

Understanding Pain

(45 Years of Pain Science in < 45 Minutes)

Kevin Cuccaro, D.O.

Faculty Disclosure:

The speaker, Dr. Kevin Cuccaro, has declared they have no relevant financial disclosures.

Learning Objectives

- Assess outcomes with common pain management treatments
- Define modern pain science using a new conceptual model.
- Describe how to assess and 'deconstruct' pain in order to direct treatment.

Today's Goals

↑ Pain Awareness

Challenge Beliefs

Think *Differently*

Kevin Cuccaro, D.O.

Before:

- Anesthesiology (Univ. of Chicago)
- 'Pain Medicine' (Univ. of Michigan)
- Assoc. Program Dir. (NMCSD)
- Board Certified 'Pain Injection Specialist'

“Why aren't people better?”

Now:

- Pain Specialist & Consultant
 - ✓ Healthcare Systems/PCPCH's
 - ✓ OHA Clinical Innovations Fellow
 - ✓ Oregon Pain Management Commission
 - ✓ OHA HERC Chronic Pain Task Force

What We'll Cover Today:

- **Concept #1:** What Is The Purpose of Pain & How Can People Hurt Even If It Appears “Nothing’s Wrong”
- **Concept #2:** What Is The Most Common Misconception About Pain Almost Everyone Makes (& Which Causes Treatments To Fail)
- **Concept #3:** How To Think Differently For Safe & Effective Pain Treatment

A Pain Problem?

Pain

- Common presenting symptom
- Most common disability
- \$600+ Billion annually
- 116 Million Americans*

Available at: <http://www.iom.edu/Reports/2011/Relieving-Pain-in-America-A-Blueprint-for-Transforming-Prevention-Care-Education-Research/Report-Brief.aspx>. Accessed May 5, 2015

Back Pain

- 2nd Most Common Reason for ALL Physician Visits
- Lifetime Prevalence of 60-90%
- Industrialized & Developing World
- *Disability Rates Very Different*

Waddell G. 1987 Volvo award in clinical sciences. A new clinical model for the treatment of low-back pain. *Spine*. 1987;12(7):632-44.

Allan DB, Waddell G. An historical perspective on low back pain and disability. *Acta Orthop Scand Suppl*. 1989;234:1-23.

Cost & Benefit

What We Did...

- ↑ MRI's 300%
- ↑ Procedures 130-700+%
- ↑ Surgeries 300+%
- ↑ Opioids 690+%

What We Got...

- ↑ Disability Rates
- ↑ Complication Rates
- ↑ Healthcare Costs

No Improvement in Self
Reports

Overall Results...

2000

US Pop. 282 Million

45 Million Chronic Pain

2010

US Pop. 309 Million

100 Million Chronic Pain

↑9.6%

↑122%

How

↑ 122%!?!?

Despite More 'Treatment'?

What Is Pain?

Concept #1: What Is The Purpose of Pain & How You Can Hurt Even If It Appears “Nothing’s Wrong”

Pain or No Pain?



Pain or No Pain?



Who Has Pain?



How can someone...

Severe pain in their foot... but no spike?

Have a nail in their thumb...but little pain?

'Spinal deformity'...but no pain?

'Normal' X-Rays...but tremendous pain?

What Is Pain?

"Pain is an
unpleasant sensory & emotional
experience
*associated with actual or potential
tissue damage or described in
terms of such damage."*

IASP 1994

Unpleasant
Sensory AND Emotional
Bodily Experience
In Response To Perceived
Danger



Key Concept #1

The Purpose of Pain Is Protection Not Punishment

"Hurt $\neq$ Harm"

1. Protection Not Punishment

("Hurt" ≠ "Harm")

'Harm WITHOUT Hurt'

- Distraction
- Life or Death Events
- General Anesthesia
- Belief of *Harmlessness*

'Hurt WITHOUT Harm'

- High (But Not Too High) Threat
- Expectation of Harm or
'Vulnerable' Expectation
- Belief of *Harm*

Pain $\neq$ Damage!

No Pain



Pain!



Key Concept #1: The Purpose of Pain Is Protection
Hurt $\neq$ Harm

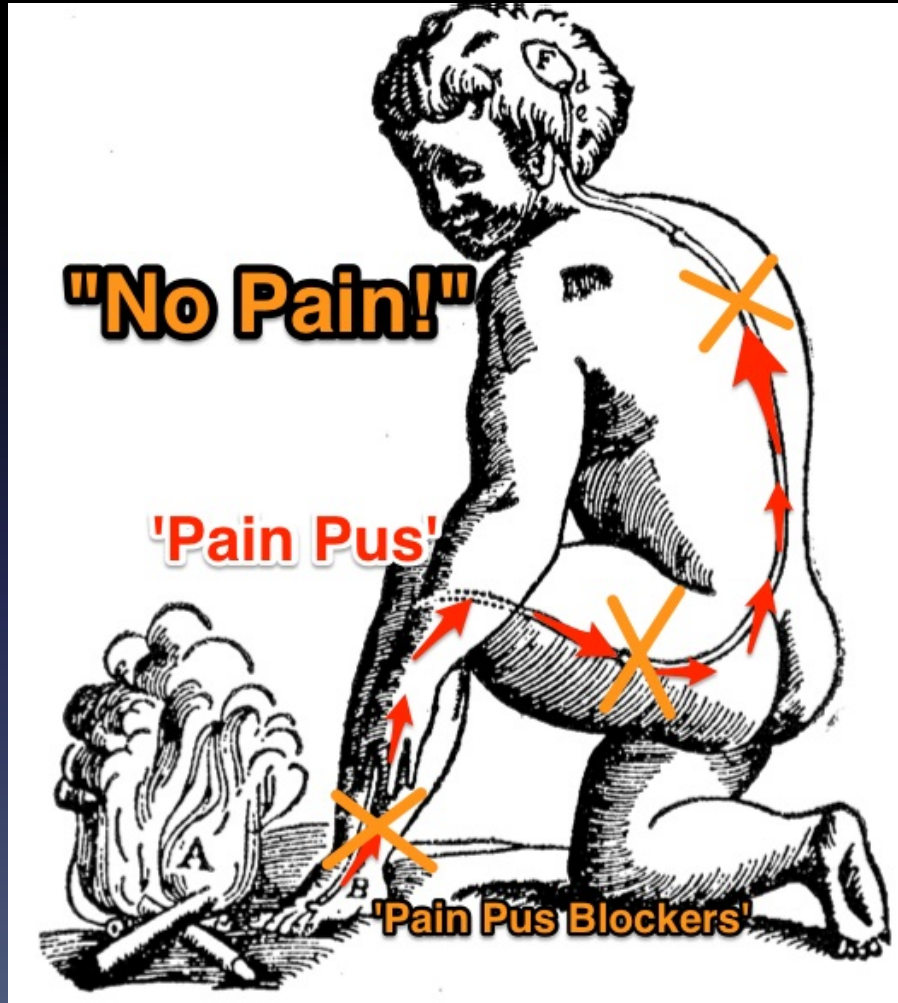


Key Concept #2

Pain Does NOT "*Come From...*" The Body

Pain Is "*Constructed*" In The Brain

IF Pain “*Came From...*”



...Then cutting, poking,
adjusting, drugging, 'Pain Pus
Pathways' would *consistently*
& *predictably* work with
sustained results...

But is this true?

Maybe Our Model Needs An Update...?



16th Century

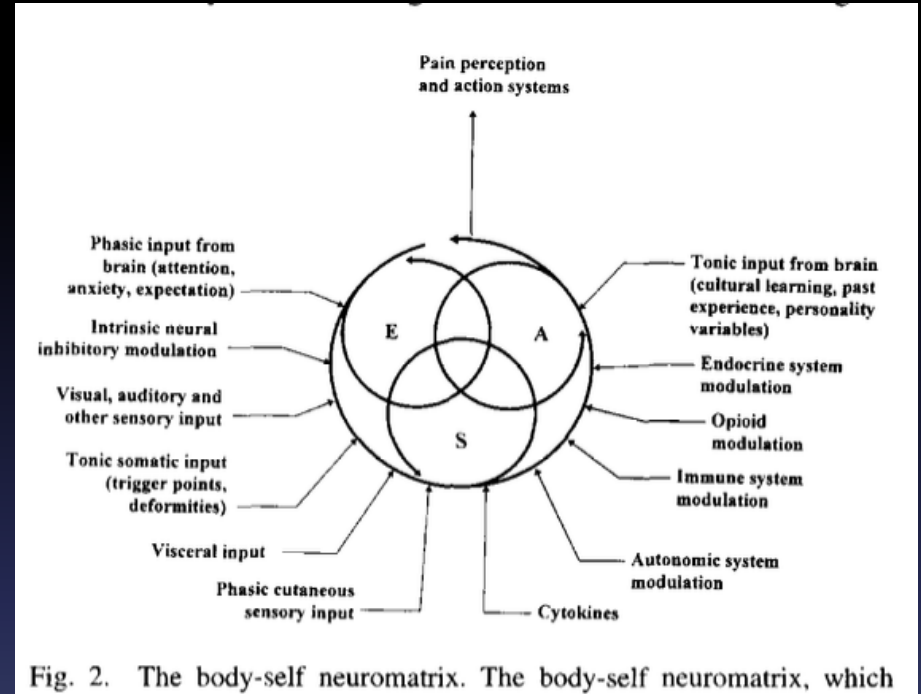


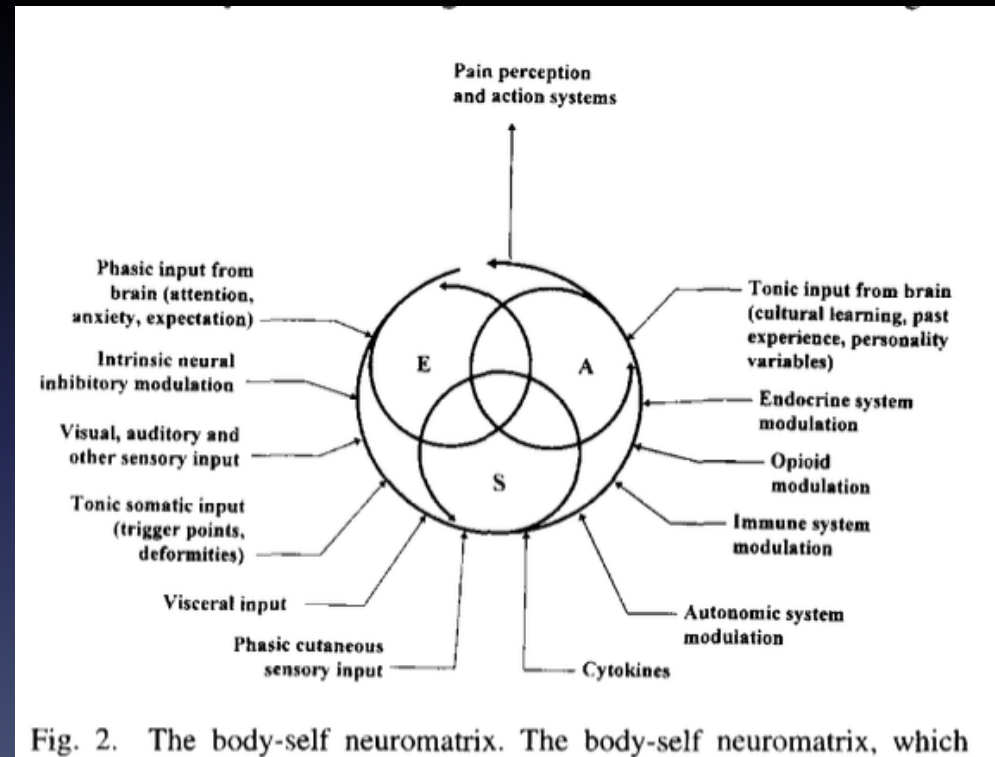
Fig. 2. The body-self neuromatrix. The body-self neuromatrix, which

Melzack R. From the gate to the neuromatrix. Pain. 1999;Suppl 6:S121-6.

21st Century

How We *Construct* Pain

Unpleasant
Sensory AND Emotional
Bodily Experience
In Response To
Perceived Danger



How We *Construct* Pain

Unpleasant

Sensory AND Emotional

Bodily Experience

In Response To

Perceived Danger

Sensation (Feeling)

'Where is it?' & 'What is it like?'

+

Emotion (Meaning)

'What does this mean?'

+

Cognition (Thinking)

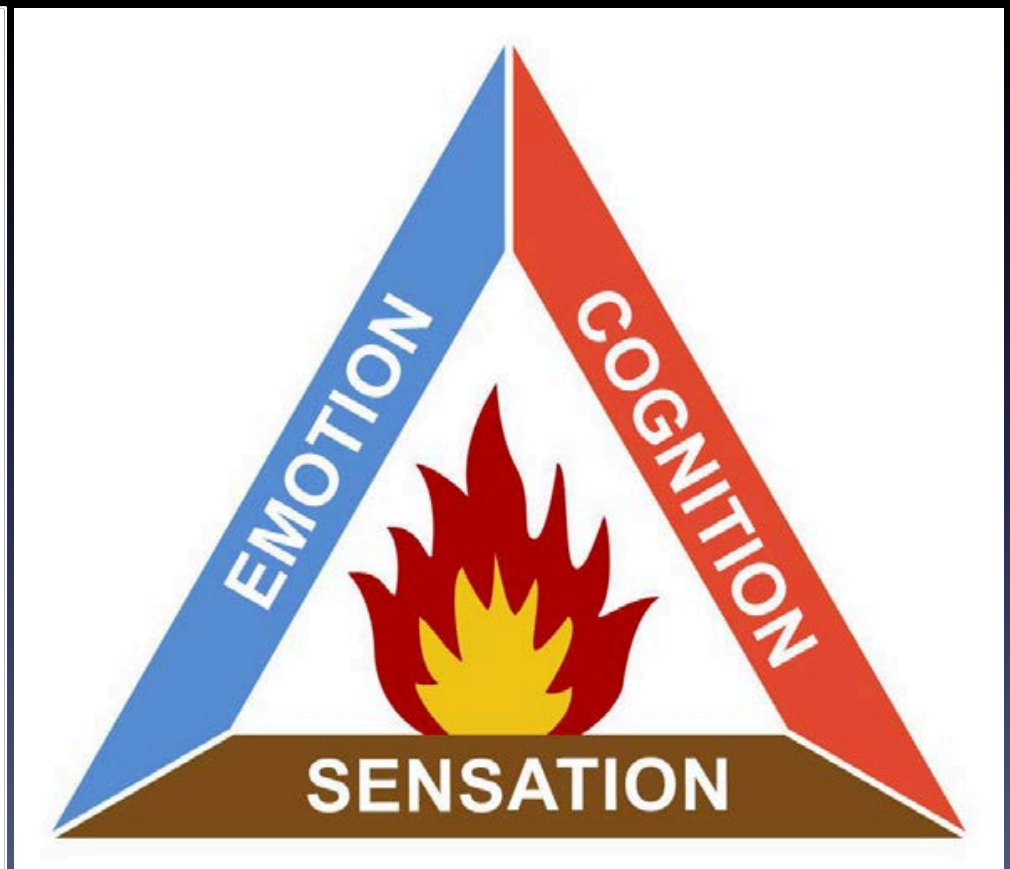
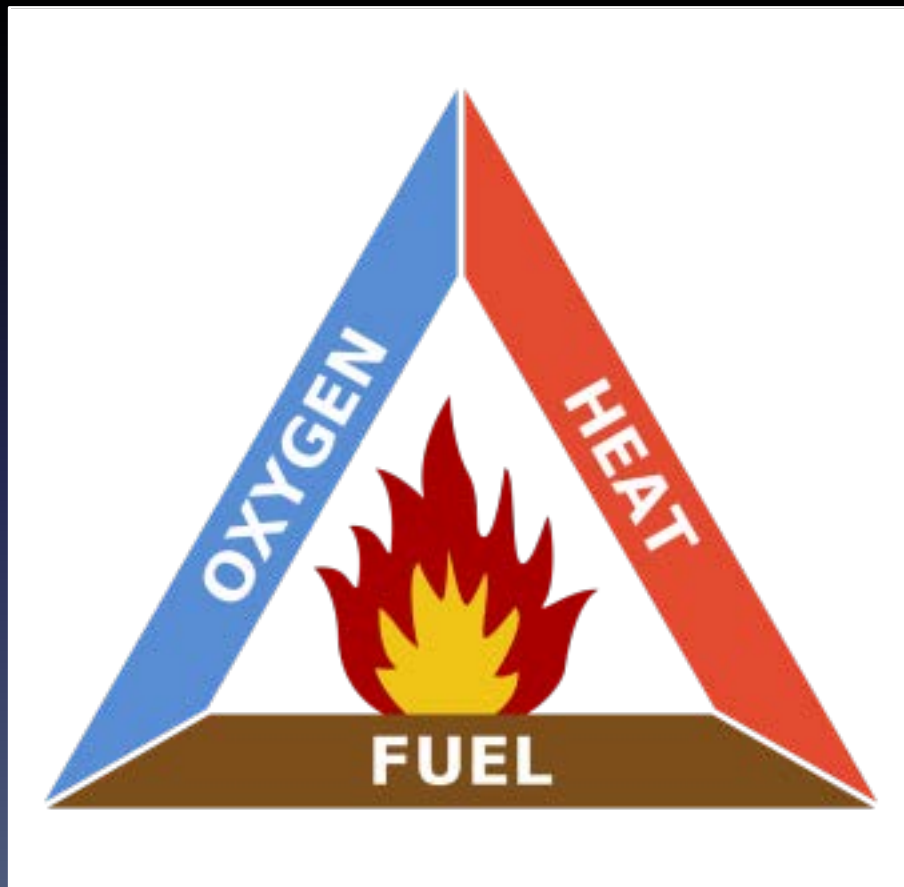
'Does it matter right now?

& What should I do?'

Confusing? Not Really

Firefighters Understand This

Pain



Fuel, Heat, & Oxygen of Pain

Cognition/Attention ("Heat")

- Threat Appraisal
- Accidental vs. Intentional
- Uncertainty & Anxiety

Sensation/Transmission ("Fuel")

- A-Beta vs. A-Delta vs. C-fibers
- Interoceptive, Proprioceptive...
- *'Top-Down' Influences*

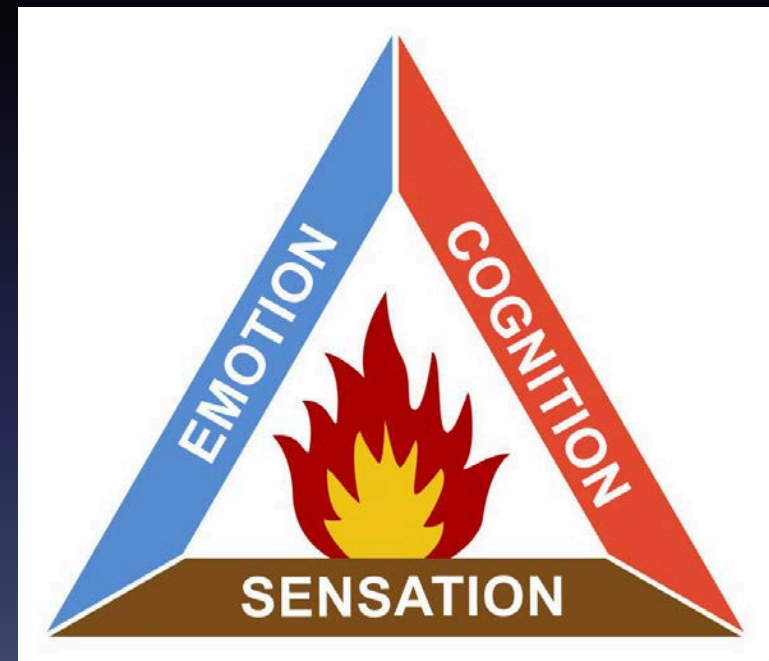
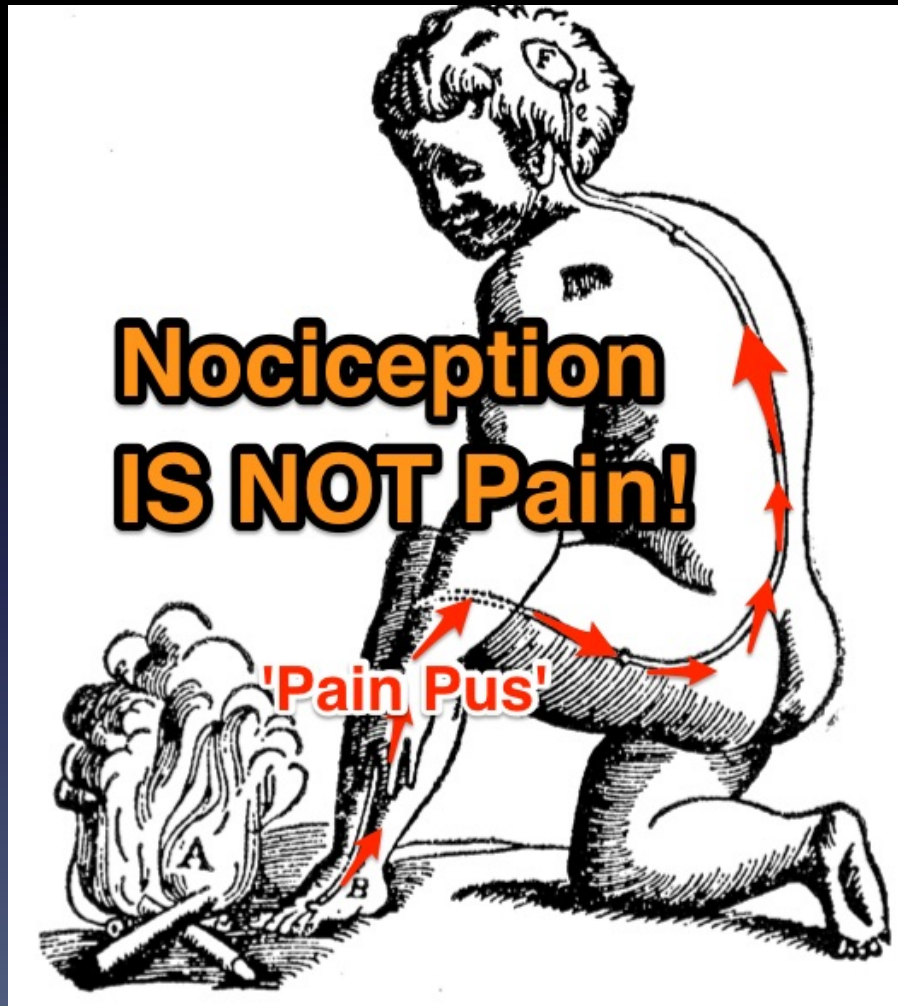
Emotion/Meaning ("Oxygen")

- Fear & Loss Meaning
 - Ex. Abd Pain
- Anger & Injustice
- Loss & Depression

Important: What Is This?



Structure OR Sensation Alone ≠ Pain



Key Concept #2: Pain is Constructed.
It Does Not "Come From..."

Key Concept #3:

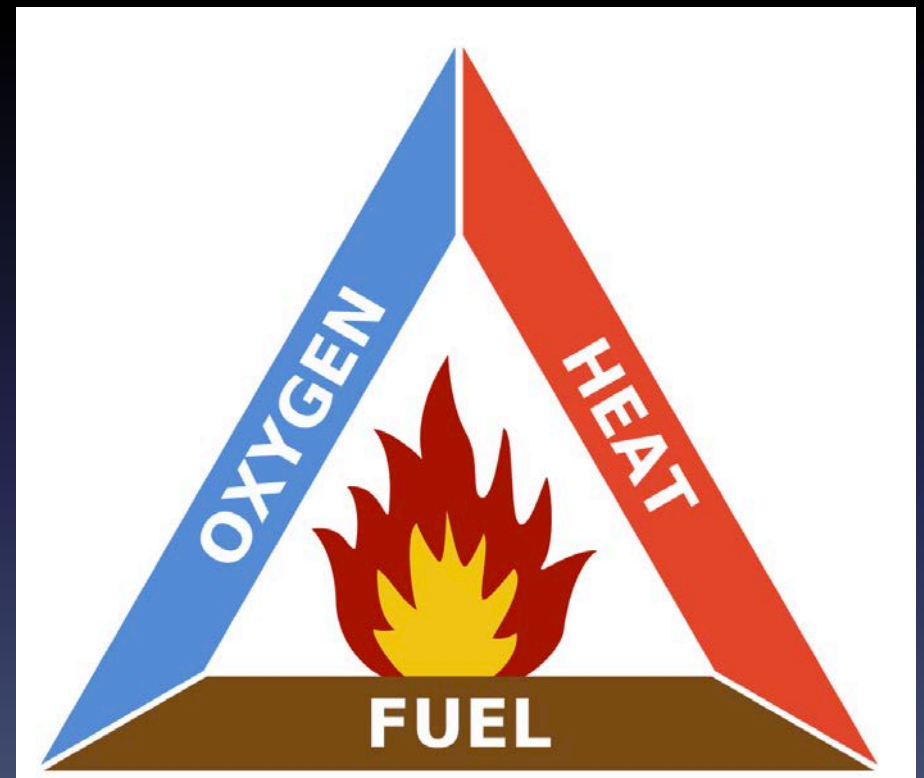
If You Know What You're Treating...

You Know How To Treat It

Firefighters Understand Fire

Then 'Deconstruct' It To

Target Treatment



The Same Applies To Pain

'Pain Fire' Examples

Spike In Boot

Sensation/Transmission ("Fuel")

- 'Tissue Issues' or No?

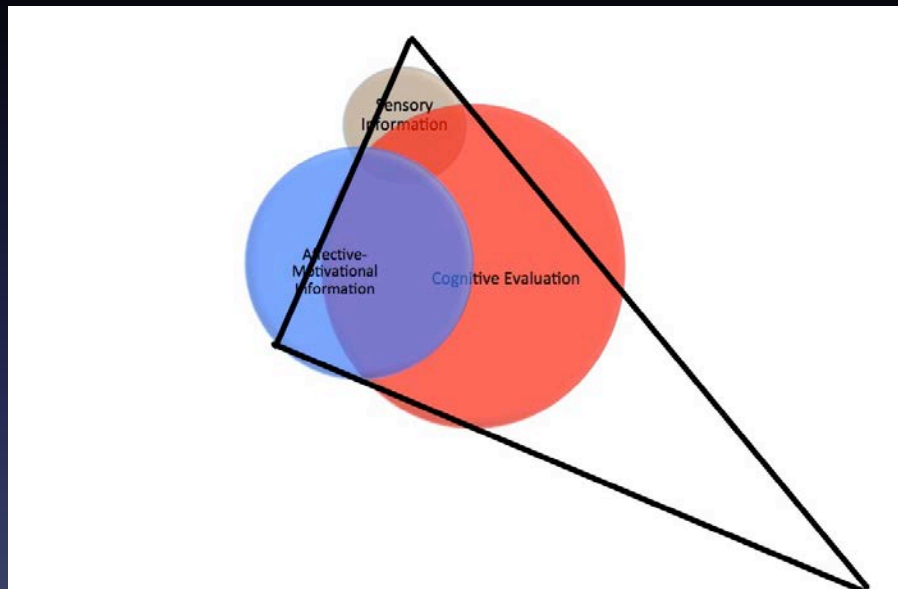
Cognition/Attention ("Heat")

- Threat, Uncertainty, Anxiety?

Emotion/Meaning ("Oxygen")

- Fear, Loss/Harm Meaning?





Nail In Thumb

Sensation/Transmission ("Fuel")

- 'Tissue Issues' or No?

Cognition/Attention ("Heat")

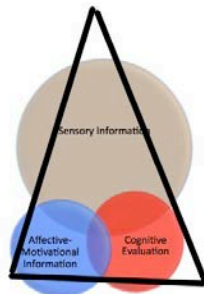
- Threat, Uncertainty, Anxiety?

Emotion/Meaning ("Oxygen")

- Fear, Loss/Harm Meaning?



Nail In Thumb



'Normal Spine'

Sensation/Transmission ("Fuel")

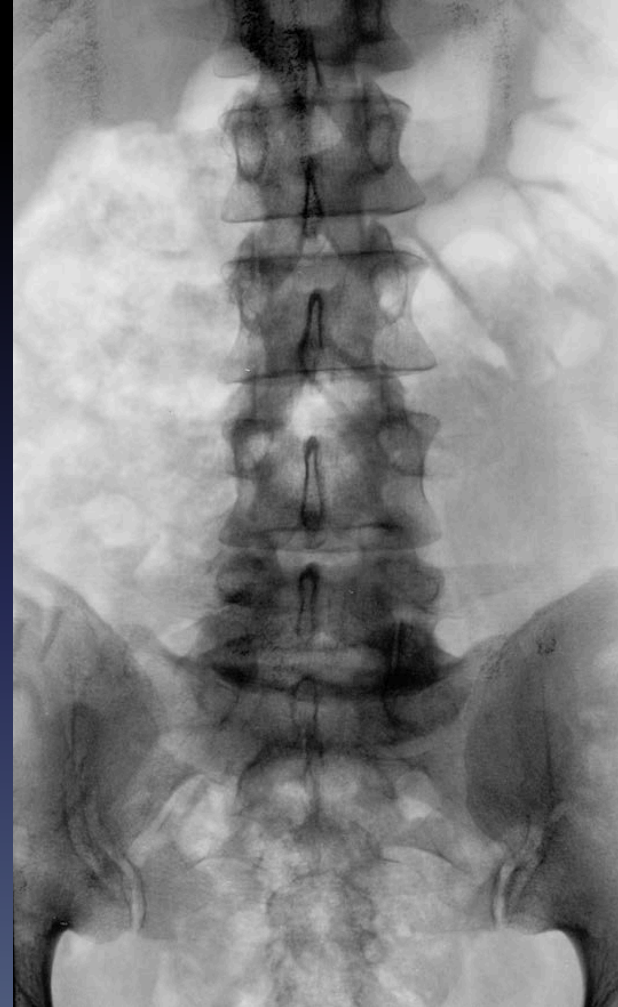
- 'Tissue Issues' or No?

Cognition/Attention ("Heat")

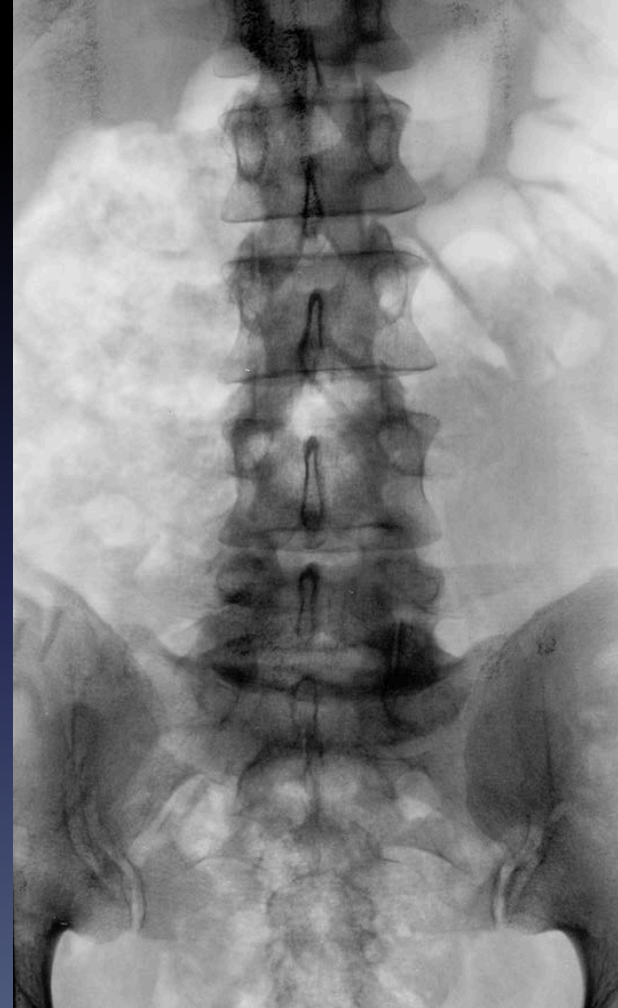
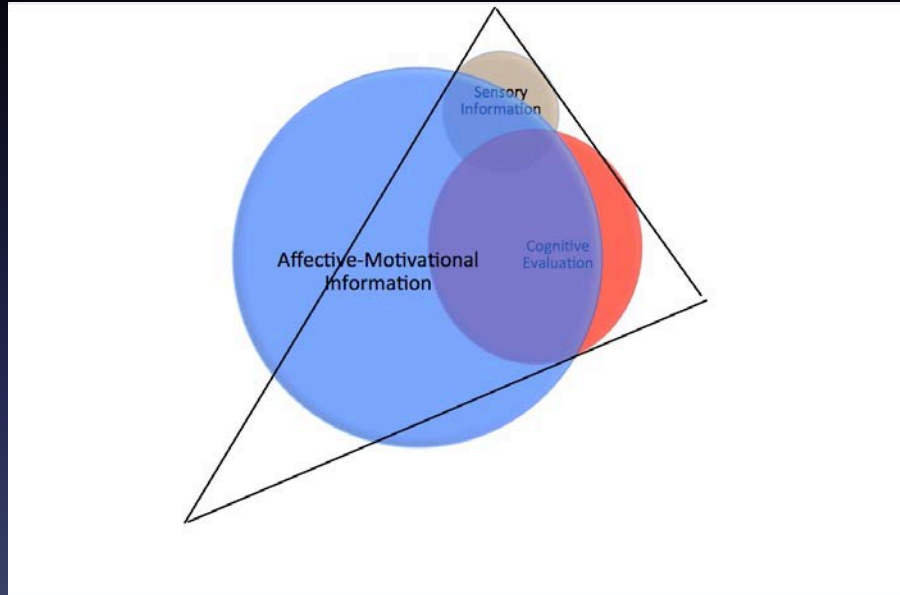
- Threat, Uncertainty, Anxiety?

Emotion/Meaning ("Oxygen")

- Fear, Loss/Harm Meaning?



'Normal Spine'



Scoliosis

Sensation/Transmission ("Fuel")

- 'Tissue Issues' or No?

Cognition/Attention ("Heat")

- Threat, Uncertainty, Anxiety?

Emotion/Meaning ("Oxygen")

- Fear, Loss/Harm Meaning?



Scoliosis

No Pain



Why This Matters

What We Assume About Pain



What ALL Pain Actually Is



"Your Pain Is Coming From..."

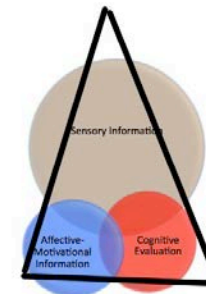
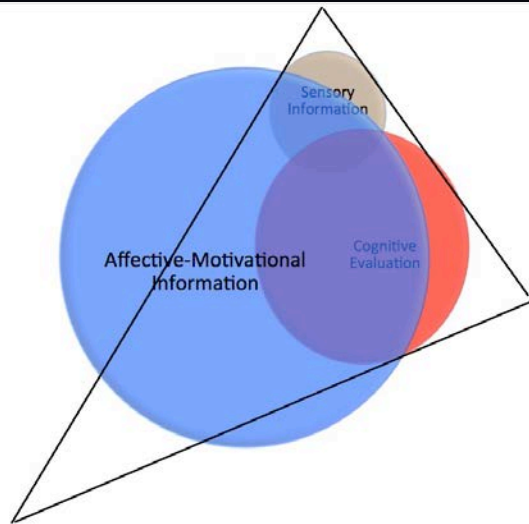
How We 'Treat' Pain...

- Increased MRI's 300%
- Increased Procedures 130-700+%
- Increased Surgeries 300+%
- Increased Opioids 690+
- Structure-Focused Therapy
- Body-Focused Messaging

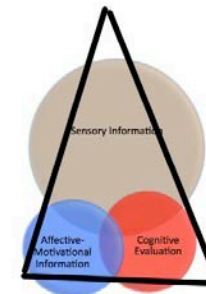
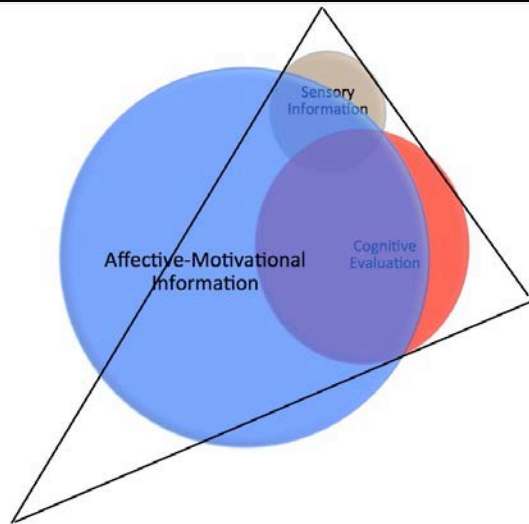
Focused Here



Different 'Fires' May Have Different *Primary* Treatment...



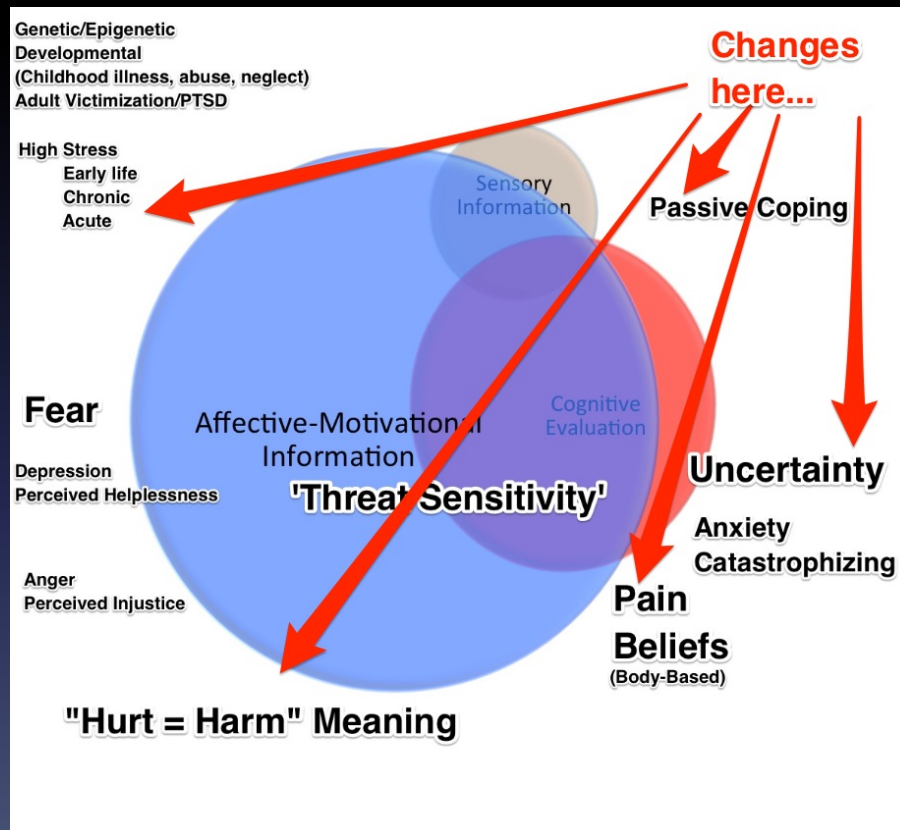
...But Multiple Places To Intervene...



Most Important...Often Not Appreciated

- Genetic/Epigenetic
- Developmental
 - Childhood Illness, Abuse, Neglect
- Adult Victimization/PTSD
- High Stress
 - Early Life
 - Chronic **Stress**
 - Acute **Stressors**
- Anxiety
- Depression
- **Pain Beliefs & Expectations**
- **Maladaptive Coping**
 - Pain Intensity
 - Nonorganic Signs
 - High Baseline Impairment

But Where Improvement Seen...

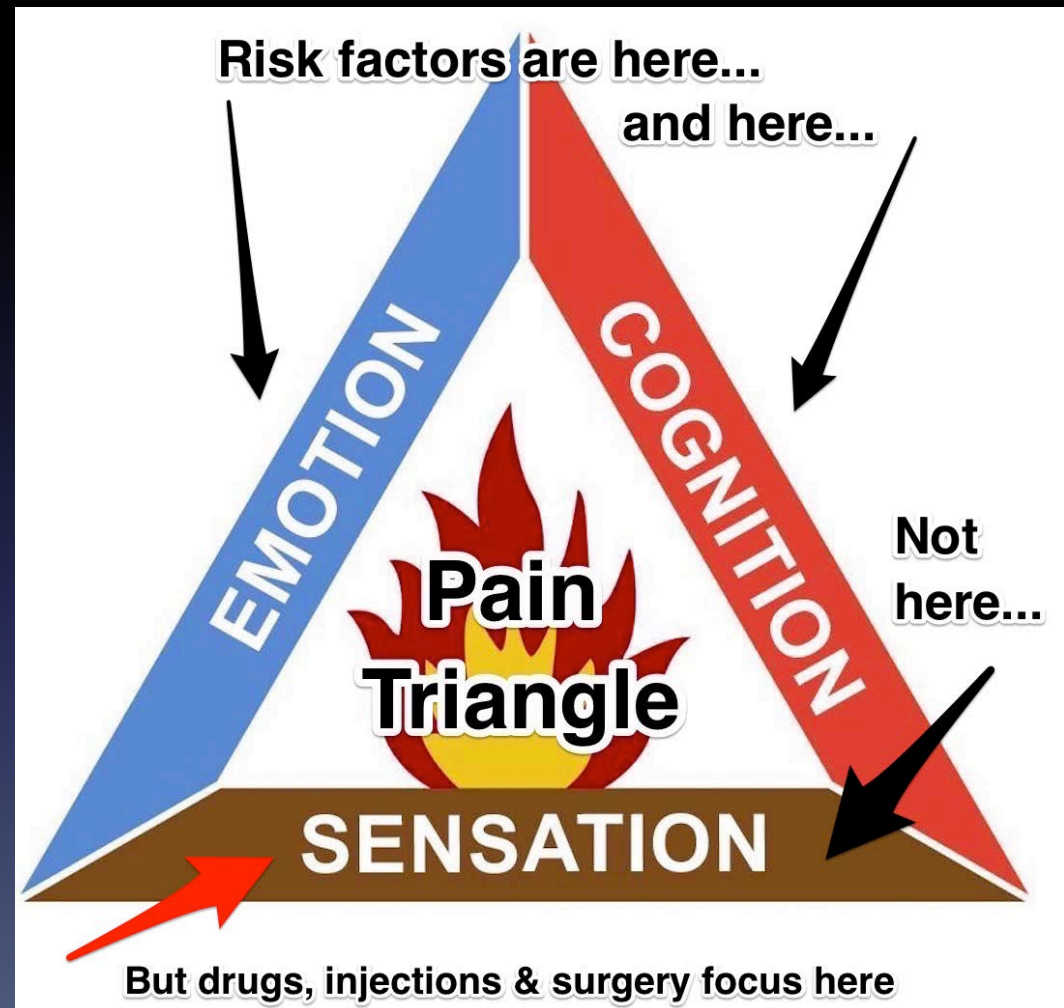


Changes In:

- Pain Beliefs
 - Coping Strategies
 - Passive → Active
 - Pain Self-Efficacy
 - Psychological Distress
- (Even With 'Physical' Modalities)

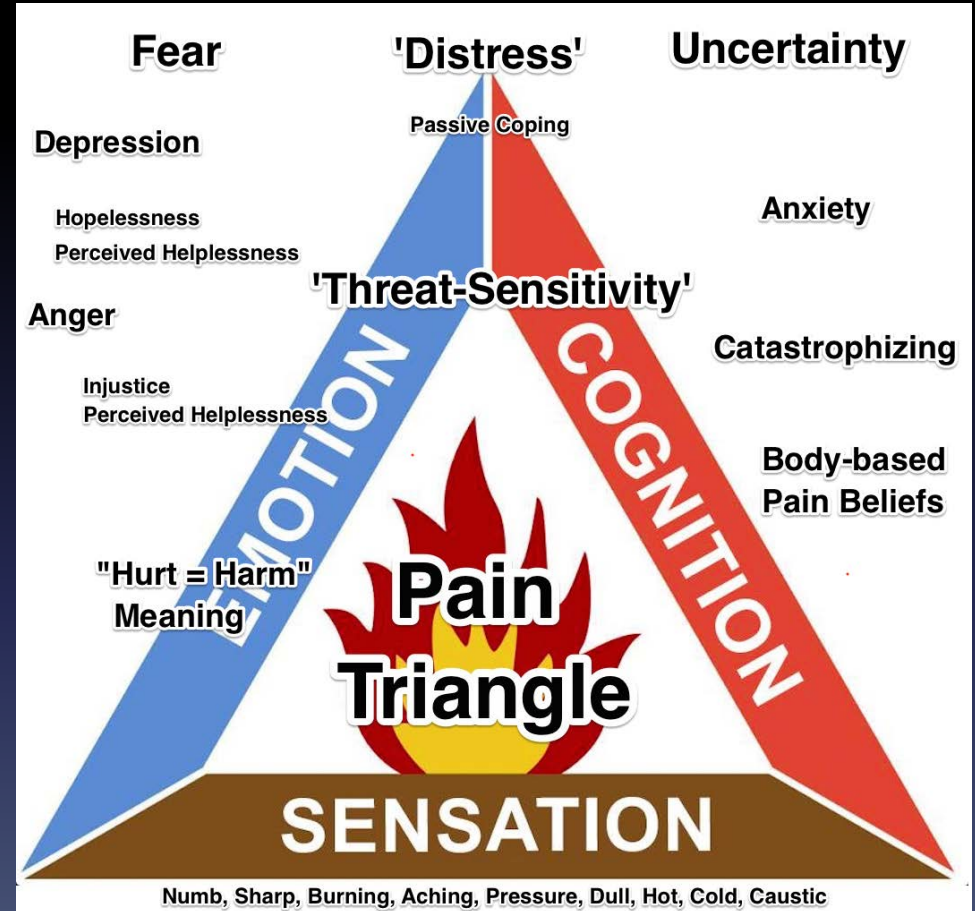
The Challenges of Pain

- Pain Constructed from 3 Elements
 - But Focus Is on 1.
- Medical Tx Limited
 - Rx. Are 'Fast'
 - Surgery & Injections are Profitable
- Misinformation, Fear & False Beliefs



The Goals

- Understand Pain
- Question Beliefs
- *Think Differently*
(Like A Firefighter)



The Key Concepts...

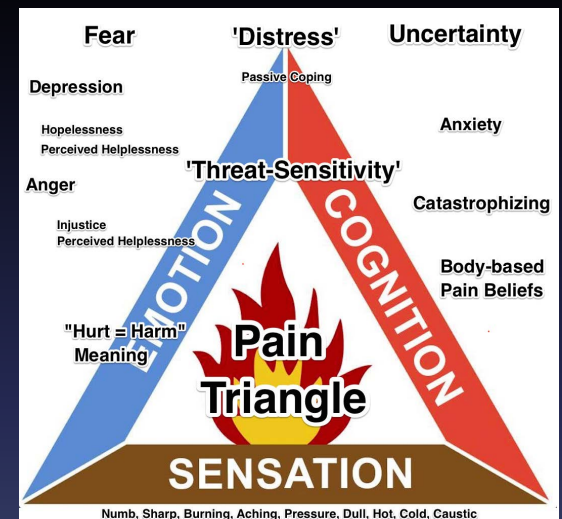
- **Key Concept #1:** The Purpose of Pain Is Protection,

↑Danger (not Damage) ↑Pain

- **Key Concept #2:** Pain Is Constructed, It Does Not “Come From...”

Requires Three Dimensions To Construct (Not One)

- **Key Concept #3:** Understand Pain & How It Is Constructed...Then ‘*Target*’ Your ‘Treatments’ (Like A Firefighter).

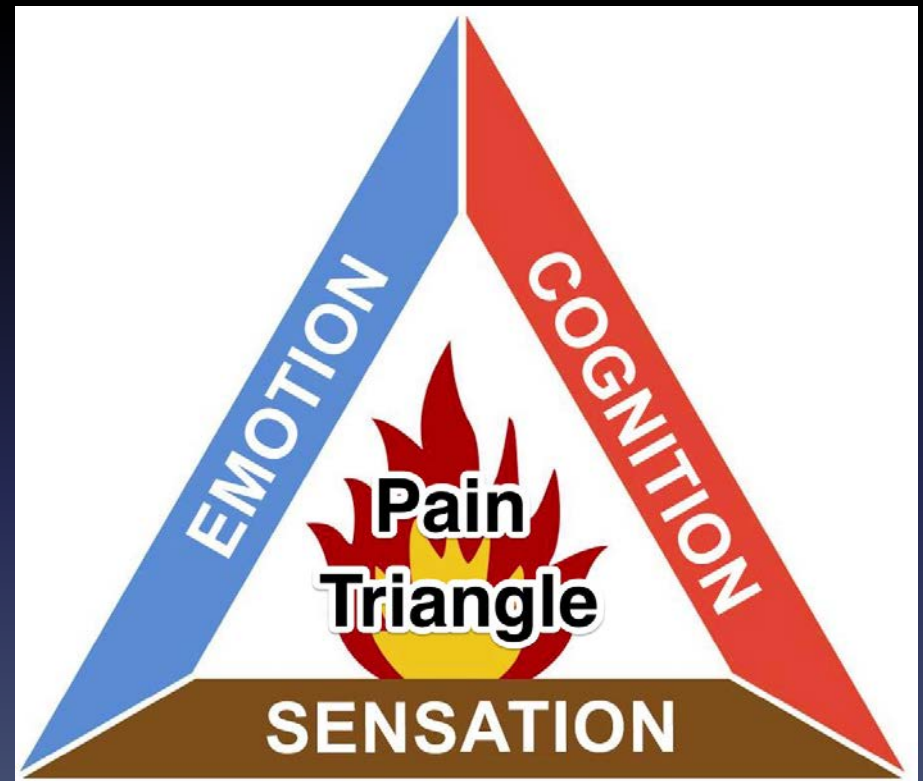


Questions?

Contact:

Kevin@StraightShotHealth.Com

(References Next)



References

Institute of Medicine (US) Committee on Advancing Pain Research, Care, and Education. Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. Washington (DC): National Academies Press (US); 2011. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK91497/doi:10.17226/13172>

Sehgal N, Colson J, Smith HS. Chronic pain treatment with opioid analgesics: benefits versus harms of long-term therapy. *Expert Rev Neurother*. 2013;13(11):1201-20.

Deyo RA, Mirza SK, Turner JA, Martin BI. Overtreating chronic back pain: time to back off?. *J Am Board Fam Med*. 2009;22(1):62-8.

Freburger JK, Holmes GM, Agans RP, et al. The rising prevalence of chronic low back pain. *Arch Intern Med*. 2009;169(3):251-8.

O'Neill CW. Commentary: Diagnostic tests for chronic low back pain--a dismal science. *Spine J*. 2013;13(2):113-5.

Atluri S, Sudarshan G, Manchikanti L. Assessment of the trends in medical use and misuse of opioid analgesics from 2004 to 2011. *Pain Physician*. 2014;17(2):E119-28.

Mafi JN, McCarthy EP, Davis RB, Landon BE. Worsening trends in the management and treatment of back pain. *JAMA Intern Med*. 2013;173(17):1573-81.

Friedly J, Standaert C, Chan L. Epidemiology of spine care: the back pain dilemma. *Phys Med Rehabil Clin N Am*. 2010;21(4):659-77

Olsen Y, Daumit GL. Chronic pain and narcotics: a dilemma for primary care. *J Gen Intern Med*. 2002;17(3):238-40.

Fishman S, Berger L. *The War on Pain*. Harper Collins; 2001.

Brennan F. The US Congressional "Decade on Pain Control and Research" 2001-2011: A Review. *J Pain Palliat Care Pharmacother*. 2015;29(3):212-27.

J P Fisher et al. *BMJ* 1995;310:70 (Boot & Nail Image)

"Nail gun injury" Available at: <http://www.contractortalk.com/f14/forthcoming-nail-gun-injury-40719/>. Accessed May 18, 2016.

©Kevin Cuccaro, D.O.

Brinjikji W, Luetmer PH, Comstock B, et al. Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. *AJNR Am J Neuroradiol*. 2015;36(4):811

Jarvik JJ, Hollingworth W, et al. The Longitudinal Assessment of Imaging and Disability of the Back (LAIDBack) Study. Baseline Data. *Spine* 2001;26:1156-1166

Suri P, Boyko EJ, Goldberg J, Forsberg CW, Jarvik JG. Longitudinal associations between incident lumbar spine MRI findings and chronic low back pain or radicular symptoms: retrospective analysis of data from the longitudinal assessment of imaging and disability of the back (LAIDBACK). *BMC Musculoskelet Disord*. 2014;15:152.

Jarvik JG, Hollingworth W, Heagerty PJ, Haynor DR, Boyko EJ, Deyo RA. Three-year incidence of low back pain in an initially asymptomatic cohort: clinical and imaging risk factors. *Spine*. 2005;30(13):1541-8

Kalichman L, Kim DH, Li L, Guermazi A, Hunter DJ. Computed tomography-evaluated features of spinal degeneration: prevalence, intercorrelation, and association with self-reported low back pain. *Spine J*. 2010;10(3):200-8

Carragee EJ, Alamin TF, Miller JL, Carragee JM. Discographic, MRI and psychosocial determinants of low back pain disability and remission: a prospective study in subjects with benign persistent back pain. *Spine J*. 2005;5(1):24-35.

Carragee E, Alamin T, Cheng I, Franklin T, Van den haak E, Hurwitz E. Are first-time episodes of serious LBP associated with new MRI findings?. *Spine J*. 2006;6(6):624-35.

Melzack R. From the gate to the neuromatrix. *Pain*. 1999;Suppl 6:S121-6.

Melzack R, Katz J. *Pain*. Wiley Interdiscip Rev Cogn Sci. 2013;4(1):1-15.

Wikipedia, the free encyclopedia. Fire triangle. Available at: https://en.wikipedia.org/wiki/Fire_triangle. Accessed May 16, 2015].

Wall P, McMahon S. The relationship of perceived pain to afferent nerve impulses. *Trends Neurosci.* 9(6), 254–255 (1986).

Beecher HK. Pain in Men Wounded in Battle. *Ann Surg.* 1946;123(1):96-105

Carlino E, Frisaldi E, Benedetti F. Pain and the context. *Nat Rev Rheumatol.* 2014;10(6):348-55.

Arntz A, Claassens L. The meaning of pain influences its experienced intensity. *Pain.* 2004;109(1-2):20-5.

Moseley GL, Arntz A. The context of a noxious stimulus affects the pain it evokes. *Pain.* 2007;133(1-3):64-71.

Helsen K, Vlaeyen JW, Goubert L. Indirect acquisition of pain-related fear: an experimental study of observational learning using coloured cold metal bars. *PLoS ONE.* 2015;10(3):e0117236.

Pazzaglia C, Testani E, Giordano R, Padua L, Valeriani M. Expectation to feel more pain disrupts the habituation of laser-pain rating and laser-evoked potential amplitudes. *Neuroscience.* 2016;333:244-51.

Blasini M, Corsi N, Klinger R, Colloca L. Nocebo and pain: An overview of the psychoneurobiological mechanisms. *Pain Rep.* 2017;2(2)

Urquhart DM, Bell RJ, Cicuttini FM, Cui J, Forbes A, Davis SR. Negative beliefs about low back pain are associated with high pain intensity and high level disability in community-based women. *BMC Musculoskelet Disord.* 2008;9:148.

Hurter S, Paloyelis Y, Williams AC, Fotopoulou A. Partners' empathy increases pain ratings: effects of perceived empathy and attachment style on pain report and display. *J Pain.* 2014;15(9):934-44.

Karos K, Meulders A, Vlaeyen JW. Threatening social context facilitates pain-related fear learning. *J Pain.* 2015;16(3):214-25.

Lee H, Hübscher M, Moseley GL, et al. How does pain lead to disability? A systematic review and meta-analysis of mediation studies in people with back and neck pain. *Pain.* 2015;156(6):988-97.

De rooij A, Van der leeden M, Roorda LD, Steultjens MP, Dekker J. Predictors of outcome of multidisciplinary treatment in chronic widespread pain: an observational study. *BMC Musculoskelet Disord.* 2013;14:133.

Jackson T, Wang Y, Wang Y, Fan H. Self-efficacy and chronic pain outcomes: a meta-analytic review. *J Pain.* 2014;15(8):800-14.