Explaining Pain To Change Pain:
An evidence based update with psychomotor tools to treat ALL painful patients

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Cite current evidence supporting pain science and therapeutic neuroscience education for the treatment of painful conditions.

Use evidence based tools to best identify those patients who might be at higher risk for developing chronic pain.

Identify best practice methods for inciting patient buy in and understanding of the pain experience.

Identify tools available to best elicit and enhance patients’ understanding of the pain experience.

Give and receive real time feedback from colleagues during practice sessions of therapeutic neuroscience education.

Identify and adopt best language utilization to better empower patients embracing of movement and aerobic exercise to improve long term outcomes in the chronic pain population.

Let’s Start With a Story

"At least half the days he spent on this earth were days of intense physical pain."
—Robert F. Kennedy Oral History (John F. Kennedy Presidential Library and Museum)
Let’s Start With a Story

23 y/o: 1st LBP from “football injury”
27 y/o: 1st back surgery
31 y/o: Dxed w/ Addison’s dx (hypoadrenalism)
37 and 38 y/o: 2nd and 3rd back surgery

All Failed Surgeries

Let’s Start With a Story

Until his death at 43 he was on:
• Bowel Antispasmodics
• Muscle Relaxers
• Phenobarbital
• Meprobamate
• Librium
• Pain Meds
• Demerol
• Codeine
• Oral/injected cortisone
• Nembutal (sleep)
• Testosterone
• Novocaine/Procaine back injections

Pain Stats

116 Million Americans have a persistent pain state (IOM 2011)
35% of people in Ireland live with pain (Raferty et al 2011)
$635B cost in medical Rx/Lost Productivity
OA is the most common form of arthritis and the leading cause of disability world-wide, largely due to pain...” (OARSI, Neogi, 2013)

Chronic Pain is increasing over time
1:7 early 1990s——> 1:4 (Wall and Melzack 2005)
Pain Stats

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Revolution→Declaration of Montreal IASP 2015

Finding that pain mgmt is inadequate in most of the world b/c:
- There are major deficits in knowledge of health care professionals regarding the mechanisms and management of pain
- Chronic pain with or without diagnosis is highly stigmatized (also by health professionals) Pain 2016

Other statements more to do with opioid access and acute pain mgmt

EPIDEMIC

Deaths from opioids/alcohol/suicide
2015 Nobel Prize Economic Science
Middle Aged White Americans Mortality worsening
Heart Dx and DM Alcohol Cirrhosis and Opioid Overdose
EPIDEMIC

- Deaths from opioids/alcohol/suicide
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- Heart Disease, DM, Chronic Pain and Opioid Overdose

OVERDOSE DEATH RATES IN AMERICA

- Opioid Pain Relievers
- Heroin
- Cocaine
- Marijuana

All underlying causes of death

Opioid Epidemic CDC

- Everyday 78 people die from opioid overdoses in the US
- 1:8 25-29 y/o die from Opioid OD → leading cause of death
- 2000-2014: 500,000 deaths from opioids
- US consumes >90% of the world’s opioids

Chronic Pain > 100M Sufferers
Figure 1. Increases in the use of common surgical low back procedures.

Figure 2. Percentage of individuals with permanent work disability (Social Security Disability Income beneficiaries) disabled by various medical conditions. (Data are from reference 24.)
Global Burden of Disease

Why Physical Therapy??

- We listen to our patients!!

- We don’t prescribe drugs or surgery!!

- We don’t kill you!!
Red FLAGS

- Serious disease
- History of Cancer
- Fracture
- Night Sweats, Unexplained Weight Loss
- UMN lesions
- B/B changes

Blue FLAGS= Perceived Work Features

- Dissatisfaction with job
- High demand/low control work environment
- Physically Uncomfortable Work (Ergonomics)
- Perception of little support from job, mgmt, or colleagues

How About the Flag that really Matters in Recovery Process??!!
Psychological distress (e.g. depression, anger, bereavement, frustration) 52% pts w/ CLBP are depressed Anger Turned Inward 4x more likely for future LBP/NP Auvinen 2010, Carroll 2004, Jarvik 2007 Can be screened reliably by 3 item questionnaire (BMJ 2005) Characterized by negative affect: “Yes, but….” Poor Sleep Inactivity Endogenous Pain inhibition

**Yellow FLAGS**

Perceived inconsistencies/ambiguities about the injury and its implications Unhelpful coping strategies (e.g. fear of pain and aggravation, catastrophizing, illness behavior, overreaction to medical problems) Use of the Pain Catastrophizing Scale (PCS) to quantify Also MAY use Impact of Events Scale to measure post traumatic stress

**Yellow FLAGS**

Pain Catastrophizing: exaggerated negative orientation towards pain, imagining worst possible outcomes. Good construct validity, reliability, and stability Sullivan 1995 Associated with increased risk of developing persistent pain and disability. For the normative database, patients who scored above 30 (75th percentile) on the PCS; 70% remained unemployed one year post injury 70% described themselves as totally disabled for occupationally related activities

**PCS**
Fixation on Pain
Magnification of its Threat Value
Adopt a Helpless Outlook
Pts – ve Beliefs Are Based on HCP encounters Lin et al BMJ Open 2013

Beliefs about pain & injury (e.g. that there is a major underlying illness/disease, that avoidance of activity will help recovery, that there is a need for passive physical treatments rather than active self-management)

Measured with Fear Avoidance Beliefs Questionnaire (FABQ) or Tampa Scale of Kinesiophobia (TSK)

Assesses FEAR of movement, NOT catastrophization, anxiety, etc.

Fear Avoidance Beliefs
Numerical/Statistical Importance

> 14 PA subscale indicates higher fear avoidance/less likely RTW
> 19 Work subscale less likely to respond to LS manip
> 30 Work subscale indicates increased likelihood of poor outcome
> 34 doubles the chance of long term work restrictions Fritz and George 2002

High Fear Avoidance is associated with high intake pain intensity and poor function (JOSPT 2011)

Directs the need to Pain Science education with Cognitive Behavioral Techniques and a Graded Exercise Approach

Passive treatments should be avoided and discouraged
Can Also Ask Fear Related Questions

- What are you afraid of??
- What is your worst case scenario?
- Are you afraid activity will increase your pain? Cause harm?
- Use clinical experience to catch fearful statements/movements.
- Direct your pt education accordingly.

Motivational Interviewing

Sobell and Sobell 2008

- Open Ended Questions:
  - “Tell me Your story”
  - Reflective Listening
  - “From What I Hear…”
  - Normalizing
  - “There are many people with your condition…”
  - Statements supporting self-efficacy
  - “You’ve really worked hard at this.”
- Advice or Feedback
  - “Would you like to learn about how pain works?”

Getting the Most out of the Clinical Encounter: The Four Habits Model

By: Richard A. Frueh, PhD

- Model use of patient’s own language in questions and description.
- Avoid questions that might cause stress or anxiety.
- Provide clear and concise information.
- Encourage patients to ask questions and participate in their care.
Calgary Cambridge Model

Interviewing Drill
- MDs interrupt the pt on avg app 12-18 sec into the interview Dyche 2005
- Understanding drops 1/3 w/o agenda
- 2 min each, real problem, questions only

Brief Psychological Report (Tempting)

Patient's Name: 
Date: 
Diagnosis (circle one):

Nuts  Not Nuts

I DON'T PRACTICE PSYCHOLOGY!!
If someone has pain in their hand, one does not comfort the hand, but the sufferer

Philosopher Ludwig Wittgenstein, 1953
Placebo and naloxone can alter post-surgical pain by separate mechanisms

Richard H. Gracely, Ronald Dubner, Patricia J. Wolskee & William R. Deeter

Nature 1983

- Double Blind, Placebo-controlled trial
- Fentanyl for Wisdom Teeth extraction
- Placebo group showed stat sig improvement in pain w/ opioid removal

**HOW ARE THESE TREATED?**

- Stiff Joint → OMPT
- Muscle tension/MTP → STM, DN
- Poor movement → Motor Control exercises
- Faulty Beliefs/Thoughts → ???

**STaRT Back Tool**

The Keele STaRT Back Screening Tool

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your back pain has spread down your leg or arm whole time in last 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>weeks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You feel depressed or other emotional or mental state for last 2 weeks?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You feel very tired now, which interferes with your work or sleep?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You have had a very much for a period within a condition ever since?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You worry a lot about your back pain?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The pain in your neck and back is serious, that it is an urgent medical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>problem?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>You have seen a doctor about your back pain?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your pain is step on your back pain in the last 2 weeks?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Score**

1. 0 = None
2. 1 = Mild
3. 2 = Moderate
4. 3 = Severe
5. 4 = Very Severe
6. 5 = Extreme

**Interpretation**

- Score of 0-2: No Complaints
- Score of 3-4: Some Complaints
- Score of 5: Severe Complaints
Effect of Stratified Care for Low Back Pain in Family Practice (IMPACT Back): A Prospective Population-Based Sequential Comparison

- Large, significant change in Disability in High Risk group
- Mean Time off work 50% lower in intervention group
- More standardization → more referrals
- Lower cost due to low risk pts not being treated excessively
Pain Neurophysiology Questionnaire

1. It is possible to have pain and not know about it.
2. When part of your body is injured, special pain receptors convey the pain message to your brain.
3. Pain only occurs when you are injured or at risk of being injured.
4. When you are injured, special receptors convey the danger message to your spinal cord.
5. Special nerves in your spinal cord convey 'danger' messages to your brain.
6. Nerves adapt by increasing their resting level of excitement.
7. Chronic pain means that an injury hasn't healed properly.
8. The body tells the brain when it is in pain.
9. Nerves adapt by making ion channels stay open longer.
10. Descending neurons are always inhibitory.
11. Pain occurs whenever you are injured.
12. When you injure yourself, the environment that you are in will not affect the amount of pain you experience, as long as the injury is exactly the same.
13. The brain decides when you will experience pain.

Titles/Brands

- Neurophysiology of Pain Education
- Pain Physiology Education
- Pain Biology Education
- Pain Neurophysiology Education
- Therapeutic Neuroscience Education

Attention Students!!!

"I had a crazy upside-down way of presenting quantum mechanics, absolutely inside-out, in which everything that was advanced would come first, and everything that was elementary, in the conventional sense, would come last."

—Richard Feynman, Ph.D.

"We believe...that the non-standard approach to pain education, which begins with and emphasizes processes at the subcellular and cellular scale, poorly prepares trainees to assess and treat pain in everyday clinical practice."

—Anesthesiology 2014: 120(3)
Why Is This Class So Special??

- It’s NOT (the end all be all, designed only to improve your awareness and skills in 4 hours vs. 8 weeks)!!
- Pain /= Harm → Old concept/Too Simplistic
- Telling is NOT teaching
- Experience is a Better Teacher than Information, but both are needed for LT change
- We Need Better Tools/Skills to Teach

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Friday afternoon, 4:30 pm, primary referral source pt walk in, 1 yr onset, MVA, multiple health care practitioners...
Looks like this...
What CPR works for this pt?

- Manip
- Stabilization
- Traction
- Directional Preference
  - L1-S1, SIJ, B hips TTP to CPAs
  - B SLB 45 degrees
  - AROM LS flex/ext 10 degrees
  - Good general health
  - Exercises regularly
  - Family Hx of LBP

Pts like these want to know (Verbeek, Sengers 2004)

- What is wrong with me??
- How long will it take??
- What can I do about it??
- What can you do about it??
- How much will it cost?? (working clinicians)

Some of my New Favorite Questions/Statements

What do you think is going on with your body?

What do you think it will take to get you better?

“I’m SORRY…”
**Education Evidence**

- Some benefit for acute/subacute LBP, NOT CLBP (Engers, Jellema 2008)
- No evidence for neck pain, radic or nonradic (Gross 2008)
- No evidence for Pre Op Education for THA/TKA (McDonald/Heidt 2004)
- Overall, evidence is lacking, more for chronic pain
- Perhaps due to…
Education Helps Prevent Injury

Recent Pain Science Evidence

More Evidence for Pain Science Education

- Improved outcomes of therapeutic exercises (Moseley 2002)
- Reduction in widespread brain activity characteristic of a pain experience (Moseley 2005)
- A recent systematic review of neurophysiology pain education concludes that for chronic musculoskeletal disorders, this education strategy may have a positive impact on pain, disability, catastrophizing and physical performance (Louw 2011)
- NNT for improvement in pain (3) and disability (2) for CLBP (Moseley 2002)
- A preoperative pain neuroscience education program for lumbar radiculopathy reported better surgical experience and less healthcare utilization (Louw 2014)
Moseley, Aus. J of Physio 2005
A: 4.5 years
LBP and B LE, all imaging WNL
B: 1 week of Abd draw in
C: 2.5 hours of pain education
D: Comparison of B and C

Explain Pain experiences??
The Backfire Effect

The Misconception: When your beliefs are challenged with facts, you alter your opinions and incorporate the new information into your thinking.

Storytelling > Statistics

- Evolutionarily dominant
- Listeners more engaged
  (Kounzes and Posner 2002)
- Information more easily / accurately remembered
  (Borgida/Nisbett 1977; Zembe 1990; Williams 1993; Conger 1991)
- WORKS ON MBA Students!!
Don’t always believe what you perceive

THE PAOMNEHAL PIEOR OF THE HMNAN MNID. According to a research at Cambridge University, it doesn’t matter in what order the letters in a word are, the only important thing is that the first and last letter be in the right place. The rest can be a total mess and you can still read it without problem. This is because the human mind does not read every letter by itself, but the word as a whole.

What is the experience and why?

Why is the Top Different From the Bottom?

Gold Standard For Pain Education in Curricula

IASP – All Professions (Last updated May 2012)

PT Specific Curricula

IASP Curriculum Outline on Pain for Physical Therapy
Task Force Members: Helen Slater, Kathleen Sluka, Anne Söderlund, Paul J. Watson (Chair)

Introduction
Pharmacology
Curriculum Development
Curriculum Implementation
Course Development and Evaluation
References

Hoeger Bement & Sluka, 2015
Survey: Pain Education In DPT Curricula

Previous survey: 4 hours spent on pain education (Scudds, 2001)
Updated survey: 31 hrs (±1.8) (Mean ± SEM); Range 5-115 hours.
50% of respondents were unaware of Institute of Medicine report on pain (2001) or the guidelines for PT education on pain from International Assoc. for the Study of Pain (IASP)
Only 61% of faculty responders thought their students received adequate education on pain.

Definitions
“PAIN: An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or defined in such terms”. (IASP)
http://www.iasp-pain.org/
History

- Cartesian model of pain
- More than 350 years old
- STILL exerts undue influence on how clinicians view pain
- Specifically, NOCIOCEPTION=PAIN Wade

Nociopception

- The encoding and processing of noxious stimuli
- Can be encoded autonomically (HTN)
- or behaviorally (reflex withdrawal)
- Mechanical, Chemical, Thermal

Nociopception: responds to change in environment, not tissue status

- Governed by:
  - A Delta fibers (fast myelinated), slowly adapting and buildup
  - C fibers
    - Small, Thin
    - Unmyelinated, Glandular
    - Upregulated in the presence of inflammation, and cause inflammation
  - Danger only, not pain
Pain: another version

- Pain is a multiple system output, activated by an individual’s specific pain neural signature. Mosely 2003
- The neural signature is activated whenever the brain perceives a threat (DANGER). Melzack 2001
- “Pain is a multisensory and emotional experience felt in the body, resulting in the need to take action to protect that body part” Moseley

Nocioceptors are NOT pain receptors
more DANGER receptors

Nonsense terms → Adverse Conditioning

- Nonsense terms
  - Pain Receptor
  - Pain Pathway
  - Pain Fibers
  - Pain Message
  - Pain Signal
- Sensible Terms
  - Nociceptor
  - Nociceptive pathway
  - Spinal nociceptors
  - Nociceptive signal
- Friendly/Accurate Terms
  - Danger Detector
  - Danger Transmitter
  - Danger Signal
  - Danger Messenger
History

- Gate Control
- Circa 1965
- Serves well, to a point
- DOES NOT account for
  - phantom limb
  - spinal stenosis pain
  - post-surgical pain

PSB model

- Posture/Structure/Biomechanic
- AKA: the biomedical/"bottoms up" model
- Works well for acute pain...

PSB model

- Also refers to this
- These are important tools in our arsenal
- For reasons perhaps we don’t consider (trust, connection, possibility of change)
People want to know more about pain, and not anatomy or biomechanics. Those concepts can’t explain this! Louw 2009, Mosley 2003.

Bio-psycho-social model

- Accounts for the 2 other critical components of the pain experience which can drive the afferent, cognitive, and motivational sides of the neuromatrix.
The 1st step
The Pain Mechanism Model (Gifford 1998)

- DAMPs: Damage Associated Molecular Patterns (releases proinflammatory chemicals)
- PAMPs: Pathogen Associated Molecular Patterns (alcohol??)
- XAMPs: Xenobiotic Associated Molecular Patterns (anything that doesn’t normally belong i.e. exogenous opioids)
- CAMPs: Cognitive Associated Molecular Patterns Hutchison 2016

Neurotag/NeuroSignature
Slipped disc → LBP → No Fun!!
Hebbian Theory: Nerve that...
Pain/=Injury

- 40% of nonpainful shoulders have BCT with Reilly, Macleod 2006
- 25-50% of general population have degenerative spine MRI, Kjaer, Leboeuf-Yde 2005

Explain Pain Revolution

- Challenge the Concept → NOT the Person
- Present Alternative Concept
- Give Evidence For that New Concept

iz on me coffe brek

com bak her
Whose spine would you rather have?
We, as clinicians, typically aren’t comfortable with this.
Pt Education on Neuromatrix

- “If it’s OK, can I talk a little bit how your brain affects your pain and overall health?”
- Asking permission
- Giving concrete examples (Grandma meeting)
- Repeating messages (memory meeting, stress meeting, etc.)
- “People hear “your pain is in your head”, insinuating the pain is not real. It is very real, very unique, and brain based.”

Pt Education

- Honesty Without Compassion Is Brutality.
- Compassion without Honesty Is Enabling.
- Don’t Blame the Patient.
Nociceptive Pain Smart 2011

- Presence of:
  - Localization, Intermittent, Aggs/Eases

- Absence of:
  - Burning, Dysthesias, Night Pain

- Strongest Predictor: Localization (OR 69.79)

Peripheral Sensitization Smart 2011

- Predictors are:
  - History of Nerve Injury
  - Dermatomal (OR 24.29)
  - Neurodynamic Assessment

Peripheral Sensitization Smart 2011

- Different Ion Channels
  - Temp, mechanical, chemical
  - Immune, Hydrogen, Light
  - Phospholipase-A2 (disc injury)

- Replaced every 48 hours

- Based on what the brain feels like it needs
Peripheral Sensitization

- Cortisol release / Adrenaline → Natural Steroids
- SNS activates and doesn’t shut off = Dry Brain
- Lack of PSNS activation to recover and “Rewet” the brain

Maladaptive Neuroplasticity / Central Sensitization

- Predictors:
  - Pain disproportionate to the Injury
  - Disproportionate Aggs/Eases (OR 30.69)
  - Psychosocial sxs
  - Diffuse palpation sensitivity

Maladaptive Neuroplasticity / Central Sensitization

- Neuroplastic changes along neuroaxis of pain experience resulting in sensitization, altered perception, altered motor control, and prefrontal area changes affecting emotion.
- Smudging
- Boom and Bust clients
Gray Matter changes in CLBP

- 5-11% less neocortical gray matter
- Pattern distinct for chronic pain
- Equal to gray matter lost over 10-20 years aging
- 1.3 cm³/yr of CLBP

Medial PreFrontal Cortex

- Area that references back to you, empathy, emotional engagement
- Dorso Medial: Empathetic Response in a Therapeutic Alliance
- Ventro Medial: Activates with rumination, worry, anxiety, etc.
Lateral Pre Frontal Cortex

- Modulates emotional responses overriding automatic behaviors
- Assessment center: goal oriented and stimulus driven
- Regulates ability to stay engaged, stimulated, and aware of what's happening

Language Ricter 2010

1. Empathetically connect with the patient
2. Reframe fear inducing metaphors (AIM 2004)
   - “It’s bone on bone” → “Did you know only 50% correlation btw knee pain and OA? Bedson,Croft 2008
   - “Your back/knee is out/degenerated” → “The back is a strong and resilient structure”
   - Degeneration=Adaptation!

Language Ricter 2010

3. Use metaphors to analogize SAFETY
   - “Your Hurts Will Not Harm You”
     - “Motion Is Lotion”
     - “Tease/Touch your Pain”
     - “Play with your Pain”

1. Watch your language, give context
   - Instability
   - Weak core
   - Wear and Tear
Communication

- Telling is NOT Teaching
- Pts in pain need multiple "doses" of education
- Written plans needed, I.E. notebooks
- Chronic Pain pts short term memory is poor (Pain mtgs, Brain Fog, Cortisol)

Other Tools and Techniques

- GOLD level evidence for Aerobic Exercise
  - >50% VO2 Max and >10min, ~100-105 BPM Hoffman, Shepanski 2004
- OMPT/Modalities within a neurophys framework Puentadura, Landers 2011, Iversen, Chhabriya 2011
- Sleep hygiene (checklist) Schwalbe, Chandran 2011
- Relaxation, in sitting/supine, Hewitt, Geritz 2009
- Lateralization (NOI Recognize), Mirror therapy, Graded Motor Imagery/Visualization, Sensory Discrimination
- Empathy, communication, connection, motivational interviewing
Other Tools

- **Pressure hyperalgesia**
  Pressure pain threshold to pressure
  Compare to other body regions

- **Cold hyperalgesia**
  Apply ice for 5 seconds to back of wrist
  VAS>5 indicates cold hyperalgesia (>3°C)

- **Alldynia**
  Non-noxious stimulus = pain response
  Repeated stimuli = pain summation

- **Pain summation with repeated movement**
  Repeated stimuli = pain summation

Basic Science Layout Review

- Anatomy and Physiology
- Biomechanics and Kinesiology
- Exercise Science
- Pain Science
- Psychology and Interpersonal Relations

- *NOT SEPARATELY CLASSIFIED AND RXED*
  - *ALL INTERWOVEN*

How much, How Often

- 30 min Meeus, Nijs 2010, Van Oosterwijck, Nijs 2011
- 4 hours Moseley 2003
- 20 min Louw 2015
- Common Frequency at 1 week apart
- Total time Spent 30 min-8 hours
- Avg 2.5-4 hours
**FALSE!!**

**T/F**
The pain you feel is the same that your grandparents felt.

**FALSE!!**

**T/F**
In chronic pain, chemicals associated with stress can directly activate nociceptive pathways.

**FALSE!!**

**T/F**
The Timing and Intensity of Pain matches the timing and number of signals in nociceptors.
T/F  
You can experience more than 1 pain at a time.  
FALSE!!

T/F  
Nerves can adapt by making more ion channels (sensors).  
TRUE!!

T/F  
Nerves have to connect a body part to the brain in order for that part to be in pain.  
FALSE!!
Experience Necessary

- The Mind is What the Brain Does For a Living”

- We are not thinking creatures that feel, but feeling creatures that think.” Jill Bolte Taylor

Practice Delivery Of

- Pain Science Information
- Pair up
Likely Results

- Superficial Learning
  - No questions
- Deep Learning
  - Challenges, questions
  - You suck!!
  - Don’t take it personal

At the End of the Day

- Per the evidence:
  - We can/are going from Pain Mgmt to Pain Improvement
  - No Pain Mgmt Clinic, but “Pain Clinic” or “Pain Program”
  - Chronic Pain forms bad connectivity habits/behaviours
  - Challenge concept, not the patient
  - Use “input” wisely (words/education/OMT)
  - Use DANGER, not PAIN

How Well Did You Connect?

Change in Pain  Lee et al 2016
What to do on Monday??

- Rethink our own perceived knowledge of pain and pain science (Pain Neuro Questionnaire)
- Retool how we connect and EDUCATE our patients with pain (Empathy, Touch, Healing Metaphors, Pictures)

References

Bedeel et al. Words That Harm, Words That Heal. Ann Int Med. 2004(164), 1365-68


Online Resources

Facebook groups
- Explaining Pain Science
- Noigroup.com
- Pain-ed.com
- Paintoolkit.com
- Somasimple.com
- Ispinstitute.com
- https://healthskills.wordpress.com/