Slide 1

Behavioral Approaches to Chronic Pain Management

Carolyn McManus PT, MS, MA
Swedish Medical Center, Seattle WA
VA Puget Sound Health System, Seattle, WA
CarolynMcmanus.com
Leslie Russek, PT, DPT, PhD, OCS
Clarkson University, Potsdam, NY
Canton-Potsdam Hospital, Potsdam, NY
http://people.clarkson.edu/~lrussek

Slide 2

Objectives

- Clinical practice guidelines
- Research supporting behavioral management
- Physiology of chronic pain
- Integrating behavioral approaches into PT
- Challenges to working with patients with chronic pain
- Summary of behavioral approaches
- Case study
- Pain SIG business meeting

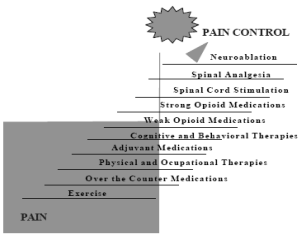
Slide 3

Definitions

- Pain
  - "An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage." (International Association for the Study of Pain: http://www.iasp-pain.org)
- Chronic pain
  - "Any pain that persists beyond the anticipated time of healing." (Turk 2001)
  - Chronic pain is an error in central pain processing mediated through mechanisms of neural plasticity.
- Although acute pain serves as a protective warning signal, chronic pain has no known survival benefit.

Slide 4

Pain Management Continuum



Behavioral Management of Chronic Pain www.nationalpainfoundation.org 4

Slide 5

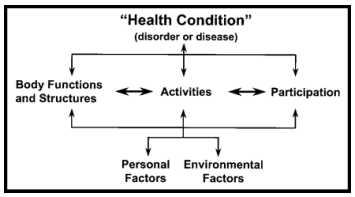
Chronic Pain as a Disease

- Chronic pain is a 'disease'
- This 'disease' must be managed
  - Like other chronic diseases: diabetes, hypertension, etc.
- Set realistic goals:
  - Decrease pain (might not be possible)
  - Increase function
  - Improve quality of life
- Need disease management skills
  - Address contributing factors as well as symptoms

Behavioral Management of Chronic Pain 5

Slide 6

International Classification of Functioning, Disability Model



Behavioral Management of Chronic Pain 6

Slide 7

Chronic Pain in the ICF Model

- **Body function**
  - Sensation of pain
  - Mobility of joints
  - Muscle power/endurance
  - Psychomotor function
  - Proprioceptive function
  - Exercise tolerance
  - Energy & drive
- **Body Structure**
  - Musculoskeletal structures
  - Structure of the brain
  - Structure of the nervous system

Behavioral Management of Chronic Pain 7

Slide 8

Chronic Pain in the ICF Model

- **Activities**
  - Lifting & carrying
  - Walking/moving around
  - Maintaining body position
  - Doing housework
  - Difficulty handling stress & psychological demands
  - Focusing attention
- **Participation**
  - Daily routine
  - Remunerative work
  - Family relationships
  - Intimate relationships
  - Community life
  - Acquisition of goods & services
  - Recreation/leisure

Behavioral Management of Chronic Pain 8

Slide 9

Chronic Pain in the ICF Model

- **Personal Factors**
  - Fitness
  - Habits
  - Coping styles
  - Lifestyle
  - Psychological assets
  - Upbringing
  - Social background
- **Environmental Factors**
  - Technology for home or employment
  - Healthcare professionals
  - Social security policies
  - General support services, transportation
  - Attitudes of family, friends, colleagues, health professionals

Slide 10

Chronic Pain Clinical Practice Guideline Recommendations

- Use biopsychosocial approach
- All patients should participate in exercise
- Include cognitive behavioral approach
- Psychosocial problems do not invalidate pain complaint
- Treatment should be sensitive to culture
- Active self-management is essential
- Institute for Clinical Systems Improvement (ICSI) Assessment & Management of Chronic Pain: www.icsi.org/guidelines_and_more/gl_os_prot/

Slide 11

Pain Models

Biomedical Model

- Appropriate for acute pain
- Peripheral nociception is primary input for pain
- Treatment focus on disease or injury
- Reductionist approach
- Reliance on medical management

Biopsychosocial Model

- Appropriate for chronic pain
- Central processing modulates nociception and the experience of pain
- Illness behavior, cognitive & emotional responses strongly impact pain
- Multidimensional approach
- Emphasize self-management

Medical Treatment Utilization Schedule (MTUS) Medical Treatment Guideline at www.dir.ca.gov/.../MTUS_**ChronicPain**MedicalTreatmentGuidelines.pdf

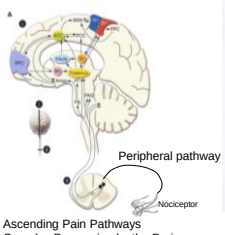
Slide 12

Physiology of Chronic Pain

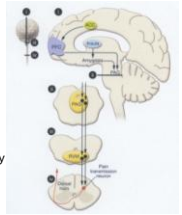
- Pain pathway succinct overview
- Pain classification
- The brain in chronic pain
- Stress and pain
- Cognitive frame

Slide 13

Pain Pathways



Ascending Pain Pathways
Complex Processing by the Brain



Descending Pain Pathways

(Schweinhardt 2010)

Slide 14

Pain Categories

- Nociceptive pain
  - Evoked by noxious stimulus
- Inflammatory pain
  - Evoked by inflammatory processes
- Pathological pain
  - Neuropathic pain evoked by peripheral nerve damage
  - Dysfunctional pain evoked, in the absence of tissue damage, by sensitization of central nervous system neurons

Woolf 2010

Slide 15

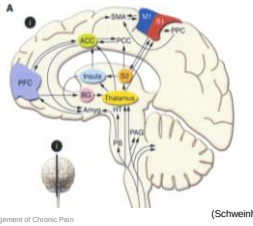
If Pain Were a Fire Alarm…

- Nociceptive pain would be activated by a hot fire
- Inflammatory pain would be activated by warm temperatures
- Pathological pain would be a false alarm.
  - The alarm is going off, but there is no fire.
  - The problem is the wiring.

Woolf 2010

Slide 16

The Brain in Chronic Pain



(Schweinhardt 2010)

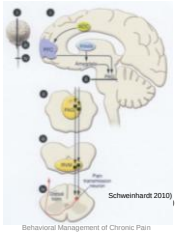
Slide 17

Brain Changes in Chronic Pain

- Grey matter reductions in prefrontal, cingulate and insula cortices (May 2008)
- Reorganization of motor and somatosensory cortices (Tsao 2008)
- Increased rest activity and abnormal functional connectivity in the insula and anterior cingulate (Malinen 2010)
- A shift away from sensory processing regions toward regions encoding emotional & motivational states (Apkarian 2011)

Slide 18

Descending Modulation of Pain

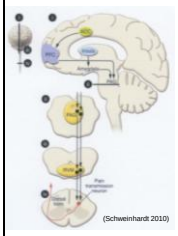


Schweinhardt 2010)

- Pathway projects from brainstem to the spinal cord and modulates dorsal horn neuron activity (Heinricher 2009)

Slide 19

Descending Modulation of Pain


(Schweinhardt 2010)

- Neurons in the rostral ventral medial medulla (RVM)
  - On cells: descending facilitation
  - Off cells: descending inhibition
- Facilitory and inhibitory activation is usually balanced
  - This balance can shift with injury, chronic pain, attention and stress (Heinricher 2009, Sprenger 2012, Wagner 2013)

Behavioral Management of Chronic Pain 19

Slide 20

Stress and Pain

- Slows wound healing (Kiecolt-Glaser 1995, Marucha 1998)
- Implicated in the transition from acute to chronic back pain (Pincus 2002)
- Can contribute to exacerbation of
  - Fibromyalgia (Alder 2005)
  - Chronic headaches (Houle, 2009)
  - Rheumatoid arthritis (Eijsbouts 1999)
  - Pelvic pain (Heim 1998)
  - Irritable bowel syndrome (Bach 2006)
  - Persistent postmastectomy pain (Schrieber 2013)
- Adversely affects surgical outcomes (Van Susante 1998, Geiss 2005)

Behavioral Management of Chronic Pain 20

Slide 21

Stress and Pain

- Laboratory research on rodents suggests peripheral and central mechanisms contribute to stress induced hyperalgesia. (Quintero 2011, Rivat 2010, Martenson 2009)
- Water avoidance stress in rats produced mechanical hyperalgesia in skeletal muscle and:
  - 34% decrease in mechanical threshold of muscle nociceptors
  - Nearly two-fold increase in action potentials produced by a fixed intensity suprathreshold stimulus.
  - 67% increase in conduction velocity (Chen 2011)

Slide 22

Childhood Trauma/Abuse & Pain

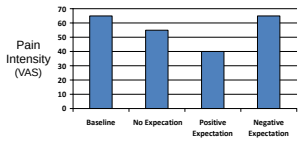
- Over-activates hypothalamic-pituitary axis (HPA) in childhood, blunts HPA responses as an adult
- Alters dopamine, seratonin, GABA, & cytokines
- Results in structural brain changes
- Alters epigenetics of neuroendocrine system
- Increases risk of chronic pain in adulthood
- (Tietjen 2011, Davis 2005)

Slide 23

Cognitive Frame

1. Expectation

Treatment expectations substantially modulate benefit of opioid medication

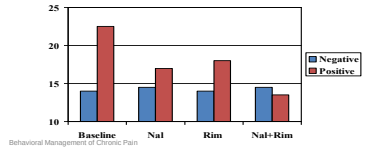


(Bingel 2011)

Slide 24

Cognitive Frame

2. Belief
   - Changing meaning of pain from negative to positive
     - Improves pain tolerance
     - Co-activates of endogenous opioid and canabinoid systems (Benedetti 2013)

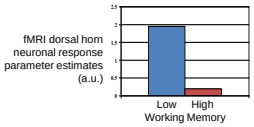


Slide 25

Cognitive Frame

3. Attention
   - Neuronal response to painful stimulation was significantly reduced in the dorsal horn under high working memory task compared to low
     - Substantial contribution of endogenous opioids to this mechanism

(Sprenger 2012)



Slide 26

Pain Physiology: Summary

- Treatment of chronic pain requires an accurate understanding of underlying mechanisms
  - These mechanisms are complex and multi-factorial
  - The experience of pain does not require peripheral tissue damage
- All pain perception involves activation of cognitive and emotional brain areas
- Chronic pain is associated with structural and functional brain changes
- Cognitive processing alters descending pathway modulation in the spinal cord

Slide 27

Pain Physiology: Summary

- Stress plays a role in generating hyperalgesia and chronic pain through both central and peripheral mechanisms
- Childhood trauma and abuse adversely alters neuroanatomy and neurophysiology
  - Leading to an increase risk of chronic pain as an adult

Slide 28

Psychosocial Impact on Pain

- WHO decree that chronic pain management should take a biopsychosocial perspective
- Failure to address psychosocial issues leads to poorer outcomes (Nicholas, 2011; Foster, 2011)
- Common psychosocial obstacles to recovery from chronic pain:
  - Stress
  - Anxiety, fear-avoidance, catastrophization
  - Depression, negativity
  - Low personal control
  - Social isolation

Slide 29

Integrating Behavioral Approaches

- Pain education, including neurophysiology
- Mindfulness
- Breathing
- Cognitive behavioral approaches
- Relaxation
- Biofeedback
- Behavioral approaches to exercise: traditional, tai chi, qigung, yoga, visualization, guided imagery

Slide 30

Pain Education

- Patients understand factors contributing to their experience of pain
- Offered in individual or class format
- Topics include:
  - Anatomy of the nervous system
  - Peripheral and central sensitization
  - How the brain and spinal cord process and regulate pain information
  - Neuroplasticity
  - Difference between acute and chronic pain
  - Pathological pain: hurt ≠ harm

Slide 31

Pain Education

- A recent systematic review of neurophysiology pain education concludes that for chronic musculoskeletal disorders, this education strategy may have a positive impact on pain, disability, catastrophizing and physical performance
- (Louw 2011)

Slide 32

Key take home messages

- Pain is *not* due to incoming messages from the peripheral nervous system alone
- *All* pain perception shares neuropathways with cognition and emotion
- No brain, no pain
- Pain does not always imply tissue damage
  - Hurt does not always mean harm

Slide 33

Key take home messages

- Sensitive nerves send signals in the absence of tissue damage
- The brain contributes to generating pain in the absence of tissue damage
- The body's stress reaction increases nerve sensitivity and generates pain in the absence of tissue damage
- Cognitive and behavioral choices impact nervous system activation

Slide 34

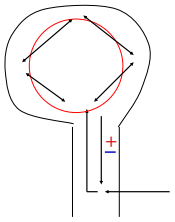
Skillful language for patients

- "I am sore, but I am safe."
- "Hurt does not mean harm."
- "If I stay calm, my nerves will stay calm."
- "That sensation is due to my sensitive nerves over-firing. I do not have to give it my attention."

Slide 35

Pain Education

1. Nerves carry information from body area to spinal cord
2. Communicates with a spinal cord nerve pathway that carries information to the brain
3. The brain processes the information
4. Another nerve pathway carries information back down to the spinal cord and, like a volume control, can increase or decrease the activity here

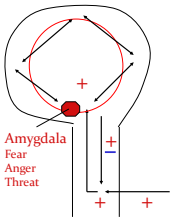


5. With ongoing pain and stress, these pathways become sensitive and generate pain in the absence of tissue damage

Slide 36

Pain Education

1. Nerves carry information from body area to spinal cord
2. Communicates with a spinal cord nerve pathway that carries information to the brain
3. The brain processes the information
4. Another nerve pathway carries information back down to the spinal cord and, like a volume control, can increase or decrease the activity here
5. With ongoing pain and stress, these pathways become sensitive and generate pain in the absence of tissue damage



Slide 37

Mindfulness

- History:
  - In 1979 Jon Kabat Zinn began teaching mindfulness meditation to patients with chronic medical conditions at the University of Massachusetts Medical Center
  - Mindfulness Based Stress Reduction (MBSR)
  - Program: 1x/week, 2.5 hours, 8 consecutive weeks
  - *Full Catastrophe Living* by Kabat Zinn
  - Tens of thousands of people have now gone through this program worldwide
  - http://w3.umassmed.edu/MBSR/public/searchmember.aspx

Slide 38

Mindfulness

Research

Comprehensive literature review concludes that in chronic health conditions including heart disease, chronic pain, RA, fibromyalgia, type 2 diabetes, PTSD, depression and cancer, MBSR contributes to improved;

- coping
- well-being
- quality of life
- health outcomes (Merkes 2010)

Slide 39

Mindfulness

Pain-related Research

Meditation has been shown to contribute to:

- Lower baseline pain sensitivity (Grant 2009)
- Less negative appraisal of pain (Brown 2010)
- Reduced pain attentional bias toward pain in adults with chronic pain (Garland 2013)
- Improved pain acceptance and physical function in older adults with chronic low back pain (Morone 2008)
- Improved pain scores, physical and social function in women with chronic pelvic pain (Fox 2011)

Slide 40

Mindful Awareness: Skillful Way to Pay Attention

- Present moment
- Stable
- Non-judging
- Accepting
- Kind, friendly
- Curious
- Non-striving

- http://www.carolynmcmanus.com/pages/workshops.html Introduction to Mindfulness Parts 1 & 2

Slide 41

Mindful Awareness

- Pain = Sensation + Your Reaction
  - Physical
  - Cognitive
  - Emotional
- The first step to self-regulate your reaction to pain is to skillfully observe your present moment experience with mindful awareness
- Be curious and experiment

Slide 42

Mindful Awareness

1. Physical
   - Breathe
2. Cognitive
   - Label pain "sensation"
   - Mind is like a camera lens. Choose wide angle.
     - Mind is like the sky, sensation is like a cloud

Slide 43

Mindful Awareness

2. Cognitive
   - Fear and worry are about the future.
     - Plan for tomorrow but do not live there.
     - Return to the present moment and today.
     - How do you best take care of yourself here and now?
     - This makes for a good today and serves as the foundation for tomorrow.

Behavioral Management of Chronic Pain 43

Slide 44

Mindful Awareness

- 3. Emotional: Kindness and compassion
  - How you would show up for a friend in your circumstance?
  - Notice how this feels in your body and the language that comes to you.
    - This is your natural wisdom in the face of life's challenges.
  - As you breathe, pay attention to this breathe with the same understanding and goodwill that you would show to a dear friend

Slide 45

Mindful Breathing

- Slow, deep breathing reduces sympathetic nervous system activity and pain perception (Chalaye 2009, Busch 2012)
- May prove especially helpful to patients with fibromyalgia. Compared to healthy controls FM patients:
  - Have smaller chest expansion measurements
  - Lower maximal inspiratory and expiratory pressures (Ozgocmen 2002)

Slide 46

Home Program

- Practice mindful breathing:
  - When you experience pain escalation
  - Formal mindful breathing practice
    - Guided meditation instructions: CDs, online, apps
  - Informal breathing practice
    - Become aware of your breathing during routine daily activities

Slide 47

Psychosocial Approaches

- Behavioral analysis should be part of the initial patient evaluation
- Identify links between patient's complaints and:
  - Behaviors:
    - Fear avoidance, pain persistence
  - Internal environment:
    - Thoughts, moods, sensations such as anxiety, stress, depression, low internal sense of control
  - External environment:
    - Stressors, supports, family and friends

Slide 48

Customize Approach to Person

- Different personality types benefit from different behavioral/psychological approaches
- Response to pain (van Koulil, 2010/11)
  - Fear-avoidance
  - Pain-persistence
- Cognitive clusters (Flor & Turk, 2011)
  - "Well-adapted"
  - "Dysfunctional"
  - "Distressed with little social support"
  - "Psychophysiologically highly reactive"

Slide 49

Fear-Avoidance vs. Pain-Persistence

Fear-Avoidance

- Pain-avoidant behavior
- Fear of pain
- Catastrophizing
- Hypervigilance
- Social reinforcement for pain behaviors

Pain-Persistence

- Continue activity in spite of pain
- Ignore or deny pain
- Set unrealistic goals
- Ignore physical limits
- Lov

Slide 50

Managing Fear-Avoidance

- Decrease focus on symptoms
- Goal setting
- Gradual increase in activity, independent of symptoms
- Reinforcing healthy behaviors
- Ignoring pain behaviors
- Progressive exercise (quota system)
- Graded exposure
- Visualization (van Koulil, 2010, 2011)

Slide 51

Managing Pain-Persistence

- Realistic goal-setting
- Pacing
- Activity regulation (alternating activity & inactivity)
- Balanced daily activity
- Cognitive restructuring
- Gradually progressed conditioning exercises
- Gradual increase in activity
- Assertiveness training
  - (van Koulil, 2010, 2011)

Slide 52

Pain Personality Types

(Flor & Turk, 2011)

1. **"Well-adapted":** low levels of pain, distress, interference with life; high self-efficacy and activity
   - Rx: pain education & coping skills
2. **"Dysfunctional":** high pain intensity, interference with activity, pain behavior, social support & solicitousness; negative pain self-talk.
   - Rx: operant treatment approach

Slide 53

Pain Personality Types

(Flor & Turk, 2011)

3. **"Distressed with little social support"**: low self-efficacy, social support, solicitousness of others; 'punished' rather than rewarded for pain behavior; high affective distress & perceived daily stress
   - Rx: CBT, including stress & pain management, managing dysfunctional relationships

Slide 54

Pain Personality Types

(Flor & Turk, 2011)

4. **"Psychophysiologically highly reactive":** high stress-reactivity, muscle tension, daily stress; low social support, little reinforcement for pain behavior, low activity due to pain.
   – Rx: relaxation, biofeedback

Slide 55

Cognitive Behavioral Approach

- Patient education about physiological and psychosocial aspects of chronic pain
- Education that Rx must address both components
- Pain management rather that elimination
- Active patient participation
- Emphasis on wellness behaviors
  – Enlist family support
- Elimination of fear-avoidance or pain-persistence
- Institute for Clinical Systems Improvement (ICSI) Assessment & Management of Chronic Pain: www.icsi.org/guidelines_and_more/gl_os_prot/ (Guidelines for using CBT in a busy clinical environment)

Slide 56

Cognitive Behavioral Approach

- Do not use pain as a guide ("Hurt ≠ harm")
- Time-contingent, not pain-contingent activity level and medication usage
- Progressive exercise and activity
- Return to activity and participation
- Pleasant activity scheduling
- Institute for Clinical Systems Improvement (ICSI) Assessment & Management of Chronic Pain: www.icsi.org/guidelines_and_more/gl_os_prot/ (Guidelines for using CBT in a busy clinical environment)

Behavioral Management of Chronic Pain 56

Slide 57

Cognitive Restructuring

- Identify automatic negative thoughts, including catastrophizing
- Challenge these thoughts, replace them with coping strategies
- Example:
  - Identify negative thoughts: "On Sunday I got a full-blown headache that sent me to bed. I will never be healthy."
  - Challenge thoughts: "I felt really good for 5 days. I did a lot of yard work Saturday because I felt so good. I had a flare because I did more than my current strength allows. I can't do that much yard work now, but I might be able when I am stronger. I will recover from this flare."

Behavioral Management of Chronic Pain 57

Slide 58

Problem-Solving

- Identify the problem
- Generate potential solutions
- Prioritize options
- Implement solution and assess effectiveness
- Example:
  - Identify problem: "Doing yard-work flared my neck pain because I did too much lifting and bending over; I wasn't thinking about posture or body mechanics."
  - Generate solutions: "I need to work more slowly and thoughtfully, so I can use good body mechanics and posture. Have the kids lift and carry so I don't do as much. Rest after an hour, even if I haven't finished, then do more later…"

Behavioral Management of Chronic Pain 58

Slide 59

Pain Coping Skills (Nielson, 2013)

- Progressive relaxation
- Activity-rest cycles & pacing
- Graded activity
- Pleasant activity scheduling
- Challenging negative thoughts
- Calming self-statements
- Distraction
- Problems solving
- Flare management

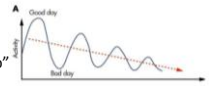
Slide 60

Operant Restructuring (Flor & Turk, 2011)

- Based on premise that pain behaviors have been positively reinforced & healthy behaviors have not
- Decreases inappropriate behaviors:
  - Activity avoidance
  - Bracing & guarding
  - Excessive reliance on medications
- Example:
  - "When I first injured myself, it was appropriate to avoid activities that increased pain. Now, pain is due to a malfunction of the nervous system rather than damage to my muscles or joints. Exercise may be uncomfortable, but will increase my function and won't damage my muscles or joints."

Slide 61

Pacing



- Avoid over-activity "yo-yo"
- Address deconditioning
- Determine baseline tolerance
  - E.g., 10-20% below level that causes a flare
- Use time based pacing
  - Avoid task-based or pain-based pacing
- Gradually progress activity
- During flare, decrease to 50%, but do not stop

Slide 62

Pleasant Activity Scheduling

- People with chronic pain tend to neglect pleasant activities
  - Due to belief they do not deserve to enjoy themselves
  - As punishment for being unable to do 'work' activities
  - Because of decreased enjoyment overall
- Have patients identify realistic pleasant activities
  - And activities they might be able to do in the future
- Have patients schedule pleasant activities

Slide 63

Sleep Hygeine

- Relax before bedtime; avoid stressful activities
  - Practice relaxation activity: meditation, breathing…
  - Avoid television, computers etc at bedtime
- Keep bedroom comfortable (dark, warm, quiet)
- Exercise daily (not vigorously within 3 hrs of bedtime)
- Avoid caffeine, nicotine, alcohol
- Keep a routine: specific times & activities
- Reserve bedroom for sleep & intimacy
- Get up after 20 minutes unable to fall asleep

Slide 64

Relaxation

- Meditation
- Diaphragmatic breathing
- Progressive muscle relaxation
- Visualization
- Autogenic training
- Activity-based
  - Yoga, Tai Chi, Qigung
- Biofeedback

Slide 65

Biofeedback (McKee 2008, Flor & Turk 2011)

- Types
  - Surface electromyography (EMG)
  - Heart rate, blood pressure, respiration rate
  - Heart rate variability
  - Skin temperature
  - Electrodermal reaction (galvanic skin response, GSM)
  - Games and apps
- Research on effectiveness
- Protocols

Slide 66

Biofeedback: Surface EMG

- Good for chronic pain, anxiety, headaches, myofascial pain, TMD, incontinence
- Advantages: immediate feedback makes it easy for patients to learn and progress
- Disadvantages: cost of equipment, time demands
- Cost: $2,000-4,000

Slide 67

Biofeedback: Heart Rate

- Good for chronic pain, anxiety, depression, HTN
- Advantages: inexpensive, most clinics have pulse oximeters, easy for patients to understand
- Disadvantages: difficult for patients to learn control
- Cost: $20-40

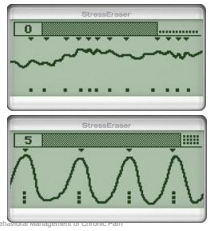
Slide 68

Biofeedback: HR Variability

- Good for chronic pain, anxiety, depression, asthma, HTN
- Advantages: immediate feedback, easy to learn control, ability to 'keep score' and set targets, equipment relatively inexpensive
- Disadvantages: few clinics own equipment or are familiar with use
- Cost: $130-180
- iPhone app: StressDoctor $5

Slide 69

Heart Rate Variability



Stressed:
- Jagged line

Relaxed:
- Smooth curve
- Boxes under curve
- Session score

Slide 70

Biofeedback: Temperature

- Good for chronic pain, migraine, HTN, Raynaud's, edema
- Advantages: inexpensive
- Disadvantages: difficult to learn, slow response
- Cost: $20-40
- Bio-Q ring

Slide 71

Biofeedback: Galvanic Skin Response

- Good for chronic pain, anxiety, headaches
- Advantages: relatively fast response, can connect to computer for visual/graphic feedback
- Disadvantages: difficult to learn, few clinics own equipment
- Cost: $100-200
- The Wild Divine

Slide 72

Biofeedback Games

- The Wild Divine galvanic skin response ($400-500)
- Thought Stream galvanic skin response ($160)
- MindField GSR or skin temperature attachments for iPhone attachment & app ($100)
- StressDoctor iPhone heart-rate variability app ($5)
- Thought Technology (GSR), Inner Balance (HRV)
- Nintendo HR monitor

Slide 73

Biofeedback Procedures

- Teach relaxation response using biofeedback
- Have patients practice relaxation skills without biofeedback
- Gradually expose patient to stressful positions or situations
- Have patients apply relaxation skills outside the clinic
  - Premack's principle: identify a tension-assessment cue to trigger relaxation response

Slide 74

Use of "Homework"

- Emphasize importance of cognitive & behavioral activities
- Treat relaxation, etc., like a prescription that must be done regularly
- Clearly set dose and intensity, just as with exercise
- Monitor adherence to behavioral program
- Problem solve lack of adherence

Slide 75

Physical Activity & Exercise

- Mind-body exercises:
  - Tai chi
  - Qigung
  - Yoga
- Visualization
- Graded motor imagery
- Graded activity
- Graded exposure

Slide 76

Visualization (Priganc 2011)

- Simple visualization
- Mirror visual feedback:
  - Performing an exercise using mirrors to observe motion
  - Research suggests visualization may minimize increases in pain due to movement/exercise

Slide 77

Graded Motor Imagery

- Left-right judgment
- Motor imagery: visualization without actual movement
  - Static positions
  - Movement into positions
- Mirror visual feedback
  - Provides visual/cortical input that movement is normal and pain free
  - (Bowering, 2013; Priganc, 2011)

Slide 78

Graded Exercise

- Graded exercise progresses exercises using a quota
  - In spite of pain
  - Identify baseline activity tolerated
  - Meeting the quota leads to increased quota ("pacing up")
  - Inability to meet quota leads to no reinforcement
- (George 2010, Nicholas 2011)

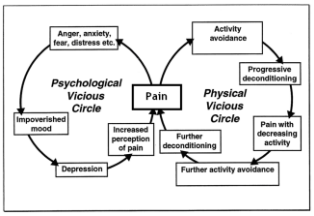
Slide 79

Graded Exposure

- Graded exposure to feared activities
  - Identify feared activities
    - By interview or Fear of Daily Activities Questionnaire
  - Start with activities causing mild anxiety
  - Continue at that level until anxiety decreases
  - Progress to activities causing greater anxiety
- Example: if lumbar flexion is feared
  - Start with flexion in supine
  - Progress to flexion in sitting
  - Progress to flexion in standing
- (George, 2010, Nicholas, 2011)

Slide 80

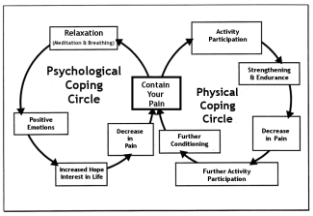
Chronic Pain Dysfunction



http://www.brainworksrehab.com

Slide 81

Chronic Pain Function



http://www.brainworksrehab.com

Slide 82

Challenges Working with People With Chronic Pain

- Dealing with patients' psychosocial problems
- Dealing with patients' negative attitudes
- Empathy fatigue
- Time management
- Insurance & Billing

Slide 83

Patient's Psychosocial Problems

- Psychological and social problems may be beyond our training and skill level
- Suggestions
  - Refer for psychological services
  - Recommend support groups (in-person/on-line)
  - Recommend self-care books, web-sites, etc.
  - Know your limits
  - Know your scope of practice

Slide 84

Maladaptive Attitudes

- Misconceptions about exercise
  - Interpreting normal exertional soreness as pain flare
- Interpreting moderation as failure
- Poor body awareness
  - Inability to distinguish stress from muscle tension
  - Inability to distinguish emotional from physical pain
  - Inability to feel mild 'warning' discomfort
- Suggestions:
  - Education: "Sore but safe," "Challenge tissues"
  - Mindful movement: tai chi, yoga, Feldenkrais

Slide 85

Maladaptive Attitudes

- Have great difficulty pacing themselves and tend to overdo activity
  - Garden metaphor
- Inconsistent with home exercise program
  - Start low, go slow
  - No achievable goal is too small
- Skeptical of mind-body approach
  - Pain education

Slide 86

Time Constraints

- How can you do all this patient education on top of everything you arleady do?
- Limit hands-on and modalities
  - Research shows little long-term benefit
- Focus time on patients' self-management skills
  - Managing their own trigger points
  - Home exercises
  - Home use of heat, TENS, traction, if needed
- Select specific, achievable goals for each visit

Slide 87

Avoiding Therapist Burnout

- Suggestions:
  - Remember: you control the treatment, but the patient is responsible for the outcome through his/her active engagement
  - Be aware of your triggers and limits
  - Be compassionate with yourself
    - Be at ease with pain you cannot relieve
    - Think about what went right in your day
    - Communicate with colleagues and support system
    - (Stebnicki, 2000: Empathy fatigue)

Slide 88

Billing & Insurance

- How do we bill for behavioral management?
  - 97112 Neuromuscular reeducation
  - 97535 Self-care/home management training
  - 97110 Therapeutic exercise
- Insurance problems
  - Time-based approval (e.g., 6 wks): advocate for a given number of visits
  - Visit limits: spread visits out, e.g., 1x/wk

Slide 89

Psychosocially Informed PT

Behavioral Management of Chronic Pain **Foster N E , and Delitto A PHYS THER 2011;91:790-803** 89

Slide 90

Case Study : Jake

38 y/o man c/o 4 yr hx of chronic neck, upper back and UE pain that had become more severe in the past 2 years
Gradual onset, no specific precipitating factors
Pain intensity 4-9/10, average 5/10
Constant, dull, throbbing, aching, intermittently shock-like
Aggravates: working at a computer for greater than 30 min, carrying anything
Eases: rest, ice, heat
Interference scale: 1 none - 10 maximum
- General activity 7
- Mood 9
- Normal work 6
- Relationships 4
- Enjoyment of life 9

Normal MRI

Behavioral Management of Chronic Pain 90

Slide 91

Previous treatment:
4 different courses of PT that included manual therapy, stretching, strengthening, ultrasound, traction, hand and wrist splints
Chiropractic, acupuncture and massage

Behavioral Management of Chronic Pain 91

Slide 92

Patient perspective:
"None of it helped and as the years progressed I got worse and worse. I felt like I was aging exponentially. I was withering away and losing weight. I was in total despair and thought to myself that at this rate, I was destined for a life of sickness. I tried very hard to think positive, but at times the weight of pain and worry was overwhelming." Jake

Behavioral Management of Chronic Pain 92

Slide 93

Treatment directed at chronic pain mechanisms:

- 3 visits individual treatment:
  - •introduced mindfulness,
  - •body awareness,
  - •surface EMG biofeedback,
  - •breathing,
  - •relaxation
  - •cognitive restructuring
- Pain education class
- Mindfulness based stress reduction program

Behavioral Management of Chronic Pain 93

Slide 94

Patient perspective:
"I learned that there wasn't anything wrong with my body. At first I didn't believe it. The pain was real! Then I was taught a different way of looking at pain. My nerves were the problem. It became clear that my pain was a manifestation of my stress and it was compounded by the way I reacted to the pain and life situations." Jake

Behavioral Management of Chronic Pain 94

Slide 95

Patient perspective:
"Understanding the biology of pain helped a lot. At the start of all of this, when my pain increased, I panicked and thought there was something wrong. I kept doing less and less because I thought I was hurting myself. Now, I know sensitive nerves had a major role in my pain. I stopped freaking out. Instead of panicking, I told myself to stay calm. I stretched, relaxed and did deep breathing. It really made a difference." Jake

Behavioral Management of Chronic Pain 95

Slide 96

Patient perspective:
"After a few weeks I found amazing results. The pain decreased and I could do more. By the time I finished the course I was virtually pain free. I also learned a new way of looking at the world. I had gone my whole life without living in the moment. Now I don't even stress about things that drove me crazy before. I am more compassionate, patient and deliberate."
Jake

Slide 97

In Conclusion…

- Clinical Practice Guideline approach:
  - **Use biopsychosocial approach**
  - **All patients should participate in exercise**
  - **Include cognitive behavioral approach**
  - **Psychosocial problems do not invalidate pain complaint**
  - Treatment should be sensitive to culture
  - **Active self-management is essential**
- Institute for Clinical Systems Improvement (ICSI) Assessment & Management of Chronic Pain: www.icsi.org/guidelines_and_more/gl_os_prot/

Slide 98

We would like to thank:

Orthopedic Section Leadership
- Tess Vaughn, PT, COMT, DPT, OCS, Education Committee Chair
- John Garzione, PT, AAPM, President, Pain Special Interest Group

Carolyn's colleagues: Will Robinson PT, Jo Fasen PT, Gordon Irving, MD and the staff in Outpatient Rehab Services, Swedish Medical Center

Leslie's colleagues: faculty and students at Clarkson University and staff at Canton-Potsdam Hospital

Slide 99

Resources in the Handout

- Books for both the PT and patients
- Web sites for both the PT and patients
- Reference list for this presentation

Slide 100

Please stay for the Pain Special Interest Group Business Meeting

Behavioral Approaches to Chronic Pain Management
Carolyn McManus & Leslie Russek
CSM 2014: 2/6/14

Helpful Books/Resources

- Branch R, Wilson R. **Cognitive Behavioural Therapy for Dummies**. Wiley & Sons, 2010. (patient resource)
- Butler D, Mosely L. **Explain Pain**. Adelaide, Noigroup Publications, 2003. (PT and patient resource)
- Caudill, M. **Managing Pain Before It Manages You**. New York: Guilford Press, 2008. (patient resource)
- Flor H, Turk D. **Chronic Pain: An Integrated Biobehavioral Approach**. Seattle, IASP Press, 2011. (PT resource)
- Kabat-Zinn J. **Mindfulness for Pain Relief** (CD). Sounds True, Inc, 2009. (patient resource)
- Kabat-Zinn, J. **Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain and Illness**. New York: Del Publishing Co, 1991. (patient resource)
- Louw A. **Why Do I Hurt?** Orthopedic Physical Therapy Products. 2013. (patient resource)
- Otis, John. **Managing Chronic Pain: A Cognitive Behavioral Approach**. New York: Oxford University Press, 2007. (patient resource)
- Schubiner, H. **Unlearn Your Pain.** Available through Dr. Schubiner's website: www.unlearnyourpain.com (patient resource)
- Sluka K. **Mechanisms and Management of Pain for the Physical Therapist**. Seattle, IASP Press, 2009. (PT resource)
- Turk D and Winter F. **The Pain Survival Guide: How to Reclaim Your Life**. Amer Psychological Assn, 2005. (patient resource)
- Vierck E, Kassan S, Vierck CJ. **Chronic Pain for Dummies**, for Dummies, 2011. (patient resource)

Helpful Websites

Organization/Purpose	**Website**
American Academy of Pain Medicine. Professional organization for physicians has some patient educational material.	www.painmed.org
American Chronic Pain Association. **Provides education and peer support for patients and families.**	www.theacpa.org
American Pain Foundation. Educational material for patients and families, including material specifically for military & veterans with chronic pain.	www.painfoundation.org
Australian Transport Accident Commission has an extensive selection of physical and psychosocial outcome measures.	http://www.tac.vic.gov.au Go to Provider Resources, Clinical Resources, then Outcome Measures
Carolyn McManus*:* Information regarding programs at Swedish Medical Center, for veterans and also audio guided relaxation programs	www.CarolynMcmanus.com
Change Pain*:* A modular approach to understanding pain and its management. Educational resources for clinicians.	http://www.change-pain.co.uk/
Hunter Integrated Pain Service: YouTube patient education video "**Understanding Pain: What to do about it in less than five minutes?"**	YouTube link: http://youtu.be/4b8oB757DKc http://www.hnehealth.nsw.gov.au/pain
Institute for Clinical Systems Improvement (ICSI):	www.icsi.org/guidelines_and_more/gl_os_prot/

Assessment & Management of Chronic Pain. Clinical practice guideline on chronic pain.	search for guidelines on pain
***International Association for the Study of Pain* (IASP).** Professional organization for researchers, clinicians and educators. Has some public education resources.	www.iasp-pain.org
Mayday Pain Project. Educational information for providers, patients, and specific sections for caregivers.	www.painandhealth.org
***California Department of Industrial Relations*:** Medical Treatment Utilization Schedule (MTUS) Medical Treatment Guideline for chronic pain	http://www.dir.ca.gov/dwc/MTUS/MTUS_RegulationsGuidelines.html select "Chronic pain medical treatment guidelines"
Neil Pearson, PT, a Canadian physical therapist discusses nervous system sensitization in a 3 part video	www.Lifeisnow.ca
Pain Treatment Topics. Educational material for clinicians, patients and families. Links to resources on many other sites. Comprehensive section on pain assessment tools.	www.pain-topics.org
Pain.com. Educational modules and articles for clinicians.	www.pain.com
PainAction. Educational material for patients. Includes self-management tools. Integrated with clinician educational site PainEDU.com .	www.painaction.com
PainDoctor.com. Educational material for patients and families.	www.paindoctor.com
PainEDU.org. Educational material for clinicians and educators. Includes downloadable PowerPoint lectures. Integrated with patient education site PainAction.	www.painedu.org
UMass Center for Mindfulness listing of mindfulness based stress reduction programs:	http://w3.umassmed.edu/MBSR/public/searchmember.aspx

Behavioral Approaches to Chronic Pain Management

References

1. Alder GK, Geenan R. Hypothalamic-pituitary-adrenal and autonomic nervous system functioning in fibromyalgia. Rheum Dis Clin North Am. 2005;31(1):187-202.
2. Apkarian AV, Hashmi JA, Balili MN. Pain and the brain: Specificity and plasticity of the brain in clinical chronic pain. Pain 2011;11:S49-S64.
3. Bach DR, Erdmann G, Schmidtmann M, et al. Emotional stress reactivity in irritable bowel syndrome. Eur J Gastroent Hepatol 2006;18(6):229-236.
4. Benedetti F, Thoen W, Blanchard C, et al. Pain as a reward: changing the meaning of pain from negative to positive co-activates opioid and cannabinoid systems. Pain. 2013;154(3):361-7.
5. Bingel U, Wanigasekera V, Wiech K, et al. The effect of treatment expectation on drug efficacy: Imaging the anagesic benefit of the opioid remifentanil. Sci Transl Med. 2011:16;3(70):70ra14.
6. Bowering, KJ, O'connell, NE, Tabor, A, Catley, MJ, Leake, HB, Moseley, GL & Stanton, TR The effects of graded motor imagery and its components on chronic pain: a systematic review and meta-analysis. J Pain, 2013; 14: 3-13.
7. Brown CA, Jones AK. Meditation experience predicts less negative appraisal of pain: electrophysiological evidence for the involvement of anticipatory neural responses. Pain 2010;150(3):428-38.
8. Busch V, Magerl W, Kern U, et al. The effect of deep and slow breathing on pain perception, autonomic activity and mood processing: An experimental study. Pain Med. 2012;13(2):215-28.
9. California Department of Industrial Relations: Medical Treatment Utilization Schedule (MTUS): Chronic Pain Medical Treatment Guidelines. Department of Industrial Relations, San Francisco, CA, 2009. Retrieved

January 31, 2012, from http://www.dir.ca.gov/dwc/MTUS/MTUS_RegulationsGuidelines.html
10. Chalaye P, Goffaux P, Lafrenaye S, et al. Respiratory effects on experimental heat pain and cardiac activity. Pain Med 2009;10(8):1334-40.
11. Chen X , Green PG, Levine JD. Stress enhances muscle nociceptor activity in the rat. Neuroscience 2011;185:166-73.
12. Davis DA, Luecken LJ, Zautra AJ. Are reports of childhood abuse related to the experience of chronic pain in adulthood? A meta-analytic review of the literature. Clin J Pain 2005;21(5):398-405.
13. Eijsbouts A. The role of the hypothalamic-pituitary-adrenal axis in rheumatoid arthritis. Baillieres Best Pract Res Clin Rheumatol. 1999;13(4):599-613.
14. Flor H, TD 2011. *Chronic Pain: An Integrated Biobehavioral Approach*, Seattle, IASP Press.
15. Foster, NE & Delitto, A Embedding psychosocial perspectives within clinical management of low back pain: integration of psychosocially informed management principles into physical therapist practice--challenges and opportunities. Phys Ther, 2011; 91: 790-803.
16. Fox SD, Flynn E, Allen RH. Mindfulness meditation for women with chronic pelvic pain: a pilot study. J Reprod Med. 2011;56(3-4):158-62.
17. Garland EL, Howard MO. Mindfulness oriented recovery enhancement reduces pain attentional bias in chronic pain patients. Psychother Psychosom. 2013;82(5):311-8.
18. Geiss A, Rohleder N, Kirschbaum C, et al. Predicting failure of disc surgery by a hypofuctional HPA axis: evidence from a prospective study on patients undergoing disc surgery. Pain. 2005 Mar;114(1-2):104-17.
19. George, SZ, Wittmer, VT, Fillingim, RB & Robinson, ME Comparison of graded exercise and graded exposure clinical outcomes for patients with chronic low back pain. J Orthop Sports Phys Ther, 2010; 40: 694-704.
20. Grant JA, Rainville P. Pain sensitivity and analgesic effects of mindful states in Zen meditators: a cross-sectional study. Psychosom Med 2009;71:106-14.
21. Green PG, Chen X, Alvarez P, et al. Early-life stress produces muscle hyperalgesia and nociceptor sensitization in the adult rat. Pain 2011;152(11):2549-2556.
22. Gross CR, Kreitzer MJ, Reilly-Spong M, et al. Mindfulness-based stress reduction versus pharmacotherapy for chronic primary insomnia: a randomized controlled clinical trial. Explore (NY). 2011;7(2):76-87.
23. Gross CR, Kreitzer MJ, Thomas W, et al. Mindfulness-based stress reduction for solid organ transplant recipients: A randomized controlled trial. Altern Ther Health Med 2010;16(5):30-8.
24. Heim C, Ehlert U, Hanker JP, et al. Abuse-related posttraumatic stress disorder and alterations of the hypo-thalamic-pituitary-adrenal axis in women with chronic pelvic pain. Psychosomatic Med. 1998;60(3):309-18.
25. Heinricher MM, Tavares I, Leith JL, et al Descending control of nociception: Specificity, recruitment and plasticity. Brain Res Rev. 2009;60(1):214-25.
26. Institute for Clinical Systems Improvement (ICSI). 2011. Assessment and Management of Chronic Pain. Health Care Guideline. 5th ed. Available at: www.icsi.org/guidelines_and_more/
27. Kiecolt-Glaser JK, Marucha PT, Malarkey WB, et al. Slowing of wound healing by psychological stress. Lancet 1995;346(8984):1194-6.
28. Kvillemo P, Branstrom R. Experiences of a mindfulness-based stress-reduction intervention among patients with cancer. Cancer Nurs. 2011;34(1):24-31.
29. Louw A, Diener I, Butler D, et al. The effect of neuroscience education on pain, disability, anxiety and stress in chronic musculoskeletal pain. Arch Phys Med Rehabil 2011;92(12):2041-2056.
30. Malinen S, Hlushchuk Y, Koskinen, et al. Abberant temporal and spatial brain activity during rest in patients with chronic pain. PNAS 2010;107(14):6493-97.
31. Marucha PT, Kiecolt-Glaser JK, Favagehi M. Mucosal wound healing is impaired by examination stress. Psychosom Med 1998;60(3):362-5.
32. May A. Chronic pain may change the structure of the brain. Pain 2008;137(1):7-15.
33. Mckee, MG Biofeedback: an overview in the context of heart-brain medicine. Cleve Clin J Med, 2008; 75 Suppl 2: S31-4.

34. Morone NE, Greco CM, Weiner DK. Mindfulness meditation for thetreatemtn of chronic low back pain in older adults: a randomized controlled pilot study. Pain 2008;134(3):310-19.
35. Nicholas, MK & George, SZ Psychologically informed interventions for low back pain: an update for physical therapists. Phys Ther, 2011; 91: 765-76.
36. Nielsen, M, Keefe, FJ, Bennell, K & Jull, GA Physical Therapist-Delivered Cognitive-Behavioral Therapy: A Qualitative Study of Physical Therapists' Perceptions and Experiences. Phys Ther, 2013.
37. Ong JC, Shapiro SL, Manber R. Mindfulness meditation and cognitive behavioral therapy for insomnia: a naturalistic 12-month follow up. Explore (NY). 2009;5(1):30-6.
38. Ozgocmen S, Cimen OB, Ardicoglu O. Relationship between chest expansion and respiratory muscle strength in patients with primary fibromyalgia. Clin Rheumatol. 2002;21(1):19-22.
39. Parswani MJ, Sharma MP, Iyengar S. Mindfulness-based stress reduction prigram in coronary heart disease: a randomized control trial. Int J Yoga 2013;6(2):111-7.
40. Pincus T. A systematic review of psychological factors as predictors of chronicity/disability in prospective cohorts of low back pain. Spine 2002;27(5):E109-120.
41. Priganc, VW & Stralka, SW Graded motor imagery. J Hand Ther, 2011; 24: 164-8; quiz 169.
42. Schreiber KL, Martel MO, Shnol H, et al. Persistent pain in postmastectomy patients: Comparison of psychophysical, medical, surgical, and psychosocial characteristics between patients with and without pain. Pain. 2013;154(5):660-8.
43. Schweinhardt P, Bushnell MC. Pain imaging in health and disease – How far have we come? J Clin Investigation 2010;120(11):3788-97.
44. Sprenger C, Elppert F, Finsterbusch J., et al. Attention modulates spinal cord response. Curr Biol.2012:5;22(11):1019-1022.
45. Stebnicki, MA Stress and grief reactions among rehabilitation professionals: Dealing effectively with empathy fatigue. J Rehabil., 2000; 66: 23-29.
46. Tsao H, Galea MP, Hodges PWet al. Reorganization of the motor cortex is associated with postural control deficits in recurrent low back pain. Brain. 2008;131(Pt 8):2161-71.
47. Turk, DC & A., O 2001. Pain Terms and Taxonomies of Pain. In: JD, L. (ed.) *Bonica's Management of Pain, 3rd edition*. 3rd ed. Philadelphia, PA: Lippincott Williams and Wilkins.
48. Van Koulil, S, Kraaimaat, FW, Van Lankveld, W, Van Helmond, T, Vedder, A, Van Hoorn, H, Donders, AR, Thieme, K, Cats, H, Van Riel, PL & Evers, AW Cognitive-behavioral mechanisms in a pain-avoidance and a pain-persistence treatment for high-risk fibromyalgia patients. Arthritis Care Res (Hoboken), 2011;63: 800-7.
49. Van Koulil, S, Van Lankveld, W, Kraaimaat, FW, Van Helmond, T, Vedder, A, Van Hoorn, H, Donders, R, De Jong, AJ, Haverman, JF, Korff, KJ, Van Riel, PL, Cats, HA & Evers, AW Tailored cognitive-behavioral therapy and exercise training for high-risk patients with fibromyalgia. Arthritis Care Res (Hoboken), 2010; 62: 1377-85.
50. Van Susante J, Van de Schaaf D, Pavlov P. Psychological distress deteriorates the subjective outcome of lumbosacral fusion. A prospective study. Acta Orthop Belg 1998;64(4):371-377.
51. Wagner KM, Roeder Z, Desrochers K, et al. The dosomedial hypothalamus mediates stress-induced hyperalgesia and is the source of pronociceptive peptide cholesystokinin in the rostral medial medulla. Neuroscience. 2013:15;238:29-38.
52. Woolf CJ. Central senitization: implications for the diagnosis and treatment of pain. Pain. 2011;152(3 Suppl):S2-15.
53. Woolf CJ. What is this thing called pain? J Clin Invest 2010;120(10):3742-3744.
54. Würtzen H, Dalton SO, Elsass P, et al. Mindfulness meditation significantly reduces self-reported levels of anxiety and depression: results of a randomizes controlled trial among 336 Danish women treated for stage I – III breast cancer. Eur J Cancer. 2013;49(6):1365-73.
55. Zainal NZ, Booth S, Huppert FA. The efficacy of mindfulness-based stress reduction on mental health of breast cancer patients: a meta-analysis. Psychooncology. 2013 Jul;22(7):1457-65.