Pain: retraining mind & brain (FS-20)

Jo Nijs (Belgium)
Rob Smeets (Netherlands)
Mark Bishop (United States of America)
Niamh Moloney (Australia)
Exercise therapy for chronic pain: retraining mind & brain

Niamh Moloney, Mark Bishop, Rob Smeets & Jo Nijs
MANDATORY DISCLOSURE
Dr. Niamh Moloney

International Association for the Study of Pain
A warm welcome to Mark Bishop @physiobish on Twitter! #worldexpert #partyanimal #Sefid14Sev
(Re)United Province of Limburg
Overview

- Introducing rationale for retraining mind & brain
- Exercise therapy targeting pain cognitions & movement-related fear – Rob
- Nonspecific factors & their ‘overlooked’ role in exercise therapy - Mark
- Exercise therapy in work-related musculoskeletal disorders – Niamh
- Exercise therapy for desensitizing the sensitive nervous system? - Jo

- Discussion with audience
Spinal ‘damage’ in people *free of pain*

<table>
<thead>
<tr>
<th>Imaging Finding</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
<th>70</th>
<th>80</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk bulge</td>
<td>30%</td>
<td>40%</td>
<td>50%</td>
<td>60%</td>
<td>69%</td>
<td>77%</td>
<td>84%</td>
</tr>
<tr>
<td>Facet degeneration</td>
<td>4%</td>
<td>9%</td>
<td>18%</td>
<td>32%</td>
<td>50%</td>
<td>69%</td>
<td>83%</td>
</tr>
</tbody>
</table>

Spinal ‘damage’ in people **free of pain**

<table>
<thead>
<tr>
<th>Imaging Finding</th>
<th>Age (yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Disk degeneration</td>
<td>37%</td>
</tr>
<tr>
<td>Disk signal loss</td>
<td>17%</td>
</tr>
<tr>
<td>Disk height loss</td>
<td>24%</td>
</tr>
<tr>
<td>Disk bulge</td>
<td>30%</td>
</tr>
<tr>
<td>Disk protrusion</td>
<td>29%</td>
</tr>
<tr>
<td>Annular fissure</td>
<td>19%</td>
</tr>
<tr>
<td>Facet degeneration</td>
<td>4%</td>
</tr>
<tr>
<td>Spondylolisthesis</td>
<td>3%</td>
</tr>
</tbody>
</table>

Posture & shoulder pain

10 original studies

2 systematic reviews

no evidence suggesting a role for posture in shoulder pain

Rufa. Physical Therapy Reviews 2014
Treat the man, not the scan!

>70y: 2/3 has tendon damage but no pain
(Milgrom 1995)

35% athletes: significant damage on MRI but no pain
(Major & Helms 2002)
Whiplash-associated disorders

- Central sensitisation (i.e., hypersensitivity of the nervous system)
- Post-traumatic stress
- Dysfunctional stress response systems
- Impaired cervical neuromuscular control
- Dysfunctional endogenous analgesia in response to exercise
- Cognitive-emotional factors, including maladaptive pain cognitions
normal situation

central sensitization
4 main predictors/mediators of + treatment outcome?


- self-efficacy
- depression
- pain catastrophizing
- physical activity
Maladaptive pain cognitions & attitudes

barrier for effective exercise therapy
catastrophizing
kinesiophobia
somatization
stress
depression

Cognitive emotional sensitization
inhibition

facilitation
therapeutic alliance↑↑
treatment expectations↑↑
inhibition
facilitation
Overview

- Introducing rationale for retraining mind & brain
- **Exercise therapy targeting pain cognitions & movement-related fear** – Rob
- Nonspecific factors & their ‘overlooked’ role in exercise therapy – Mark
- Exercise therapy in work-related musculoskeletal disorders – Niamh
- Exercise therapy for desensitizing the sensitive nervous system? - Jo

- Discussion with audience
Exercise therapy targeting pain cognitions and movement-related fear in chronic pain management

Rob J.E.M. Smeets, MD, PhD
Pain and treatment

• Mostly trying to solve the impairments diagnosed
• However, often no clear biomedical explanation for the persistence of chronic pain
• Nevertheless, treatment mostly primarily aimed at restoring health related physical fitness
• Partly based on the ‘deconditioning syndrome’-hypothesis that deconditioning hampers execution of physical daily life activities

Bortz West J Med. 1984;141:691-4
Mayer et al. Spine 1985;10:482-93
Physical deconditioning

• The evidence for the existence and development of physical deconditioning (VO$_2$max, CSA and fibre distribution back muscles, energy expenditure (double labelled H$_2$O-level) in CLBP is still inconclusive!

Smeets et al. Disability and Rehabilitation 2006;28:673-693
Smeets et al. Pain 2007;130:201-202
Previous research in CLBP

- RCT aerobic and muscle strengthening exercises versus Graded Activity and Problem Solving Training and all together.
- All three were equally effective in reducing level of disability and QoL
- GA plus PST is cost-effective

Smeets et al. BMC Musculoskeletal Disorders 2006:7:5
Process evaluation

• Not increase of aerobic fitness or muscle strength but reduction of pain catastrophizing was mediating factor


• Higher expectancy and credibility after explanation of rationale was associated with better outcome

Other developments

• Fear avoidance model was introduced in 2000 by Vlaeyen and Linton
• Increasing proof of influential role of psychological factors (catastrophizing, fear of injury, depression etc) in the development and maintenance of chronic pain associated disability

Nicholas et al, Eur J Pain 2007
Pincus et al, Arthritis Rheum 2006
Swinkels-Meewisse et al, Spine 2006
Other developments

• Trial showed that treatment based on FA-model (Graded Exposure) was equally effective but more cost-effective as Graded Activity in CLPB with higher levels of fear measured with the Tampa Scale of Kinesiophobia

• Reduction in disability was mediated by reduction of catastrophizing thoughts but level of fear was no moderating factor

Leeuw et al. Pain 2008;138:192-207
Genetics

Provoking factors

Tissue damage

Neurophysiological and immunological changes, plasticity

Cognitions

Environment

Person

Psychophysiology

Pain behavior

PAIN

Genetics
Cognitive factors

- Attributions
- Misinterpretation of symptoms
- Fear of movement, injury, pain, disability
- Expectancies
- Depression
- Anxiety
- Coping with stress/problems
Fear avoidance model

- Pain experience
- Injury/strain
- Disuse
- Disability
- Depression
- Avoidance/escape
- Hypervigilance
- Fear of movement
- (Re)injury, pain
- Catastrophizing
- Low fear
- Recovery
- Exposure

Vlaeyen. IASP Press, 2003;24:631-650
Pain related fear

Patients with chronic pain report fear for…….
Interoceptive stimuli

Mild pain, physiological sensations (crack, discoloration, increased sweating etc.) are interpreted as new or increased damage.
Proprioceptive stimuli

Stimuli that occur while performing activities or movement are interpreted as potentially dangerous and that they will elicit new or increased damage.
Exteroceptive stimuli

Information of care providers, results of MRI, or information of other patients that confirms the by the patient feared situation (loss of work, being wheelchair dependent)
Effect of pain related fear

Avoidance and escape behavior

Avoidance
“I am not lifting any heavy things because this will damage my back.”

Escape
“As soon as I feel pain I will quit doing that activity, as pain means that damage will occur in my back.”
Role of care-provider

- Attitudes and attributions do have a clear impact on the content of the treatment they will provide and its outcome
- More biomedical oriented care-providers provide advice that results in a less active lifestyle

But some jobs are really dangerous!!
Graded Exposure in Vivo

- Originally based on the extinction of a classically conditioned association
- Nowadays also seen as a cognitive process: fear network that is activated, expectations are being tested and adjusted
- Based on an individualized hierarchy of pain related stimuli
- Behavioral experiments
Graded exposure in chronic pain

1. Screening and the construction of fear hierarchy

2. Education plus explanation of treatment rationale

3. Graded exposure in vivo
Screening

• PT, OT, PS additionally to physiatrist, perform an analysis of cognitive, behavioral and physiological factors and functional goals

• Mainly focussing on:
  - Fearful cognitions/conditional assumptions; “Feeling pain means damage/harm”
  - Formulation of questions in terms of threat and harm instead of fear
  - How does the patient interpret the results of the performed diagnostic tests?
Fear hierarchy: PHODA

- Photograph series of Daily Activities: pictures of activities are rated by patient using a thermometer
- Four versions:
  - Back
  - Upper extremity
  - Lower extremity
  - Adolescents
Education (personalised FA-model)

**Negative consequences:**
- Physical fitness decreased
- Feeling depressed, guilty, angry
- Experiencing less quality of life
- Sleep disturbances

**Behavior:**
- Avoiding playing with sons, working as a nurse, sports, riding a bike
- Walking with crutches when outdoors
- Sitting while ironing, cooking, getting the kids dressed
- Pacing (good and bad days)

**Cognitions:**
- If the pain increases and I go on, I have to blame myself for ending up in a wheelchair
- Pain is a sign that something is wrong (doctor told me: CRPS = inflammation of the nerves)
- I have to be careful otherwise CRPS will spread to my other leg or to my arms

**Onset CRPS-I after ankle sprain**

<table>
<thead>
<tr>
<th>Medical interventions</th>
<th>Effect?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taking rest</td>
<td>-</td>
</tr>
<tr>
<td>Medication</td>
<td>-</td>
</tr>
<tr>
<td>Physical therapy</td>
<td>-</td>
</tr>
<tr>
<td>TENS</td>
<td>start +, later on - only a few weeks</td>
</tr>
<tr>
<td>Nerve blocks</td>
<td></td>
</tr>
</tbody>
</table>

**Current pain experience**

**Pain-related fear**
Behavioral experiment

- Activity is chosen (fear hierarchy, personal relevance)
- Patient formulates expectations and scores credibility
- Therapist shows activity
- Patient performs activity (no safety behavior; as normal as possible)
- Evaluation; re-scoring credibility and discuss expectations
CRPS example
After 18 sessions
After 18 sessions
Summary

- Biopsychosocial theory of pain instead of medical theory
- Goal is to reduce disability through reducing pain-related fear or other attributions
- Focus is on reducing disability and NOT pain
- It is not about ignoring pain, but about not allowing pain to restrict your life and attaching different meaning to pain after exposure (shift away from pain)
Summary

• The general assumption that activity increases pain and certain pain levels implicate loss of control over daily life performance is challenged over time of treatment
Graded Exposure CRPS-I: REMOVE trial

- Graded exposure in vivo versus pain contingent exercise (Oerlemans)
- Moderate to high level of fear of movement/pain (PHODA >33)
- One arm or leg affected
- Follow-up 6 months
- Mean duration of complaints; 5 years
REMOVE trial: results

- Significant and clinically relevant improvement
  - Disability (functioning with arm or leg)
  - Quality of life
  - Pain intensity
  - Catastrophizing
  - PHODA
  - Analysis physiological signs and accelerometry data in progress

- Mechanisms of effect currently studied with fMRI
Many challenges still exist!

Thanks for your attention
Overview

- Introducing rationale for retraining mind & brain
- Exercise therapy targeting pain cognitions & movement-related fear – Rob
- **Nonspecific factors & their ‘overlooked’ role in exercise therapy** - Mark
- Exercise therapy in work-related musculoskeletal disorders – Niamh
- Exercise therapy for desensitizing the sensitive nervous system? - Jo
- Discussion with audience
Florida Gators?
Non-specific factors?

- Expectations
- Contextual factors
- Therapist effect/therapeutic alliance
Expectations

• Very broad construct
  – Peck et al identified 65 separate expectations in patients seeking treatment at VA

• General types
  – Normative
  – Ideal
  – Predicted
    » Defined by Thompson and Sunol, 1995
Expectations and outcome

• Associated with outcomes across ICF domains
Expectations for exercise

• General Exercise
  – Self-efficacy and outcome expectations are known predictors of exercise behavior among older individuals
    – King et al, 2002; Shaughnessy et al, 2006
  – A significant relationship between outcome expectations related to exercise and exercise
    – Conn, 1998; Schneider, 1997
  – Outcome expectations may be predictors of exercise behavior than self-efficacy expectations
    – Resnick, 1998
Outcome Expectations for Exercise Scale: Utility and Psychometrics

Barbara Resnick,¹ Sheryl Itkin Zimmerman,²,³ Denise Orwig,⁴ Anne-Linda Furstenberg,² and Jay Magaziner⁴
How we’ve measured this
Patient centered outcome

• Developed for patients with pain
  » Robinson 2005

• Examines pain, fatigue, emotional distress and interference with activity
  – Usual
  – Desired
  – Expected
  – Most important to address
Patient centered outcome

On a scale of 0 (none/not affected) to 100 (worst imaginable/most affected), indicate the levels you expect after treatment for your...

• mobility __________
• self-care __________
• interactions with people __________
• community and social life __________
• energy and drive __________
• mental function __________
• emotional distress __________
• sensory function __________
• pain __________

— Bishop et al, 2012
Simple survey

• Measure and use interventions based on patient preference and expectation

• I believe ________________ will significantly help to improve this episode of my back pain.
Expectations for exercise

• Specific to pain
  – Older adults and expected outcome
  – Current levels: 38/100, expected levels post: 15/100
    • So expected exercise to reduce pain 60%!
      – Bishop et al, 2012

  – For spinal disorders
Expectations for exercise

I believe this intervention will significantly help to improve this episode of pain

Disagree
Unsure
Agree
Challenges

• So generally high expectations for exercise in rehabilitation

• What happens when these aren’t met?

• Remember the older adults?
  – Expected level post: 15; Actual level post: 33
Expectation mechanisms

• Likely work through placebo as an active mechanism of intervention
Therapeutic Alliance

“Practitioners who attempted to form a warm and friendly relationship with their patients, and reassured them that they would soon be better, were found to be more effective than practitioners who kept their consultations impersonal, formal, or uncertain.”

Di Blasi et al., 2001
Therapeutic alliance

• The intervention “buffet”
Clinical Application

• Measure and use interventions based on patient preference and expectation
  – Patient centered outcome questionnaire
  – Patient preference survey tools
With some help from our friends

- Meryl Alappattu
- Jason Beneciuk
- Rogelio Coronado
- Corey Simon
- Carolina Valencia

- Joel Bialosky
- Sergio Romero
- Michael Robinson
- Steven George
Overview

- Introducing rationale for retraining mind & brain
- Exercise therapy targeting pain cognitions & movement-related fear – Rob
- Nonspecific factors & their ‘overlooked’ role in exercise therapy - Mark

- **Exercise therapy in work-related musculoskeletal disorders** – Niamh

- Exercise therapy for desensitizing the sensitive nervous system? - Jo

- Discussion with audience
Exercise for work related neck and arm pain - fostering stress resilience

DR NIAMH MOLONEY
Let’s talk about Cathy...

Non-specific neck/arm pain

Fear of losing job

Neural tissue sensitisation

Poor job control

Thermal & Pressure hyperalgesia

High work stress

Sedentary
Evidence for exercise in work-related neck pain

Work related: Preliminary evidence that strengthening & endurance exercises beneficial

Chronic mechanical neck pain: Low-moderate quality evidence to support specific strengthening exercise

Work: Aerobic exercise effective

Mechanical neck pain: Low quality evidence of little or no benefit from aerobic exercise

Sihawong et al. J Manip Physiol Ther 2011; Andersen et al. Man Ther 2010; Gross et al. 2015 The Cochrane Library 2015, Issue 1
Evidence for exercise in work-related upper limb pain

Low quality evidence no effect of exercise on pain or disability vs. control

Low quality evidence aerobic exercise better than specific exercise for pain at short term

Verhagen et al. 2013 The Cochrane Library 2013, Issue 12
Sensory profiles in non-specific neck and arm pain

+Ve pressure pain sensitivity
- median nerve and tibialis anterior in office workers
- neck in trapezius myalgia

+Ve Heat and cold pain sensitivity in office workers
- Ve in idiopathic neck pain and chronic trapezius myalgia

Conditioned pain modulation
- work related upper limb conditions = controls
- dysfunctional in those with higher pressure pain sensitivity

Pain sensitisation in office workers with non-specific arm pain

But not everyone is sensitised....
Different sensory phenotypes evident

<table>
<thead>
<tr>
<th>Sensory Phenotype</th>
<th>Group</th>
<th>Between-Group Differences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NSAP</td>
<td>CR</td>
</tr>
<tr>
<td>Sensory loss_{small}</td>
<td>3 (7.5)</td>
<td>2 (12)</td>
</tr>
<tr>
<td>Sensory loss_{large}</td>
<td>4 (10)</td>
<td>2 (12)</td>
</tr>
<tr>
<td>Sensory loss_{mixed}</td>
<td>5 (12.5)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>Sensory hypersensitivity</td>
<td>7 (18)</td>
<td>5 (29)</td>
</tr>
<tr>
<td>Sensory hypersensitivity and sensory loss</td>
<td>11 (27)</td>
<td>1 (6)</td>
</tr>
<tr>
<td>NAD</td>
<td>10 (25)</td>
<td>6 (35)</td>
</tr>
<tr>
<td>Total</td>
<td>40 (100)</td>
<td>17 (100)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Psychological profiles in work-related neck and arm pain

Poor job satisfaction
Poor decision making control
Poor workstyle

Stress/High perceived job stress
Depression
Catastrophizing

Macfarlane et al, 2000; Sim et al., 2006, Bongers et al. 2002, Henderson et al., 2005;
Stress-regulation system

Brain arousal/renewal systems
Fear circuits

Autonomic system

HPA axis

Inflammatory/immune system

Kozlowska, Harvard Rev Psychiatry 2013
Chronic Stress

Stress

Cortisol dysregulation

Hypo-cortisolism
Hyper-cortisolism

Pro-inflammatory response

Knorr et al. 2010; Smith & Vale 2006; Vachon-Presseau et al. 2013; Generaal et al. 2014
Cathy...

**Stress Buffer**

- Higher physical activity
- Lower stress levels

Non-specific neck/arm pain
- Neural tissue sensitisation
- Thermal & Pressure hyperalgesia
- Fear of losing job
- Poor job control
- High work stress
- Sedentary

Lower physical activity
Chronic Stress
Pain sensitisation

Rabey et al. *Pain* 2015; Geulayov et al. General Hospital Psychiatry 2010
Stress buffering

Stress resistance ≠ absence of stress response
Rather…allows an organism to experience greater stress intensities and/or longer stress duration before stress consequences cross over from adaptive to maladaptive

Stress resilience
People require less time and/or treatments to recover after crossing the tipping point from adaptive to maladaptive effects

Fleschner et al. Stress 2011
Can exercise increase stress resistance and resilience?

Fitter people have blunted stress responses

- Blunted HPA/cortisol stress responses to mental stressors in:
  - Physically trained men vs. sedentary men
  - Physically fit elderly women vs. elderly unfit counterparts

- Stress buffering from exercise more effective in those at risk
  - Chronically stressed caregivers
  - Family history of hypertension

Fitter people have lower inflammatory responses to stressful mental tasks

Association between physical fitness inflammatory cytokine responses to mental stress in 207 older adults

Lowest tertile of fitness demonstrated highest inflammatory responses to mental stress

Hamer & Steptoe *Psychosomatic Medicine* 2007
Exercise, mood and inflammation

- Habitual exercisers (n=41) to withdraw from exercise for 2 months

- Recorded mood, and activity levels regularly

- Pre-post: inflammatory response to mental stress

  - Endrighi et al. *Psychosomatic Medicine* 2011

Stress buffering effects in part mediated by associations between physical activity and mood

  Poole et al. 2011
<table>
<thead>
<tr>
<th>Study</th>
<th>Intervention (vs. control)</th>
<th>Anxiety</th>
<th>Depression</th>
<th>Stress</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlantis et al*</td>
<td>Exercise + behaviour modification</td>
<td>=</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>De Zeeuw et al*</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eriksen et al*</td>
<td>Exercise, stress management training, combined</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gronningaeter et al.</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hinman et al</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kerr and Vos*</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sjorgen et al</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tveito and Eriksen*</td>
<td>Exercise</td>
<td>=</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cheema et al*</td>
<td>Yoga</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hartfiel et al</td>
<td>Yoga</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sakuma et al*</td>
<td>Yoga</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wolever et al</td>
<td>Yoga, mindfulness</td>
<td></td>
<td>✔</td>
<td></td>
</tr>
</tbody>
</table>

Both groups
Which exercise for your patient?

Informed by biopsychosocial assessment of patient

Utilise approaches such as COACH program for chronic disease management (Redfern et al. 2008)
Acknowledgements

Toby Hall
Catherine Doody
Andrew Leaver
Markus Huebscher
James McAuley
Trudy Rebbeck
Darren Beales
Overview

- Introducing rationale for retraining mind & brain
- Exercise therapy targeting pain cognitions & movement-related fear – Rob
- Nonspecific factors & their ‘overlooked’ role in exercise therapy - Mark
- Exercise therapy in work-related musculoskeletal disorders – Niamh

- **Exercise therapy for desensitizing the sensitive nervous system?** - Jo

- Discussion with audience
Medical diagnosis ~ central sensitization

- Fibromyalgia / chronic fatigue syndrome
- Whiplash associated disorders
- Low back pain
- Temporomandibular dysfunction
- Myofascial pain syndromes
- Osteoarthritis
- Rheumatoid arthritis
- Irritable bowel syndrome
- Headache
- Tennis elbow
- Shoulder pain
Central sensitization in osteoarthritis


36 studies OA vs. healthy consistent evidence favouring central sensitization subgroup (30%)
Central sensitization predicts pain following surgery

Shoulder impingement syndrome

Thoracotomy

Central sensitization mediates PT-effect

Chronic whiplash

Chronic tennis elbow
Central sensitization mediates treatment effect in chronic low back pain

time x group x central sensitization interaction:
- walking ability
- disability
Time for change!

A new way of reasoning

A new way of treating

*Brain therapy for (musculoskeletal) pain*

A new way of communicating

*Replacing back schools by brain schools*
PT’s can reduce central sensitization

osteoarthritis:
exercise therapy $\rightarrow$ pain sensitivity ↓↓

neck/shoulder pain:
exercise therapy $\rightarrow$ central adaptation pain perception

physical activity & pain matrix

The arguments are self-evident.

What we need is leadership, not on stage, but in practice!
EXPLAIN PAIN
pain neuroscience education

reconceptualization of ‘pain’

threat value $\downarrow$ of pain

fear $\downarrow$ + catastrophizing $\downarrow$

Pain neuroscience education activates brain-orchestrated pain inhibition in fibromyalgia

Where were you on the 2nd Tuesday of September, 14 years ago?
stress

cortisol & noradrenaline in the brain

excitatory synapses in hippocampus, amygdala, prefrontal cortex
Retraining the pain memory

Desensitization by exposure
Therapists should try to decrease the anticipated danger (threat level) of the exercises by challenging the nature of and reasoning behind their fears, assuring the safety of the exercises, and increasing confidence in a successful accomplishment of the exercise.

One of the disks in my lower back is already damaged. So if I would lift the bucket, then the disk will probably tear ...
Retraining pain memories = associative learning

= product of discrepancy between actual & expected outcomes, so that learning only occurs for events, or sensory inputs, that the brain did not expect ('error of prediction')
McNelly et al. 2005

Exposure without danger to convince the brain of its error Zusman 2008, de Jong et al. 2008
Repeated exposure generates a new memory for safety
RCT examining Modern Neuroscience Approach to chronic spinal pain

3 sessions pain neuroscience education
15 sessions cognition-targeted exercise therapy
= 12 wks treatment

vs. evidence-based exercise therapy
Preliminary findings (n=48)
Malfliet, Kregel, et al.

pain catastrophizing ↓
fear↓
illness perceptions↑

~ pain↓ + daily functioning↑

central sensitization↓

PAIN IN MOTION
Call for action

• Your pain attributions impact exercise programs
• Use nonspecific factors for improving exercise therapy
• Exercise therapy should target pain cognitions & fear
• Exercise for work related pain fostering stress resilience
• You can ‘treat’ central sensitization by using pain neuroscience education + exercise therapy
Overview

- Introducing rationale for retraining mind & brain
- Exercise therapy targeting pain cognitions & movement-related fear – Rob
- Nonspecific factors & their ‘overlooked’ role in exercise therapy - Mark
- Exercise therapy in work-related musculoskeletal disorders – Niamh
- Exercise therapy for desensitizing the sensitive nervous system? - Jo

- Discussion with audience
PAIN IN MOTION

www.paininmotion.be
@PaininMotion
www.facebook.com/paininmotion

Refresher courses: www.paininmotion.be/EN/sem-courses.html