The Psychology Toolbox: Evidence-based Treatments for Pain Management

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Disclosure

- Advisory Board Member:
  - Bicycle Health
  - Lumina Analytics: Mission LISA (Learning Indicators of Substance Addiction)
Learning Objectives

- Differentiate between acute and chronic pain
- Explain the data supporting use of psychological interventions in pain treatment

Pain in Context

- IOM Report (2011)
  - Chronic pain affects approximately 100 million American adults
  - More than those affected by heart disease, cancer, and diabetes combined
  - Estimated annual cost of $500-600 billion in medical treatment and lost productivity
Pain Etiology

Etiological Pathways

- Biomedical
  - Initial lesion
  - Brain processing

- Physical
  - Posture
  - Repetitive movements
  - Deconditioning
  - Overcompensation
  - Guarding
Psychological Factors and Pain

• Depression and Pain

• Currie & Wang (2005) examined the temporal relationship between MDD & CBP in the general Canadian population

• National Population Health Study (NPHS)
  – Data comprised of physical & mental health status, lifestyle behaviors, healthcare utilization, socioeconomic information
  – Time 1 – Time 2: 24 months
  – Study comprised of 9,909 respondents

• Depressed individuals 3x more likely to develop CBP compared to non-depressed individuals


Psychological Factors and Pain

• Epidemiologic Catchment Area Project (funded by NIMH) sought to assess prevalence of psychiatric disorders in the general population

  – n > 20,000; Baltimore area n = 3,349, 2747, 1771
  – Diagnostic Interview Schedule: structured interview created by NIMH for study, yields diagnoses of specific disorders

• At 13 year f/u, risk of CBP increased when depressive disorder present at baseline

• Lifetime history of depressive disorder at wave 1 or 2 associated with greater than 3x risk for first ever report of back pain during the 13 year f/u period

Adverse Childhood Experiences

- Adverse Childhood Experience (ACE) Study
  - CDC/Kaiser Permanente collaboration
  - Co-PIs: Robert Anda, MD, Vincent Felitti, MD
  - Examining relationship between ACEs and health/behavioral outcomes later in life
  - Data gathered from 17K individuals between 1995-97

- Physical/emotional neglect
- Recurrent emotional abuse
- Recurrent physical abuse
- Sexual abuse (contact)
- Household substance abuse
- Incarceration of household member
- Chronic mental illness
- Mother treated violently
- One or no parents
Adverse Childhood Experiences

- Higher ACE scores increase risk for developing
  - Medical/psychiatric disease
  - CD/SA issues
  - Health-related QOL issues
  - Partner violence
  - Sexual activity
  - Suicidality

Adverse Childhood Experiences

- Abuse and Somatic Disorders


- 23 studies, 4640 subjects

- Significant association between sexual abuse and a lifetime diagnosis of:
  - Functional GI disorders
  - Non-specific chronic pain
  - Psychogenic seizures
  - Chronic pelvic pain

Psychological Factors and Pain

- Surgical Outcomes (lumbar surgery, SCS)
- Review of literature relating to presurgical psychological screening
- Successful outcomes generally defined
  - Decreased pain
  - Increased function
  - Return to work
  - Reduced medical treatment
- Positive relationship between one or more psychological factors and poor treatment outcome in 92% of reviewed studies


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Psychological Factors and Pain

- Most useful predictors of poor outcome:
  - Presurgical somatization
  - Depression
  - Anxiety
  - Poor coping

- Minimally predictive factors
  - Pretreatment physical findings
  - Activity interference
  - Presurgical pain intensity

Summary: Role of Psychology in Pain Etiology

- Some pain conditions are primarily due to psychogenic factors but virtually all can be influenced by psychological factors.

Does pain serve any function or purpose?
Is all pain the same?

<table>
<thead>
<tr>
<th>Acute Pain</th>
<th>Chronic Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hurt = Harm</td>
<td>Hurt ≠ Harm</td>
</tr>
<tr>
<td>Avoidance decreases damage</td>
<td>Fear-avoidance cycle</td>
</tr>
</tbody>
</table>

- **Etiology:**
  - Clear pathway
  - Often single cause
  - Many unknowns
  - Multifactorial

- **Treatment Course**
  - Fixed end point
  - Immobilization often essential for recovery
  - Medications
  - No fixed end point
  - Immobilization can worsen condition
  - Medications: Caution
Management Approach to Pain

- Similar to other chronic health conditions lacking a cure
- Focus on quality of life & functioning

Example: Diabetes

- Regulate diet
- Check blood sugars
- Exercise regularly
- Take insulin/medications
- Monitor wounds
Chronic Pain Management

- Medical optimization
  - Physician, NP, PA

- Physical reconditioning
  - Rehabilitation provider (PT, OT)

- Behavioral/lifestyle modification
  - Pain psychologist

Interdisciplinary Management

**Diabetes**

- Regulate diet
- Check blood sugars
- Exercise regularly
- Take insulin/medications
- Monitor wounds

**Chronic Pain**

- Medical optimization
- Physical reconditioning
- Behavioral/lifestyle modification
**Common Pain Psychology Curriculum Components**

- Overview of pain
- Pacing of activities
- Pain & stress physiology
- Relaxation training
- Sleep hygiene

**Common Pain Psychology Curriculum Components**

- Identifying environmental stressors (work & home)
- Development of stress management techniques (e.g., cognitive restructuring)
- Assertiveness/communication skills development
- Flare contingency planning
Deconstructing Pain Psychology

- Relaxation training
- The role of cognitive processes

Stress, the Nervous System, and Pain
Stress, the Nervous System, and Pain

Sympathetic Activation

- Increased heart rate
- Increased blood pressure
- Increased muscle tension
- Constriction of blood vessels
- Release of stress hormones
- Pupil dilation
- Change in breathing patterns
- Additional systemic changes

Parasympathetic Activation

- Decreased heart rate
- Decreased blood pressure
- Decreased muscle tension
- Expansion of blood vessels
- Discontinuation of stress hormone release
- Pupil constriction
- Change in breathing patterns
- Additional systemic changes
Stress, the Nervous System, and Pain

Pain

Nervous System Activation

Stress, the Nervous System, and Pain

Pain

Nervous System Activation
Stress, the Nervous System, and Pain

- Pain
  - Nervous System Activation

Stress, the Nervous System, and Pain

- Pain
  - Anxiety
  - Nervous System Activation
Stress, the Nervous System, and Pain

- Pain
- Anger
- Anxiety
- Guilt

Nervous System Activation
Stress, the Nervous System, and Pain

- Pain
  - Sadness
  - Guilt
  - Anger
  - Anxiety
  - Nervous System Activation

Stress, the Nervous System, and Pain

- Diet
- Financial Strain
- Relationship Issues
- Sleep
- Pain
- Sadness
- Guilt
- Anger
- Anxiety
- Nervous System Activation
Relaxation Training

- Breathing exercises
  - Parasympathetic activity
  - Distraction

Stress, the Nervous System, and Pain

- Diet
- Sleep
- Financial Strain
- Pain
- Sadness
- Guilt
- Anger
- Anxiety
- Relationship Issues
- Nervous System Activation
Stress, the Nervous System, and Pain

The Role of Cognitions
The Role of Cognitions

- Thought processes are often rooted in our core perception of ourselves and our roles in this world
- Usually shaped by early experiences
- Much of our maladaptive behaviors are rooted in dysfunctional thought patterns
- Can take a significant amount of time and work to alter our automatic thought processes
Catastrophization

- Exaggerated perception of a situation being worse than it actually is
  - Magnification
  - Rumination
  - Helplessness

Catastrophization

- Implications
  - Pain expectations → affective distress
  - Somatic hypervigilance/attention → increased pain perception
  - Activity reduction coping strategy → fear-avoidance cycle
  - Persistent symptoms
  - Disability
Goal of Cognitive-Behavioral Therapy

- Target maladaptive thought process to achieve healthier outcomes
  - Emotional
  - Behavioral
  - Physiologic

Empirically Validated Treatment: Self-Management Education

- Lambeek, Van Mechelen, Knol, Loisel, Anema (2010)
- Linton & Ryberg (2001)
- Flor, Fydrich, Turk (1992)
Empirically Validated Treatment

  - Randomized control trial (n=213)
  - All patients received regular primary care tx + Minimal Treatment (information pack, pamphlet) or 6-session CBT treatment.
  - Assessments administered at pretest and 12-month follow-up
  - Risk for developing long-term sick absence decreased 9x in CBT group
  - CBT participants had decreased medical utilization compared to increase in other groups

Empirically Validated Treatment

- Linton & Nordin (2006)
  - 5-year follow-up of Linton & Andersson (2000) study, also used supplemental records from the National Insurance Authority
  - 97% completed follow-up questionnaire
  - CBT group had significantly less pain, higher activity, better quality of life, and better general health compared to Minimal Treatment Group
  - Risk of long-term sick leave 3x higher in the non-CBT group
  - CBT group had significantly less lost productivity costs
Empirically Validated Treatment


- Patients deemed HR for development of chronic disability were randomly assigned to an early intervention FR group (n=22) or a non-intervention group (n=48). Low risk non-intervention subjects also evaluated (n=54).

- Patients tracked at 3 month intervals over the course of a year

- HR patients in the early intervention group had significantly lower rates of healthcare utilization, medication use, and self-report pain variables

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Empirically Validated Treatment


- HR non-intervention group displayed more symptoms of chronic pain disability compared to low risk subjects

- Greater cost savings associated with early intervention ($12,721) vs no intervention group ($21,843). Cost variables included healthcare visits, medication, lost wages, early intervention program cost.
Cochrane Review of Multidisciplinary Programs for Pain

- 41 studies, 6858 participants
- LBP > 3 months with some prior treatment
- MDP vs unimodal care focused on physical factors, standard care with GP
- Moderate quality evidence for improvements in pain and daily functioning
- Increased likelihood of RTW in 6-12 months


Biofeedback

- Definition
- Course of treatment
- Non-invasive
- Active versus passive treatment modality

Empirically Validated Treatment: Biofeedback

Biofeedback Treatment for Headache Disorders: A Comprehensive Efficacy Review

Yvonne Notorine - Alexandra Martin - Winfried Rief - Frank Andreas

Published online: 26 August 2008
© Springer Science+Business Media, LLC 2008

- Focused on migraine and TTH
- 150 outcome studies, 94 included in review
- Medium to large mean effect sizes
- Results stable over time (ave 14 months)
Empirically Validated Treatment: Biofeedback

- Improvements
  - Headache frequency
  - Perceived self-efficacy
  - Anxiety symptoms
  - Depressive symptoms
  - Medication usage

Empirically Validated Treatment: Biofeedback

- BFB superior compared to wait list control and headache monitoring
- EMG for TTH headache superior to placebo and relaxation therapies
Empirically Validated Treatment: Biofeedback

- Limitations
  - Not sufficiently investigated with other specific disorders

Mindfulness-Based Stress Reduction

- Jon Kabat-Zinn (1979) U. Mass

- Curriculum
  - 8 weeks (2.5 hour sessions)
  - Full day retreat
  - Experiential
  - Didactics
  - Group discussion
  - Daily practice
Mindfulness-Based Stress Reduction

“The awareness that emerges through paying attention on purpose, in the present moment, and non-judgmentally to the unfolding of experience moment to moment”


Mindfulness-Based Stress Reduction

- Application in pain
  - Awareness of somatic sensations without emotional attachment
  - Physiologic implications
  - Desensitization: experience of pain without negative consequences
Empirically Validated Treatment: MBSR

- Literature review (1960-2010)
- Focused solely on studies examining pain intensity
- Significant evidence for reduction in PI
- Other studies have found possible non-specific effects
- *Note: MBSR does not target changing/controlling pain*


Acceptance and Commitment Therapy

- Based on a relational approach to human language and cognition
- Uses acceptance and mindfulness processes and commitment and behavior change processes to create psychological flexibility

Acceptance and Commitment Therapy

- Movement away from strategies to control pain
- Focus on longer-term values rather than more immediate thoughts and emotions


Acceptance and Commitment Therapy

- Pain acceptance associated with decreases in
  - Pain intensity
  - Pain-related anxiety
  - Pain-related avoidance
  - Depression
  - Disability

Empirically Validated Treatment: ACT

- Meta analysis (22 studies, 1235 patients)
  - Small to medium effects on
    - Pain intensity
    - Depression
    - Anxiety
    - Physical well-being
    - Quality of life

- Findings equivalent to CBT

Empirically Validated Treatment: ACT

- ACT vs CBT
  - 114 pain participants(18-89)
  - Random assignment to 8 week ACT or CBT tx
  - Assessments at 4 time points including 6 month follow-up

Empirically Validated Treatment: ACT

- ACT vs CBT
  - Improvements for both groups
    - Pain interference
    - Pain-related anxiety
    - Depression
  - Tx effects maintained at 6 month follow-up
  - No between group differences
  - ACT participants more satisfied with tx


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