



Contemporary PT for Chronic Pain

A Neuromatrix Approach to Rehabilitation



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Conflicts of Interest?

NONE

The PROBLEM

“Pain Point”?

Why?

- *Lack of Understanding*
- *Misguided Goals*
- *Lean Payment System*
- *Poor Communication*

My Own Story

An aerial photograph of a dense urban environment, likely New York City, featuring numerous tall, modern apartment buildings with many windows. A river is visible in the background, and the sky is a clear blue. The text is overlaid on a semi-transparent dark grey rectangle.

Guiding Principles

“As to the methods there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble.”

Ralph Waldo Emerson

Guiding Principles

- **Neuromatrix Approach:**
 - Information for Mind and Body
 - Desensitization
 - General Activation
 - Turn the corner on disability

Common Thread?

Why this Approach?

- **Provides Basis for:**
 - Recalibrating management goals
 - Redirecting the Patient's focus
 - Creating measurement platform
 - Walking Patient Away from the Impairment Cliff

Neuromatrix Approach: **Information** for Mind

- **Give proper information and reassurance.**

“... with **information for patients** about the nature of the problem, provided in a manner **designed to reduce fear** and give them reason to **resume** light **activity.**”

Indahl A, et al. 1998

Neuromatrix Approach: **Information** for Mind

- Therapeutic focus: How Reduce FEAR?
 - **Education**
 - Platform-MOVEMENT
 - Systematic approach for identifying and progressing motoric and functional baselines
 - Set a Sensory Posture

Moseley GL. 2003; Thompson EL et al, 2016

Neuromatrix Approach: **Information** for Mind

Emotional Considerations

Thompson EL et al, 2016

So...How can FEAR be reduced?

PURPOSE: Which pain-related beliefs influence treatment retention and adherence?

METHODS: Assessed Pain-related beliefs:

- pain-specific **self-efficacy**,
- perceived disability**,
- catastrophizing**,
- control beliefs**,
- fear-avoidance beliefs,
- perceived benefits and barriers**,

Neuromatrix Approach: **Information** for Mind

Emotional Considerations

Thompson EL et al, 2016

So...How can FEAR be reduced?

RESULTS:

All (except control beliefs) influence treatment adherence.

Most common = **pain-related self-efficacy**

SO WHAT? **We HELP patients regain movement Self-Efficacy**

Neuromatrix Approach: **Information** for Mind

We use a “**CBT**” Movement Model

Means:

- Education
- Δ 'd thinking
- Behav exp
- Changed Attn

Outcomes:

- ↓'d distress towards pain
- ↓'d depression
- ↓'d fear & frustration
- ↑'d self locus of control

Neuromatrix Approach: **Information** for Mind

Prequel to improving Movement Self-Efficacy

- Recalibrate expectations
- Change language from PAIN to RECOVERY
- Instruction on self coping
- Air of Positivity
- Sleep Hygiene
- Social support

Neuromatrix Approach: **Information** for Mind

Results of a this Approach?

Thompson et al, 2015

Significant Changes:

increased **functional self-efficacy**

decreased **pain intensity**

decreased **pain-related fear**

Neuromatrix Approach: Information for Body

Platform-Establish a Sensory Posture

How do we SET a Sensory Posture?

- Reflexive Responses
- Proprioception
- Static & Dynamic Balance
- Postural Control

Neuromatrix Approach: Information for Body

Reflex Reactivation Important for :

- Postural control
- Response to novel perturbations
- Protective mechanisms

Impaired in:

- Recurrent Pain
- Chronic Pain



Radebold A, Cholewicki J, Panjabi MM, Patel TCh. Muscle response pattern to sudden trunk loading in healthy individuals and in patient with chronic low back pain. *Spine*. 2000;25(8):947-954

Van Dieen JH, Cholewicki J, Radebold A. Trunk muscle recruitment patterns in patients with low back pain enhance stability of the lumbar spine. *Spine* 2003; 28(8): 834-41

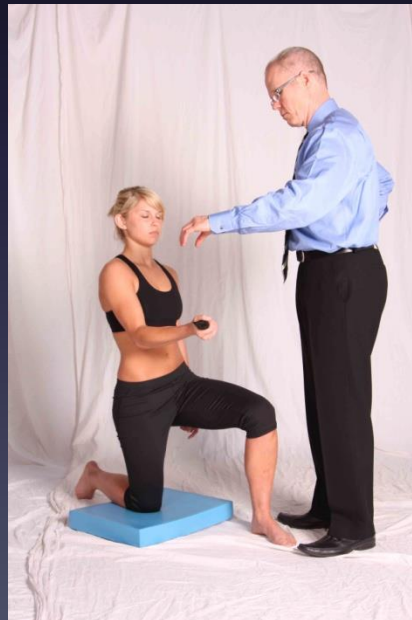
Neuromatrix Approach: Information for Body

REFLEX Fundamental Skills

- Ball or Rice-Bag Drops/Toss
- PVC or Body Blades
- Inertial Trainer

REFLEX Functional Skills

- Body Bumps
- Random Ball Toss
- Rebounder



Leinonen V, et al. Spine (Phila Pa 1976).
2007;32(5):E150-5.

Neuromatrix Approach: **Information** for Body

Proprioception involved in:

- The incoding of postural sensations
- The integration of segmental stability
- The sensory support of postural control

Learman KE, Myers JB, Lephart SM, Sell TC, Kerns GJ, Cook CE. Effects of spinal manipulation on trunk proprioception in subjects with chronic low back pain during symptom remission. *J Manipulative Physiol Ther.* 2009;32(2):118-26.

Lephart SM, Pincivero DM, Giraldo JL, Fu FH. The role of proprioception in the management of athletic injuries. *Am J Sports Med* 1997;25:130-7.

Riemann BL, Lephart SM. The sensorimotor system. Part I: The physiologic basis of functional joint stability. *J Athl Train* 20(J2;37:7i-9.

Hodges PW, Richardson CA. Inefficient muscular stabilization of the lumbar spine associated with low back pain a motor control evaluation of transversus abdominis. *Spine* 1996;21: 2640-50.

Neuromatrix Approach: Information for Body

Quadruped:

- Active Joint Repositioning
- Flexion & Extension
- Ideal towards neutral

Standing (not pictured)

- Active Joint Reposition



Neuromatrix Approach: Information for Body



Supine Set Up
1/2 Foam Roller (s), Foam pad

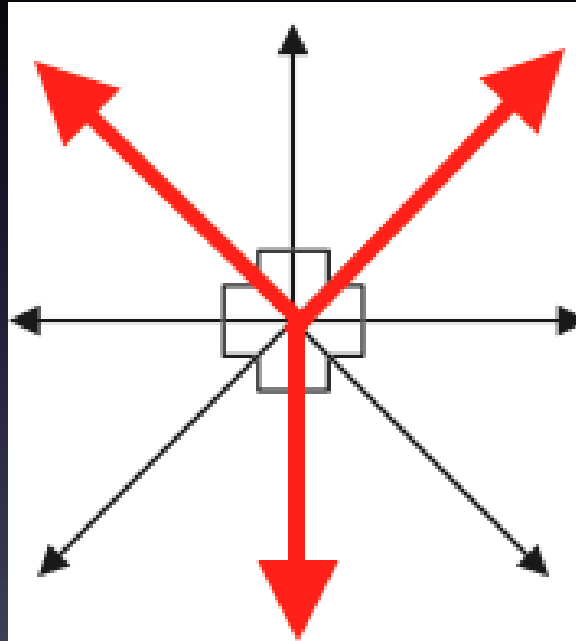


Neuromatrix Approach: **Information** for Body

Balance: BESS



Balance: Y Balance



Neuromatrix Approach: **Desensitization**

Consideration-Measures to desensitization

– **Breathing pattern...**

- Chest Breathing: ↑'d Symp
- Diaphragmatic breathing... ↓'d Symp

– **Mental Imagery**

- imagine using the arm/leg how it used to be
- See self in the future with normal function
- Imagine those activities

Neuromatrix Approach: **Desensitization**

Consideration-Level of Sensitization

■ **Somatically Sensitized**

- ✦ Use distraction during therapy:
 - Conversation: uplifting topics
 - Music (that patient enjoys)
- ✦ Make treatment pleasant, whether it encourages relaxation or activation
- ✦ Feel free to laugh with your patient

Neuromatrix Approach: **Desensitization**

Consideration-Level of Sensitization

■ **Somatically Sensitized**

- ⦿ Isolate or integrate the pt, depending on irritation level
 - ⦿ Isolate when sensory defensive
 - ⦿ Integrate when pt needs peer modeling
- ⦿ Graded textures

Neuromatrix Approach: **Desensitization**

Consideration-Treatment Setting

- Address **Photosensitivity**
 - Adjust light
 - Consider sound levels
- Make sure the patient is **warm**
- Reduce **anxiety**
 - Are pt' s constantly busy, going, or working?
 - Rx is 'your time'

Neuromatrix Approach: **General Activation**

Key components-

- Enhance the Capacity to Move (OMT)
- Produce the Power to Move (SMC)
- Calm the Waters (PAIN Sci, Intervention)
- Establish Trust (Relationship)

Why this approach?

“We are all creatures of experiences turning into memory”

(mentally and physically)



Bates B & Dufek S. 2013 Visiting Scholar Lecture Series. Center For Rehabilitation Research, School of Allied Health Sciences, TTUHSC, Lubbock, TX, USA.

Why this approach?



Movement

A change in position

(time & space)

A tool for problem solving

(time, space & n-m-s)

Bates B & Dufek S. 2013 Visiting Scholar Lecture Series. Center For Rehabilitation Research, School of Allied Health Sciences, TTUHSC, Lubbock, TX, USA.

Why this approach?



Strategy

Selected Neuro- Musculo -Skeletal
Response/Solution For the [Completion] of a
Sensorimotor Task

Foundation = Implicit Learning

Bates B & Dufek S. 2013 Visiting Scholar Lecture Series. Center For Rehabilitation Research, School of Allied Health Sciences, TTUHSC, Lubbock, TX, USA.

Neuromatrix Approach: **General Activation**

■ Trunk Functional Tests

- *Flexion Control*
- *Extension Control*
- *Lateral Flexion Control*
- *Rotational Control*

■ Hip Functional Tests

- *Flexion Control*
- *Extension Control*
- *ABd / ADd Control*
- *Rotation Control*

■ KAF Functional Tests

- *Knee Flexion Control*
- *Knee Extension Control*
- *AF DF Control*
- *AF PF Control*

■ Composite Tests

- *Symmetrical Control*
- *Asymm OKC Control*
- *Symm OKC Control*

LQFE

Neuromatrix Approach: **General Activation**

Level of Functionality

- Basis:

Proximal → Distal
Control Complexity

- Progression:

Corrective Strategies →

Composite Strategies →

Agility Strategies →

(Performance Training)

Neuromatrix Approach: **General Activation**

● Graded Responses:



Example: **Hip ABDuction**

Butler D, Mosely L. 2003

Neuromatrix Approach: General Activation

- Make a plan – write it down.
- Start with low baselines.
- Build up gradually and systematically.
- Take regular rests.
- Move Small amounts often.
- Avoid prolonged activity or rest.
- No Flare-ups > 2-3 hours
- Pace out movement level increases.
 - Just maintaining can be beneficial.
- Slow gradual approach enables long-term change.

Brook S. 2001.

Neuromatrix Approach: **General Activation**

● **Re-establishing Laterality:**

- Flash Cards
- Magazines
- Recognize online: tom@noigroup.com

● **Imagery:**

- Consider what a position would feel like
- Consider what a movement would feel like
- Consider what manipulating an object would feel like
- Consider what moving like another person would feel like.

Neuromatrix Approach: **General Activation**

- Improving Fitness and Function
 - **Activity-oriented exercise** vs. strengthening & stretching.
 - Links exercise to their day-to-day activities.
 - Exercise is not about a cure,
 - More about how to be more active despite the pain.
 - Any change to the pain = bonus!

Neuromatrix Approach: Progressions

- Fundamental → Functional
- Simple → Complex
- Focused → Distracted
- Learning enhanced → Learning challenged

Standaert CJ, Weinstein SM, Rumpeltes J. Evidence-informed management of chronic low back pain with lumbar stabilization exercises. Spine J. 2008;8(1):114-20.

Neuromatrix Approach: **Recommendations**

- Most important:

If it works, Use It!

Standaert CJ, Weinstein SM, Rumpeltes J. Evidence-informed management of chronic low back pain with lumbar stabilization exercises. Spine J. 2008;8(1):114-20.

Neuromatrix Approach: **Turning the Corner on Disability**

- **Increased Pain thresholds during physical tasks.**

Mosely GL et al 2004

- **Reduced unhelpful pain-related beliefs and attitudes, improves exercise outcomes.**

Mosely GL et al 2004, Oliviera A et al 2006.



QUESTIONS?