The Influence of Pain on Balance;
What can we do about it?

An exploration of the science behind pain perception, education of the patient and fall prevention

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Pain; what the neuroscience tells us
Contextual (AKA non-specific) effects
Neuromotor output changes
Cognitive and neurophysiological effects of pain education
Tailoring our language and words to optimize therapeutic outcomes
Improving or restoring balance through the use of focused language and pain neurophysiology education- a case description
Chapter 1—A Conceptual Framework for Understanding Pain in the Human

INPUTS TO BODY-SELF NEUROMATRIX FROM:

COGNITIVE-RELATED BRAIN AREAS
Memories of past experience, attention, meaning, and anxiety

SENSORY SIGNALLING SYSTEMS
Cutaneous, visceral, and musculoskeletal inputs

EMOTION-RELATED BRAIN AREAS
Limbic system and associated homeostatic/stress mechanisms

OUTPUTS TO BRAIN AREAS THAT PRODUCE:

PAIN PERCEPTION
Sensory, affective, and cognitive dimensions

ACTION PROGRAMS
Involuntary and voluntary action patterns

STRESS-REGULATION PROGRAMS
Cortisol, noradrenaline, and endorphin levels
Immune system activity

Fig. 1.3 Factors that contribute to the patterns of activity generated by the body-self neuromatrix, which is composed of sensory, affective, and cognitive neuromodules. The output patterns from the neuromatrix produce the multiple dimensions of pain experience, as well as concurrent homeostatic and behavioral responses. (From Melzack R: Pain and the neuromatrix in the brain, J Dent Educ 65:1378–1382, 2001.)

Fig. 1. Many inputs affect the implicit perception of threat to body tissues, labelled here as ‘How dangerous is this really?’ Those inputs have wider meaning effects, which in turn seems to affect anxiety, attention and expectation. The implicit perception of threat to body tissues determines pain and in turn influences other inputs.
Pain is NOT: Nociception
Pain is NOT coming *from* the body
We have NO pain-sensors or pain nerves
Tissue damage is NOT necessary for pain to occur, nor does damage automatically lead to pain
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„Many inputs affect the implicit perception of threat to body tissues.“
“Pain is a conscious correlate of the implicit perception of threat to body tissue.”
Lorimer Moseley, PhD
In the *Texbook of Pain* and many research papers, extensive information about altered (neuro-) motor output illustrates the pain experiences’ influence on coordination.

- Neck
- Back
- Hip
- Knee
- Ankle and foot
Case of a 92 year old veteran.

Fell one-and-a-half years ago
Hit head and lost consciousness
Was very weak in the legs for months
Ambulated only with wheeled walker
Patient kept stumbling and falling, even with walker

Patient reduced walking to absolute minimum
Initial injury:

In the periphery: altered, defensive and protective motor patterns

Centrally: heightened threat detection levels, fear
Recovery period:

Peripheral motor patterns become habitual

Central fear avoidance motor behaviour becomes default pattern
Focus of first visits:

**EXPLAIN PAIN.**

Explain how defensive motor patterns actually worsen balance.

Explain how THAT worsens fear and increases defensive patterns.

Practice walking with physical touch.

Progress to walking with proximity of therapist

Progress to walking alone with cane

Emphasize safe homework attempts.
Patient walks without cane in home, with cane outside, and with walker in mall or other venues.
Difficulties and barriers:

His persistent fear of falling,

the deeply seated notion "I am OLD, and this is just part of it"

and loss of some initial motor control and strength.
In the explaining sessions I avoided the use of words like:

- “Damage”
- “Worn out”
- “Old”
- “In your head”
- “Poor balance”
Positive suggestive words:

I emphasized the use of “we” and “our abilities” to illustrate the commonality of neurophysiological processes.

Repeated the notion that balance is a “skill” that can be practiced; reminded him of his military training — focused repetition provided improvement. (Knitting, shooting, math, skating, music)

And that falling is “being out of practice”
And repeatedly suggested that the brain is *always* “trainable and flexible”.

And suggested the book: “The Brain That Changes Itself”.
Some specific Fall References:


Some Specific Pain References:

**Topical issues in Pain IV** ed. Gifford, L *Physiotherapy Pain Association Authorhouse* 101-118

**Topical Issues in Pain V** ed. Gifford, L *Physiotherapy Pain Association Authorhouse* 55-122


Moseley GL *Unraveling the barriers to reconceptualisation of the problem in chronic pain: The actual and perceived ability of patients and health professionals to understand the neurophysiology*. *The Journal of Pain* 4:184-189 2003


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