Identifying and Managing Persistent Pain:
All Pain is not Equal
May 28, 2020
0825-0925
Assistant Professor and Associate Director of Physical Therapy (P.T.) Program, George Washington University (GWU)
Department of Health, Human Function & Rehabilitation Sciences
Co-Academic Director, Orthopedic P.T. Residency Program
Johns Hopkins Hospital/GWU
Washington, DC
Dr. Jonely is a physical therapist with over 20 years of experience treating non-operative orthopedic and persistent pain clients. Currently she teaches graduate physical therapy students full time at The George Washington University and practices one day a week clinically at The International Spine Pain and Performance Center in Washington, DC. Dr. Jonely received her Master’s Degree in Physical Therapy from Texas Tech University Health Sciences Center in 1999 and later her Doctor of Science in 2006. Dr. Jonely has also completed advanced training in manual therapy with the International Academy of Orthopedic Medicine (IAOM-US) and is a fellow of the American Academy of Orthopedic Manual Physical Therapists.
Disclosures

• Dr. Holly Jonely has no relevant financial or non-financial relationships to disclose relating to the content of this activity.

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Learning Objectives

At the conclusion of this knowledge-based activity, participants will be able to:

1. **Explain** the difference between primary nociceptive pain, neuropathic, and nocioplastic pain.

2. **Identify** the need to adopt a biopsychosocial model in the evaluation and management of persons with persistent pain.

3. **Summarize best evidence** for management of persons with persistent pain.
What are you thinking?

Image courtesy of: sodahead.com
Mark is a 67-year-old recently retired economist with a 35 year history of persistent back pain and fibromyalgia.

- Acute flare of symptoms three months ago
- Unable to walk without a cane, pain relief only while lying flat on his back
- Medications: baclofen, Meloxicam, Tylenol, Amitriptyline
Difficult client or difficult situation?
“Pain is one of the most frequent causes for patients to seek medical care.”

“. . . chronic pain is a leading source of human suffering and disability.”

Mäntyselkä, P, & et al., 2001
What is Pain?

“An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” (International Association for the Study of Pain, 2018)
Stages of Tissue Healing

Days after injury/onset

Acute vs Persistent Pain

• Acute pain management:
  – Address the **underlying cause of pain**

• Persistent pain management:
  – Address the **effects** of pain and maximize **function** and **quality of life**
Persistent Pain State

“Pain without apparent biological value persisting beyond expected healing time”

Occurs in approximately 8-45% of population and 10-15% presenting to general practitioner

Imaging is Poorly Correlated with Pain

n=3300 asymptomatic patients

• Pain affects **100 million** Americans

• **50 million** report persistent daily pain

• **One in six people with persistent pain** say the pain is sometimes so bad they want to die

Significant Socio-Economic Burden

- 27% unable to maintain relationships with friends and family
- 40% say pain impacts everyday activities
- 20-50% diagnosed with co-morbid depression
- 61% unable to work outside the home
- 13-19% have lost or changed jobs
- 40-60% report inadequate management of their pain
- 88% have other chronic illnesses
  - Cardiovascular disease
  - Depression

Significant Economic Burden

• Economic cost $560-635 billion/year

Chronic Musculoskeletal Pain

Economic Cost of Other Diagnoses

- Respiratory System
- Digestive System
- Endocrine, Nutritional,...
- Injury and Poisoning
- Neoplasms
- Cardiovascular Disease

US Dollars (Billions)


School of Medicine & Health Sciences
THE GEORGE WASHINGTON UNIVERSITY
Severe persistent pain is associated with an increased risk of mortality, independent of sociodemographic factors.

What Do They Have in Common?

[Image of Shrek and a human figure with pain highlighted]

[Links to images and article]


“Pain involves the intricate, variable interaction of

biological factors

(genetic, biochemical, etc),

psychological factors

(mood, personality, behavior, etc)

and

social factors

(cultural, familial, socioeconomic, medical, etc).”

-George Engle – biopsychosocial definition of pain

Image: https://noinotes.files.wordpress.com/2010/12/noinotes_img_1008.jpg
### Physical Functioning
- Inability to perform activities of daily living
- Sleep disturbances
- Fatigue

### Psychological Morbidity
- Depression
- Anxiety
- Fear
- Anger
- Poor self-esteem
- Maladaptive thoughts
- Catastrophizing
- Poor Self-Efficacy

### Social Consequences
- Impaired relationships with friends and family
- Intimacy/sexual activity
- Social isolation

### Societal Consequences
- Healthcare costs
- Disability
- Lost work

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The Problem

• Not all pain is equal
• If persistent pain is different then so should:
  – Assessment
  – Management
Key Points About Pain

• There is more to pain than nociception:
  – Pain is a **FEELING**
  – Pain is always an **OUTPUT**
  – Pain is about **PROTECTION**, pain does not always equal harm
  – Pain is a **DECISION** your brain makes
How is Nociception Transmitted to the Brain?

Detect signals of tissue damage or threat:
- Directly:
  - pressure, thermal
- Indirectly:
  - chemical

https://nba.uth.tmc.edu/neuroscience/m/s2/chapter07.html
Pain Perception: How does the Brain Decide?

Somatosensory Cortex: Sensory discrimination, Pain intensity = *More vague and diffuse pain

Anterior Cingulate Cortex: Emotional and Cognitive-Evaluation = *heightened pain sensation and > emotional aspect

Insular Cortex: Sensory/Affective Perception "Suffering" = *Allodynia/Hyperalgesia

Prefrontal Cortex: Cognitive Evaluation of Pain = *Increased Emotional Processing

*When Acute Pain Becomes Persistent Pain*
An fMRI-Based Neurologic Signature of Physical Pain

Tor D. Wager, Ph.D., Lauren Y. Atlas, Ph.D., Martin A. Lindquist, Ph.D., Mathieu Roy, Ph.D., Choong-Wan Woo, M.A., and Ethan Kross, Ph.D.

A Pain-Predictive Signature Pattern

SEN & SP = 94%

Pain Matrix

The “Pain Matrix” in Pain-Free Individuals
JAMA Neurology  June 2016  Volume 73, Number 6

Figure. Pain Matrix Activation in Pain-Free People

A Controls and neurosynth

B Cluster mean activation
1 Thalamus
2 Insula
3 S2
4 Anterior cingulate cortex
5 “Pain matrix”

X Pain-free patients and neurosynth

D Patients and controls conjunction

z = 8 mm  z = 18 mm  z = 28 mm  z = 38 mm  z = 48 mm
But What Happens When This Goes Awry?

• We know in some cases, the tissue has had adequate time to heal but the pain persists…

• Brain is convinced there is still a “threat”

• What’s the disconnect?
The Brain...

• Tries to help!!
  – Changes itself
    • Adds sensors (up-regulates) to the activation triggers making it easier to react
      » You had a scary experience at a particular metro station in the dark…you will have unpleasant memories, maybe a physical reaction

• The brain can also adapt in the motor and sensory cortices


Cortical Reorganization
Cortical Reorganization

Patterns of cortical reorganization in complex regional pain syndrome.
Maihofner, Christian; Handwerker, Hermann; MD, PhD; Neundorfer, Bernhard; Birklein, Frank

DOI: 10.1212/01.WNL.0000098939.02752.8E

Figure 4. Left: Projection of the equivalent current dipole (ECD) localizations for D1 (filled square) and D5 (filled circle) onto individual MRI slices for one representative patient. Note the reduction in the cortical extension of the hand from 1.8 cm (unaffected side) to 0.9 cm (complex regional pain syndrome [CRPS] side). Right: Projection of the ECD for the center of the hand (open circle) and the lower lip (open square) onto individual MRI slices. Note the inferior and lateral shift of the hand position toward the lip on the CRPS side (distances between lip and hand 2.5 cm for the normal and 1.6 cm for the CRPS side).
Clinical note

I can’t find it! Distorted body image and tactile dysfunction in patients with chronic back pain

G. Lorimer Moseley *
Wand et. al., (2011) conclude that “it is likely that part of the pain experience of chronic low back pain patients is mediated by sensitivity changes within the central nervous system and the demonstrated brain changes are a probable contribution to this.”
The Root Cause of Disease... What Do We Need to Assess?

Persistent pain


High Blood Pressure
Anxiety
Depression
Thyroid Issues
Hormone Imbalances
Inflammation
Stress
Poor Diet
Toxins
Lack of Sleep
Poor Relationships
Nutrient Deficiencies

Cancer
Allergies
Irritable Bowel
Auto Immune Disease
Diabetes
Chronic Fatigue
Poor Digestion
Genetics
Trauma
Toxic Thoughts
Lack of Exercise

So What Do We Do?

Image courtesy of: https://blog.marketo.com/
• A biopsychosocial, team based approach is vital to successful outcomes

• **Social factors**
  – Tenuous housing or employment status, low educational levels and family income, stress over housing, social isolation, history of physical or sexual abuse, past traumatic life events, cumulative traumatic life events

• **Physiological**
  – Advancing age, low activity levels, poor sleep quality, poor diet

• **Psychological**
  – Anxiety, depression, anger/hostility, impaired self-esteem, impaired general emotional functioning, negative pain beliefs

What Screening Tools Do We Have?

- Fear Avoidance Belief Questionnaire
- Pain Catastrophizing Scale
- STarT Back Questionnaire
- Optimal Screening for Prediction of Referral and Outcome-Yellow Flag (OSPRO-YF)
- Patient Health Questionnaire - 4 (PHQ-4)
- Pittsburgh Sleep Quality Index (PSQI)
- One-Item Sleep Quality Scale (SQS)
Fear Avoidance Beliefs Questionnaire

- **16 items**
- **5-10 minutes to administer**
- Fear-Avoidance *(work)*: 0-42
  - Cut off score of 29 in working population
    - Strong predictor of disability at 6 months
  - Cut off score of 22 in non working population
- Fear-Avoidance *(physical activity)*: 0-24
  - Cut off score of 14 = poor treatment outcomes
Pain Catastrophizing Scale

• 13 items
• 5-10 minutes to administer
• Three dimensions of pain catastrophizing:
  – Rumination
  – Magnification
  – Helplessness
• Higher score = greater evidence of pain catastrophizing
• Correlated with other health measures, including pain intensity, pain-related disability, fear avoidance, and psychosocial distress.
Why Screen for Catastrophizing?

- Predictive of onset of back pain and disability
- Surgical Patients:
  - predicts time to hospital discharge, postoperative pain severity, and poor quality of life, as well as the transition to chronic pain.
- Significant predictor of pain-related disability in chronic pain
- Worsens the pain experience

SBST is a simple prognostic questionnaire to identify modifiable risk factors for back pain disability
  – Biomedical
  – Psychological
  – Social
• The resulting score stratifies patients into:
  • Low Risk
  • Medium Risk
  • High Risk
• Each category has a matched treatment proposal
Thinking about the **last 2 weeks** tick your response to the following questions:

1. My back pain has **spread down my leg(s)** at some time in the last 2 weeks
2. I have had pain in the **shoulder or neck** at some time in the last 2 weeks
3. I have only **walked short distances** because of my back pain
4. In the last 2 weeks, I have **dressed more slowly** than usual because of back pain
5. It’s not really safe for a person with a condition like mine to be physically active
6. **Worrying thoughts** have been going through my mind a lot of the time
7. I feel that my **back pain is terrible and it’s never going to get any better**
8. In general I have **not enjoyed** all the things I used to enjoy

9. Overall, how **bothersome** has your back pain been in the **last 2 weeks**?

Not at all  | Slightly  | Moderately | Very much  | Extremely  
0 | 0 | 0 | 1 | 1

**Total score (all 9):** ____________  **Sub Score (Q5-9):** ____________
SBST produces two scores:

- **Total score**
  - 3 or less: Low risk
  - 4 or more
    - **Sub score Q5-9**
      - 3 or less: Medium risk
      - 4 or more: High risk
The patients in the low risk category are very likely to improve. **Support and enable self-management.**

- Consultation with clinician
- Assess medical issues, patient worries, concerns and social impact
- **Brief physical examination/assessment** helps with patient confidence
- **Medication review** and advice
- Address **specific patient issues** from the assessment
- Seek to **encourage activity** and **self-management**
- **Avoid unhelpful labels**
- Provide **oral and written information**
- Explain **outlook is good** but can re-consult if necessary
Main goals are to restore function (including work), minimize disability even if pain is unchanged and to support appropriate self-management.

- Elicit concerns and adequate physical examination
- Treatments matched to physical findings and specific needs and worries of the individual patient
- Course of physiotherapy
  - Specific physiotherapy interventions when clear specific findings from physical assessment
  - General functional activities when no strong relationship between physical findings and back pain complaint
- Treatment objectives should be specific and have an end time point and should ‘translate’ into functional improvements and reduced disability
- Some patients will need onward referral to specialist services (i.e. secondary care spinal services, ortho, pain clinic)
High Risk

• The objectives are to reduce pain, reduce disability and improve psychological functioning.
  – physiotherapy using a combined physical & cognitive-behavioral approach
  – Enable patients to manage on-going and/or future episodes of low back pain
  – Specific focus on cognitive, emotional and behavioral responses to pain and their impact on function
  – Identification of potential obstacles to rehabilitation (e.g. Yellow & Blue Flags)
Screening for Anxiety & Depression

- **Anxiety Subscale:** sum of items one and two
- **Depression subscale:** sum of items three and four
- A score of **three or greater** on either subscale is considered remarkable


The OSPRO-Yellow Flag Assessment Tool: Ten Psychological Questionnaires in One

CPAQ: Chronic Pain Acceptance Questionnaire
FABQ-PA: Fear-Avoidance Beliefs Questionnaire physical activity subscale
FABQ-W: Fear-Avoidance Beliefs Questionnaire work subscale
PASS-20: Pain Anxiety Symptoms Scale
PCS: Pain Catastrophizing Scale
PHQ-9: Patient Health Questionnaire-9
PSEQ: Pain Self-Efficacy Questionnaire
SER: Self-Efficacy for Rehabilitation
STAI: State-Trait Anxiety Inventory
STAXI: State-Trait Anger Expression Inventory
TSK-11: Tampa Scale of Kinesiophobia
The OSPRO-Yellow Flag Assessment Tool

- The OSPRO-YF is a **concise yellow flag assessment tool** that allows for accurate estimates of individual, full-length psychological questionnaire scores for depressive symptoms, anxiety, anger, fear-avoidance beliefs, kinesiophobia, catastrophizing, self-efficacy, and pain acceptance.

- **Provides:**
  - Full-length questionnaire score estimates
  - Identifies the presence of yellow flags.
    - Scores that fall in the top quartile for negative psychological questionnaires (e.g. PCS, FABQ, PHQ-9) or bottom quartile for positive psychological questionnaires (e.g. PSEQ, CPAQ and SER).

- Three forms:
  - 17-items (85% accuracy)
  - 10-items (81% accuracy)
  - Seven-items (75% accuracy)

- The OSPRO-YF **informs treatment decision-making** and facilitates treatment monitoring

https://www.orthopt.org/content/s/yellow-flag-assessment-tool-about-the-tool
The OSPRO-Yellow Flag Assessment Tool

- ORTHO PT Scoring Tool
- https://www.orthopt.org/yf/
Stress refers to a situation where a person feels tense, restless, nervous, or anxious, or is unable to sleep at night because their mind is troubled all the time. Do you feel that kind of stress these days?

1. Not at all
2. Only a little
3. To some extent
4. Rather much
5. Very much

Screening for Sleep Quality

One-Item Sleep Quality Scale (SQS)

INSTRUCTIONS:
• The following question refers to your overall sleep quality for the majority of nights in the past 7 days ONLY.
• Please think about the quality of your sleep overall, such as how many hours of sleep you got, how easily you fell asleep, how often you woke up during the night (except to go to the bathroom), how often you woke up earlier than you had to in the morning, and how refreshing your sleep was.

1. During the past 7 days, how would you rate your sleep quality overall? (Please mark only 1 box)

   Terrible  Poor  Fair  Good  Excellent

   0 1 2 3 4 5 6 7 8 9 10
Screening for Sleep Quality

**Sleep Quality Assessment (PSQI)**

What is PSQI, and what is it measuring?
The Pittsburgh Sleep Quality Index (PSQI) is an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates “poor” from “good” sleep quality by measuring seven areas (components): subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction over the last month.

**INSTRUCTIONS:**
The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

**During the past month,**

1. How many hours did you usually go to bed? [ ]
2. How long (in minutes) does it take you to fall asleep each night? [ ]
3. What time did you usually get up in the morning? [ ]
4. How many hours of actual sleep did you get each night? [ ]
5. How many hours were you in bed? [ ]

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**Scoring**

<table>
<thead>
<tr>
<th>Component</th>
<th>Score</th>
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</thead>
<tbody>
<tr>
<td>Component 1</td>
<td>#9 Score</td>
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<tr>
<td>Component 2</td>
<td>#2 Score (15 min) + #1 Score (1) + 60 min (2) + 60 min (3)</td>
</tr>
<tr>
<td>Component 3</td>
<td>#4 Score (1h 20m) + #3 Score (1h 20m)</td>
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<tr>
<td>Component 4</td>
<td>#5 Score (1h 20m) + #6 Score (1h 20m) + #7 Score (1h 20m) + #8 Score (1h 20m)</td>
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<tr>
<td>Component 5</td>
<td>#9 Score</td>
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<tr>
<td>Component 6</td>
<td>#10 Score</td>
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<tr>
<td>Component 7</td>
<td>#11 Score + #12 Score (1h 20m) + #13 Score (1h 20m) + #14 Score (1h 20m)</td>
</tr>
</tbody>
</table>

**Global PSQI**

A total score of 5+ or greater indicates poor sleep quality.

If you scored 5+ or more it is suggested that you discuss your sleep habits with a healthcare provider.

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Pittsburgh Sleep Quality Index (PSQI)

Generally:

- **SEN 89.6%, SP 86.5%** (kappa = 0.75, p < 0.001)

Over the **past seven days**, on how many days have you done a total of **30 minutes or more of physical activity**, which was enough to raise your breathing rate? This may include sports, exercise, brisk walking or cycling for recreation or to get to and from places. This should not include housework or physical activity that may be part of your job.

Over the **past seven days**, on how many days have you performed **resistance training/ strengthening exercises** for each major muscle group?

Powell, K.E., King, A.C, Buchner, D.M., & et. al. (2018)
What is the Purpose of a Physical Exam?

A Mechanism Base Approach?

Musculoskeletal Pain

- Nociceptive
- Peripheral Neuropathic
  - Central (sensitization)
Nociceptive Pain

Pain that arises from actual or threatened damage to non-neural tissue and is due to activation of nociceptors. (ISAP)
Clusters of symptoms and signs predictive of Nociceptive Pain in patients with low back pain with/without leg pain:

**Presence of:**
1. Pain localised to the area of injury/dysfunction (strongest predictor OR 69.79)
2. Clear, proportionate mechanical/anatomical nature to aggravating and easing factors
3. Usually intermittent and sharp with movement/mechanical provocation; may be a more constant dull ache or throb at rest

**Absence of:**
4. Pain in association with other dysesthesias (e.g. crawling, electrical, heaviness)
5. Pain variously described as burning, shooting, sharp or electric-sock-like
6. Night pain, disturbed sleep
7. Antalgic (i.e. pain relieving) postures/movement patterns

**SEN: 90.0, SP: 91.0, LR+10, LR- 0.10**
Neuropathic Pain

“Pain caused by a lesion or disease of the somatosensory nervous system.” (IASP)
Clusters of symptoms and signs predictive of **Peripheral Neuropathic Pain in patients with low back pain with/without leg pain:**

**Presence of:**
1. History of nerve injury, pathology or mechanical compromise
2. *Pain referred in a dermatomal or cutaneous distribution (strongest predictor OR 24.29)*
3. Pain/symptom provocation with mechanical/movement tests (e.g. active/passive, neurodynamic, i.e. SLR) that move/load/compress neural tissue

**SEN:** 86.3, **SP:** 96.0, **LR+** 21.57, **LR-** 0.14
“Increased responsiveness of nociceptive neurons to their normal input, and/or recruitment of a response to normally subthreshold inputs.” (ISAP)
“Increased responsiveness and reduced threshold of peripheral nociceptors to noxious stimuli in their receptive fields.” (ISAP)

• Occurs in response to tissue injury, i.e. inflammation

• Protective mechanism, by definition – resolves as inflammation recedes and tissues heal
“Increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input.” (ISAP)
Clusters of symptoms and signs predictive of **Central Sensitisation** in patients with low back pain with/without leg pain:

**Presence of:**
1. Pain disproportionate to the nature and extent of injury or pathology
2. Disproportionate, non-mechanical, unpredictable pattern of pain provocation in response to multiple/ nonspecific aggravating/easing factors (strongest predictor OR 30.69)
3. Strong association with maladaptive psychosocial factors (e.g. negative emotions, poor self efficacy, maladaptive beliefs and pain behaviours, altered family/work/social life, medical conflict)
4. Diffuse/non-anatomic areas of pain/tenderness on palpation

**SEN:** 91.8, **SP:** 97.7, **LR+** 40.64, **LR-** 0.08

Central Sensitization?

Musculoskeletal pain

Disproportionate pain experience?

YES

Diffuse pain distribution?

YES

Central Sensitization

NO

Central Sensitization Inventory ≥ 40?

YES

Central Sensitization

NO

no Central Sensitization

NO

no Central Sensitization

Sensitivity 81%, Specificity 75%

## Central Sensitization Inventory: Part A

Please circle the best response to the right of each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I feel tired and unrested when I wake from sleeping.</td>
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<tr>
<td>2. My muscles feel stiff and achy.</td>
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<td>3. I have anxiety attacks.</td>
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<td>4. I grind or clench my teeth.</td>
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<tr>
<td>5. I have problems with dizziness and/or vertigo.</td>
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<td>6. I need help in performing my daily activities.</td>
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<td>7. I am sensitive to bright lights.</td>
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<td>8. I get tired very easily when I am physically active.</td>
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<tr>
<td>9. I feel pain all over my body.</td>
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<td>10. I have headaches.</td>
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<td>11. I feel discomfort in my bladder and/or burning when I urinate.</td>
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<td>12. I do not sleep well.</td>
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<td>13. I have difficulty concentrating.</td>
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<td>14. I have skin problems such as dryness, itching, or rash.</td>
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<td>15. Stress makes my physical symptoms get worse.</td>
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<td>16. I feel sad or depressed.</td>
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<td>17. I have low energy.</td>
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<td>18. I have muscle tension in my neck and shoulders.</td>
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<td>19. I have pain in my jaw.</td>
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<tr>
<td>20. Certain odors, such as perfumes, make me feel dizzy and unraveled.</td>
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<tr>
<td>21. I have to urinate frequently.</td>
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<td>22. My legs feel uncomfortable and restless when I am trying to go to sleep at night.</td>
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<td>23. I have difficulty remembering things.</td>
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<td>24. I suffered trauma as a child.</td>
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<td>25. I have pain in my pelvic area.</td>
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</tbody>
</table>

Subclinical (0-20); mild (21-39); moderate (40-49); severe (50-59); extreme (60-100); Nebelt R, et al. 2016

### Have you been diagnosed by a doctor with any of the following disorders?

Please check the box to the right for each diagnosis and write the year of the diagnosis.

<table>
<thead>
<tr>
<th>Disorder</th>
<th>NO</th>
<th>YES</th>
<th>Year Diagnosed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Restless Leg Syndrome</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2. Chronic Fatigue Syndrome</td>
<td></td>
<td></td>
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<tr>
<td>3. Fibromyalgia</td>
<td></td>
<td></td>
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<tr>
<td>4. Temporomandibular Joint Disorder (TMJ)</td>
<td></td>
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<tr>
<td>5. Migraine or tension headaches</td>
<td></td>
<td></td>
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<tr>
<td>6. Irritable Bowel Syndrome</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>7. Multiple Chemical Sensitivities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Neck Injury (including whiplash)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Anxiety or Panic Attacks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Depression</td>
<td></td>
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</tr>
</tbody>
</table>

Extreme CSI severity levels are more likely to be associated with diagnoses of fibromyalgia, chronic fatigue syndrome, TMJ, tension/migraine headaches and anxiety or panic attacks (p<0.01). Higher CSI severity levels are also associated with reported depressive symptoms, perceived disability, sleep disturbance and pain intensity (p<0.02).

“Pain that arises from altered nociception despite no clear evidence of actual or threatened tissue damage causing the activation of peripheral nociceptors or evidence for disease or lesion of the somatosensory system causing the pain.” (ISAP)
• Pain Pressure Threshold
• Scratch Test
• Pinch-Roll Test
• Match Stick Test
• Impaired Laterality
• Two Point Discrimination
What Are You Currently Doing to Manage Persons with Persistent Pain? Could We Offer More?
The Root Cause of Disease... What Changes Can We Make?

- High Blood Pressure
- Anxiety
- Depression
- Thyroid Issues
- Hormone Imbalances
- Inflammation
- Stress
- Poor Diet
- Toxins
- Lack of Sleep
- Poor Relationships
- Nutrient Deficiencies
- Poor Digestion
- Genetics
- Trauma
- Toxic Thoughts
- Lack of Exercise

Persistent pain

A Biopsychosocial Approach

Biopsychosocial model of pain
Championed by Butler and Moseley and others. 2000
Knowledge is Power

- **Retrain Pain** (retrainpain.org)

**B. INTERVENTIONS – PATIENT EDUCATION AND COUNSELING**

Clinicians should not utilize patient education and counseling strategies that either directly or indirectly increase the perceived threat or fear associated with low back pain, such as education and counseling strategies that (1) promote extended bed-rest or (2) provide in-depth, pathoanatomical explanations for the specific cause of the patient’s low back pain. Patient education and counseling strategies for patients with low back pain should emphasize (1) the promotion of the understanding of the anatomical/structural strength inherent in the human spine, (2) the neuroscience that explains pain perception, (3) the overall favorable prognosis of low back pain, (4) the use of active pain coping strategies that decrease fear and catastrophizing, (5) the early resumption of normal or vocational activities, even when still experiencing pain, and (6) the importance of improvement in activity levels, not just pain relief.

A Mechanism-Based Approach to Physical Therapist Management of Pain

Ruth L. Chimenti, Laura A. Frey-Law, Kathleen A. Sluka

Mechanism Based Approach to Pain Management

- Nociceptive
  - Exercise
  - TENS

- Nociplastic
  - Education
  - Massage
  - TENS

- Neuropathic
  - Exercise

- Nociceptive
  - Topical analgesic
  - Nonsteroidal anti-inflammatory
  - Opioid
  - Channel blocker

- Nociplastic
  - Serotonin-noradrenaline reuptake inhibitor
  - Tricyclic antidepressant

- Neuropathic
  - Gabapentinoid

Time out for TENS

Effectiveness of Transcutaneous Electrical Nerve Stimulation for Treatment of Hyperalgesia and Pain

Josimari M. DeSantana, PT, PhD, Deirdre M. Walsh, PT, PhD, Carol Vance, PT, MSc, Barbara A. Rakel, RN, PhD, and Kathleen A. Sluka, PT, PhD

- Low Frequency (< 10 Hz) or High Frequency (> 50Hz)
  - Low frequency not for those with opioid tolerance
  - High frequency for those with opioid tolerance
  - Otherwise, mixed within same session
- High Intensity
- Minimum 30 minutes
• **Insufficient physical activity** is an independent risk factor for disease; linked to over 35 different diseases.

• **Poor nutrition and/or inactivity** can independently modify metaflammation.
Get Them Moving: The Power of Exercise

- Increased Cardiovascular Endurance and Capacity
- Enhance Muscular tone
- Increased Muscular Strength
- Improved Metabolism
- Decreased Adiposity
- **Improved Mood and Mental Health**
- Enhanced Memory and Cognitive Abilities
- **Immune-Modifying Properties**
- **Induced Analgesia**
  - Released opioid peptides
Low Back Pain

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability, and Health from the Orthopaedic Section of the American Physical Therapy Association


Interventions – Progressive Endurance Exercise and Fitness Activities

Clinicians should consider (1) moderate- to high-intensity exercise for patients with chronic low back pain without generalized pain, and (2) incorporating progressive, low-intensity, submaximal fitness and endurance activities into the pain management and health promotion strategies for patients with chronic low back pain with generalized pain.

Delitto, A., & et. al. (2012).
Neck Pain: Revision 2017

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association


Chronic
For patients with chronic neck pain with mobility deficits:

B Clinicians should provide a multimodal approach of the following:
- Thoracic manipulation and cervical manipulation or mobilization
- Mixed exercise for cervical/scapulothoracic regions: neuromuscular exercise (eg, coordination, proprioception, and postural training), stretching, strengthening, endurance training, aerobic conditioning, and cognitive affective elements
- Dry needling, laser, or intermittent mechanical/manual traction

C Clinicians may provide neck, shoulder girdle, and trunk endurance exercise approaches and patient education and counseling strategies that promote an active lifestyle and address cognitive and affective factors.
What Evidence Do We Have?

Chronic
For patients with chronic neck pain with radiating pain:

B Clinicians should provide mechanical intermittent cervical traction, combined with other interventions such as stretching and strengthening exercise plus cervical and thoracic mobilization/manipulation.

B Clinicians should provide education and counseling to encourage participation in occupational and exercise activities.

Chronic
For patients with chronic neck pain with movement coordination impairments (including WAD):

C Clinicians may provide the following:

- Patient education and advice focusing on assurance, encouragement, prognosis, and pain management
- Mobilization combined with an individualized, progressive submaximal exercise program including cervicothoracic strengthening, endurance, flexibility, and coordination, using principles of cognitive behavioral therapy
- TENS

Neck Pain: Revision 2017

Clinical Practice Guidelines Linked to the International Classification of Functioning, Disability and Health From the Orthopaedic Section of the American Physical Therapy Association

Graded Motor Imagery: Where We Begin When Movement Is Too Painful

Bowering, K., & et. al. (2013).
Decety, J. (1996)
Flor, H., & et. Al. (2001)

http://www.gradedmotorimagery.com/images/gmi-stages.gif
Sensory Discrimination

- Two-Point Discrimination
- Graphesthesia
- Localization
- Sharp/dull
- Directional
- Textures
- Ect.

Louw, A., & et al. (2015)
Harvie et al. (2017)
Your beliefs become your thoughts,  
Your thoughts become your words,  
Your words become your actions,  
Your actions become your habits,  
Your habits become your values,  
Your values become your destiny.

M K Gandhi

https://www.quotemaster.org/belief+systems
Cognitive Behavioral Therapy

• Branch of psychotherapy (extensive research across mental health diagnoses)
• Hands-on therapy style that helps participants examine relationships between thoughts and feelings and behaviors
• Exploration of thinking behind various difficulties and look for errant thinking
• Goal directed to help individuals challenge assumptions and practice thinking differently to change outcomes
• Process-based psychotherapy
• ACT teaches people to notice, accept and embrace private events instead of trying to control them.
• ACT does not attempt to improve or alleviate symptoms, but to stop obsessing over them, create new lifestyle patterns and make healthier choices.
• ACT works on the assumption that pain is part of being human and unavoidable
  – “Pain is inevitable but suffering is optional”
When you own your breath, nobody can steal your peace.

UNKNOWN

BURNISHEDCHAOS.COM
Conscious Breath Exercise. . .
“You may need to exercise a nerve, to relax”

- Breathing activates afferent pathways that stimulate the vagus nerve
- Voluntary change in breath pattern can alter vagus nerve activity (Philippot P. & Blairy S. 2010)
  - Pursed lip breathing
  - Pranayama
    - Activate parasympathetic nervous system
      - Decreased DBP, SBP and anxiety & stress
      - As little as 5 min/day in one week
      - Improve oxidative stress
  - Enhance respiratory function
    - Increased oxygenation
  - Improved attention, reaction time, fine-motor function

https://www.pinterest.com/pin/66498531971165732/
Mindfulness Meditation

• Mindfulness–Based Stress Reduction (MBSR) initiated by Jon Kabat-Zinn at University of Massachusetts
  – Over 100 randomized control trial (RCTs) have examined MBSR and mindfulness meditation on a variety of clinical and personal challenges
    – Large Effects:
      • Stress
    – Moderate Effects
      • Anxiety
      • Depression
      • Distress
      • Quality of life
    – Small Effects
      • Burnout

What is Mindfulness

• “The awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding experience moment by moment.”
  – Formal Meditation
  – Informal focus on bringing attention and awareness to all aspects of life

Together with inactivity, inadequate sleep is one of the most underrated lifestyle risk factors for chronic disease and inflammation.
Can Poor Sleep Cause Pain and/or Inflammation?

• Sleep disturbance and long sleep duration are associated with **increases in markers of systemic inflammation** (increased CRP, IL-6)
• A single night of disrupted sleep can induce generalized **hyperalgesia** and increase **anxiety**.
• Poor sleep can contribute to and sustains **central sensitization** in patients with chronic low back pain
• Insomnia = cerebral microglia mediated **low-grade inflammatory** response
  • Increased IL-6
  • Prostaglandin E2
  • Nitric Oxide
How Can We Help?

• Referral for Medical/InterProfessional Management
  • Insomnia
  • Sleep Apnea
  • Restless Leg Syndrome
• Change negative thoughts about sleep
  • Cognitive Behavioral Therapy
• Education
  • Sleep Hygiene
  • Relaxation Techniques
• Sleep Restriction Therapy
• Supplements
  – Melatonin, 5-HTP, GABA, L-Tryptophan, Valerian
• Exercise
• Greenspace Exposure
• Meditation
• Conscious Breath Practice

http://i.huffpost.com/gen/854861/images/o-HOW-MUCH-SLEEP-facebook.jpg
You Are What You Eat

• Metaflammation:
  – Excessive sugar, salt, alcohol, saturated and trans fats
  – inadequate fiber, fruit, vegetables, grains and certain nutrients
  – processed food versus whole foods

Let food be thy medicine, and thy medicine be thy food.

— HIPPOCRATES, 460 BC
Eat 10 Servings of Fruits & Vegetables a Day for Optimal Health

How Much Do They Need?

- 5-7 servings/day
- 10 servings to reverse chronic disease
  - Prevents:
    - Cancer
      - Lowest risk observed at 10 servings per day
    - CVD
    - Premature mortality

Aune et al 2017, Meleger et al 2014
Food pyramid for subjects with chronic pain: foods and dietary constituents as anti-inflammatory and antioxidant agents

Mariangela Rondanelli¹, Milena Anna Faliva¹, Alessandra Miccono², Maurizio Naso¹, Mara Nichetti¹, Antonella Riva³, Fabio Guerriero⁴, Manuela De Gregori⁵,⁶, Gabriella Peroni¹ and Simone Perna¹*
What about Hydration?

- Dehydration
  - Impairs Cognitive Performance
  - Impairs Physical Coordination
  - Correlated with Pain Sensitivity

Social Support

- People who have **supportive close relationships** have **lower levels of systemic inflammation** compared to people who have unsatisfactory relationships.
- Negative and competitive social interactions can increase proinflammatory cytokine activity on a daily level.
If less < 7, “what might be preventing you from achieving a higher score?”
Let’s Give it a Try. . .

- Armed with this knowledge, how do you approach patients?
- Mark’s case
• Pain is…
• Pain is a “Decision” of the brain
  – based on information from the tissues,
    • regulated by the spinal cord and brain
    • involves multiple systems and experiences
• What are some ways you can evaluate the different contributions of a person’s pain experience?
Will You Be Able to Recognize the Primary Pain Mechanism of Your Next Patient?

What Changes Will you make?
Key Takeaways

• Persistent pain is common, complex and challenging

• An understanding of biological, social, physical and psychological contexts are vital to successful outcomes

• Management should be holistic and evidence-based
  – Pharmacological and non-pharmacological


Ferrie, J.E., Kivimäki, M., Akbaraly, T.N., & et. al. (2013). Associations Between Change in Sleep Duration and Inflammation: Findings on C-Reactive Protein and Interleukin 6 in the Whitehall II Study. The American Journal of Epidemiology, 178(6), 956–961.
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Pain Tracts and Sources (Section 2, Chapter 7) Neuroscience Online: An Electronic Textbook for the Neurosciences: Department of Neurobiology and Anatomy - The University of Texas Medical School at Houston. (n.d.). Retrieved from https://nba.uth.tmc.edu/neuroscience/m/s2/chapter07.html


References


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   b. If you have not previously used the CEPO CMS click register to create a new account.

3. Follow the onscreen prompts to complete the post-activity assessments:
   a. Read the Accreditation Statement
   b. Complete the Evaluation
   c. Take the Posttest

4. After completing the posttest at 80% or above, your certificate will be available for print or download.

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