

# Chronic Pain Reconsidered: The Role of Neural Circuits in the Brain

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## Is pain a syndrome or a symptom?

### **Should we treat all pain the same?**

Fever gets symptomatic rx or specific antibiotic or antiviral treatment.

Should we treat metastatic cancer pain as we do fibromyalgia pain?

Should we treat RA pain as we do migraine pain?

Should we treat Crohn's as we do IBS?

Medically unexplained chronic pain is assumed to be structural by patients and many clinicians.

However, if no tissue damage is found, then what?

Are we willing to tell patients that their pain is “all in their heads”?

Chronic pain is assumed to be both biological and psychological; i.e., having both nociceptive inputs and central sensitization or amplification.

**Treatment is multidisciplinary.**

Yet this model is not particularly effective in reducing pain.

## Institute of Medicine Report

110 million Americans in chronic pain:

- Back pain: 30%
- Headaches: 15%
- Neck pain: 15%
- IBS: 10%,
- Facial pain: 5%
- CWS: 2–4%

Costs greater than for cancer, cardiovascular disease and diabetes combined;  
>\$600 billion/year.

IOM, <http://www.iom.edu/Reports/2011>.

## Trends in Low Back Pain (LBP) in the US

Rates of increase in Medicare costs (last decade):

- Epidural steroid injections – 629% increase
- Opioids for back pain – 423% increase
- Lumbar MRI – 307% increase
- Spinal fusion surgery – 220% increase
- Change in disability and pain – 25% increase

Deyo et. al. J Am Bd Fam Med 2009; 22: 62-68.

## Surgical Treatment for Chronic Non-specific LBP

Several studies have found no difference in long term outcomes between surgery and conservative forms of therapy, including physical therapy, observation and exercise.

There are no studies comparing surgery to sham surgery, unlike meniscal tear trials.

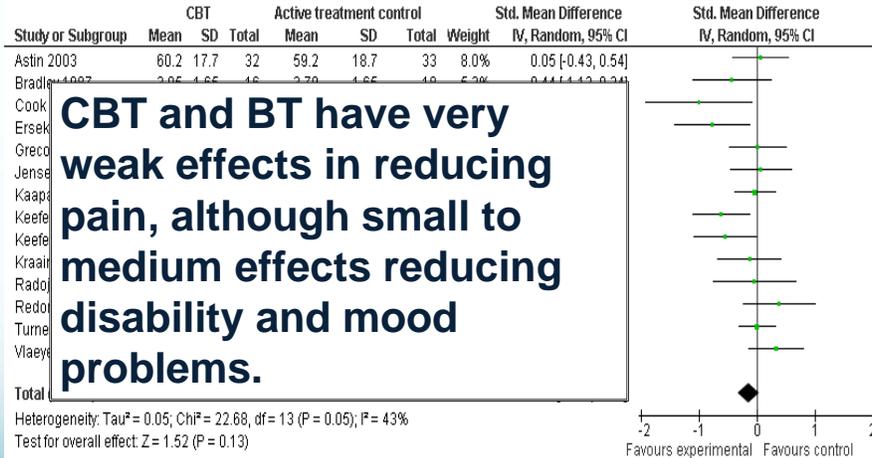
Peul, N Engl J Med 2007;356:2245-56. Brox, Spine 2003, 28:1913–1921.  
Osterman, Spine 2006, 31:2409–2414.

## Meta-analysis: review of epidural injections for back pain

Evidence on efficacy of epidural injections specifically for **spinal stenosis, lbp without radiculopathy, or failed back surgery syndrome** is sparse and inconclusive, but showed **no clear benefit**.

Chou, et. al., Spine, 2009, 34: 1078–1093. Friedly, et. al., N Engl J Med 2014; 371:11-21.

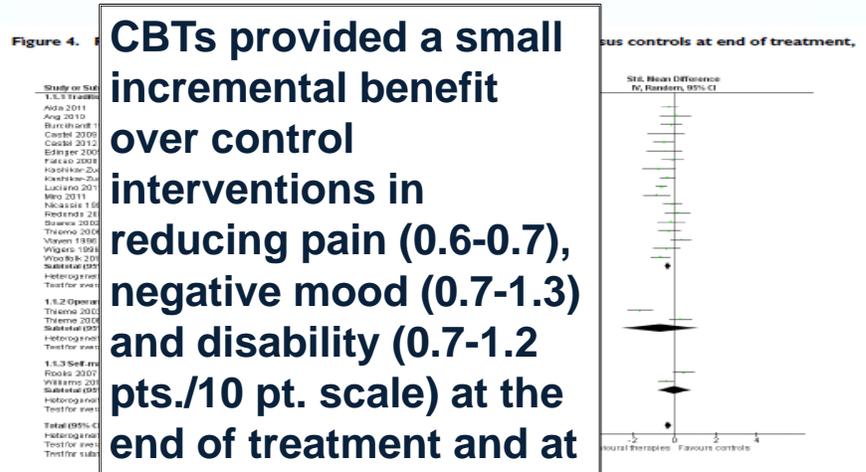
# Cochrane Review: Psychological Treatment for Chronic LBP



**CBT and BT have very weak effects in reducing pain, although small to medium effects reducing disability and mood problems.**

Eccleston et. al., Cochrane Library, April 15, 2009.  
 DOI: 10.1002/14651858.CD007407.pub2

# Cochrane Review: CBT for FM



## Mindfulness for lbp: meta-analysis

Compared with usual care, MBSR was associated with short-term improvements in pain intensity and physical functioning that were not sustained in the long term. Between-group differences in disability, mental health, pain acceptance, and mindfulness were not significant at short- or long-term follow-up. Compared with an active comparator, MBSR was not associated with significant differences in short- or long-term outcomes.

Annals of Internal Medicine, 2017;166:799-807.

## Limitations of current approaches

1. Lack of specific diagnosis of cause of pain
2. Methods geared towards coping or living with pain, not reducing it
3. Emotional processing is not actively encouraged

Lumley and Schubiner, Psychosomatic Medicine, 2019, 81:114-124.

# Predictive Coding

How Emotions are Made, Lisa Feldman Barrett, Mariner Books, 2018

Vision is constructed



## Canadian construction worker

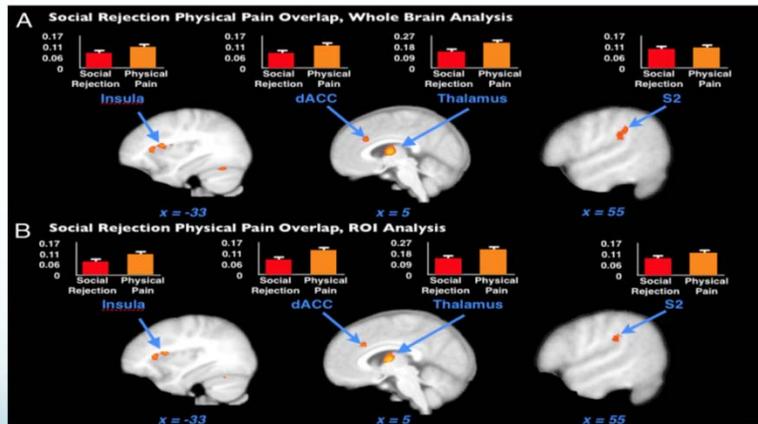


## UK construction worker



Fisher, et. al. British Medical Journal, January 7, 1995

# Emotional pain equals physical pain



Kross, et. al. PNAS. 2011, 108: 18244–18248.

# Vietnam War Injury



## Pain as a dynamic process

- All pain is real. There is not real pain and imaginary pain.
- All pain is generated by the brain.
- Pain can be triggered by tissue damage and by neural circuits (in the absence of tissue damage).

## Proportion of chronic conditions that are primarily brain induced/non-structural

- PNEA (psychogenic epilepsy): 40%; some are both
- Headaches: 98%
- Fibromyalgia: 99%
- IBS: 99%
- Pelvic pain syndromes: 90%
- Chronic neck/back pain: >85%

- MRI showed grade 1 spondylolisthesis, severe disc space narrowing at L4-L5, disc desiccation at L2-L3 & L3-L4
- Disc bulging w/ compression of the thecal sac, bilateral neural foraminal narrowing and facet hypertrophy at L2-3, L3-4, L4-5, and L5-S1
- Right L4 and L5 nerve root compression due to bulging discs

Some people do need surgery—how about her?

### Prevalence of degenerative spine imaging findings in asymptomatic patients, n=3300

| Imaging Finding    | Age (yr) |     |     |     |     |     |     |
|--------------------|----------|-----|-----|-----|-----|-----|-----|
|                    | 20       | 30  | 40  | 50  | 60  | 70  | 80  |
| Disk degeneration  | 37%      | 52% | 68% | 80% | 88% | 93% | 96% |
| Disk bulge         | 30%      | 40% | 50% | 60% | 69% | 77% | 84% |
| Disk protrusion    | 29%      | 31% | 33% | 36% | 38% | 40% | 43% |
| Annular fissure    | 19%      | 20% | 22% | 23% | 25% | 27% | 29% |
| Facet degeneration | 4%       | 9%  | 18% | 32% | 50% | 69% | 83% |
| Spondylolisthesis  | 3%       | 5%  | 8%  | 14% | 23% | 35% | 50% |

Brinjiki W, et. al. Am J Neuroradiol. 2015, 36:811-6.

## Diagnostic Process

A careful diagnostic process determines which model of treatment to apply:

### **Coping versus Curing**

**Step One:** Rule out a clearly identifiable structural disorder  
(neurological exam, routine testing)

## Examples of structural disorders

- Tumors, infections
- Auto-immune conditions
- Large herniations with consistent and/or neurological signs
- Severe or erosive OA

## Diagnostic Process

**Step Two:** Rule in a neural circuit disorder  
By diagnosis: IBS, primary headache,  
fibromyalgia, pelvic floor dysfunction

By medical history and provocative testing:

## Confirmatory Evidence

1. Functional
2. Inconsistent
3. Triggered
4. Demonstrate neural circuits on exam and by exercises

## Clues to a Functional Disorder

- Symptoms begin without a physical precipitation
- Symptoms persist after an injury has healed
- Symptoms are in a distribution pattern that is symmetric
- Symptoms occur on one whole side of the body or occur on half of the face, head, or torso
- Symptoms spread over time to different areas of the body
- Symptoms radiate to the opposite side of the body or down a **whole** leg or arm
- Symptoms that occur in many different body parts
- Symptoms that have the quality of tingling, electric, burning, numb, hot or cold

## Symptoms that are Inconsistent

- Symptoms shift from one location in the body to another
- Symptoms are more or less intense depending on the time of day, or occur upon awakening or while asleep
- Symptoms occur after, but not during, activity or exercise
- Symptoms occur when one thinks about them
- Symptoms occur when stress is increased
- Symptoms are minimal or non-existent when engaged in joyful or distracting activities
- Symptoms are minimal or non-existent after some kind of therapy, such as massage, chiropractic, Reiki, acupuncture, an herbal or vitamin supplement

## Symptoms that are Triggered

- Symptoms are triggered by things that are not related to the actual symptom, such as foods, smells, sounds, light, computer screens, menses, changes in the weather
- Symptoms are triggered by the anticipation of stress, such as prior to school, work, a doctor's visit, a medical test, a visit to a relative, or a social gathering; or during those activities
- Symptoms that are triggered by simply imagining engaging in the triggering activity, such as bending over, turning the neck, sitting or standing—**diagnostic AND therapeutic test**
- Symptoms are triggered by light touch or innocuous stimuli, such as the wind or cold

## It's all in your head?

Anyone who say that pain is all in your head is either ignorant or cruel

Implies that pain is imaginary, not real, your fault, that you are crazy or mentally ill

None of that is true

## What patients need to “get”

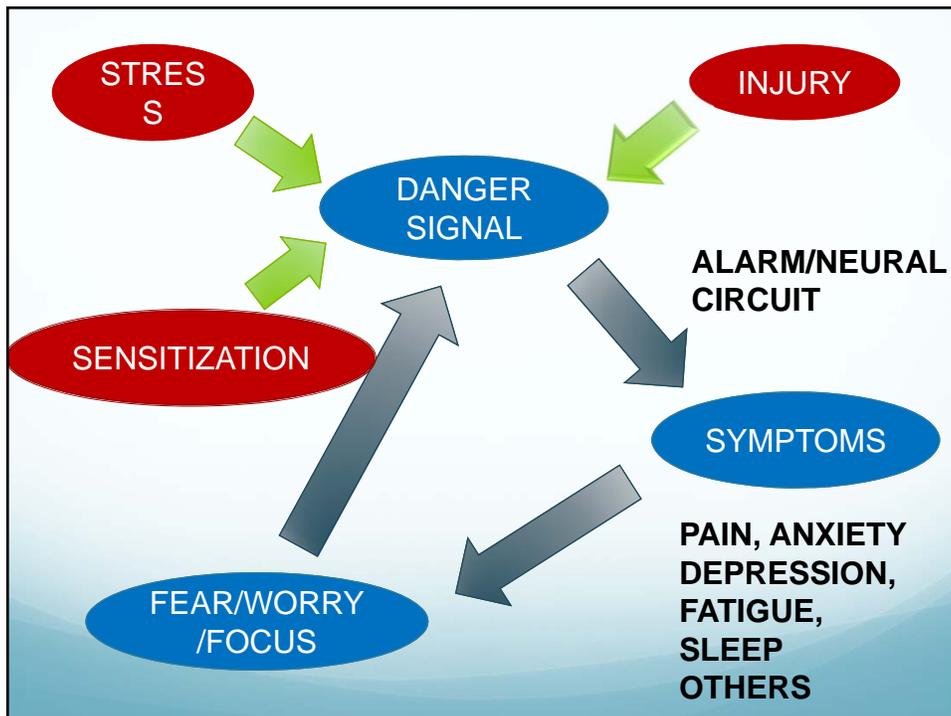
Your symptoms are real, but they will not harm you  
Your brain has been sensitized and is creating symptoms

Symptoms are due to neural pathways

Most people have this, at least to some degree

This is not your fault

You can get better



Research Paper

**PAIN**

## **Emotional awareness and expression therapy, cognitive behavioral therapy, and education for fibromyalgia: a cluster-randomized controlled trial**

Mark A. Lumley<sup>a,\*</sup>, Howard Schubiner<sup>b</sup>, Nancy A. Lockhart<sup>a</sup>, Kelley M. Kidwell<sup>c</sup>, Steven E. Harte<sup>d,e</sup>, Daniel J. Clauw<sup>d,e,f</sup>, David A. Williams<sup>d,e,f,g</sup>

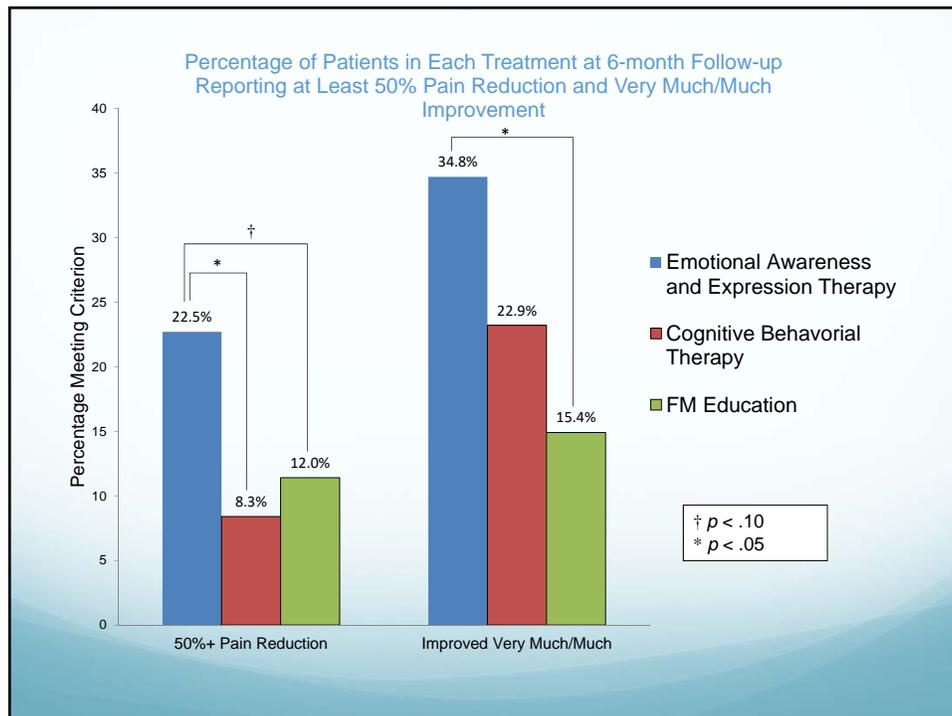
### **Multi-site RCT for Fibromyalgia**

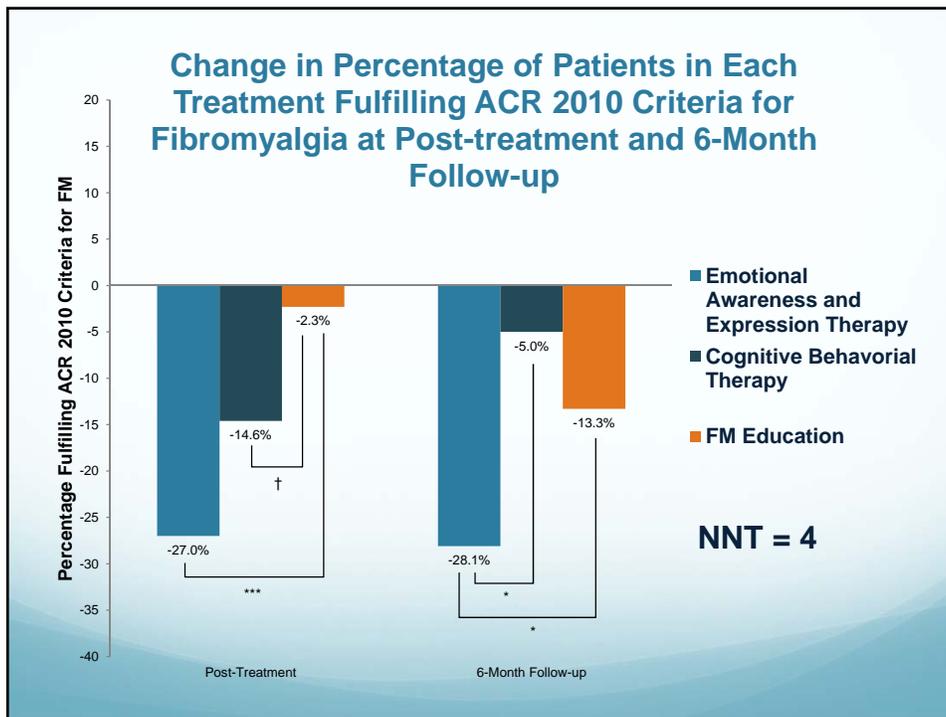
- NIH-funded, 2-site, 3-arm, allegiance-controlled RCT (Wayne State University; University of Michigan, Providence Hosp.)
- Patients: n = 230 (94% female, M = 49 years old); 8 sessions, 90-min, once per week, small group
- Assessments: Baseline, post-treatment, and 6-month follow-up

Lumley, Schubiner, et al., PAIN, 2017.

## Emotional Awareness and Expression Therapy

- Symptom-stress life review
- Experiential expression exercises of anger, guilt, sadness
- Developing compassion and forgiveness
- Learning to honestly confront troubled relationships





## Pain Reprocessing Therapy (PRT) for Chronic Back Pain

RCT at University of Colorado (Yoni Ashar, Tor Wager, Alan Gordon, Christie Uipi, Howard Schubiner, Mark Lumley)

151 patients (mean age 41; with average duration of back pain of 10 years) randomized to:

PRT: 1 introductory session with physician and 8 sessions (individual) with therapist over 4 weeks

- 50 randomized; 45 initiated treatment; 44 completed treatment

Open-label placebo injection

Treatment as usual, waitlist control

Primary outcome: Average pain severity over last week  
fMRI brain studies pre and post

## Results

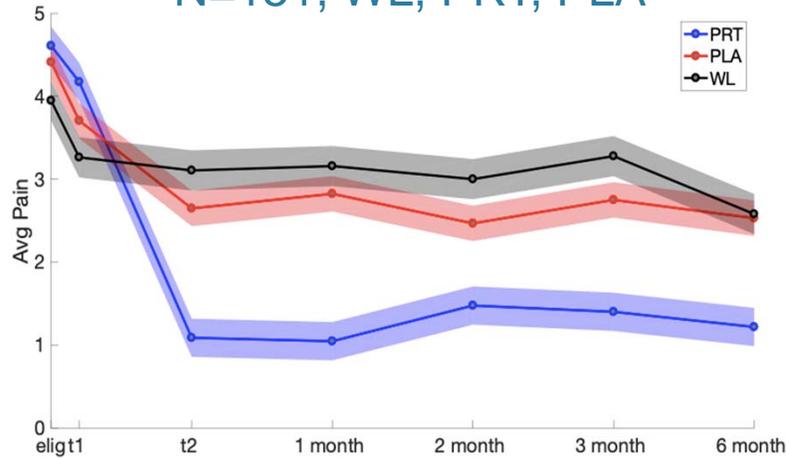
- 45 of those in the PRT arm were evaluated by HS:
- 43 were found to have no evidence of back pathology (95%)
- 2 were in the unsure or probably structural category
- Small sample, but other studies corroborate

## Results

- PRT: average of 72% reduction in pain
  - Waitlist: 19% reduction
  - Injection: 35% reduction
- 75% of PRT patients were “pain free or nearly pain free” (scores of 0 and 1) at post-treatment (one month)
  - Waitlist: 10%
  - Injection: 23%

## Boulder Back Pain Study: Follow up data

N=151, WL, PRT, PLA



I developed daily, persistent headaches at the age of 15. The pain intensified and manifested into migraines, TMJ, neck and shoulder pain. Over the next 37 years, I saw numerous doctors and tried many medications; I tried physical therapy, chiropractors, biofeedback, injections, and treatment at a world-renowned headache center. Nothing helped.

In 2015, my daughter, a nurse practitioner, gave me *Unlearn Your Pain*. I had no intention of reading it. I didn't think it could help. Then my husband and I went on vacation and my pain lessened, but I noticed when I returned home the pain increased. I opened the book and identified myself in it, particularly that an emotionally stressful event had taken place in my life when the pain started.

I saw Dr. Schubiner and he ruled out tissue damage as the cause of my pain. He explained that "the truth will set you free." He was right. As I realized that my real pain was caused by my brain, I stopped focusing on the symptoms, and started to look at the underlying cause.

I went through the workbook and spoke with a coach for four sessions. I was able to understand the connection between my emotional state and my physical pain. Through writing, I began to feel the emotions that my brain had been protecting me from for all those years. Once I began to feel, I was able to heal. I now have the tools and insight to stop pain when it starts by recognizing the cause; my thoughts and emotions. That was it, that was all it took. 37 years of suffering that I didn't have to endure.

On April 17, 2019 it will be four years that I will be pain free. My life is completely changed. I don't think about pain anymore and I don't fear it. I have confidence in myself and have learned to be kind to me. I also lead an active lifestyle without any limitations by "triggers" that I used to think were causing the pain. I think of all the time wasted and all the money spent trying to fix my physical pain when all along the cure was in me. It is so hard to explain this to others, but I am a living testimony to the fact that it is real.

I hope and pray the medical community will come on board with this. I think of all the people who could be cured and live a full life. My hope is that others would have the same freedom from pain that I have now.

## Evaluation steps

- Listen to story with compassion
- Validation for symptoms/situation
- Explain pain and predictive coding
- Medical history looking for evidence of FIT
- Assess life story looking for linkages
- Physical exam, lab and image review
- Personalize information/explain
- Offer hope/optimism
- In office demonstration of circuits
- Start treatment plan

**Distinguish between primarily nociceptive, central or both**

**Choose treatment based upon the diagnostic evaluation**

**Coping model of multi-disciplinary clinic versus**

**Curing model of pain and brain education, PRT, and EAET**

Dr. Schubiner - you have been on my mind. I wrote to you earlier in the year that most of my pain was gone. I was so relieved. Over the last three months, I had to experience the decline and passing of my husband (last Friday). He was in hospice in our home which required a lot of physical work and emotional pain. The back and hip pain returned one day and it occurred to me that my mind was more than ready to take me down. Per your training, I restarted affirmations, processed emotional pain with my sister and a friend, and claimed victory over the mind devils. It worked. I was healthy and able to care for David through the end. Thank you again for helping me.

Pain is an **interpretation** made by the brain based on many inputs, both current and past

Pain is generated by neural circuits and commonly occurs in the absence of nociceptive inputs

In this situation, it may be reversible

For each illness that doctors cure with medicine, they provoke ten in healthy people by inoculating them with the virus that is a thousand times more powerful than any microbe: the idea that one is ill.  
--Marcel Proust

“Primum non nocere”

## Web Resources

- [Tmswiki.org](http://Tmswiki.org)
- Curable app
- [PainPsychologyCenter.com](http://PainPsychologyCenter.com)
- [UnlearnYourPain.com](http://UnlearnYourPain.com)
- [BackInControl.com](http://BackInControl.com)
- [SirpaUK.com](http://SirpaUK.com)
- [PPDassociation.org](http://PPDassociation.org)
- TMS forum: [facebook.com/Groups/drsarno/?ref=share](https://facebook.com/Groups/drsarno/?ref=share)

## Books for patients

- Dr. John Sarno: The Mindbody Prescription, Healing Back Pain, and The Divided Mind
- Dr. Howard Schubiner: Unlearn Your Pain and Unlearn Your Anxiety and Depression
- Dr. David A. Hanscom: Back in Control
- Dr. David Clarker: They Can't Find Anything Wrong
- Steve Ozanich: The Great Pain Deception
- Dr. David Schechter: Think Away Your Pain
- Georgie Oldfield: Chronic Pain: Your Key to Recovery

## Books for professionals

- Drs. Abbass/Schubiner: Hidden From View
- PPDA Textbook: Clarke, Abbass, Schubiner, Smith-Clark (eds)

## Documentaries

- All the Rage: Dr. Sarno documentary, available at [rumur.com](http://rumur.com)
- This Might Hurt: filmed in Detroit, just released
- Pain Brain: Boulder back pain study documentary, in progress

Thank you!