Does Understanding=Analgesia?
Explaining Pain Neuroscience & Physiology

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Disclosure

- Nothing to disclose
- The opinions expressed in this presentation do not represent the official position of the US Department of Veterans Affairs
Learning Objectives

- Review research supporting the use of neuroscience education in rehabilitation of patients living with pain
- Discuss at least 1 didactic technique using a metaphor or story to explain pain to a patient
- Restate the benefits of framing pain from a nervous system perspective, rather than strictly an anatomical one

What patients want to know

Why do I have pain?
How long will it take?
What can I do for it?
What can you do for it?

Explain pain, not (just) anatomy…

### Explain Pain (EP)
### Pain Neuroscience Education (PNE)  

<table>
<thead>
<tr>
<th>CURRICULUM CONTENTS</th>
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| ▪ Nociception and nociceptive pathways  
  (neurons, synapses, action potentials) |
| ▪ Spinal inhibition and facilitation |
| ▪ Peripheral and central sensitization |
| ▪ Plasticity of the brain and nervous system |

Moseley, Hodges, et al., 2004; Van Oostemeijck, Nijss et al., 2011
No reference to anatomical models

No discussion of emotional or behavioral aspects of pain

Use prepared examples and metaphors

Include illustrations (hand drawings or other visual aides)

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PNE for chronic MSK disorders benefits patients by:

- Reducing pain
- Improving patient knowledge of pain
- Improving function
- Lowering disability
- Enhancing movement
- Minimizing healthcare utilization

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PNE works best in combination

- Manual therapy (Moseley, 2002; Ryan et al, 2010; PuenteDura & Flynn, 2016)
- Trigger point dry needling (Tellez-Garcia et al., 2014)
- Aerobic exercise, including circuit training (Ryan et al, 2010)
- Aquatic exercise (Pires et al, 2015)
- Movement exercise (Vibe Fersum et al, 2013)
- Graded exposure and pacing strategies for daily tasks (Meeus et al., 2010, Vibe Fersum et al., 2013)

Applying PNE

Address beliefs, fear, and inputs at key moments.

Graded exposure to exercise, movement and activity. Modify, problem solve, or progress at key moments.

Function

Pain

Slide credit: Richard Jacob Boyce DPT, COMT, TPS, CEEAA
PNE: Key Messages

- Persistent pain is not just about the “tissue issues”
- The central nervous system plays a big role (in all pain states)
- Pain is an output of the brain, which influences inputs
- Pain is modulated by physical factors AND meaning, context, expectations, and experience
- Nociception is neither sufficient nor necessary for pain production
- Sensitization is a natural adaptive feature of the nervous system, which can become unhelpful
- Neuroplasticity or bioplasticity principles are used to reverse some unhelpful adaptations in the nervous system

The Teaching Part

In the room with a distressed patient….now what?
Purpose of Pain?

This bike does not have an alarm.

Thankfully, our bodies do!
Pain is an alarm.

It is a multisystem output used by our body to warn us about actual or potential danger.

Pain is usually useful, because it’s designed to protect us.

Sometimes our body’s alarm system becomes too sensitive, meaning it is not a helpful alarm and goes off for no reason. Kind of like a smoke alarm alerting you when a single candle is lit.
Things you need to know about pain but probably don’t

Pain Is Weird

Which one hurts more?

Injury doesn’t match pain much of the time.
Pain and tissue damage don’t match

Tissue damage without pain?  Pain without tissue damage?


Pain is like vision

Our brains take all the information at hand and make the most sensible story to generate a sensory experience.
Pain is like taste

Your brain produces a taste experience with more than just your tongue.

What is pain?

- Pain is a multisystem output of the brain that is part of a suite of protective mechanisms
  - Muscle spams
  - Muscle weakness
  - Immune response
  - Inflammation
  - Behaviors or movement (running, fighting, freezing, kicking, shaking limb, etc)
- Pain is felt somewhere in the body (or a representation)
- Pain is a conscious experience produced whenever the evidence of danger to our body outweighs the evidence of safety

Moseley & Butler “Explain Pain Protocometer Workbook” 2014
How does the brain get messages of danger from the body?

Nociceceptor Cell = The Danger Sensor
DANGER CATEGORIES

Chemical
Thermal
Mechanical

Ion channels are replaced every 48-72 hrs.

Descending Control = actions from the brain to control nerve impulses
Descending Inhibition: The Helpful Kind

Stubbing your toe

Descending Facilitation: Helpful?

Soccer drama?
TWIN PEAKS: Patient Education

Adapted from: *Explain Pain* (2003)

Nonphysical Pain Modulators

- Context
- Experience
- Expectations
- Meaning
- Beliefs
Your brain produces a pain experience with more than just nociceptors

Moseley & Arntz (2007). Pain 133; 64-71

Our brain works on a priority basis

How dangerous is this?

Many signals are considered at once

The brain must make the most sensible story given all the data
Is action required? Will pain help motivate action?

“Pain is a call to action, not a damage meter.”
~Todd Hargrove

Tissue problem vs pain problem

Our brains are not empty

“Thoughts and beliefs are nerve impulses in your brain!”
How powerful are thoughts?

What you think, say, and do as a clinician will influence your patient’s pain experience

“...The 2 placebo groups differed only in the clinicians’ knowledge of the range of possible double-blind treatments.”

- Patient
  - Placebo
  - Fentanyl
  - Naloxone

- Dentists
  - PN: Placebo or naloxone
  - PNF: Fentanyl + placebo or Fentanyl + naloxone

100% chance of receiving no analgesia
50% chance of receiving analgesia

Bones adapt in response to the loads they absorb during specific activities over a lifetime

- “Our skin shows signs of age with wrinkles and spots. Our spine show signs of age in other ways. Osteophytes and degenerative changes are like wrinkles on the inside.”

—Protectometer (Moseley, Butler 2015)

The human body is more like a tree than a car.

Resilient.
Robust.
Adaptable.
What you can say

“My exam shows me that you no longer have a significant body tissue problem, but what you have is a pain problem. We use different strategies to treat pain problems like yours than what we would use to treat a recent tissue injury.”

- It’s safe to move
- The nervous system is wonderfully adaptable
- Movement is Medicine
- You can be sore, but safe
- Start low, go slow
- Challenge the flare line, don’t push through it

What did we miss?

- Persistent pain is not just about the “tissue issues”
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Patient Resources

www.retrainpain.org
www.tamethebeast.org
www.greglehman.ca
www.amazon.com
www.optp.com

YouTube videos

- Pain Explained by Central London Community Healthcare NHS Trust
- Understanding Pain and What To Do About It in 5 Minutes
- Why Things Hurt (Moseley)
- Neil Pearson channel 421
Helpful Websites for Patients and Providers

- noigroup.com
- retrainpain.org
- tamethebeast.org
- lifeisnow.ca
- bettermovement.org
- gradedmotorimagery.com
- painscience.com
- bodyinmind.org
- healthskills.wordpress.com
- aptei.ca

Questions?
References

References