (e.g., Advil, Motrin).
- Prescription opioid pain medication may be given a maximum of 8 weeks following surgery. During this period, we will help you comfortably step down your dose each week. By North Carolina Law, these can now only be given 7 days at a time (STOP Act, Session Law 2017- 150, 144).

The CMC Orthopedic Team
New Patient Education

- Created by MSKI Quality Advisory Committee
- Ask your practice manager about ordering
- Available in English and Spanish
- Branding for each region
- Approved by health literacy
New Patient Education

- Created by MSKI Quality Advisory Committee
- Ask your practice manager about ordering
- Available in English and Spanish
- Branding for each region

Pain Management: Myths and Facts

<table>
<thead>
<tr>
<th>Myth</th>
<th>Fact</th>
<th>More Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicines are the best way to lower my pain.</td>
<td>You can use many ways to help control your pain. There are medicines and tools such as cold therapy, meditation, music therapy and aromatherapy.</td>
<td>Scan below to learn more</td>
</tr>
<tr>
<td>Opioid medicines are the only medicines that can help my pain. Examples of opioids are Percocet, Oxycodeone and Hydrocodone.</td>
<td>There are other medicines that can lower pain. There are antinociceptive (Tramadol), anti-inflammatories (Ibuprofen, Motrin, naproxen, and others) and gabapentin. These medicines help to lower the bad side effects of opioids.</td>
<td>Scan below to learn more</td>
</tr>
<tr>
<td>Acetaminophen (Tylenol®) and Ibuprofen (Advil®, Motrin®) are bad for my liver or kidneys. I should not take them.</td>
<td>It is not safe to take too much of any medicine. Unless a doctor told you not to take them, it is safe to take them. You should take them how your doctor tells you.</td>
<td>Scan below to learn more</td>
</tr>
<tr>
<td>Ice or cold therapy makes my pain worse.</td>
<td>The cold may cause discomfort at first. It will help with swelling and numb the nerves. This will help with your pain over time. If you do not like using ice packs, there are other types of cold therapy. You can buy or rent these.</td>
<td>Scan below to learn more</td>
</tr>
</tbody>
</table>

Scan below to learn more.
New Patient Education

- Created by MSKI Quality Advisory Committee
- Ask your practice manager about ordering
- Available in English and Spanish
- Branding for each region

Atrium Health Musculoskeletal Institute

Cryotherapy (cold therapy)

Cold therapy uses a device to keep the area of your body with pain cold longer. This helps with pain after an injury or surgery. It helps with swelling and numbs the nerves. Using a homemade ice pack is fine, but it can be messy. It can also be hard to apply to some parts of the body.

Below are other types of cold therapy. You can buy or rent these to use at home. You can get them at online websites like Amazon. These can also be ordered through a home health agency or medical supply company. Our office will be happy to help you with this if needed.

Where can I buy these?

- Chattanooga ColdPack Wraps®
  - Comes in many shapes and sizes to use on arms, legs, neck, or back
  - [www.chattco.com](http://www.chattco.com)
- DonJoy DuraCold Therapy®
  - Wraps for the shoulder, knee, wrist, foot, ankle, neck, or back
  - [www.donjoy.com](http://www.donjoy.com)
- O2G Compression/Cold Supports®
  - Use on the knee, shoulder, ankle, wrist, or back
- Polar Ice® products
  - Cooling machines and wraps used for many parts of the body
  - [www.polarproducts.com](http://www.polarproducts.com)
- My Cold Therapy® products
  - Cooling machines and wraps used for many parts of the body
  - [www.mycoldtherapy.com](http://www.mycoldtherapy.com)

Approved by Atrium Health Medical Surgical Health Education Committee, May 2019.

Atrium Health complies with applicable Federal civil rights laws and does not discriminate on the basis of race, color, national origin, age, disability or sex.

ATTENTION: si habla español, tiene un asistente de servicios gratuitos de lengua hispana. Llame al 1-800-425-8488.

CHIEF V.Nie: hombre o mujer, tiene un asistente con habilidades de lengua hispana. Llame al 1-800-425-8488.
New Patient Education

Acute Pain Management

Learn to Manage Your Acute Pain
Acute pain usually:
- Starts quickly
- Is caused by something specific like surgery or an injury
- Does not last longer than a few months

What's the Plan?

**STEP 1**
Use over-the-counter pain relievers and other pain relief methods FIRST.

**Examples:**
- Acetaminophen (Tylenol®)
- Ibuprofen (Advil or Motrin®)
- Stronger forms of these medicines are prescriptions
- See below for important pain relief methods and tools

**STEP 2**
If you still have pain, continue using over-the-counter pain relievers and add your opioid meds AS PRESCRIBED.

**Examples:**
- Hydrocodone (Norco, Vicodin or Lortab)
- Oxycodone-acetaminophen (Percocet®)
- Tramadol (Ultram®)

**STEP 3**
LOWER your use of pain meds over time.

**Timelines:**
- Re-check your need for opioids every 5 to 7 days
- Stop opioids as soon as possible

Treating Pain
There are many ways to treat pain without the use of opioids.
- Self-care: Things you can do to lower pain on your own may include daily body movement, eating healthy or doing activities you enjoy.
- Key tools: Talk to your care team about how these could help you.
  - Mindfulness or meditation therapy
  - Cold therapy
  - TENS unit: a device that treats nerve pain
  - Music therapy
  - Aromatherapy
  - Pet Therapy
- Non-opioid medicines: Talk to your care team about these options.

How a Pain Plan Helps You
- Get back to movement, exercise, activities, and relationships
- Improve happiness, satisfaction, and overall quality of life
- Understand your pain and create best plan for you
- Address other medical issues related to pain

Why Do We Limit the Use of Opioids?
Opioids can cause many side effects or problems:
- Constipation (cannot poop)
- Depression (feeling down or sad for long periods)
- Higher sensitivity to pain
- Long-term use, abuse, and overdose

What To Do If You Feel Like Your Meds Are Not Working Well
- Contact the doctor who prescribed your pain meds. You can call or send a message through your MyChart.
- Talk to your care team about options that will meet your specific needs.

We work together to create the best pain management plan for you. Our goal is to stop opioid use in 7 days or less. Please work with your care team for ongoing pain issues.

Approved by Atrium Health Medical Surgical Health Education Committee, January 2022.
New Tapering Aid

- Based on OTA Clinical Practice Guideline
- Not patient-facing
- Sent to practice managers to print for clinicians
- Stay tuned for pre-op opioid taper this year!
Balance

Safety  Comfort
Thank you!