Allina Health
COURAGE KENNY REHABILITATION INSTITUTE

The Power of PNE (Pain Neuroscience Education) Messaging to Positively Impact Outcomes Part 1

Presented by:
Jennifer Finstrom MS PT, BCB
Sonja McGill MS PT, TPS
11-8-19

Objectives

1) Participants will understand and be able to verbalize phrases to promote development of a positive therapeutic alliance.

2) Participants will learn how to apply PNE strategies by re-framing the pain experience as an opportunity for positive change.

Nails and Neuroscience-It's Not Just About The Nail

- https://www.youtube.com/watch?v=yWcEhtg7W3s (1:42)

2

Definition of Pain

- An unpleasant somatosensory experience **100%** produced by the **brain** based on how one's personal map interprets the information it has available. This same pain map is activated when there is a **perceived threat**."
  - Moseley, G.L., A pain neuromatrix approach to patients with chronic pain. Man Ther 2003. 8(3): p. 130-40

3

Pain Neuroscience Education (PNE)

What is Pain Neuroscience Education?

- Current evidence based research that promotes a provider explaining to the patient the neurobiology and neurophysiology of their pain experience. When the patient truly understands it, they have less pain, less disability, move better, perform better with rehab, have better cognitions regarding their pain and decreased sensitization of their nervous system. (Moseley 2005; Ryan, Gray et al. 2010)
- It is NOT biomedical model education

Research Study # 1

Pre-op PNE for Lumbar Radiculopathy:
A Multicenter Randomized Controlled Trial With 1-Year Follow-up

Objective: To determine if the addition of PNE to usual preoperative education would result in superior outcomes with regard to pain, function, surgical experience, and health care utilization post-surgery

- Louw, Adriaan, PhD, PT[*,†]; Diener, Ina, PhD, PT[†]; Landers, Merrill R., DPT, PhD, PT[‡]; Puentedura, Emilio J., DPT, PhD, PT[*,‡]
- Spine: August 15, 2014 - Volume 39 - Issue 18 - p 1449–1457

Study Design

- Multicenter, randomized, controlled trial on pre-op PNE for lumbar radiculopathy.
- Patients 18-65 years old scheduled for lumbar surgery (LS) for radiculopathy
- Randomly assigned to 2 groups
  - Usual Care
  - Experimental Group
    - Scheduled for one 30 minute pre-op education visit during the week prior to surgery

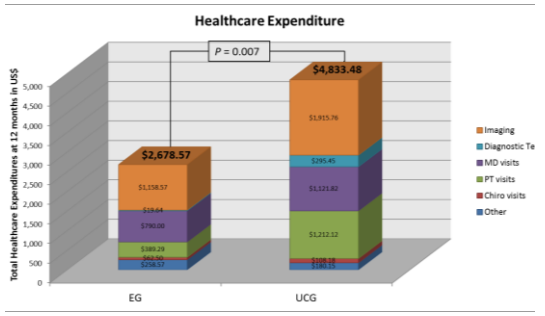
Outcome Measures

- 67 patients completed the following outcomes prior to LS (baseline), and 1, 3, 6, and 12 months after LS:
  - Low back and leg pain (numeric rating scale)
  - Function (Oswestry Disability Index)
  - Various beliefs and experiences related to LS (10-item survey with Likert scale responses)
  - Post-op utilization of health care (utilization of health care questionnaire).

Results

- At 1-year follow-up, there were no statistical differences between the experimental and control groups with regard to primary outcome measure of low back pain, leg pain, and function. BUT
- In a majority of the categories regarding surgical experience, the PNE group scored significantly better:
  - better prepared for LS
  - Pre-op session preparing them for LS and LS meeting their expectations
  - Health care utilization post-LS also favored the PNE group resulting in 45% less health care expenditure compared to the control group in the 1-year follow-up period.

Healthcare Expenditure Difference



Conclusion

- PNE resulted in significant behavior change
  - Despite a similar pain and functional trajectory during the 1-year trial, patients with LS who received PNE viewed their surgical experience more favorably and used less health care facilities in the form of medical tests and treatments.

What about 3 years later? Research Study # 2

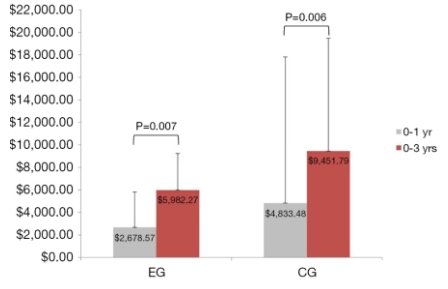
- Participating patients from the previous RCT were contacted for 3-year follow-up.
- Of the 67 patients who were in the study, 61 completed 1-year follow-up.

- At 3-year follow-up, 50 patients responded, with 22 in the experimental group (EG) and 28 in the control group (CG).

Results

- Cumulative medical expenses were 37% lower for the EG, with those patients spending less on X-rays and less visits to their family physician, physical therapist, and massage therapist.
- There were no differences in patient reported outcomes between groups, BUT patients who received PNE continued to view their surgical experience more favorably compared to those that did not.

Estimated Medical Expenses in U.S. Dollars (means and std deviations) Related to the LS after 1 and 3 years.



Take Home Message

- Adding 1 PNE session prior to LS results in significant reduction in healthcare costs 3-year after LS, despite persistent pain and disability.

- Educating patients about the normal responses to LS in a neuroscience framework may result in significant behavior changes following surgery, and decrease the ongoing healthcare utilization of a large percentage of LS patients.
  - Louw A, Diener I, Landers MR, Zimney K, Puentedura EJ. Three-year follow up of a randomized controlled trial comparing preop PNE for patients undergoing surgery for lumbar. J Spine Surg 2016;2(4):289-298

Research Study # 3

Effect of PNE combined with cognition-targeted motor control training on chronic spinal pain

Objective To compare PNE combined with cognition-targeted motor control training with current best-evidence physiotherapy for reducing pain and improving functionality, gray matter morphologic features, and pain cognitions in individuals with chronic spinal pain

- **Anneleen Malfliet (UGent)** , **Jeroen Kregel (UGent)** , **Iris Coppieters (UGent)** , **Robby De Pauw (UGent)** , **Mira Meeus (UGent)** , Nathalie Roussel, **Barbara Cagnie (UGent)** , **Lieven Danneels (UGent)** and Jo Nijs (2018) JAMA NEUROLOGY. 75(7). p.808-817

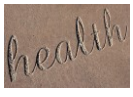
Design, Interventions and Outcomes

- **Design:** Multicenter randomized clinical trial conducted from Jan 1, 2014, to Jan 30, 2017, among 120 patients with chronic nonspecific spinal pain in 2 outpatient hospitals with follow-up at 3, 6, and 12 months.
- **Interventions:** Participants were randomized into an experimental group (combined PNE and cognition-targeted motor control training) and a control group (combining education on back and neck pain and general exercise therapy).
- **Main Outcomes and Measures:** Primary outcomes were pain (pressure pain thresholds, numeric rating scale, central sensitization inventory) and function (pain disability index, mental health and physical health).

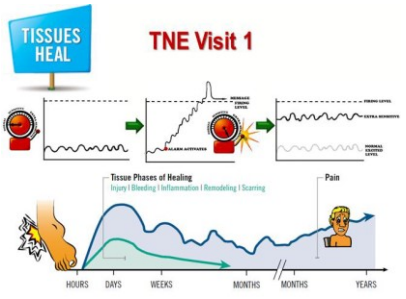
Results

The experimental group experienced:

- reduced pain
- higher pressure pain thresholds
- reduced central sensitization
- improved function
- better mental health
- better physical health



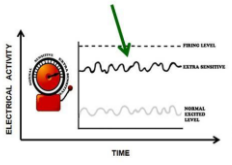
Examples PNE



Louw, Zimney, O'Hotto & Hilton, 2016
Used with permission

Examples PNE

Waking up the alarm system



1. How do you know this?
2. Why did they stay up there?
3. How do we calm it down?

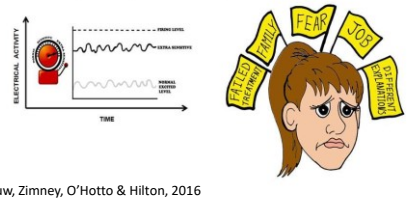
Louw, A. Your Nerves Are Having Back Surgery. 2012

Louw, Zimney, O'Hotto & Hilton, 2016
Used with permission

Examples PNE

Waking up the alarm system

2. Why did my nerves stay so sensitive?



Louw, Zimney, O'Hotto & Hilton, 2016
Used with permission

The Four Pillars of PNE

Treatment MUST Include:

1. Pain Neuroscience Education (PNE)
2. Sleep
3. Aerobic exercise
4. Goal setting

(ISPI, 2017)

A car needs all four tires inflated to run.
One flat tire, no go!

How Do We Connect?

- **MI =** A patient-centered, directive approach to enhance intrinsic motivation for behavior change by working with and resolving ambivalence
- **MI spirit =** collaborative, evocative, and respectful of the patient's autonomy
- An intentional use of the **THERAPEUTIC ALLIANCE** to elicit in the patient a commitment to some type of health behavior change
- Tailoring your intervention to the **Behavioral Change Stage** your patient is at

Behavior Change Phases Simplified

- Pre-contemplative "I won't"
- Contemplative "I may"
- Preparing/Planning "I will"
- Action "I am"
- Maintenance "I still am"
- Relapse
  - Resuming old behavior patterns. This is the rule more than the exception
  - Differentiate from ***lapse*** = slip up with quick return to action/maintenance

24

Improve Patient Outcomes Apply the 10 A's

Affirmation
Alliance
Avoid the 'righting reflex'
Avoid attribution error
Acceptance
Accurate Empathy
Autonomy Support
Apologize
Actively promote
Accurate language

25

25

Therapeutic Alliance- 4 Cs

- What do you CALL your condition
- What do you think CAUSED it
- How do you COPE with it
- What CONCERNS do you still have?

26

Are We Fools or Persuaders?

- " A fool takes no pleasure in understanding, but only in expressing personal opinion." Proverbs 18:2
- "People are generally better persuaded by the reasons which they have themselves discovered than by those which have come into the mind of others." Blaise Pascal

Research Study # 4

The Therapeutic Alliance Between Clinicians and Patients Predicts Outcome in Chronic LBP

Objective: investigate whether TA between PT's and patients with chronic LBP predicts clinical outcome

(Paulo H. Ferreira, Manuela L. Ferreira, Christopher G. Maher, Kathryn M. Refshauge, Jane Latimer, Roger D. Adam. DOI: 10.2522/ptj.20120137 Published April 2013)

28

Design, Interventions, Outcomes

Design: 2013 retrospective observational randomized controlled study Sydney Australia that looked at whether Therap.Alliance b/t PT's and patients with CLBP predicted clinical outcomes

Interventions:

- *General exercise group*: strengthening and stretching of main mm groups
- *Motor control exercise group*: trunk mm coordination to control intersegmental spinal mvmt, including transversus abdominis, multifidus, diaphragm, pelvic floor mms
- *Spinal manipulative therapy group*: received joint mobilization or manipulation to the spine or pelvis

Outcomes: PSFS, global perceived effect of treatment, pain, and disability were measured before and after 8 weeks of treatment (12 visits)

29

Results

- Therapeutic Alliance was consistently a predictor of outcome for all the measures of treatment outcome in all 3 groups (general exercise, motor control exercise, spinal manipulative therapy)
- Prognosis for patients with LBP who are seeking conservative rx is significantly better if they rate their interaction with treating clinician higher

30

Research Study # 5

Enhanced Therapeutic Alliance Modulates Pain Intensity & Muscle Pain Sensitivity in Patients With Chronic Low Back Pain: An Experimental Controlled Study

Objective: To compare the effect of enhanced versus limited Therapeutic Alliance on pain intensity and muscle pain sensitivity in patients with CLBP receiving either active or sham IFC

Jorge Fuentes, Susan Armijo-Olivo, Marth Funabashi et al.,Physical Therapy, Volume 94, Issue 4, 1 April 2014, Pages 477–489

31

Design, Interventions, Outcomes

Design: Double blind, placebo controlled study with 117 patients, randomly divided into 4 groups at University of Alberta Canada

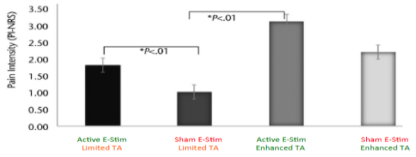
Interventions:
Active E-stim with limited Therapeutic alliance (46% decr pain)
Sham E-stim with limited Therapeutic alliance (24% decr pain)
Active E-stim with enhanced Therapeutic alliance (77% decr pain)
Sham E-stim with enhanced Therapeutic alliance (54% decr pain)

Outcomes: Pain intensity (PI-NRS) and Muscle pain sensitivity as assessed via pressure pain threshold (PPT)

32

Results

Enhanced Therapeutic Alliance Modulates Pain Intensity & Muscle Pain Sensitivity in Patients With Chronic Low Back Pain: An Experimental Controlled Study- Fuentes et al. (2014)



Slide Created by: *Timothy W. Flynn,PT, PhD: Clinical Reasoning in Chronic LBP. The Modern Manual Therapist Perspective. Presented at ISPI Clinical Conference 2016*

33

Patient-Centered vs. Provider-Centered Alliance

Patient-Centered	Provider-Centered
"I give my patients the right to decide."	"I just need to tell my patients what to do."
"I recognize that info alone doesn't change behavior."	"My patients need to get educated on what's wrong with them."
"I create opportunities for patients to get healthier.	"My job is to make my patients better."
"I won't work harder than my patients do. I choose to dance"	"I feel like I'm wrestling with my patients."
"I'm teaching my patient to become their own expert."	"I'm the expert here."

Words That Heal

[VIEWPOINT]

MICHAEL STEWART, MCSP, SRP, MSc, BSc (Hons), PG Cert (Clin Ed)† • STEPHEN LOFTUS, PhD†

Sticks and Stones: The Impact of Language in Musculoskeletal Rehabilitation

JOrthop Sports Phys Ther 2008;38(7):399-402. doi:10.2519/jospt.2008.0601

'Words are, of course, the most powerful drug used by mankind."
Rudyard Kipling[1]

to be acknowledged and understoo
and deliberately used as part of thera
Misunderstanding or ignorine nave

Words that Heal vs. Words that Harm

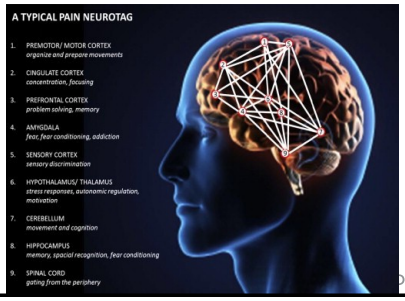
Normal age change	Chronic degenerative
Normal age change	Wear and tear
All appears normal	Negative test results
Need strength/control	Instability
Nervous system	Neurological
Pulling/disruption	Tear
Sensation changes	Paresthesia
Shortened nerve	Trapped nerve
Condition	Disease
It will be okay	Don't worry

Words that Heal vs. Words that Harm

Tissue changes	Tissue damage
Normal curve in back/neck	Lordosis
Normal curve in back	Kyphosis
Bulge	Herniation
Swelling	Effusion
You may need to make some adjustments	You need to live with this
May persist, but you can overcome it	Chronic

Neuromatrix

- https://zaccupples.com/tag/noi-group/page/2/



Nails and Neuroscience-It's Not Just About The Nail

- https://www.youtube.com/watch?v=GTD1vwl2LNU (1:38)
- Exhibit A

Exhibit B

A) Chicago male construction worker 3.5" nail x 36 hrs
B) South Korean male 2" nail x 4 yrs

39

CKRI 3 Week Pain Program 3 Year Stats 2016-2018

	Discharge After 3 wks	4 month Post -Discharge
Opioid Reduction *(MME)	76% decreased MME use	92% decreased MME use
Pain Reduction (opioid dependent and tapering)	16% decreased pain	19% decreased pain
Pain Reduction (all patients)	13% decreased pain	16% decreased pain
Return to work, job search or job retraining	_____	56%
BDI (Beck Depression Inventory)	42% decreased depression	35% decreased depression
_____	_____	_____
Avg Pain duration = 6.3 yrs		
Pain types: LBP, Neck pain, FMS, Other: CRPS, OA, RA, HA	**Patient satisfaction:** 71% excellent 29% good = 100% great!	**Likely to refer to others**: 84% strongly agree 16% agree = 100% great!
*MME = milligram morphine		