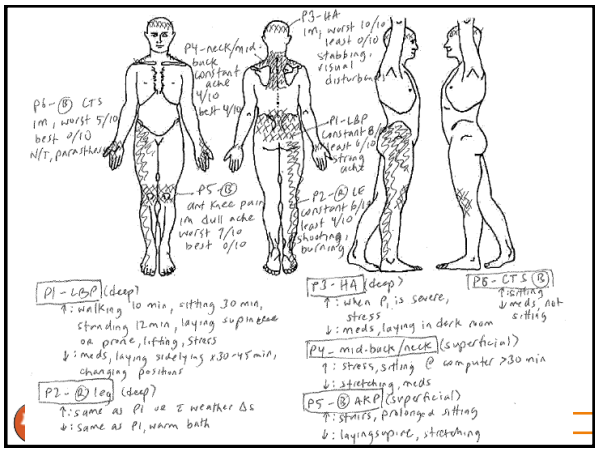
www.vompti.com

Integration of Pain Science into Patient Management

Dhinu Jayaseelan, DPT, OCS, FAAOMPT

Orthopaedic Manual Physical Therapy Series
Charlottesville 2017-2018



Subjective Exam Asterisks

(Aggravating/easing factors, description/location of symptoms, behavior, mechanisms of injury)

- 34 y/o female, 8 yr history of widespread disabling pain
- Initially started as LBP after doing a boot camp exercise class (overhead squat); became worse overtime, including radiation into the leg. Saw multiple medical practitioners, became increasingly dissatisfied with lack of improvement.
- Currently complains of pain multiple pain locations, inability to work (on disability), frustrated by limited function, anxious and depressed with current status. Sleeps ~3-4 hrs/night, gradual weight loss (~15 lbs in 8 months) due to lack of appetite

Subjective Exam Asterisks (cont'd)

(Aggravating/easing factors, description/location of symptoms, behavior, mechanisms of injury)

- Aggravating factors (P1): walking > 10 minutes, sitting > 30 minutes, standing > 12 minutes, lifting > 5-10 lbs, laying prone or supine, stress
- Easing factors (P1): meds (~25% reduction x 4 hours), laying sidelying 30-45 min, changing positions
- Quality/behavior (P1): constant strong ache, no marked difference am v. pm
- Symptom relationship?: Believes P1 & 2 are related, P3 & 4 resultant from P1 but not always connected, P5 and 6 usually indep of others

Self-Reported Outcomes

- ODI
  - 39/50; 78% (crippling back pain)
- FABQ
  - W: did not complete
  - PA: 23/24
- PHQ-2
  - 6/6 (little interest & feeling depressed nearly every day)

Previous Treatment(s)

Year: Type	Treatment / Notable Memories	Response
2008: PT	- Cert-MDT - Repeated Extensions - Told 'back is vulnerable', 'don't bend', 'jelly doughnut' metaphor	Symptoms worsened, became constant
2010: PT	- 'Aggressive' lumbar stabilization	'Created leg pain'
2012: PT	- Cert-MDT - 'Need to keep the lordosis', 'your spine is fragile because of the chronicity'	Headaches started Irritability elevated
2013 – 2016: Chiro	- 2-3x / wk, x 3 years	'Feels better after being adjusted', 'helps to be aligned', 'lasts ~ 6 hrs)
2014: PT	- Thoracic manipulation - Dry needling ('I love the needling, it'd help for a couple hours, I think I need more of it')	Upper back pain began

Previous Treatment (Con't)

- Med list:
  - Gabapentin, Phentynol patches, Tramadol, Oxycodone, Flexeril, Ibuprofen, Zoloft, Xanax, Relistor
- Injections:
  - R L4-5 facet CSI x 3 in 2013, no effect
  - Trigger point injections every ~4-6 months L-spine, hip, minimal temporary benefit (1 week)
- Ketamine infusion:
  - No benefit
- Also trialed: acupuncture, herbal supplements, 'detox weekend', marijuana, alcohol
  - No lasting benefit
- Imaging: MRI (+) mod disc bulge at L3,4 on R, otherwise unremarkable; Radiographs (+) DDD L-spine

Structure(s) at fault

Joints in/refer to painful region	Myofascial tissue in/refer to painful region	Non-contractile tissue in/refer to painful region	Neural tissue in/refer to painful region	Other structures to be examined (non-MSK)

Is this a useful tool, in this case?

Structure(s) at fault (P1)

Joints in/refer to painful region	Myofascial tissue in/refer to painful region	Non-contractile tissue in/refer to painful region	Neural tissue in/refer to painful region	Other structures to be examined (non-MSK)
L2-3,3-4,4-5,5-S1 facets SIJ Hip	Paraspinals, glute max/med/min, piriformis	L3-S2 discs Interspinsous ligaments	Sciatic n. L3-S2 n. roots	Liver

- Primary hypothesis after subjective: chronic pain with central sensitization
- Differential (rank order): fibromyalgia, chronic fatigue syndrome, lupus

Physical Exam Asterisks

(Special tests, movement/joint dysfunction, posture, palpation, etc)

- Observation: flexed posture in sitting, general sense of malaise
- ROM:
  - 25% limitation all planes, pain all directions, primarily extension
    - Symptoms ↑ in flexion with added cervical flexion (→ baseline with cervical ext)
  - (+) Gower's sign
  - Did not assess overpressures or quadrants
- Neuro Exam:
  - Myotomes – invalid secondary to pain with testing
  - 1+ DTRs bilateral C5,6,7,L3-4,S1
  - (-) clonus, Babinski, Hoffman's, ataxic gait
- Palpation:
  - widespread hyperalgesia, allodynia at lumbar spine
- Accessory motion:
  - unable to assess secondary to guarding
- Quantitative sensory testing:
  - ↓ PPTs at local and remote sites

Rate your assessment of severity/irritability

Justify your assessment with examples from the subjective and/or objective exam

- Severity: None Min Mod **Max**
  - Impacts ability to do daily tasks, self-report of severe disablement
- Irritability: None Min Mod **Max**
  - Symptoms aggravated rapidly, take extended durations to return to baseline

Stage and stability?

- Acute Subacute **Chronic** Acute on chronic
  - 8 yr history, no recent MOI or trauma
- Stable Improving **Worsening** Fluctuating Red flags?
  - Spread of symptom location, increased intensity, severity, functional decline

- Are the relationships between the areas on the body chart, the interview, and physical exam consistent? "Do the features fit" a recognizable clinical pattern? If YES, what?

'Chronic pain syndrome'

- Identify any potential risk factors (yellow, red flags, non-MSK involvement, biopsychosocial)

Depression, anxiety/stress, fear of movement, weight loss, a number of other treatments without benefit

Chronic Pain

(including Central Sensitization)

- Background (Institute of Med Report, 2011)
  - Affects ~100 million Americans annually (> DM, heart disease, stroke, CA *combined*)
  - Annual cost (2010) between $560-635 billion
- Subjective
  - Pain persisting > 3 months
  - Often associated with 2+ major body areas of symptoms (late stage)
  - Pain is disproportionate to tissue injury, severe
  - Elevated stress, anxiety, fear of movement, depression
- Objective Examination
  - Not well defined, due to diagnostic variability
  - Altered movement patterns (fear of movement/unwilling to move), not always consistent with mechanical dysfunction
  - Reduced threshold to touch/pressure, often widespread

Treatment Planning

Impairments	Functional Limitations	Goals
- Decreased lumbar AROM all planes - Impaired posture - Impaired muscle performance - Widespread pain	- Reduced sitting, standing, walking tolerance - Decreased sleep - Unable to lift min/moderately heavy objects	- Increase willingness to move - Pt to understand pain science/mechanisms - Patient to be indep with aerobic activity program

- What is your primary objective after intial eval?
  - Education: pain neuroscience, stability of the human body, expectations with PT, benefit of multidisciplinary approach
  - Manual therapy: hands off day 1
  - Exercise prescription: submaximal aerobic activity, graded exposure
  - Referral: psychologist

Pain: An Ongoing Area of Research.

- Entire journal issues devoted to management of chronic pain
  - JMMT
    - 2017. 25(3)
  - Medical Clinics of North America
    - 2016. 100(1)
    - Pathophys, acute v. chronic pain, pharm mgmt, biopsychosocial/ multimodal mgmt, headaches, neuropathic pain, etc
  - Physiotherapy Theory and Practice
    - 2016. 32(5)
    - Pain neuroscience education

What is Pain?

- "An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." – IASP
  - Interpreted by the brain
  - Can be protective, can also be disabling
- Chronic pain – pain persisting beyond expected tissue healing timelines

- SUBJECTIVE

American Pain Society
RESEARCH
EDUCATION
TREATMENT
ADVOCACY
ELSEVIER
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Toward a Mechanism-Based Approach to Pain Diagnosis

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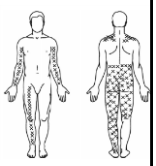
- Chronic LBP very complex, determining a specific tissue at fault challenging (aging/degeneration/imaging ≠ symptoms)
- "As pain becomes centralized (an initial peripheral trigger resulting in persistent alterations in the CNS) and more widespread over time, it becomes increasingly difficult and less relevant to identify the initial source"

How Can We Identify Pain Mechanisms?

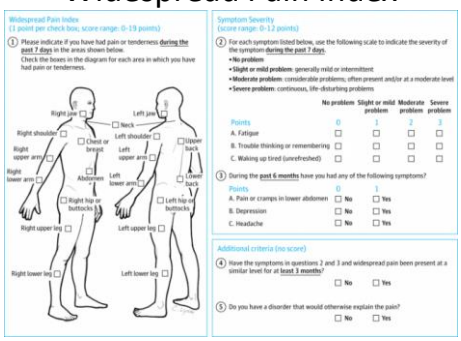
- Subjective exam, body diagram
- Quantitative Sensory Testing
- Classifications of musculoskeletal pain / evolving research
  - Central Sensitization
  - Peripheral Neuropathic Pain
  - Nociceptive Pain

Subjective Exam



- Pain location(s) and relationships, SINSS
- Body diagram (Visser, Pain Pract 2016)
  - > 20% pain surface area associated with:
    - Pain sensitization ($p = 0.0002$)
    - 'Severe' or 'extremely severe' anxiety scores ($p = 0.0270$)
    - ≥ 5 psychosocial stressors ($p = 0.0022$)
    - ≥ 5 significant life events ($p = 0.0098$)
    - Use of ≥ 7 pain management strategies ($p = 0.0001$)
  - Widespread Pain Index score ≥ 7 independently associated with sensitization (OR: 11.36)

Widespread Pain Index



ACR, Arthritis Care Res 2010

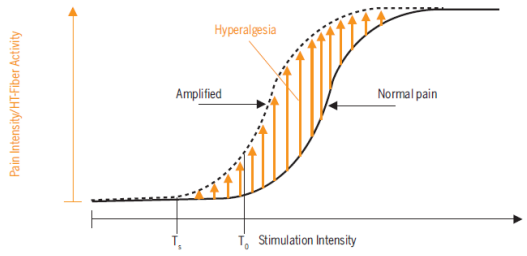
[CLINICAL COMMENTARY]

CAROL A. COURTNEY, PT, PhD[1] • ALICIA EMERSON KAVCHAK, PT, MS[2] • CARINA D. LOWRY, PT, DPT[3] • MICHAEL A. O'HEARN, PT, MHS[3]

Interpreting Joint Pain: Quantitative Sensory Testing in Musculoskeletal Management

- Clinical method for detecting changes in nociceptive pathways potentially undetectable by other testing (NCV)
- May aid in identifying conditions where joint or muscle insult has induced changes in neural processing
  - Helps direct treatment to musculoskeletal tissue, central nociceptive mechanism, or psychosocial contribution (biopsychosocial model)
- Can be used as an outcome measure

Courtney CA, JOSPT 2010



Quantitative Sensory Testing (QST)

- Commonly used methods:
  - Pressure pain thresholds*
  - Vibration detection threshold
  - Thermal detection threshold

- Taken locally and at a remote site, compare bilaterally, mean of 3 trials

PAIN
Pain 123 (2006) 231–243
www.elsevier.com/locate/pain

Research papers

Quantitative sensory testing in the German Research Network on Neuropathic Pain (DFNS): Standardized protocol and reference values

R. Rolke [a,b], R. Baron [c,1], C. Maier [d,1], T.R. Tölle [e,*,1], R.-D. Treede [a,1], A. Beyer [f], A. Binder [c], N. Birbaumer [g], F. Birklein [b], I.C. Bötefür [h], S. Braune [h], H. Flor [i], V. Huge [f], R. Klug [j], G.B. Landwehrmeyer [j], W. Magerl [a], C. Maihöfner [k], C. Rolko [l], C. Schaub [d], A. Scherens [d], T. Sprenger [e], M. Valet [e], B. Wasserka [g]

Self-reported pain severity, quality of life, disability, anxiety and depression in patients classified with 'nociceptive', 'peripheral neuropathic' and 'central sensitisation' pain. The discriminant validity of mechanisms-based classifications of low back (±leg) pain

- Patients classified as CS dominant reported the following, compared to neuropathic of nociceptive dominant:
  - More severe pain
  - Poorer physical and mental health related quality of life
  - Greater levels of back pain-related disability, depression, and anxiety
- Similar pattern repeated when comparing neuropathic to nociceptive dominant patients

Smart KM, 2012 Man Ther

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]

- 4 items in a 'diagnostic' cluster
  - Disproportionate, non-mechanical, unpredictable pattern of pain in response to multiple/non-specific aggravating/easing factors
  - Pain disproportionate to the nature and extent of injury or pathology
  - Strong association with maladaptive factors (ie negative emotions, poor self-efficacy, etc)
  - Diffuse/non-anatomic areas of tenderness on palpation
- Presence of the cluster has high levels of classification accuracy:
  - Sensitivity: 91.8 (95% CI: 84.5-96.4)
  - Specificity: 97.7 (95% CI: 95.6-99.0)

Smart KM, 2012 Man Ther

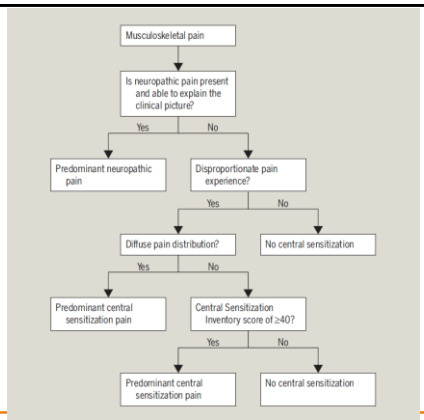


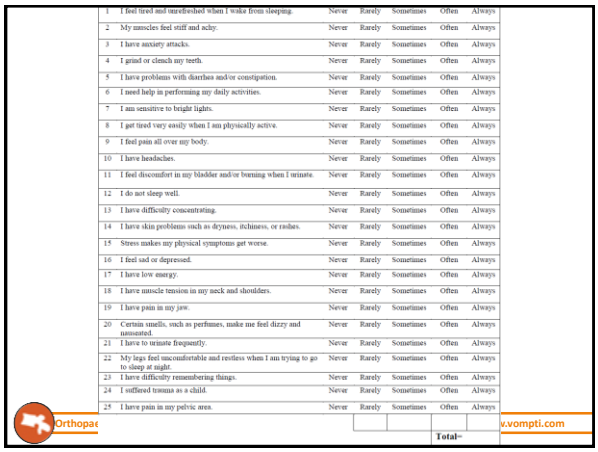
FIGURE. Algorithm for the clinical recognition of central sensitization pain (modified from Nijs et al[29]).

Nijs, JOSPT 2016

Central Sensitization Inventory

- 2 part questionnaire intended to identify the presence of central sensitization
- Part A: 25 questions, 0-4 Likert scale, higher scores indicate greater impact of sensitization
- Part B: not scored, asks about previous diagnoses
- Statistical metrics:
  - Test-retest reliability: 0.82
  - Specificity: 0.75
  - Sensitivity: 0.81

Neblett, J Pain 2016



1	I feel tired and unrefreshed when I wake from sleeping.	Never	Rarely	Sometimes	Often	Always
2	My muscles feel stiff and achy.	Never	Rarely	Sometimes	Often	Always
3	I have anxiety attacks.	Never	Rarely	Sometimes	Often	Always
4	I grind or clench my teeth.	Never	Rarely	Sometimes	Often	Always
5	I have problems with diarrhea and/or constipation.	Never	Rarely	Sometimes	Often	Always
6	I need help in performing my daily activities.	Never	Rarely	Sometimes	Often	Always
7	I am sensitive to bright lights.	Never	Rarely	Sometimes	Often	Always
8	I get tired very easily when I am physically active.	Never	Rarely	Sometimes	Often	Always
9	I feel pain all over my body.	Never	Rarely	Sometimes	Often	Always
10	I have headaches.	Never	Rarely	Sometimes	Often	Always
11	I feel discomfort in my bladder and/or burning when I urinate.	Never	Rarely	Sometimes	Often	Always
12	I do not sleep well.	Never	Rarely	Sometimes	Often	Always
13	I have difficulty concentrating.	Never	Rarely	Sometimes	Often	Always
14	I have skin problems such as dryness, itchiness, or rashes.	Never	Rarely	Sometimes	Often	Always
15	Stress makes my physical symptoms get worse.	Never	Rarely	Sometimes	Often	Always
16	I feel sad or depressed.	Never	Rarely	Sometimes	Often	Always
17	I have low energy.	Never	Rarely	Sometimes	Often	Always
18	I have muscle tension in my neck and shoulders.	Never	Rarely	Sometimes	Often	Always
19	I have pain in my jaw.	Never	Rarely	Sometimes	Often	Always
20	Certain smells, such as perfumes, make me feel dizzy and nauseated.	Never	Rarely	Sometimes	Often	Always
21	I have to urinate frequently.	Never	Rarely	Sometimes	Often	Always
22	My legs feel uncomfortable and restless when I am trying to go to sleep at night.	Never	Rarely	Sometimes	Often	Always
23	I have difficulty remembering things.	Never	Rarely	Sometimes	Often	Always
24	I suffered trauma as a child.	Never	Rarely	Sometimes	Often	Always
25	I have pain in my pelvic area.	Never	Rarely	Sometimes	Often	Always
					Total=	

Mechanisms-based classifications of musculoskeletal pain: Part 2 of 3: Symptoms and signs of peripheral neuropathic pain in patients with low back (±leg) pain

Keith M. Smart[a,*], Catherine Blake[b], Anthony Staines[c], Mick Thacker[d,e], Catherine Doody[b]

- 3 items in the 'diagnostic' cluster
  - Pain referred in a dermatomal or cutaneous distribution
  - History of nerve injury, pathology, or mechanical compromise
  - Pain/symptom provocation with mechanical/ movement tests (active/passive, neurodynamic) that move/load/compress neural tissue
- Presence of the cluster has high levels of classification accuracy:
  - Sn: 86.3 (95% CI: 78.0-92.3)
  - Sp: 96.0 (95% CI: 93.4-97.8)

Smart KM, 2012 Man Ther

PainDETECT

(Screening Questionnaire for Neuropathic Pain)

Item	Score
Gradation of pain	
• Do you suffer from a burning sensation (e.g. stinging nettles) in the marked areas?	0-5
• Do you have a tingling or prickling sensation in the area of your pain (like crawling ants or electrical tingling)?	0-5
• Is light touching (clothing, a blanket) in this area painful?	0-5
• Do you have sudden pain attacks in the area of your pain, like electric shocks?	0-5
• Is cold or heat (bath water) in this area occasionally painful?	0-5
• Do you suffer from a sensation of numbness in the areas that you marked?	0-5
• Does slight pressure in this area, e.g. with a finger, trigger pain?	0-5
Pain course pattern	
Please select the picture that best describes the course of your pain:	
Persistent pain with slight fluctuations	0
Persistent pain with pain attacks	-1
Pain attacks without pain between them	+1
Pain attacks with pain between them	+1
Radiating pain	
Does your pain radiate to other regions of your body? Yes/No	+2/0

For each question: never, 0; hardly noticed, 1; slightly, 2; moderately, 3; strongly, 4; very strongly, 5
Questions used to document pain, but which were not used in the scoring, are not shown

- -1 (minimum) to 38 (maximum)
- ≤ 12, a neuropathic component is unlikely
- ≥ 19, a neuropathic component is likely
- Between 13-18, uncertain
  - Sn. 84%
  - Sp. 84%

Freynhagen, Curr Med Res Opin 2006

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

Keith M. Smart[a,*], Catherine Blake[b], Anthony Staines[c], Mick Thacker[d,e], Catherine Doody[b]

- 7 items in a 'diagnostic' cluster
  - Pain localized to the area of injury/dysfunction
  - Clear, proportionate mechanical/anatomical nature to aggravating and easing factors
  - Usually intermittent and sharp with movement/mechanical provocation; may be a more constant dull ache or throb at rest
  - Absence of:
    - Pain in association with other dysesthesias
    - Night pain/disturbed sleep
    - Antalgic postures/movement patterns
    - Pain described as burning/shooting/sharp/electric-shock-like
- Presence of the cluster has high levels of classification accuracy:
  - Sensitivity: 90.9 (95% CI: 86.6-94.1)
  - Specificity: 91.0 (95% CI: 86.1-94.6)

Smart KM, 2012 Man Ther

REVIEW

NEUROBIOLOGY OF FIBROMYALGIA AND CHRONIC WIDESPREAD PAIN

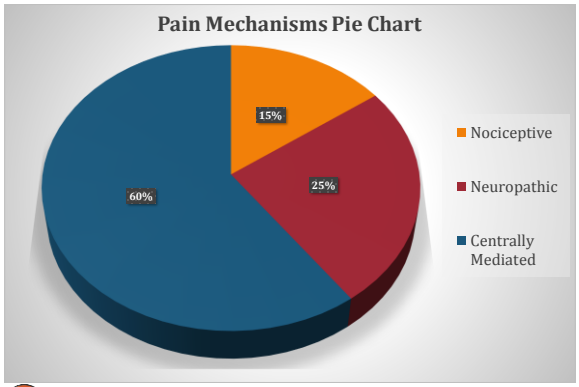
KATHLEEN A. SLUKA[a,*] AND DANIEL J. CLAUW[b]

[a] Physical Therapy and Rehabilitation Science, Pain Research Program, University of Iowa, United States

[b] Anesthesiology, Medicine (Rheumatology) and Psychiatry, University of Michigan, United States

- Enhanced excitation, reduced inhibition
- Chronic pain is a continuum
  - Peripherally driven → completely centrally augmented
  - Must understand where patients fit on this continuum to apply appropriate treatment (ie NSAIDs v. anti-depressants)
- Centrally augmented pain not likely to benefit from treatment for acute pain or inflammation of tissues (ie NSAIDs, injections, surgery)

Neuroscience 338 (2016) 114–129



HOW DO WE TREAT ALTERED CENTRALLY MEDIATED PAIN PROCESSING MECHANISMS?

(Weekend 4)

- Therapeutic Neuroscience Pain Education
  - Reduce fear, Improve coping ability
  - Improve understanding, Ergonomics, Back school
  - Encourage confrontation
- Empower patient
- Multi Disciplinary approach
- Treatment Based Classification
- Graded Exposure (time not symptom based)
  - Early active mobility
  - Return to normal activity levels - modified without increasing pain
- Graded Exercise
  - Exercise to pain limit
  - Restore function, improve disc/cartilage nutrition, promote bone/muscle strength, increased endorphin levels and reduce pain sensitivity

Clinical biopsychosocial physiotherapy assessment of patients with chronic pain: The first step in pain neuroscience education

Amarins J. Wijma PT, PhD, C. Paul van Wilgen PT, PhD, Mira Meeus PT, PhD & Jo Nijs PT, PhD

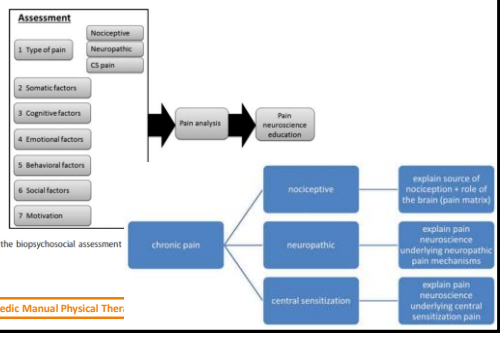


Figure 1. Flowchart of the biopsychosocial assessment

Original Study

Three-year follow-up of a randomized controlled trial comparing preoperative neuroscience education for patients undergoing surgery for lumbar radiculopathy

Adriaan Louw[1], Ina Diener[2], Merrill R. Landers[3], Kory Zimney[4], Emilio J. Puentedura[5]

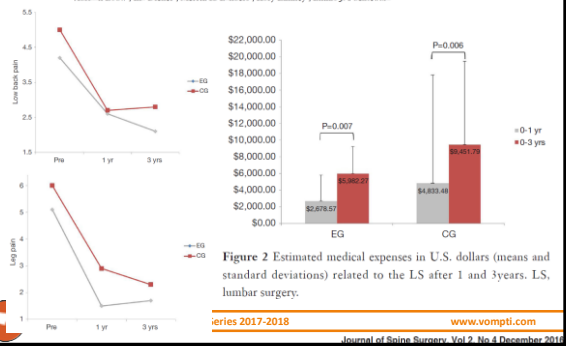


Figure 2 Estimated medical expenses in U.S. dollars (means and standard deviations) related to the LS after 1 and 3years. LS, lumbar surgery.

Journal of Spine Surgery. Vol 2, No 4 December 2016

Cochrane Library

Kamper SJ, Apeldoorn AT, Chiarotto A, Smeets RJ, Ostelo RWJG, Guzman J, van Tulder MW
Multidisciplinary biopsychosocial rehabilitation for chronic low back pain.
Cochrane Database of Systematic Reviews 2014, Issue 9. Art. No.: CD000963.

- Moderate quality evidence that multidisciplinary treatment results in larger improvements in pain and daily function than usual care or treatment aimed only at physical factors
- Moderate evidence that multidisciplinary treatment doubled the likelihood that people were able to work in the next 6 to 12 months compared to treatments aimed at physical factors

TABLE 2. Estimated Prevalence of Depression, Anxiety, and Substance Use Disorders in Commonly Occurring Chronic Pain Conditions

Variable	Prevalence (%)
Depression	
Spinal pain (lumbar, thoracic, or neck)[26-29]	2-56
Neuropathic pain[33-36]	4-12
Fibromyalgia[17-23]	21-83
Migraine headache[37-41]	17-28
Temporomandibular joint disorder[24,25]	16-65
Pelvic pain[42-46]	19-22
Abdominal pain[30-32]	9-54
Arthritis[23,37,38,47-49]	3-39
Anxiety	
Spinal pain (lumbar, thoracic, or neck)[26-29,38]	1-26
Neuropathic pain[24-36]	5-27
Fibromyalgia[18-21,23]	18-60
Migraine headache[38,39,41]	2-45
Temporomandibular joint disorder[50-52]	15-65
Pelvic pain[42,53]	12-41
Abdominal pain[30,32]	21-51
Arthritis[23,37,38,48,49]	1-35
Substance use disorder	
Spinal pain (lumbar, thoracic, or neck)[26-29]	4-14
Neuropathic pain[24-56]	1-9
Fibromyalgia[19,20,23]	1-25
Migraine headache[40]	1-6
Arthritis[23,49]	1-12

Current and 12-mo prevalence rates grouped together.

Hooten W 2016

Frontiers in Psychology

Recommendations from the Italian Consensus Conference on Pain in Neurorehabilitation

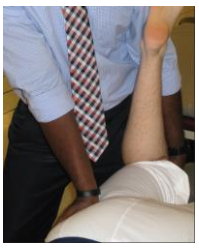
- B level evidence:
  - Depression is a predictive factor of pain associated with neurological conditions and the two factors are correlated
  - Depression, anxiety, anger, and cognitive factors, such as self-efficacy and pain catastrophizing, predict worse outcomes for multidisciplinary, surgical, physical and psychological treatments and are mediating factors in pain reduction

[RESEARCH REPORT]

TIMOTHY H. WIDEMAN, PT, PhD[1] • WHITNEY SCOTT[2] • MARC O. MARTEL[3] • MICHAEL J.L. SULLIVAN, PhD[2]

Recovery From Depressive Symptoms Over the Course of Physical Therapy: A Prospective Cohort Study of Individuals With Work-Related Orthopaedic Injuries and Symptoms of Depression

- 106 patients with work-related injuries and symptoms of depression
- Received 7 sessions of PT, followed up to 1 yr
- Depressive symptoms resolved in 40% of patients
- Persistence of depression predicted by elevated levels of depressive symptoms and pain-catastrophizing at pre-treatment, and lack of improvement in pain self-efficacy at midtreatment



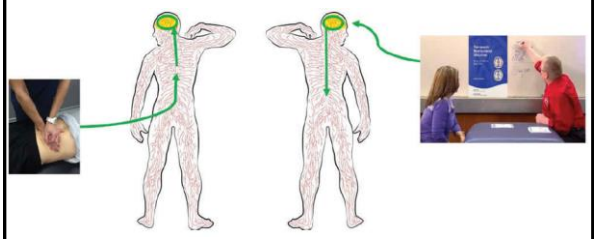
http://www.kingofthegym.com/56-yo-lifting-weights-and-trying-to-lose-fat-weight-lifting-q-and-a/

WHAT ABOUT OUR BREAD AND BUTTER?

Combining manual therapy with pain neuroscience education in the treatment of chronic low back pain: A narrative review of the literature

Emilio J. Puentedura, PT, DPT, PhD[a], and Timothy Flynn, PT, PhD[b]

- Pain neuroscience education associated with decreased pain, pain catastrophizing, disability, and improved physical performance
- PNE: mischaracterized as needing to be hand's off, education only
- Adding manual therapy to PNE can provide additive local mechanical/neurophysiological effects, meet patient expectations, and refresh/sharpen body schema maps

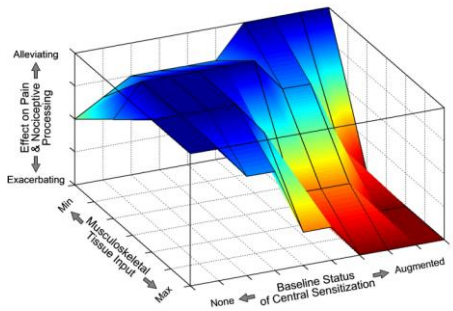


PHYSIOTHERAPY THEORY AND PRACTICE 2016, VOL. 32, NO. 5, 408–414

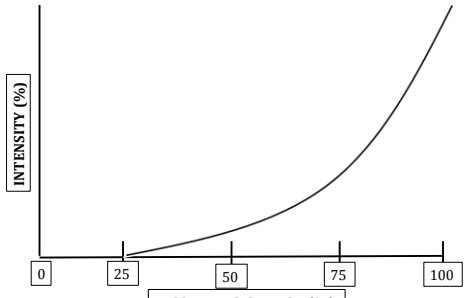
Manual Therapy Associated With..

- Enhanced descending pain modulation (Vigotsky, Pain Res Treat 2015)
- Enhanced mechanisms of conditioned pain modulation (Courtney, JOSPT 2016)
- Reduction in bilateral hyperalgesia following unilateral joint mobilization (Sluka, J Pain 2006)
- Improved remote site pain sensitivity (Coronado, J Electromyogr Kinesiol 2012) and temporal sensory summation (Bishop, Spine J 2011) following spinal manipulation
- Among others… (Bialosky 2009, 2017)

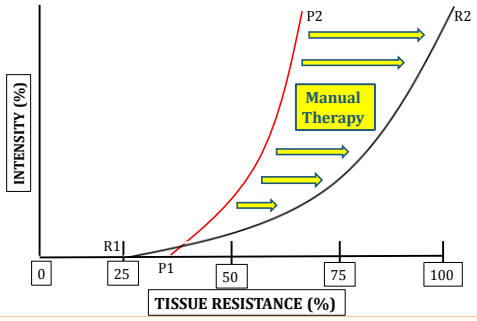
Courtney CA. Mechanisms underlying the effects of manual therapy: a new look at an old concept (Invited Review). Manuelletherapie. 2013;17:68-72.



Movement Diagram



Pain Dominant Patient



Practice

- Assess R1 and R2 for the following
  - PA at L4
  - Inf glide at PFJ
- Can you consistently treat at gr I and II?

Effects of Exercise

- Cochrane review. Resistance exercise training for fibromyalgia. 2013.
  - Mod-mod/high intensity resistance training improved function, pain, tenderness, and strength in women with fibro
  - 8 wks of aerobic exercise superior to mod-mod/high intensity resistance training in pain reduction
- Naugle, KM. A meta-analytic review of the hypoalgesic effects of exercise. J Pain 2012.
  - Exercise induced hypoalgesia noted in chronic pain populations after submax aerobic activity (large – moderate effect size)
  - Hyperalgesia may be seen with vigorous aerobic activity
- Schuch FB. Exercise as a treatment for depression: A meta-analysis adjusting for publication bias. J Psychiatr Res 2016.
  - Mod/vigorous intensity aerobic activity has a large and significant antidepressant effect in people with depression (including MDD)

[CASE REPORT]

CRAIG P. HENSLEY, PT, DPT, OCS, FAAOMPT1 • CAROL A. COURTNEY, PT, PhD, FAAOMPT, ATC2

Management of a Patient With Chronic Low Back Pain and Multiple Health Conditions Using a Pain Mechanisms–Based Classification Approach

- 26 y/o male, 3 yr history of CLBP, 1 yr hx of LE pain
- PMHx: left sided hemiparesis 2° stroke, pancreatic kidney transplant, left sided blindness, osteoporosis 2° hyperparathyroidism
- 20 visits over 6 months
- ODI improved > 50%, achieved all goals without pain meds

Hensley C, JOSPT 2014 – Pain Mechanisms Decision Making

- Nociceptive
  - Worsening of symptoms with certain movements, relief with alteration of movement
  - But – not localized, night pain, dysesthesia, burning
- Neuropathic
  - Hx of CVA, DM; 12 on LANSS pain scale, relief with gabapentin, (+) SLR
  - But – no cutaneous mechanical detection threshold deficits, no dermatomal pattern
- Central sensitization
  - Fit all 4 criteria per Smart et al

- What are you going to reassess at subsequent visits?
  - Activity level

PROGNOSIS/EXPECTATIONS

- How do you expect to progress your treatment over subsequent visits?
  - Monitor graded exercise & progress as tolerated, add manual therapy for P1/2 symptom modulation

Associated factors for expected outcome:

- Favorable
  - Integration of other practitioners, patient understanding pain
- Unfavorable
  - Psychosocial factors, chronicity, 'failed' previous treatments

Possible referrals:

  - Pain support groups, pain psych, nutritionist

'Gap' in Knowledge

Patient or Population	Intervention	Comparison	Outcomes
Chronic LBP	Psych	Control	Self-reported disability, pain

- Article reviewed: Effect of mindfulness-based stress reduction vs cognitive behavioral therapy or usual care on back pain and functional limitations in adults with chronic LBP: an RCT
- Relevance to the clinical case: Patients with CLBP who received CBT of mindfulness-based stress reduction demonstrated significantly better improvement in self-reported disability in the short and long term, as compared to usual care

Cherkin, 2016 JAMA

Clinical Pattern

(Chronic pain related to centrally mediated processing mechanisms)

Subjective	Objective
- Pain lasting > 3 months - Widespread pain - Pain reported as severe, unpredictable - Concomitant anxiety, stress, depression, maladaptive behaviors	- Functional outcome scales demo significant disability - Reduced PPTs - Hyperalgesia, allodynia

Should we only apply a mechanisms approach to widespread pain?

[RESEARCH REPORT]

MELANIE L. PLINSINGA, MSc[1] • MICHEL S. BRINK, PhD, MSc[1]
BILL VICENZINO, PhD, MSc, Grad Dip Sports Phty, BPhty[2] • C. PAUL VAN WILGEN, PhD, MSc, PT[3-5]

Evidence of Nervous System Sensitization in Commonly Presenting and Persistent Painful Tendinopathies: A Systematic Review

- 16 full-texts reviewed, all rotator cuff or lateral elbow tendinopathy (no LE), mostly case-control trials
- Lower PPT readings at the site of tendinopathy as well as other sites
  - Suggestive of augmented central processing

Local Unilateral Dysfunction can be a Central Problem

- Strong evidence supporting presence of central sensitization in the shoulder pain population
  - Noten, Pain Pract 2016
  - Sanchis, Semin Arthritis Rheum 2015
  - Borstad, Braz J Phys Ther 2015
  - Coronado, Clin J Pain 2014
- Patients with PFPS may demonstrate:
  - Heightened flexor withdrawal reflex after knee pathology (Courtney et al, Clin Neurophysiol, 2011)
  - Impaired conditioned pain modulation (Rathleff et al, Clin J Pain, 2016)
  - Widespread hyperalgesia (Pazzinatto et al, Pain Med, 2016)
  - Higher levels of mental distress (Jensen et al, JOSPT, 2005)
  - Bilateral tactile sensitivity deficits (Jensen et al, Eur J Pain, 2007)

Some names to know in pain

- Lars Arendt-Nielsen (Denmark)
- Joel Bialosky (U of Florida)
- David Butler (Australia)
- Carol Courtney (U of Illinois at Chicago)
- Cesar Fernandez-de-Las-Penas (Spain)
- Adrian Louw (Iowa)
- Lorimer Moseley (Australia)
- Jo Nijs (Belgium)
- Kathleen Sluka (U of Iowa)
- Clifford Woolf (Boston)