



Pain-Proof:

Building Resilience To Chronic Pain

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Please email info@DrKachko.com with any questions.



A Bit About Me



Why This Conversation Matters



100 Million
Americans
Struggle with
Chronic Pain

What does “Pain-Proof” Mean?



Curious Findings From History



Curious Findings Today



Curious **Only**
in a Purely
Structural
Model



An Incomplete Picture

In people without pain...

Image Finding	Age 20	Age 30	Age 40	Age 50	Age 60	Age 70	Age 80
Disk Degeneration (%)	37	52	68	80	88	93	96
Disk Bulge (%)	30	40	50	60	69	77	84
Spondylolesthesis (%)	3	5	8	14	23	35	50

AJNR Am J Neuroradiol. 2015 Apr;36(4):811-6. doi: 10.3174/ajnr.A4173. Epub 2014 Nov 27.
Systematic literature review of imaging features of spinal degeneration in asymptomatic populations.

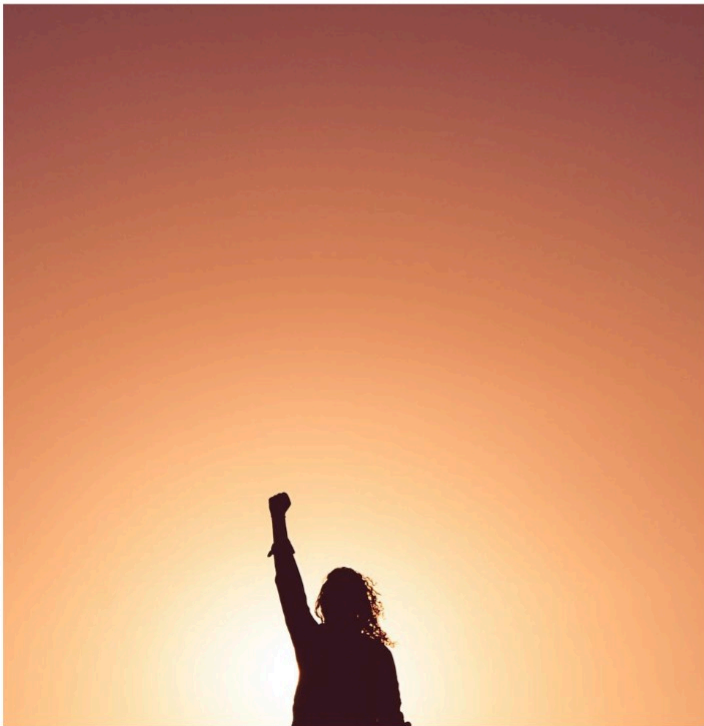
We've Inherited A Fear-Based Model of Care



- 1 A “broken” body that needs to be fixed**
The body is inherently fragile
- 2 Giving up our power and agency**
This fix must come from our doctors only
- 3 We can't pain-proof ourselves**
How we treat our bodies is not as important as medication or surgery

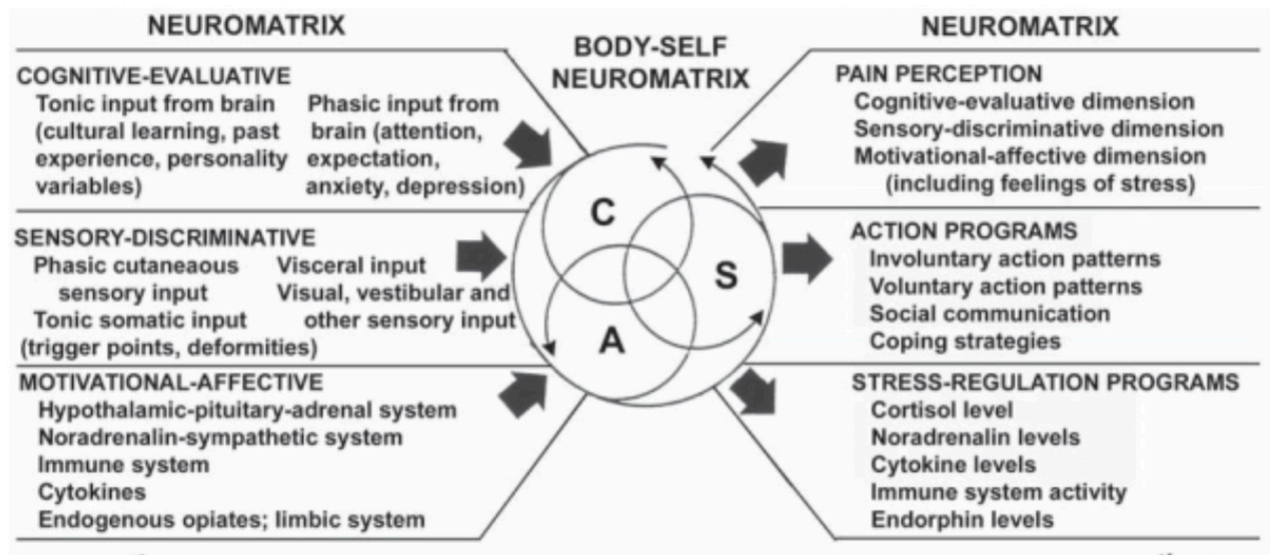
The New Paradigm Is Empowered

How We Talk To Our Patients Matters



- 1 Must treat you as a person**
Not “just” a patient
- 2 Must be comprehensive**
Considering how body AND brain perceive pain
- 3 Must involve you**
You are in control of your future
- 4 Must acknowledge what's possible**
Taking stock of what you are still able to do to help yourself
- 5 Must value your abilities**
Complete recovery from pain is not the *only* value
- 6 Must help you feel supported and understood**
You are not alone

The Not-So-New Model: The Neuromatrix



Proposed by Ronald Melzack in 1990
(25 years after Melzack and Wall's famous Gate Control theory)

Chronic Pain: Psychosocial Determinants



Alarm



Danger Signals



Disembodied Affect

Chronic Pain: Psychosocial Healing



Re-Set the Alarm



Re-Train what is feared



Re-Discover the Body

Study: Signals from the outside world

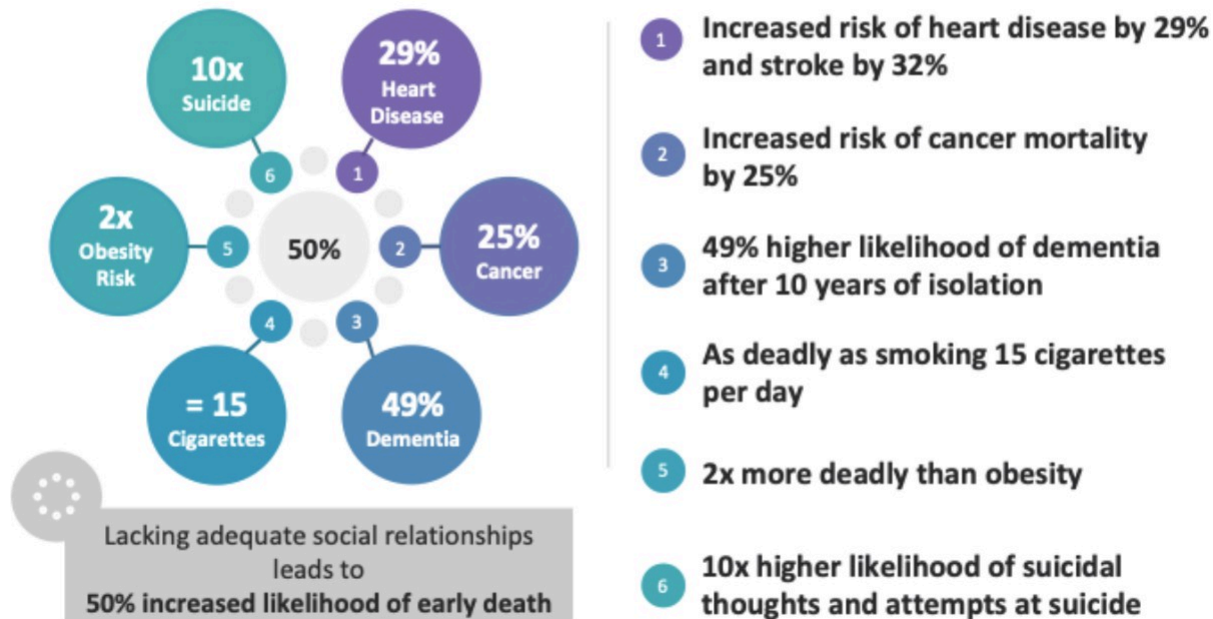


Context Matters

- The environment within which we experience our pain is very important

A Growing Public Health Concern

Social Isolation and Loneliness are among the largest threats to public health and safety of our time



Isolation: A Growing Epidemic

Our evolutionary need for human connection is as strong as
the need for food and water

Perceived Isolation



We are tribal by nature.
Yet, in this quickly globalizing world we're feeling more alone than ever.

Social Pain and Physical Pain



fMRI studies show social isolation causes increased activity in the dorsal anterior cingulate cortex, ventral prefrontal cortex and the anterior insula - *regions typically associated with physical pain perception*

PMID: 26678402, 19706472, 14551436, 20548058, 20679216, 25222636

Loneliness: An Evolutionary Context



Perceived safety and
Hyper-vigilance



Attention to positive and negative
stimuli



Quality > Quantity

Cacioppo JT, Cacioppo S, Boomsma DI. Evolutionary Mechanisms for Loneliness. Cognition & emotion. 2014;28(1):10.1080/02699931.2013.837379. doi:10.1080/02699931.2013.837379.



“Natural selection operates across generations, and it is a process that continues. The capacity for feeling loneliness, when viewed from an evolutionary perspective as an **adaptive biological capacity**, is not so much about a dysfunctional property of humankind that produces personal misery as it is about promoting an individual’s genetic legacy... If this reasoning is correct, then **loneliness may well be a polygenic trait subject to epigenetic influences.**”

JOHN CACIOPPO, PH.D. UNIVERSITY OF CHICAGO
LEADING SOCIAL ISOLATION RESEARCHER

Loneliness Genes

Heritability: 40-55%

CRHR1

rs1876831 / rs242938 - regulates diverse physiological processes including stress, reproduction, immune response and obesity

SLC6A4 (5-HTTLPR)

Long allele (L) may be associated with lower levels of serotonin, Short Allele (S) may be associated with depression if sufficient stress exists

DRD2 (the TaqIA polymorphism)

rs1800497 - associated with a reduced number of dopamine binding sites in the brain, and is deeply tied with reward response

OXTR

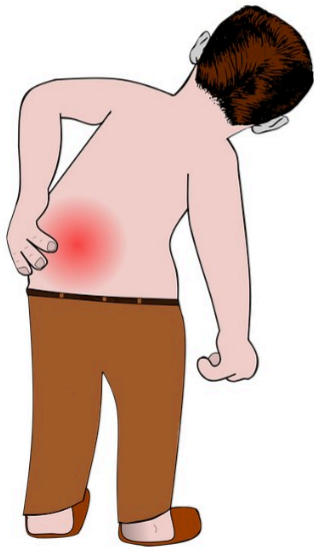
rs53576 - G allele are more empathetic, feel less lonely, employ more sensitive parenting techniques

Acute vs Chronic Pain

Understanding the difference matters

	Acute Pain	Chronic Pain
Length	< 12 weeks	> 12 weeks
Meaning	Danger/Alert	Body continues to sense danger
Pain medication	Useful	Often not helpful
Preferred Activity Level	Reduced	Return to proper activity with proper pacing
Tissue Healing	On-going	Likely has taken place
Primary Goal	Pain Relief	Improved Quality of life
Optimal Approach	Reduce pain sensation, inflammation, and swelling	Complete Biopsychosocial approach

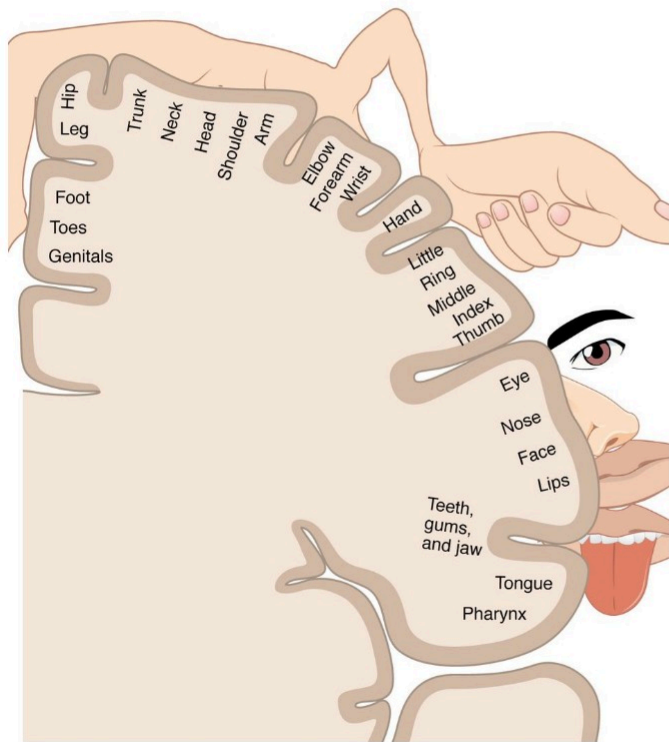
Pain Explained: Patient Language



Pain felt in the body is *experienced* in the brain (*Bottom-Up Approach*)

But pain is never “only” in the brain

Pain Explained: Patient Language



The brain sends signals down to the body to turn off pain (*Top-Down Approach*)

With chronic pain, these signals are not as effective

Chronic Overlapping Pain Conditions

“Theory of the Unity of Disease”?

- 1 Chronic Lower Back Pain
- 2 Migraine Headache
- 3 Endometriosis
- 4 Chronic Tension Headache
- 5 Fibromyalgia
- 6 Irritable Bowel Syndrome
- 7 Vulvodynia
- 8 TMJ
- 9 Chronic Fatigue Syndrome
- 10 Interstitial Cystitis

“Fibromyalgianess”

- **ACR Diagnostic criteria for FM**

1. Number of painful body areas among 19 total
2. + Symptom Severity Index in the domains of Fatigue, Waking Energy, and Cognitive Symptoms (Rated 0-3)
3. + Quantity of “Other” Somatic Symptoms (ie Muscle Weakness, Dry Mouth, Rash, Wheezing etc.) (Rated 0-3)

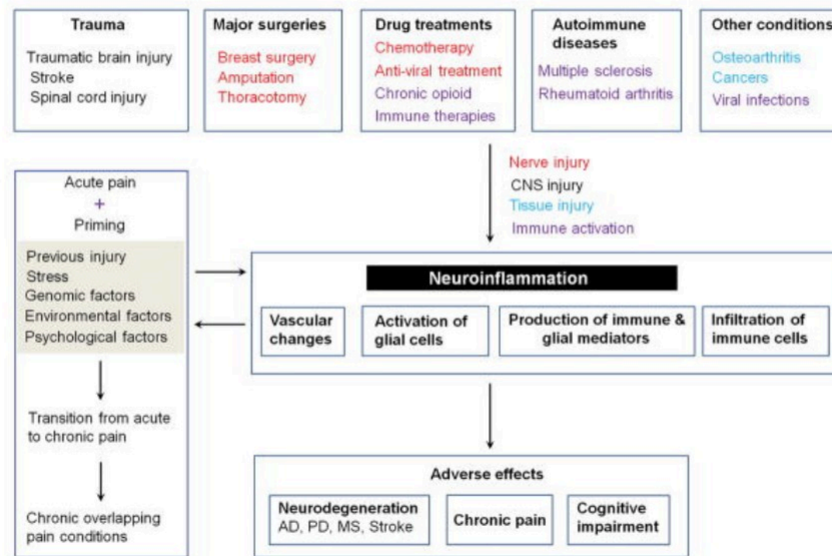
- **Direct Clinical Implications**

- Criteria predictive of opioid consumption after hysterectomy (accounting for other factors predictive of intake after acute surgery)
- ***Increase of 7-mg oral morphine equivalents for every 1-point increase on the 31-point***
- PMID: 25768860

Wolfe F, Clauw DJ, Fitzcharles M-A, et al. The American College of Rheumatology preliminary diagnostic criteria for fibromyalgia and measurement of symptom severity. *Arthritis Care Res.* 2010;62(5):600-610.

Neuroinflammation and Central Sensitization

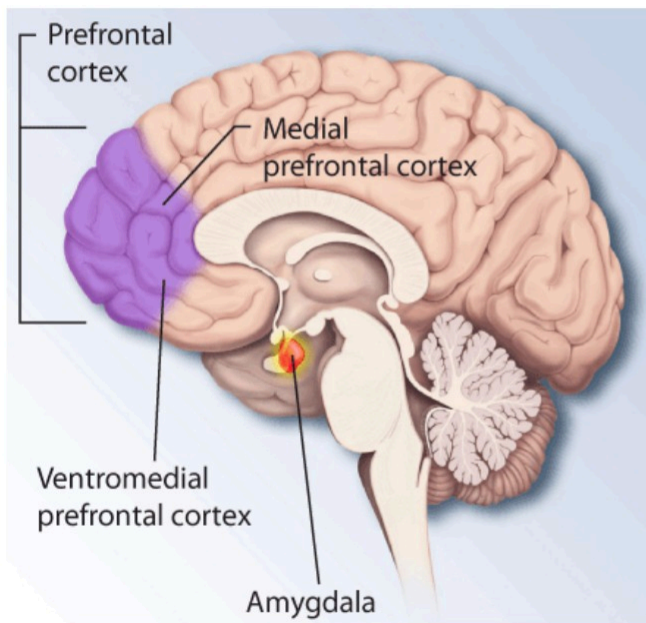
The Role of Microglia



Anesthesiology. 2018 Aug; 129(2): 343–366.

PMID: 29462012

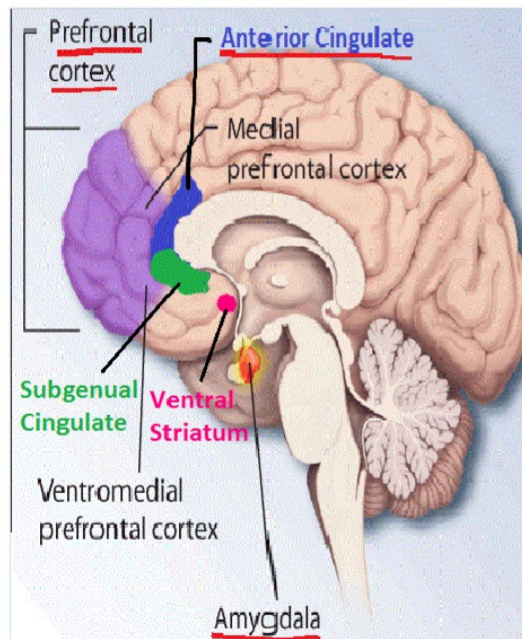
The Pre-Frontal Cortex: Top-Down Inhibition



- Chronic pain associated with gray matter loss in PFC
- Medial PFC is main source of cortical afferents to the PAG for modulation of pain
PAG is the primary control center for descending pain modulation and pain relief
- Can induce pain chronification via its corticostriatal projection, possibly depending on the level of dopamine receptor activation (or lack of) in the ventral tegmental area-nucleus accumbens reward pathway

Role of the Prefrontal Cortex in Pain Processing. *Molecular Neurobiology* (2019) 56:1137–1166

Anterior Cingulate Cortex: Pain-Related Suffering



- Central role in the **affective** components of pain as well as depression and anxiety
- **Highly plastic** and susceptible to “Long-Term Potentiation” via NMDA Receptor activity
- **Key:** Role in conflict monitoring and error detection

PMID: 26878750, 25433903, 27307118, 15725491

Neurological: Brain-Based Pain Assessment



Frontal Lobes



Cerebellum



Vestibular System

Pain Genetics - High Heritability

SLC6A4

Involved in serotonin transport and correlated to anxiety, depression, loneliness and chronic pain (especially FM)

(PMID: 23545734, 23280346)

COMT

Implications for things like mood, insomnia ADD/ADHD, Bipolar disorder, medication processing, and likelihood of successful placebo effect.

(PMID: 25532715)

OPRM1

Presence of the “G” variant of this gene explains up to 4.7% of the difference in pain intensity for men with low back pain followed for 5 years

(PMID: 28471875)

KCNS1

Correlated to higher post-surgical pain scores and increased pain sensitivity overall

(PMID: 31129315)

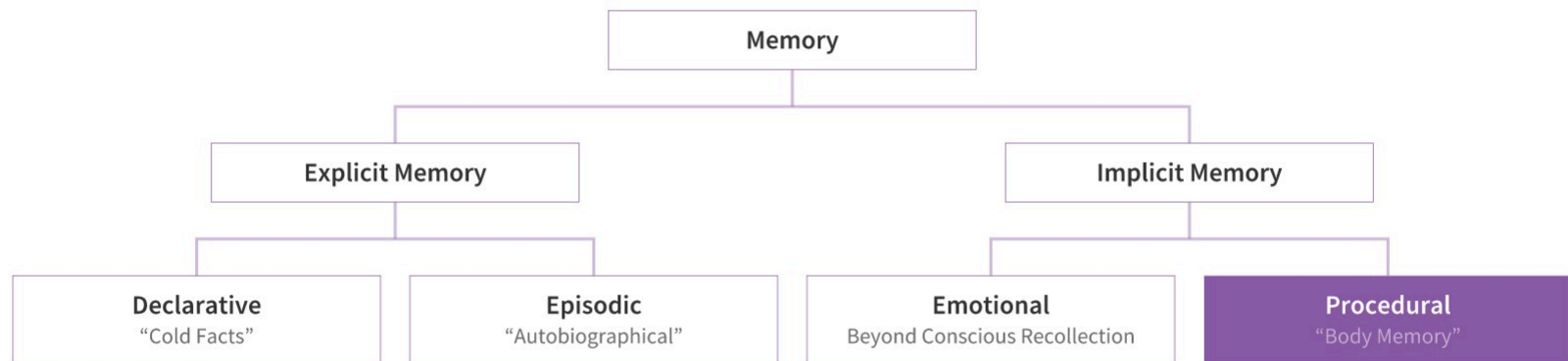
Pain, Safety, and ACEs



- **1958 British Birth Cohort Study: higher levels of traumatic stress at age 7 increased multiple measures of chronic pain at age 45**
PMID: 19304391
- **Statistically significant associations between fibromyalgia and all six examined childhood adversities after adjustment for gender and age**
PMID: 28712419
- **Increased autonomic dysregulation**
PMID: 31060644

Body Memory and False-Positive Bias

Based on the teachings of Peter A. Levine, PhD, "Trauma and Memory"



“But what if it IS a saber tooth tiger...”

Is there a “pain personality”?

People who tend to pain
chronification and OUD often share
the following characteristics:



Low self-efficacy



“Catastrophizing”



Hyper-vigilance

Is there a “Pain-Proof” personality?

Our role as providers who aim to **directly reduce pain:**



High Self-Trust



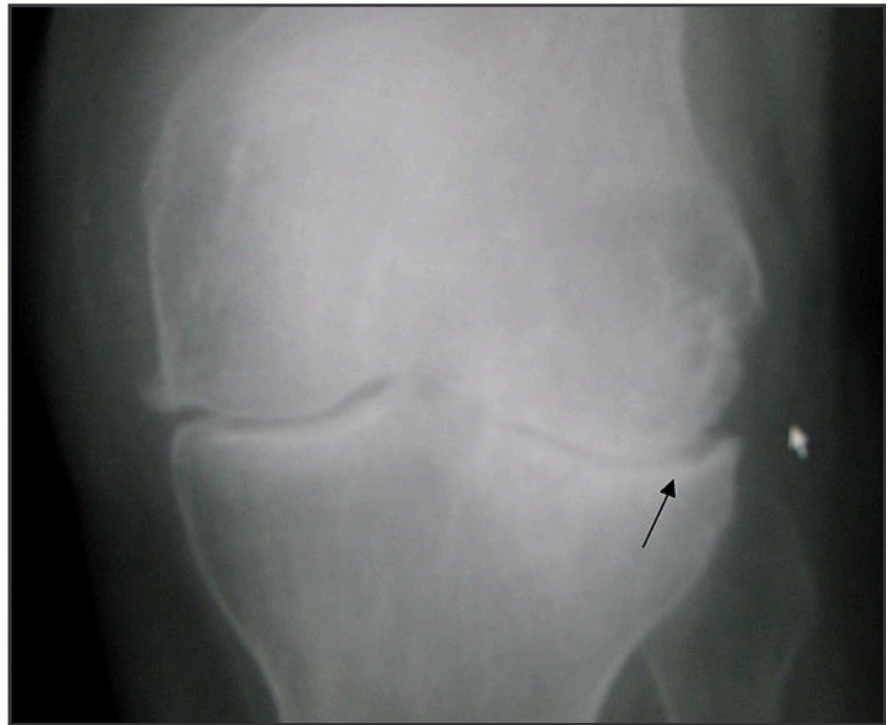
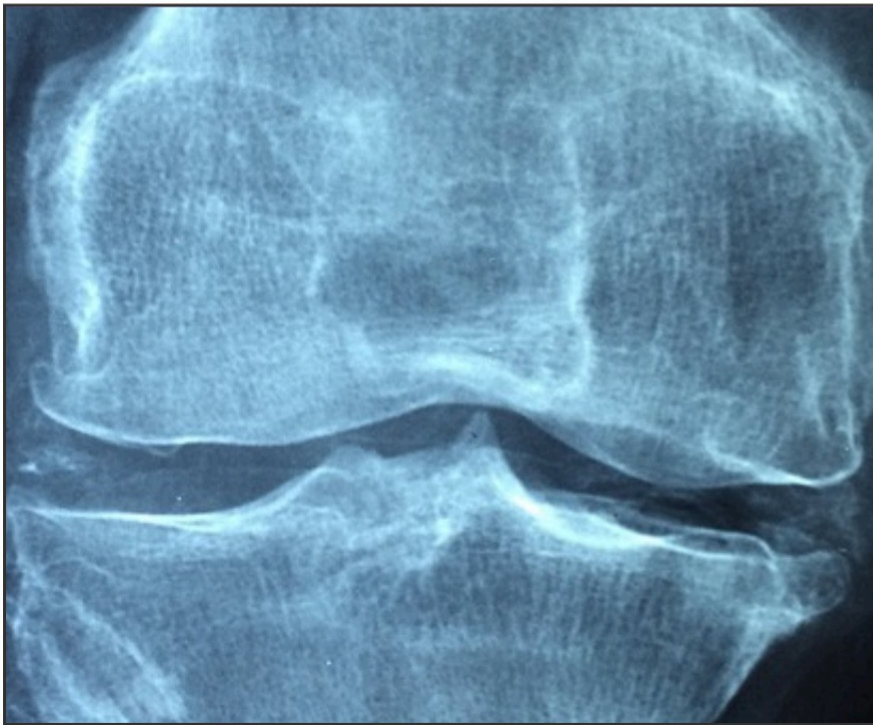
**Clear long-term
understanding**



Feeling of safety

How Do We Help Our Patients Become “Pain-Proof”?

Therapeutic Considerations



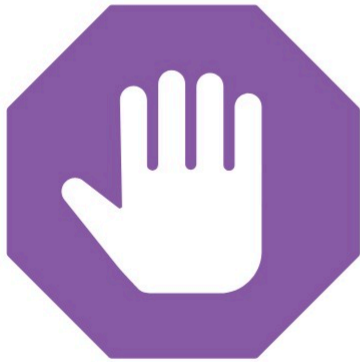
The Pain Paradox

Two Key Takeaways



- 1 Wishing pain away actually makes it worse
- 2 A Focus on Quality of Life Reduces Pain

Inducing Neuroplastic Changes



- 1 Acknowledge the ancient alarm system in our brains
- 2 Literally change our brains by sending that system new signals

Clinical Hypnotherapy and “Competitive Plasticity”



A New Clinical Toolkit



- **Foundational Recommendations**
- **Condition-Specific Recommendations**

Osteoarthritis

Targeted Objective: Guide our patients to return to a feeling of *safety* around movement, thought, and emotion

Pain-Proof Toolkit



- **Nutrition**

- Specific Comprehensive “Diets”
- Targeted Nutrients
- Proper Hydration

- **Mind-Body Medicine**

- Self-Expression
- Mindfulness Techniques
- Brain Training
- Clinical Hypnotherapy
- Biofeedback

- **Gut Assessment and Repair**

- Microbiome Repair
- Inflammation
- Immune Function
- Neurotransmitter Balance
- Hyper-permeability

- **Brain-Based Movement Therapies**

- Graded Exercise
- Safety Re-Training
- Posture and Gait Assessment
- Ergonomics

Pain-Proof Toolkit



- **Brain-Based Manual Therapies**

Acupuncture and Trigger Point Therapy

Soft-Tissue Work

Taping

Cupping

Gua Sha

Percussion Tools

Hydrotherapy

- **Electric Stimulation**

Electroacupuncture

TENS and PEMF

- **Botanical Medicine**

Systemic

Topical

- **Genomic and Epigenetic Support**

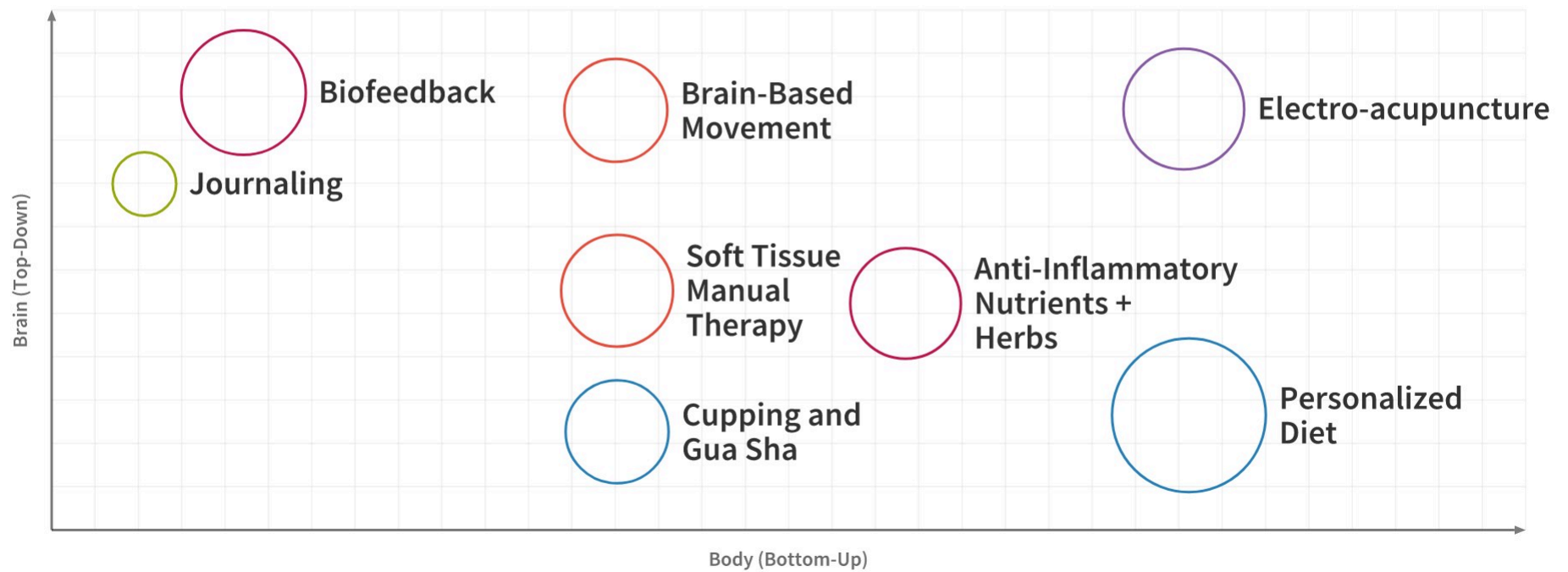
- **Immune System Re-Training**

TH1 / TH2 Balance

- **Sleep Support**

- **Environmental Medicine**

Condition Case Example: Osteoarthritis



Pain Neuroscience Education (PNE)



2016 Meta-analysis: 13 Studies

- Reduced pain and improving patient knowledge of pain
- Improved function and lowered disability
- Reduced psychosocial factors
- Enhanced movement
- Minimized healthcare utilization

PMID: 2731541

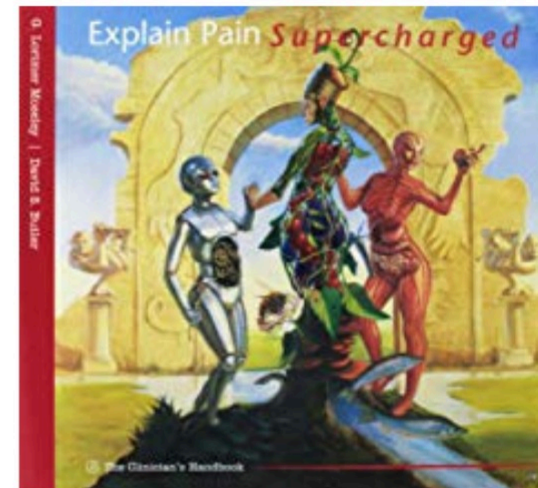
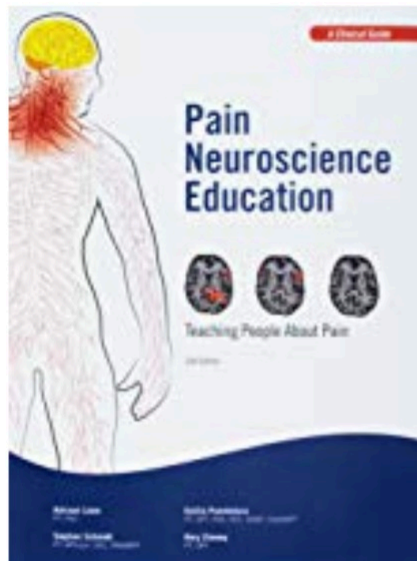
Pain Neuroscience Education for Low Back Pain



Gold Standard for Chronic Pain Conditions

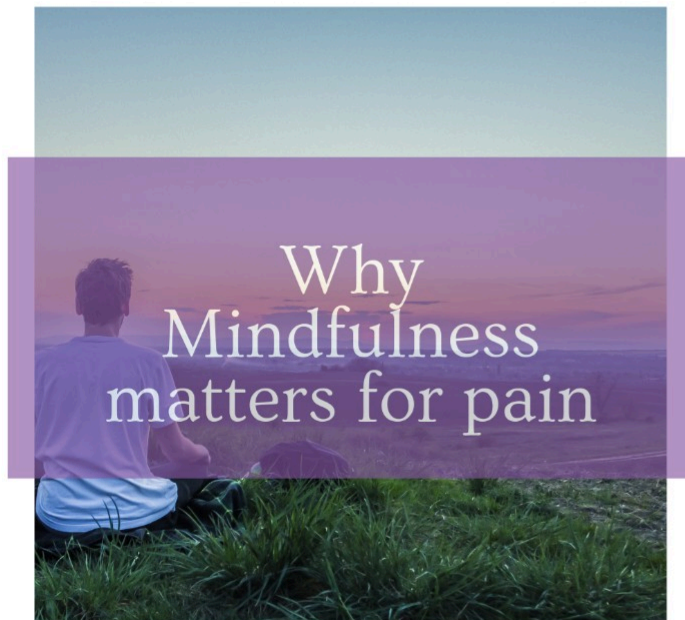


PNE: Two resources for practitioners



Low | Pain Neuroscience Education: Teaching People About Pain
Moseley | Explain Pain Supercharged

Mind-Body Connection



Our “Default Mode” is always on, **unless we learn to re-train it**

Re-Aligning Value Systems: ACT

[Clin J Pain](#), 2017 Jun;33(6):552-568. doi: 10.1097/AJP.0000000000000425.

Acceptance and Commitment Therapy (ACT) for Chronic Pain: A Systematic Review and Meta-Analyses.

Hughes LS¹, Clark J, Colclough JA, Dale E, McMillan D.

⊕ Author information

Abstract

OBJECTIVES: Chronic pain places a burden on individuals and the economy. Although there is evidence for the effectiveness of cognitive-behavior therapy, it is recognized that the effects are limited. Acceptance and Commitment Therapy (ACT), which aims to increase valued action in the presence of pain, has been suggested as an alternative approach. The objective of this review was to determine the clinical effectiveness of ACT for chronic pain in adults when compared with control conditions and other active treatments.

METHODS: The searches of this systematic review were conducted in the Cochrane library, MEDLINE, EMBASE, CINAHL Plus (EBSCO), and PsycINFO. Grey literature, reference list, and reverse citation searches were also completed.

RESULTS: Eleven trials were included. ACT was favored over controls (no alternative intervention or treatment as usual). Significant, medium to large effect sizes were found for measures of pain acceptance and psychological flexibility, which are typically considered processes of ACT. Significant small to medium effect sizes were found for measures of functioning, anxiety, and depression. Measures of pain intensity and quality of life were not significantly different than zero. Generally effect sizes were smaller at follow-up.

DISCUSSION: ACT was more clinically effective than controls on a number of outcomes. It is possible that methodological limitations, some of which are common to psychological trials, may have led to overestimated effects. Only a few studies compared ACT to active treatments and while the evidence is promising for ACT in the treatment of chronic pain, further methodologically robust trials are required.



**Reaching
toward our joy**



**Remembering
how it felt**

Mindfulness Practice: Clinical Utility

Ann Behav Med. 2017 Apr;51(2):199-213. doi: 10.1007/s12160-016-9844-2.

Mindfulness Meditation for Chronic Pain: Systematic Review and Meta-analysis.

Hilton L¹, Hempel S², Ewing BA², Apaydin E², Xenakis L², Newberry S², Colaiaco B², Maher AR², Shanman RM², Sorbero ME², Maglione MA².

⊕ Author information

Abstract

BACKGROUND: Chronic pain patients increasingly seek treatment through mindfulness meditation.

PURPOSE: This study aims to synthesize evidence on efficacy and safety of mindfulness meditation interventions for the treatment of chronic pain in adults.

METHOD: We conducted a systematic review on randomized controlled trials (RCTs) with meta-analyses using the Hartung-Knapp-Sidik-Jonkman method for random-effects models. Quality of evidence was assessed using the GRADE approach. Outcomes included pain, depression, quality of life, and analgesic use.

RESULTS: Thirty-eight RCTs met inclusion criteria; seven reported on safety. We found low-quality evidence that mindfulness meditation is associated with a small decrease in pain compared with all types of controls in 30 RCTs. Statistically significant effects were also found for depression symptoms and quality of life.

CONCLUSIONS: While mindfulness meditation improves pain and depression symptoms and quality of life, additional well-designed, rigorous, and large-scale RCTs are needed to decisively provide estimates of the efficacy of mindfulness meditation for chronic pain.

KEYWORDS: Chronic pain; Meditation; Mindfulness; Systematic review

Sleep As Medicine



- **Between 67% and 88% of people who deal with long-term pain also have trouble sleeping well**

PMID: 31207606

- **Impacted by sleep**
 - opioid processing
 - neurotransmitter production (like serotonin)
 - immune function
 - endocannabinoid systems
 - hypothalamus-pituitary-adrenal axis

Sleep As Medicine: Key Factors



- Regularity
- Light Exposure
- Temperature
- Coffee/Alcohol/Fluids
- Stress

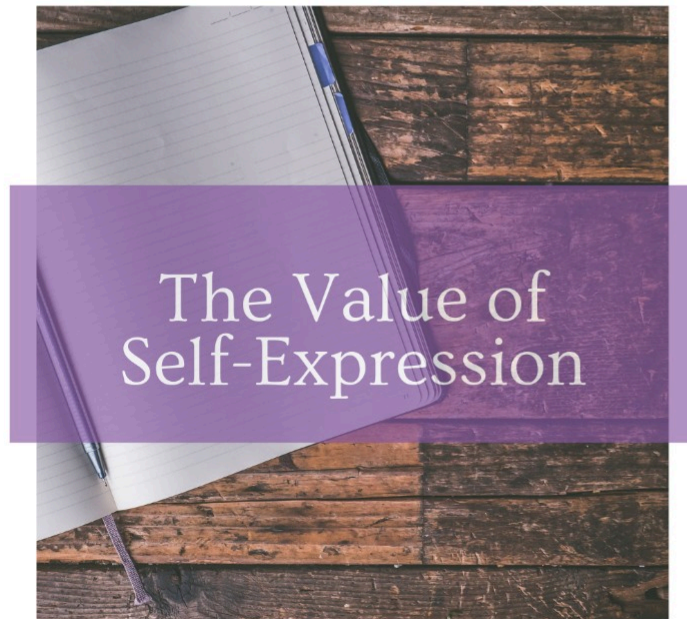
The Value of Self-Management



- **6 Week Online Program with 305 Patients**
- **Reduced:**
 - Pain Severity
 - Pain Interference
 - Pain-induced fear
 - Pain-disability
 - Emotional strain including anxiety, depression, stress

A randomized controlled evaluation of an online chronic pain self management program. Pain . 2012 February ; 153(2): 319-330. doi:10.1016/j.pain.2011.10.025.

Self-Expression



- Higher levels of childhood trauma increase risk of chronic pain

PMID: 19304391

- **Study:** group-based Emotional Awareness and Expression Therapy (EAET)

- **Result:** More pain reduction than the Fibromyalgia education group and similar improvements with the Cognitive Behavioral Therapy group, except more people in the EAET group had at least 50% pain reduction than in the CBT group

PMID: 28796118

Kinesiophobia Contributes to Pain Chronification

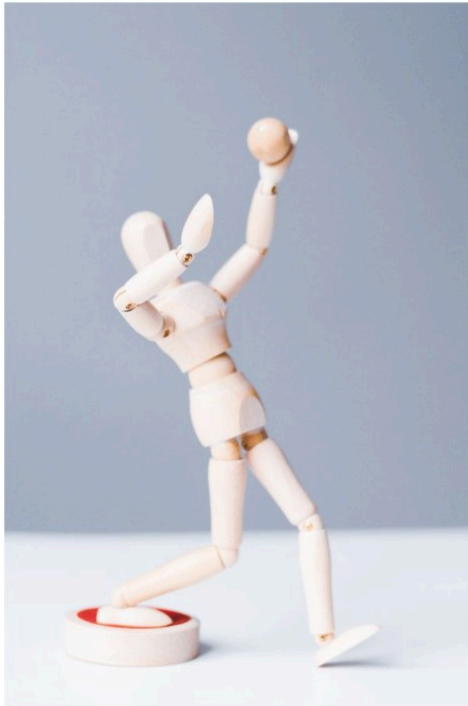


Is it safe to exercise?

Proper pacing is essential:

**Find sustainable set-point, Reduce to 80%,
Increase by 5% each week**

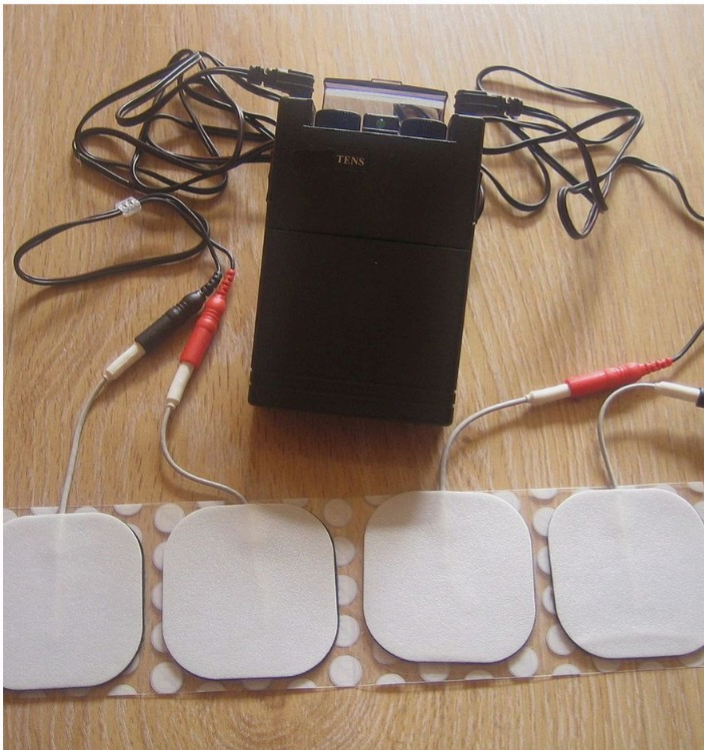
Posture and Proper Ergonomics



How we move impacts how we feel:

- Sit
- Stand
- Walk
- Work
- Sleep

Electric Stimulation: TENS and PEMF



- **TENS Study: Treatment of chronic low back pain with TENS demonstrated significant pain reduction. The application of TENS may lead to less pain medication usage**

PMID: 27042787

Acupuncture



- **Acupuncture has been shown to be effective for chronic pain beyond placebo and its effects have been shown to last**
PMID: 29198932
- **Also useful for other conditions that co-occur like anxiety, depression, and digestive issues**

Food As Medicine

2019 Review and meta-analysis of 23 studies confirms the importance of nutrition in chronic pain (PMID: 30294938)



- Anti-inflammatory
- Dairy Free
- Auto-Immune Paleo (AIP)
- Elimination Diet
- Gluten Free
- Therapeutic Fasting

Food As Medicine: Key Nutrients



- **Omega 3s**

- **Vitamin D**

- Deficient in people with chronic pain
- Especially important in dealing with inflammation and auto-immune conditions
- People with Vitamin D Receptor mutations have higher risk of RA

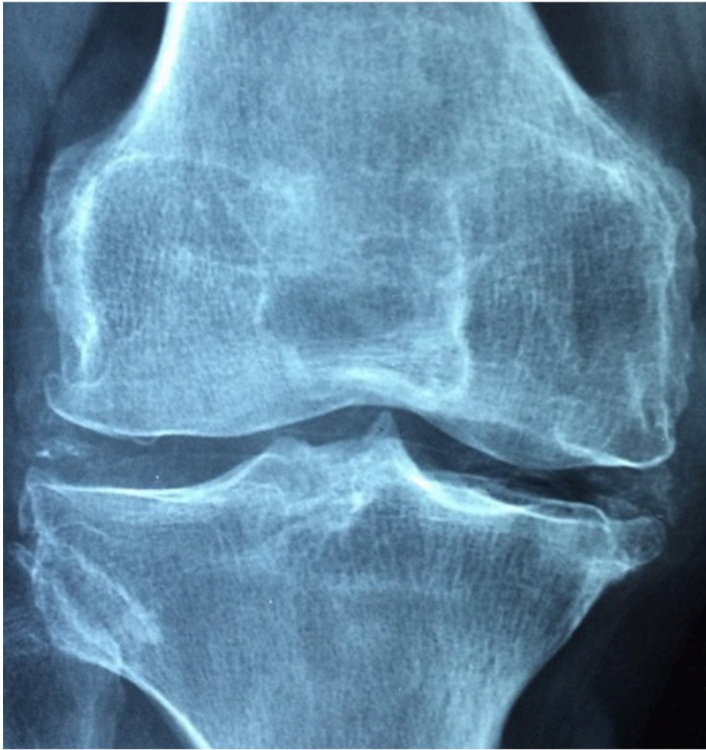
- **Magnesium**

- More than 300 essential metabolic reactions
- Important for muscle relaxation

- **B Vitamins**

- Essential for neurotransmitter production

Weight Loss



- Weight loss reduces knee-joint loads : each pound of weight lost will result in a **four pound** reduction in the load exerted on the knee per step during daily activities

PMID: 15986358

Curcumin



- Chondroprotective, anti-inflammatory, anti-oxidative
- 1500 mg per day for 4 weeks resulted in a reduction in pain comparable to that with ibuprofen at 1200 mg per day
- Turmeric extracts experienced less abdominal pain or discomfort compared to those taking ibuprofen

Efficacy and safety of Curcuma domestica extracts compared with ibuprofen in patients with knee osteoarthritis: A multicenter study. Clinical Interventions in Aging 9, 451–458.

Omega 3s: EPA and DHA



- Anti-Inflammatory
- Both 1000mg and 2000mg proven to reduce pain and increase walking speed in **knee OA**

PMID: 26387397

Bromelain



- Bromelain(500 mg) as effective as diclofenac (100 mg) in 40 patients with knee OA after 16 weeks

PMID: 27470088

Avocado/Soybean “Unsaponifiables”



- Studies show as effective as NSAIDs and chondroitin sulfate in **knee OA**

PMID: 11578021

- Of interest, in addition to pain, ASU (Piascledine) was suggested to exert a **structure modifying effect in hip OA**

20% fewer patients who exhibited joint space loss in the ASU vs placebo group after 3 years

PMID: 23345601

Capsaicin (Red Pepper)



- 4-week crossover trial in female farmers with mild or moderate **knee OA**, 0.0125% capsaicin gel significantly reduced pain, stiffness and functional scores vs placebo.

Be aware of burning sensation possibility

PMID: 20973322

Boswellia (Frankincense)



- 333 mg Boswellia serrata extract (BSE) three times daily for 8 weeks experienced significantly decreased knee OA pain, increased knee flexion and increased walking distance

Most potent Boswellic Acids: 11-keto- β -boswellic acid (KBA) and 3-acetyl-11-keto- β -boswellic acid (AKBA)

PMID: 21479939

Glucosamine and Chondroitin



- Review and meta-analysis of 26 studies through May 2018 found that:

PMID: 29980200

- Chondroitin is effective in reducing pain
- Glucosamine is effective in reducing stiffness

Thank You! Questions?

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@InnerSourceHealth

