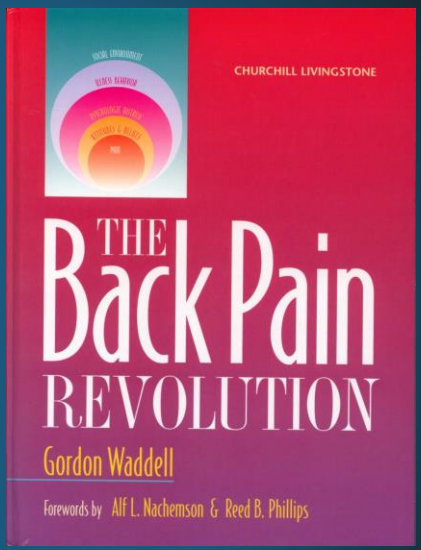
Biopsychosocial/Central Sensitization Therapeutic Neuroscience Education

Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018

Eric M Magrum DPT OCS FAAOMPT

"The Fear of pain may be more disabling than pain itself."



- **Low Back Pain** is a 20th century **medical disaster**
- Surgical/diagnostic technology, cures, vaccines, pharmacology **advances**
- **Back strains disable** more people than all serious spinal pathology together
- **Rising** work loss, compensation, early retirement, and long term **disability** benefits continue

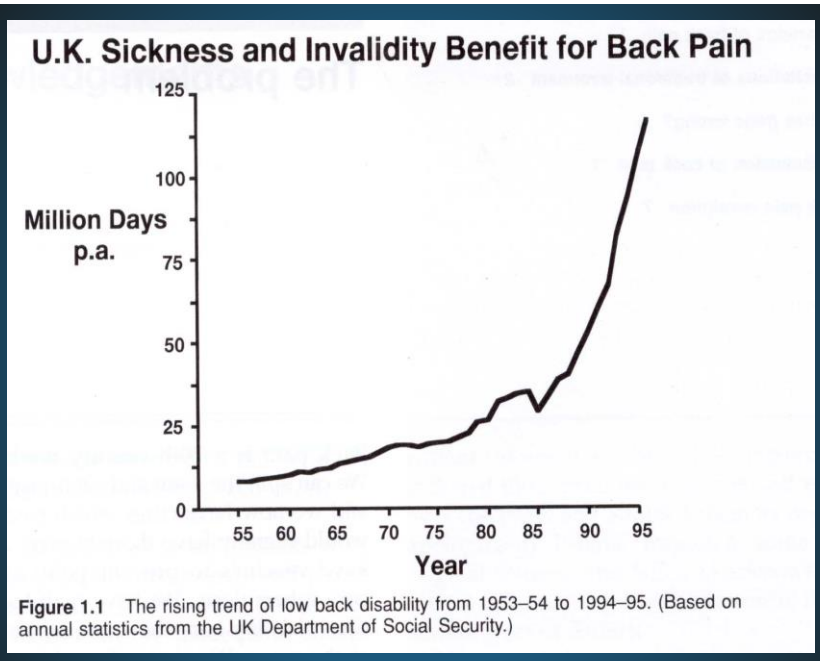
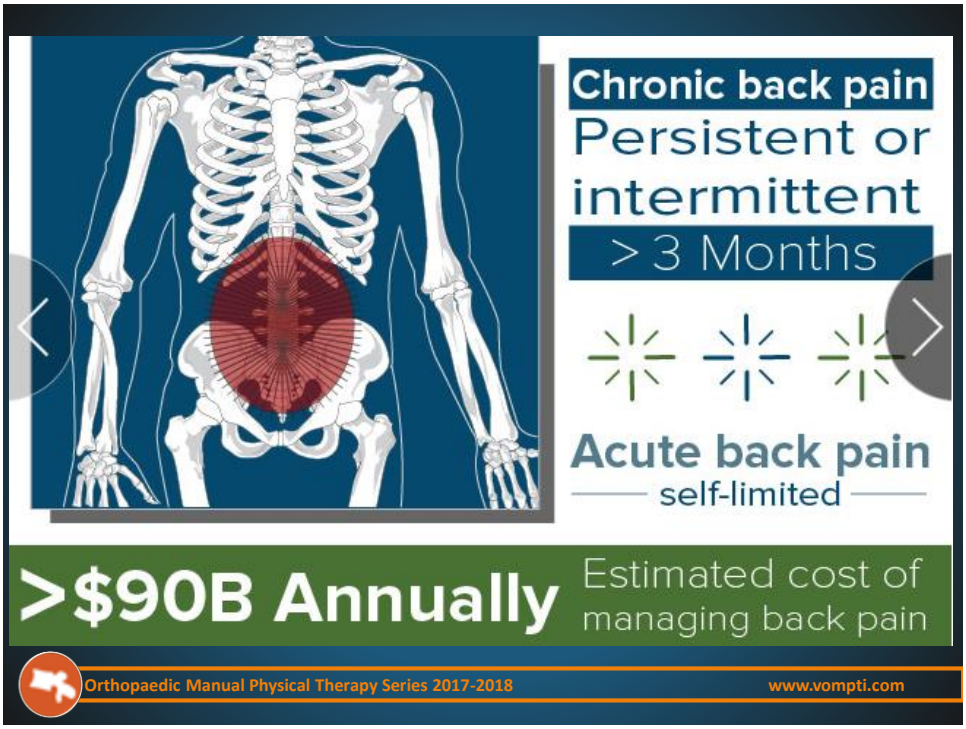


Figure 1.1 The rising trend of low back disability from 1953–54 to 1994–95. (Based on annual statistics from the UK Department of Social Security.)

Disproportionate Costs

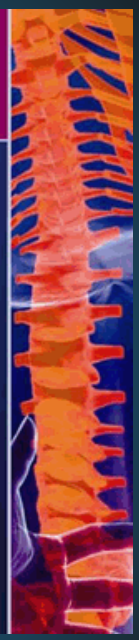
- 5% patients occupational LBP consume 90% of expenditures
- Individuals not returning to work within 4-8 weeks following injury significantly increase chances of long term disability.
- Early detection of and proper management of patients with poor coping strategies showing psychological distress out of proportion to the organic back disorder may help facilitate recovery and return to function.



Adverse Prognostic Indicators

- Yellow flags are psychosocial indicators suggesting increased risk of progression to long-term distress, disability, and pain
- Can be applied more broadly to assess likelihood of development of persistent problems from acute pain presentation
- Yellow flags can relate to the patient's attitudes and beliefs, emotions, behaviors, family, and workplace

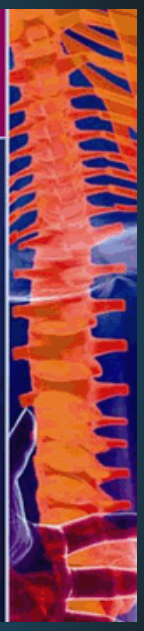
Kendall NA. *Baillieres Best Pract Res Clin Rheumatol.* 1999;13(3):545-554.



Risk Factors for Chronic Low Back Pain: Yellow Flags

- Belief that pain and activity are harmful
- "Sickness behavior" such as extended rest
- Bodily preoccupation and catastrophic thinking
- Low or negative mood, anxiety, social withdrawal
- Personal problems (eg, marital, financial, etc)
- History of substance abuse
- Problems/dissatisfaction with work ("blue flags")
- Overprotective family/lack of support
- History of disability and other claims
- Inappropriate expectations of treatment
  - Low expectation of active participation

The presence of yellow flags highlights the need to address specific psychosocial factors as part of a multimodal management approach



Low Back Pain

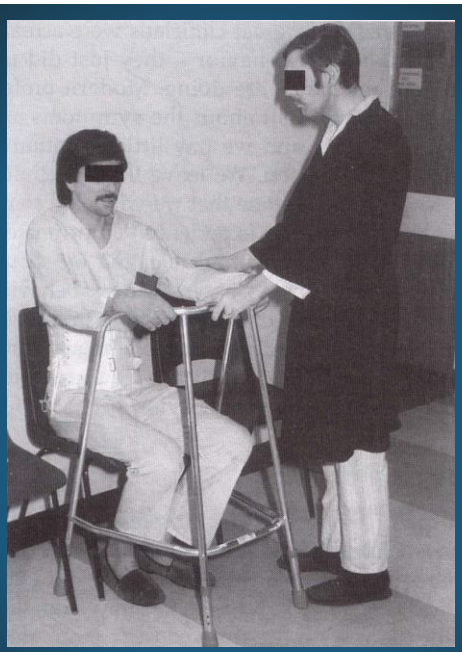
Acute ⟷ Chronic

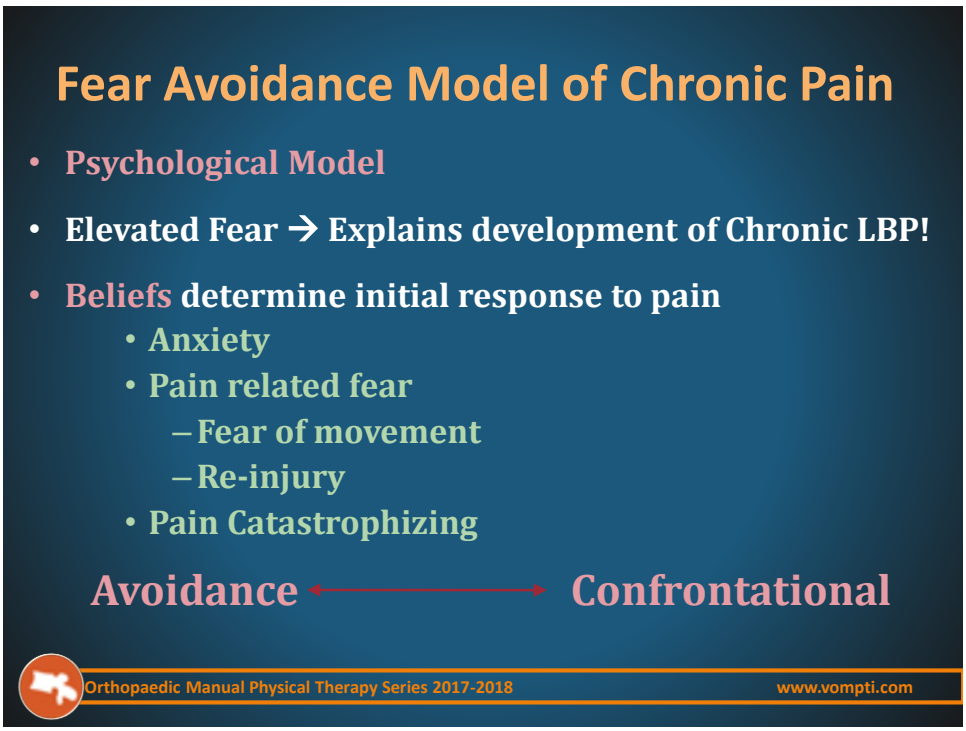
- Estimate of tissue damage
- Context
- Adaptive behaviors/Confrontation
- Nociceptive pain
- Inflammatory pain

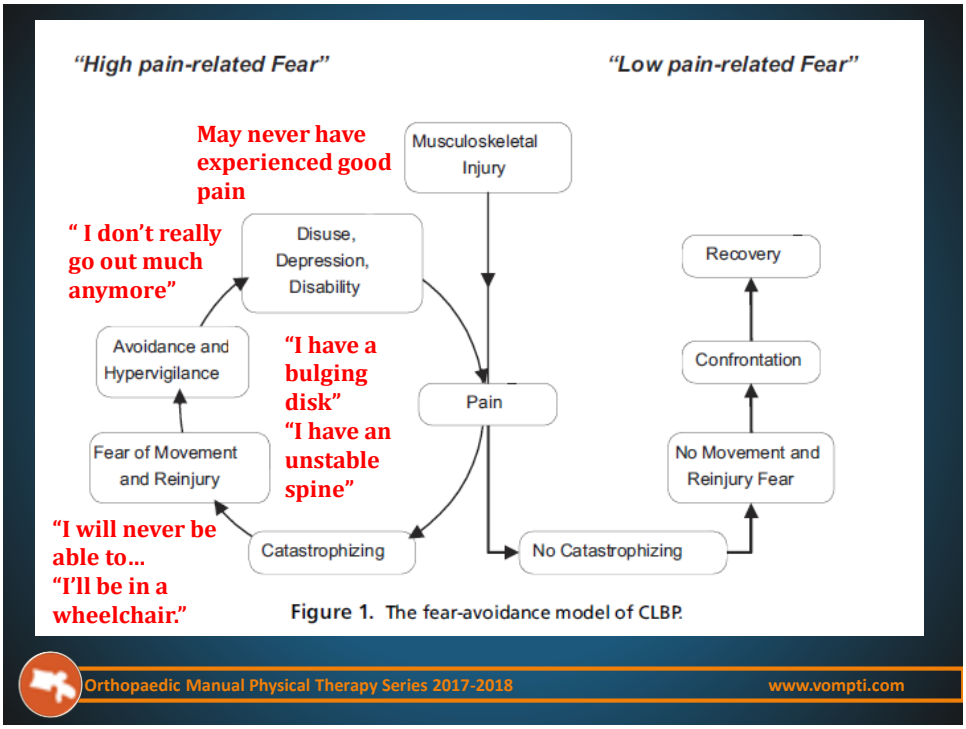
- Management
  - Acute injury management
  - Short period of rest
  - Graded activity

- No tissue damage
- Lifestyle factors
- Psychosocial factors
- Mal adaptive behaviors

- Management
  - Relaxation
  - Assurance
  - Cognitive Functional Therapy





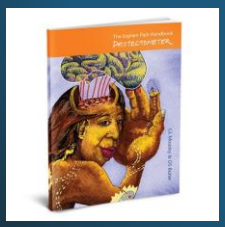


Fear-Avoidance Model of Chronic Pain

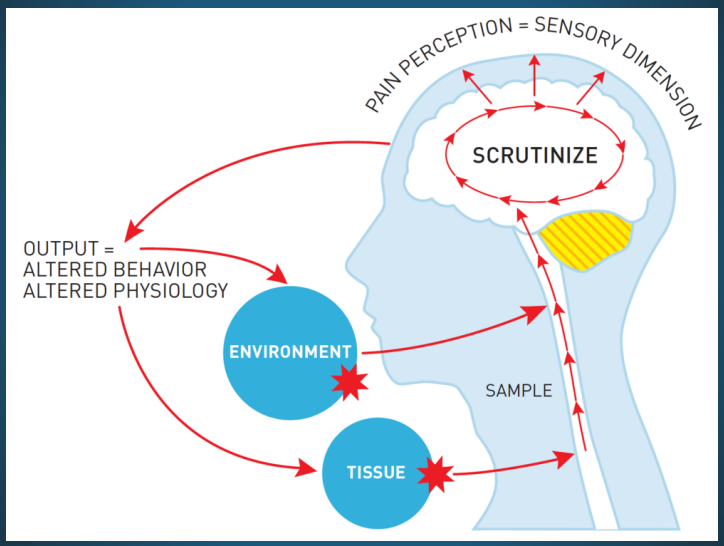
- Pain perception (2 components)
  - Sensory and Emotional
- Sensory mediated by physiological factors related to nocioception
- Emotional reaction mediated by psychological factors related to fear of pain

Moseley Key Points:

- Pain is a conscious experience that depends on the brain evaluating many inputs, not just those from the tissues.
- It hurts where your brain thinks the problem is, not necessarily where it really is.
- Pain depends on how much danger your brain thinks you are in, not how much you are really in.



Persistent Pain = CNS processing alteration



Catastrophization

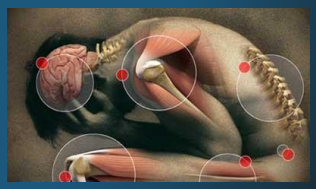
- "I've never had pain like this before; it's never less than 10/10 pain" (Magnification)
- "Oh my God, I'll never get back to work, bless you, this is going to permanently injure me for life, I can never do my job again" (Rumination)
- "Oh, my mom had this pain and, oh my God, she was out of work for a year, and she got, you know, she went to the chiropractor, nothing worked, I just know I'm going to get surgery." (Helplessness)

Low Fear → Sensory = Emotional →

Confrontational = Adaptive

– Return to normal social/vocational activity

- High Fear → Emotional > Sensory → Avoidance = Maladaptive (exaggerated pain perception → chronic disability)
  - Psychological (hyperalgesia, depression)
  - Physical (decrease physical performance, disuse)
  - Societal (chronic disability)



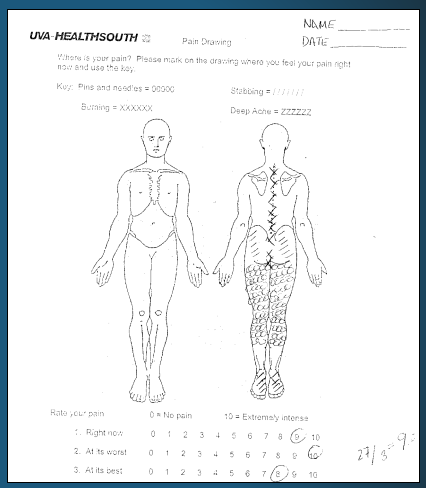
Disease versus Illness Behavior

- Distinguish physical signs/symptoms from behavioral
- Diagnostic Triage - RED FLAGS

Simple backache
Nerve root pathology
Possible serious spinal pathology

Assess Illness Behavior

- FABQ
- PHQ – 2
- TSK
- Body Chart/Pain Diagram
- Oswestry/NDI
- Listen/Observe



FABQ/PHQ-2

Here are some of the things which other patients have told us about their pain. For each statement please circle any number from 0 to 6 to say how much physical activity such as bending, lifting, walking or driving affect or would affect your pain.

If you don't have back pain, please answer these questions in relation to where you are feeling pain.

Physical Activity Subscale

	Completely Disagree			Unsure			Completely Agree
1. My pain was caused by physical activity	0	1	2	3	4	5	6
2. Physical activity makes my pain worse	0	1	2	3	4	5	6
3. Physical activity might harm my back	0	1	2	3	4	5	6
4. I should not do physical activities which (might) make my pain worse	0	1	2	3	4	5	6
5. I cannot do physical activities which (might) make my pain worse	0	1	2	3	4	5	6

FABQ PA sub scale: score items 2-5; High > 15

Work Activity Subscale

The following statements are about how your normal work affects or would affect your back pain.

	Completely Disagree			Unsure			Completely Agree
6. My pain was caused by my work or by an accident at work	0	1	2	3	4	5	6
7. My work aggravated my pain	0	1	2	3	4	5	6
8. I have a claim for compensation for my pain	0	1	2	3	4	5	6
9. My work is too heavy for me	0	1	2	3	4	5	6
10. My work makes or would make my pain worse	0	1	2	3	4	5	6
11. My work might harm my back	0	1	2	3	4	5	6
12. I should not do my normal work with my present pain	0	1	2	3	4	5	6
13. I cannot do my normal work with my present pain	0	1	2	3	4	5	6
14. I cannot do my normal work till my pain is treated	0	1	2	3	4	5	6
15. I do not think that I will be back to my normal work within 3 months	0	1	2	3	4	5	6
16. I do not think that I will ever be able to go back to that work	0	1	2	3	4	5	6

FABQ-W: Score items 6-7, 9-12, 15; High score > 34/42

The role of fear-avoidance beliefs in acute low back pain: relationships with current and future disability and work status

Julie M. Fritz[a,*], Steven Z. George[b], Anthony Delitto[c] Pain 94 (2001) 7–15

- FABQ correlated with pain, disability, depressive symptoms, physical impairments, non organic findings
- FABQ-W correlated with disability (r=.40)
- FABQ-PA correlated with disability (r=.34)
- FABQ-W predictive of perceived disability, future return to work

Investigation of Elevated Fear-Avoidance Beliefs for Patients With Low Back Pain: A Secondary Analysis Involving Patients Enrolled in Physical Therapy Clinical Trials

- FABQ – W (work subscale) better predictor of 6 month outcomes
- FABQ-W > 20 indicated and increased risk of chronic disability

J Orthop Sports Phys Ther 2008;38(2):50-58.

Tampa Scale for Kinesiophobia

(Miller , Kori and Todd 1991)

1 = strongly disagree
2 = disagree
3 = agree
4 = strongly agree

1. I'm afraid that I might injury myself if I exercise	1	2	3	4
2. If I were to try to overcome it, my pain would increase	1	2	3	4
3. My body is telling me I have something dangerously wrong	1	2	3	4
4. My pain would probably be relieved if I were to exercise	1	2	3	4
5. People aren't taking my medical condition seriously enough	1	2	3	4
6. My accident has put my body at risk for the rest of my life	1	2	3	4
7. Pain always means I have injured my body	1	2	3	4
8. Just because something aggravates my pain does not mean it is dangerous	1	2	3	4
9. I am afraid that I might injure myself accidentally	1	2	3	4
10. Simply being careful that I do not make any unnecessary movements is the safest thing I can do to prevent my pain from worsening	1	2	3	4
11. I wouldn't have this much pain if there weren't something potentially dangerous going on in my body	1	2	3	4
12. Although my condition is painful, I would be better off if I were physically active	1	2	3	4
13. Pain lets me know when to stop exercising so that I don't injure myself	1	2	3	4
14. It's really not safe for a person with a condition like mine to be physically active	1	2	3	4
15. I can't do all the things normal people do because it's too easy for me to get injured	1	2	3	4
16. Even though something is causing me a lot of pain, I don't think it's actually dangerous	1	2	3	4
17. No one should have to exercise when he/she is in pain	1	2	3	4

Depression Screening Tool

Patient Health Questionnaire (PHQ-2)

Over the past 2 weeks, have you often been bothered by:

1. Little interest or pleasure in doing things? ☐ Yes ☐ No
2. Feeling down, depressed, or hopeless? ☐ Yes ☐ No

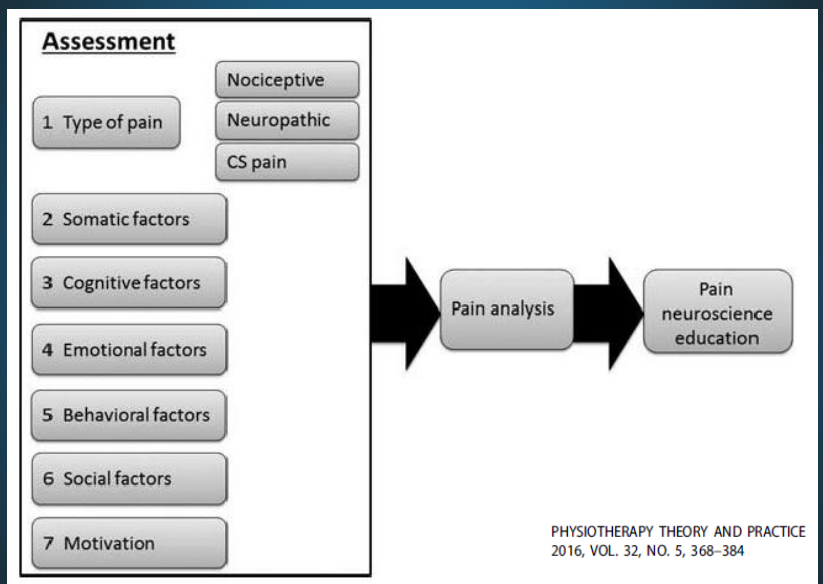
Kroenke K, Spitzer RL, Williams JB.
The Patient Health Questionnaire-2: validity of a two-item depression screener. Med Care 2003; 41:1284-92

Oswestry LBP Disability Questionnaire

- Perceived level of Disability- self reported
- Proven reliable and responsive to change
- MCID = 6 points

SCORE INTERPRETATION OF THE OSWESTRY LBP DISABILITY QUESTIONNAIRE	
0-20% Minimal disability	Can cope with most ADLs. Usually no treatment is needed, apart from advice on lifting, sitting, posture, physical fitness, and diet. In this group, some patients have particular difficulty with sitting and this may be important if their occupation is sedentary (typist, driver, etc.)
20-40% Moderate disability	This group experiences more pain and problems with sitting, lifting, and standing. Travel and social life are more difficult and they may well be off work. Personal care, sexual activity, and sleeping are not grossly affected, and the back condition can usually be managed by conservative means.
40-60% Severe disability	Pain remains the main problem in this group of patients, but travel, personal care, social life, sexual activity, and sleep are also affected. These patients require detailed investigation.
60-80% Crippled	Back pain impinges on all aspects of these patients' lives both at home and at work. Positive intervention is required.
80-100%	These patients are either bed-bound or exaggerating their symptoms. This can be evaluated by careful observation of the patient during the medical examination.
Data compiled from Fairbanks et al, 1980.	

Clinical biopsychosocial physiotherapy assessment of patients with chronic pain: The first step in pain neuroscience education



Listen/Observe

- Build Therapeutic Alliance
- Express Empathy
- Open/Reflective Questioning
- Summarizing
- Identify Discrepancies
- Goal setting
- Support Self efficacy

Let patients tell their story

- Pain and impact on life
- History of pain
- Location
- Pain behavior (aggs/ease)
- Functional impairments
- Disability
- Sleep patterns
- Level of fear
- Activity level
- Lifestyle behaviors
- Avoidance specific activities (work/social)
- Degree of pain focus
- Pain coping strategies
- Stress and relationship to pain
- Pain beliefs
- History of anxiety/depression
- Goals for management

Explanatory and Diagnostic Labels and Perceived Prognosis in Chronic Low Back Pain

Results. Two major categories representing the predominant themes emerging from the content analysis were "Degeneration" and "Mechanical." Degenerative terms such as "wear and tear" and "disc space loss" indicated a progressive loss of structural integrity. Examples of phrases used by patients included "deterioration [...] spine is crumbling" and "collapsing [...] discs wearing out." The use of degenerative terms by patients was associated with a poor perceived prognosis ($P < 0.01$). Degenerative and mechanical terms were more commonly used by patients when they were documented in correspondence from secondary care specialists ($P = 0.03$ and 0.01, respectively).

SPINE Volume 35, Number 21, pp E1120–E1125

Editorial: How the Words We Use Affect the Care We Deliver

Clinical Orthopaedics and Related Research®
A Publication of The Association of Bone and Joint Surgeons®

Interventional Therapies, Surgery, and Interdisciplinary Rehabilitation for Low Back Pain

An Evidence-Based Clinical Practice Guideline From the American Pain Society

- **Recommendations**
  - **Non Radicular LBP**
  - **Unresponsive to conservative management**
  - **Integrated approach**
    - **Rehab + Psychological/Social-Occupational**
  - **Intensive Interdisciplinary rehab**
    - **Component of cognitive/behavioral emphasis**
      - **Strong Recommendation/High-quality Evidence**

SPINE Volume 34, Number 10, pp 1066–1077

Therapeutic Neuroscience Education

- Decrease fear and positively change a patient's perception of their pain (Moseley 2003)
- Immediate effect on improvements in patients' attitudes about pain (Moseley 2003)
- Improvements in pain, cognition and physical performance (Moseley 2004)
- Increased pain thresholds during physical tasks (Moseley, Hodges et al. 2004)
- Improved outcomes of therapeutic exercises (Moseley 2002)
- Reduction in widespread brain activity characteristic of a pain experience (Moseley 2005)

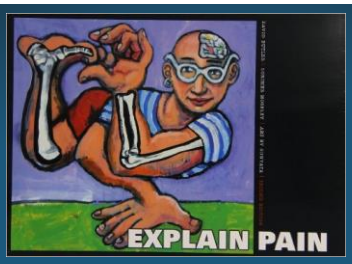
SYSTEMATIC REVIEW

Arch Phys Med Rehabil Vol 92, December 2011

The Effect of Neuroscience Education on Pain, Disability, Anxiety, and Stress in Chronic Musculoskeletal Pain

Adriaan Louw, PT, MAppSc, Ina Diener, PT, PhD, David S. Butler, PT, EdD, Emilio J. Puentedura, PT, DPT

- "Compelling Evidence"
- TNSE
  - Improved Movement
  - Decr Pain perception
  - Decr Disability
  - Decr Catastrophization
- Re conceptualize - Chronic Pain caused by increased sensitization not tissue damage
  - Decrease Threat
  - Reappraise ability to move



- Understand Pain
  - Explain cycle of pain
  - Change beliefs/thoughts/response to pain
  - Reassurance
  - Reduce threat
  - Patient Goal setting
  - Behavior change
- Change Perception of pain as threatening and harmful
- Chronic Pain Physiology
- Nervous system Sensitivity
- Multiple biopsychosocial factors influence

How to explain central sensitization to patients with 'unexplained' chronic musculoskeletal pain: Practice guidelines

- Pain Physiology Education indicated
  - Maladaptive illness behavior present
  - Clinical picture dominated by Central Sensitization
- Education
  - Re conceptualize pain
  - Acute versus Chronic pain
  - Purpose of acute pain
  - How acute pain progresses to chronic
- What sustains Chronic pain
  - Emotions
  - Stress
  - Pain behavior
- Coping strategies
- Self management programs
- Graded Exposure/Activity

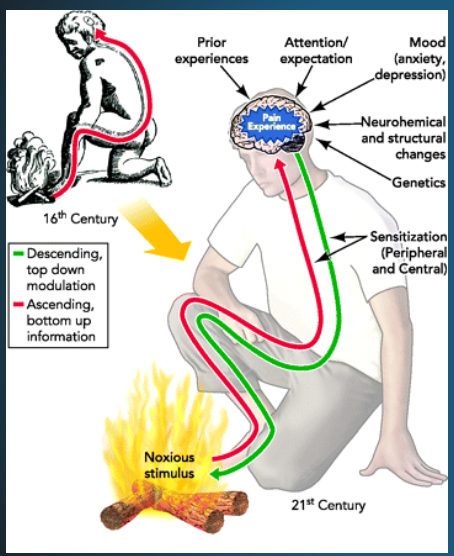
Manual Therapy 16 (2011) 413–418

BIOPSYCHOSOCIAL MANAGEMENT OF BACK PAIN

Is like Teenagers and Sex;
Everybody talks about it,
Nobody really knows how to do it,
Everyone thinks everyone else is doing it,
So everyone claims to be doing it.

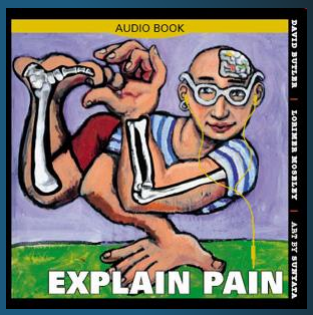
back pain

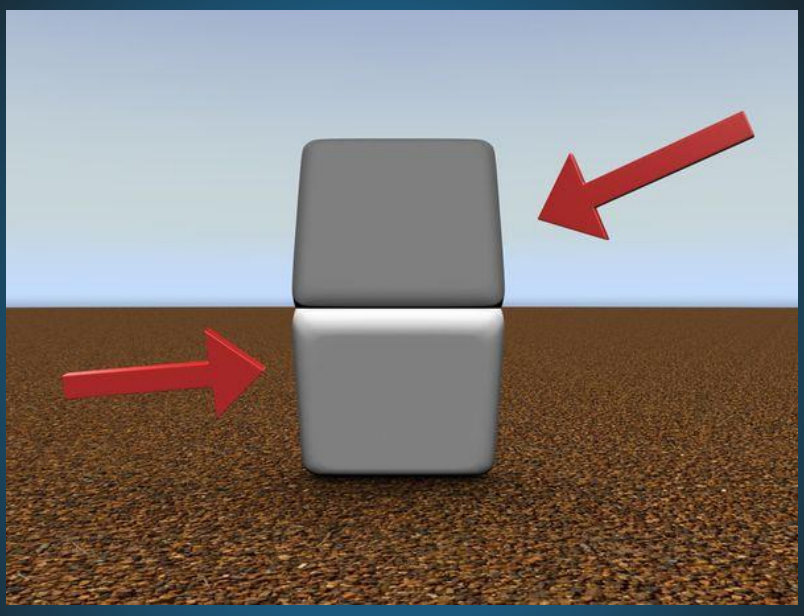
Re Conceptualize Pain



Neuro Physiology of Pain

- Pain is a sensory and emotional experience - not just tissue damage
- Pain is constantly modulated with the CNS
- Pain is a perception (like other inputs/senses) – the brain has to decide how to interpret





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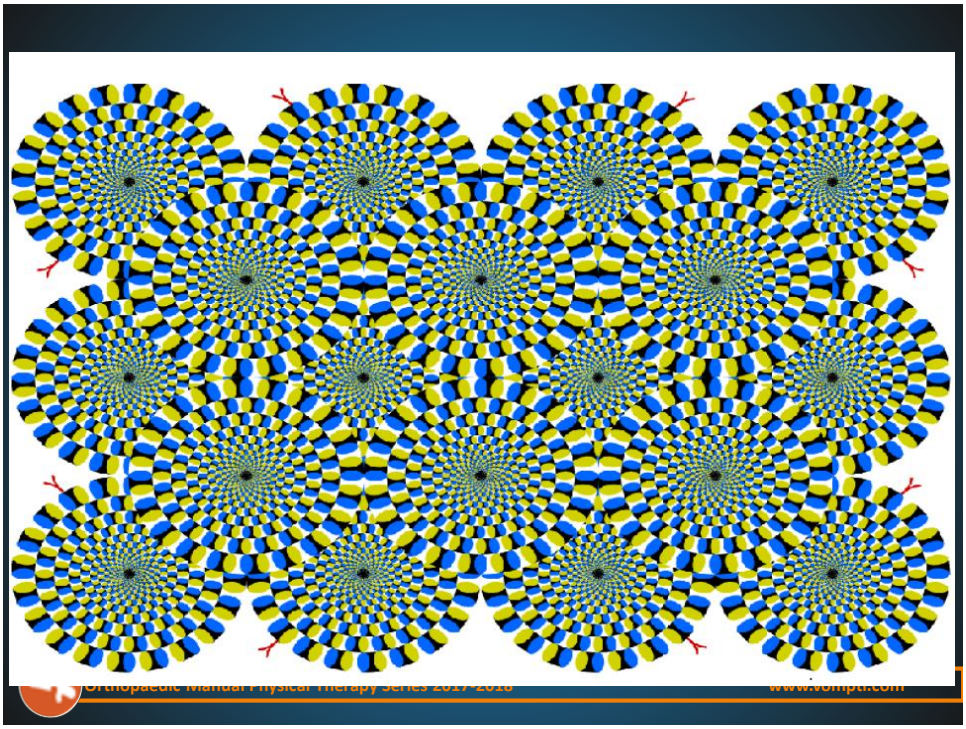
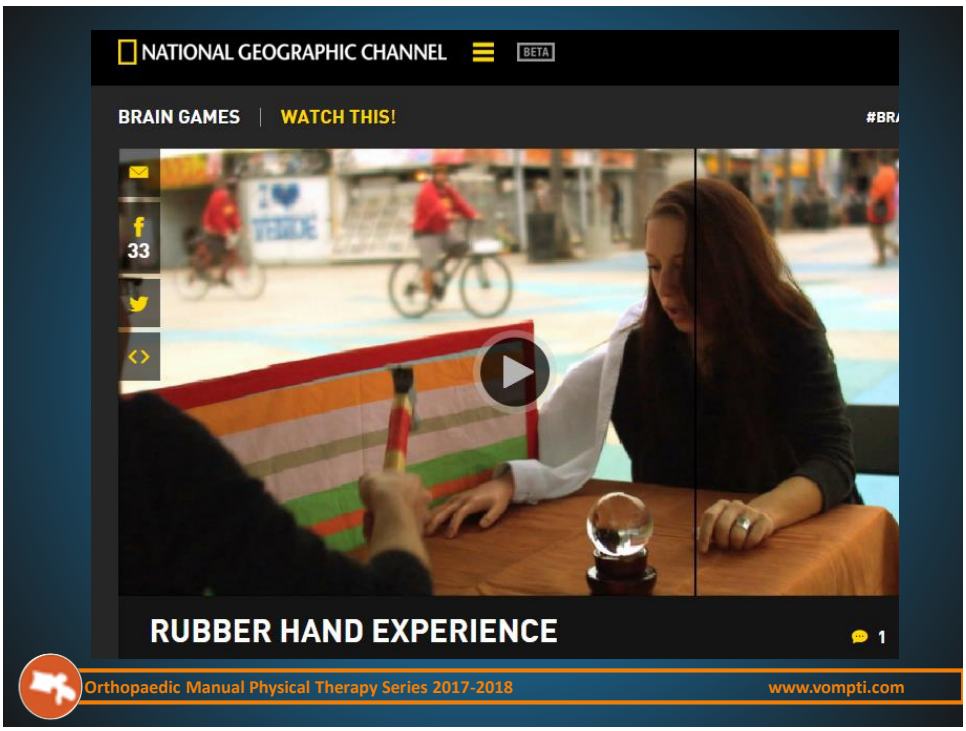
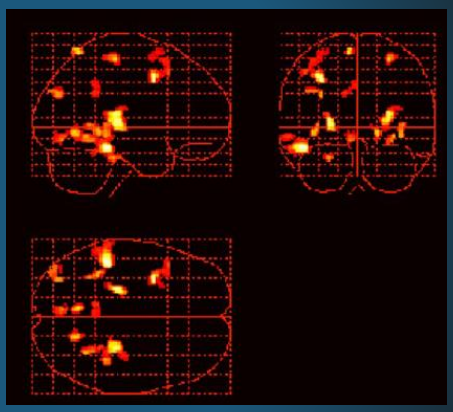




Visualization of Painful Experiences Believed to Trigger the Activation of Affective and Emotional Brain Regions in Subjects with Low Back Pain



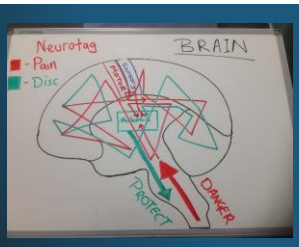
Patients with LBP!

Displayed activation in cortical areas related to pain and emotions

PLoS ONE | November 2011 | Volume 6 | Issue 11

Modern definition of LBP

LBP is a multiple system output, activated by an individual's pain neuromatrix in response to perceived threat



A TYPICAL PAIN NEUROTAG

1. PREMOTOR/ MOTOR CORTEX
   organize and prepare movements
2. CINGULATE CORTEX
   concentration, focusing
3. PREFRONTAL CORTEX
   problem solving, memory
4. AMYGDALA
   fear, fear conditioning, addiction
5. SENSORY CORTEX
   sensory discrimination
6. HYPOTHALAMUS/ THALAMUS
   stress responses, autonomic regulation, motivation
7. CEREBELLUM
   movement and cognition
8. HIPPOCAMPUS
   memory, spacial recognition, fear conditioning
9. SPINAL CORD
   gating from the periphery

DESCENDING MODULATION

Internal regulation system:
- can literally turn afferent input (including nociceptive input) up or down like volume control

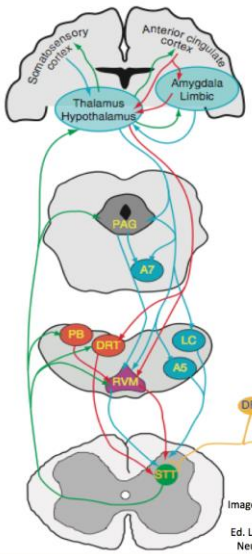


Image: Ossipov MH; Pain Pathways: Descending Modulation. Ed. Larry R Squire; Encyclopedia of Neuroscience 2009 Elsevier Ltd.

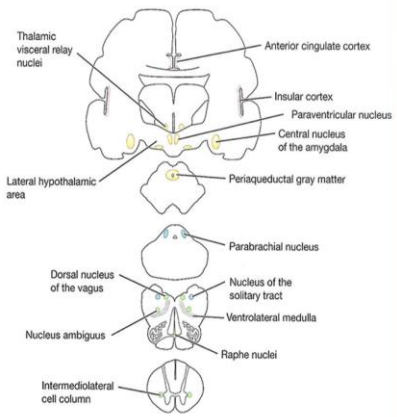
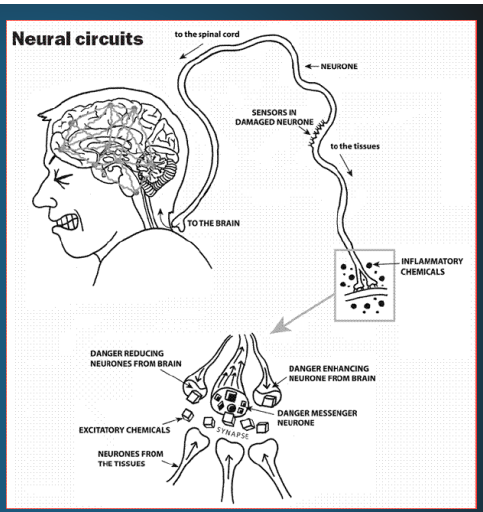


Image: Mayo Clinic Medical Neurosciences 5th Ed

" Amplification of the neural signaling in the CNS that elicits pain hypersensitivity "

Pain/Altered Sensation

- Synaptic and membrane excitability changes in the central nervous system and not necessarily due to processes in tissues



Recognition of central sensitization in patients with musculoskeletal pain: Application of pain neurophysiology in manual therapy practice

Manual Therapy 15 (2010) 135–141

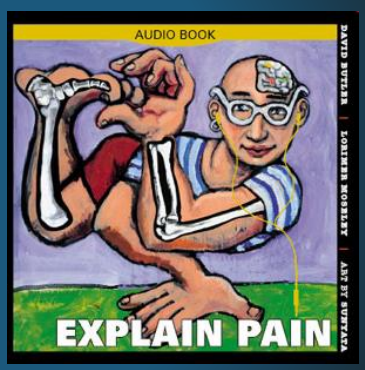
- Central Sensitization
- Alterations in CNS processing
  - Impaired descending inhibitory mechanisms
  - Activation ascending/descending Pain facilitation pathways
  - Increased activity in brain centers involved in acute pain
  - Noxious stimulus are amplified, prolonged, and widely spread : Hyperalgesia
  - Increased excitability : Non noxious → Noxious: Allodynia

How to explain central sensitization to patients with 'unexplained' chronic musculoskeletal pain: Practice guidelines

Manual Therapy 16 (2011) 413–418

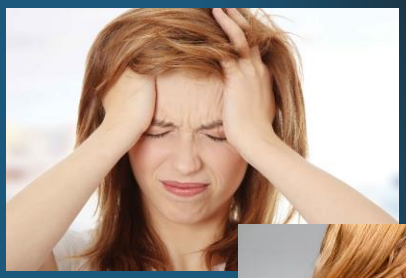
Jo Nijs [a,b,c,*], C. Paul van Wilgen [e,f], Jessica Van Oosterwijck [a,b,c], Miriam van Ittersum [d,e], Mira Meeus [a,b]

- Reconceptualise Pain
- Convince patient hypersensitivity of CNS not local tissue damage is cause of pain
- Educate:
  - Acute vs. Chronic Pain
  - How pain originates in nervous system
    - Nocioceptors
    - Ion Gates
    - Neurons
    - Action potentials
    - Peripheral sensitization
    - Synapses
    - Inhibitory/excitatory chemicals
    - Descending/ascending pathway
    - Role of CNS – Pain memory/perception
  - How pain becomes chronic
    - Plasticity of nervous system
    - Potential sustaining factors of central sensitization
    - Emotions, stress, illness perceptions, pain cognitions, pain behaviors

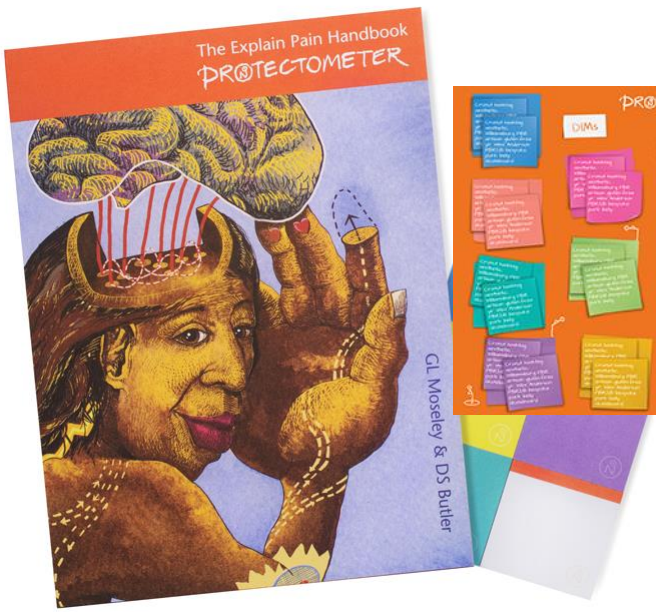


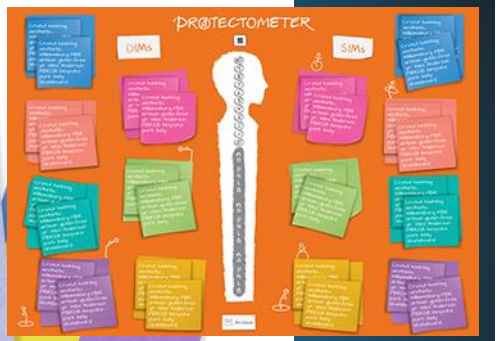
Teach pain is in your head
Without teaching that pain is in your head

- Pain is an output of the brain developed to protect
- Pain is a reflection of the brain's evaluation of danger messages to body tissues
- Modulated by many systems/factors - Beliefs
  - Cognitive
  - Physical
  - Emotional
  - Social
  - Lifestyle

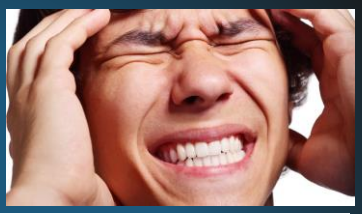


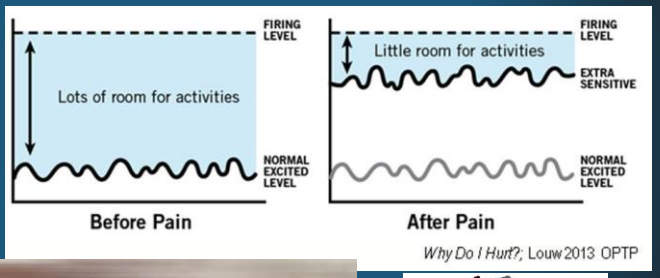
Headache analogy





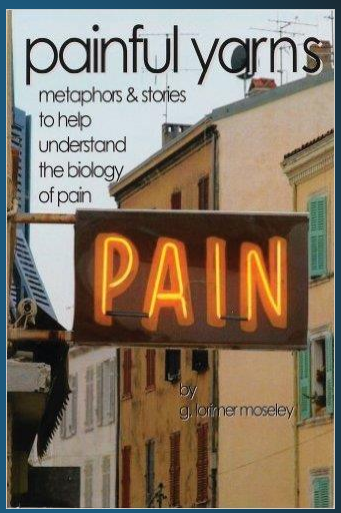
Analogies
Metaphors
Stories



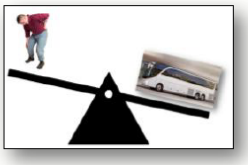


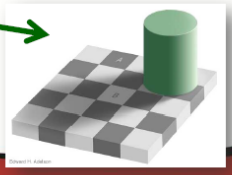
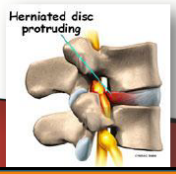
Why Do I Hurt?; Louw 2013 OPTP

TEDxAdelaide - Lorimer Moseley - Why Things Hurt

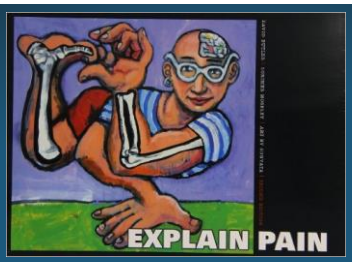


LBP is a
- multiple system
- output
- activated by an individual's pain
- neuromatrix
- in response to
- perceived
- threat

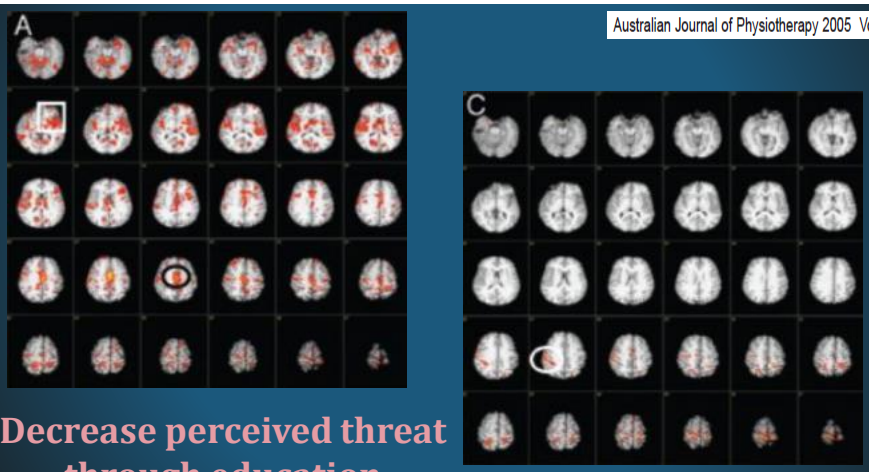
Education is Therapy
ispinstitute.com



- Understand Pain
  - Explain cycle of pain
  - Change beliefs/thoughts/response to pain
  - Reassurance
  - Reduce threat
  - Patient Goal setting
  - Behavior change
- Change Perception of pain as threatening and harmful
- Chronic Pain Physiology
- Nervous system Sensitivity
- Multiple biopsychosocial factors influence

Widespread brain activity during an abdominal task markedly reduced after pain physiology education: *f*MRI evaluation of a single patient with chronic low back pain

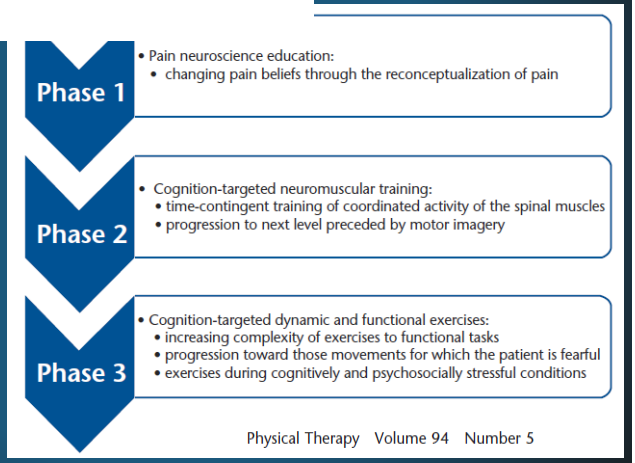
Australian Journal of Physiotherapy 2005 Vol. 51



Decrease perceived threat through education

G Lorimer Moseley

A Modern Neuroscience Approach to Chronic Spinal Pain: Combining Pain Neuroscience Education With Cognition-Targeted Motor Control Training



Physical Therapy Volume 94 Number 5

Cognitive Functional Therapy for Disabling Nonspecific Chronic Low Back Pain: Multiple Case-Cohort Study

Physical Therapy Volume 95 Number 11

Kieran O'Sullivan, Wim Dankaerts, Leonard O'Sullivan, Peter B. O'Sullivan

- **Behaviorally based intervention**
- **Decrease CNS sensitivity**
- **Tailored to individual**
- **Target specific behaviors**
  - **Aggravating postures/activities**
  - **Muscle guarding**
  - **Pain behaviors**
  - **Cognitive/Psychosocial behaviors**
    - **Pain experience**
    - **Thoughts/emotions**

- **Goal of CFT**
  - **Facilitate patients performing painful activity**
    - **Relaxed**
    - **In control of pain**
    - **Different view of pain**
    - **Reduce the threat**
    - **Provide reassurance**
    - **Provide Hope**
    - **Encourage Active approach to Rehab**

Target Functional Behaviors

- Behavior experiments to reduce pain
- Breathing/Relaxation/Mindfulness
- Normalize faulty movement patterns
- Break into component parts
- Enhance Body awareness
- Discourage pain behaviors
- Target fearful/painful activities
- Avoid isolated muscle training
- Graded exposure training
- Confidence – self efficacy

Physical Therapy Volume 95 Number 11

Graded Exposure "Exposure without danger"

- Behavioral intervention
- Encourages confrontation by improving exercise/activity tolerance
- Parameters set based on time (not pain contingent)
  - Frequency
  - Intensity
  - Duration
  - Graduated Progressions

The Effect of a Fear-Avoidance–Based Physical Therapy Intervention for Patients With Acute Low Back Pain: Results of a Randomized Clinical Trial

SPINE Volume 28, Number 23, pp 2551–2560

Steven Z. George, PT, PhD,* Julie M. Fritz, PT, PhD, ATC,† Joel E. Bialosky, PT, MS,‡ and Douglas A. Donald, MPT§

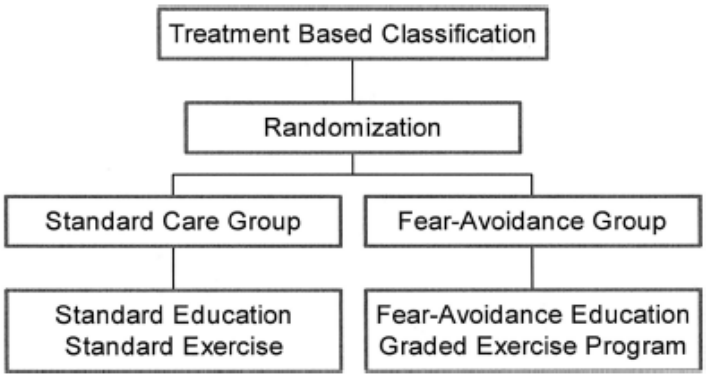


Figure 2. Treatment group components.

The Effect of a Fear-Avoidance–Based Physical Therapy Intervention for Patients With Acute Low Back Pain: Results of a Randomized Clinical Trial

Steven Z. George, PT, PhD,* Julie M. Fritz, PT, PhD, ATC,† Joel E. Bialosky, PT, MS,‡ and Douglas A. Donald, MPT§

- **Resultant disability at 4 weeks/6 months**
- **Dependent on classification and specifically directed intervention**
- **Pts with elevated Fear Avoidance Beliefs benefited from Fear Avoidance directed PT**
- **Pts without elevated Fear Avoidance did not benefit from Fear Avoidance directed PT**

SPINE Volume 28, Number 23, pp 2551–2560

Physical Therapy Utilization of Graded Exposure for Patients With Low Back Pain

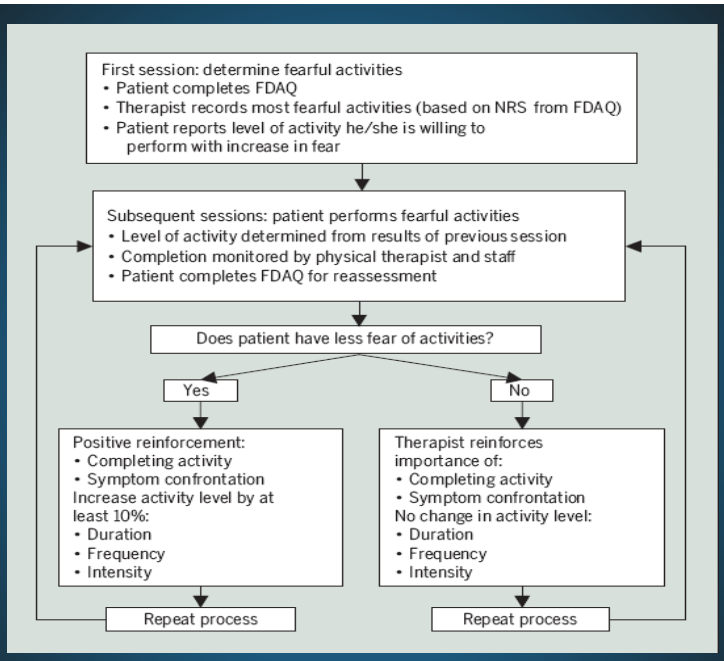
FEAR OF DAILY ACTIVITIES QUESTIONNAIRE (FDAQ)

People with low back pain have told us that they are fearful of performing certain activities because they believe these activities will cause additional low back pain, or reinjure their back. Examples of such activities are listed below. Using the provided scale, please rate each activity for the amount of fear it causes you, as it relates to your low back pain. Because not all activities are fearful for all people, we are also asking you to list 2 different activities that cause you fear, and to rate the fear associated with those activities.

0 ———— 100
No fear of activity — Maximal fear of activity

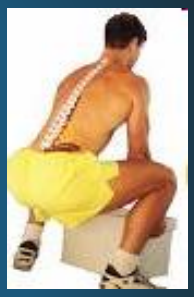
Activity	Rating (0-100)
1. Sitting for longer than 1 hour	_____
2. Standing for longer than 30 minutes	_____
3. Walking for longer than 30 minutes	_____
4. Lifting less than 20 pounds*	_____
5. Lifting 20 pounds* or more	_____
6. Carrying less than 20 pounds*	_____
7. Carrying 20 pounds* or more	_____
8. Twisting	_____
9. Reaching to the floor	_____
10. Performing back exercises	_____
11. _____	_____
12. _____	_____

George SZ JOSPT 2009



Graded Exposure

- Behavioral approach
- Decrease fear through controlled experience
- Encourages confrontational response
- Patients learn (direct experience) activities will not harm the spine
- Fearful activities assessed (FDAQ)
- Modified position, frequency, intensity, duration – not fearful
- Education, Positive reinforcement, Utilize coping strategies



Exercise for chronic musculoskeletal pain: A biopsychosocial approach

Musculoskeletal Care. 2017;1–9.

- Understand Pain biology- "Explain Pain"
- Frequently reassure pts – Safe to move
- Exercise time, not pain based
- Have responses to 'flare ups'
- Individualized, enjoyable – related to patient goals
- Lower exercise dose
- Provide feedback, correct technique
- Emphasis on restoring movement confidence

Feasibility and Safety of a Virtual Reality Dodgeball Intervention for Chronic Low Back Pain: A Randomized Clinical Trial

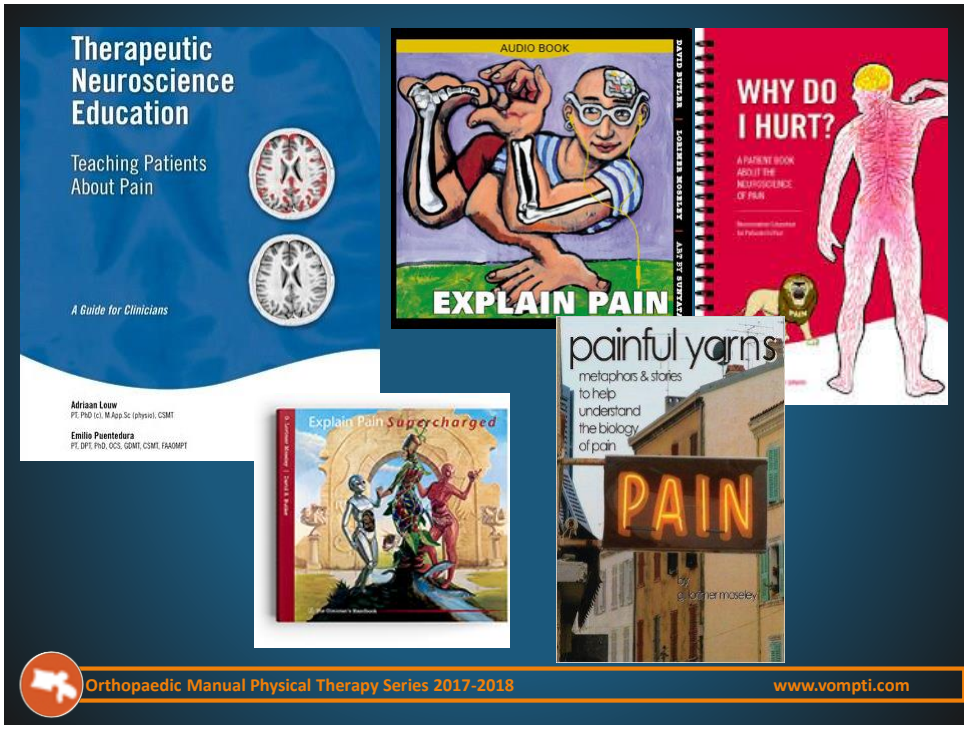
The Journal of Pain, 2016

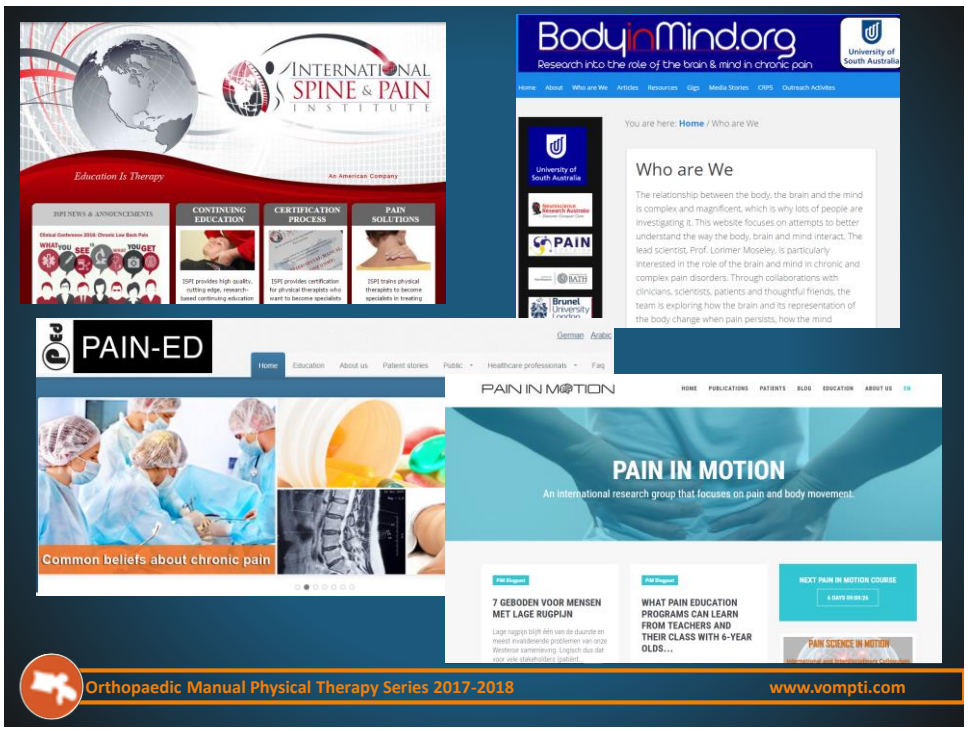
- Increased Lumbar flexion
- No adverse effects
- No increased pain/disability
- No increased pain medication use

What did you like most about the game?	"It was a fun way to engage my back in exercise and I was most focused on the game than the pain in my body."

Treatment interventions

- Therapeutic Neuroscience Pain Education
  - Reduce fear, Improve coping ability
  - Improve understanding, Ergonomics, Back school
  - Encourage confrontation
- Empower patient
- Multi Disciplinary approach
- Aerobic Exercise
- Cognitive Functional Training
- Graded Exposure (time not symptom based)
  - Early active mobility
  - Return to normal activity levels - modified without increasing pain
- Graded Exercise
  - Graduated- progressive Exercise
  - Restore function, improve disc/cartilage nutrition, promote bone/muscle strength, increased endorphin levels and reduce pain sensitivity





How much would you pay to live pain free?

By Christopher Ingraham August 7

actually pose it to people: "Consider your overall satisfaction with life being often troubled by pain, what would you be willing to pay to be just as happy but without pain?"

The answer: between $56 and $145. *A day*. Which works out to between $20,000 and $53,000 *a year*. Recall that the median household income is about $56,000, and the trade-off becomes stark: Some people would theoretically be willing to give up their entire livelihoods to be pain-free.

Dr J Pain Cases....