The Role of Exercise, Meditation, and Interdisciplinary Care in Pain Management from a Physiatrist Perspective

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Objectives:

- 1) Define acute versus chronic pain and review pain scales.
- 2) Discuss the role of meditation/ mindfulness techniques and cognitive behavioral therapy in pain management.
- 3) Discuss the role of exercise including physical therapy, t'ai chi and yoga in pain management.
- 4) Define interdisciplinary care in pain management
- 5) Provide evidence for role of interdisciplinary pain management through presentation of results of 3 years of interdisciplinary pain committee effect in an acute rehabilitation hospital.

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Acute versus Chronic Pain Defined:

Acute Pain

- Sudden onset
- Specific cause
- 4-6 weeks duration (6-12 weeks subacute)
- Ex: post-operative pain, broken bone, dental surgery, labor and delivery pain, acute back pain

Chronic Pain

- Ongoing pain (> 3 months)
- Pain signals active long beyond initial cause
- May last months with no specific trigger identified
- Ex: Headache, arthritis, back pain, fibromyalgia, nerve pain, chronic back pain

(Chou et al, 2017)

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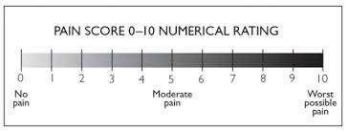
Pain Scales: Numeric Pain Rating Scale

- Patient makes 3 pain ratings: current, best and worst over 24 hours
- Average of 3 ratings represents past 24 hours
- (McCaffery, Beebe et al. 1989): "Please indicate the intensity of current, best, and worst pain levels over the past 24 hours on a scale of 0 (no pain) to 10 (worst pain imaginable)"



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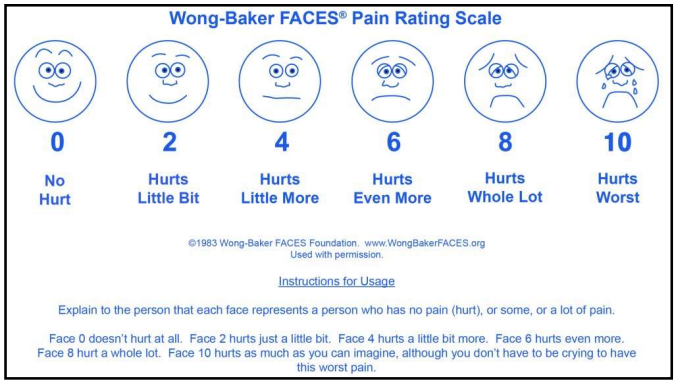

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Challenges of Rating pain:

- Largest by far: pain is SUBJECTIVE!
- Your 8 may be my 4 regardless of the above scales
- Goal of treating pain:

  Until there is none (often patient perception)?

  Treat until reduced by some Percentage- 25/50/75%?

  Newer focus: treat until pain is at an Acceptable level for each INDIVIDUAL!!

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Nurse Script
Nurse: What is your Acceptable Pain Level?
Patient reply: "0 out of 10".
Nurse: "Zero is the absence of pain. While we do everything we can to reduce your pain level as low as possible, we may not be able to completely eliminate your pain.
An acceptable level of pain means the amount of pain: • that you are able to experience without being in distress • you can tolerate that does not affect your ability to function in an important way such as deep breathing, coughing or walking.
"With those ideas in mind, what is your **acceptable** pain level?" (focus on individual)

Foundations of Safe and Effective Pain Management Evidence-based Education for Nurses, 2018

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How to achieve acceptable pain level? First tool: Meditation & Mindfulness

- Mindfulness-based stress reduction:

1) 8 weekly group sessions for chronic back pain
2) Focus on body awareness and body scanning meditation techniques
3) Assist with chronic pain, stress, anxiety and depression

(Benson-Henry **Institute** for **Mind Body** Medicine at MGH- tons of courses for RN, physicians including coaching and MBSR type courses as example and see diagram Umass)

The 5 Best Mindfulness Based Stress Reduction Training Programs - MBSR THE MASTER

(Cherkin et al, 2016), (Chou et al, 2017)

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Benefits of Mindfulness based stress reduction techniques:

1) **Pain reduction** of 30% or more and better function
2) Effects on pain lasted even at 1 year follow up!
3) Significant stress reduction and decrease in depressive symptoms
4) No difference in results vs. Cognitive behavior therapy (see next slides) though

(Cherkin et al, 2016), (Chou et al, 2017)

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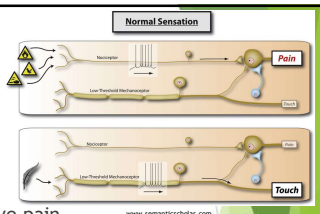
Insomnia is linked to chronic pain & becomes target for treatment of pain



www.semanticscholar.com

- Insomnia as barrier for effective pain management
- Insomnia as precipitating & perpetuating factor for chronic pain
- Insomnia decreases performing physical activity/ desire to be active

(Nijs et al, 2018)

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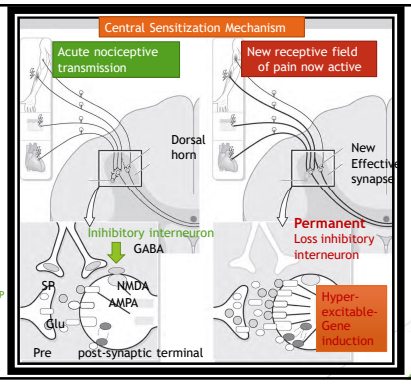

(Mense, 2003), Shah, 2008)

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Insomnia long term effects in perpetuating chronic pain:

- Leads to increased **central sensitization /hyperalgesia** of pain stimuli/ increased pain severity (see next slide)
- Leads to **neuro-inflammation** (associated w/ stress/anxiety)
- Decreased dopamine levels (reward center in brain)
- Increases serotonergic dysfunction

(Nijs et al, 2018)

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Cognitive behavioral therapy (CBT) intervention by physical therapy:

- For all patients with chronic pain check:
  1) sleep latency – how many minutes takes to fall asleep?
  2) minutes awake after sleep lay down to sleep?
  3) more than 3 days per week?
  4) more than 3 months?
  5) Are these sleep changes aggravated by the pain?
  6) Were these sleep challenges present before the chronic pain? (completes further sleep questionnaire)

(Nijs et al, 2018)

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Cognitive Behavioral Therapy intervention by PT for insomnia:

www.zazzle.com

- Psychosocial intervention with goal of changing beliefs and attitudes about sleep
- Change thoughts and how think about falling asleep
- Includes relaxation training
- Includes stress management
- Uses deep breathing techniques
- Uses guided imagery to achieve above objectives

(Nijs et al, 2018 and 2012)

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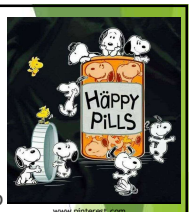
Goals of Cognitive Behavioral Therapy intervention for pain:



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1) Improve coping skills
2) Improve self-regulation
3) Improve healthy behaviors regarding sleep (sleep hygiene- no caffeine after 2pm, not watching tv at bedtime/looking at iphone, etc.)
4) Avoid sleep aides- hypnotic medications (avoid side effects, addictive properties)

(Nijs et al, 2015 and 2018)

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CBT Results especially in chronic back pain patients (PT intervention):

- Improved sleep quality
- Decreased sleep latency (time taken to fall asleep)
- Reduced pain levels and fatigue
- Decreased depressive symptoms
- Increased desire to exercise
- Improvements in pain maintained at 3 month follow-up
- Improvements in sleep quality and fatigue maintained at 1 year follow up!

(Nijs et al, 2015 & 2018)

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How to achieve acceptable pain level? First tool: Exercise- PT/Yoga/T'ai Chi

- In subacute (2 trials) chronic (13 trials) low back pain: **physical therapy** (especially multi-disciplinary) had:
  1) Lower short-term pain intensity from review of 13 randomized control trials
  2) Lower short term disability
  3) Less long term pain intensity (8 trials)
  4) Greater return to work likelihood (1.87 odds ratio almost 2x controls)

(Chou et. al 2017)

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Passive physical therapy evidence base for chronic low back pain:

www.carewell.com

- Low yield for pain control:
  1) traction
  2) ultrasound
  3) lumbar supports
  4) taping
  5) electrical muscle stimulation

EXCEPTION: **Superficial Heat**: more effective for acute and subacute back pain than non-heated control for pain control (nice modality for acute Inpatient musculoskeletal pain)- (RN & PT use)

(Chou et. al, 2017)

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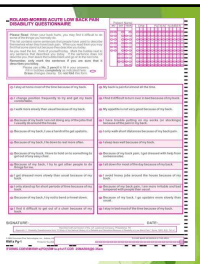
How to achieve acceptable pain level? Yoga:

- 12 weeks of yoga classes (n=92) versus
- Conventional stretching (n=91) versus
- Self-care book (n=45)
- Assessed with: 1) back-related functional status- used modified Roland Disability Questionnaire, 23-point scale (see diagram)
- 2) "Bothersomeness" of pain scale (11-point scale)
- 3) Outcomes assessed at start, 6, 12 and 26 weeks by interviewers unaware of treatment group.

(Sherman et. al, 2012)


ROLAND-MORRIS ACUTE LOW BACK PAIN DISABILITY QUESTIONNAIRE

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Results of Yoga study:

- 12 week outcomes:

1) Yoga group superior to self-care group for pain relief ($p<0.001$)- highly significant
2) 26 weeks later, yoga group still superior to self-care group ($p<0.0001$)
3) However, yoga was not superior to conventional stretching
4) Likely, result due to large part of yoga class was stretching with breathing

(however, skewed population in study: 60% women, 80-87% Caucasian, 46-50 average age (40-60 years old)- younger population- interesting to repeat study with more diverse population- ? generalizable to other ethnic groups, males, older/younger patient population)

(Sherman et al, 2012)

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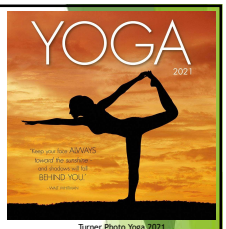
Yoga: (systematic reviews)

- 10 systematic reviews of effects of yoga for chronic low back pain overall
- 5 trials found yoga to be associated with lower pain intensity
- 5 trials noted effect of yoga to significantly improve function/ return to work
- Lower pain intensity also noted at long term follow up (26 weeks)
- Better function at short term and long term follow up as well with yoga systematic review evidence base.

(Chou et al, 2017), (Sherman et al, 2012), (Cramer et al, 2013)



Turner Photo Yoga 2021 Photo Wall Calendar

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How to achieve acceptable pain level? T'ai chi evidence base for chronic arthritis:

- Osteoarthritis: relief of pain and stiffness after 12 weeks of t'ai chi 1-2x/week (Rogers et. al, 2009), vs. controls on wait list.
- Osteoarthritis (Fransen et. al, 2007)- compared hydrotherapy to T'ai Chi demonstrating similar benefit for pain and physical function scores for patients with knee osteoarthritis
- Rheumatoid arthritis: (Uhlig et. al, 2010))- improved pain and body awareness after 2x/week 12 weeks of t'ai chi for arthritis

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Benefits of T'ai Chi explored:

- Integrate balance, flexibility, neuro-muscular coordination
- Dual attention to commands and movement (cognitive component)/ multi-tasking
- Heightened body awareness
- Improved mental focus

(Vergara-Diaz et. Al, 2018)

(Bewellbuzz.com-image)

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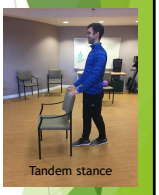
Overall benefits of T'ai Chi for Balance and Falls Prevention:

- Based on multiple studies using 8-12 week t'ai chi interventions with age>55 patients:

1) Significantly decreased **fear** of falling(more likely to exercise (**decrease pain**)/ maintain social outings)
2) Significant improvement in balance: using one leg stance, even one leg jump testing
3) Timed up and go test (in elderly non-CVA patients) significant reductions in timing to stand up and ambulate
4) Significant improvement in tandem stance
5) Improved awareness of body movement and their environment


Tandem stance

(McGibbon et al, 2005, Lelard et al, 2010, Kwok et al, 2010, Gyllensten, 2010, Verhagen et al, 2004)

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T'ai Chi and decreased fall risk and chronic pain risk in Parkinson's disease

- Meta-analysis of 7 studies Parkinson's disease patients (Winser et al, 2018)
- Parkinsons patients participating in t'ai chi improved balance (statistically significant) measured with the Timed Up and Go Test ($P < 0.001$)
- Tai Chi significantly reduced falls incidence in Parkinson's disease per 7 studies as well (mostly short yang form in recent studies)
- Decreased stiffness/ bradykinesia leading to **decreased pain** especially **back pain** in Parkinson's patients

(Vergara-Diaz et al, 2018), (Li et al 2012- New England Journal of Medicine)

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Interdisciplinary Pain Management Programs:

- Target patients with these characteristics:

1) Complex pain problems
2) Failed less intense intervention for pain control
3) Higher rates of opioid use
4) Problems in vocational functioning
5) Seen by wide range of physicians (orthopedics, neurosurgery, PCP, anesthesia pain, PMR-often last referral who are at interdisciplinary pain center!)
6) Higher levels of emotional distress
7) "Last hope" going to interdisciplinary clinic to "solve" pain

(Clark, T, 2000)

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Interdisciplinary Pain Management Team

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Interdisciplinary Pain Team Members:

- **Physicians** (anesthesia trained or physical medicine and rehabilitation, whose entire training focuses on interdisciplinary team care)
- **Physical therapists** (preferably trained in above CBT and other biofeedback/ mindfulness techniques)
- **Occupational therapists-** work on activities of daily living, return to work goals
- **Psychotherapist** (also can do CBT, work on fixed beliefs about pain as discussed prior)
- **Social worker-** assist with return to society/work/worker's compensation cases, family dynamics which may worsen pain such as domestic violence/abuse)

(Clark T, 2000)

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Focus of interdisciplinary program:

- Medication management (work away from opioids number of pills/strength of dose), focus on NSAID, Tylenol, possibly methadone or suboxone for addiction (physician)
- Graded physical exercise and help overcome anxiety regarding movement and physical activity (PT/OT)
- Cognitive behavioral therapy- help change fixed thinking patterns about pain and movement that hinder their recovery and progress in therapy (psychologist/PT)
- Teach biofeedback and relaxation techniques- self-regulate high arousal levels
- Decrease impact of pain on function, work, and life roles with family/friends including ergonomics, energy conservation and vocational counseling (social worker/ PT/ psychologist)

(Clark T, 2000)

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Interdisciplinary Pain Committee at Acute Rehabilitation Hospital:

- Members:

1) Head of pharmacy and another pharmacist to lead the committee
2) Physician (myself)
3) Physical therapist
4) Occupational therapist
5) Nurse (could have chief nursing officer)
6) Case Manager / (could also have social worker)

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Successful Initiatives by domain: PT

- Physical therapy: developed pain consultation by therapist- referred by pharmacist based on high opioid usage on admission (high MME on admission- see slides)
- Use of traffic light page (red/yellow/green pain levels)- hang in patient room- RN/patient/therapy refer to it
- Discussion of "acceptable pain level"
- Find modalities and rec's patient willing to use when in red/yellow/green zone and provide patient education
- Yellow: use calming coloring book, use breathe app on phone, use heat/ice pack/ Tylenol/motrin, stretching, reposition, elevate swollen limb/ bracing education
- Red: speak to nurse, reassess frequency of meds, still can use ice/heat, reposition, adjust bracing.

Traffic Light System of Pain (crouchphysio.com)

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Pain plan worksheet example:

Name: Sally S. Room #: 221

My Pain Plan

Tolerable Level = _____

In addition to my regularly scheduled medications, these are the pain management options that work best for me:

Red (reactive):

My pain is stopping me from doing all activities. I need to ask my nurse if I can take pain medicine

Yellow (proactive):

My pain is ramping up and I need to do something now to manage it. Here's what I can do:

stand up and stretch, read a book, listen to music, do my deep breathing routine, listen to a guided meditation on my phone.

Green (preventative):

I don't have much pain now and I'm going to use these strategies to keep the pain away:

ice pack, elevate my leg, get out of bed and into the chair, do my ROM exercises, keep busy (crosswords and word searches)

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Education: (For Nursing and PT/OT)

- Provide education to nurses about acceptable pain level/ can train on use of script discussed earlier
- Educate nurses on modalities such as heat/ice, icy hot. Bengay, over the counter topical meds (diclofenac gel) can apply to painful joints when ordered (educate physicians too)
- When patient fatigued, maybe consider melatonin, not just provide opioid to help patient sleep (not always pain as only mediator of insomnia)
- PT/OT: educate on modalities such as ultrasound, heat, ice, TENS unit, mirror therapy, etc.
- PT/OT: educate about pain consultation and how to make individual pain plan, assess before and after session pain, (did anything done in therapy WORSEN the pain?)

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Physician/Pharmacist intervention:

- Discontinued PRN opioid medications not used by patient for 5 days (automatically discontinued by pharmacist)- approved in med executive committee
- After 2 years, changed initiative approved by med exec committee to after 4 days of no use by patient, discontinue PRN opioid order (removed 100's of opioid orders!)
- This initiative also prevents diversion of opioids by nursing (no temptation as not in patient's medication drawer)
- Also when order discontinued during stay, patient will NOT be sent home with opioid prescription (whereas prior internists more likely to prescribe opioids if PRN order on med list at discharge)

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Physician/NP education

During medical staff meetings:

1) I educated medical staff regarding pain consultation by therapy (red/yellow/green light etc.)
2) Educated that patients only allowed by law (unless cancer/ palliative) to receive 1 week supply of opioid medication, so should not be giving 60 pills oxycontin and hundreds of Percocet. Instead, provide prescription for only enough to taper medication over a week or f/u pain clinic visit.

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Physician/ NP Initiatives:

- During medical staff meetings:

1) I provided individual internists with "report card" of their percentage of patients receiving opioid script and number of pills per patient versus region and nation (not versus other doctors in hospital)
2) If patients have a pain specialist, should have pain medication at home already, so can either give them zero opioid script or very small supply to make sure enough until follow-up with pain specialist clinic with whom have pain contract.

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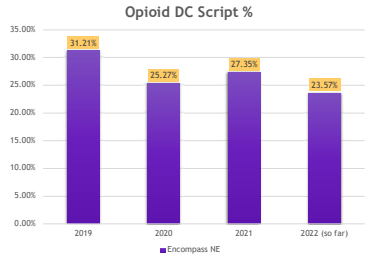
Opioid Stewardship 2022- (data from our pain committee)



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Results:

- Over 24% decrease (1 in 4 less) in number of patients provided with an opioid pain medication script at discharge!
- Again, direct correlation with number of discontinued PRN opioids on day 5 and then decreased further after day 4 discontinuation with newly approved initiative.
- Patient satisfaction scores in 2022 have improved as compared to 2019/2020 and likely in part due to pain consultation and more education about pain management after discharge/ more planning for tapering opioid as well.
- Case management also educating patients about pain clinic and setting up pain clinic apt. to prepare post-discharge

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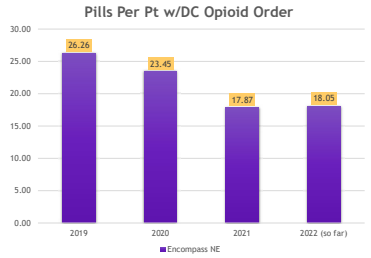
Opioid Stewardship 2022



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Number of Opioid Pills per Discharged Patient:

- Over 30% decrease (31.2%) in pills prescribed at discharge (26 in 2019 to 18 pills per patient at discharge in 2022)
- Overall, less opioid pills distributed into community, less pills to take when return home and decreased risk of addiction/long-term use of opioid medication.
- Send patient home now with plan to decrease opioids over time (discuss alternate medications and pain plan)
- All patient have PCP appointment within 7 days of discharge
- Schedule pain clinic appointment for those at highest risk of chronic opioid use and on high dose opioids (highest MME during stay- see next slide)

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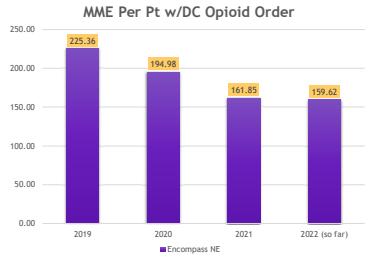
MME: Morphine Milligram Equivalents

Opioid Stewardship 2022



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MME per patient (morphine milligram equivalents)

- Since above initiatives completed, decreased by 29.1% MME! (morphine milligram equivalents)
- MME used to compare different opioid medications using one standard tool
- Determine how opioids relate to each other using MME

Codeine 0.15 MME, tramadol 0.10MME, versus morphine: 1.0 MME versus
Hydromorphone: 4 MME, Methadone: 3 MME
Methadone 40-60mg: 10 MME!

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How can you advocate for your patients and incorporate above strategies? (Nurse)

- **Nurse:** Ask "acceptable" pain level for each patient and document, follow-up after interventions how pain is doing, offer heat packs for acute/subacute back pain, consider melatonin (instead of or prior to using a hypnotic medication)
- **Nurse** (consider taking MBST course/ CBT course): Offer meditation/mindfulness strategy: short breathing exercise/ teach pursed lip breathing, give instructions on a paper for body scanning technique, encourage use of breathe app on apple watch/phone for more tech savvy patients

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Physical therapy/ Occupational Therapy intervention for chronic pain patients:

- Consider training with a CBT course/ MBST course (mind body institute at MGH/ u mass, etc.)
- Consider asking more about insomnia in your subacute to chronic pain patients (use intake form to guide you)
- Use CBT/ MBST course to better educate your patients on breathing/ mindfulness techniques
- consider use of traffic light page/strategy to post in patient room/add to home exercise plan
- Create list after discharge of yoga/ t'ai chi classes in community (YMCA, senior centers, mind body institute, video at home) (or case management can provide list)
- Create list of centers for multidisciplinary physical therapy after discharge

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Case management/ social workers: what interventions can you use?

- create a list of pain clinics, especially interdisciplinary/multi-disciplinary pain management clinics to better serve chronic pain patients
- assist connecting during acute stay with pain clinic (especially multidisciplinary)
- schedule pain clinic follow up to decrease need for pain scripts at discharge/ number of pills prescribed (plan pain contract with that clinic only)

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Physicians/ pharmacy in acute care hospital interventions

- Consider use of melatonin, serotonin based such as trazodone for sleep aids, (try to avoid hypnotic medication- ambien etc.)
- educate nursing to use melatonin/trazodone and not just use opioids to help with sleep (wreck sleep architecture in chronic pain patients as well)
- Recommend follow up in multi-disciplinary pain clinic or consider physiatrist who specializes in pain management as take interdisciplinary approach
- Pharmacist can assist looking in data base for recent prescriptions filled by patient to know how many pills and type of pain medications have at home/ need for script or not.
- Prescribe naloxone for use at home for all patients on high dose opioids at discharge (pharmacist guidance used for MME cutoff)

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Lastly, consider starting your own interdisciplinary pain committee!

- Any discipline can bring up this idea to chief nursing officer or it's a great pharmacy initiative. Or physician could bring to administration at hospital/medical director
- Discuss initiatives such as discontinue PRN opioid pain medications not being requested by patients.
- The committee can create great quality improvement projects (resident physicians/ nursing students can be part of it)
- Great opioid stewardship project- huge focus of joint commission- opioid crisis- will be impressed with addition of this committee and initiatives completed
- Monitor numbers of pills per patient at discharge, percentage receiving opioid script, naloxone usage.

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Summary:

- Acute and subacute back pain do respond effectively to superficial heat application
- Each patient requires individualized multi-disciplinary pain plan to achieve acceptable pain level (nurse, therapy, and physician driven plan) and should address insomnia (avoid hypnotics that worsen sleep architecture)- consider PT driven evidence based CBT therapy.
- There are several randomized control trials with statistically significant results including decreased pain intensity and improved function to support use of yoga, CBT, MBST, t'ai chi, and multidisciplinary physical therapy interventions especially for chronic low back pain and hyperalgesia.
- Strongly encourage your institution to develop an interdisciplinary pain committee as the opioid pandemic requires all of our efforts one patient at a time with hospital team work to see concrete results (25-30% reduced scripts, pills, and MME in our case and improved patient satisfaction!)

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Questions?!

(With deepest appreciation of Master Tseng, my greatest inspiration for this talk!)

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