The Patient Response Model

Implications for Mobility, Stability, and Pain Science Education

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Learning Objectives:

At the completion of this unit of study and with students review of material, the student learner will be able to:

1. Compare and contrast exercise theories and approaches of the Australian, MDT (McKenzie), and Movement System (Sarhmann) systems.

2. Analyze pathology based and kinesiopathological models in musculoskeletal physical therapy.

3. Synthesize and integrate the principles of testing repeated spinal movements, single limb and passive movements to classify patients based on patient response.

4. Analyze examination findings to arrive at a PT diagnosis and prognosis based on a patient response system.

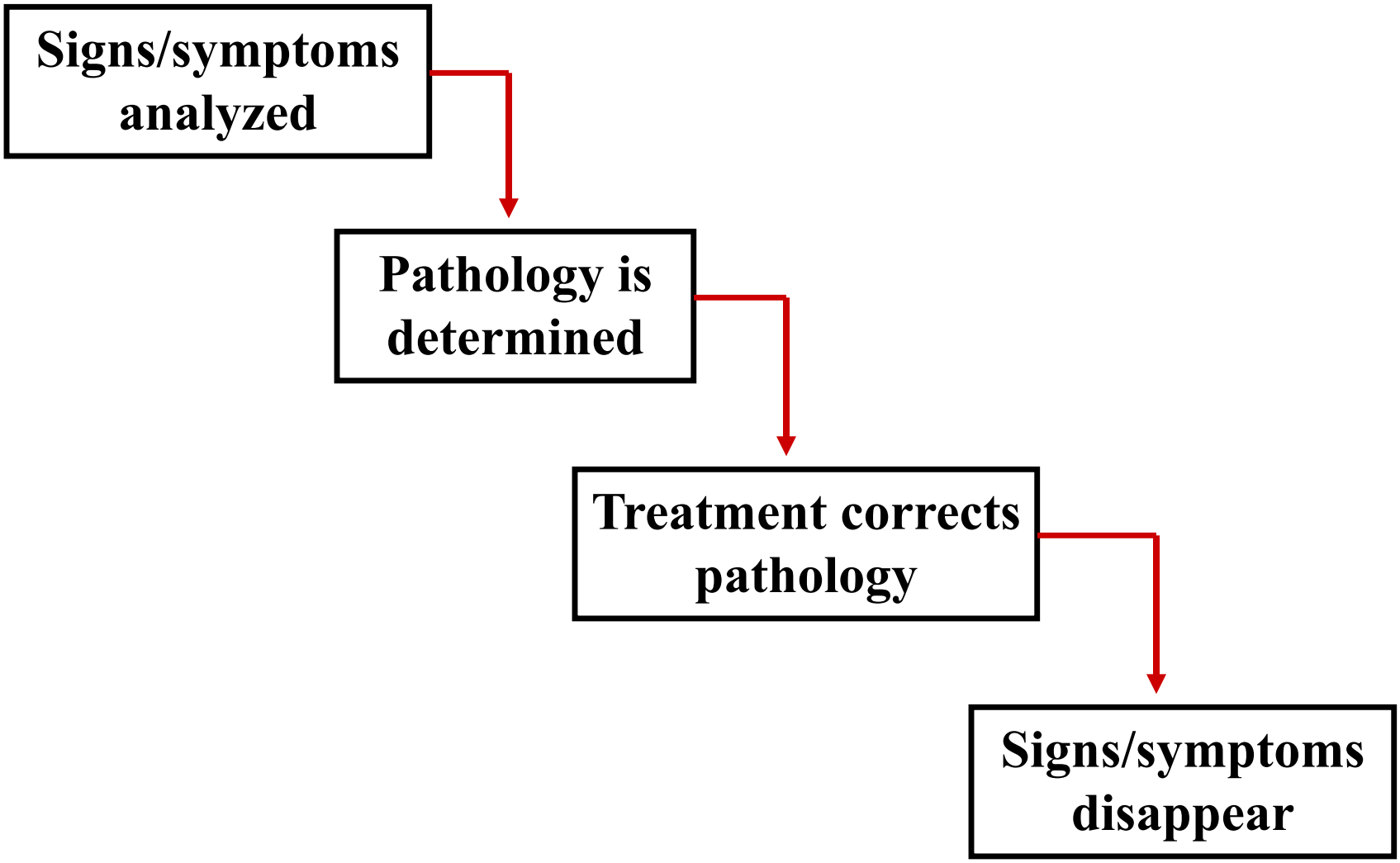
5. Analyze research related to MDT, Treatment Based Classification (TBC) and Movement System Balance and Pain Mechanism Classification (PM) .

Expert Quotes

Pathoanatomical diagnoses

- “80% of back pain is caused by weak or tense muscles.”
- “The majority of LBP actually originates in the sacral ligaments.”
- “In 50% or more...the facet joint is the site of dysfunction.”
- “90-95% of back pain is due to disks.”
- “An extremely high percentage...have fascial problems.”
- “50%-70% of chronic symptoms are psychological in origin.”

Medical Model of Disease



Pathoanatomical models

Cyriax – annular disc

McKenzie – nuclear disc

Paris – passive intervertebral motion

Nordic/osteopathic - facet

Osteopathic – fascial

Sahrmann/Kendall – muscle balance

Diagnosis vs. Classification

Diagnosis: “ ***The process of determining the cause of a patient’s illness or discomfort***”

Classification: ***“The process of classifying clinical data into named categories of clinical entities for the purpose of making clinical decisions regarding therapeutic management”***

(Rose, 1989)

Classification Systems for Low Back Pain

Identifiable source of LBP present in <10%

Classification systems often based on anatomical (theoretical) model

No one classification system is more reliable than others (Riddle, 1998)

Certain characteristics of particular classification systems may have appropriateness based on symptom chronicity (International Classification for Functioning 2013)

Acute Low Back Problems in Adults

Bigos S et al. Agency for Health Care Policy and Research (AHCPR) 1994

Comparison of a Guideline-Based Approach versus a Classification Approach in the Treatment of Acute, Work-Related Low Back Pain

Julie M. Fritz, PT, PhD, ATC

Anthony Delitto, PT, PhD

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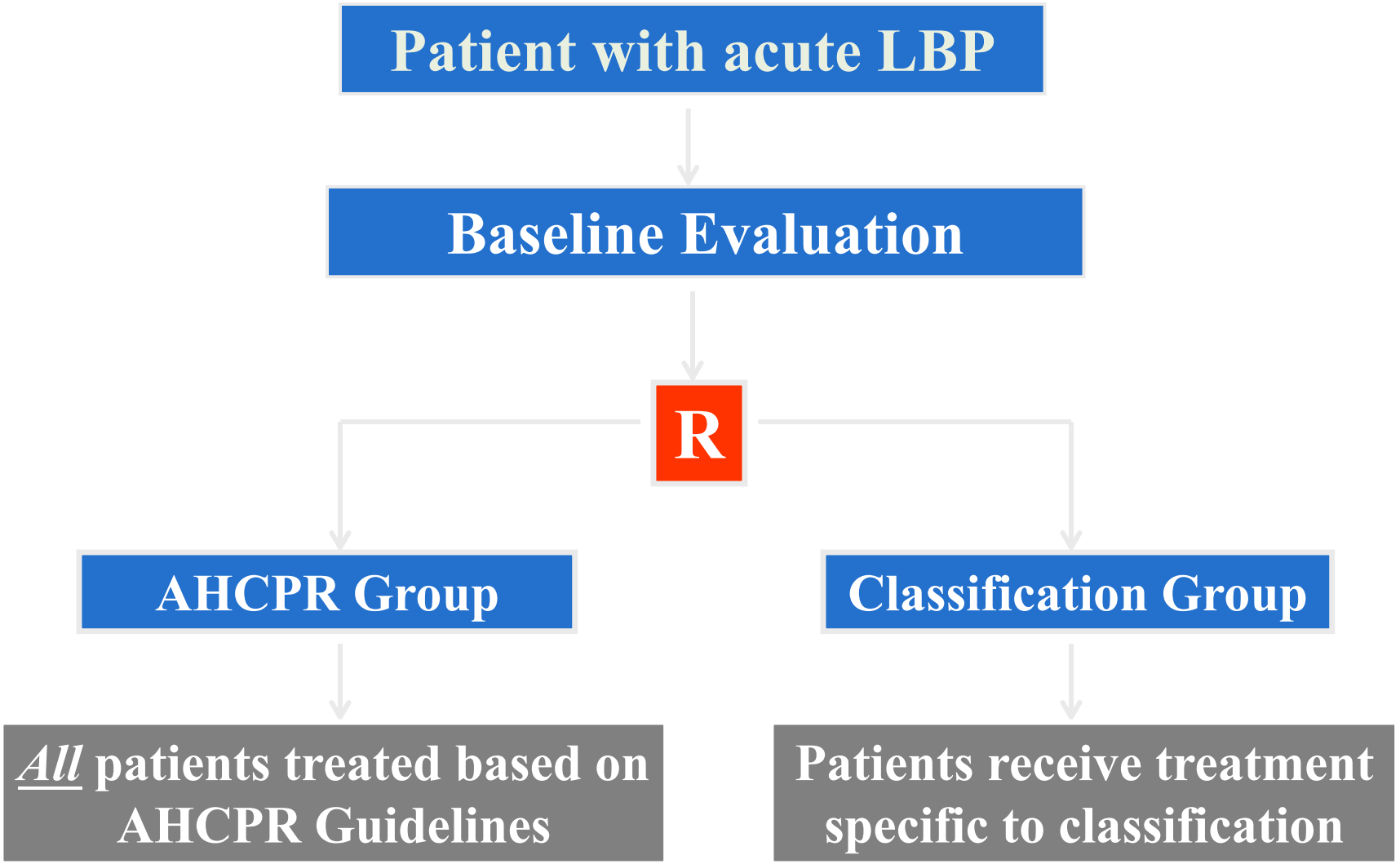
Department of Physical Therapy

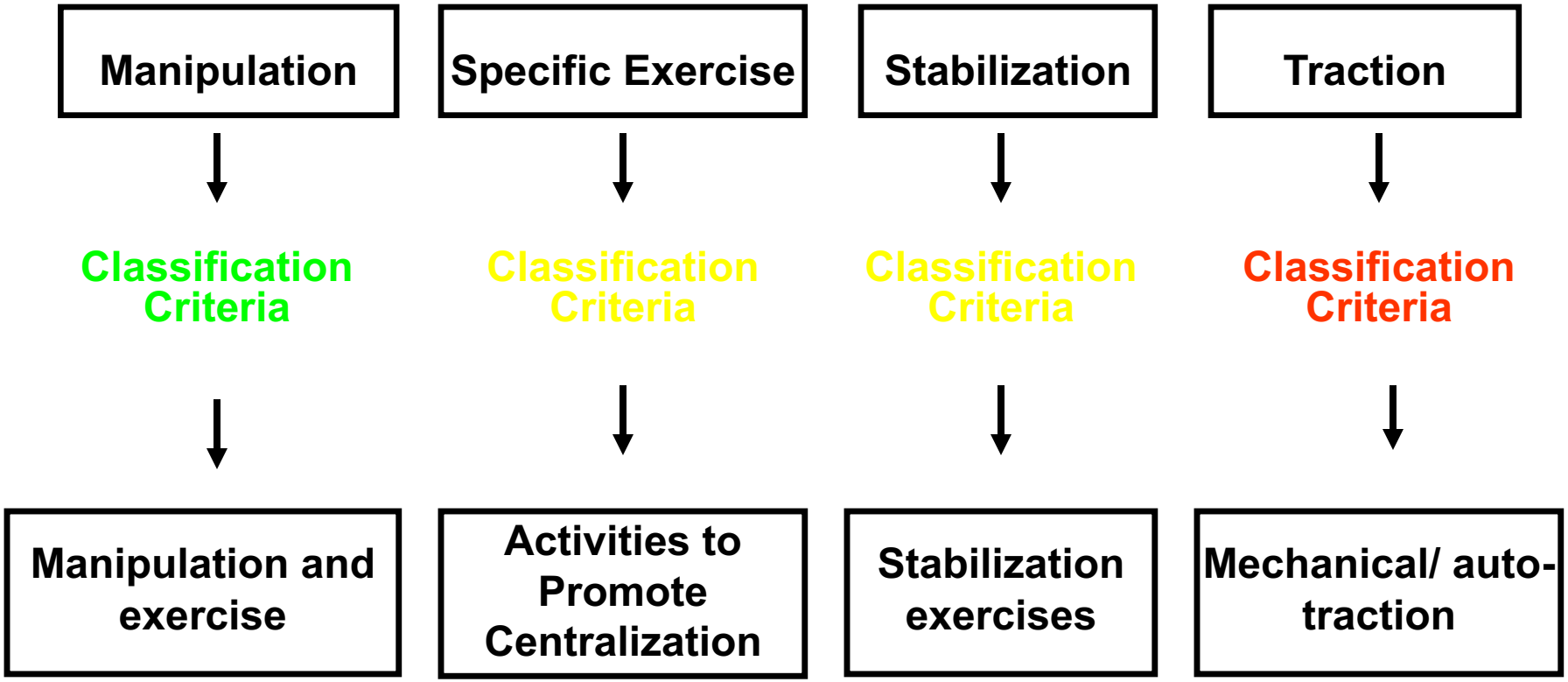
University of Pittsburgh

Fritz J, Delitto A, Erhard R. Comparison of a Guideline-Based Approach versus a Classification Approach in the Treatment of Acute, Work-Related Low Back Pain. Spine. 2003;28:1363-1372



Fritz J, Delitto A, Erhard R. Comparison of a Guideline-Based Approach versus a Classification Approach in the Treatment of Acute, Work-Related Low Back Pain. Spine. 2003;28:1363-1372

Low Back Pain Classifications



Fritz J, Delitto A, Erhard R. Comparison of a Guideline-Based Approach versus a Classification Approach in the Treatment of Acute, Work-Related Low Back Pain. Spine. 2003;28:1363-1372

Patient response methods

Maitland – *patient response* to passive

Movement System Balance (Sahrmann) – *patient response* to active limb movements

MDT (McKenzie)– *patient response* to repeated end range movements

"Patient response methods…

require dedicated communication between clinician and patient for clinical decisions, without necessarily requiring a pathology based diagnosis." *Orthopaedic Manual Therapy: An Evidence Based Approach, 2nd ed. 2011.*

Cook C, Ramey K, Hegedus E. Physical therapy exercise intervention based on classification using the patient response method: a systematic review of the literature. *J Man Manip Ther. 2005;13(3):152-62.*

End Range Forces and Manual Physical Therapy

Diagnostic Properties of **End range of motion (ERP)**

- Exposes dysfunction (biomechanical model)
- Reduces derangement

James Cyriax MD

"Father of Orthopaedic Medicine"

Mechanical Diagnosis and Therapy (MDT)

Examination for centralization and directional preference

Mechanical Diagnosis and Therapy (MDT)

General Misconceptions

- Based only on symptoms
- Classification based on pathoanatomy of the lumbar intervertebral disc
- Focused on extension exercises (prone pressup)


This is not…

Lumbar Spine Examination

Subjective

Patient Functional Questionnaires

Structural exam

AROM

Repeated **end range** movements

Joint mobility assessment

Muscle performance

- ✓Resisted
- ✓MMT
- ✓Endurance
- ✓Muscle balance
- •Neurological
- •Palpation

When should we **not** test end range?

Hypermobility vs. Instability

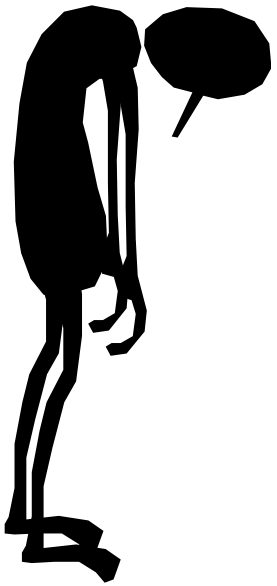
- Mechanism of injury
- Level of function
- AROM weightbearing
- PIVM weightbearing vs. nonweightbearing
- Neurological tests
- Palpation

Patient Questionnaires

- Oswestry
- Fear Avoidance Beliefs Questionnaire
- Hendler 10 Minute Screening test for Chronic Low Back Pain
- Job Satisfaction
- **Yellow Risk Form (YFRF)**

Structural examination

Levangie PK. The association between static pelvic asymmetry and low back pain. Spine. 2000;25:2551-2552.



AROM

Quantity of movement

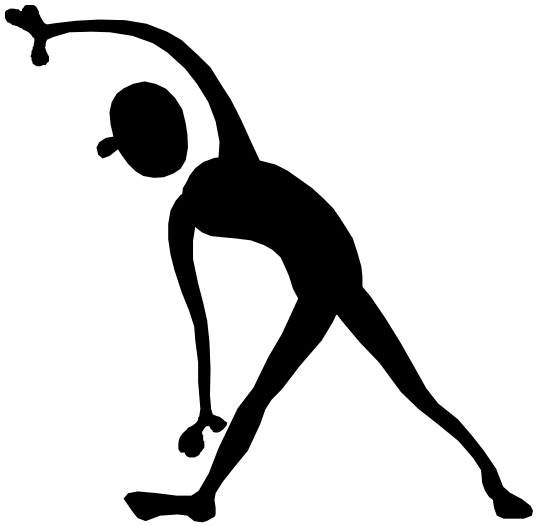
Flexion 40-60 degrees,

Extension 20-35 degrees - double inclinometer

Lateral flexion 15-20 degrees Rotation 30 degrees (includes thoracic – standard goniometer (AMA)

Methods:Tape measure, fingertip-to-floor, double inclinometer, Modified-Modified Schober

Quality of movement



AROM

- Extension in standing
- Sidebending in standing
- Sideglide in standing
- Flexion in standing

Repeated **End Range** Movements

- Flexion in standing
- Extension in standing
- Sidegliding in standing
- Flexion in lying
- Extension in lying

Repeated end range movements

Donelson R, Aprill C, Medcalf R, Grant W. A prospective study of centralization of lumbar and referred pain: a predictor of symptomatic discs and annular competence. Spine. 1997;22:1115-1122.

Razmjou H, Kramer JF, Yamada R. Intertester reliability of the McKenzie evaluation in assessing patients with mechanical low-back pain. J Orthop Sports Phys Ther. 2000;30:368-389.

Centralization and Directional Preference

- **Centralization** - Describes the phenomenon by which limb pain emanating from the spine is progressively abolished in a distal to proximal direction in response to therapeutic loading strategies, with each progressive abolition being retained over time (lasting change).
- **Directional Preference** - Phenomenon of preference for postures/movements that decrease, abolish or centralize symptom and often improve a limitation of movement (lasting change).
  - **Mechanical change**
  - **Improvement in symptoms – pain or location**

Centralization

Werneke M, Hart DL, Resnik L, Stratford PW, Reyes A. Centralization: prevalence and effect on treatment outcomes using a standardized operational definition and measurement method. J Orthop Sports Phys Ther; 38:116-125, 2008.

Long A, May S, Fung T ; The comparative prognostic value of directional preference and centralization: a useful tool for front-line clinicians? J Manual Manip Ther; 16.248-254, 2008.

Directional Preference

Long A, Donelson R, and Fung T "Does it matter which exercise? A RCT of exercise for LBP. Spine, 2004. 29 (23):2593-2602.

Schenk RJ, Jozefczyk C, Kopf A. A randomized clinical trial comparing therapeutic interventions for low back pain. J Man Manip Ther,2003;11(2).

Centralization and Directional Preference

Werneke MW, Edmond S, Deutscher D, Ward J, Grigsby D, Young M, McGill T, McClenahan B, Weinberg J, Davidow AL. Effect of adding McKenzie syndrome, centralization, directional preference, and psychosocial classification variables to a risk-adjusted model predicting functional status outcomes for patients with lumbar impairments. J Orthop Sports Phys Ther. 2016; 46(9):726-41.

Efficacy of MDT Approach

Donelson R, Aprill C, Medcalf R, Grant W. A prospective study of centralization of lumbar and referred pain: a predictor of symptomatic discs and annular competence. Spine. 1997;22:1115-1122.

Albert HB, Hauge E, Manniche C. Centralization in patients with sciatica: are pain responses to repeated movement and positioning associated with outcome or types of disc lesions? Eur Spine J. 2012.

Efficacy of the Repeated Movement Exam

Intertester Reliability of McKenzie's Classifications of the Syndrome Types Present in Patients with Low Back Pain Riddle and Rothstein, Spine, 1993.

Intesterter Reliability of McKenzie Evaluation in Assessing Patients with Mechanical Low Back Pain Razmjou, Kramer, Yamada JOSPT, 2000.

PROM

- Flexion
- Extension
- Sidebending
- Rotation

End feels firm, may be hard in rotation and lateral flexion to same side due to approximation of zygoapophyseal joints

PROM

- Passive movements
- Passive intervertebral motion

❑Flexion in sidelying

❑Extension in sidelying

❑Sidebending in sidelying

❑Sidebending in prone

❑Rotation in prone

Passive Intervertebral Motion

Gonella C, Paris S, Kutner M. Reliability in evaluating passive intervertebral motion. Phys Ther. 1982;62:436-444.

Insaco EL, et al. Reliability in evaluating passive intervertebral motion of the lumber spine. J of Man and Manip Ther. 1995;3:135-143.

Grading of PIVM

- Expected mobility at each segment
- Comparison to levels above and below
- Patient's age
- Patient's sex
- Comparing right and left motions to one another

Passive Vertebral Pressures (Maitland)

- PACVP
- PAUVP
- TVP
- Joint mobility testing based on *patient response*

Resistive Isometrics and MMT

- Trunk extension
- Pelvis elevation
- Trunk flexion
- Trunk rotation

Deficits require stabilization or strengthening?

Neurological

- Dermatomes, myotomes, deep tendon reflexes, superficial and pathological reflexes
- neural tension testing

Johnson EK, Chiarello CM. The slump test: the effects of head and lower extremity position on knee extension. J Orthop Sports Phys Ther. 1997;26:310-317.

Movement System Balance Theory

Van Dillen LR, Sahrmann SA, Norton BJ, et al. Reliability of physical examination items used for classification of patients with low back pain. Phys Ther. 1998;78:979-988.

Maluf KS, Sahrmann SA, Van Dillen LR. Use of a classification system to guide nonsurgical management of a patient with chronic low back pain. Phys Ther2000;80:1097-1111.

Reliability of Rotation Syndromes

Van Dillen LR, Norton BJ, Sahrmann SA, et al. Efficacy of classification-specific treatment and adherence on outcomes in people with chronic low back pain. A one-year follow-up, prospective, randomized, controlled clinical trial. Man Ther. 2016; 24:52–64.

Adherence to performance training

Van Dillen LR, Norton BJ, Sahrmann SA, et al. Efficacy of classification-specific treatment and adherence on outcomes in people with chronic low back pain. A one-year follow-up, prospective, randomized, controlled clinical trial. Man Ther. 2016; 24: 52–64

Special Tests

- Functional testing – Functional movement screen
- Quadrant test
- Valsalva
- McKenzie SG test
- Hoover test
- Segmental mobility tests
- Compression
- Distraction
- **Dural stretch and sciatic tension tests**: SLR, Slump, Bowstring, Femoral nerve tension test

Adverse Neural Tension (ANTT)

Adverse neural tension is an abnormal physiological or mechanical response from the nervous system which limits the system's range or stretch

Basis for Adverse Neural Tension

Affects

- Improvement of vascularization
- Improvement of axoplasmic flow
- Improvement of mechanical properties of the nervous system

Sites for ANTT

- Soft tissue, osseous, or fibrosseous tunnels
- Where nervous system branches
- Where nervous system is fixed
- At points of friction

Slump Test

To assess the mobility of pain sensitive structures in the vertebral canal and intervertebral foramen

The test evaluates limitation of motion and reproduction of the patient's symptoms (Maitland, 1979)

Slump Test

- Lumbar flexion
- Neck flexion
- Knee extension
- Foot dorsiflexion
- Neck extension

Straight Leg Raise Tests

- Neck flexion (Soto Hall)
- Dorsiflexion (tibial nerve - Braggard's)
- Adduction
- Internal rotation (peroneal nerve tract)
- Plantarflexion/inversion (peroneal nerve tract)
- Dorsiflexion/inversion (sural nerve)

Documentation Criteria

P1 when symptoms start

P2 when symptoms occur at limit of range

R1 when resistence is first encountered

R2 when resistence stops further movement

Palpation - irritability

- Skin rolling
- Skin puckering
- Tone
- Ligamentous tenderness
- Direct palpation over nerve may produce symptoms.
- Palpation to differentiate
- Nerve tenderness
- Methods of palpation

Myofascial Restrictions

Indication for soft tissue intervention?

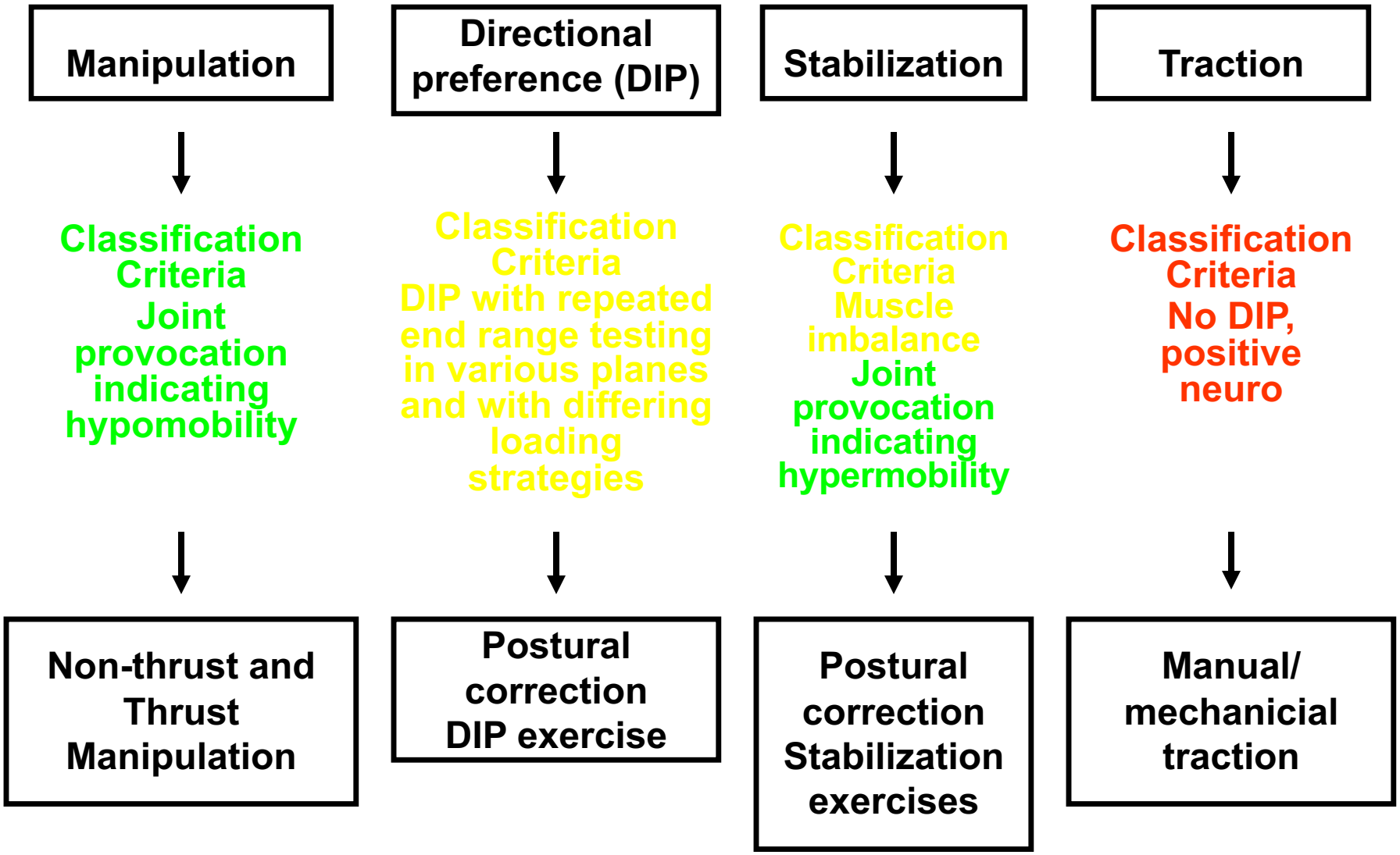
Evaluation – synthesis of examination findings

PT Classification

Riddle, D. Classification and low back pain: a review of the literature and critical analysis of selected systems. Phys Ther. 1998;78:708-735.

Fritz JM, Delitto A, Erhard RE. Comparison of Classification-Based Physical Therapy with Therapy Based on Clinical Practice Guidelines for Patients with Acute Low Back Pain. Spine. 2003;28(13):1363-1372

Patient Response Model



Pathoanatomical diagnosis or movement based diagnosis

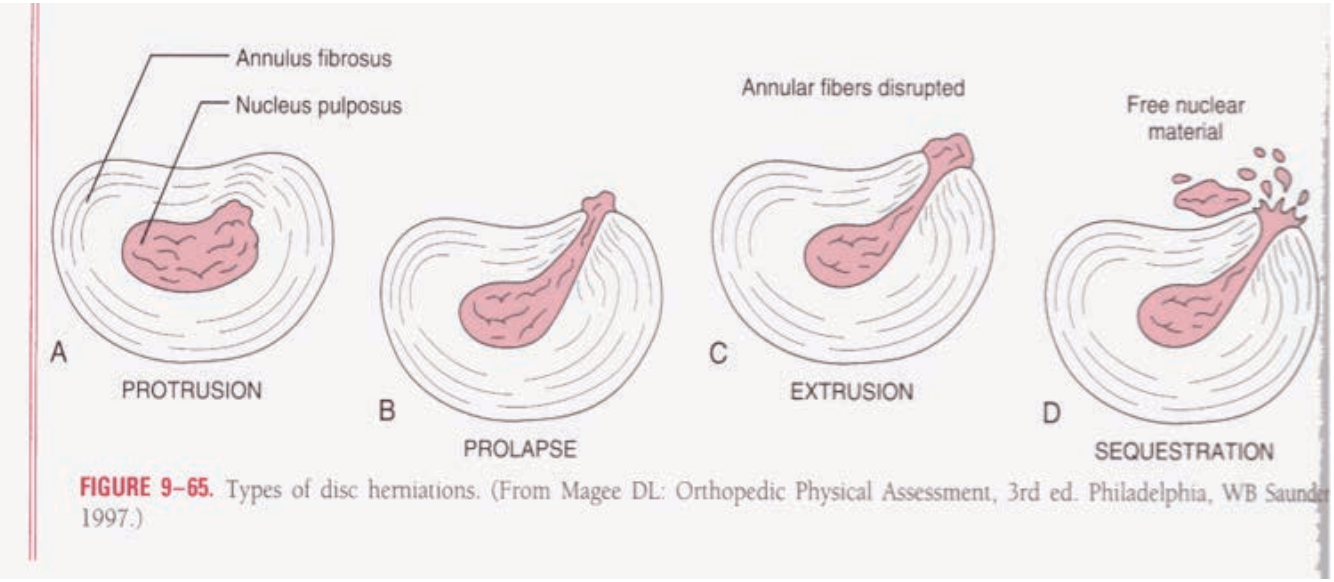
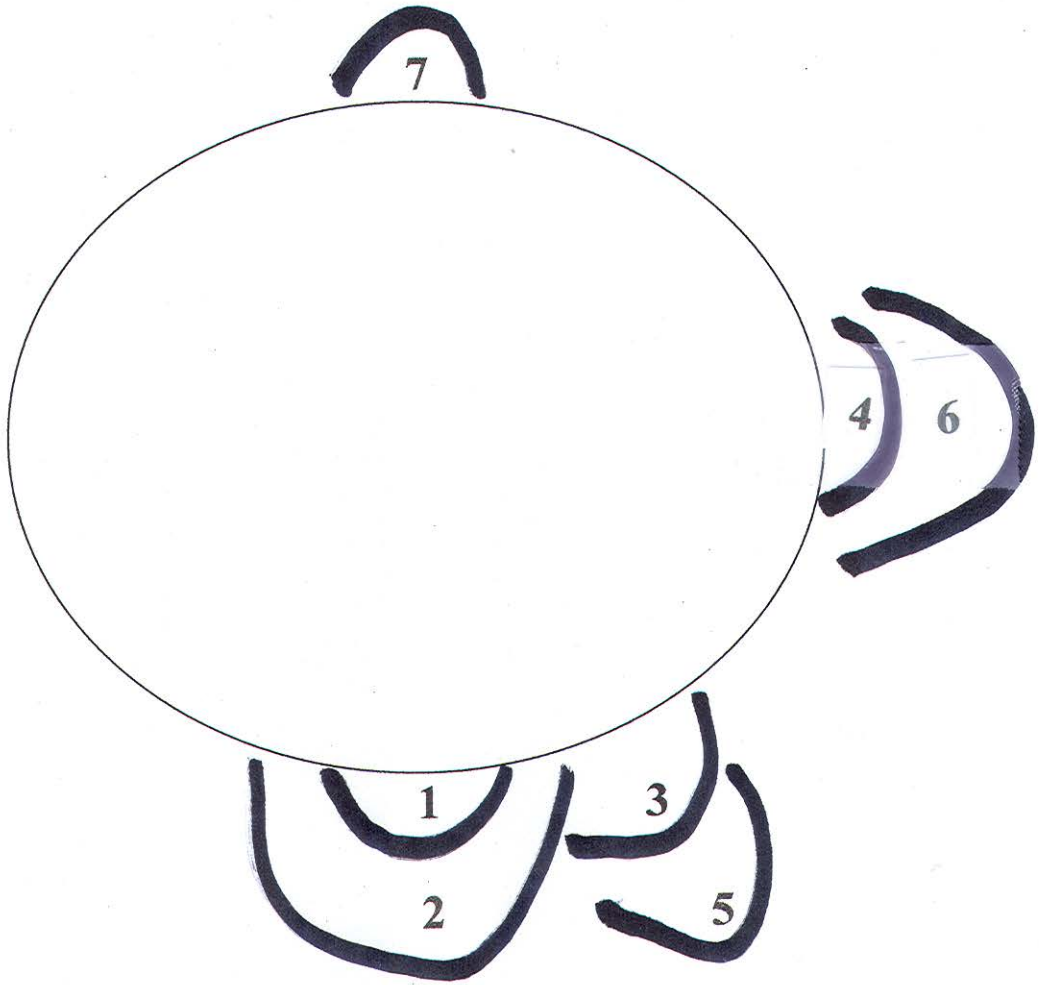


FIGURE 9–65. Types of disc herniations. (From Magee DL: Orthopedic Physical Assessment, 3rd ed. Philadelphia, WB Saunde 1997.)

Derangement



More recent derangement terminology

Central Symmetrical (previously 1,2,7)

Unilateral Asymmetrical Symptoms to Knee (previously 3,4,7)

Unilateral Asymmetrical to Below Knee (previously 5,6)

Responder?

Low Back Pain Classifications

Psychosocial

Werneke MW, Hart DL, George SZ, Deutscher D, Stratford PW.; Change in psychosocial distress associated with pain and functional status outcomes in patients with lumbar impairments referred to physical therapy services. J Orth Sports Phys Ther; 41:969-980, 2012.

Psychosocial

Werneke MW, Edmond S, Deutscher D, Ward J, Grigsby D, Young M, McGill T, McClenahan B, Weinberg J, Davidow AL. Effect of adding McKenzie syndrome, centralization, directional preference, and psychosocial classification variables to a risk-adjusted model predicting functional status outcomes for patients with lumbar impairments. J Orthop Sports Phys Ther. 2016; 46(9):726-41.

Werneke MW, Hart DL, George SZ, Deutscher D, Stratford PW. Change in psychosocial distress associated with pain and functional status outcomes in patients with lumbar impairments referred to physical therapy services. J Orth Sports Phys Ther. 2012; 41:969-980.

Biopsychosocial Model

Unconscious or repressed negative emotions (psychosomatic disorders)

Depression, anxiety, and anger (emotional disorders)

Conscious tendency to misinterprets or over interpret nociception (catastrophizing)

Heightened concern about pain and its source (fear avoidance)

Inability to cope with past trauma (post traumatic stress disorder)

Social and cultural factors influence illness and behavior

Readiness to change (self-efficacy)

Kolski MC, O'Connor A. A World of Hurt. 2015

Classification of Central Pain Mechanisms

Joe Lorenzetti PT, DPT, MS, FAAOMPT,

Cert. MDT, MTC

Spine Team Leader, Catholic Health System of Buffalo

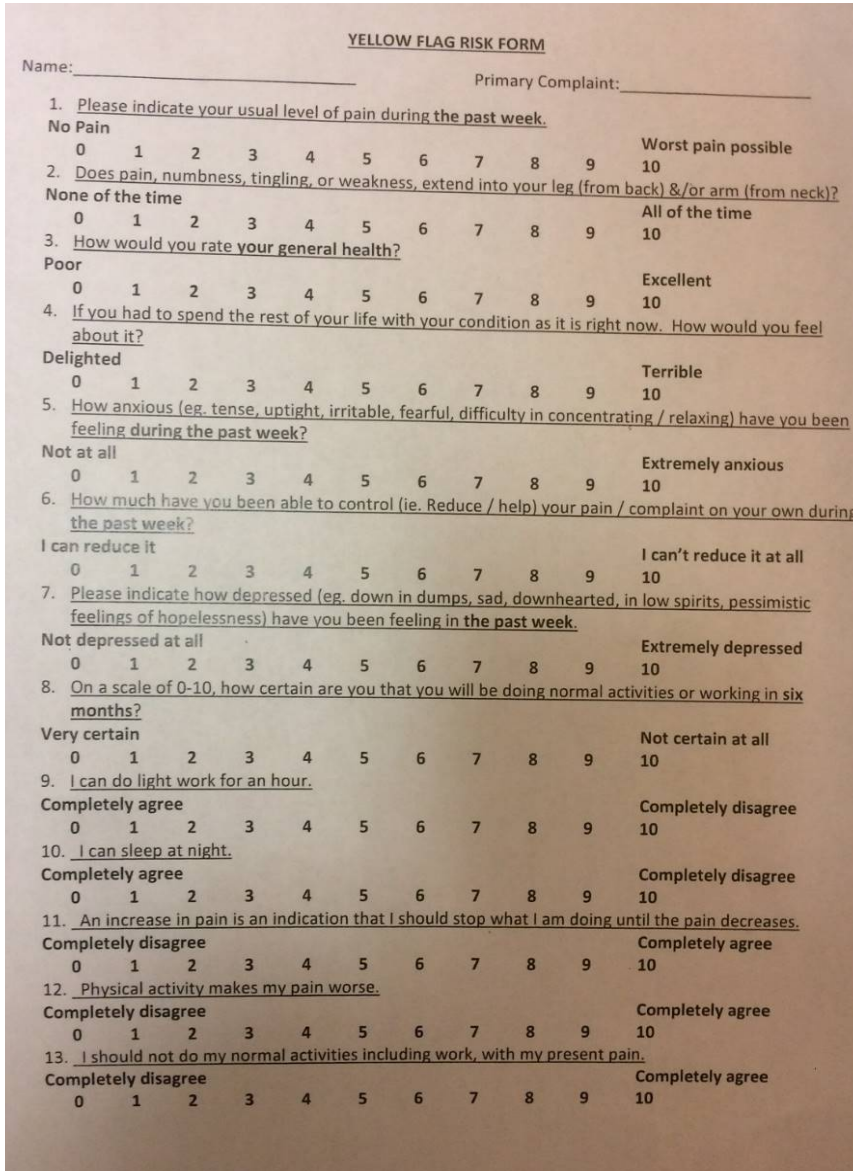
Pain Classification and Chronic Pain

- Nociceptive: Inflammatory
- Nociceptive: Ischemia
- Peripheral Neurogenic
- Central sensitization
- Affective
- Motor/Autonomic

A World of Hurt A Guide to Classifying Pain

Melissa C. Kolski and Annie O'Connor

Yellow Flag Risk Form (YFRF)



YELLOW FLAG RISK FORM

Name:_____ Primary Complaint:_____

1. Please indicate your usual level of pain during the past week.

No Pain 0 1 2 3 4 5 6 7 8 9 Worst pain possible 10

2. Does pain, numbness, tingling, or weakness, extend into your leg (from back) &/or arm (from neck)?

None of the time 0 1 2 3 4 5 6 7 8 9 All of the time 10

3. How would you rate your general health?

Poor 0 1 2 3 4 5 6 7 8 9 Excellent 10

4. If you had to spend the rest of your life with your condition as it is right now. How would you feel about it?

Delighted 0 1 2 3 4 5 6 7 8 9 Terrible 10

5. How anxious (eg. tense, uptight, irritable, fearful, difficulty in concentrating / relaxing) have you been feeling during the past week?

Not at all 0 1 2 3 4 5 6 7 8 9 Extremely anxious 10

6. How much have you been able to control (ie. Reduce / help) your pain / complaint on your own during the past week?

I can reduce it 0 1 2 3 4 5 6 7 8 9 I can't reduce it at all 10

7. Please indicate how depressed (eg. down in dumps, sad, downhearted, in low spirits, pessimistic feelings of hopelessness) have you been feeling in the past week.

Not depressed at all 0 1 2 3 4 5 6 7 8 9 Extremely depressed 10

8. On a scale of 0-10, how certain are you that you will be doing normal activities or working in six months?

Very certain 0 1 2 3 4 5 6 7 8 9 Not certain at all 10

9. I can do light work for an hour.

Completely agree 0 1 2 3 4 5 6 7 8 9 Completely disagree 10

10. I can sleep at night.

Completely agree 0 1 2 3 4 5 6 7 8 9 Completely disagree 10

11. An increase in pain is an indication that I should stop what I am doing until the pain decreases.

Completely disagree 0 1 2 3 4 5 6 7 8 9 Completely agree 10

12. Physical activity makes my pain worse.

Completely disagree 0 1 2 3 4 5 6 7 8 9 Completely agree 10

13. I should not do my normal activities including work, with my present pain.

Completely disagree 0 1 2 3 4 5 6 7 8 9 Completely agree 10

YFRF Scoring and Domains

< 49 = Green = Low Risk for psychosocial factors

50 – 64 = Yellow = Moderate Risk for psychosocial factors

65+ = Red = High risk for psychosocial factors

Three main domains related to slower recovery and delay of normal activity:

1) Fear/Escape Avoidance Behavior toward physical activity (# 9, 11, 12, 13)

2) Confidence in general health and condition (# 3,4) and pain control and normal ability (# 6,8)

3) Emotion and social well being – depression and anxiety (# 5,7)

Pain

Pain

"A multisystem output, activated by specific pain neuromatrix. This neuromatrix is activated whenever the brain concludes it is in danger and action is required."

ButlerD, Moseley, L Explain Pain, 2003

Chronic Pain

126.1 million adults in the USA had some pain over the last 3 months

25.3 million adults are suffering from chronic pain

Louw A, Nijs J, Puentedura EJ. A Clinical perspective on a pain neuroscience education approach to manual therapy. Journal of Manual and Manipulative Therapy. 2017;1:160-168

Pain and Threat Perception

Brain determines degree of threat and pain function.

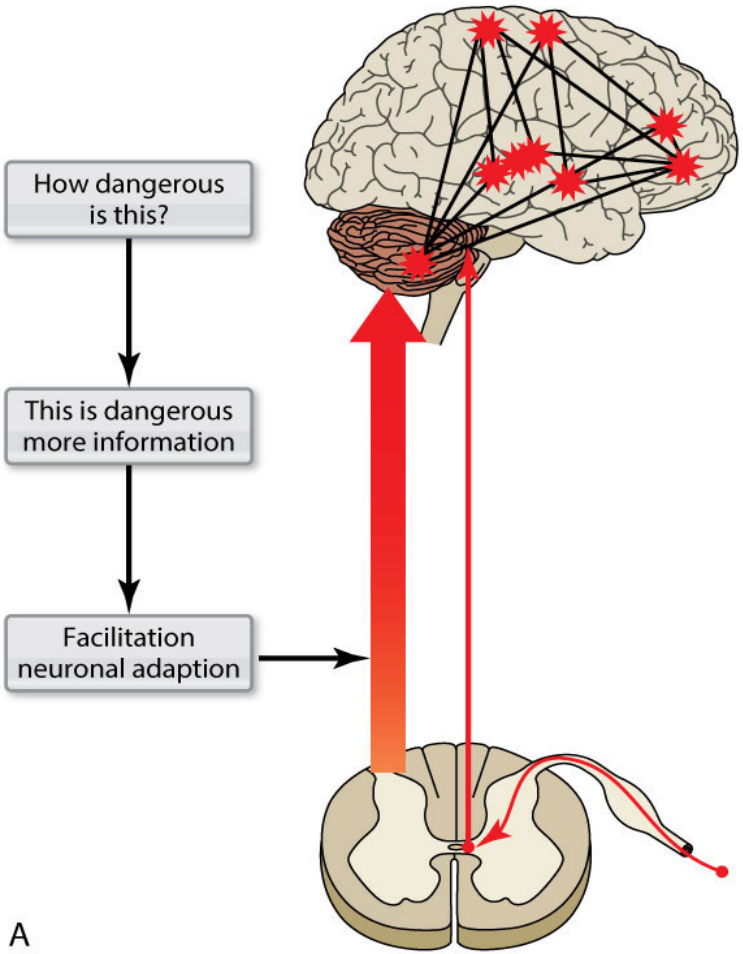
Perception of threat is key factor.

Threat perception makes a significant contribution to the effectiveness of pain education.

Survival is the most basic function.

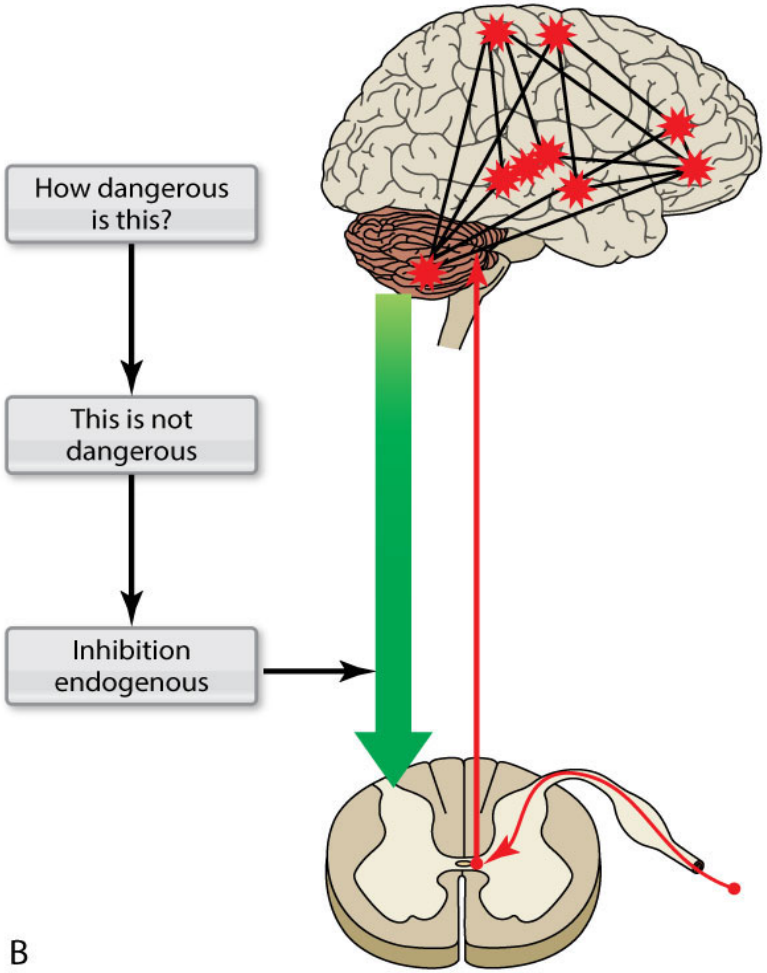
Pain is protection against threat of danger.

Threat Perception



From Louw A: Why do I hurt? A neuroscience approach to pain, Minneapolis, 2013, OPTP.

Threat Perception (Cont.)



From Louw A: Why do I hurt? A neuroscience approach to pain, Minneapolis, 2013, OPTP.

Threat and Fear Avoidance

Vlaeyen JW, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. *Pain.* Apr 2000;85(3):317-332.

Systematic Literature Review of Imaging Features of Spinal Degeneration in Asymptomatic Populations

Imaging findings for 3,110 asymptomatic individuals

Disk degeneration:
- 37% of 20-year-old individuals.
- 96% of 80-year-old individuals.

Disk bulge:
- 30% of those 20 years of age.
- 84% of those 80 years of age.

Disk protrusion:
- 29% of those 20 years of age.
- 43% of those 80 years of age.

Annular fissure:
- 19% of those 20 years of age .
- 29% of those 80 years of age.

Brinjikji W, Luetmer PH, Comstock B, Bresnahan BW, Chen LE, Deyo RA, Halabi S, Turner JA, Avins AL, James K,
Wald JT, Kallmes DF, Jarvik JG.AJNR Am J Neuroradiol. 2015 Apr;36(4):811-6. doi: 10.3174/ajnr.A4173. Review.

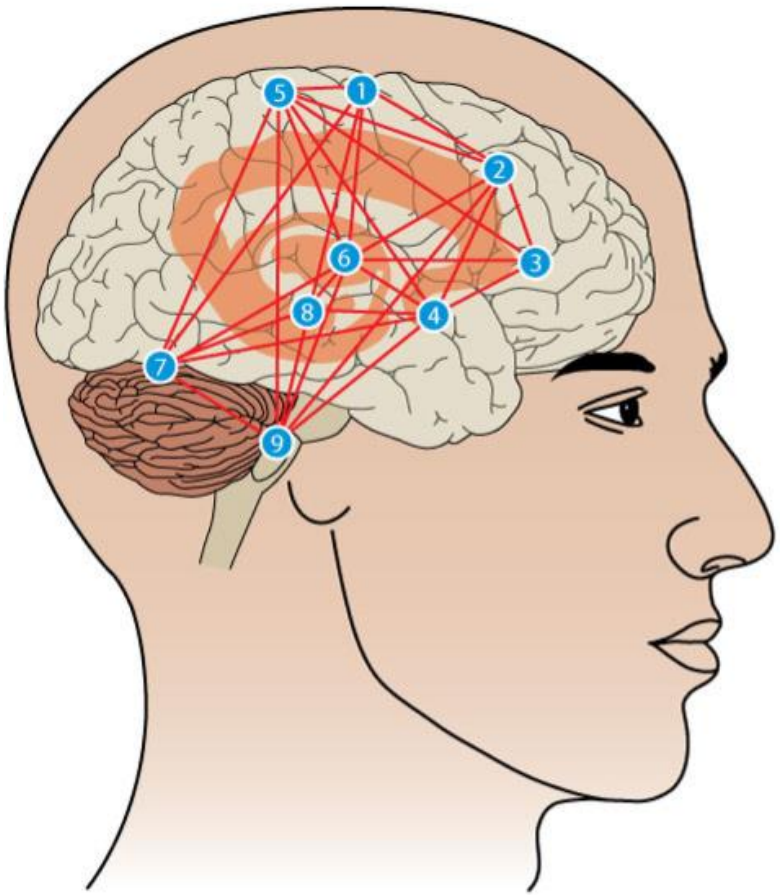
Reconceptualization of Pain

Pain is a multiple system output, activated by an individual's pain neuromatrix

Neuromatrix theory

- Collection of brain areas activated during a pain experience
- Conceptualizes that areas of brain work as a network

Pain Neuromatrix



A typical pain neuromatrix

1. Premotor/Motor cortex
   Organize and prepare movements
2. Cingulate cortex
   Concentration, focusing
3. Prefrontal cortex
   Problem solving, memory
4. Amygdala
   Fear, fear conditioning, addiction
5. Sensory cortex
   Sensory discrimination
6. Hypothalamus/Thalamus
   Stress responses, autonomic regulation, motivation
7. Cerebellum
   Movement and cognition
8. Hippocampus
   Memory, spatial recognition, fear conditioning
9. Spinal cord
   Gating from the periphery

From Puentedura EJ, Louw A: A neuroscience approach to managing athletes with low back pain, Phys Ther Sport *13[3]:123-133, 2012.*

CLASSIFICATION BASED SYSTEMS

Pain Classifications
(Gifford and Butler 1997)

Peripheral Nervous System Pain Mechanisms

- Nociceptive: Inflammatory Mechanical vs Chemical
- Nociceptive: Ischemic
- Peripheral Neurogenic

Central Nervous System Pain Mechanisms

- Central Sensitization
- Affective Pain Mechanism Conscious vs Unconscious
- Autonomic/Motor Pain Mechanism

Classification Based Systems

Why Classification Based Systems?

Shirley Ryan Abilitylab

Average duration of visits = 15 visits

Duration of visits trained MDT and Pain Mechanism Classification System (PMCS) = 6.93 visits

Central Mechanisms

What is Central Sensitization?

Central sensitization = “An amplification of neural signaling within the central nervous system that elicits pain hypersensitivity” and “increased responsiveness of nociceptive neurons in the central nervous system to their normal or subthreshold afferent input.”

Nijs J, Goubert D, Ickmans K. JOSPT. 2016;46:1024-1028

Central Sensitization

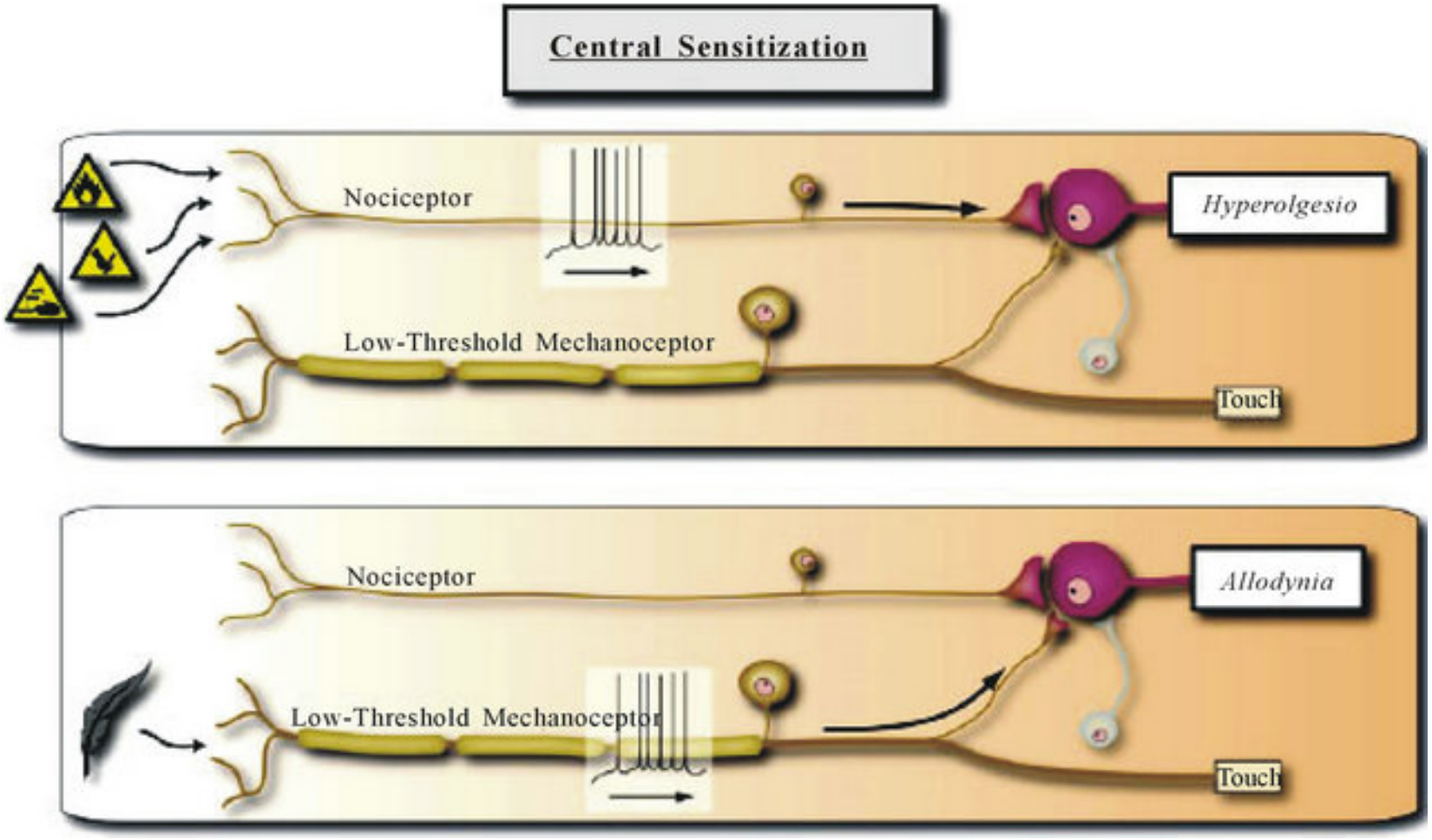
Nociceptor inputs can trigger a reversible, yet prolonged increase in the excitability of neurons in central nociceptive pathways (Wolf, 2011).

Evidence has shown inhibitory interneurons are destroyed and random excitatory connections may form.

Symptoms associated with the lowering of change in excitability include:

- Hypersensitivity
- Hyperalgesia
- Allodynia

Normal vs. Central Sensation



Why Central Sensitization Happens

Starts with changes in dorsal horn of spinal cord following intense peripheral noxious stimuli, tissue damage, nerve damage and inflammation.

These changes cause reduction pain threshold, amplification of pain responses, and spread of pain sensitivity to non-injured areas.

These changes occur through the central nervous system.

Chronic or Persistent Pain Conditions with a Central Sensitization Component

RA

Knee OA

TMJ disorders

Fibromyalgia

HA's

Neuropathic pain

CRPS

Post surgical pain

Visceral pain hypersensitivity syndromes (IBS)

Wolf, 2011

Subjective Characteristics

Location – wide spread, non-anatomical distribution of pain

Frequency- constant, unremitting, spontaneous, latent

Descriptors- catastrophic terms, pain threat high

Intensity – high severity and irritability

Onset – chronic, past expected tissue healing, pain disproportionate

History – multiple failed interventions

24 hour behavior – erratic, inconsistent

Psychosocial – maladaptive and harmful beliefs/poor self efficacy

Aggravating/alleviating factors – disproportionate, non-mechanical, unpredictable

Kolski MC, O'Connor A. A World of Hurt. 2015

Objective Characteristics

Movement testing – disproportional, no coloration between stimulus and response

Palpation – diffuse non-anatomical areas of tenderness

Posture - antalgic with atrophy of muscles

Neurological testing – hyperalgesia, allodynia

Proprioceptive screen - negative

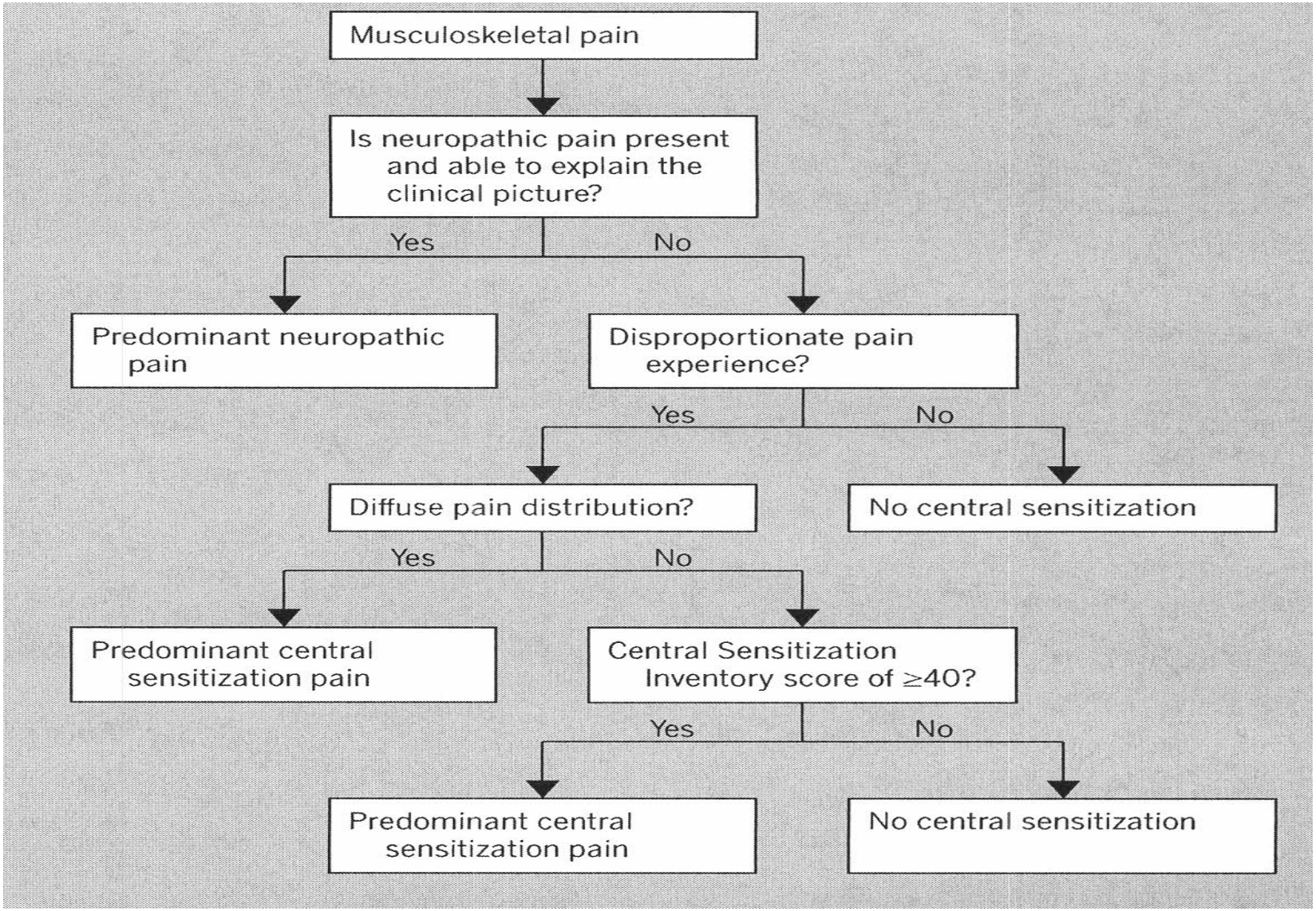
Breath assessment – upper respiratory

Yellow flag assessment – positive for catastrophization, fear avoidance, harmful thoughts, distress

Readiness stage - variable

Fear avoidance belief – FABQ physical activities >14

Kolski MC, O'Connor A. A World of Hurt. 2015



Nijs J, Goubert D, Ickmans K. JOSPT. 2016;46:1024-1028

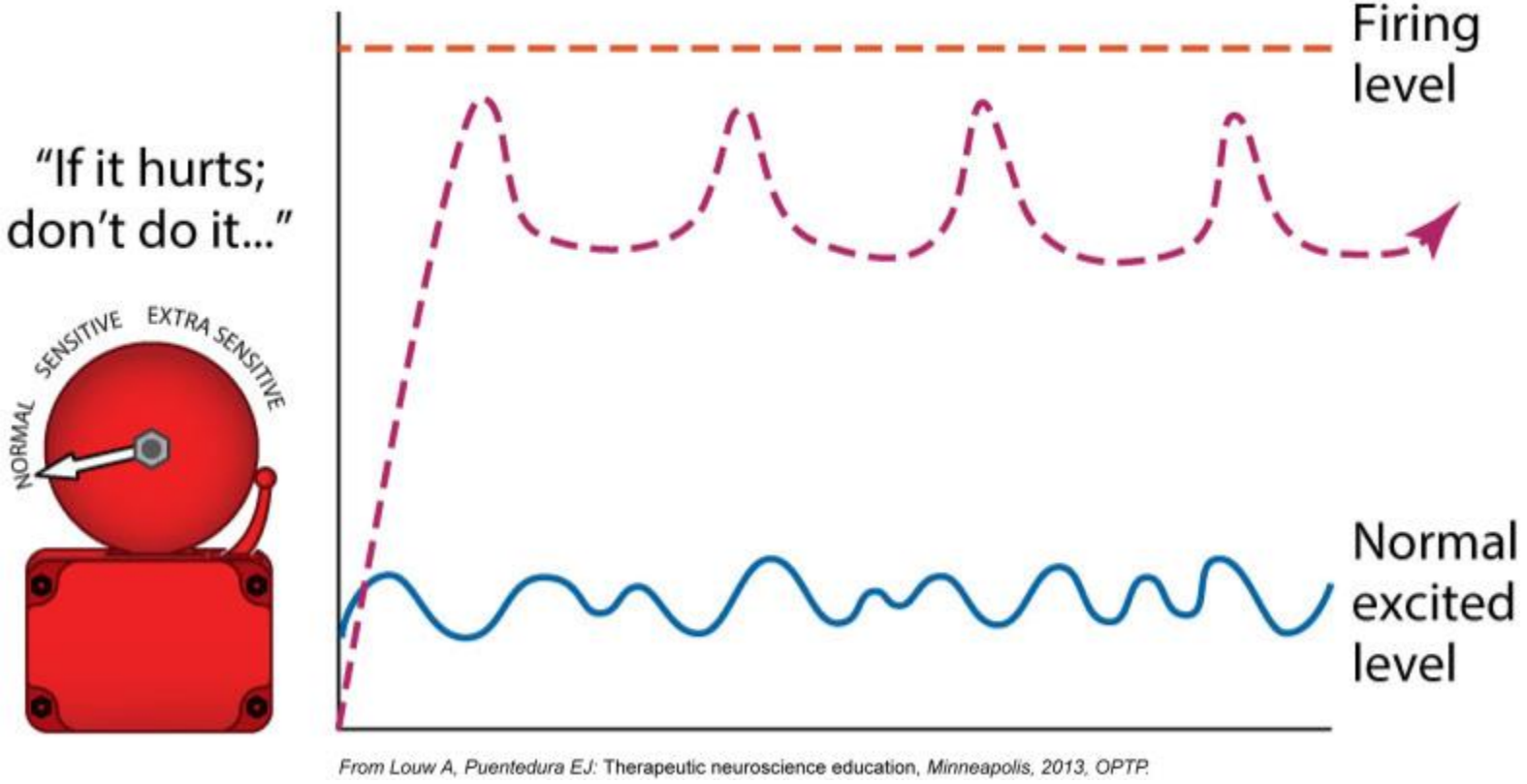
Intervention

Education

- Explain hurt vs. harm
  - *Non-damaging nature of pain*
- Activity Pyramid
  - *Flare up managements*
  - *Green, yellow, and red lights*
- Pain mechanism educating
- Pain journal (control negative thoughts)
- Control to the patient
  - *Explanation of the no worse concept*
- Coping strategies
  - *Diaphragmatic breathing*
  - *Relaxation*

Kolski MC, O'Connor A. A World of Hurt. 2015

“If It Hurts, Don’t Do It”



From Louw A, Puentedura EJ: Therapeutic neuroscience education, *Minneapolis, 2013, OPTP.*

Words that Harm

It's all in your head.

Pain means you did something wrong.

It runs in the family.

Your _____ is out of place.

Your _____ doesn't move correctly.

Flare up = harm

Discontinue any exercise which caused you pain.

Your MRI looks terrible.

Kolski MC, O'Connor A. A World of Hurt. 2015

Words that Heal

Good pain/movement safe pain.

All pain is REAL.

Your test results are a normal part of aging.

Kolski MC, O'Connor A. A World of Hurt. 2015

Affective Pain Mechanism Conscious vs Unconscious

Happened a while ago but the brain does not know that.

Not an input but is output driven.

Psychosocial

Anger, worry, fear, depression (conscious emotions) cause symptoms.

Good candidate for a cognitive behavioral therapist.

Affective Intervention

Pain mechanism education:

- Brain's role in pain
- Psychology for coping
- Understand movement safe pain to return to rewarding activities
- Master non pharmacy sleep hygiene, stress management, healthy lifestyle

Autonomic Motor

Primary somatosensory cortex

Short circuit from the virtual body to the actual body

Brain driven

The brain is shutting down body parts

“Brain dysfunction” which takes 16-24 weeks to remodel

If brain is in the final stage of protection, it is shutting down the body part.

Phantom pain

Training Brain to Periphery

Graded motor imagery (GMI)– rehab process consisting of left-right discrimination recognition tasks, imagined movements, and mirror therapy.

- GMI
  - *Left/right discrimination*
  - *Explicit motor imagery*
  - *Mirror therapy*

Systematic review displayed good level 2 evidence of the GMI's effective in reducing pain in adults with CRPS type 1.

YFRF Patterns and Best Pain Science Education

YFRF Pattern 1 = Central Sensitivity Pain Mechanism

- High Questions: 9, 11, 12, 13
- Activity Traffic Light – A Guide to movement and safe pain
- Reframe cognitions, thoughts and words can alter sensitivity toward movement

YFRF Patterns and Best Pain Science Education

YFRF Pattern 2 = Affective Pain Mechanism

- High questions 3, 4, 5, 6, 7, 8
- Role of emotions and social imbalance, conflict, stress to pain
- Encourage discovery through journaling
- Purpose: Trigger focused – non pharmacy coping
- Restore meaningful activities and rewarding life

YFRF Patterns and Best Pain Science Education

YFRF Pattern 3 = Peripheral Neurogenic Pain Mechanism

- High questions 1, 2, 6, 12
- Neurodynamic Exercise – nerves need movement
- Nerve tissue is longest – 3% of body weight
- Nerve is strongest tissue – 3x tensile load of body weight
- Nerve is dynamic – consumes 26% of blood volume
- Nerve is sensitive – negative thinking increases sensitivity
- Nerve exercise – Slider vs. tensioner

Pain Mechanisms and Intervention

- Nociceptive: Inflammatory – Chemical/Direction
- Nociceptive: Ischemia – Tissue remodel
- Peripheral Neurogenic – Entrapment/Tight
- Central sensitization - Cognitive
- Affective - Coping
- Motor/Autonomic - Sensorimotor

A World of Hurt A Guide to Classifying Pain

Melissa C. Kolski and Annie O'Connor

Low Back Pain Classifications