

# **Nonpharmacologic Therapies to Treat Chronic Pain**

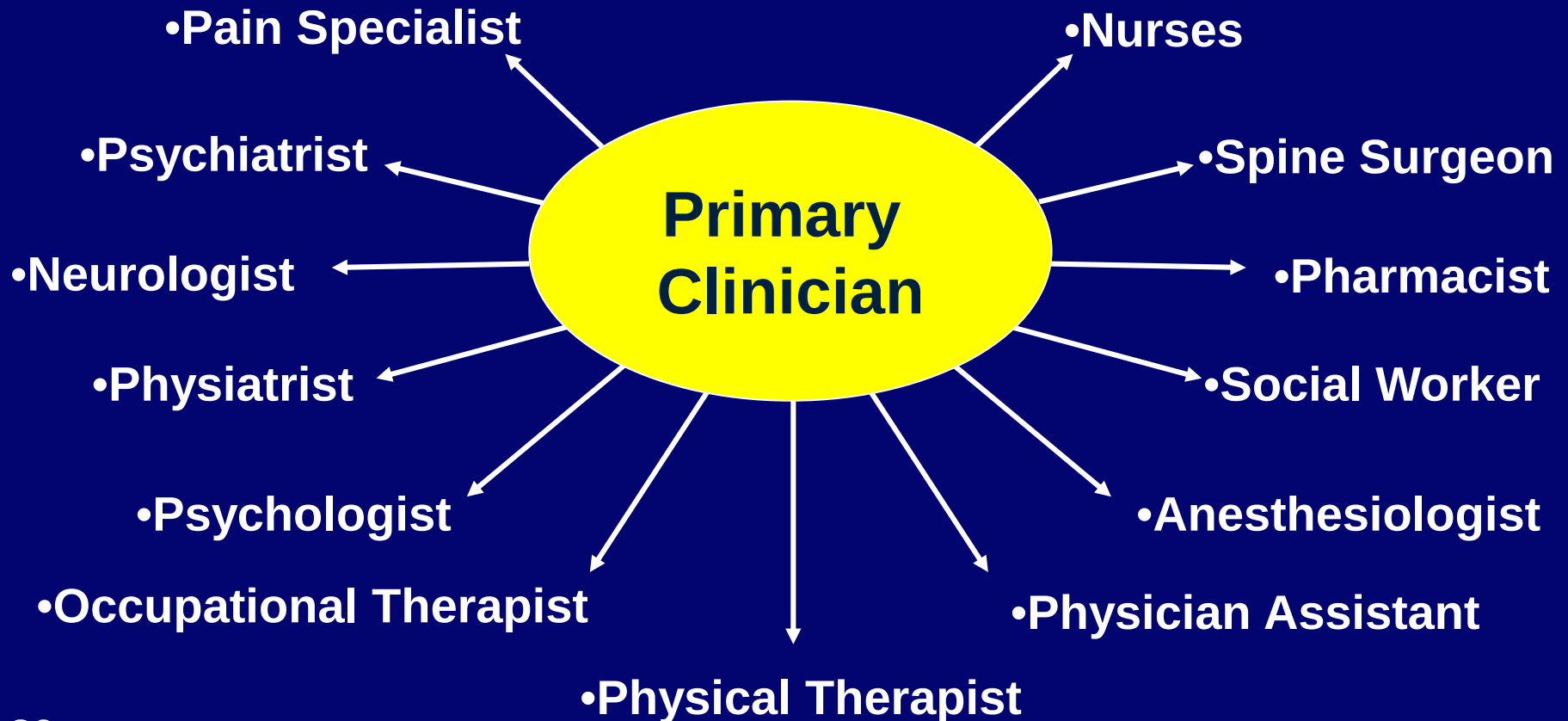
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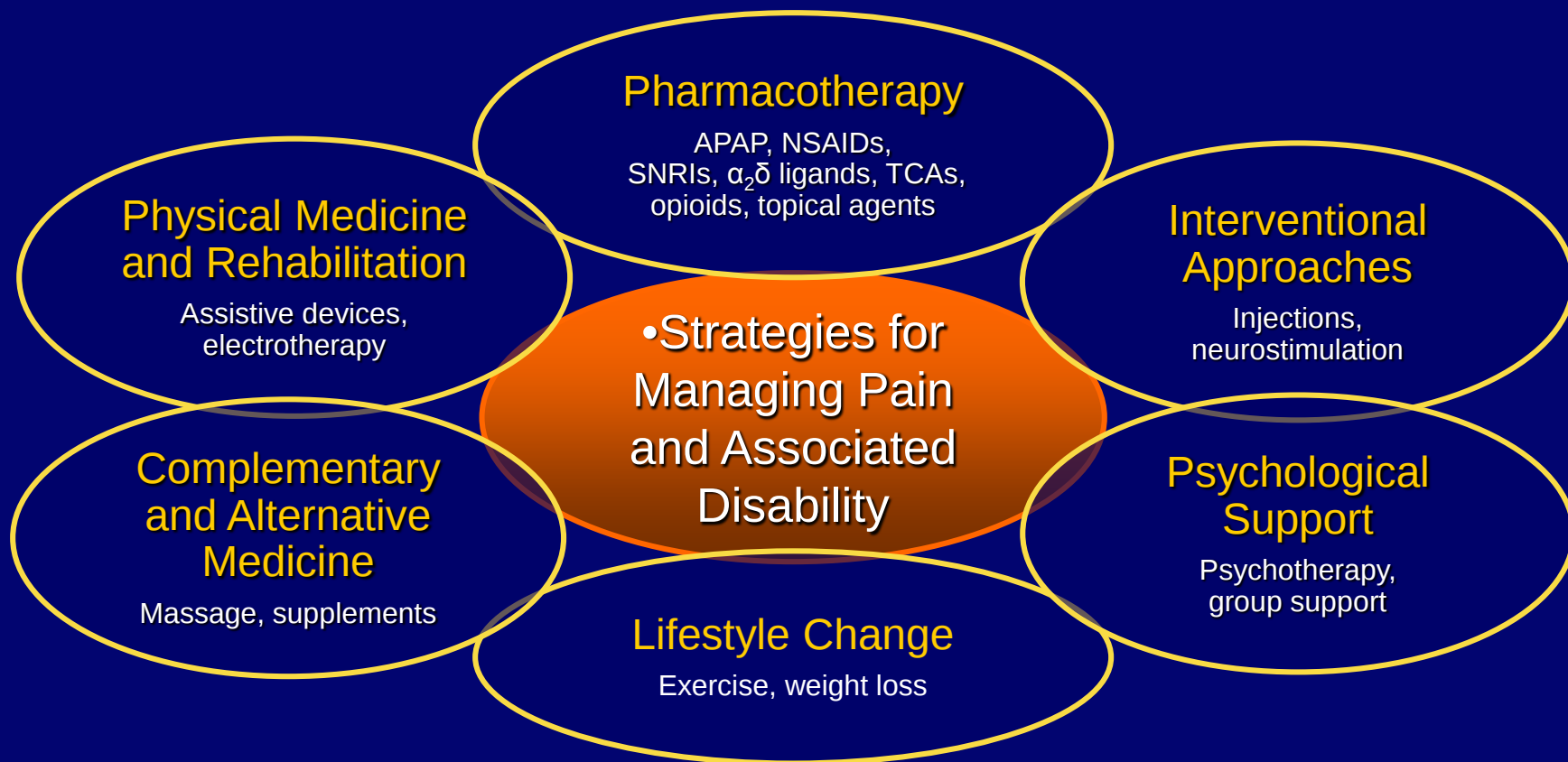
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# Consider the Multidisciplinary Team Approach

•Integrated      Coordinated      Interdisciplinary



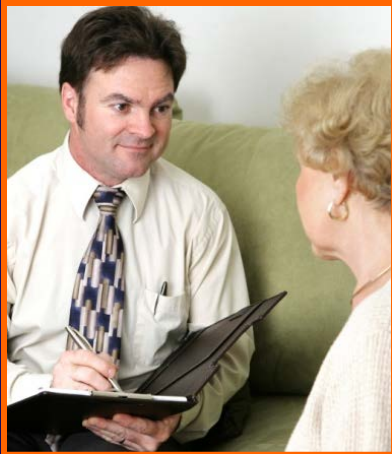
# Multimodal Treatment



•SNRI, serotonin-norepinephrine reuptake inhibitor; TCA, tricyclic antidepressant

•American Society of Anesthesiologists (ASA) Task Force on Chronic Pain Management, American Society of Regional Anesthesia and Pain Medicine (ASRAPM) *Anesthesiology*. 2010;112:810-833; Institute for Clinical Systems Improvement (ICSI). *Assessment and Management of Chronic Pain*. 4th ed. November 2009.

# Nonpharmacologic Pain Modalities



- **Psychologic support**

- CBT
- Group support
- Biofeedback
- Relaxation training
- Supportive psychotherapy



- **Lifestyle change**

- Exercise
- Weight loss



- **CAM**

- Massage
- Spinal manipulation
- Supplements
- Homeopathy
- Acupuncture



- **Physical medicine and rehabilitation**

- Hot/cold presses
- Assistive devices
- Physiotherapy
  - Pulsed electromagnetic field therapy
- Transcutaneous electrical nerve stimulation
- Hydrotherapy

•CAM, complementary and alternative medicine; CBT, cognitive behavioral therapy

Adams ML. *Clin Podiatr Med Surg*. 2008;25:409-429; National Center for Complementary and Alternative Medicine.

What is CAM? <http://nccam.nih.gov/health/whatiscam/>. Accessed April 27, 2011.

# Patient Education

## *The Cornerstone of Effective Pain Management*

- Teach patients to report pain
  - Consider assessment tools
- Provide information
  - Nonpharmacologic strategies
  - Pharmacologic options
  - Routes of administration
  - Management of side effects
- Address attitudes and beliefs
  - Expression of pain
  - Cultural influences
  - Opioid addiction, tolerance, dependence



# Chronic Pain Management

## *Analgesia and Functional Gains*

- Respect individual differences among patients
- Develop transparent, collaborative relationship
  - Decisions emerge from ongoing dialogue
- Listen attentively to patient
  - Understand patient's needs
  - Evaluate patient-specific benefits and risks of therapy
- Establish individualized goals
  - Objective, verifiable, obtainable
- Educate patients about realistic expectations and their own roles and responsibilities in managing their pain



•Fishman SM. *Responsible Opioid Prescribing: A Physician's Guide*. Washington, DC: Waterford Life Sciences; 2007.

•Lambert M. *Am Fam Physician*. 2010;82:434-439.

# Motivational Interviewing

- Express Empathy

- Support Self-efficacy

- Develop Discrepancy

- Roll With Resistance

## Brief Action Planning 3 Core Questions

- “Is there anything you would like to do for your health in the next week or two?”
  - Elicit preferences/desires for behavior change
- “How confident do you feel about your plan?”
  - Evaluate confidence
- “Sounds like that plan is going to work for you. When would you like to check in with me to review how you are doing with your plan?”
  - Arrange for follow-up

# Physical Treatment Options

- Exercise (stabilization training)
- Neutral position
- Soft tissue mobilization
- Transcutaneous electrical nerve stimulation (TENS)
- Electrothermal therapy
- Complementary measures (acupuncture; relaxation/hypnotic/biofeedback therapy)
- Spinal manipulative therapy
- Multidisciplinary treatment programs (back schools/education/counseling/pain clinic)

# Cryotherapy (Ice): Analgesic Properties

- Decreases inflammation and edema
- Decreases hematoma formation (local vasoconstriction)
- Decreases nerve-conduction velocity
- Decreases neuronal pain-signal transmission
- Counterirritant (Gate Control Theory)
- Inhibits stretch reflex ( $\alpha$ muscle spasm)

# Spinal Manipulation and Mobilization

- Mechanism of action
  - Restoring spine function may reduce/relieve neck/back pain and headache
- Review of SMT studies in CGH
  - 3 to 6 weeks' treatment
  - SMT is effective for short- and long-term relief compared with no treatment
  - SMT is effective in short-term compared with massage or placebo SMT
  - Weak evidence that SMT is better than mobilization for short-term relief

•SMT=spinal manipulative therapy. There are 5 trials total in the review.

•Bronfort et al. *Cochrane Database Syst Rev.* 2004;3:CD001878.

# Physical Activity and Chronic Pain

- Aerobic Exercise
  - Low-moderate = 50-60% of max HR will improve chronic pain symptoms
  - Moderate-high = 60-80% of max HR will improve fitness
- Strength Training
  - Contracting muscles against resistance
  - Land base > aquatic base
- Flexibility Training
  - Modest effect on pain but better effect on emotional stability
- Movement Therapies
  - Yoga, Tai Chi, Qigong
  - Improves balance, mobility, joint flexibility and emotions

# Recognizing Psychosocial Factors Is Important

**They may strongly influence chronicity and patient prognosis.**

## Red Flags

- Current psychiatric symptoms
  - past psychiatric history
- History of addictive disease
- Change in social function
  - employment
  - family and relationships
  - recreation
- Medical–legal status
- Compensable injury
- Ongoing unresolved litigation

# Psychological Intervention Options

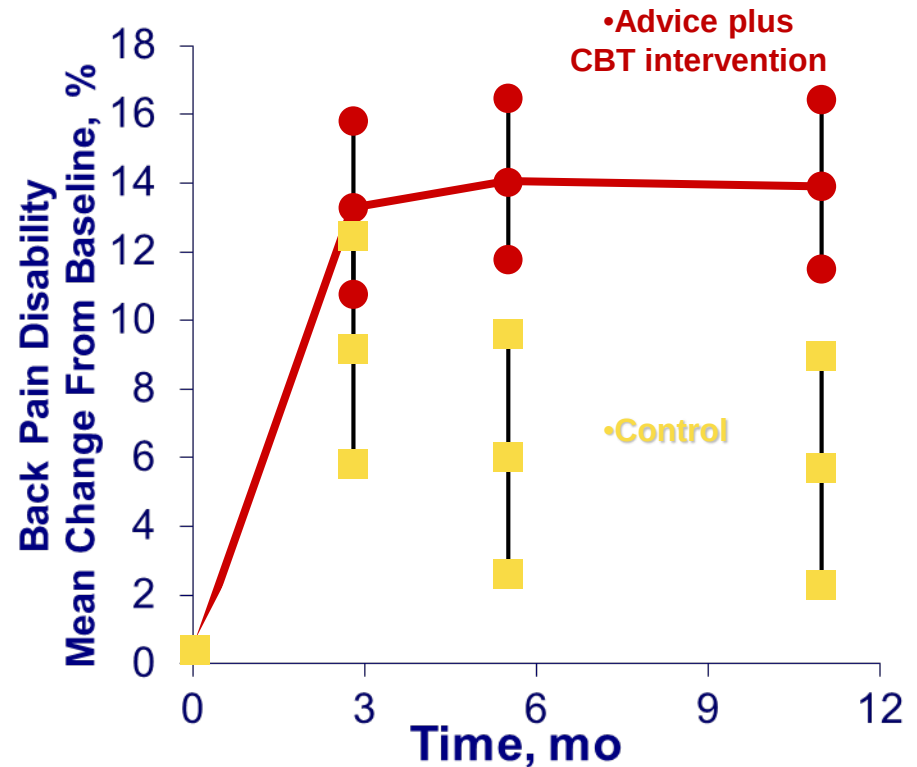
**Chronic pain can have a devastating psychological effect on patients**

- Psychological interventions include
  - active listening/empathy
  - limit setting
- Refer for
  - family therapy
  - group therapy
  - supportive psychotherapy
  - cognitive behavioral therapy
- Psychotropics

# CBT for LBP in Primary Care

- **CBT**

- Identify dysfunctional or irrational thoughts that prevent a patient from appropriately adjusting to chronic pain and associated disability
- Use positive and negative reinforcement to modify maladaptive thought patterns and increase adaptive behavior
- Reduce both affective and behavioral symptoms related to feelings of suffering



care patients with functionally impairing subacute or chronic LBP.

Modified Von Korff scale measures pain and disability.

- Gatchel RJ, et al. *Spine J.* 2008;8:40-44; Lamb SE, et al. *Lancet.* 2010;375:916-923;
- Turk DC. *Reg Anesth Pain Med.* 2003;28:573-579.

•CBT significantly reduced  
LBP-associated disability

# Exercise for Headache

- 6 weeks of low-load endurance exercises to train muscle control of cervicospinal region
  - Twice daily
    - Craniocervical flexion
    - Scapular adduction and retraction
  - Low-level, rotatory-resistance isometrics
  - Postural correction
- Significant improvement in neck pain and headache frequency and intensity compared with controls
- Similar improvement compared with SMT

• N=200 patients; n=52 in exercise therapy; n=51 in SMT; n=49 in combined therapy; n=48 controls.

• Jull et al. *Spine*. 2002;27:1835-1843.

# Nonpharmacological Treatments for OA

Nonpharmacologic approaches are the cornerstone and should be continued throughout treatment period

- Patient Education
- Self management programs
- Personalized social support
- Weight loss
- Aerobic exercise programs
- Physical therapy range of motion exercises
- Muscle strengthening exercises
- Assisted devices for ambulation
- Patellar taping
- Appropriate footwear
- Occupational therapy
- Joint protection and energy conservation
- Assisted devices for activities of daily living

# Evidence Based Nonpharmacologic Therapy for Low Back Pain

- American Pain Society guidelines suggest the following treatments be considered for eligible CLBP patients<sup>1,2</sup>

## Good evidence for moderate efficacy

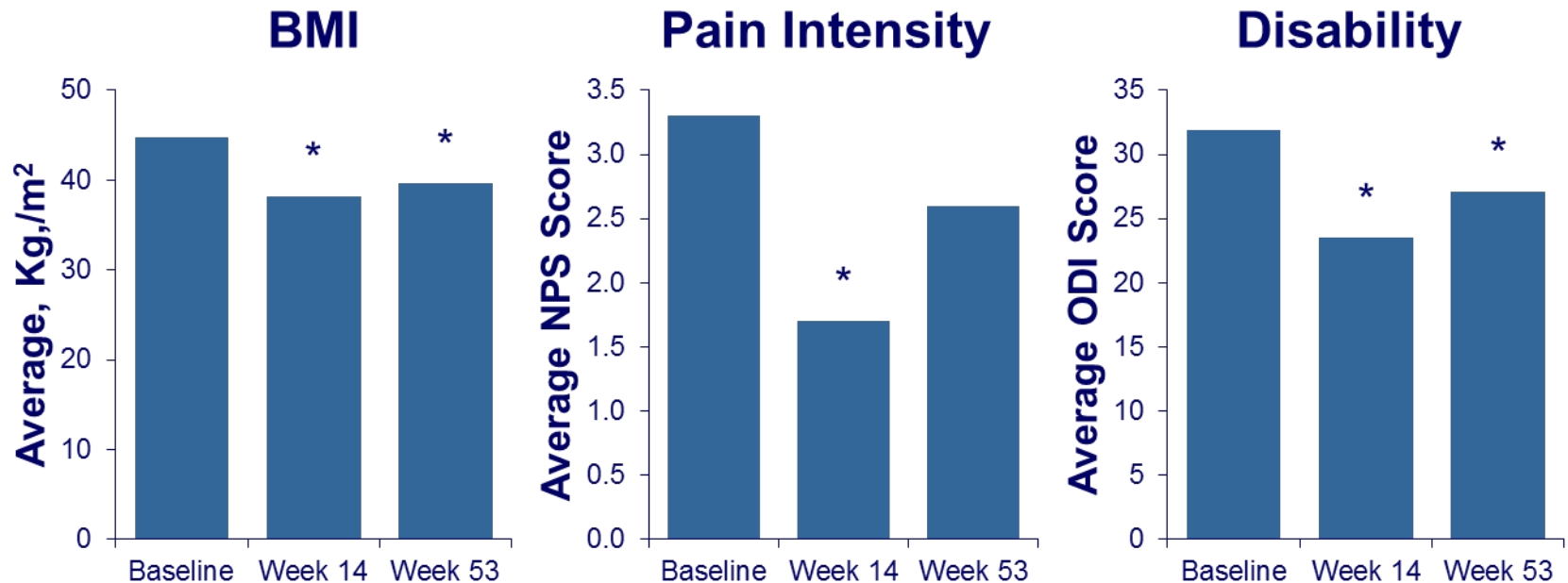
- Cognitive behavioral therapy
- Exercise
- Spinal manipulation
- Interdisciplinary rehabilitation

## Fair evidence for moderate efficacy

- Acupuncture
- Massage
- Yoga
- Functional Restoration (Physical conditioning)

# Weight Loss Reduces Pain and Improves Function in LBP

- Obese adults with LBP of any duration enrolled in a multidisciplinary, medically-supervised, nonsurgical weight-loss program



# American Pain Society (APS) Fibromyalgia Review

- Extensive literature review performed by 13 APS-selected experts
- Goal: provide current, evidence-based guidelines for optimal FMS treatment
- Recommendation: a combination program including patient education, exercise, cognitive therapy, and select medications

# Fibromyalgia Nonpharmacologic Strategies with Strong Evidence for Efficacy

- Cardiovascular exercise
  - Effect stops when exercise stops
  - Pool exercise well tolerated, very helpful
  - Strenuous bouts and isometric exercise may worsen pain
- Cognitive-behavioral therapy (CBT)
  - Decreases pain, improves function
- Patient education
  - Sustained 3- to 12-month improvement
- Combination/multidisciplinary therapies
  - eg, exercise + CBT

Goldenberg et al. *JAMA*. 2004;292:2388-2395.

# Fibromyalgia Strategies with Moderate, Weak, and No Evidence for Efficacy

- Moderate evidence
  - Strength training
  - Acupuncture
  - Hypnotherapy
  - Biofeedback
  - Pool therapy
- Weak evidence
  - Chiropractic, manual, and massage therapies
  - Electrotherapy
  - Ultrasound
- No evidence
  - Trigger point injections
  - Flexibility exercises

# Promoting Physical Activity in Fibromyalgia

- 12-week lifestyle physical activity (LPA) intervention produced a 59% increase in physical activity
- Accumulating 30 minutes of moderate-intensity LPA in short bouts throughout the day significantly improved self-reported health status
- Moderate, though nonsignificant, effects on pain, fatigue, disability, and performance were noted

# Phantom Limb Pain: Mirror Therapy

- Patient asked to look at a mirror image of the intact limb, which is perceived as an intact limb where the phantom used to be, and to make symmetrical movements.
- May re-establish control over phantom limb and alleviate pain in some patients although lacking controlled data



•Ramachandran. Proc R Soc Lond B Biol Sci, 1996

Phillip rotated his body, shifting his shoulder, to “insert” his lifeless phantom into the box. Then he put his right hand on the other side of the mirror and attempted to make synchronous movements. As he gazed into the mirror, he gasped and then cried out, :Oh, my God! Oh, my God, doctor! This is unbelievable. It’s mind boggling!: He was jumping up and down like a kid. “My left arm is plugged in again. It’s as if I’m in the past. All these memories from so many years ago are flooding back into my mind.

Four weeks later following ten minutes a day with the box and mirror, Phillip reported that the limb had gone, “all I have now is my phantom fingers and palm dangling from my shoulder.” The pains had significantly reduced (only the fingers still hurt - the rest had gone).

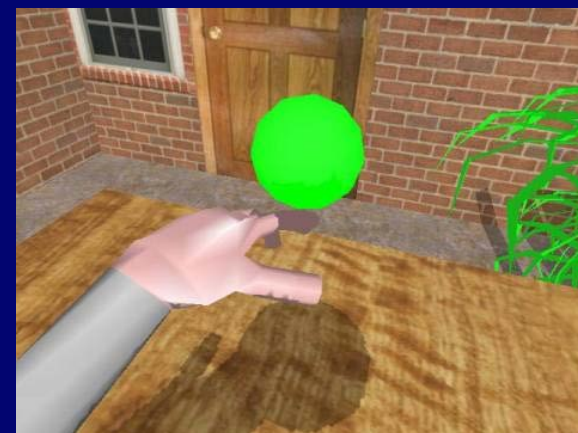
V.S Ramachandran, *Phantoms in the Brain*

# Phantom Limb Pain: Graded Motor Imagery

- Involves training patients to improve right/left discrimination, imagine pain free movements of affected and normal limbs followed by practicing pain free movements with the aid of a mirror box
- A randomized controlled trial showed a NNT of 3 at 6 months for a composite end point of 50% pain reduction and improvement in function
  - Patients in the placebo are received standard physical therapy and usual medical care

# Phantom Limb Pain: Virtual Reality

- Three patients with PLP (2 upper and 1 lower) took part in immersive virtual reality sessions.
- Anatomical limb movements were transposed into the movements of a virtual limb
- All subjects reported transferal of sensations into the muscles and joints of the phantom limb with decrease in pain



•Murray et al. Disabil Rehabil. 2007

# Repetitive Transcranial Magnetic Stimulation

- 2008, FDA approved for the treatment of depression
- Typical session lasts 30-60 minutes
- Short magnetic pulses delivered through a coil placed over target area
- Capable of targeting specific areas of the brain
- Patients feel a slight tapping as pulses delivered
- 2010 Cochrane review concluded that high-frequency rTMS showed small but consistent improvement in pain (O'Connell et al, Pain Research Forum, 2010)
- Appears to work best for neuropathic pain

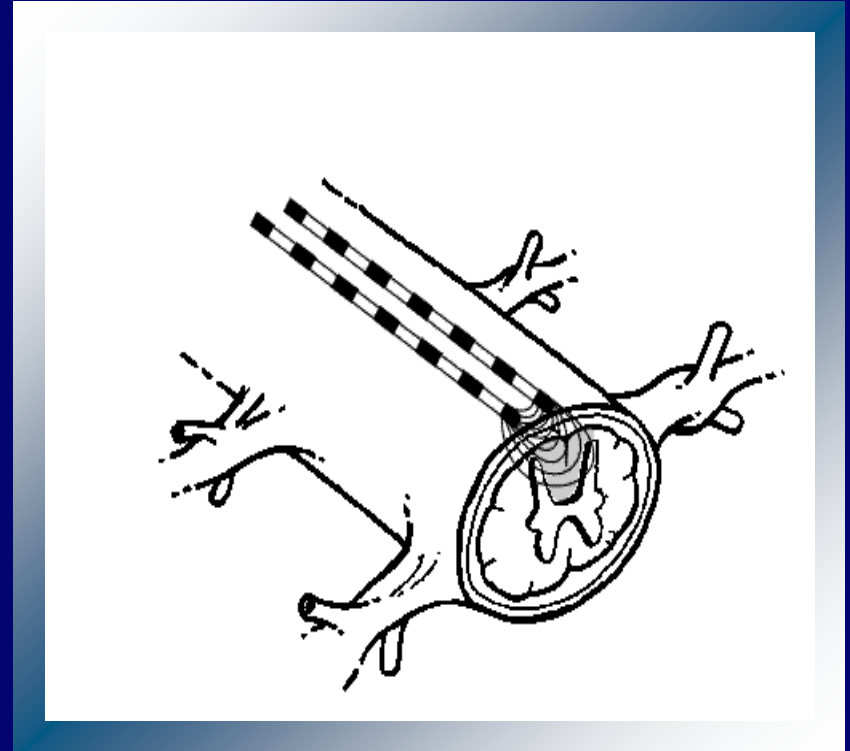
# Injections and Ablations for Chronic Pain

- Myofascial Injections
- Epidural Steroid Injection
- Sacroiliac Joint Injection and RFA
- Facet Joint Injection and RFA
- Sympathetic Block
- Celiac and Hypogastric Plexus Block
- PRP and Stem Cell Therapy

# Spinal Cord Stimulation

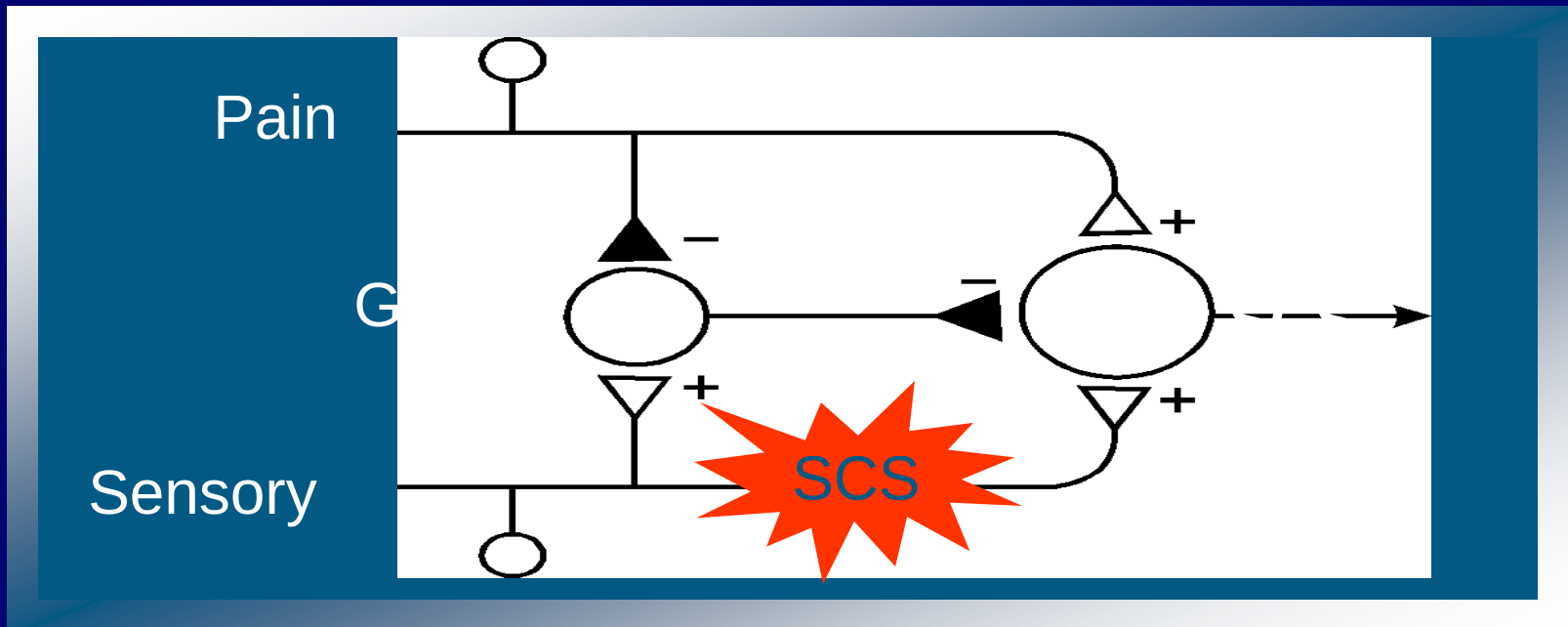
## Dorsal Columns

- Contain secondary sensory (afferent) fibers
- Stimulation produces paresthesia over large areas of selected regions corresponding to level of cathode & below



# Spinal Cord Stimulation and the Gate Control Theory

SCS Implanted Near Dorsal Column Stimulates the Pain-inhibiting Nerve Fibers Masking Painful Sensation With a Tingling Sensation (Parathesia)



# *Programs can be activity or pain based (walking, sleep, etc.)*



**Program 1**

Morning – pain  
is stable



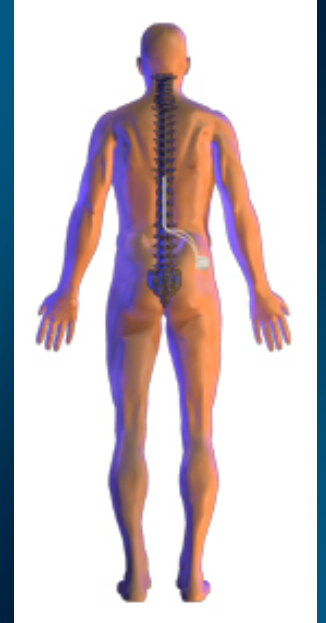
**Program 2**

Walking - pain  
progress with  
activity



**Program 3**

Afternoon -  
addresses pain  
progression

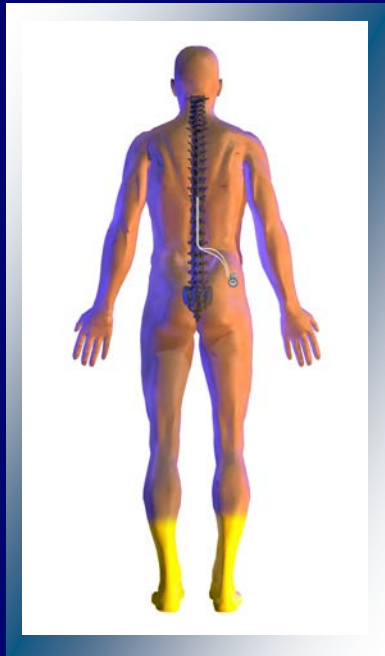


**Program 4**

Sleeping - turns  
off at set time to  
conserve battery

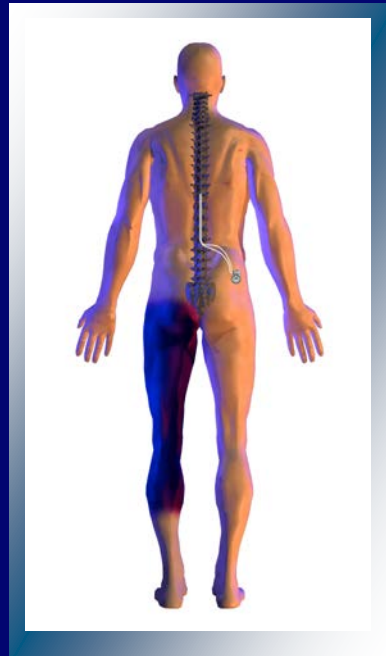
**EXAMPLE**

# Multiple Concurrent Programs



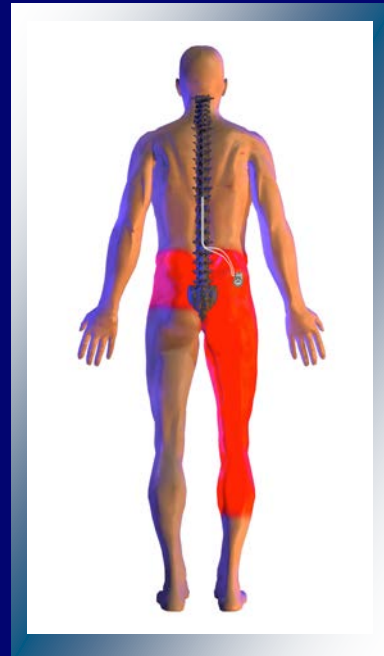
**Stim Set 1**

**Covers  
Feet**



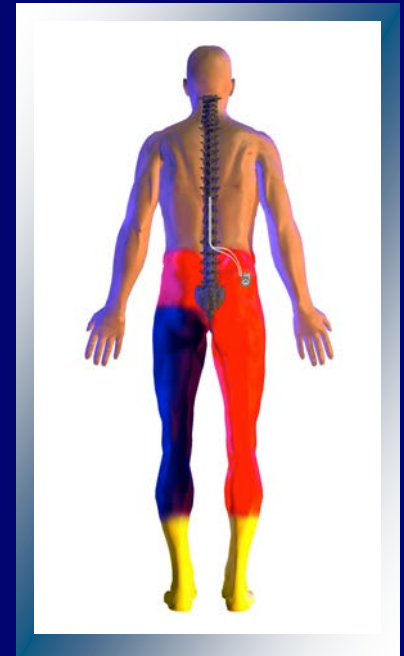
**Stim Set 2**

**Covers  
Left Leg**



**Stim Set 3**

**Covers  
Right Leg  
and Back**



**Stim Sets  
Combined  
and Cycled  
for Broader  
Coverage**

# SCS Waveforms

- **Traditional**

Relatively low energy  
Recharge every 2 months



- **Burst Stimulation**

Parameters within traditional range  
Low-moderate energy  
Average recharge similar to tonic  
Device provides both tonic and burst  
Same expected device life as tonic



- **High frequency**

Parameters outside traditional range  
Highest energy, daily recharge  
Current device only provides high frequency stimulation  
Reduced device life compared to tonic



# DRG Stimulation

- Early European data promising for tx LE difficult to tx conditions
  - CRPS
  - Post-amputation
  - Neuropathic groin pain
- Can also target broad trunkal pain by staggering multiple level lead placement
- US Non-inferiority study vs tonic SCS for neuropathic leg pain showed better relief with DRG stim

