A Therapeutic Approach to Pain Management

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ECONOMIC IMPACT

2010

$500 billion - $635 billion spent on pain

- $309 billion on heart disease
- $243 billion on cancer
- $188 billion on diabetes

STATISTICS FROM FORWARD THINKING PT

- More than 100 million Americans suffer from chronic pain (Global Burden of Disease Study 2013)

- US Opioid Epidemic: In 2012, health care providers wrote 259 million prescriptions for opioid pain medications. (www.cdc.gov)
• Pennsylvania ranks third highest in the nation in the percentage of injured workers who become long-term opioid users
• July 2018- Wolfe administration introduced opioid prescription guidelines for individuals with workman’s compensation injuries
PAIN = AN UNPLEASANT SENSORY AND EMOTIONAL EXPERIENCE ASSOCIATED WITH ACTUAL OR POTENTIAL TISSUE DAMAGE

INTERNATIONAL ASSOCIATION FOR THE STUDY OF PAIN
PAIN IS A MULTISYSTEM OUTPUT BASED ON PERCEIVED THREAT
(G.L. MOSLEY, 2003)
ACUTE PAIN

• Generally 3 Months or less in duration

• **Serves a useful biologic purpose, is associated with skeletal muscle spasm and sympathetic nervous system activation, and is self-limited.** Grichnick and Ferrante

• Originates from a mechanical stress to a locally injured tissue

• Is aggravated or eased by particular movements or positions (moveforwardPT.com)
PERSISTENT PAIN

PAIN LASTING >3 MONTHS THAT DOES NOT RESPOND TO CONSERVATIVE TREATMENT (PAINTOOLKIT.ORG)
Central Sensitization

“Pain is effectively generated as a consequence of changes within the CNS that then alter how it responds to sensory inputs, rather than reflecting the presence of peripheral noxious stimuli” (Latremoliere and Woolf)
Clinical Signs of Central Sensitization

- Hyper-excitability to input from the periphery
- High FABQ score
- Diffuse pain
- Spontaneous pain or travels to other areas
- Pain associated with emotional disturbances and maladaptive cognitions
HOW DOES THE BODY PERCEIVE PAIN?
OUR NERVES ACT AS AN ALARM SYSTEM

• Our bodies contain 45 miles of nerves
• Nerves have electricity flowing through them
• Nerves have thresholds
• When they get excited enough to reach a threshold, this message is sent to the brain for analysis
PAIN COMES FROM THE BRAIN

1) Premotor/Motor Cortex - organize and prepare movements
2) Cingulate Cortex - Concentration, focusing
3) Prefrontal Cortex - problem solving, memory
4) Amygdala - fear, fear conditioning, addiction
5) Sensory Cortex - sensory discrimination
6) Hypothalamus/Thalamus - stress responses, autonomic regulation, motivation
7) Cerebellum - movement and coordination
8) Hippocampus - memory, spacial recognition, fear conditioning
9) Spinal Cord - gating from the periphery

(Louw, A. Puenteedura E.)
THE BRAIN DETERMINES WHETHER PAIN IS A THREAT

Louw A, Puentedura E.
PERSISTENT PAIN IS LESS ABOUT TISSUES

- Doesn’t fit into classic models of mechanical pain behavior or manual therapy techs
- Clinicians may feel like they are “chasing pain”
- Influenced by stress related factors
TIPS TO DECREASE CHANCE OF ACUTE PAIN BECOMING CHRONIC

• Understand pain mechanisms
• Keep moving
• Get help from a physical therapist
• Don’t be labeled by imaging
• Get help for anxiety and depression

moveforwardPT.com
REFERRAL TO THERAPY SOONER RATHER THAN LATER

• “Patients who received physical therapy early after an episode of acute low back pain had a lower risk of subsequent medical service usage than patients who received physical therapy at later times” Spine April 2012

• Active physical therapy for patients with acute low back pain is associated with better clinical outcomes, decreased use of prescription medications, MRI and epidural injections, and lower healthcare costs than passive physical therapy. http://www.apta.org/Media/Releases/Consumer/2008/8/12/
PERSISTENT PAIN IMPACTS

• Cognition, beliefs, emotions and behaviors

• Therapy goals: ↓Fear of movement
  
  Give patient back some control

• We must be able to impact pain beliefs to make movement based therapy successful

(Louw and Puentedura)
(Louw, Therapeutic Neuroscience Education)
PERSISTENT PAIN LEADS TO CHEMICAL CHANGES
The Persistent Pain Cycle

1. Depression & mood swings
   - Negative thinking, fear of the future,
   - Weight gain or loss

2. Time off work, money worries, relationship concerns
   - Loss of fitness, weak muscles, joint stiffness
   - Medication side effects

3. Persistent Pain
   - Being less active
   - Stress, fear, anxiety, anger & frustration
   - Sleep problems, tiredness & fatigue

4. Create 'no go' lists of things you cannot do
   - www.paintoolkit.org

Jefferson Health | Magee Rehabilitation

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE
COMMON PAIN DIAGNOSES

• Back pain, acute or persistent
• Fibromyalgia
• Neck pain
• CRPS
• Overuse syndromes
# Functional Pain Scale

<table>
<thead>
<tr>
<th>Not Well Controlled</th>
<th>Moderate</th>
<th>Well Controlled</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>Distressing</td>
<td>Mild generally does not interfere with activities or sleep</td>
</tr>
<tr>
<td>Immobilizing</td>
<td>Blocking</td>
<td>Uncomfortable</td>
</tr>
<tr>
<td>Severe</td>
<td>Distressing</td>
<td>Mild</td>
</tr>
<tr>
<td>Intense</td>
<td>Distressing</td>
<td>Minimal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Immobilizing &lt;br&gt;Needs ER, bedridden, unable to move, talk, or sleep</td>
</tr>
<tr>
<td>9</td>
<td>Severe &lt;br&gt;Can’t think about anything else, can barely talk, can’t sleep</td>
</tr>
<tr>
<td>8</td>
<td>Intense &lt;br&gt;Can’t concentrate, conversation is difficult, activity and sleep not possible</td>
</tr>
<tr>
<td>7</td>
<td>Blocking &lt;br&gt;Minimal sleep and activity possible; pain interferes significantly</td>
</tr>
<tr>
<td>6</td>
<td>Distressing &lt;br&gt;Increasing activity but pain still prohibits regular activity, sleep interrupted</td>
</tr>
<tr>
<td>5</td>
<td>Irritating &lt;br&gt;Pain tolerable, few activities limited by pain</td>
</tr>
<tr>
<td>4</td>
<td>Distracting &lt;br&gt;Aware of pain but can continue with activities</td>
</tr>
<tr>
<td>3</td>
<td>Uncomfortable &lt;br&gt;Pain is troubling but can be ignored</td>
</tr>
<tr>
<td>2</td>
<td>Mild &lt;br&gt;Noticeable when not distracted</td>
</tr>
<tr>
<td>1</td>
<td>Minimal &lt;br&gt;Hardly noticeable</td>
</tr>
</tbody>
</table>
TREATMENT LENGTH FOR PT AND OT

- Goal driven
- Previous therapy experiences
- Return to work potential
WHO MAKES A GOOD THERAPY CANDIDATE?

• Compliance
• Impact of Fear? / FABQ
• Perceived disability/ Oswestry
• Patient buy-in
PHYSICAL THERAPY STRATEGIES FOR PAIN

• Always starts with a good evaluation
  Range of motion, strength, functional tolerances
  Evaluation used to prescribe and exercise program and manual therapy needs.
• Strong consideration for symptom irritability
• Consider whole person and overall functional tolerance
• PT specific vs PT/OT similarities
JOINT MOBILIZATIONS

• Stimulates type II joint receptors to decrease pain
• Stimulates synovial fluid
• Assists with remodeling of scar tissue
• Overall goal= Convert abnormal pain and range to normal
• Can be specifically directed and controlled for depth, direction and duration with accurate feedback from the patient.
INSTRUMENT ASSISTED SOFT TISSUE MOBILIZATION

• Aka “Scraping” technique
• Helpful for treating trigger points, tendonitis/tendinosis, scar tissue areas
• Thought to assist with reorganizing collagen fibers
Self- Efficacy

- Regular pain management strategies as a part of ADLS
- Utilize techniques on scheduled intervals to try to decrease use of medications over time.
- They can have a positive impact on their pain state. Nerves are constantly regenerating
Pain medicine is only part of pain management.

Ask your treatment team about these other pieces:
- Distraction
- Bedtime Routine
- Repositioning
- Understanding My Pain
- Heat & Ice
- Stress Management and Relaxation
- Massage & Acupuncture (private pay)
- Electrical Stimulation
- Healthy Habits

Our goal at discharge:
Pain management with fewer pills = Greater safety and better health at home.
Self Pain Management

- Heat/ice
- Electric stimulation/TENS
- Self massage
EXERCISE ASSESSMENT AND PRESCRIPTION

SPECIFIC EXERCISE TO REDUCE PAIN

FLEXIBILITY

STRENGTH/STABILIZATION
CHEMICAL BENEFITS OF CARDIOVASCULAR EXERCISE

• Regulation of cortisol and adrenaline
• Improved sleep
• Improved mood and cognition
• Regulation of blood flow
• Decreased sensitivity of nerves
• Reduced pain via decreased activation of ion channels (Louw)
HOW MUCH CARDIO IS ENOUGH?

• Aerobic exercise for >10 minutes and >50% of VO2 Max is required to elicit exercise analgesia (Hoffman, Shepanski, et al, 2004)

• A more general guideline would be to elevate HR to 100-110 bpm for most middle aged individuals

• Daily brisk walk is likely enough

• Helps transition them out of medical model to community setting
Recreational Physical Activity

• In patients with chronic low back pain along with addressing behavioral changes to impact fear avoidance can result in lower disability than usual physical therapy (Noa Ben-Ami)

• Especially important in those that are distressed Noa Ben-Ami)
OT NON- PHARMACOLOGICAL STRATEGIES FOR PAIN MANAGEMENT

• Evaluate the basics
• Pain level
• Posture
• Body mechanics
• Lifestyle
• Functional status/tolerances
• Work status/job description
OTHER EXERCISE STRATEGIES

• Basic stretches
• Restorative yoga
• Pilates
• Tai chi/Qi Gong
BREATHING AND RELAXATION STRATEGIES

• Meditation
• Qi Gong
• Tai Chi
• Distraction and Leisure
TAI CHI AND QI GONG

• Purposeful fluid motion, focused attention, and breathing.
• Enhances flexibility, decreases stress, improves feelings of well-being.
• Balances life force energy.
• Low impact
SLEEP POSITIONING
SLEEP HYGIENE

• Maintain a regular sleep routine
• Don’t stay in bed awake for more than 5-10 minutes.
• Don’t watch TV or read in bed.
• Avoid electronic use 2-3 hours before bed.
• Cigarettes, alcohol, and over-the-counter medications may cause fragmented sleep.
• Exercise regularly
A second set of branches separate from the ST-12 points and internally permeate the Stomach before spiraling wrapping the Spleen and joining the primary channel branches at the ST-35 points.

The Internal and External Qi Flow of the Stomach (St) Channels
Shiatsu continued
BIOFEEDBACK

• Biofeedback therapy is a non-drug treatment.
• Patients learn to control bodily processes that are involuntary such as muscle pain, blood pressure, skin temperature and heart rate.
• Biofeedback promotes relaxation and reduce stress.
• Especially useful for CRPS
EMG: Senses tension in a specific muscle group. Helpful for a number of pain conditions including muscle spasms, back and neck pain, tension and migraine headaches.

Thermal: Blood vessels constrict in response to emotional tension resulting in drop in temperature in the extremities. Increasing relaxation causes increased temperature.

Galvanic Skin Response: Measures activity of sweat glands and amount of perspiration in the skin. Increased perspiration is associated with greater anxiety.
BIOFEEDBACK
BRING AWARENESS TO POSTURE
SEATING CONSIDERATIONS FOR SEDENTARY WORKERS
PROLONGED SEATING

• Strained neck and shoulders
• Sitting puts more pressure on the spine than standing.
• Hips become tightened with limited range of motion.
• Sitting time including time in automobiles and TV time increases premature mortality risk.

CORRECT SITTING POSTURE

- Upper back straight with shoulders relaxed at your sides.
- Backrest of the chair supports curve in the lower back.
- Hips as far back of the chair as possible.
- Adjustable seat for optimal height.
- Top of monitor at eye level or slightly below.
- Arms relaxed at sides with upper and lower arm forming a 90° angle.
- Wrists straight with fingers relaxed.
- Lower legs at a 90° to 110° angle of thighs with adjustable leg room above.
- Feet flat on the ground or resting on a footrest.
SEATING PRODUCTS
STANDING WORK ALTERNATIVES
ERGONOMIC/INDUSTRIAL CONSIDERATIONS FOR MATERIAL HANDLING
BODY MECHANICS AND HOME MANAGEMENT
PROPER TECHNIQUE FOR SHOVELLING SNOW

Keep feet wide apart. Put weight on front foot close to shovel and use leg to push shovel straight ahead.

TRISH MICALASTER / THE GLOBE AND MAIL

Shift weight to rear foot and keep shovel-load close to body. Lift with arms and legs, not back.

Turn feet in the direction of throw and pivot entire body rather than twisting at the waist.
WORK SIMULATION
NUTRITION

• Pain and Mood strongly linked.

• Nutrient dense diet provides adequate nutrients to support a healthy mood and are essential for making neurotransmitters that impact mood and pain.

OTHER

• Quotas/pacing
• Cognitive behavioral therapists
BREATHING EXS FOR STRESS MANAGEMENT

• 4 Square Breathing
• 4-7-9 Breathing
• Diaphragmatic Breathing
• Alternate Nostril Breathing
• Progressive Muscle Relaxation
• 3 Part Breathing
MINDFULNESS MEDITATION

WALKING MEDITATION

MEDITATIONROOM.ORG
Mindfulness Meditation in the presence of noxious stimulation reduced pain unpleasantness by 57% after 4 days of training.

Brain Mechanisms Supporting the Modulation of Pain by Mindfulness Meditation

Fadel Zeidan, Katherine T. Martucci, Robert A. Kraft, Nakia S. Gordon, John G. McHaffie and Robert C. Coghill

Journal of Neuroscience 6 April 2011, 31 (14) 5540-5548; DOI: https://doi.org/10.1523/JNEUROSCI.5791-10.2011
AROMATHERAPY
MIRROR BOX THERAPY

- Graded Motor Imagery
- Laterality Training
- Motor Imagery
- Mirror Visual Feedback

PAIN APPS

• My Pain Diary: Tracks pain symptoms and triggers, patterns and trends.
  https://chronicpainapp.com

• Web MD Pain Coach: Offers tracking of pain symptoms including triggers, treatments, and video access to specific conditions.
  www.webmd.com/mobile
BENEFITS OF AN FCE

• Evaluates an individual’s ability to perform work activities.

• Intensive short-term evaluation that focuses on major physical tolerance abilities related to musculoskeletal strength, endurance, speed, and flexibility.

• Matheson FCE uses instruments whose reliability and validity are backed up by peer reviewed research.
REFERRAL QUESTIONS

- Can the client return to their pre-injury job?
- Did the client give consistent and full effort during testing?
- Are subjective reports reliable and consistent with objective findings?
- What are the client’s maximal safe lifting abilities?
- Recommendations are needed for work restrictions or rehabilitation.
- Determine recommendations for reasonable accommodations and ergonomic modifications
<table>
<thead>
<tr>
<th>Physical Demand Level</th>
<th>Occasional 0-33% of the workday</th>
<th>Frequent 34%-66% of the workday</th>
<th>Constant 67%-100% of the workday</th>
<th>Typical Energy Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>10 lbs</td>
<td>Negligible</td>
<td>Negligible</td>
<td>1.5 - 2.1 METS</td>
</tr>
<tr>
<td>Light</td>
<td>20 lbs</td>
<td>10 lbs and/or walk/stand/push/pull of arm/leg controls</td>
<td>Negligible and/or push/pull of arm/leg controls while seated</td>
<td>2.2 - 3.5 METS</td>
</tr>
<tr>
<td>Medium</td>
<td>20 to 50 lbs</td>
<td>10 to 25 lbs</td>
<td>10 lbs</td>
<td>3.6 - 6.3 METS</td>
</tr>
<tr>
<td>Heavy</td>
<td>50 to 100 lbs</td>
<td>25 to 50 lbs</td>
<td>10 to 20 lbs</td>
<td>6.4 - 7.5 METS</td>
</tr>
<tr>
<td>Very Heavy</td>
<td>Over 100 lbs</td>
<td>Over 50 lbs</td>
<td>Over 20 lbs</td>
<td>Over 7.5 METS</td>
</tr>
</tbody>
</table>

Leonard Matheson 1993
OT CASE EXAMPLE
PERSISTENT PAIN VIDEO

https://www.youtube.com/watch?v=OYo1AD5mOk
RESOURCES


• Global Burden of disease study 2013

• Opioids compared with placebo or other treatments for chronic low back pain: an update of the Cochrane Review.

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• Noa B. Chodick G, Mirovsy Y, Pincus T, Shapiro Y. Increasing Recreational Physical Activity in Patients with Chronic Low Back Pain: A Pragmatic Controlled Clinical Trial. JOSPT 2017 Feb (47:2) 57-66

• Everything you wanted to know about Chronic Pain, Explained in Five Minutes: https://www.youtube.com/watch?v=OYOi1AD5mOk