Use of Therapeutic Neuroscience Education to address Psychosocial Factors Associated with Acute Low Back Pain: A Case Report

Physiotherapy Theory and Practice (in press)
YOUR historical path...

Maitland
McKenzie  Butler
Upledger Paris Barnes
Janda Kolar Cook
Gray  Lee
Hruska
“Find it; Fix it”
Our Paradigms our Outdated

A

Symptoms
Pathology

B

Symptoms
Pathology
Intervention

C

Symptoms
Pathology

D

Symptoms
Pathology
Please just look at the light
Conclusions: For chronic MSK pain disorders, there is compelling evidence that an educational strategy addressing neurophysiology and neurobiology of pain can have a positive effect on pain, disability, catastrophization, and physical performance.
Conclusions: Core stabilization has been advocated as preventative, but offered no such benefit when compared to traditional lumbar exercise in this trial. Instead, a brief psychosocial education program that reduced fear and threat of low back pain decreased incidence of low back pain resulting in the seeking of health care. Since this trial was conducted in a military setting, future studies are necessary to determine if these findings can be translated into civilian populations.
What about Acute Pain
My patient with acute LBP

- 19 y/o female, CNA at a nursing home
- 1 week post LBP from injury while lifting a patient
- Pain 3/10, 7/10 at worst
- Occasional pain down leg
- ODI 36%,
- \( FABQ_{PA} = 23 \), \( FABQ_{W} = 30 \)
All Low Back Pain is not the same

• 10% of the claims lead to 86% of the costs. (Hashemi et al. 1997)
Early Predictors of Chronic Work Disability

- Socio-demographic
- Employment related
- Pain and function
- Clinical status
- Health care
- Administrative/legal
- Health Behaviors
- Psychological

Early Predictors of Chronic Work Disability

• Self-reported physical disability seems to be more important than pain intensity in predicting work disability duration.
  – Psychological variables such as mental health, fear avoidance, and catastrophizing factors were strong predictors
Early Predictors of Chronic Work Disability

- Accommodated work – 2 x the odds of chronic work disability if not offered within first 3 weeks
Early Predictors of Chronic Work Disability

• Injury Severity
  – Pain and Function Questionnaires

• Radicular pain
  – Without reflex, sensory or motor loss 2x more likely to be disabled
  – With reflex, sensory or motor loss 3.7x more likely to be disabled
Early Predictors of Chronic Work Disability

• Psychosocial factors
  – Supervisor/employee relations
  – Heavy lifting requirements
  – Hectic work pace
Yellow Flag Questionnaires

- Keele STarT Back Screening Tool
- Acute Low Back Pain Screening (ALBPS) Questionnaire
  - Medium Risk
The Keele START Back Screening Tool

Patient name: ___________________________ Date: ______________________

Thinking about the last 2 weeks, tick your response to the following questions:

1. My back pain has spread down my leg at some time in the last 2 weeks
2. I have had pain in the shoulder or neck at some time in the last 2 weeks
3. I have only walked short distances because of my back pain
4. In the last 2 weeks, I have dropped more cleanly than usual because of back pain
5. It's not really safe for a person with a condition like mine to be physically active
6. Worring thoughts have been going through my mind a lot of the time
7. I feel that my back pain is serious and it's never going to get any better
8. In general, I have not enjoyed all the things I would like to do

9. Overall, how bothersome has your back pain been in the last 2 weeks?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Very much</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>❏</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
</tbody>
</table>

Total score (sum of questions 1-8): ______________________

Sub score 125 (x): ______________________

The START Back Tool Scoring System

[Diagram showing risk levels based on scores]
Acute Low Back Pain Screening (ALBPS) Questionnaire

• 21 item questionnaire
• High risk group with a score of greater than 105
  score can identify about three quarters of long term cases
• 90-105 at medium risk candidate for long term cases
Variables Present

- Is your work heavy or monotonous?
  - Patient answer = 10 (10 = extremely)
- How would you rate the pain that you have had during the past week?
  - Patient answer = 7 (10 = pain as bad as it could be)
- How tense or anxious have you felt in the past week?
  - Patient answer = 7 (10 = As tense and anxious as I’ve ever felt)
- In your view, low large is the risk that your current pain may become persistent?
  - Patient answer = 4 (10 = very large risk)
- An increase in pain is an indication that I should stop what I am doing until the pain decreases
  - Patient answer = 10 (10 = completely agree)
Discriminating variables

- Heavy or monotonous work
- Previous sick leave
- Current pain intensity
- Light work availability
- Perceived chance to be working in 6 months
- Belief that one should not work with current pain levels
- Stress
Back to our Patient for the Subjective and Objective Exam

Thinking, worrying, uncertainty, questions, anger, frustration

PAIN
Subjective Examination...
Could also be emotional overload

Choice made
Importance of early education?

Pull back
Do less
Increased fear

Irrational thoughts

Limited knowledge

Threatening and provocative words; Medical tests; Various opinions; Internet information; Experiences
Objective findings

• No red flags but did have yellow flags and medium risk for persistent pain

• Range of Motion and Movement Quality
  – Decreased bending in all motions with no directional preference
  – Pain and apprehension with all movement
  – Aberrant movements with transitional movements (i.e. sit to stand, supine to sit)
Neurodynamics

• Relevant neurodynamic tests
  – Slump “+” on right with knee at 30 degrees
  – SLR “+” on right at 50 degrees
  – Sidelie slump “–”

• No myotome, dermatome or reflex deficits
SI provocation tests

- Distraction “+”
- Thigh trust “+” on right “-” on left
- Gaenslen’s “+” right and left
- Compression “-”
- Sacral thrust “-”
Palpation and Segmental testing

- Hyperalgesia with touch to Low Back
- “Questionable” Hypomobility of lower lumbar
Prone Hip Internal Rotation

- Right 20 degrees
- Left 45 degrees
Potential Structures Involved?

- Lumbar musculature
- Lumbar ligamentous structures
- Right lower lumbar facet joints
- Right SI joint
- Lower lumbar discs
- Lumbo-sacral plexus neurodynamics
Diagnosis?
No, Keith Smart

Original article

Mechanisms-based classifications of musculoskeletal pain: Part 1 of 3: Symptoms and signs of central sensitisation in patients with low back (±leg) pain

Keith M. Smart a,*, Catherine Blake b, Anthony Staines c, Mick Thacker d,e, Catherine Doody b
Mechanisms Based Classification

- Nociceptive
  - Chemical and/or Mechanical
- Peripheral Neurogenic
- Central
Let’s Treat with EBP

Super Fix It 5000

Clockwise or Counter Clockwise?
Clinical Prediction Rule’s?

- Lumbar Stability?
- Lumbar Traction?
- Lumbar Manipulation?
Consider ALL therapy this way... BOTH

Tissues → Environment

Sample

Tissues → Environment

Gifford, L.S., Pain, the tissues and the nervous system. Physiotherapy, 1998. 84: p. 27-33.
A Few Therapeutic Possibilities...

- Neuroscience Education
- Tactile/Skin
- Movement/Blood Flow
- Body Parts/Body Space
- Reduce Threat
A Few Therapeutic Possibilities...

NUEROSCIENCE
EDUCATION

TACTILE/
SKIN

MOVEMENT/
BLOOD FLOW

BODY PARTS
BODY SPACE

REDUCE THREAT
Therapeutic Neuroscience Education

• If the primary complaint is PAIN why educate patients about anatomy and biomechanics?

• Why not just teach them more about....PAIN?
Efficacy Neuroscience Education

Conclusions: For chronic MSK pain disorders, there is compelling evidence that an educational strategy addressing neurophysiology and neurobiology of pain can have a positive effect on pain, disability, catastrophization, and physical performance.

Conclusions: Core stabilization has been advocated as preventative, but offered no such benefit when compared to traditional lumbar exercise in this trial. Instead, a brief psychosocial education program that reduced fear and threat of low back pain decreased incidence of low back pain resulting in the seeking of health care. Since this trial was conducted in a military setting, future studies are necessary to determine if these findings can be translated into civilian populations.
1. Validate tissues got injured, 
   Assure them they will heal!!!

2. Nerves got sensitive, 
   They will calm down!!!
4 Questions a Patient Wants Answered

1. “Doc, what’s wrong with me?”
2. “Doc, how long’s it going to take to get better?”
3. “Doc, is there anything I can do to help myself?”
4. “Doc, is there anything you can do to help me?”

Louis Gifford, forward Therapeutic Neuroscience Education: Teaching Patients About Pain.
“Doc, what’s wrong with me?”
Nociception
Tissues get injured, Tissues HEAL!!!!!
The Nervous System

Your Alarm System: Normal
Alarm System
Alarm System
Specific to your situation
1. How do you know this?
2. Why did they stay up there?
3. How do we calm it down?
Waking up the alarm system

- Motion Detector
- Lights
- Car Sensors
Waking the Neighbors

Louw, A; Your Nerves Are Having Back Surgery. 2012
The Police...

Louw, A; Your Nerves Are Having Back Surgery. 2012
Waking up the alarm system

Before Pain

Lots of room for activities

After Pain

Little room for activities

Why Do I Hurt?; Louw 2013 OPTP
“Doc, how long’s it going to take to get better?”
A Few Therapeutic Possibilities...

- Neuroscience Education
- Movement/Blood Flow
- Tactile/Skin
- Body Parts/Body Space
- Reduce Threat
PAIN ≠ INJURY
Tissue Recovery

Tissue Repair Phases and Timescale

- Bleeding
- Inflammation
- Proliferation
- Remodelling

Timescale:
- Hours
- Days
- Weeks
- Months
Pain Recovery
Altering Beliefs

- Decreased cortical activation
“Doc, is there anything I can do to help myself?”

- Education – “know pain, know gain”
- Exercise – “motion is lotion” / “sore but safe”
- Medication
A Few Therapeutic Possibilities…

NUEROSCIENCE EDUCATION

MOVEMENT/ BLOOD FLOW

TACTILE/ SKIN

BODY PARTS BODY SPACE

REDUCE THREAT
Endogenous Mechanisms

Know pain = Know gain
A Few Therapeutic Possibilities…

NUEROSCIENCE EDUCATION

TACTILE/ SKIN

MOVEMENT/ BLOOD FLOW

BODY PARTS BODY SPACE

REDUCE THREAT
Pacing/Graded Exposure

Home Exercises
“Doc, is there anything you can do to help me?”
A Few Therapeutic Possibilities...

- Neuroscience Education
- Movement/Blood Flow
- Tactile/Skin
- Body Parts/Body Space
- Reduce Threat
A Few Therapeutic Possibilities...

NUEROSCIENCE EDUCATION

MOVEMENT/ BLOOD FLOW

TACTILE/ SKIN

BODY PARTS BODY SPACE

REDUCE THREAT
Stolen with permission in kind from Diane Jacobs, PT
Follow up Visits

• Visit 2 and 3
  – TNE as needed to reinforce main message
  – Continue progression of manual therapy with joint mobs and soft tissue techniques.
  – Exercises for motor control and awareness of movement

• Visit 4 and 5
  – Decrease in manual therapy
  – Trunk strengthening and functional lifting
# Outcomes

## Functional Measurements

<table>
<thead>
<tr>
<th></th>
<th>Initial</th>
<th>1 week</th>
<th>2 week (D/C)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Lumbar Range of Motion: Flexion</strong></td>
<td>15°</td>
<td>30°</td>
<td>60°</td>
</tr>
<tr>
<td><strong>Lumbar Range of Motion: Extension</strong></td>
<td>5°</td>
<td>15°</td>
<td>25°</td>
</tr>
<tr>
<td><strong>Standing tolerance</strong></td>
<td>20-30 minutes</td>
<td>1-2 hours</td>
<td>unlimited</td>
</tr>
<tr>
<td><strong>Lifting tolerance</strong></td>
<td>10#</td>
<td>15#</td>
<td>50#</td>
</tr>
</tbody>
</table>

## Outcomes Questionnaires

<table>
<thead>
<tr>
<th>Outcomes Questionnaires</th>
<th>Initial</th>
<th>Discharge</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODI</td>
<td>18/50</td>
<td>0/50</td>
</tr>
<tr>
<td>Numeric Pain Score</td>
<td>3/10</td>
<td>0/10</td>
</tr>
<tr>
<td>FABQ (PA)</td>
<td>23</td>
<td>0</td>
</tr>
<tr>
<td>FABQ (W)</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Keele SBST</td>
<td>4/9</td>
<td>0/9</td>
</tr>
<tr>
<td>ALBPS Questionnaire</td>
<td>101</td>
<td>0</td>
</tr>
<tr>
<td>PSFS</td>
<td>4/10</td>
<td>10/10</td>
</tr>
</tbody>
</table>
General Conclusion

• Pain is a protective mechanism developed by the brain based on how it interprets information

• “Feeding the brain better information” seems key to alter pain.
Case Report Conclusion

- The use of TNE with a patient with acute LBP appeared to prevent the development of persistent pain problems, especially in this at risk patient.
Shape shifting pain: chronification of back pain shifts brain representation from nociceptive to emotional circuits

Javeria A. Hashmi,1 Marwan N. Baliki,1 Lejian Huang,1 Alex T. Baria,1 Souraya Torbey,1 Kristina M. Hermann,1 Thomas J. Schnitzer2 and A. Vania Apkarian1,3,*
The Best Way to Treat Persistent Pain?

Prevent it!!!

An ounce of prevention is worth a pound of cure

PEARLS OF WISDOM
Thank you & acknowledgements...

Kory.Zimney@usd.edu

- Adriaan Louw PT, M.App.Sc (physio), GCRM, CSMT
- Emilio “Louie” Puentedura- PT, DPT, PhD, OCS, GDMT (Australia), FAAOMPT, CSMT
- ISPI staff and faculty