CHRONIC PAIN AND THE OPIOD EPIDEMIC: WHAT HEALTH SERVICE PSYCHOLOGISTS NEED TO KNOW

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Financial Disclosure

- I have no financial relationships to disclose

Learning Objectives

- Develop knowledge of the extent, causes and impact of the current opioid epidemic
- Demonstrate understanding of the neuroscience of pain
- Summarize the impact of pain and chronic opioid use on cognitive functioning

Myths

- Opioids = Pain medication

Medication

- First Line (Acute Pain) – Pharmacological agents
  - Average pain reduction for opioids = 1/3
  - Non-opioid pain reduction (NSAIDs, Muscle Relaxers, etc.) = 1/3
  - Neuropathic Pain
    - Tricyclic antidepressants, anticonvulsants and topical drugs = 1/3

Turk (2002)

Myths

- Individuals with “real” pain can benefit from chronic opioid therapy (COT).

Myths

- Opioids recommended for < 3 and rarely over 7 days for acute pain.

https://www.cdc.gov/drugoverdose/prescribing/guideline.html

Myths

- Individuals with "real" pain can benefit from chronic opioid therapy (COT).
- If someone is at low risk for opioid use disorder (OUD), the benefits of opioids can outweigh the risk.

REVIEW

Annals of Internal Medicine

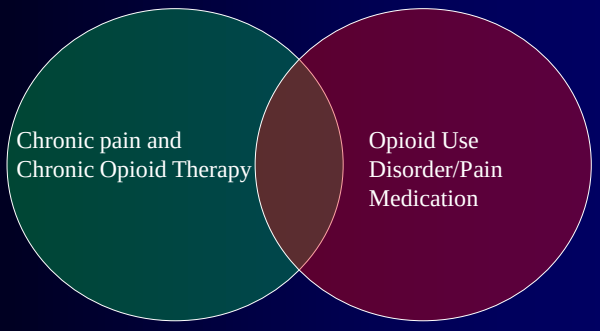
The Effectiveness and Risks of Long-Term Opioid Therapy for Chronic Pain: A Systematic Review for a National Institutes of Health Pathways to Prevention Workshop

Roger Chou, MD; Judith A. Turner, PhD; Emily B. Devine, PharmD, PhD, MBA; Ryan N. Hansen, PharmD, PhD; Sean D. Sullivan, PhD; Ian Blazina, MPH; Tracy Dana, MLS; Christina Bougatsos, MPH; and Richard A. Deyo, MD, MPH

Conclusion: Evidence is insufficient to determine the effectiveness of long-term opioid therapy for improving chronic pain and function. Evidence supports a dose-dependent risk for serious harms.

Annals of Internal Medicine • Vol. 162 No. 4 • 17 February 2015

Clarification



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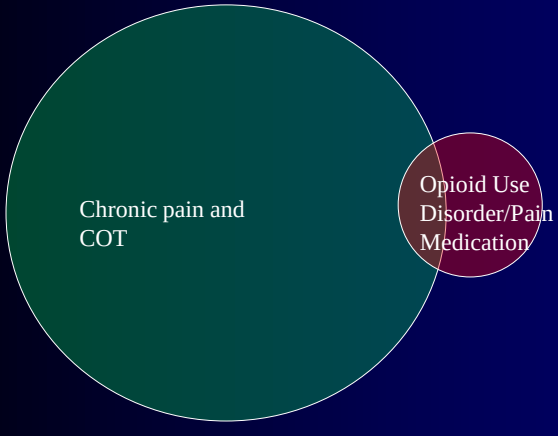
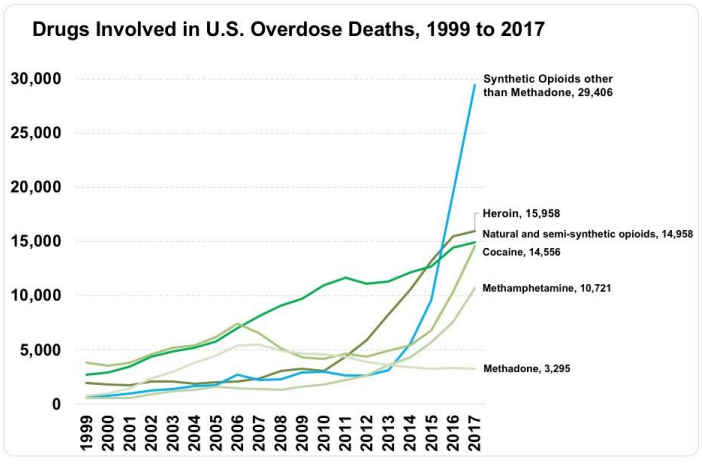


All Overdose Deaths



https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates

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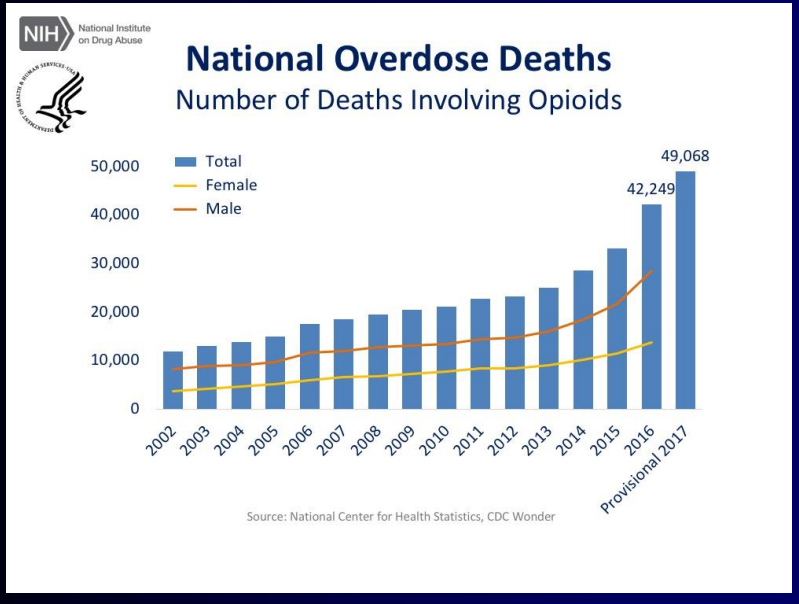

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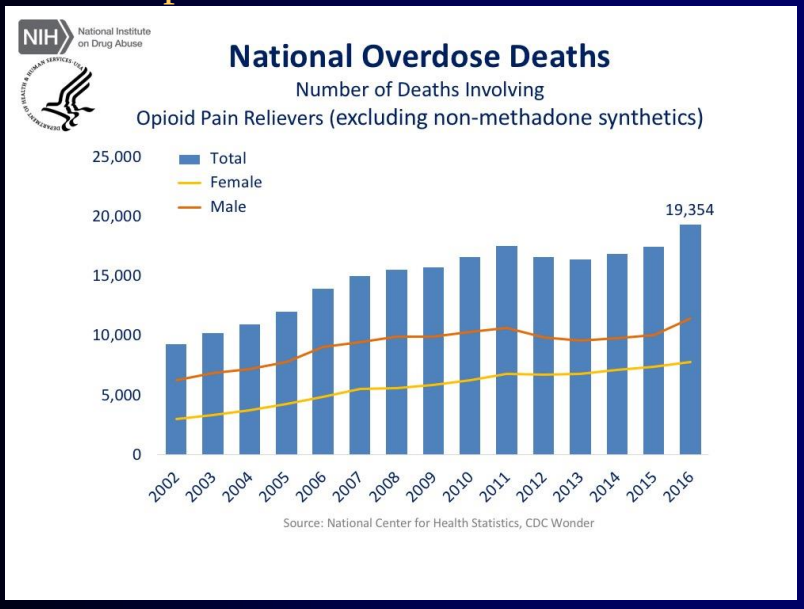
Opioid Pain Reliever Deaths



https://www.drugabuse.gov/related-topics/trends-statistics/overdose-death-rates

How Did We Get Here

- Number of factors
  - Beginning in the late 1990's and early 2000's, chronic pain continued to be on the rise and newer treatments were slow to come to fruition.
  - Movement began to dispel some of the "myths" around opioids and promote more effective pain management, at first, within palliative care.

(Huber et al., 2016)

How Did We Get Here

"The published literature continues to be very limited, but a growing clinical experience, combined with a critical reevaluation of issues related to efficacy, safety, and addiction or abuse, suggests that there is a subpopulation of patients with chronic pain that can achieve sustained partial analgesia from opioid therapy without the occurrence of intolerable side effects or the development of aberrant drug-related behaviors."

(Portenoy., 1996, p. 203)

How Did We Get Here

- Number of factors
  - Pain as "5th Vital Sign" (VA in 1999 & JCAHO in 2001)
  - Well-intentioned providers, patient advocacy groups and pharma collaborated to develop strategies for the safe and effective use of opioid pain relievers for chronic non-malignant cancer pain (CNCP)

(Huber et al., 2016)

How Did We Get Here

- Number of factors
  - Emphasis placed on:
    - Risk vs. benefit analysis
    - Assessment of opioid misuse risk
    - Different formulations, dosing strategies, tamper proofing

(Huber et al., 2016)

Myths

- Opioids = Pain medication
- Use of opioid pain relievers = Chronic opioid therapy
- Individuals with “real” pain can benefit from chronic opioid therapy (COT).
- If someone is at low risk for opioid use disorder (OUD), the benefits of opioids can outweigh the risk.

Scope of the Chronic Pain Problem

- Approximately 100 million adults in US with chronic pain.
- From 1995 to 2010, both the prevalence and expenditures have grown for the most common type chronic pain: Chronic Low Back Pain (CLBP).

(Gaskin & Richard, 2012)

Scope of the Pain Problem

- Chronic Pain: $500 - $635 billion a year in medical costs and lost productivity.
  - Chronic Pain Direct Costs: $261-300 billion
  - Cardiovascular Disease: $309 billion
  - Cancer: $243 billion
  - Diabetes: $127 billion

(Gaskin & Richard, 2012)

Pain

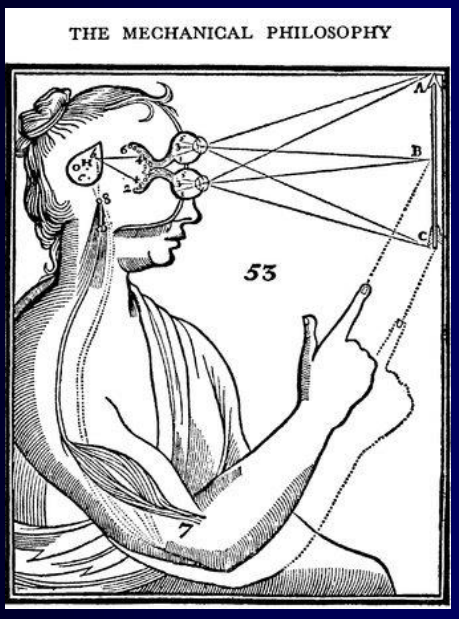
- Pain – Warning signal
- Chronic Pain – Lasting longer than 3 to 6 months

Pain

- Traditional Biomedical Model
  - Specificity Theory - The degree of pain should correlate with the degree of tissue damage.
    - Organic vs. Functional
    - Physical vs. Psychological
    - "Real" vs. "Fake"
  - Implicit model

(Turk & Gatchel, 2002)

Cartesian Dualism



Psychological Factors and Pain

- Combat soldiers during WWII in Anzio Italy
  - Serious injuries – Not in shock
  - Only 20% required morphine (Beecher, 1946).
- Negative expectation of pain relief will reverse the effects of remifentantil (Bingel et al. (2011).
- Negative emotional state vs. positive emotional state (Villemure & Bushnell, 2009).

Pain

- Biopsychosocial Model
  - An injury or illness is required to initiate the pain process.
  - The longer the pain persists the more important the psychosocial factors become.
    - Physical vs. psychological
      - Viewed as insufficient paradigm
      - Psychosocial overlay

(Turk & Gatchel, 2002)

Pain vs. Nociception

- No pain receptors, nociceptors.
- Nociception does not always equal pain

(Butler & Moseley, 2003)

Pain vs. Nociception

- Nociception without pain
- Pain without nociception

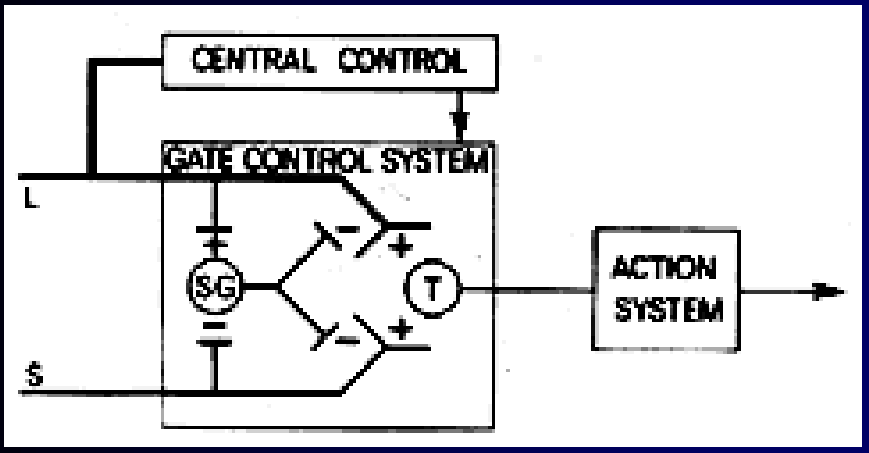
- We experience pain when the brain translates nociception as "danger" or had been interpreting nociception as "danger"
  - Learning/conditioning

(Butler & Moseley, 2003)

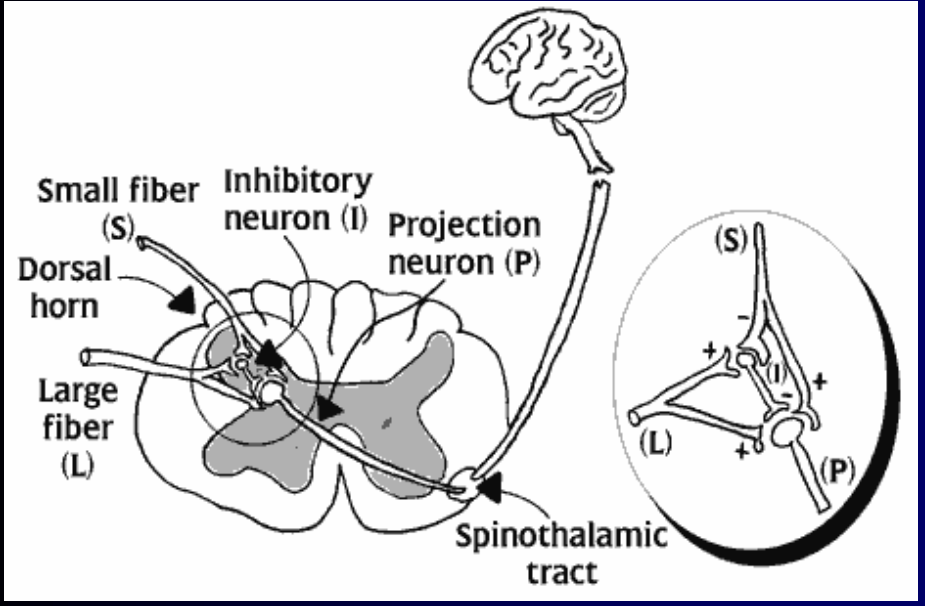
"Pain is a complex sensory and emotional experience that can vary widely between people and even within an individual depending on the context and meaning of the pain and the psychological state of the person."

(Bushnell et al., 2013)

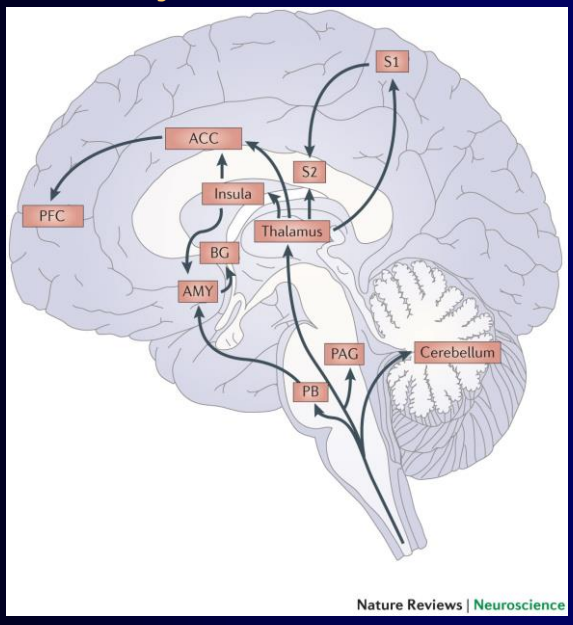
Gate Control Theory of Pain



Melzack and Wall (1965)

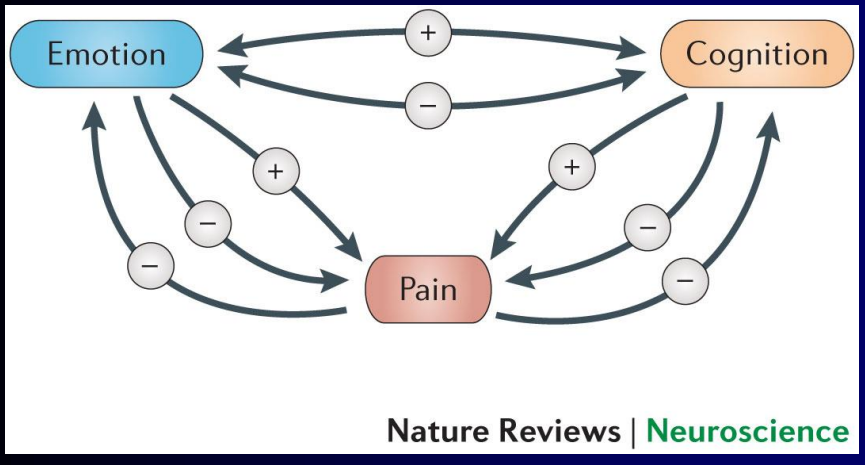


Pain Pathways



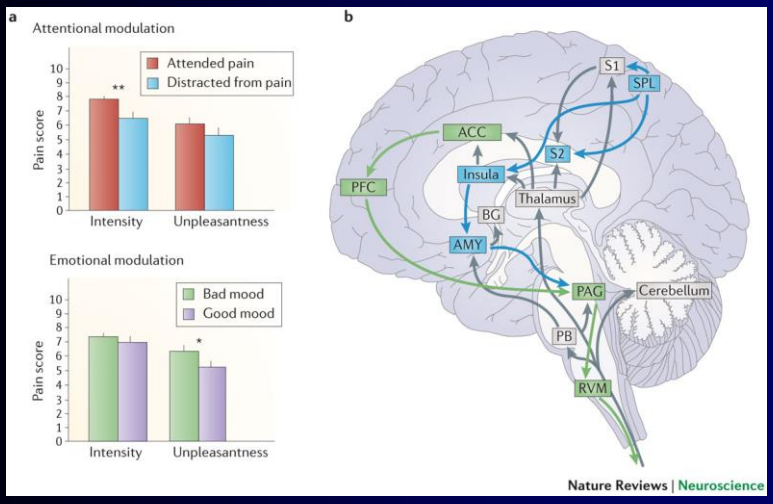
(Bushnell et al., 2013)

Pain



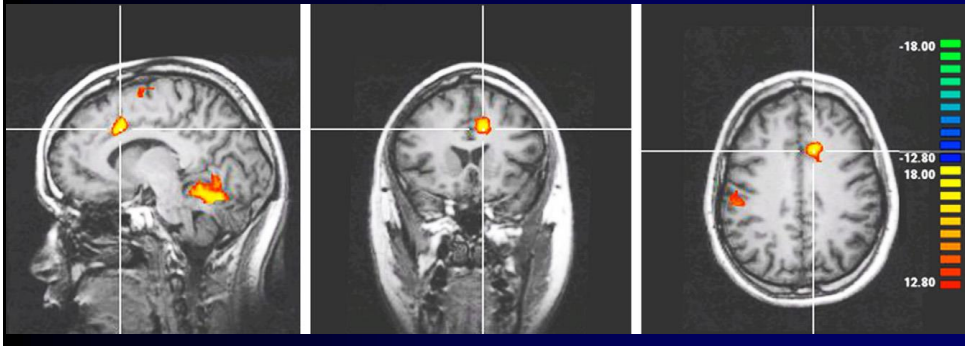
(Bushnell et al., 2013)

Pain Pathways



(Villemure & Bushnell, 2009; Bushnell et al., 2013)

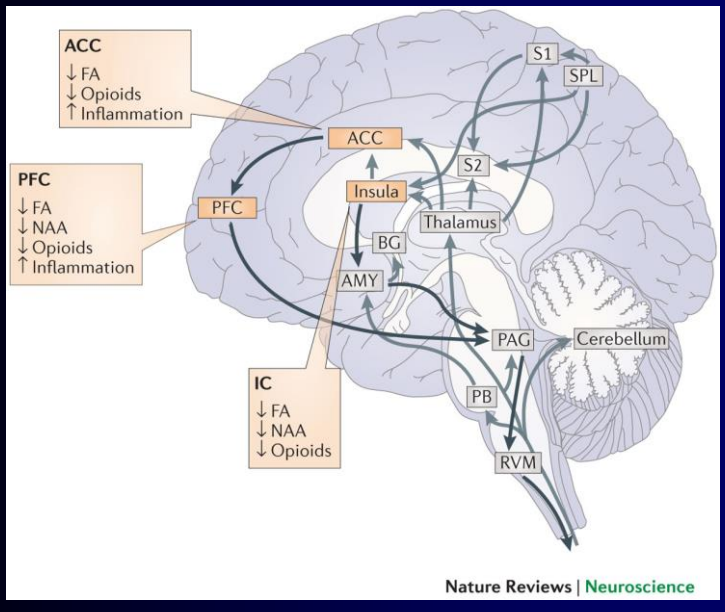
Pain Pathways



(deCharms et al., 2005)

Chronic pain becomes a complex condition impacting social and occupational functioning, emotional and cognitive functioning, and identity.

Pain Pathways



(Bushnell et al., 2013)

Impact of Pain on Cognitive Functioning

- Attention
  - Pain demands attention
    - Self-report
    - Switching and interference tasks
    - Cognitive resources (relevant stimuli)

(Moriarty, McGuire & Finn, 2011)

Impact of Pain on Cognitive Functioning

- Working Memory
  - Spatial
  - Verbal
- Processing speed

(Moriarty, McGuire & Finn, 2011)

Impact of Pain on Cognitive Functioning

- Executive Functioning
  - Complex (interference and switching)
  - Emotional decision-making
    - Iowa Gambling Task

(Moriarty, McGuire & Finn, 2011)

Impact of Pain on Cognitive Functioning

- Whitlock et al. (2017) – Health and Retirement Study
  - 10,065 individuals over 62 evaluated every other year for 12 years (composite memory score made up of several cognitive tests and dementia probability score)
  - "Persistent pain associated with accelerated memory decline and increased probability of dementia" (p. 1146)
    - 2.2% increased risk after covariate adjustment

Impact of Pain on Cognitive Functioning

- Whitlock et al. (2017)
  - Statistically significant differences at baseline:
    - Education
    - Hypertension
    - Heart disease
    - Stroke
    - Depression
    - Alcohol use?

Whitlock et al. (2017)

Mental Health Disorders and Chronic Pain

- 59% met current diagnostic criteria for a psychiatric disorder
  - Polatin et al. (1993)
- 34-54% Major Depressive Disorder
  - Polatin et al. (1993); Fishbain et al. (1997)
  - Other studies estimate as high as 84%
- 35% Anxiety Disorder
  - McWilliams, Cox & Enns (2003)

Opioids

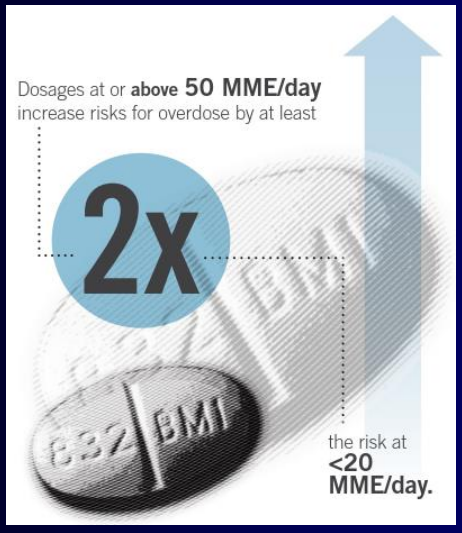
- Opioids impact at multiple levels
  - Spinal cord
    - Block nociceptor input
    - Enhances pain inhibitory fibers and suppress amplifying fibers
  - Brain
    - Increased sense of well-being and pain tolerance in reward centers
  - Peripheral

Opioids

- Pain reduction
- Increased sense of well-being
- Drowsiness
- Confusion
- Nausea
- Constipation
- Slowed breathing

https://www.drugabuse.gov/publications/drugfacts/prescription-opioids

Opioids



https://www.cdc.gov/drugoverdose/pdf/calculating_total_daily_dose-a.pdf

Opioids

Calculating morphine milligram equivalents (MME)

OPIOID (doses in mg/day except where noted)	CONVERSION FACTOR
Codeine	0.15
Fentanyl transdermal (in mcg/hr)	2.4
Hydrocodone	1
Hydromorphone	4
Methadone	
1-20 mg/day	4
21-40 mg/day	8
41-60 mg/day	10
≥ 61-80 mg/day	12
Morphine	1
Oxycodone	1.5
Oxymorphone	3

These dose conversions are estimated and cannot account for all individual differences in genetics and pharmacokinetics.

https://www.cdc.gov/drugoverdose/pdf/calculating_total_daily_dose-a.pdf

Chronic Opioid Use and Neuropsychological Findings

- Sjogren and colleagues (2000)
  - Compared 40 individuals receiving opioid therapy to 40 control subjects
  - Continuous reaction time (CRT), finger tapping test (FTT), paced auditory serial addition task (PASAT)
  - Subjects receiving opioids scored worse than controls on all of these measures
    - PASAT positively correlated with pain ratings

(Sjogren, et al., 2000)

Chronic Opioid Use and Neuropsychological Findings

- Jamison and colleagues (2003)
  - 144 individuals with chronic low back pain
  - Digit Symbol and Trail Making Test-B
  - Evaluated prior to opioid initiation and then again at 90 and 180 days
  - No differences for age, gender, educational level, pain score or depressive symptoms
  - Above 30 mg morphine equivalent

(Jamison, et al., 2003)

Chronic Opioid Use and Neuropsychological Findings

- Jamison and colleagues (2003)
  - Statistically significant improvements on TMT – B and Digit Symbol

(Jamison, et al. ,2003)

Chronic Opioid Use and Neuropsychological Findings

- Block and Cianfrini (2013)
  - Non-systematic review of neuroimaging and neuropsychology study
  - "To date, evidence from opioid studies suggests only mild deficits in specific cognitive domains (e.g., memory, attention/concentration) and only under specific conditions (e.g., dose escalation)."

(Block and Cianfrini, 2013 p. 343)

Chronic Opioid Use and Neuropsychological Findings

- Baldacchino and colleagues (2012)

- Impairments in verbal recognition, learning and recall?
- Attention?
- Cognitive flexibility?
- Planning?

(Baldacchino, et al., 2012)

Chronic Opioid Use and Neuropsychological Findings

- Baldacchino and colleagues (2012)

- "…the meta-analysis suggests that chronic opioid exposure is associated with deficits across a range of different neuropsychological domains. However, the only domains where meta analysis suggests robust impairment were those of verbal working memory, cognitive impulsivity (risk taking), and cognitive flexibility (verbal fluency)."

(Baldacchino, et al. 2012, p. 2065)

Chronic Opioid Use and Neuropsychological Findings

- Fong-ha leong and Yuan (2017)
  - Review with at least two weeks abstinence
- Some evidence of:
  - Continued impulsivity compared to controls
  - Continued impact on emotional regulation
  - Most difficulties resolve

(Fong-ha leong & Yuan, 2017)

Mental Health Disorders and Chronic Pain

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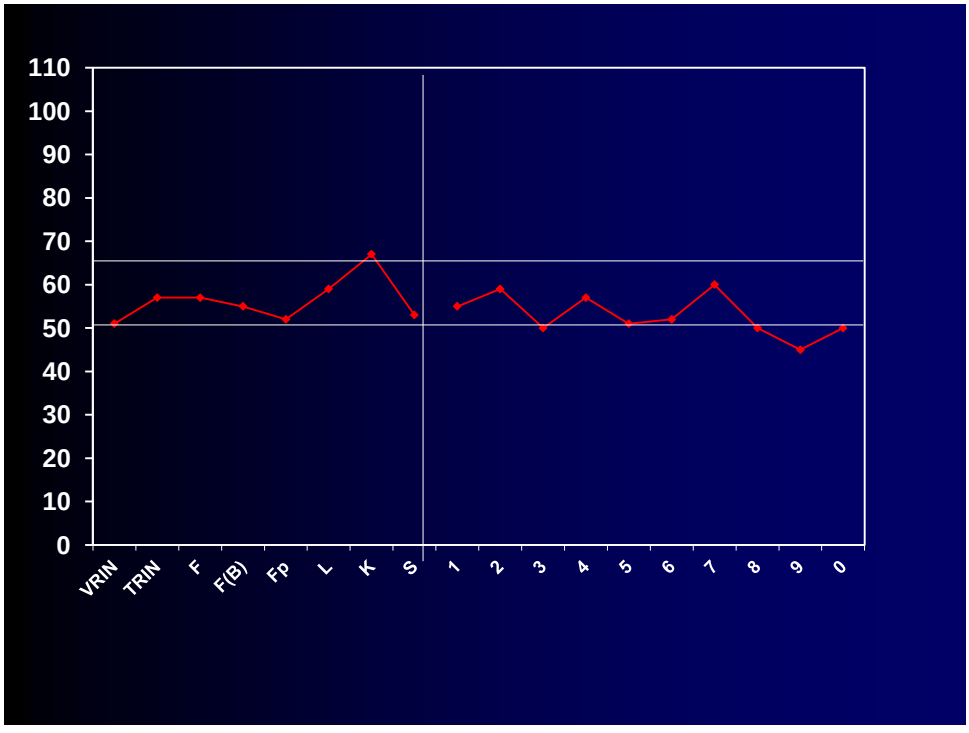
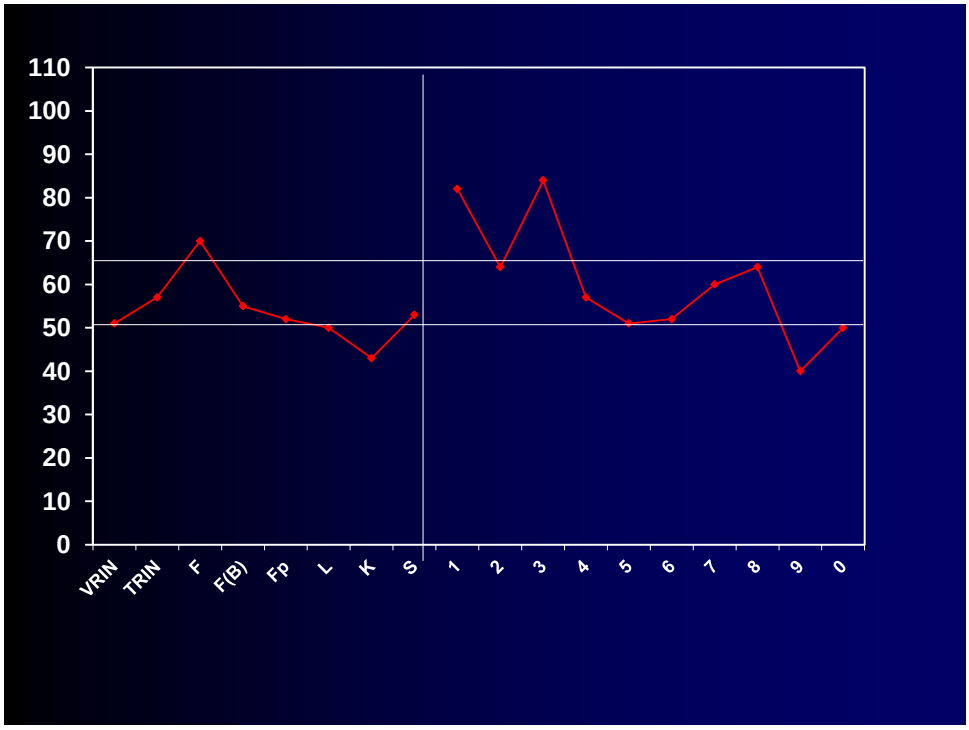
Chronic pain becomes a complex condition impacting social and occupational functioning, emotional and cognitive functioning, and identity.

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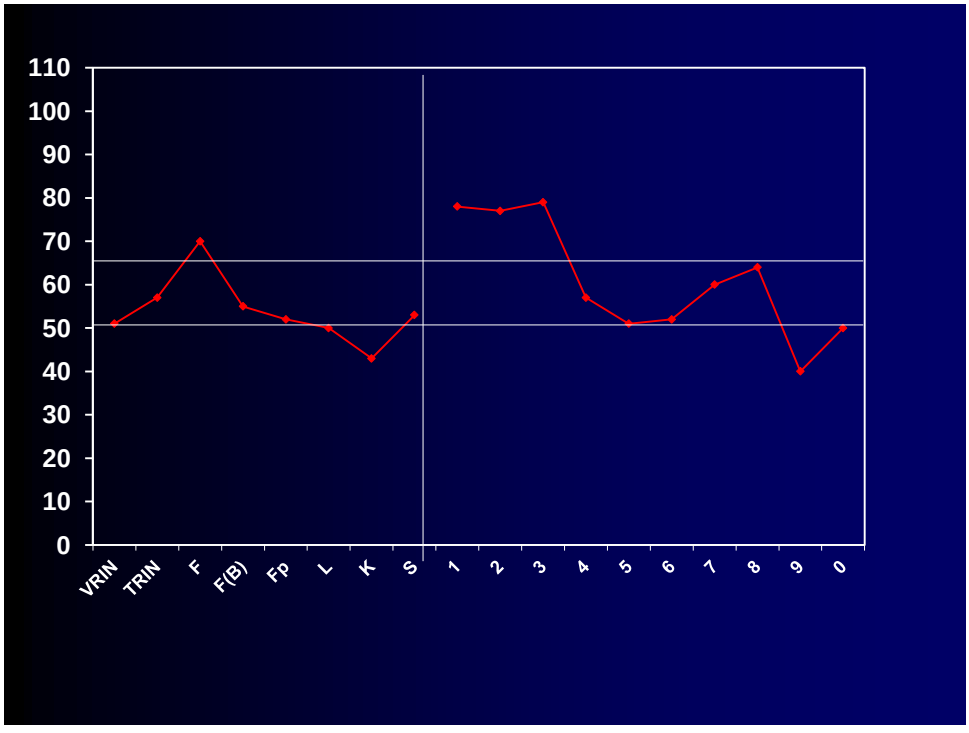
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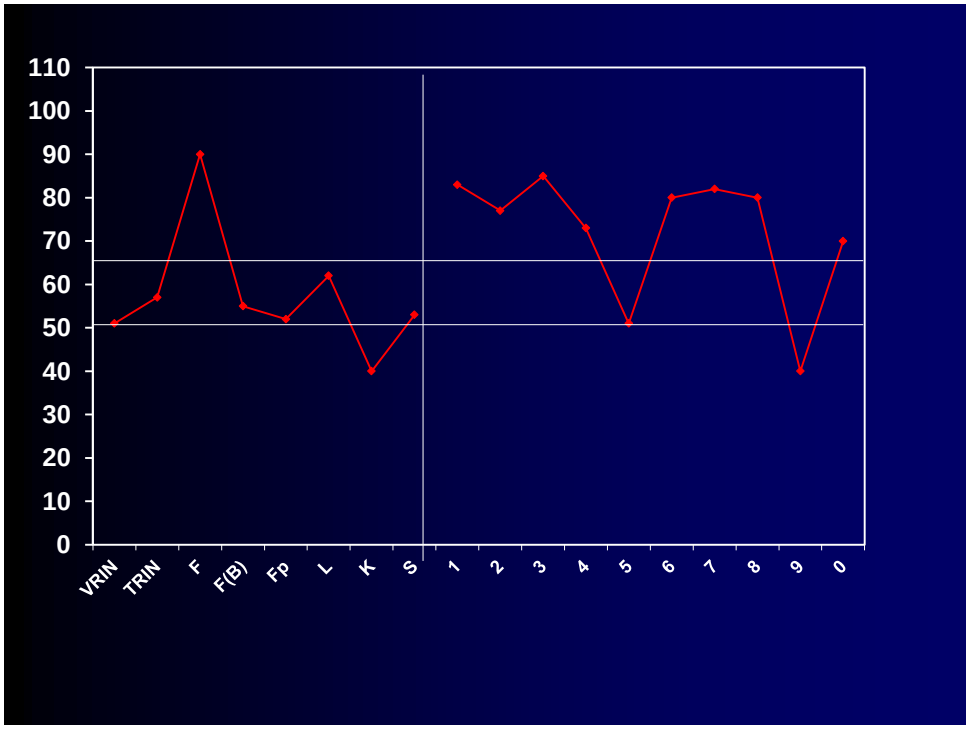

Chronic pain becomes a complex condition impacting social and occupational functioning, emotional and cognitive functioning, and identity.

So, how do we treat this complex condition?

Medication

- First Line – Pharmacological agents
  - Average pain reduction for opioids = 1/3
  - Non-opioid pain reduction = 1/3
  - Neuropathic Pain
    - Tricyclic antidepressants, anticonvulsants and topical drugs = 1/3

Turk (2002)

Medication

- Opioids
  - Substance use disorders
  - Endocrinopathy
  - Increased risk of fractures
  - Opioid induced hyperalgesia
  - Death

  - Limited evidence basis for "long-term use"

(Von Korff et al., 2011)

REVIEW

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Annals of Internal Medicine • Vol. 162 No. 4 • 17 February 2015

Effect of Opioid vs Nonopioid Medications on Pain-Related Function in Patients With Chronic Back Pain or Hip or Knee Osteoarthritis Pain
The SPACE Randomized Clinical Trial

Erin E. Krebs, MD, MPH; Amy Gravely, MA; Sean Nugent, BA; Agnes C. Jensen, MPH; Beth DeRonne, PharmD; Elizabeth S. Goldsmith, MD, MS; Kurt Kroenke, MD; Matthew J. Bair; Siamak Noorbaloochi, PhD

RESULTS Among 240 randomized patients (mean age, 58.3 years; women, 32 [13.0%]), 234 (97.5%) completed the trial. Groups did not significantly differ on pain-related function over 12 months (overall *P* = .58); mean 12-month BPI interference was 3.4 for the opioid group and 3.3 for the nonopioid group (difference, 0.1 [95% CI, −0.5 to 0.7]). Pain intensity was significantly better in the nonopioid group over 12 months (overall *P* = .03); mean 12-month BPI severity was 4.0 for the opioid group and 3.5 for the nonopioid group (difference, 0.5 [95% CI, 0.0 to 1.0]). Adverse medication-related symptoms were significantly more common in the opioid group over 12 months (overall *P* = .03); mean medication-related symptoms at 12 months were 1.8 in the opioid group and 0.9 in the nonopioid group (difference, 0.9 [95% CI, 0.3 to 1.5]).

JAMA March 6, 2018 Volume 319, Number 9

Interventions/Surgery Low Back Pain

- Discectomy, laminectomy, chemonucleolysis reflect good evidence with moderate improvements in pain in patients with radiculopathy.

- Many other interventions have minimal or limited evidence
  - Epidural steroid injections of for spinal stenosis
  - Radiofreqeuncy denervation for radiculapathy

Chou et al., (2009)

Magnetic Resonance Imaging of the Lumbar Spine in People without Back Pain
Maureen C. Jensen, Michael N. Brant-Zawadzki, Nancy Obuchowski, Michael T. Modic, Dennis Malkasian, and Jeffrey S. Ross
N Engl J Med 1994; 331:69-73July 14, 1994

- "Thirty-six percent of the 98 asymptomatic subjects had normal disks at all levels. With the results of the two readings averaged, 52 percent of the subjects had a bulge at least one level, 27 percent had a protrusion, and 1 percent had an extrusion. Thirty-eight percent had an abnormality of more than one intervertebral disk. The prevalence of bulges, but not of protrusions, increased with age. The most common nonintervertebral disk abnormalities were Schmorl's nodes (herniation of the disk into the vertebral-body end plate), found in 19 percent of the subjects; annular defects (disruption of the outer fibrous ring of the disk), in 14 percent; and facet arthropathy (degenerative disease of the posterior articular processes of the vertebrae), in 8 percent."

Solutions

- Opioid Crisis Response Act of 2018
  - More funding for inpatient treatment
  - Medicaid
  - Mail order
- Suboxone

https://www.nytimes.com/2018/09/26/health/opioid-bill-congress.html

Solutions

- Providers?
- Randomized trial 861 prescribers
  - Letter regarding patient death vs. control
  - Approximate 10% decrease in opioid prescriptions

Doctor et al., (2018)

Interdisciplinary Pain Management

- Chronic pain is a complex condition.
- The biopsychosocial approach is the best way to conceptualize this complex condition.
- An interdisciplinary team is required to address the biological, psychological and social impacts of chronic pain.

Interdisciplinary Pain Management

- Interdisciplinary care involves providers from different disciplines under one roof.
- Formal and informal means of regular communication.
- Thorough evaluations and systematic monitoring of outcomes.
- Patients receive medical care, physical therapy, occupational therapy, psychotherapy, etc.

Interdisciplinary Pain Management

- Functional Restoration (Developed for WC population)
  - 87% of patients receiving functional restoration working at 2-year follow-up compared to 41% of comparison group. (Mayer et al., 1987)
    - Twice as many surgeries in comparison group
    - Significantly more (5times more) healthcare visits for comparison group
    - Comparison group more likely to be re-injured
    - Findings replicated in US and abroad (Hazard et al., 1989; Patrick et al., 2004; Bendix et al., 1996; Hildebrandt et al., 1997)

Interdisciplinary Pain Management

- Interdisciplinary
  - Friedrich et al. (2005)
    - 93 patients CLBP
    - Standard Exercise or Interdisciplinary
    - 3.5 weeks, 4 months, 12 months & 5 years
    - Lower pain and lower disability

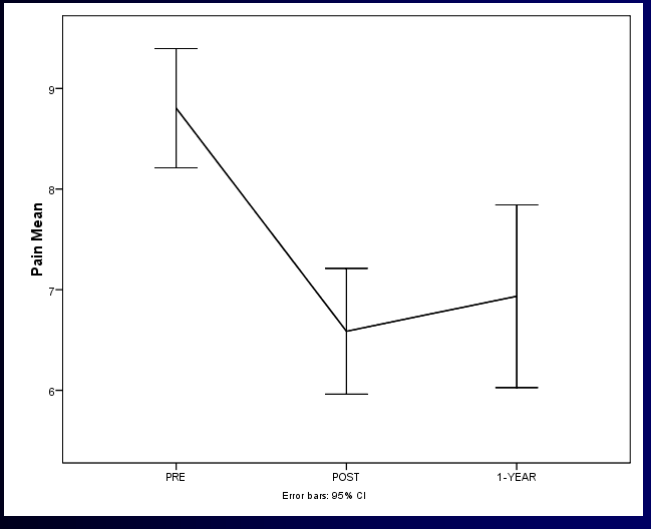
Interdisciplinary Pain Management

- Interdisciplinary
  - Fairbank et al. (2005)
    - Multicenter, RCT 349 CLBP patients
    - Spinal Fusion vs. Interdisciplinary
    - Both groups improved, no difference in pain or self-reported disability
    - Revero-Arias et al. (2005)
      - $14,400 spinal fusion vs. $8,323 interdisciplinary

Interdisciplinary Pain Management

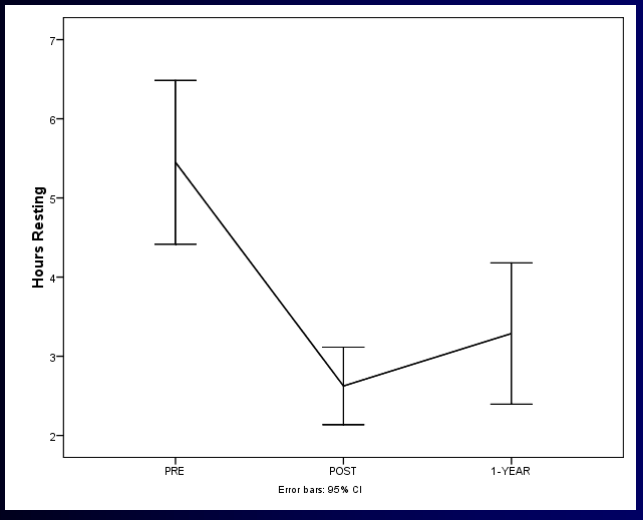
- Interdisciplinary
  - Skouen et al. (2002)
    - 195 patients with CLBP
    - Light interdisciplinary, Extensive interdisciplinary or TAU PCP
    - Interdisciplinary better pain and functional outcomes
    - No difference between light or extensive interdisciplinary programs

1-Year Pain Reduction



(Oslund et al., 2009)

1-Year Hours Resting Improvement



(Oslund et al., 2009)

Interdisciplinary Pain Management

- Interdisciplinary
  - Gatchel and Okifuji (2006)
  - Therapeutic and Cost-Effectiveness review of literature past 10 years
  - Back pain annual medical costs ($12,900 to $19,823)
  - Annual medical costs reduced by 68% in interdisciplinary care
  - Average age 45
  - Similar calculations for disability

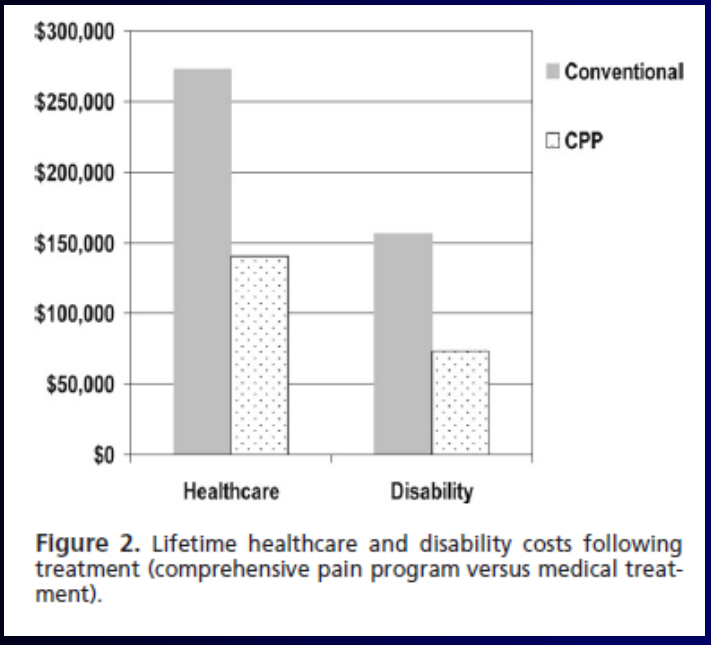


Figure 2. Lifetime healthcare and disability costs following treatment (comprehensive pain program versus medical treatment).

Gatchel & Okifuji., (2006)

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