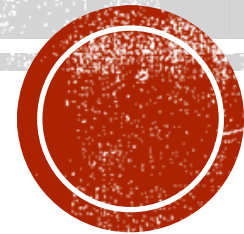


DOES UNDERSTANDING = ANALGESIA?

Explaining Pain Neuroscience & Physiology



Kate Schopmeyer, DPT, CPE, CSCS
kschopmeyer@paineducator.com
San Francisco Safety Net Pain Day Conference
September 20, 2017

DISCLOSURES

- No financial conflicts of interest to disclose.
- The opinions expressed in this presentation do not represent the official position of the US Department of Veterans Affairs.
- I might challenge your beliefs about pain. I'm okay with that.



LEARNING OBJECTIVES

- Participants will review research supporting the use of neuroscience education in rehabilitation of people living with pain.
- Learners will demonstrate use of one metaphor or story to explain pain to a patient or family member.
- Learners will be able to restate the benefits of framing pain from a nervous system perspective, rather than an anatomical one.



WHAT WE ALL WANT TO KNOW WHEN WE HURT

Why do I have pain?

How long will it take?

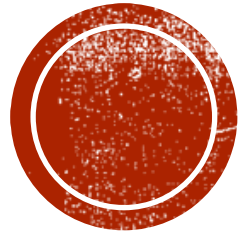
What can I do for it?

What can [my healthcare provider] do for it?

Verbeek J, Sengers MJ, Riemens L, Haafkens J. Patient expectations of treatment for back pain: a systematic review of qualitative and quantitative studies. *SPINE* 2004; 29(20): 2309-18.

Cherkin, D.C., 1998. Primary care research on low back pain: the state of the science. *Spine*, 23(18), pp.1997-2002.





PAIN IS WEIRD

Things you need to know about pain but probably didn't

Kate Schopmeyer DPT CPE

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?

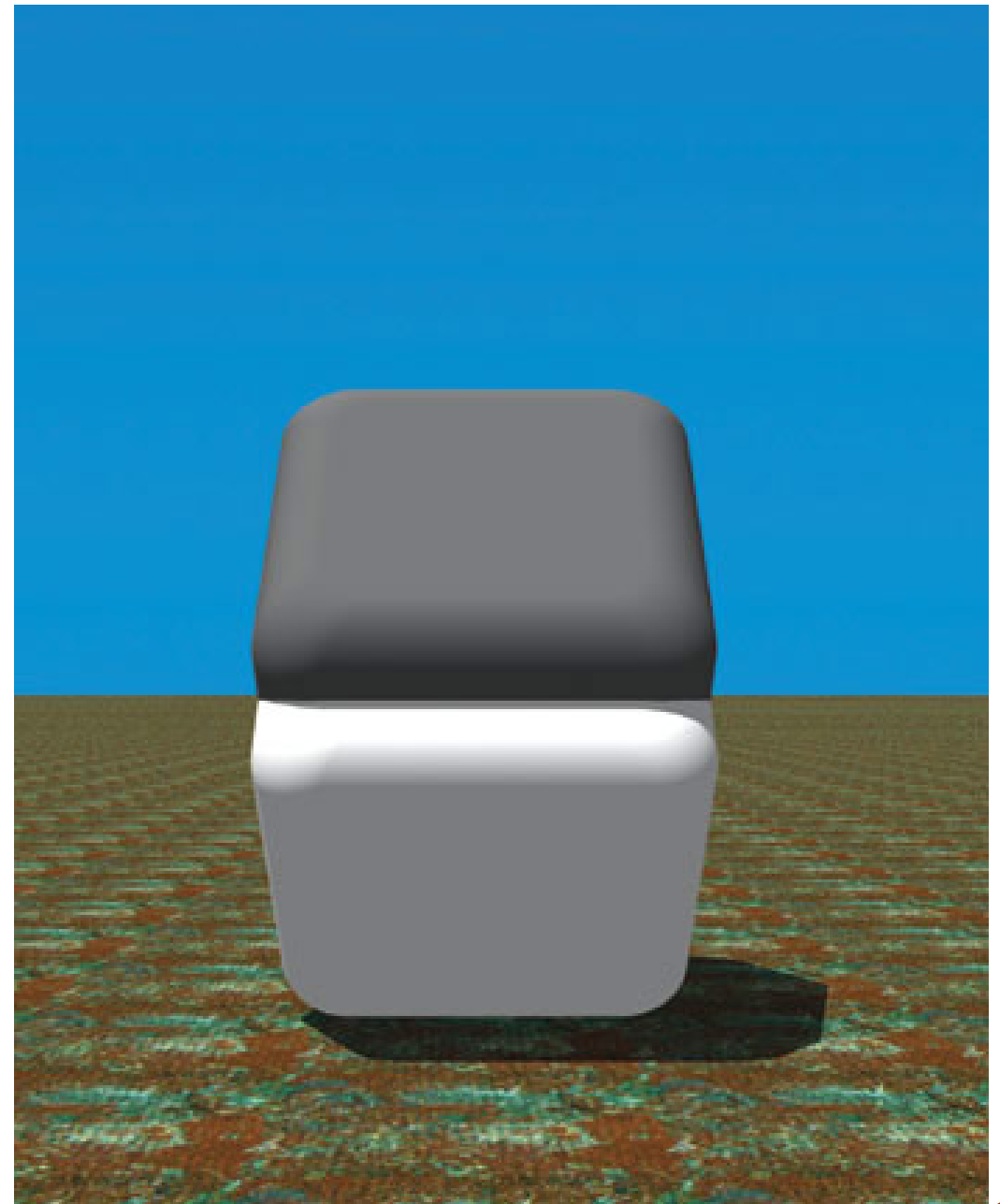


Fisher *et al.* Minerva. *British Medical Journal.* 1995



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.



Massimiliano Z, Spence C. The Role of Auditory Cues in Modulating the Perceived Crispness and Staleness of Potato Chips. *Journ Sensory Stud.* Oct. 2004; Vol 19 (5). 347-363.



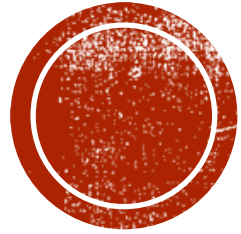
WHAT IS PAIN?

- **Pain is a multisystem output of the brain that is part of a suite of protective mechanisms.**
 - Muscle spasms
 - Muscle weakness
 - Immune response
 - Inflammation
 - Behaviors (running, fighting, freezing)

- **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 2014)**





EXPLAINING PAIN

Pain Neuroscience Education

PNE: KEY MESSAGES

- 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 *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 bio-plasticity principles are used to reverse some unhelpful adaptations in the nervous system.



Explaining pain for chronic MSK disorders is effective for:

- reducing pain
- improving knowledge of pain
- improving function
- lowering pain-related disability
- reducing psychosocial factors
- enhancing movement
- minimizing healthcare utilization

1. Louw, A., Zimney, K., Puentedura, E.J. and Diener, I., **2016**. The efficacy of pain neuroscience education on musculoskeletal pain: A systematic review of the literature. *Physiotherapy theory and practice*, 32(5), pp.332-355.
2. Louw, A., Diener, I., Butler, D. S., & Puentedura, E. J., **2011**. The effect of neuroscience education on pain, disability, anxiety, and stress in chronic musculoskeletal pain. *Archives of Physical Medicine & Rehabilitation*, 92(12), 2041-2056.
3. Zimney, K., Louw, A., & Puentedura, E. J., **2014**. Use of Therapeutic Neuroscience Education to address psychosocial factors associated with acute low back pain: A case report. *Physiotherapy: Theory and Practice*, 30(3), 202-209.
4. Louw A, Diener I, Landers MR, Puentedura EJ., **2014**. Preoperative Pain Neuroscience Education for Lumbar Radiculopathy: A Multi-Center Randomized Controlled Trial With One-Year Follow-Up. *Spine*. May 28.



EXPLAIN PAIN (EP) **PAIN NEUROSCIENCE EDUCATION (PNE)**

CURRICULUM CONTENTS

- **Nociception and nociceptive pathways
(neurons, synapses, action potentials)**
- **Spinal inhibition and facilitation**
- **Peripheral and central sensitization**
- **Plasticity of the brain and nervous system**



EXPLAIN PAIN (EP) PAIN NEUROSCIENCE EDUCATION (PNE)

TEACHING ELEMENTS

- ✓ 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)

1. Gallagher L, McAuley J, Moseley GL. A randomized-controlled trial of using a book of metaphors to reconceptualize pain and decrease catastrophizing in people with chronic pain. *Clin J Pain*. 2013 Jan;29(1):20-5.
2. Adriaan Louw, Emilio Puentedura. *Therapeutic Neuroscience Education: Teaching Patients About Pain; A guide for clinicians*. USA: International Spine and Pain Institute; 2013.



MAKE THE COMPLEX SIMPLE



PAIN IS AN ALARM.

IT IS A MULTI-SYSTEM OUTPUT USED BY OUR BODY TO WARN US ABOUT ACTUAL OR POTENTIAL DANGER.

PAIN IS USUALLY USEFUL, BECAUSE IT'S DESIGNED TO PROTECT US.



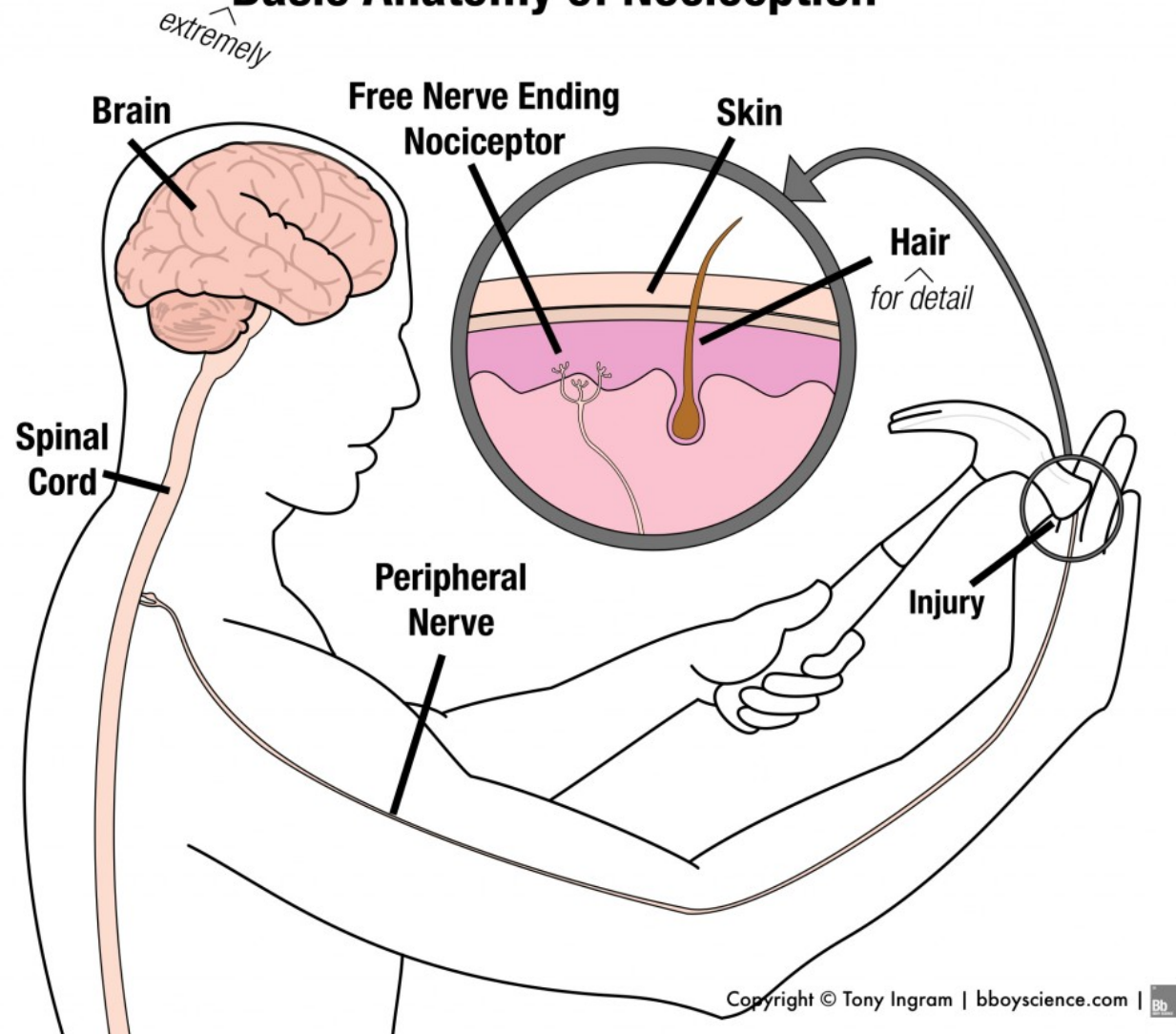


www.retrainpain.org

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.



Basic Anatomy of Nociception

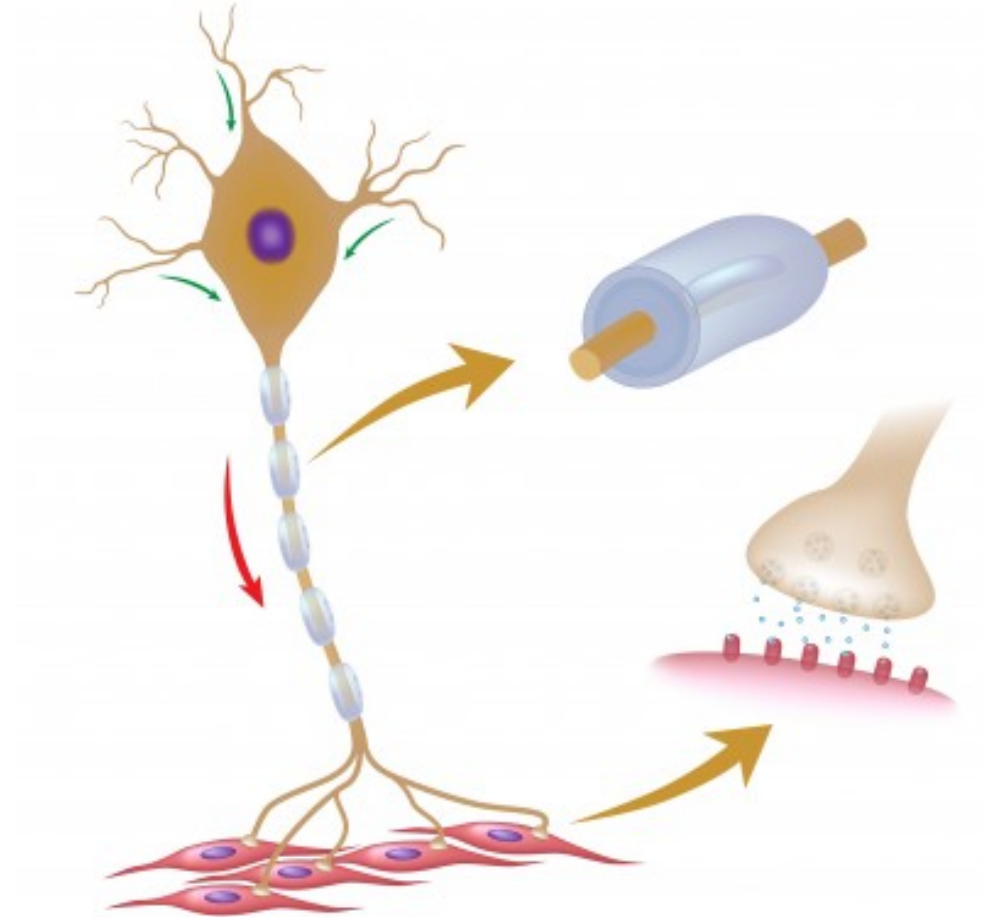


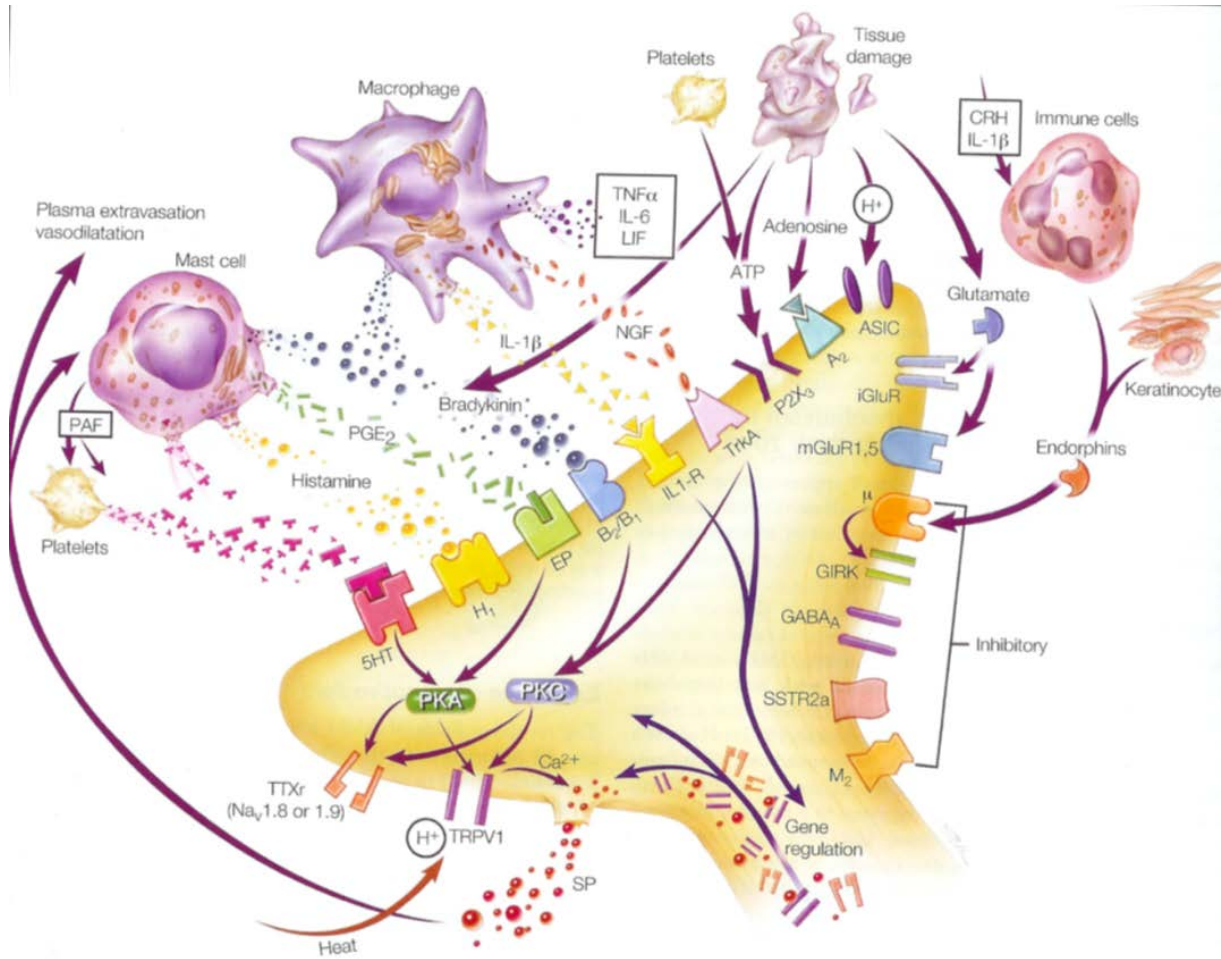
How does our brain get messages of danger from the body?



NOCICEPTOR CELL=

THE DANGER SENSOR



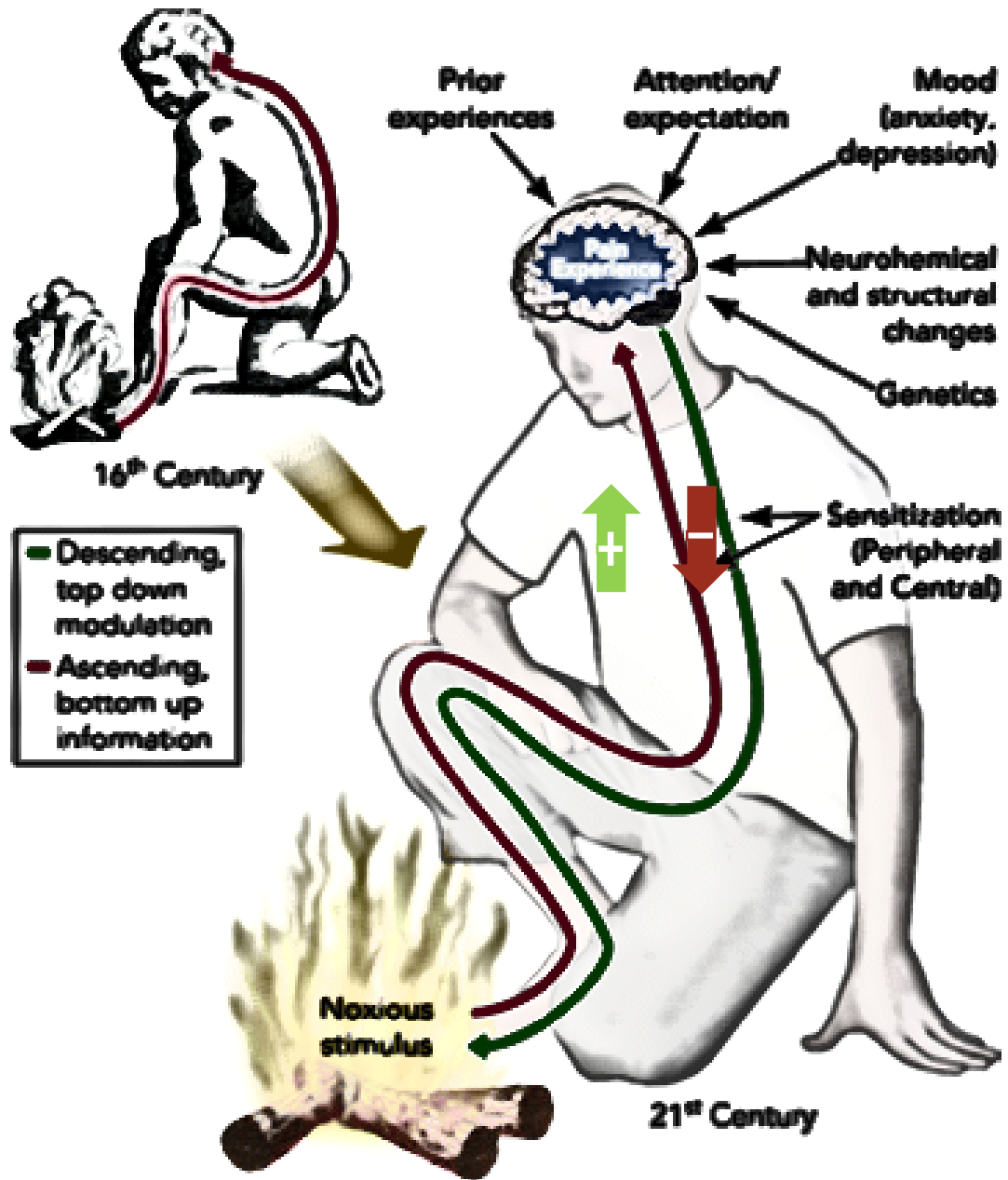


DANGER CATEGORIES

CHEMICAL
THERMAL
MECHANICAL

Ion channels are replaced every 48-72 hrs.





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Descending Control=

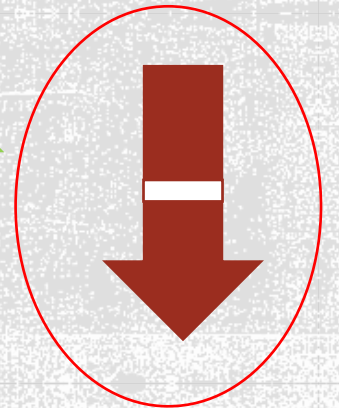
actions from the brain to control nerve impulses



DESCENDING INHIBITION: THE HELPFUL KIND



Stubbing your toe



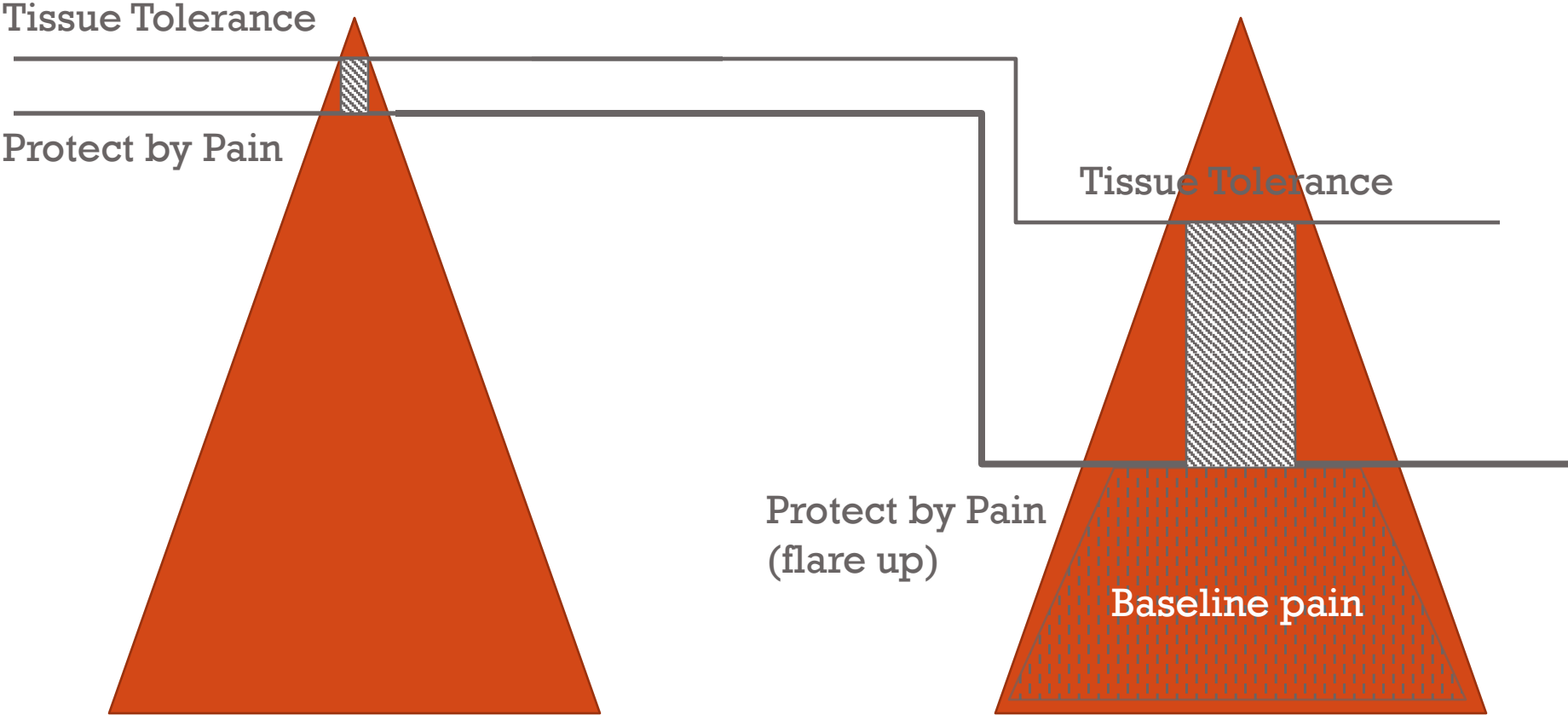
DESCENDING FACILITATION: HELPFUL?

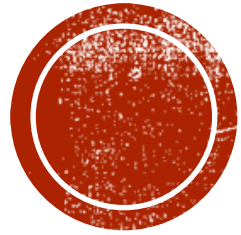


Soccer drama?



TWIN PEAKS: PATIENT EDUCATION



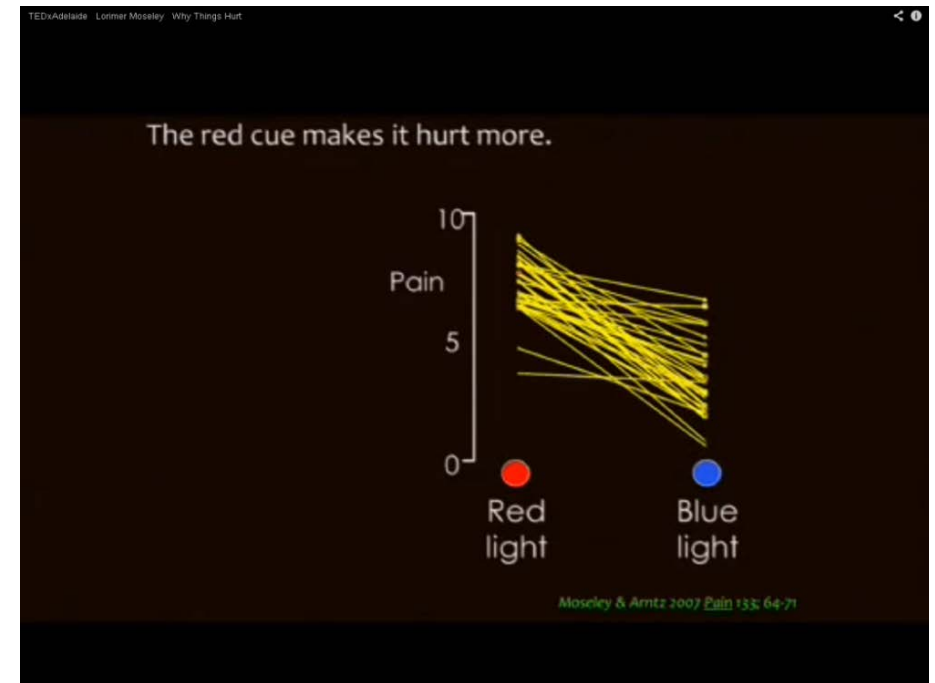
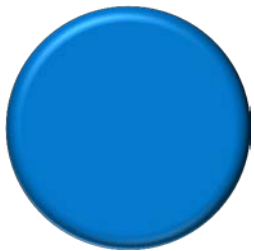


PAIN IS WEIRD

Things you need to know about pain but probably didn't

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YOUR BRAIN PRODUCES A PAIN EXPERIENCE WITH MORE THAN JUST NOCICEPTORS.



NON-PHYSICAL PAIN MODULATORS



Kate Schopmeyer DPT CPE

Context
Experience
Expectations
Meaning
Beliefs



OUR BRAIN WORKS ON A PRIORITY BASIS.

How
dangerou
s is this?



Many signals are considered at once.

The brain must make the most sensible story given all the data.



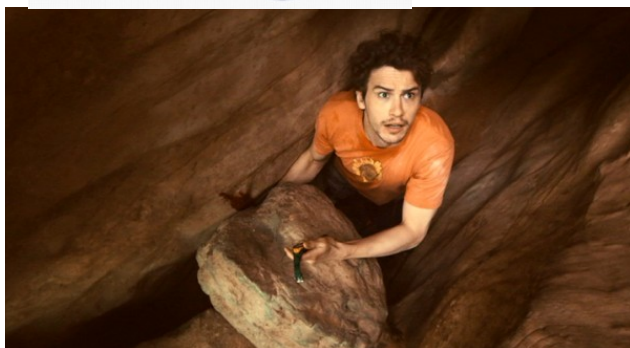
Is this an “issue with the tissues” or an overactive alarm?

Is action required? Will pain help motivate action?

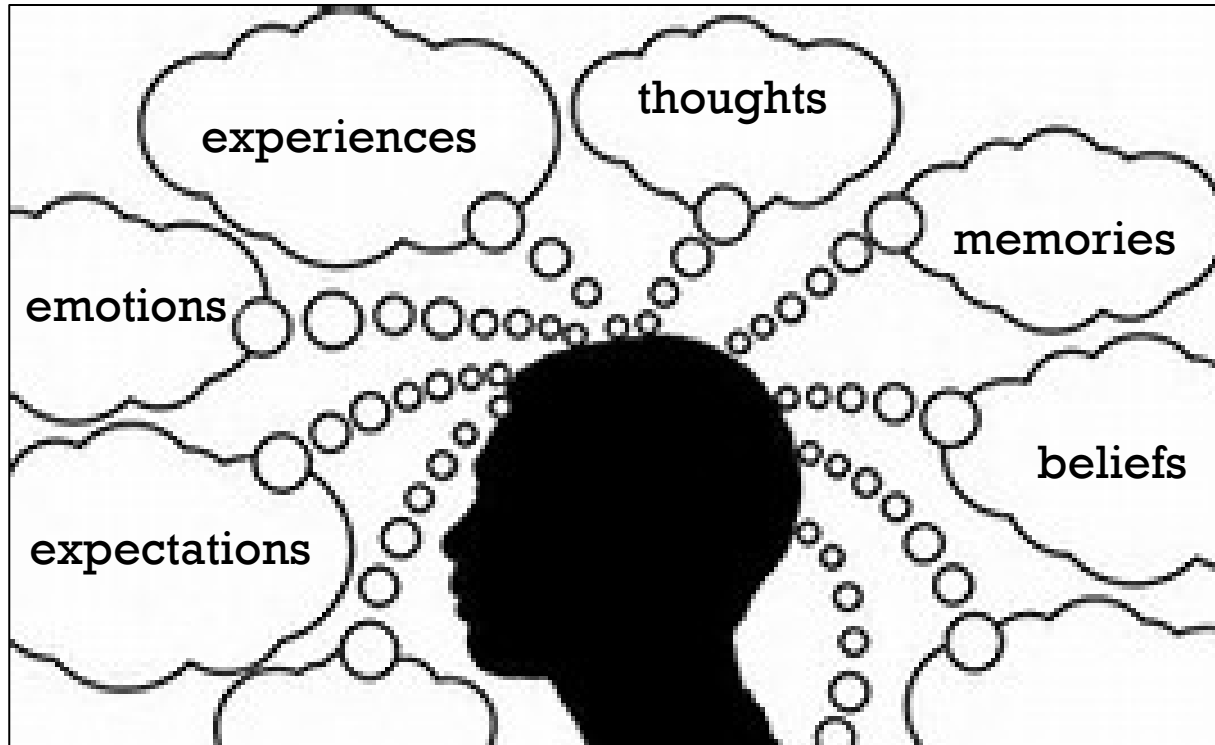


“Pain is a call to action,
not a damage meter.”

~Todd Hargrove



OUR BRAINS ARE NOT EMPTY



**“Thoughts
and beliefs
are nerve
impulses in
your brain!”**



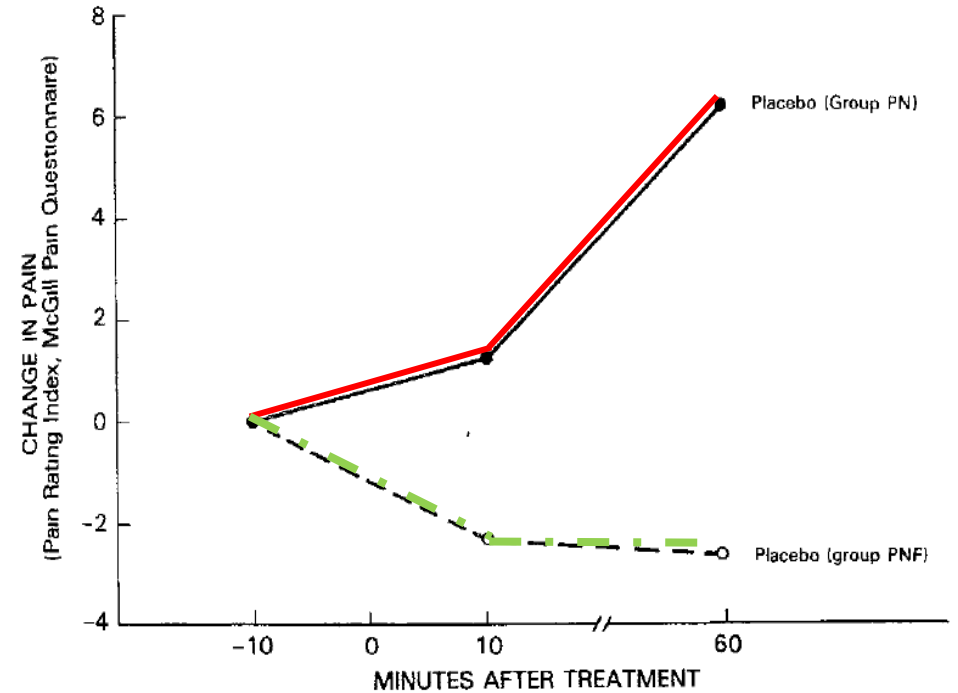
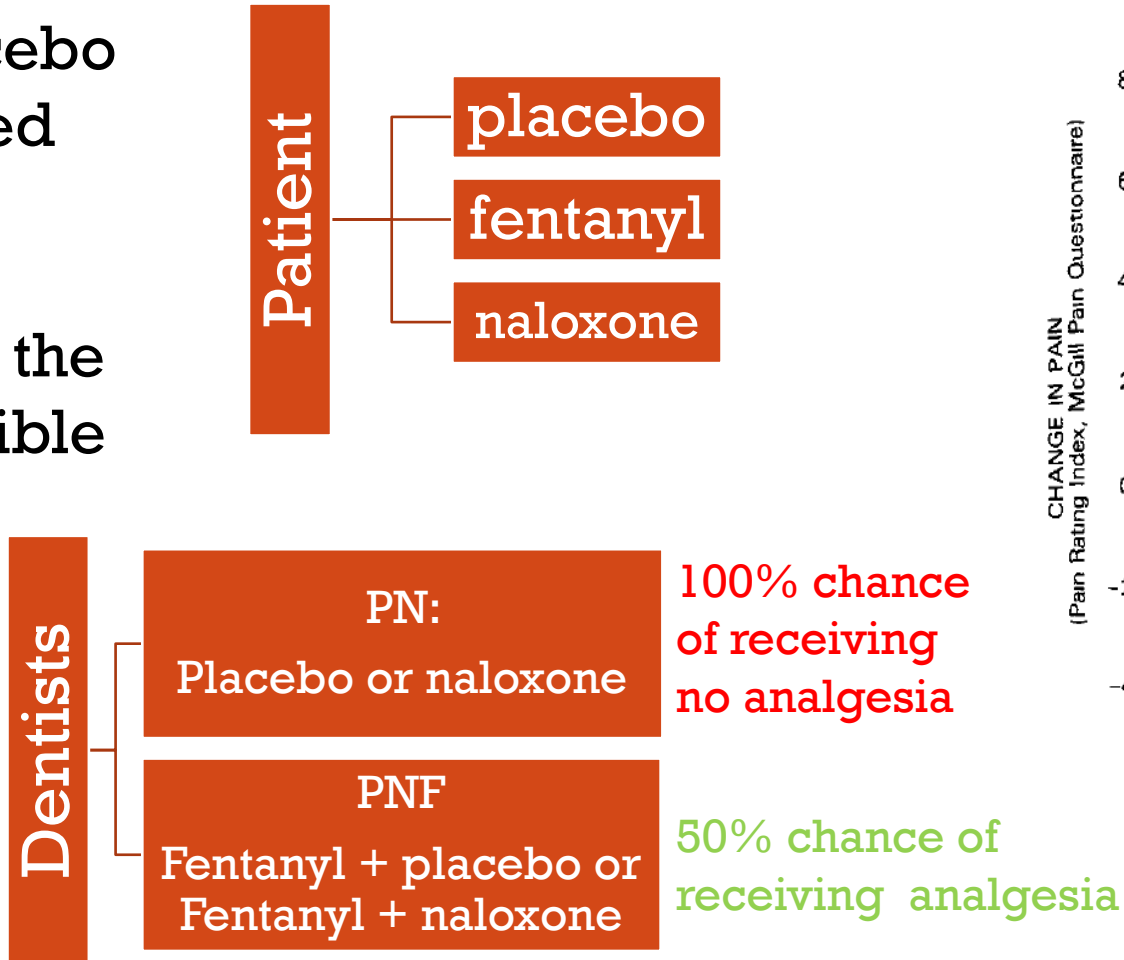


HOW POWERFUL ARE THOUGHTS?

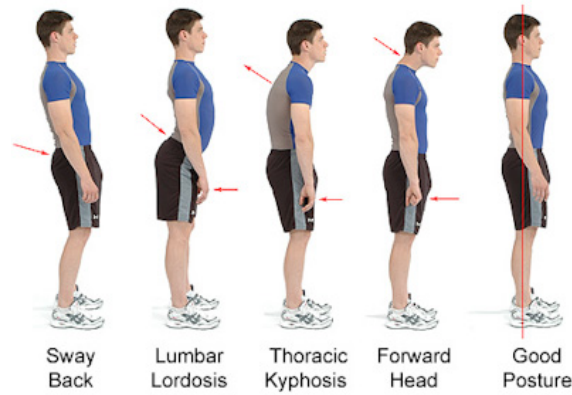
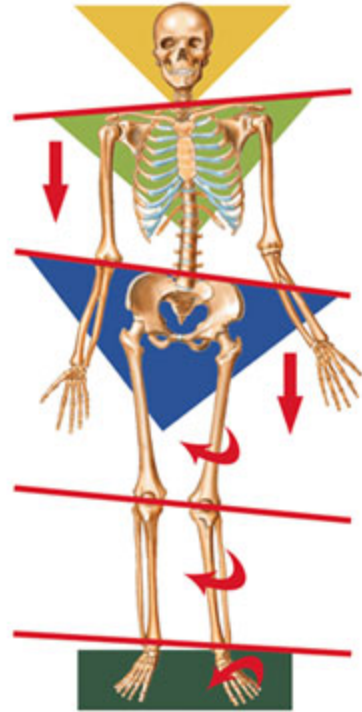


What you think, say and do as a clinician will influence your patient's pain experience.

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



BELIEFS ABOUT BACKS (AND HIPS, AND KNEES, AND SHOULDERS...)





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 A HEALTHCARE PROVIDER CAN DO

1. Check our own beliefs about pain
2. Learn to explain pain, not (just) anatomy
3. Rule out the Scary-Nasties



Ask your provider new questions:

- How do I know if my pain system is being overprotective?
- How can I retrain my pain system to be less protective?
- How do I know if I'm safe to move?

Learn about pain:

- Our bodies are wonderfully adaptable
- Movement is Medicine
- You can be sore, but safe
- Start low, go slow
- “Challenge the flare line, don't push through it, doing this can help you move it.”

www.tamethebeast.org

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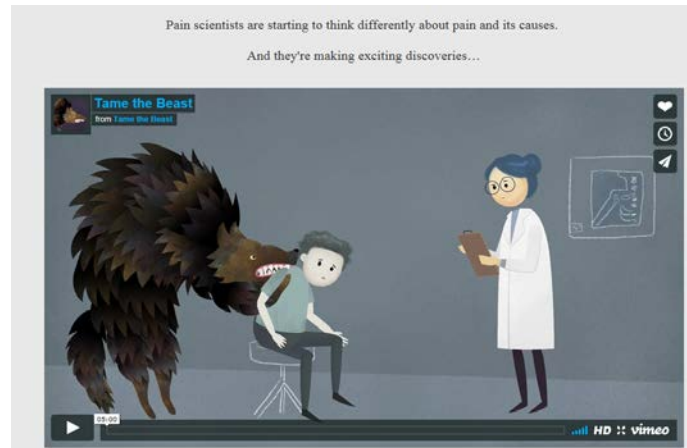
WHAT YOU CAN DO



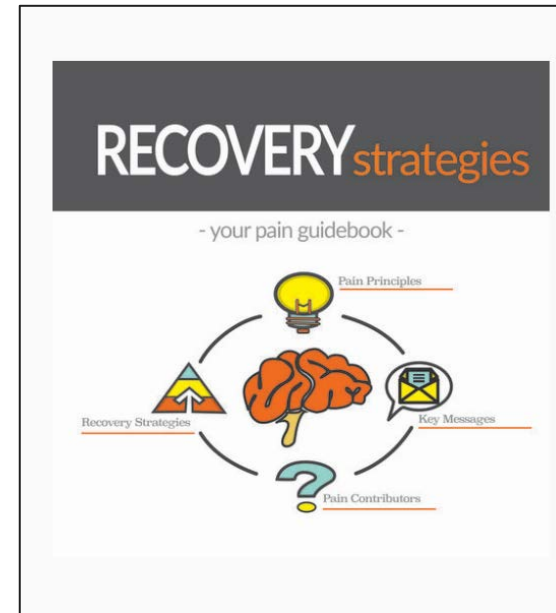
PAIN EDUCATION RESOURCES



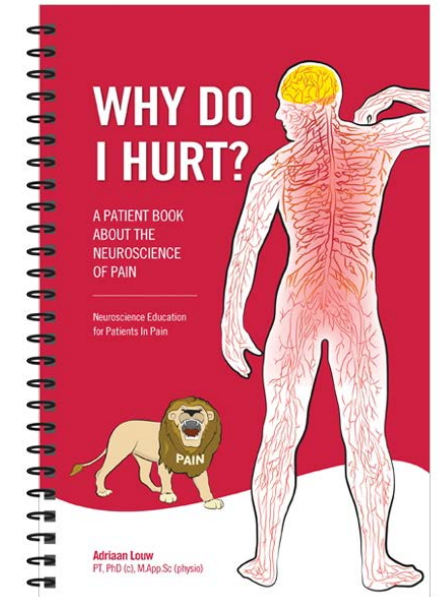
www.retrainpain.org



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
- Brainman Chooses
- Why Things Hurt (Moseley)



HELPFUL WEBSITES FOR PATIENTS AND PROVIDERS

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





QUESTIONS?



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