Changing Mindsets to Enhance Pain Treatment Effectiveness

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Owner, Optimized Psychology

2011 Institute of Medicine Report

• Globally about 1 in 3 have ongoing pain
• Erodes quality of life, confers suffering
• Economic burden
Psychological Disorders and Pain

Depression $\rightarrow$ PAIN$^{1-2}$
Anxiety $\rightarrow$ PAIN$^3$
Posttraumatic Stress Disorder $\rightarrow$ PAIN$^4$

Co-occur
1. Carroll LJ, Cassidy, Cote P. 2004
2. Bair MJ et al. 2003
3. Granot M & Tarter DJ. 2005
4. Kessler RC. Chiu WT et al 2005
Pain and Psychological Disorders

Depression ← PAIN¹
Anxiety ← PAIN²
Posttraumatic Stress Disorder ← PAIN³

Co-occur
3. Weisler-Frank, Maier, Watkins 2005

Bidirectional relationship

PAIN ←→ PSYCH

What predicts treatment response?

Pain is Complex
Context
Meaning
Cognition
Emotion
Affect
Mood
Attention
Social factors

IASP Definition of Pain

Pain Definition: A noxious sensory and emotional experience

EXPECTATIONS

- Analgesic (Pollo, Amanzio, et al. 2001)
- Amplify pain (Benedetti, Lanotte, Lupiano, Colloca 2007)

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From cue to meaning: Brain mechanisms supporting the construction of expectations of pain

Oleg V. Lyubomirsky, Fadi Zaidan, John B. MacIver, Robert A. Koltz, and Robert G. Coghill

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DRUG EFFICACY

The Effect of Treatment Expectation on Drug Efficacy: Imaging the Analgesic Benefit of the Opioid Remifentanil

Ulrike Biegel,1,2 Vishwanat Venkateshwaran,1 Katja Wisch,1 Rusain Ni Mhuirisceartagh,1 Michael G. Lee,1 Markus Ploner,1 Irene Tracey1

Evidence from behavioral and self-reported data suggests that the patient's beliefs and expectations can shape both therapeutic and adverse effects of any given drug. We investigated how divergent expectations alter the analgesic efficacy of a potent opioid in healthy volunteers by using brain imaging. The effect of a fixed concentration of the μ-opioid agonist remifentanil on constant heat pain was assessed under three experimental conditions using a within-subject design with an expectation of analgesics, with expectancy of a positive analgesic effect, and with negative expectancy of analgesics (that is, expectation of hyperalgesia or exacerbation of pain). We used functional magnetic resonance imaging to record brain activity to corroborate the effects of expectations on the analgesic efficacy of the opioid and to elucidate the underlying neural mechanisms. Positive treatment expectancy substantively enhanced (declined) the analgesic benefit of remifentanil in contrast, negative treatment expectancy aboli-
ished remifentanil analgesia. These subjective effects were substantiated by significant changes in the neural activity in brain regions involved in the coding of pain intensity. The positive expectancy effects were associated

ORIGINAL ARTICLE

Placebo and Nocebo Effects Are Defined by Opposite Opioid and Dopaminergic Responses

David J. Scott, BSc; Christian S. Serenky, DDS, PhD; Christine M. Eganlah, BSc; Hong Rong, PhD; Robert J. Kruppel, PhD; Joo-Kur Zhang, MD, PhD

Negative Mindset:
Pain Catastrophizing
Measuring Catastrophizing

Coping Skills Questionnaire
Catastrophizing Subscale
Frank Keefe et al. 1989
6 items

Pain Catastrophizing Scale
Michael J. Sullivan et al 1995
13 items; 3 subscales

Magnification
I wonder whether something serious may happen
I become afraid that the pain will get worse
I keep thinking of other painful events

Rumination
I anxiously want the pain to go away
I can’t seem to get it out of my mind
I keep thinking about how much it hurts
I keep thinking about how badly I want the pain to stop

Helplessness
I feel I can’t go on
I feel I can’t stand it anymore
There’s nothing I can do to reduce the intensity of the pain
It’s terrible and I think it’ll never go to get any better
I worry all the time about whether it will end
It’s awful and I feel that it (d) will never end

PAIN
Pain Catastrophizing Impacts

- Increased affective distress
- Muscle and joint tenderness
- Muscular tension at rest
- Pain-related disability
- Mediates efficacy of pain treatments
- Predicts the development of chronic pain


Pain Catastrophizing: Impact on Patient Outcomes

- Poor response to various pain treatment modalities
- Poor response to surgery
- Longer hospital stays
- More likely to develop chronic pain after surgery
- Greater use and misuse of opioids
- More likely to be on opioids at 10 year f/u


How do we treat pain catastrophizing?

- Cognitive Behavioral Therapy
- Mindfulness Based Stress Reduction
- Yoga
- Acceptance and Commitment Therapy
- Combination treatments (e.g., PT + CB strategies)

1. Keefe FJ; Thorn B; Burns J; Cherkin D.
Mindfulness-based stress reduction and cognitive behavioral therapy for chronic low back pain: similar effects on mindfulness, catastrophizing, self-efficacy, and acceptance in a randomized controlled trial

Abstract
Cognitive behavioral therapy (CBT) is believed to improve chronic pain problems by decreasing pain catastrophizing and increasing self-efficacy for managing pain. Mindfulness-based stress reduction (MBSR) is believed to benefit patients with chronic pain by decreasing mindfulness and pain acceptance. However, little is known about how these therapeutic mechanisms may work in the context of CBT to improve chronic pain outcomes.

1. Seminowicz and Davis. Cortical responses to pain in healthy individuals depends on pain catastrophizing. 2014.
Altered Brain Structure and Function Correlate with Disease Severity and Pain Catastrophizing in Migraine Patients. (Hubbard et al 2014)
Sharifzadeh, Kao, Sturgeon, Rico, Mackey, Darnall. Pain Catastrophizing Moderates Relationships Between Pain Intensity and Opioid Prescription: Non-linear Sex Differences Revealed (in press, Anesthesiology)
Does CBT treatment make the brain healthy again?

Pain Catastrophizing and Efficacy of Cognitive Behavioral Therapy

- Increases prefrontal gray matter in patients with chronic pain
  \cite{Seminowicz, J Pain, 2013}
You participate with your pain!!

The Volume Dial Analogy
Single-Session Class Reduces Catastrophizing

<table>
<thead>
<tr>
<th>Time Point</th>
<th>PCS Mean (SD)</th>
</tr>
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<tbody>
<tr>
<td>Baseline</td>
<td>26.1 (10.8)</td>
</tr>
<tr>
<td>Post-Treatment Week 2</td>
<td>16.5 (9.9)</td>
</tr>
<tr>
<td>Post-Treatment Week 4</td>
<td>13.8 (9.5)</td>
</tr>
</tbody>
</table>

N=57
PCS = Pain Catastrophizing Scale

<table>
<thead>
<tr>
<th>Clinical importance of post-class PCS changes</th>
<th>Week 2</th>
<th>Week 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>PCS Change</td>
</tr>
<tr>
<td>Increased PCS</td>
<td>5</td>
<td>+19.8 (21.6)%</td>
</tr>
<tr>
<td>No Change (&lt;15%)</td>
<td>19</td>
<td>-1.2 (2.8)%</td>
</tr>
<tr>
<td>Minimally Important Change (15-29%)</td>
<td>10</td>
<td>-23.3 (3.2)%</td>
</tr>
<tr>
<td>Moderately Important Change (30-49%)</td>
<td>13</td>
<td>-40.6 (4.9)%</td>
</tr>
<tr>
<td>Substantially Important (&gt;50%)</td>
<td>14</td>
<td>-61.3 (11.9)%</td>
</tr>
</tbody>
</table>
Large Effect Sizes (Cohen’s $d$)

Baseline to Post-Treatment Week 2: $d = 0.85$
Baseline to Post-Treatment Week 4: $d = 1.15$

NCCIH R01 Award
Darnall / Mackey Co-PIs
Pediatric Pain: Treat Caregiver Catastrophizing

**Predicts Pain Persistence**

Understanding How Catastrophizing Changes

Darnall BD, Sturgeon JA, Cook KF, Taub CJ, Burns JW, Sullivan MJ, Mackey SC.

Treatment to Prevent Chronic Pain

**Opportunities:**
- Non-surgical acute pain
- Healthy population
- At-risk healthy individuals
- Pre- and post-surgical


Meta-analysis of 15 studies
5046 surgical patients

Pre-surgical pain catastrophizing was the strongest predictor of postsurgical chronic pain

Pain Catastrophizing

- Greater post-surgical opioid use (Papaioannou et al. 2009)
- Length of hospital stay (Picavet et al. 2002)
- Delayed early recovery from surgery (Hadj et al. 2011)
- Poor post-surgical function (Hadj et al. 2011)

Pain Psychology and Pain Catastrophizing in the Perioperative Setting
A Review of Impacts, Interventions, and Unmet Needs
Beit D. Satal, MD

Stanford HEALTH CARE
Welcome to My Surgical Success

My Surgical Success
View – Book an Appointment
Healthy & Free
My Surgical Success
View – Book an Appointment
Healthy & Free
Using Peri-Op CHOIR to Deliver Perioperative Pain Psychology Treatment

Opioid Reduction & Biopsychosocial Treatment of Pain

CDC
Centers for Disease Control and Prevention
What YOU Can Do

(1) Educate your patients:
   MINDSET MATTERS
   • How one *RESPONDS* to pain is a critical determinant.
   • Explain that while PC is understandable, it has a toxic effect on pain and undermines treatments.
(2) Screen Patients

- Status Assessment
- Treat prior to inventions
- Behavioral medicine as first-line, not last resort

Intervention Begins With YOU

- Broad endorsement of active strategies to turn down the ‘pain dial’.
- The rationale you provide will empower patients to participate positively in their outcomes.
- Align with them in what is an active, team effort.

Referrals

- Pain psychologist
- Health psychologist
- General psychologist
- Pain Education Classes
- Mindfulness Based Stress Reduction
- Gentle Yoga
Ideally in treatment, patients learn to:

- Identify pain catastrophizing
- Apply skills to adaptively self-regulate

~ TIMING MATTERS! ~

- Early in pain catastrophizing leads to better tx response to multidisciplinary pain care
- Better results for various pain treatments


• Integrated systems for phenotyping
• Delivery of targeted treatments
• Barriers to care must be dismantled
• Integration of technology
• Think beyond existing treatment paradigms