



## Psychosocial Factors in Low Back Pain

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## Objectives

- Recognize contributions of yellow flags, green flags, black flags, and blue flags in effective management of low back pain.
- Understand differences with treatment mediators, treatment moderators, and prognostic factors.
- Synthesize different biopsychosocial pain models.
- Outline problems with the biomedical pain relief model in musculoskeletal pain conditions.



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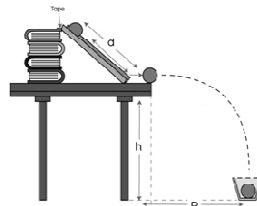
## Objectives

- Demonstrate understanding of the fear-avoidance model including the important role of health care provider beliefs.
- Recognize the role of fear, catastrophizing, depression, and self-efficacy in low back pain and methods used to measure meaningful change.
- Identify the role of central sensitization.
- Assimilate strategies to address biopsychosocial factors to enhance therapeutic efficacy.



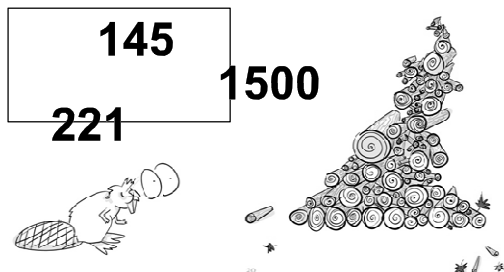
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## Models to Predict Low Back Pain



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If one prognostic factor is good....



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## Nature of Low Back Pain

- Typically see a rapid improvement in 4 weeks (BMJ 2003)
- 90% with LBP stop consulting in 3 months
- Persistent symptoms typical
- 1-year incidence between 1.5% and 36% (Wheeler, 2014)
- Neither constant pain nor complete pain relief is typical



Lots of Complexity!!!



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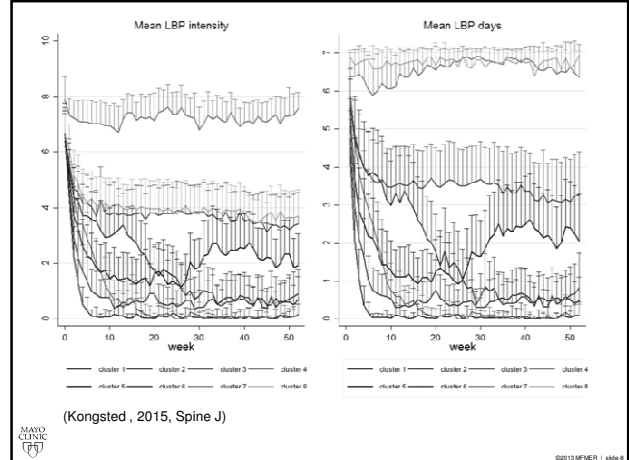
## Risk Factors for Onset of LBP

- Women > men
- Older > younger (until age 65)
- Lower education
- Workplace factors (blue flags)
- Psychosocial factors (somatization, anxiety, depression, fear)
- General health
- Cultural factors
- Hypertension, smoking, obesity risk factors are associated with sciatica.

(Delitto, 2012, JOSPT)



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## Red Flags



Sudden change in bowel/bladder, saddle area anesthesia

Sustained fever, IV drug user, weak immune system

Trauma, fall, osteoporosis

History of cancer (prostate, breast, lung), unexplained weight loss, unchanging lasting weeks

1/20 with LBP, 15-35 yo, night pain, 1+ hours morning stiffness

**Cauda Equina**

**Infection**

**Fracture**

**Cancer**

**Inflammatory (AS)**



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## NASCAR - Yellow Flags



- **Yellow Flag:** Means there is a hazard on the track ahead, slow down and no overtaking.



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## Screening for Back Pain Yellow Flags

Yellow flags are factors that increase the risk of developing, or perpetuating long term disability and work loss associated with low back pain.

Includes Blue, Black, and Yellow Flags.



(Kendall et al, 1997)

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## Blue Flags



### Big 7 Work Issues

1. Heavy physical demands (self-reported)
2. Inability to modify work
3. Lack of workplace support
4. Increased job stress
5. Job dissatisfaction
6. Poor expectations for return to work
7. Fear of re-injury (patient thinks they need to be 100% to return to work)

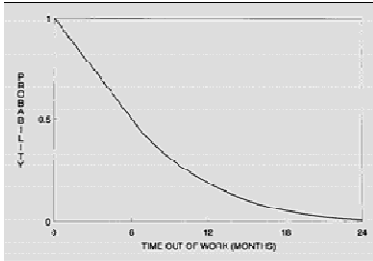
\*\*Less likely to return to work if newer worker or with increased time passed before reporting symptoms.

(Lea, Spine 2003; Carragee, Spine 2005; Shaw, JOEM, 2009)



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## Returning to work



Dramatic decrease in probability of returning to work over time.



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## Black Flags



- Policies/Compensation issues
  - financial disincentive
  - reimbursement
- Lower Income/Education
- Comorbidities
  - Smoking history
  - Number of surgeries
  - Chronic pain states



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## Newsweek Article "The Price of Pain"

2-12-08



"In part, we're just guilty of trying to keep hitting things with the same hammer over and over again and not taking a step back and rethinking the problem and considering whether an exercise program, more physical therapy, may be beneficial."

– Richard Deyo



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## Green Flags



- Centralization
  - Powerful predictor of improvement
  - Patients will likely benefit from directional preference exercises
- Clinical Prediction Rules
  - Manipulation (Flynn, 2002; Childs, *Annals Int Med*, 2004)
  - Stabilization (Hicks, *Phys Ther*, 2005)



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## Yellow Flags – Psychosocial Factors



- Emotional issues (Linton, *Spine* 2000)
  - Depression
  - Anxiety/Distress
  - Social Withdrawal
  - Self-Efficacy
  - Passive Coping Style
- Family issues
- Fear avoidance issues
  - Fearful, Fear avoidant, Kinesiophobia
  - Catastrophizing

\*\*Catastrophizing and kinesiophobia predicted low back pain and disability cohort of 1845 subjects (Picavet 2002)



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## Prognostic Factors for Development of Chronic LBP

- Symptoms below the knee
- High pain intensity
- Widespread pain
- Low expectations of recovery
- Higher baseline disability
- Being non-employed

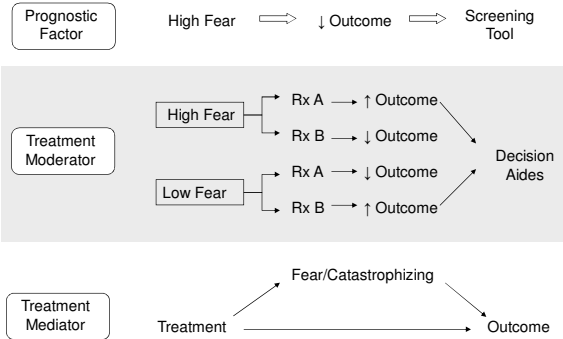


(Delitto, 2012, JOSPT; Grotle 2010, Pain; Turner 2008, Spine; Pincus 2008, Arth Rheum)



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## Prognostic Factors, Moderators, Mediators



## Psychosocial Pain Models

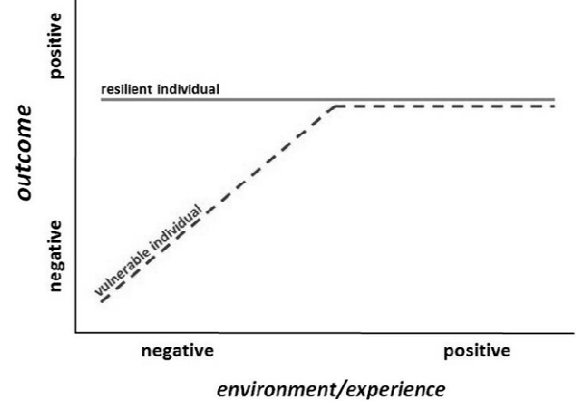
1. Stress-diathesis model (Schultz, 2004)
2. Self-efficacy model
3. Acceptance/contentment model
4. Mis-directed problem solving model (Crombez, 1997)
5. Fear-avoidance model (Lethem & Troup, 1983)

(Linton & Shaw 2011)



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## Diathesis-Stress/Dual-Risk Model



## Self-Efficacy Model

Self-Efficacy = a person's belief about their capabilities.

- Domain specific
- People have beliefs about their capabilities to deal with LBP
- Modifying/improving self-efficacy may improve their management of LBP



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## Acceptance/Contentment Model

- Coping strategies are dependent on person's acceptance of current state
- Rx with minimizing their focus on factors out of their control
- Focus on acceptance of current condition
- Become content to manage current state
- Move forward/turn the page



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## Misdirected Problem Solving Model

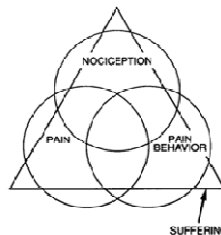
- Worry about current situation
- Ruminates
- Hyper-vigilance to pain
- Therapy involves cognitive behavioral therapy to overcome misdirected focus on pain and current state.

(Crombez, 2007)



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## Fear Avoidance Model

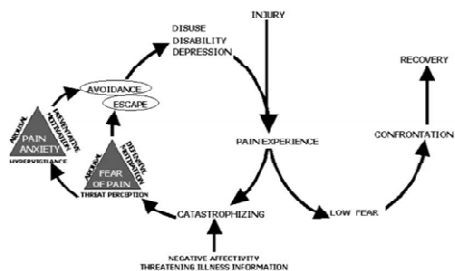


- LETHAM ('83) & TROUP ('87)
- "Fear avoidance model of exaggerated pain perception (FAMEPP)"



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## Updated Fear-Avoidance Model



(Leeuw, 2007, J Behav Med)



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## Fear-Avoidant Attitudes and Beliefs

- Belief that pain is harmful
- Belief that all pain must be abolished before returning to activity
- Expectation of increased pain with activity or work
- Expecting the worst
- External locus of control, belief that pain is uncontrollable
- Passive attitude to rehabilitation



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## Fear of Low Back Pain



The only thing we have to fear is....

.... Disability depends more on the fear avoidance than on pain or physical pathology ---  
**The fear of pain is more disabling than the pain itself.**

Crombez G. Pain related fear is more disabling than pain itself: evidence on the role of pain-related fear in chronic LBP disability. *Pain*. 1999;80:329-339.



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## Confronters

- Strong desire to return to normal activities
- Confront pain barriers
- Adaptive response
- Synchronous sensory and emotional components of pain
- Gradual return to activity



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## Avoiders

- Fear of harm and reinjury with activity
- Reduced activity
- Maladaptive response
- Exaggerated pain perception
- Desynchronous relationship between sensory and emotional pain components
- Increasing disability



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## Screening for Fear-Avoidance Beliefs

- Self Report Questionnaires
  - Fear Avoidance Beliefs Questionnaire (FABQ)
  - Tampa Scale for Kinesiophobia (TSK)
- Can we just tell by looking?
- Scanner?



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## Identifying Fear-Avoidance Beliefs by Therapists Managing Patients with Low Back Pain (Calley et al, 2010, JOSPT)

80 Subjects from 3 PT clinics with LBP completed FABQ, TSK, PCS, ODI, 2 item brief fear avoidance

8 Therapists performed blinded ratings of perceived subject fear avoidance based on the clinical exam

### Results

- Therapists consistently under-rated actual fear avoidance scores

- Therapists ratings had moderate reliability (ICC=0.6 to 0.8) but poor accuracy

- Therapist ratings were actually predictive of baseline elevated disability scores, and some association with catastrophizing

- The 1 item screening question, "are you afraid that physical activity will increase your LBP" may have value as a 1 question screen for elevated fear avoidance beliefs (a no response is more meaningful, -LR=.027).



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## Elevated Fear-Avoidant Belief Correlations Seen During Physical Exam

- Decreased walking speed
- Limited lumbar flexion
- Decreased spinal extensor strength
- Decreased lifting capacity
- Decreased trunk muscle surface EMG (49.5% lower)
- Decreased lumbar velocity during reaching task
- Decreased ability to lift 7 kg from floor to table height
  
- No change with limited hip flexion or limited thoracic flexion

(Thomas, Eur Spine J 2008)



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## How to Quantify Fear-Avoidance Beliefs and Fear of Activity

- Fear-Avoidance Beliefs
  - FABQ – Fear Avoidance Beliefs Questionnaire
  - TSK – Tampa Scale of Kinesiophobia
- Fearful Activities

PHODA (Kugler, 1999; Trost, *Pain*, 2009)

<http://www.sciencedirect.com/science/article/pii/S1526590007007298>

[http://www.psychology.unimaas.nl/phoda-sev/Phoda-SeV\\_UK.htm](http://www.psychology.unimaas.nl/phoda-sev/Phoda-SeV_UK.htm)

FDAQ (George, *Phys Ther*, 2009)

<http://ptjournal.apta.org/content/89/9/969.full.pdf+html?sid=dd4742b4-e7b5-48fe-8ff8-1c04d01118a>



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## FABQ – What is it good for?

- Reliable and valid way of identifying patients who have high pain avoidance beliefs.
- Useful with various clinical prediction rules (Lumbar/thoracic spinal manipulation or stabilization prediction rules)
  - FABQ-W <19 = one of 5 criteria predicting positive lumbar manipulation outcome
  - FABQ-PA ≤ 9 = one of 4 criteria predicting negative stabilization outcome
  - FABQ-PA <12 = one of 6 criteria predicting positive thoracic manipulation in patients with neck pain
- FABQPA scores were more predictive of 1 year disability in subjects with chronic low back pain. (Grotle, *Spine* 2006)



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## FABQW – What is it good for?

- Identifies individuals with a high likelihood of developing chronicity (at risk of not returning to work)
  - >34 FABQ-W have a +LR=3.33
  - <29 FABQ-W have a -LR=0.08  
(Fritz, *Phys Ther* 2002)
- Acute LBP – 6 month predictive value
  - >20 FABQW were 5 times more likely to not improve
  - <5 FABQW were 3 times more likely to have improvement  
(George, *JOSPT* 2008)
- Insurance – No predictive value with private insurance patients. FABQW predicted disability in workers comp patients.
  - (Cleveland *Euro Spine J* 2008)



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## Catastrophizing

### Catastrophizing ....

is a maladaptive response defined as an exaggerated orientation towards pain stimuli and pain experience.



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## If you've heard of other catastrophies...



Catastrophizing = Tendency to ruminate, magnify  
.... or feel helpless about pain.



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## How to Quantify Catastrophizing

**Pain Catastrophizing Scale (PCS)**: a 13-item self-report questionnaire used to quantify patient pain catastrophizing.

Items on the PCS are rated on a 5-point scale and the questionnaire can be subdivided into three components:

- rumination
- magnification
- helplessness

### **Pain Vigilance and Awareness Questionnaire**

(Sullivan, 1995; Kraaijaat, 2003)



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## Depression

\*\*Quite possibly the most important yellow flag we should be screening for (Haggman et al. 2004)

15-22% incidence of all patients seen in primary care (5-8% major depression)

### How to Quantify Depression

- Beck Depression Inventory
- Zung Depression Scale
- Geriatric Depression Scale
- 9-question Patient Health Questionnaire (PHQ-9)
- 2-question Patient Health Questionnaire (PHQ-2)



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## How to Screen for Depression

### Two questions are as good as many (PHQ-2):

1. "During the past month, have you often been bothered by feeling down, depressed, or hopeless?"
2. "During the past month, have you often been bothered by little interest or pleasure in doing things?"

If responses to either of the above are yes, then follow up with the question:

3. "Is this something that you would like help with?"

(Arroll, 2005)



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## How to Screen for Depression

### Want a screening tool with high sensitivity

\*\*A sensitive test that is negative rules out the disorder.

- Two item screening test for depression had sensitivity of 96% and a specificity of 57% for major depressive episode.
- Additional "help" question had sensitivity of 75% and a specificity of 94%.
- The positive likelihood ratio for the help question was 13.0 and the negative likelihood ratio was 0.27.

(Arroll, 2005)



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## How to Address Depression

- Referral to Primary Care
- Anti-Depressant Medications
- Exercise
- Cognitive Behavioral Therapy
- Education - Inspire Hope



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## How to Quantify Self-Efficacy

### Pain Self Efficacy Questionnaire (PSEQ)

10 questions about the patient's confidence in carrying out various normal activities despite the pain.

Total score ranges from 0 to 60 points with higher scores indicating higher perceived pain self-efficacy.

### Chronic Pain Self-Efficacy Scale (CPSS)

22-item questionnaire, 3 factors: Self-efficacy for pain management, coping with symptoms, and physical function.



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## How to Quantify Self-Efficacy

### PAIN SELF EFFICACY QUESTIONNAIRE (PSEQ) M K Nicholas (1989)

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

Please rate how confident you are that you can do the following things regularly despite the pain. To indicate your answer circle **one** of the numbers on the scale under each item, where 0 = not at all confident and 5 = completely confident.

For example:

0 1 2 3 4 5 6  
Not at all Completely  
Confident confident

Remember, this questionnaire is **not** asking whether or not you have been doing these things, but rather how confident you are that you can do them at present, despite the pain.

1. I can enjoy things, despite the pain.

0 1 2 3 4 5 6  
Not at all Completely  
Confident confident

(Nicholas, 1989)



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## How to Address Self-Efficacy

- Patient Centered Care
- Motivational Interviewing
- Active Listening
- Graded Exposure/Exercise
- Education - Inspire Hope

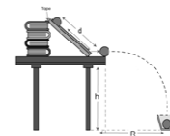


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## Biomedical Model (Pain Relief Model)

View: LBP is a disease caused by anatomic pathology

Management: Identify and treat pathology, relieve associated stresses



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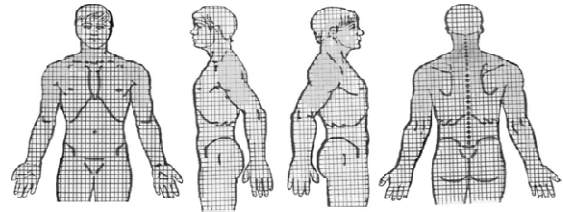


## Problems with Pain Relief Model

1. High number of false positives with imaging (Chou, 2007)
2. Variability in nervous system processing (Coghill, 2003)
3. Variability in pain location (O'Neill, 2009)
4. Very controlled force of pain stimulus has poor correlation with pain intensity



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C4-C5 discogram pain referral map.



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## Biomedical Management



### Feedback given to patients:

- Base explanation on anatomical model
- Abnormality in anatomy = pathology
- Pain is a sign to limit activities
- Interventions are a "progression"



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## Biopsychosocial Model

**View:** LBP is a common condition or experience strongly influenced by psychosocial factors, not a serious disease.

**Management:** Identify patients at risk for chronicity, and use interventions that decrease the likelihood they will become chronic including graded exercise and graded activity.



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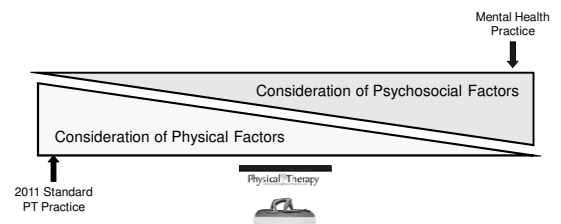
## Biopsychosocial Management

- De-emphasizes anatomical findings
- Encourages patient to take an active role in his or her recovery
- The Back Book is an educational tool used to lower fear-avoidance
  - Teach patients to remain active
  - Become confronters not avoiders
  - Back pain is a common experience
  - Graded exercise
  - Graded exposure to activities that are perceived as painful



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## Current Management of LBP



PTJ, May, 2011

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Patient asks, "How can I exercise when everything I do hurts?"

#### Biomedical

Let pain be your guide

How's your pain now?

Does this exercise hurt?

Just try your best.

Lets get rid of your pain  
1st...then we'll try exercise

Ignore psychosocial factors

#### Biopsychosocial

Explain that hurt ≠ harm

Educate on chronic pain  
changes brain processing

Set quota based goals

Do not keep asking patient  
how their pain is doing

Give positive expectations of  
improved function

Address psychosocial factors



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## How to Address Fear-Avoidance & Catastrophizing

### Graded Exercise

- Goal: improved activity tolerance, not pain
- Prescription based on therapist determined quota of intensity, duration, & repetition, NOT on patient response to pain
- Positive reinforcement given when quotas are met
- Quota is progressed until desired functional level is reached (~10% increase once each quota is reached is recommended)
- Encourage positive expectations
- Avoid anatomical explanation of pain
- Regularly review clinic performance
- Positive feedback

(George, 2003)



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## Effect of Physical Activity on Pain-Related Fear

- Elfving, *Phys Ther Res*, 2007  
Subjects with low back pain that reported lower physical activity levels had higher pain catastrophizing and fear avoidance beliefs.

- Lin, Pain, 2011  
Persons with chronic LBP have lower activity levels. Persons with acute/subacute LBP have variable activity levels.



Let's Encourage Activity!



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## How to Address Fear-Avoidance & Catastrophizing

### Graded Exposure

- Based on phobia model
- Need to use PHODA or FDAQ to identify fearful activities
- Graded exposure to fearful stimulus
  - Example: Spider
- Increase patient confidence in doing fearful activity

(George, 2009)



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## Can fear avoidance be lowered in 1 session?

Jellema found no changes in FABQ scores at baseline, 6 weeks and 52 weeks in two groups of subjects with subacute low back pain managed by their general practitioner.

Group A – minimal intervention strategy aimed at identifying and addressing psychosocial factors including fear avoidance, catastrophizing, distress – one 20 minute intervention session.

Group B – standard care



(Jellema, 2005)

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## Using Neurophysiology Education to Lower Patient Fear

Explain:

- -Neurophysiology
- -Nociceptive pathways
- -Spinal inhibition and facilitation
- -Peripheral & central sensitization
- -Nervous system plasticity

(Butler D. & Moseley GL. Explain Pain. Noigroup, 2003)



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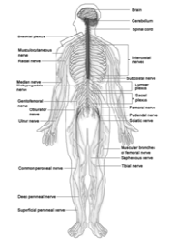
## Therapeutic Neuroscience Education Name recognition

- David Butler
  - Neuro Orthopaedic Institute
- Lorimer Moseley
  - Body in Mind
- Adriaan Louw
  - International Spine & Pain Institute
- Jo Nijs
  - Pain in Motion

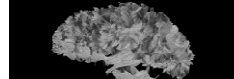


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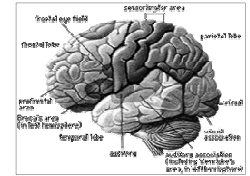
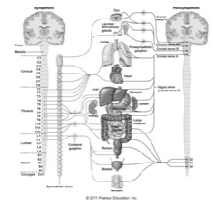
## Neuroanatomy 101



[http://en.wikibooks.org/wiki/Human\\_Physiology/The\\_Nervous\\_System](http://en.wikibooks.org/wiki/Human_Physiology/The_Nervous_System)



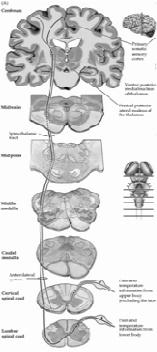
<http://www.neurosurgery.pitt.edu/research/surgical-neuroanatomy-lab>



<http://www.willamette.edu/~gorri/classes/cs445/brain.html>

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## Overview of Nociceptive Input Anterolateral System (ALS) / Spinothalamic Tract (STT)



First order neuron (A $\delta$  and C fibers)

- Free nerve ending  $\rightarrow$  DRG  $\rightarrow$  [Lamina I & II]  $\rightarrow$

Second order neuron

- Decussate  $\rightarrow$  Rostral to Ventral Posterior Lateral Nucleus of [Thalamus]  $\rightarrow$

Third order neuron

- Synapse on primary somatosensory cortex

(Purves et al, 2001)



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## What is pain and how do we describe it?

International Association for the Study of Pain :

- "An unpleasant **sensory and emotional** experience associated with **actual or potential** tissue damage, or described in terms of such damage."

- Activity in the nociceptor and nociceptive pathways by a noxious stimulus is not pain
- Pain is **always a psychological state**
- Pain most often has a proximate physical cause

### IASP Taxonomy

Pain	Hypoesthesia	Nociceptive stimulus
Allodynia	Neuralgia	Nociceptor
Analgesia	Neuritis	Noxious stimulus
Anesthesia dolorosa	Neuropathic pain	Pain threshold
Causalgia	Central neuropathic pain	Pain tolerance level
Dysesthesia	Peripheral neuropathic pain	Paresthesia
Hyperalgesia	Neuropathy	Sensitization
Hyperesthesia	Nociception	Central sensitization
Hyperpathia	Nociceptive neuron	Peripheral sensitization
Hypoalgesia	Nociceptive pain	



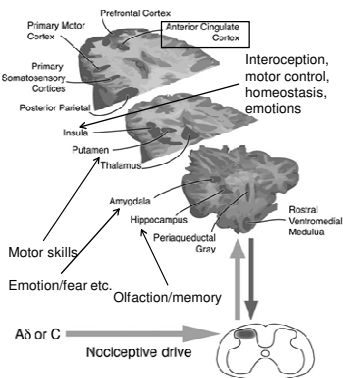
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## Cerebral Signature of Acute Pain

Brain regions that activate during a painful experience

- Bilaterally active
- Increased activation on the contralateral hemisphere.

"We do not yet have a central signature that unequivocally reflects peripheral nociceptive inputs"

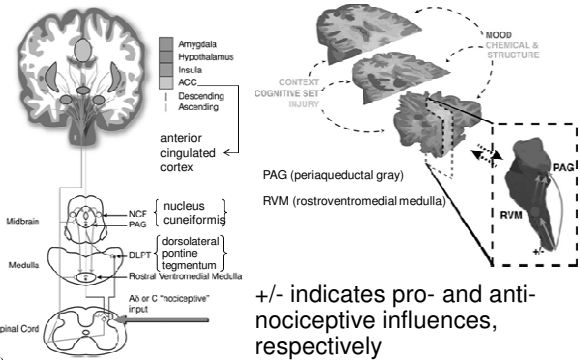


(Tracey & Mantyh 2007)



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## Descending Pain Modulation

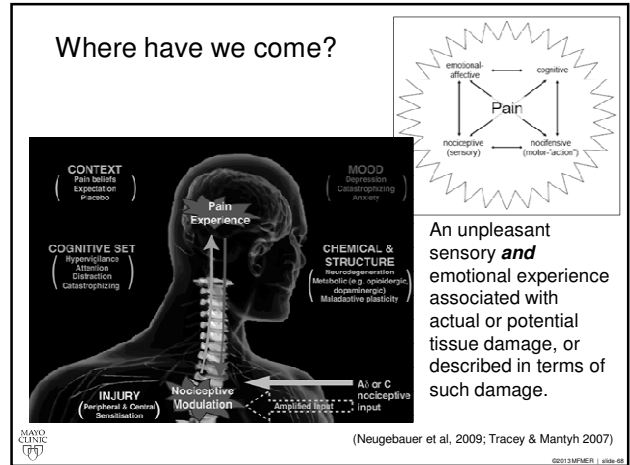
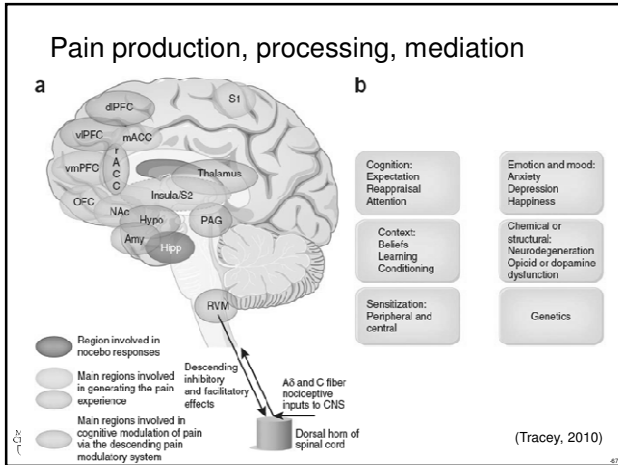


+/- indicates pro- and anti-nociceptive influences, respectively

(Tracey & Mantyh 2007)



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### Clinical Application Examination and plan

- A 64-year-old female with history of CLBP
- Outcome tools (initial visit, immediately after first session, 7-month follow-up)
- NPRS = 9/10, ODI = 54%, FABQ-W= 25/42, FABQ-PA = 20/24 and Zung Depression Scale = 58
- Treatment
  - abbreviated NE approach
  - exercises (range of motion, stretches, and cardiovascular),
  - aquatic therapy
- Twice a week for 4 weeks, (8 visits)

(Louw, Puentedura, Mintken 2012)

### Clinical Application The Peripheral Nervous System

“In your case, you developed back pain and based on many issues (pain, treatment, explanations, job and family) the nerves in your back have become very sensitive, but because your nervous system is one large, attached system that connects your low back to your hip, legs, neck and shoulders, the “system” wakes up. The good news is that we can explain this and the more you understand about this, the more your nerves will calm down.”

(Louw, Puentedura, Mintken 2012)

### Clinical Application CNS and Neuromatrix

“Pain is a response by the brain based on the perceived threat. Your pain is real. The pain you experience though may not be a true reflection of your tissues. Your whole brain is involved in processing the pain.”

(Louw, Puentedura, Mintken 2012)

### Clinical Application Output Systems

“These systems are there to protect you. It is normal. However, these systems need to be restored to normal resting levels. Why are they active? Threat. Every time you experience pain and not understand it (which we already discussed) your systems will get activated. Can you now see why understanding your pain better can help? Basically the large lion (big threat) becomes a small lion cub which is less threatening and you need not call on these systems too much to protect you.”

(Louw, Puentedura, Mintken 2012)

## Clinical Application Subsequent PT visits

- Reinforce the neuroscience message
- Explain back to you their understanding of the sections above
- Focus on cardiovascular exercise
- Develop a home exercise program
- Work on setting goals for their job, ADL's, exercise, recreation and social interaction
- Set goals for therapy – especially prognosis



(Louw, Puentedura, Mintken 2012)

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## Clinical Application Outcomes

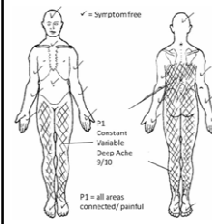


FIGURE 1. Pattern of the patient's pain.

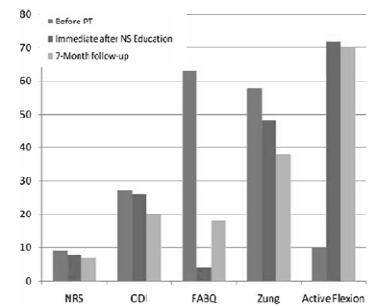


FIGURE 2 Results for pain, disability, fear-avoidance beliefs, depression, and range of motion.



Louw, Puentedura and Mintken 2012

## In the Clinic Patient education tools

Understanding Pain: What to do about it in less than five minutes?



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## In the Clinic Patient education tools

TEDxAdelaide  
Lorimer Moseley - Why Things Hurt



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## Neurophysiology of Pain Questionnaire (True or False)

1. Receptors on nerves work by opening ion channels (gates) in the wall of the nerve.
2. When part of your body is injured, special pain receptors convey the pain message to your brain.
3. Pain only occurs when you are injured.
4. The timing and intensity of pain matches the timing and number of signals in nociceptors (danger receptors).
5. Nerves have to connect a body part to your brain in order for that body part to be in pain.
6. In chronic pain, the central nervous system becomes more sensitive to nociception (danger messages).
7. The body tells the brain when it is in pain.



(Moseley 2003)

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## Neurophysiology of Pain Questionnaire (True or False)

8. The brain sends messages down your spinal cord that can increase the nociception (danger message) going up your spinal cord.
9. The brain decides when you will experience pain.
10. Nerves adapt by increasing their resting level of excitement.
11. Chronic pain means that an injury hasn't healed properly.
12. Nerves can adapt by making more ion channels (gates).
13. Worse injuries always result in worse pain.
14. Nerves adapt by making ion channels (gates) stay open longer.
15. Second-order nociceptor (messenger nerve) post-synaptic membrane potential is dependent on descending modulation.



(Moseley 2003)

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## Neurophysiology of Pain Questionnaire (True or False)

16. When you are injured, the environment that you are in will not have an effect on the amount of pain you experience.
17. It is possible to have pain and not know about it.
18. When you are injured, chemicals in your tissue can make nerves more sensitive.
19. In chronic pain, chemicals associated with stress can directly activate nociception pathways (danger messenger nerves).

Answers: 1. T; 2. F; 3. F; 4. F; 5. F; 6. T; 7. F; 8. T; 9. T; 10. T; 11. F; 12. T; 13. F; 14. T; 15. T; 16. F; 17. F; 18. T; 19. T

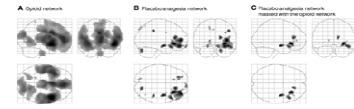
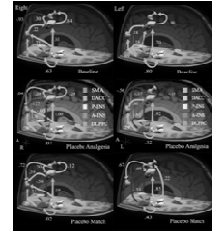


(Moseley 2003)

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## Where do we go from here?

- Acute pain
- Fibromyalgia
- Chronic Musculoskeletal pain
- Low Back Pain
- Placebo/Nocebo
- Empathy



SYSTEMATIC REVIEW

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

Adrian Lowe, PT, MAppS, Ina Dimer, PT, PhD, David S. Butler, PT, EdD, Emilio J. Puenteduro, PT, DPT

Lowe et al. 2011; Holden, 2004; Petrovic et al. 2002; Cogans et al. 2007



## Central Sensitization

Defined as:

- augmentation of responsiveness of central neurons to input from unimodal and polymodal receptors

Encompasses:

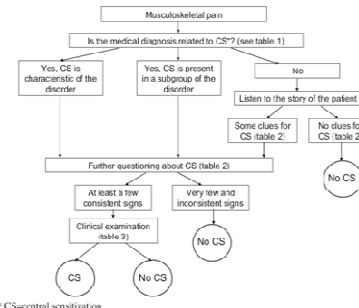
- altered sensory processing in the brain
- malfunctioning of descending anti-nociceptive mechanisms
- increased activity of pain facilitatory pathways
- temporal summation of second pain or wind-up
- long-term potentiation of neuronal synapses in the anterior cingulate cortex

(Nijs, 2010)



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## Recognition of Central Sensitization



\* CS=central sensitization

Fig. 2. Diagnostic clinical reasoning process to recognize central sensitization, CS, central sensitization.

(Nijs, 2010)



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## Recognition of Central Sensitization

Table 1  
Medical diagnosis associated with an increased likelihood for central sensitization.<sup>a</sup>

Medical diagnosis	Central sensitization is a characteristic of the disorder	Central sensitization is present in a subgroup
Chronic low back pain	✓	✓
Chronic whiplash associated disorders	✓	✓
(Sub)acute whiplash associated disorders	✓	✓
Temporomandibular disorders	✓	✓
Myofascial pain syndrome	✓	✓
Osteoarthritis	✓	✓
Rheumatoid arthritis	✓	✓
Fibromyalgia	✓	✓
Chronic fatigue syndrome	✓	✓
Chronic headache	✓	✓
Irritable bowel syndrome	✓	✓

<sup>a</sup> Based on evidence from scientific studies (Langemark et al., 1993; Merris et al., 1997; Maixner et al., 1998; Eumstein et al., 2000; Curatolo et al., 2001; Weisman-Fogel et al., 2003; Giesecke et al., 2004; Wolfe and Michaud, 2004; Prellsticker et al., 2005; Schmidt-Wilcke et al., 2006; Vierck, 2006; Yunus, 2007b; Nijs et al., 2008).

(Nijs, 2010)



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## Recognition of Central Sensitization

Table 2  
Symptoms related to the presence of central sensitization.

Symptom	Characteristic of CS	Might be related to CS
Hypersensitivity to bright light	✓	
Hypersensitivity to touch	✓	
Hypersensitivity to noise	✓	
Hypersensitivity to pesticides	✓	
Hypersensitivity to mechanical pressure	✓	
Hypersensitivity to medication	✓	
Hypersensitivity to temperature (high and low)	✓	
Fatigue		✓
Sleep disturbances:		✓
Unrefreshing sleep		✓
Concentration difficulties		✓
Swollen feeling (e.g. in limbs)		✓
Tingling		✓
Numbness		✓

CS, central sensitization.

(Nijs, 2010)



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## Recognition of Central Sensitization

**Table 3**  
Overview of the clinical examination of patients with suspected central sensitization.<sup>a</sup>

Clinical tests
1. Assessment of pressure pain thresholds at sites remote from the symptomatic site
2. Assessment of sensitivity to touch during manual palpation at sites remote from the symptomatic site
3. Assessment of sensitivity to vibration at sites remote from the symptomatic site
4. Assessment of sensitivity to heat at sites remote from the symptomatic site
5. Assessment of sensitivity to cold at sites remote from the symptomatic site
6. Assessment of pressure pain thresholds during and following exercise
7. Assessment of joint end feel
8. Brachial plexus provocation test

<sup>a</sup> For all the tests used for the assessment of central sensitization, hypersensitivity to a stimulus needs to be demonstrated at both symptomatic and distant sites (Yunus, 2007a).

(Nijs, 2010)



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## Other Tools to Screen for Psychosocial Factors for LBP

1. Orebro Pain Questionnaire
2. Cassandra Prediction Rule
3. Large Databases - FOTO
4. STarT Back Screening Tool



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## Orebro Musculoskeletal Pain Questionnaire

A systematic review found that the OMPQ had moderate ability to predict long-term pain and disability.

25 items

(Hockings, Spine, 2008)

### Orebro Musculoskeletal Pain Screening Tool

By MSK.Meica  
Open iTunes to buy and download app.

**Description**  
Screen patients for risk of developing pain related disability. The Short Form Orebro Musculoskeletal Pain Screening Questionnaire (MSKMeica Web Site) - Orebro Musculoskeletal Pain Screen.

**What's New in Version 1.1**  
+++ Swedish Translation

iPhone Screenshots



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## 5-Item Cassandra Predictive Rule

In the past month, how much were you distressed by:

	NOT AT ALL	A LITTLE	MODERATELY	QUITE A BIT	EXTREMELY	
1-Feeling everything is an effort	0	1	2	3	4	DK
2-Trouble getting your breath	0	1	2	3	4	DK
3-Hot or cold spells	0	1	2	3	4	DK
4-Numbness or tingling in parts of your body	0	1	2	3	4	DK
5-Pain in your heart or chest	0	1	2	3	4	DK

**Coding:** The 5-item Cassandra score is obtained by calculating the mean of non missing items (one missing/DK item allowed; cut-off: 0.80). Patients whose score is < 0.80 are at low risk of long-term, severe, back-related functional limitations and may benefit the most from conservative treatment. Patients whose score is ≥ 0.80 are at high risk of long-term, severe, back related functional limitations and may warrant more aggressive interventions and a closer follow-up. DK: Don't know.

(Dionne, J Clin Epidemiol, 2011)



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## FOTO – Focus on Therapeutic Outcomes

**INPATIENT FUNCTIONAL STATUS SUMMARY**

**Adjusted Clinical Risk**

Age	50	0	0
Sex	Female	0	0
Smoking Status	Smoker	0	0
Disability	Severe	0	0
Insurance	Medicaid	0	0
Comorbidities	None	0	0
Diagnosis	Low Back Pain	0	0
Procedure	Discectomy	0	0
Surgeon	Dr. Smith	0	0
Operative Time	120	0	0
LOS	3	0	0
30 Day Mortality	0	0	0
30 Day Readmission	0	0	0
30 Day Reoperation	0	0	0
30 Day Complication	0	0	0
30 Day Cost	\$10,000	0	0
30 Day Satisfaction	85%	0	0

**Functional Status Measures**

Initial Score: 20  
Interpretation of FS Score/Stage Value: 20

**Rehabilitation Resource Predictors**

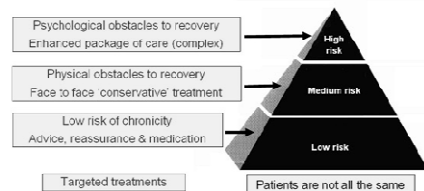
Pre-op Physical/FK Change: 15  
Discharge FS Score: 60  
Visit/episodes: 11  
Duration of Episodes in Days: 60  
Satisfaction Score: 85%



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## STarT Back Screening Tool

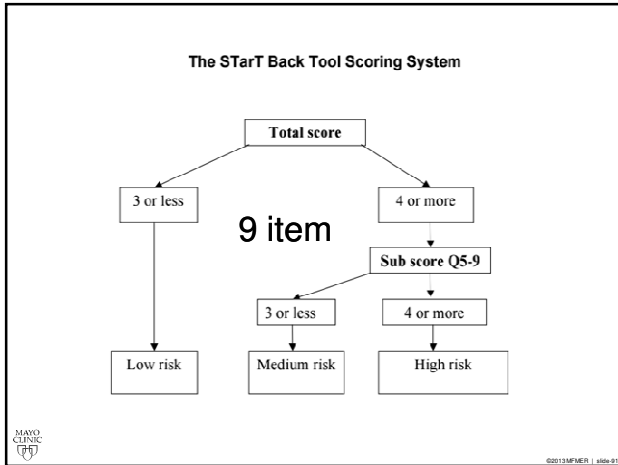
Concept of subgroup & targeting for primary care low back pain



(Hill, Eur J Pain, 2009)



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### STarT Back Screening Tool in Physical Therapy Settings

**Fritz 2011 PTJ** – Prospective case series of 214 patients receiving physical therapy for LBP. The SBT categorized 33.2% of the patients as being at low risk, 47.7% as being at medium risk, and 19.2% as being at high risk.

Concept of subgroup & targeting for primary care low back pain

Relative to the low-risk category, the high-risk category had larger improvements in predicted outcomes and the medium-risk category had similar improvements in predicted outcome.

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### STarT Back Screening Tool in Physical Therapy Settings

**Foster, Ann Int Med, 2014** - Patients (n = 922) given usual care or stratified via STarT back tool and given matched treatment. Clinically important improvements in RMDQ scores for high risk group 2.3 (95% CI, 0.8-3.9) and smaller significant changes in medium risk group 0.7 (95% CI, 0.1-1.4).

Concept of subgroup & targeting for primary care low back pain

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### Influence of Practitioner Beliefs

**Poiraudau, S. et al. Fear-avoidance beliefs about back pain in patients with subacute low back pain. Pain, 2006:124;305-311.**

- 286 Rheumatologists participated
- 443 patients with subacute (4-12 week) LBP participated
- Completed modified self rated FABQ
- Completed FABQ, Quebec Back Pain Disability Scale, Hospital Anxiety Depression questionnaire
- Average Scores
  - FABQ-PA = 9.2
  - FABQ-W = 16.7
  - 10% of physicians had high (>14) FABQ-PA scores
  - FABQ-PA = 16.7
  - FABQ-W = 19.3
  - 68% of patients had high (>14) FABQ-PA scores

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### Influence of Practitioner Beliefs

**Results**

Significant associations with patient's elevated FABQ-PA scores and:

- Lower level of education (OR 4.19; 95% CI 1.83-9.57)
- Physicians' high fear-avoidance beliefs (OR 5.92, CI 1.31-26.32)

**Summary**

- Patients with subacute LBP with elevated FABQ-PA scores see physicians with high fear-avoidance beliefs about back pain.
- Provider interactions with patients may influence their fear avoidance beliefs.

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### Practitioner Beliefs Matter

Coudeyre reported a correlation in general practitioner FABQ-PA scores and patient scores on the FABQ-PA and FABQ-W.

General Practitioner (n=709): FABQ-PA 9.6, FABQ-W 17.4

Patients with Acute LBP (n=2727): FABQ-PA 16.8, FABQ-W 19.5

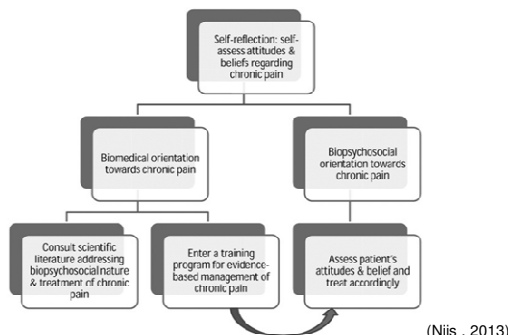
(Coudeyre, 2007)

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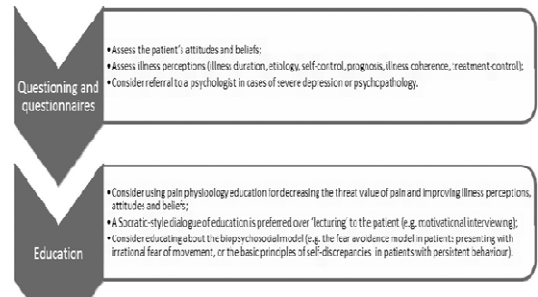
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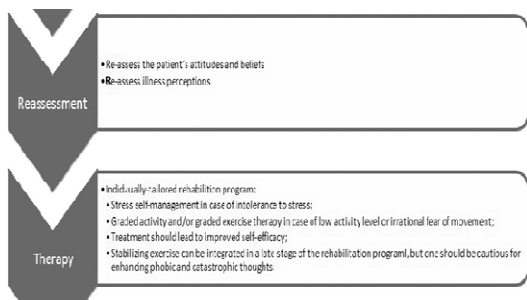
## Clinical Application Self reflection for integrating into clinic



## Clinical Application Self reflection for integrating into clinic



## Clinical Application Self reflection for integrating into clinic



## How to Self-Assess Your Own Beliefs

- Pain Attitudes and Beliefs Scale for Physiotherapists (PABS-PT)
- Health Care Providers' Pain and Impairment Relationship Scale (HC-PAIRS)

## Questions to ask ourselves

1. Are we fear avoidant?
2. Are we helping build confronters or avoiders?
3. Are we biomedically or bio-psychosocially oriented?
4. Can we communicate about psychosocial factors in a helpful way to the patient?

## Do what we do best.....

- Be Positive!
- Active listening
- Provide reassurance
- Artful communication
- Explicit interest and consideration of psychosocial factors
- Educate about LBP as a common experience



## Take Home Messages

1. Need to be aware of and screen for red, yellow, black, blue, green flags.
2. There are multiple prognostic factors, moderators, mediators.
3. Several psychosocial pain models exist.
4. Psychologically informed PT practice is a proposed paradigm shift.
5. Need to quantify and address patient fear, catastrophizing, depression, self-efficacy.



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## Take Home Messages

6. Utilize Graded Exercise, Graded Exposure or Neuroscience Education to lower fear-avoidance.
7. Central Sensitivity can be identified.
8. Therapist beliefs matter.
9. Screening tools exist to guide psychosocial management (ie STarT Back Tool).
10. Recognize your biomedical vs biopsychosocial orientation.



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