Change Your Brain, Change Your Pain
acute pain is a WARNING that must be heeded or you may be in serious trouble!
You’ve been warned!!
chronic pain
really?

- Hysterical
- Neurotic
- Hypochondriac
- Secondary gain
- Malingering
- Attention seeking
low back pain as a subset of chronic pain

Total incremental direct health care costs attributable to low back pain in the U.S. were estimated at $26.3 billion in 1998 (Luo X, et al). In addition, indirect costs related to days lost from work are substantial. Back pain is second only to upper respiratory conditions as the stated cause of work loss. The costs for treatment and compensation for LBP in industry may be greater than the total amount spent on all other industrial injuries combined. However, most of the costs, perhaps 80%, are incurred by about 20% of the LBP patients who then become disabled (Chou et al).


WebMD listing of techniques
Over the years, many variations of these techniques have been delivered, most as proprietary techniques developed by individual practitioners. [WebMD](https://www.webmd.com) has made a partial list:

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Cyriax Method
Evjenth
Maitland
Mulligan
Kaltenborn
McKenzie
Post-isometric relaxation
Trigger Point Therapy

Myofascial Release
Muscle Energy Technique
Strain-Counter Strain
Winkel
Tigny
Myofascial Release
Craniosacral Therapy
Orthopedic Manual Therapy
Oh what to do, what to dooo?
Do you have back, neck or shoulder pain that keeps recurring or won't go away?

Do you have to 'baby' your back?

Does muscle pain keep you from living and enjoying a full life?

If so, you may be suffering from TMS and this DVD will show you how Dr. Sarno can help you to become pain-free!
Rehabilitation of the Spine
A Practitioner’s Manual
Craig Liebenson

Back Sense
A Revolutionary Approach to Halting the Cycle of Chronic Back Pain
Ronald D. Siegel, Psy.D., Michael H. Urdang, and Douglas B. Johnson, M.D.

The Back Pain Revolution
Gordon Waddell
Foreword by Mark Schoene
pain models

Pathoanatomical

• Emphasizes anatomy, injury and tissue damage.
• Pain intensity equates with damage severity.
• Emphasizes further tests.
• Focus on pain rather than activity.
• Encourage passivity and dependency

• Creates a “nocebo” effect?

Biopsychosocial

• There is no sign of serious disease.
• Lower back pain is a symptom indicating that the back is somehow de-conditioned or unfit.
• Treatment can help, but long-term results depend on the patient.
• Recovery depends on restoring function- the sooner the better.
• Positive attitudes result in speedier recovery.

• Creates a “placebo” effect?
many studies support manual therapy as an effective treatment for pain.


....but by what mechanism?
The traditional mechanistic paradigm in the teaching and practice of manual therapy: Time for a reality check.

Frédéric Wellens, B.Sc., pht, RCAMPT.

Clinique Physio Axis, 2645 boul. Curé-Labelle, suite 104, Prévost, Qc, J0R1T0,
the biomechanical model – applied to acute and chronic pain

Assumes people acquire biomechanical dysfunctions of joints i.e.: hypo- or hypermobility, joint malalignment from:

- Suboptimal postures
- Muscle weakness/tightness
- Poor muscle control
- Trauma
- Repetitive strain
Whoa.. What's a joint like this doing in a girl like you?

Chiropractor pick-up lines.
flaws

• Equivocal evidence.
• Poor reliability of clinical tests designed to detect motion, position, posture.
• Scant evidence to suggest more than short term mechanical effect
• Forces used too small to create permanent change in tissues
specific vs. random

Manual therapy tailored to specific exam findings no more effective than random application.
Determining Cavitation Location During Lumbar and Thoracic Spinal Manipulation

Is Spinal Manipulation Accurate and Specific?

J. Kim Ross, MSc, DC,*† David E. Berenick, MSc, DC,*† and Stuart M. McGill, PhD*
While certainly true for acute pain, studies about posture are mixed about whether or not this phenomenon contributes to chronic pain.
what about findings on x-ray, MRI?

• Scoliosis
• Subluxations
• Stenosis
• Spondylolisthesis
• Degenerative discs and joints
• Disc bulges
• Herniated discs
Magnetic Resonance Imaging of the Lumbar Spine in People without Back Pain
Maureen C. Jensen, Michael N. Brant-Zawadzki, Nancy Obuchowski, Michael T. Modic, Dennis Malkasian, and Jeffrey S. Ross
tissue length, form, position or symmetry are poor predictors of who has pain and who does not.
but what about movement patterns?

The way we move (Functional Movement Patterns, Stability vs. Mobility) and it’s relation to pain is a subject of intense study and is at the forefront of manual therapy across all disciplines.
can compensation in one area lead to break down and pain in another?

Foot = Stable
Ankle = Mobile
Knee = Stable
Hip = Mobile
Lumbar Spine = Stable
Thoracic Spine = Mobile
Scapulothoracic Joint = Stable
Glenohumeral Joint = Mobile
Elbow Joint = Stable
“It is important to note that we are full of dysfunctions whether we are in pain or not. If we are in pain it is easy to find something wrong relevant to a precise tissue model but which may not be relevant at all to the patients state”.

these people have gross movement dysfunctions. Why are they not in bed writhing in pain?
so...if mechanical dysfunction really was the cause and intervention (manual therapy) only creates transient structural change why would there be lasting relief?
All manner of treatments, not just manual therapy, from acupuncture to ice to yoga, show an effectiveness in the treatment of pain but all propose different rationales for their effectiveness. Is it all just placebo?
maybe we are barking up the wrong tree!
Pain Pathway

450 years ago Descartes wrote, “The flame particle jumps from the fire, touches the toe, moves up the spinal cord until a little bell goes off in the brain and says, ‘ouch. It hurt’.”
if pain is an accurate indicator of tissue damage...

Why do 40% of the people (alert, rational & coherent and “not in shock”) admitted to an emergency room with horrific wounds feel no pain or pain of low intensity even after long delays?
Trainer John Sillick, 26, suffered fractured vertebrae (T1 to T12), a fractured femur, and a fractured pelvis after 19-year-old male Orky 2 breached on top of him while riding on another orca during a performance.
presented to dentist with a minor toothache...
all I felt was a “bump”....
and yet...

I got a paper cut on my finger and it hurts</s/3333333333333

Feel bad for me!!!!
there are no pain receptors

Nociceptors:
Don’t send ‘pain’ signals, they send the same signals as other receptors but just at a higher threshold.
pain is in the brain!

You will not feel pain unless and until the brain believes that there is a threat to the body and hence an action is required.
The brain produces inhibitory chemicals such as the aminoacid neurotransmitter GABA that “down-regulate” nociception transmission.
Pain is influenced by your experiences, thoughts, culture, beliefs and attitude.
There is no single ‘pain center’ in the brain.

Pain is multisensory experience (**known as the Pain Neuromatrix**).

Pain neuromatrix, includes the insula, the anterior cingulate cortex, the periaqueductal grey matter, the medial prefrontal cortex, and the supplementary motor area.
Neurotag
mouse trap game

Player turns crank A
Which future gear B
determines where to move and
push pole sign against shoe D
Once bucket hanging metal ball B balls
drops down sticky stairs F and into
trap A when lever E hits hanging hand tool
This causes bowling ball F to fall from top of
hanging hand tool through tube G, making E and
traps trap G, land on either edge of the mouth of
burning fuel container
Watch K through the air and light into wax tub O
causing cage to fall from top of post F and trap unsuspecting mouse.
After an injury, tissues heal but "muscles remember".
70% of amputees report limb pain and sensation even years after the amputation.
pain can change your nervous system

Plasticity = Neurological adaptations
plastic change in the brain

Figure 13.31, page 457

Sensory topography reflects repetitive use

Repetitive tapping with tip of finger 2 coupled with behavioral reward causes neuronal receptive fields in S1 to expand into neighboring cortex.

how does acute pain become chronic?

The descending pain modulation system is disabled by stress, adrenal overactivity, & the long-term negative effects of excessive cortisol causing the central nervous system to become sensitized.
Reduction in the production of GABA contributes to the sensitization of the pain neuromatrix.

Aside: Clinical depression is also due to a “chemical imbalance”.
Plasticity, sensitivity and chronic pain

The brain and nervous system has become so good at constructing pain at the slightest of triggers that you experience pain when a trigger is even mildly stimulated.
normal sensitivity

OUCH!
more sensitive

OUCH!

PAIN
very sensitive

OUCH!

PAIN
top-down intervention

Education

– physiology of pain
– the role of the brain in pain
– “hurt does not equal harm”
Stress management
– meditation
– activity/hobbies
– social
– work
– diet
– lifestyle
from the bottom up...

Treatment which lowers or inhibits the nociceptive signals (bottom) to the brain.
why manipulation may help

Novel stimulation into the CNS causes brain to:

- over-ride or decrease nociceptive input
- down regulate the perceived threat
- creation of descending inhibition
- brain changes the (mal)adaptive motor responses it was outputting because of the pain
- decreased temporal summation

In other words “control-alt-delete”.
caveat!

“Bottom up” only treatments may reinforce the belief that there is something wrong in the tissues and joints (and thereby raising the threat level) and may only bring temporary relief.
is there a treatment that does both?

Graded Exposure

Approach or Activity:

Gradually exposure to feared activities without causing pain lowers the threat level in the brain.
Many researchers believe that a large part of pain relief seen with exercise and other rehabilitation methods is from lowering the threat level in the brain using the graded approach.
Chronic pain causes sensitization and plastic changes in the sensorimotor cortex and elsewhere in the central nervous system. Perhaps sensorimotor training may be a promising intervention.
Managing Chronic Nonspecific Low Back Pain With a Sensorimotor Retraining Approach: Exploratory Multiple-Baseline Study of 3 Participants
Benedict M. Wand, Neil E. O'Connell, Flavia Di Pietro and Max Bulsara

Originally published online February 24, 2011
Participant 1: 29 y.o. female with 10 year history of LBP, buttock pain and right posterior thigh pain.

Pain began following a MVA.


No “red flags”, neurologically intact. No contraindications to exercise.
Participant 2: 33 y.o. male with 14 month history of bilateral LBP, intermittent left leg pain.

Onset 1 hour after lifting a heavy object.

Course of chiropractic manipulation settled symptoms but he was constantly uncomfortable and wary of movement. Experienced three further episodes of disabling pain. Had chiropractic care after third episode that eased symptoms but not completely. Not taking any pain medications.

No “red flags”, neurologically intact. No contraindications to exercise.
Participant 3: 55 y.o. female with four year history of bilateral LBP. Left sided buttock pain.

Related to a lifting mishap.

Pain was initially episodic but became constant. Treatment included several courses of PT and chiropractic which she thought were helpful. More recently she began Pilates which she believed worsened her condition. Medication for hypertension, acetaminophen for LBP.

No “red flags”, neurologically intact. No contraindications to exercise
Education: outline of a biopsychosocial model of chronic non-specific low back pain. All received a copy of *Explain Pain* during the first week as a take-home resource.
sensory: localization training

With, then without mirror visualization

Goal: 80% accuracy
sensory: same intervention, different probe...
Increasingly difficult letters and sums were written on the skin over the back. Subject was asked to identify or perform operation. 3 weeks.
motor: graded imagery

Graded motor imagery retraining. “Recognise ®”
motor: imagined movements

Subjects watched a series of 7 minute videos twice of people doing progressively greater back and body movement 3x/day
motor: graded exercise

Maintain awareness of spinal position, pain free at all times.
graded exercise

All movements are to be pain free and involve as much variety as possible.
results

Figure 1.
Change in pain intensity over time for each participant. The dashed vertical lines represent the changes between experimental phases. The first period is the pretreatment phase, the second period is the treatment phase, and the third period is the posttreatment phase.
Applications

• Avoid the “nocebo”.
• Educate patients about pain and the brain
• Chronic hurt does not equal harm
• Manipulation = “re-boot” or “control-alt-delete”.
  – Audit- what you do should make a difference in pain level.
• Rehabilitation: “reprogramming” the nervous system. Making the movement non-threatening and improving motor awareness not so much “strengthen, lengthen etc.”
Resources:

- www.noigroup.com
- www.backfitpro.com
- www.rehabps.com
- www.somasimple.com/