



# Complementary and Alternative Medicine in Spinal Cord Injury & Disorders

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# Goals and Objectives

- ▶ Review basic terminology and history of complementary and alternative medicine (CAM) modalities
- ▶ Present common CAM modalities used in Spinal Cord Injury & Disorders (SCI/D)
- ▶ Discuss research and evidence of CAM in SCI/D
- ▶ Introduce indications and contraindications for use of CAM modalities
- ▶ Assess the use of selected supplements and vitamins in SCI/D care
- ▶ Consider challenges and obstacles to using CAM with disability and/or impairment
- ▶ Share experiences and thoughts as health care consumers and providers
- ▶ No disclosures



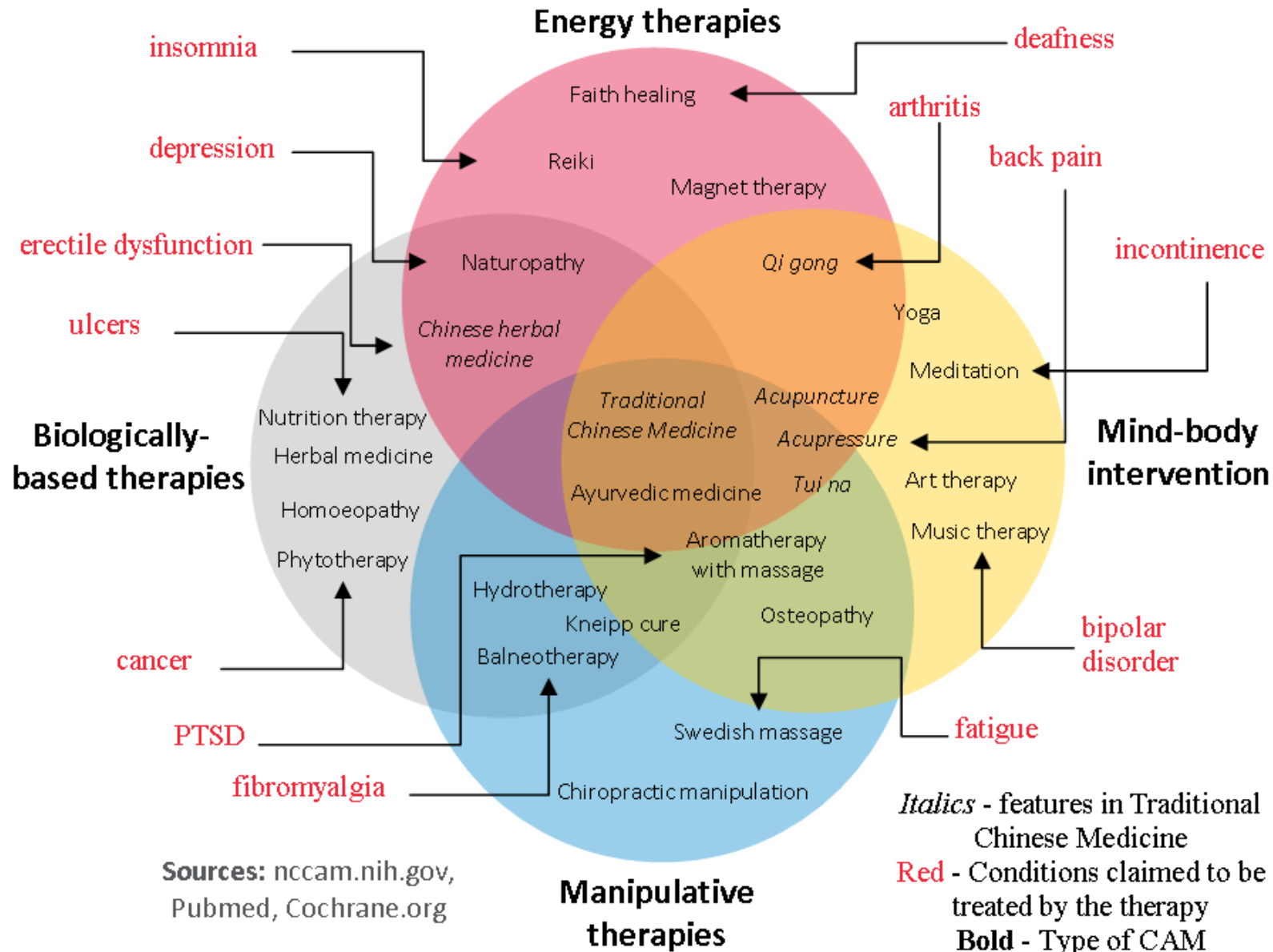


# Introduction

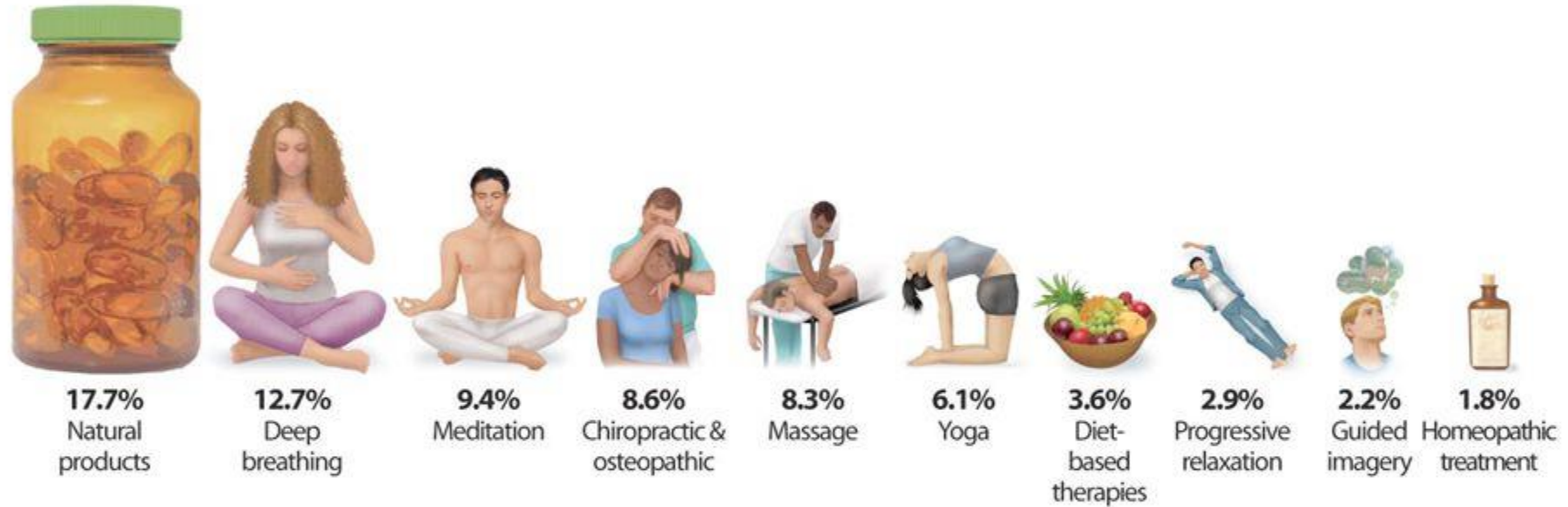


- ▶ June 2005: SCI Forum on Complementary and Alternative Medicine
  - ▶ Massage, Naturopathic Medicine, Acupuncture
  - ▶ Other topics covered since: Relaxation & Hypnosis, Medical Marijuana, Swimming and Yoga, Adaptive Recreation, Fitness, Leisure Activities, Art & Music
  - ▶ Large and diverse area of wellness and healthcare
- ▶ 2017: google "CAM SCI" = ~530,000 results!
- ▶ About 50K scholarly articles online
- ▶ Not many randomized blinded controlled studies

# Examples of CAM Based on Type



# The 10 Most Common CAM Therapies among U.S. Adults





# Definitions

- ▶ CAM = Complementary and Alternative Medicine
  - ▶ Defined as a group of diverse systems, practices, and/or products that are not generally considered part of conventional or traditional medicine, often used to treat or manage primary or secondary complications resulting from illness or injury
  - ▶ Used with (complementary) or instead of (alternative) to conventional treatment
- ▶ Integrative Medicine = blending of conventional and natural/complementary medicines and/or therapies along with lifestyle interventions and a holistic approach – taking into account the physical, psychological, social, and spiritual well-being of the person – with the aim of using the most appropriate, safe, and evidence-based modality(ies) available.
  - ▶ Practice of medicine



# Definitions



- ▶ Naturopathy = a distinct primary health care profession, emphasizing prevention, treatment, and optimal health through the use of therapeutic methods and substances that encourage individuals' inherent self-healing process
- ▶ Homeopathy = the practice of medicine that embraces a holistic, natural approach to the treatment of the sick. It is holistic because it treats the person as a whole, rather than focusing on a diseased part or labeled sickness
- ▶ Acupuncture = a holistic health technique that stems from Traditional Chinese Medicine practices in which trained practitioners stimulate specific points on the body by inserting thin needles into the skin, to manipulate the flow of energy or Qi, in order to alleviate pain or treat specific health conditions





# Background

- ▶ Survey on national sample of 830 adults with MS, CP, SCI, and OA
  - ▶ CAM practitioners consulted by 19% of patients
  - ▶ More prevalent among women compared to men
  - ▶ More common in the Western US
  - ▶ No difference in CAM use between income groups or insurance type
    - ▶ All of these patients had private insurance
  - ▶ SCI reported the lowest use among the diagnosis groups
    - ▶ More barriers to receiving CAM care?



# Background



- Conditions commonly treated:
  - Pain (especially back pain)
  - Decreased function
  - Lack of energy
- 44% of patients perceived CAM to be more effective than conventional medicine
- Dissatisfaction with effectiveness of conventional medicine
- Philosophical congruence with lifestyle
- For insured patients with disability, CAM used at similar or higher rates than general population

# Willingness to use CAM

- ▶ 2015: "Use of complementary and alternative medicine in persons with spinal cord injury in Switzerland: a survey study"
  - ▶ 103 patients with chronic (>1 year) SCI: 33 tetraplegia and 70 paraplegia
  - ▶ 54 complete, 49 incomplete
  - ▶ Data collected over 5 months
  - ▶ 74% used some form of CAM since SCI: wide variety of CAM modalities
    - ▶ Acupuncture: pain & spasticity
    - ▶ Homeopathy: UTI
    - ▶ 22% used 2 forms of CAM, 10% used more than 2
  - ▶ Indications:
    - ▶ Pain
    - ▶ Spasticity
    - ▶ UTIs
  - ▶ CAM used as a supplement rather than exclusively
  - ▶ High satisfaction 85% with CAM use for indications



# Willingness to use CAM

- ▶ Recent 2017 study at Penn State University
  - ▶ Compared beliefs and practices of SCI patients, families, and health care professionals (HCPs) towards CAM (14 modalities)
  - ▶ SCI patients and families were more likely to use and/or recommend CAM when compared to HCPs
    - ▶ Medication, yoga, relaxation/imagery, therapeutic touch/Reiki, biofeedback, massage, hypnosis, acupuncture/acupressure
  - ▶ Found a positive correlation between use of CAM and satisfaction with the alternative form of healthcare utilized



# Acupuncture



- ▶ TCM = Traditional Chinese Medicine
- ▶ Believed to have originated around 100 B.C. in China
- ▶ Came to U.S. in the 20<sup>th</sup> century
- ▶ Involves the belief that a “life force” (Qi) circulates within the body in lines called meridians
- ▶ Insertion of ~ 5-20 thin needles into the skin, left in place for 10-20 min
- ▶ Can be associated with application of heat, pressure, or laser light
- ▶ Usually used for MSK problems: LBP, shoulder stiffness, knee pain
- ▶ Often used in combination with other approaches
  - ▶ Herbs, Acupressure, Cupping, Auriculotherapy, etc.
  - ▶ Western medicine

# Acupuncture

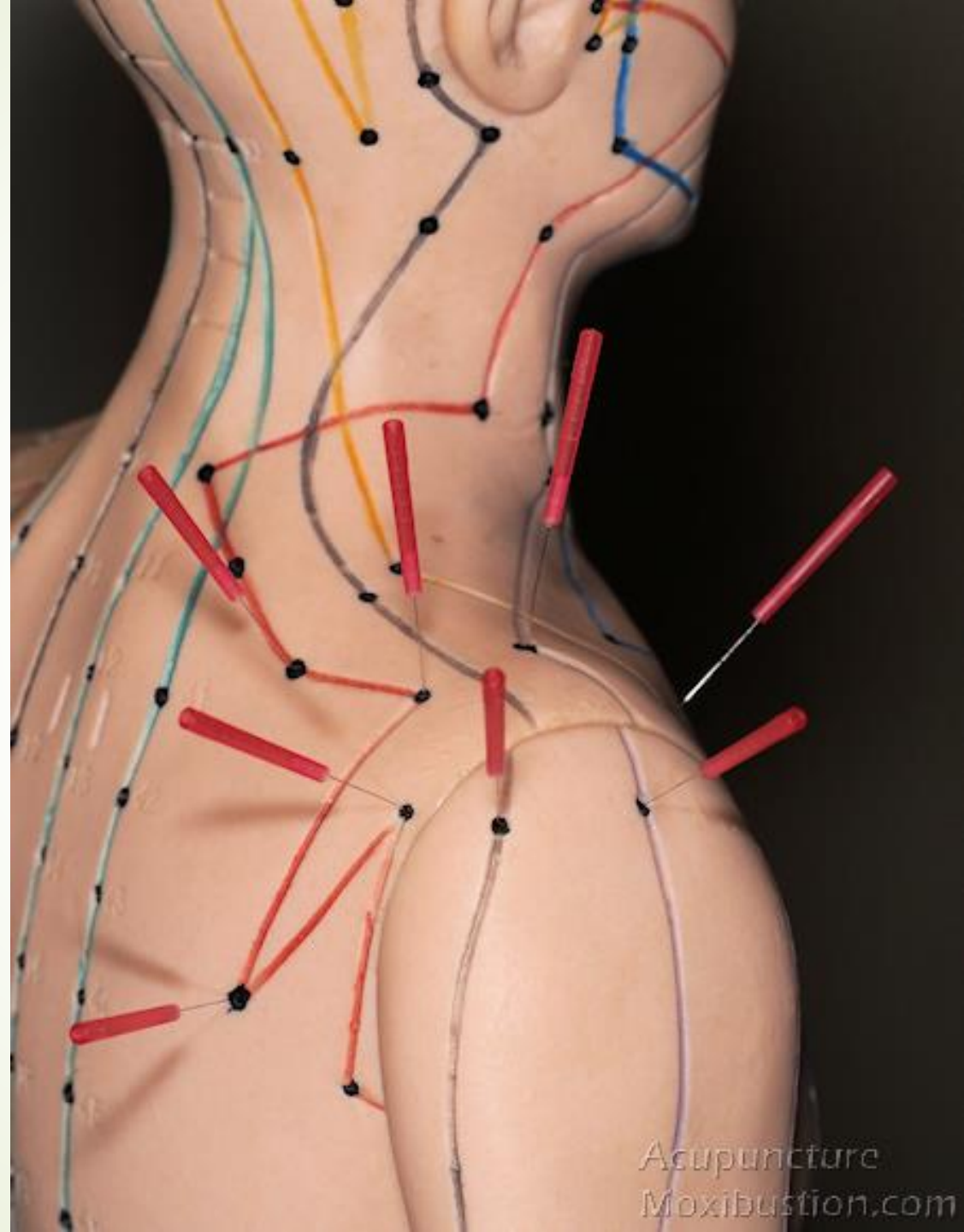
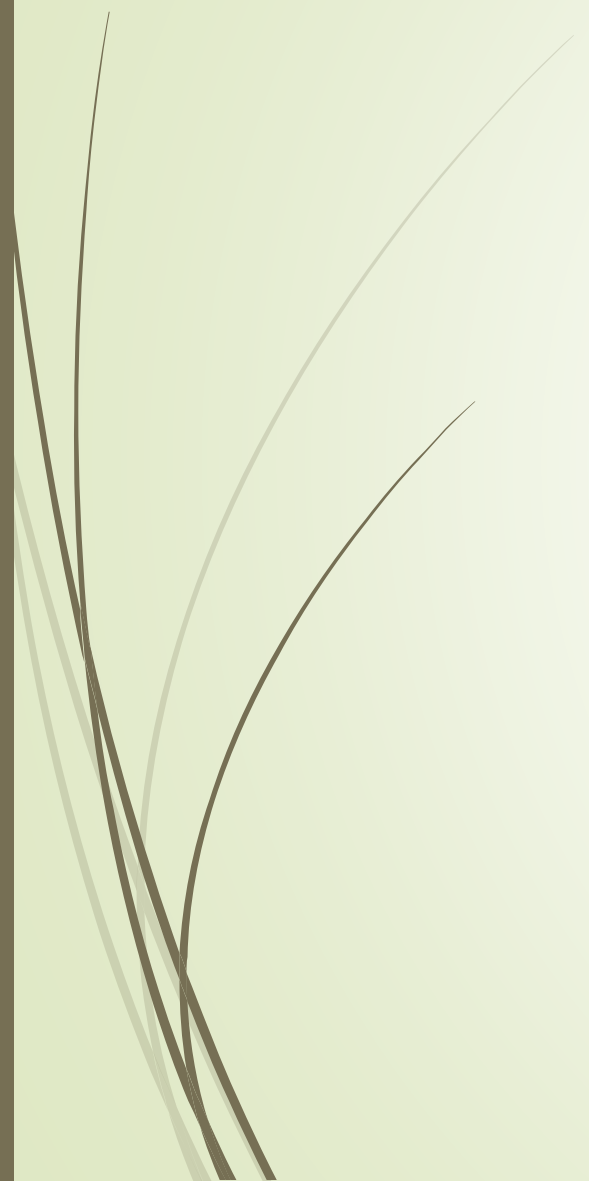
- ▶ Supine or lying on a massage table or exam bed
  - ▶ Transfers
  - ▶ Stable (rolling)
- ▶ Seated or reclined in treatment chair or WC
  - ▶ Tilt in space WC
  - ▶ Community Acupuncture Model
- ▶ SCI related risks
  - ▶ Sensation
  - ▶ Autonomic Dysreflexia
  - ▶ Orthostatic Hypotension
  - ▶ Temperature dysregulation
  - ▶ Skin integrity





# Acupuncture: Treatment for Pain

- ▶ 2001 study: moderate-severe pain of at least 6 months in chronic SCI
  - ▶ 15 acupuncture treatments over 7.5 weeks vs. no treatments
  - ▶ 46% had improved pain intensity
- ▶ 2003 study: retrospective analysis of 36 SCI patients
  - ▶ 2/3 improved pain, most burning pain below level of lesion
- ▶ 2006 study: self-reported experiences on pain relief by different interventions (massage, acupuncture, chiropractor)
  - ▶ Longer pain relief when trying alternative treatments
- ▶ 2007 study: chronic shoulder pain
  - ▶ Acupuncture vs. minimal needling of non-acupuncture points
  - ▶ Both groups had reduced pain



Acupuncture  
Moxibustion.com





# Acupuncture: Treatment of WC User Shoulder Pain in SCI

- ▶ Anywhere from 30-70% of persons with chronic SCI experience shoulder pain
  - ▶ Overuse
  - ▶ Secondary to trauma
  - ▶ Most commonly: RTC, Impingement
- ▶ 18 subjects with chronic SCI and chronic shoulder pain
- ▶ Compared 10 acupuncture treatments with 10 Trager (manual therapy focusing on bodywork and movement reeducation) treatments
- ▶ Both are effective treatments for reducing chronic shoulder pain associated with functional activities in persons with SCI



# Acupuncture: Neurogenic Bladder

- Role of acupuncture in chronic urinary retention in SCI
- Meta analysis of 3 randomized control trials including 334 patients
- Acupuncture + rehab training better than rehab training alone in decreasing PVR
- Acupuncture + aseptic intermittent cath better than cath alone in improving bladder voiding response rates
- Concluded that acupuncture may have potential effect as complementary therapy in chronic urinary retention in SCI

# Acupuncture: Neurogenic Bowel

- ▶ Wong et al. study
  - ▶ Focus on neurorecovery in SCI
  - ▶ Found: Statistically significant improvement in bowel FIM scores 1 year post-injury





# Acupuncture: Osteoporosis

- ▶ Study in subacute SCI looking at effect of acupuncture on osteoporosis in patients with SCI
- ▶ Standard therapy compared to standard + acupuncture
- ▶ Measured inflammatory markers and bone mineral density
- ▶ Bone mineral density increased after adjunctive acupuncture, but NOT statistically significant



# Acupuncture: Neurorecovery in SCI

- ▶ 2003 study by Dr. Alice Wong performing acupuncture therapies on a group of patients recovering from traumatic SCI (AIS A/B)
  - ▶ Concomitant acupuncture and auricular points 5x per week for 30min
  - ▶ Found that sensory and motor skills improved in patients who completed regimen of Oriental medicine and massage and physical therapy vs. standard rehab care
  - ▶ Improvements in motor/sensory, pinprick, FIM scores
  - ▶ Conclusion: “The use of concomitant auricular and acupuncture therapies, when implemented early in acute spinal cord injury, can contribute to significant neurologic and functional recoveries.”
  - ▶ Not double blind and unclear randomization of subjects



# Acupuncture: Neurorecovery in SCI

- ▶ 2015 systematic review and bias-adjusted meta-analysis of studies looking at overall impact of acupuncture on neurological recovery in SCI
- ▶ Included 12 RCTs from seven databases through August 2014
- ▶ Outcome measures: neurological recovery, motor function, sensory function, and functional recovery
- ▶ **Acupuncture MAY have a beneficial effect on neurological recovery, motor function, and functional recovery**
- ▶ However, the studies were generally of poor quality and there was publication bias favoring positive studies
- ▶ Need well-designed future studies to examine and confirm this



# Acupuncture: Neurorecovery in SCI

- ▶ Possible mechanisms:
  - ▶ Reduce acidic protein levels and reactive astrocyte formation
  - ▶ Reduce free radicals
  - ▶ Reduce edema
  - ▶ Reduce neuron loss
  - ▶ >> Less scar formation



# Acupuncture: Adverse Events and Side Effects

- ▶ Relatively safe and pain-free
- ▶ Possible serious adverse effects:
  - ▶ Direct spinal cord and nerve root injury
  - ▶ Subdural empyema
  - ▶ Epidural abscess
  - ▶ Epidural hematoma
- ▶ Case Report: 64yo M s/p acupuncture for left lumbar-sciatic pain
  - ▶ Presented with left sided hemiparesis and parasthesias
  - ▶ MRI: spinal epidural hematoma from C2 to T12
    - ▶ Thought secondary to venous bleeding in epidural space
  - ▶ 6 documented cases
  - ▶ Caution in patients with coagulation disorders or on blood thinners



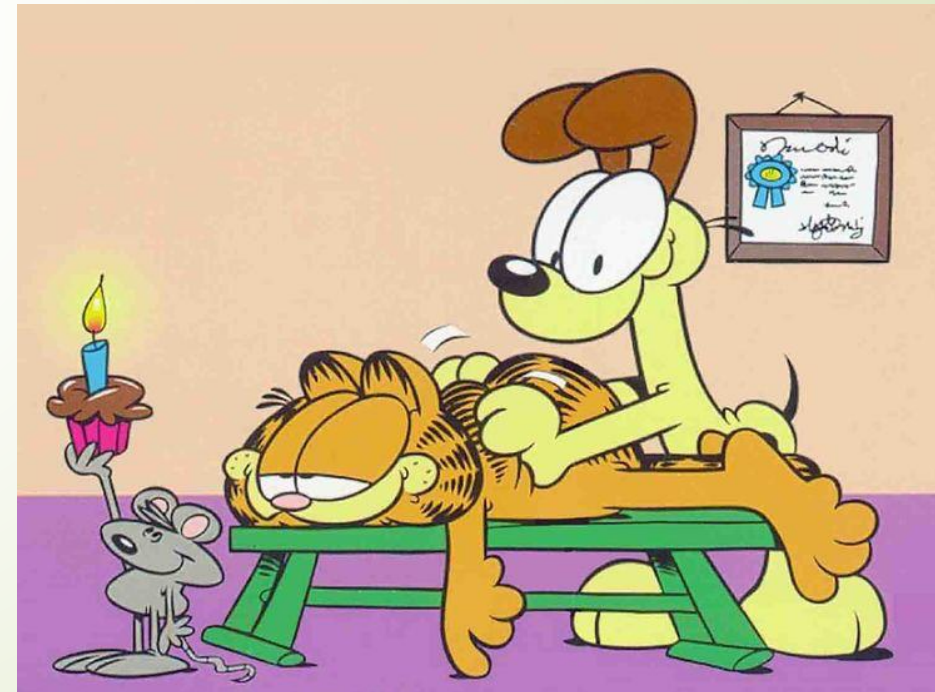


# Acupuncture: Considerations

- ▶ Potential to improve pain, motor/sensory, and bowel/bladder function
- ▶ Essentially low/no risk
- ▶ Types of acupuncture vary
- ▶ Training of acupuncture providers vary
- ▶ Research is limited
  - ▶ 2013 meta-analysis
    - ▶ 16 studies, including 2 high quality RCTs
      - ▶ 8 functional recovery, 6 bladder function, 2 pain
      - ▶ Lacking standardization of prescription for acupuncture in SCI
      - ▶ Safe non-pharmacologic treatment

# Massage

- Widely used for pain, spasticity, stress management, sports injuries, circulation, etc...
- Varied skill and experience levels among practitioners
- Rehabilitation program
  - Myofascial release
  - Spray and stretch
- Not devoid of risk
- Cost
  - Private pay vs. insurance





# Massage

- ▶ 2013 study to determine feasibility in conducting RCT of massage therapy for individuals with SCI during inpatient rehabilitation
  - ▶ Rehab nurses trained in broad compression massage (BCM)
  - ▶ Treatment group: BCM
  - ▶ Randomized control group: light touch
  - ▶ 20 min treatments: 6 sessions over 2 weeks
  - ▶ Looked at pain intensity, fatigue, and depression
  - ▶ Only 1 measure on the PHQ-9 (depression module) had a significant difference



# Massage

- ▶ 2014 systematic review found of 33 articles found that:
  - ▶ Disc herniation 16%, soft tissue trauma 11%, neurologic compromise 8%, spinal cord injury 8%, dissection of vertebral arteries 6%, bone fracture 6%, hematoma 4%, cauda equina 2.5%, pain 1% were the main complications of massage
  - ▶ Spinal manipulation has repeatedly been associated with serious adverse events
  - ▶ Incidence of such events is low, and most patient experienced full recovery

# Yoga



- ▶ **Yoga:** encompasses meditation, relaxation, breathing control, and a variety of postures
- ▶ **“Iyengar Yoga” (BKS Iyengar):** form of Hatha yoga developing physical and mental well being through stretching and activating all of the muscle groups to gain strength, flexibility, and physical balance in the form of posture (asana) and breath control (pranayama)
  - ▶ Alignment
  - ▶ Sequencing
  - ▶ Timing
- ▶ Seated or WC level
- ▶ Modify poses using: blocks, sandbags, blankets, WC position, etc.



# Iyengar Yoga: Evidence

- ▶ 2017 pilot study: 23 individuals with SCI or SCD
- ▶ 11 participants in randomized study group
- ▶ 12 wait list control group
- ▶ Yoga 2x/week for 6 weeks (seated program)
- ▶ Surveys conducted at 3 points
- ▶ Findings: reduced depressive symptoms, increased self-compassion, greater mindfulness
- ▶ Increased: sense of belonging, connectedness, purpose, acceptance of change to one's body



# Yoga



- ▶ Case Report: 59yo male patient with incomplete C3 SCI
  - ▶ Ambulatory with assistive device
- ▶ Practiced yoga for 60min sessions, twice per week, for 12 weeks
- ▶ Improvements noted in:
  - ▶ Balance
  - ▶ Endurance
  - ▶ Flexibility
  - ▶ Posture
  - ▶ Muscle strength of hip extensors, hip abductors, knee extensors
  - ▶ Performance of functional goals







# Inclusive Yoga: A Practice for Individuals with a Spinal Cord Injury



YouTube: NCHPAD





# Other




- Meditation
- Biofeedback
- Hypnosis
- Healing Touch
- Reiki Therapy
- Qi Gong
- Tai-Chi
- Chiropracty

# Do vitamins or supplements help prevent UTIs?

*And if so, which ones?.....*





# Most Used Natural Products by US Adults

- ▶ 7.8% Fish Oil/Omega 3/DHA, EPA fatty acids
- ▶ 2.6% Glucosamine and/or Chondroitin
- ▶ 1.6% Probiotics/Prebiotics
- ▶ 1.3% Melatonin
- ▶ 1.3% Coenzyme Q10
- ▶ 0.9% Echinacea
- ▶ 0.8% Cranberry
- ▶ 0.8% Garlic
- ▶ 0.7% Ginseng/Ginkgo biloba



# Cranberry

- ▶ **Cranberry:** uncertain effectiveness in preventing UTI
  - ▶ Thought to acidify urine & reduce proliferation of bacteria
  - ▶ No consensus on amount of juice or tablets, dosing, etc.
  - ▶ Caution in patients with obesity or diabetes or on anticoagulants
- ▶ VA SCI study looking at role of cranberry tablets in the prevention of UTIs in SCI patients with neurogenic bladder
  - ▶ Found a reduction in the likelihood of UTI and symptoms in those receiving the cranberry tablets
    - ▶ Frequency of UTI reduced ~30%
    - ▶ Subjects with high GFR (kidney glomerular filtration rate) or excessive mucous formation received the most benefit
  - ▶ Cranberry tablets should be *considered*



# Cranberry

## ▶ Cranberry

- ▶ 2016 review of the literature: UTIs and neurogenic bladder
- ▶ ~46K patients, retrospective study
- ▶ Only 1 study demonstrated a significant reduction in the incidence of UTI with cranberry prophylaxis in the neurogenic bladder population
- ▶ Does NOT support the use of cranberry for prevention of UTIs



# D-Mannose

- ▶ **D-Mannose:** naturally occurring sugar similar to glucose, largely excreted in the urine
  - ▶ Thought to be effective in dislodging E. Coli from the bladder wall
  - ▶ Does not kill bacteria, only displaces them
  - ▶ Evidence is weak (rat studies in the 1980s)
- ▶ 1983 study looking at effect of D-mannose and D-glucose on E. Coli with mannose-sensitive adhesins in rats undergoing diuresis
  - ▶ Levels of bacteriuria were significantly lower in rats inoculated with D-mannose within 1 day



# Vitamin C

- ▶ **Vitamin C:** thought to increase urine acidity
- ▶ Canadian Urological Association Journal study looking at best practices for the treatment and prevention of UTIs in the SCI population
  - ▶ No clinical studies which demonstrate the effectiveness of Vitamin C in improving symptoms or UTI incidence





# Methenamine

- **Cystex:** OTC UTI prevention and pain relief
  - Analgesic: sodium salicylate
  - Anti-bacterial agent: methenamine
- **Methenamine Salts:**
  - Metabolizes in the urine to ammonia and formaldehyde
  - Antimicrobial activity
  - Dependent on concentration, pH, and dwell time in bladder
  - Meta-analysis failed to show significant effect for UTI prevention
  - At this time, NOT recommended for UTI prevention



# Probiotics

- ▶ **Probiotics** = live micro-organisms & bacterial strains which may confer health benefits on the host animal, especially to the digestive system, by contributing to its intestinal microbial balance
  - ▶ “good” or “helpful” bacteria
- ▶ Common strains:
  - ▶ *Bifidobacterium lactis*
  - ▶ *Lactobacillus rhamnosus*
- ▶ Yogurt, fermented foods, supplements
  - ▶ *Live & Active Cultures Seal*
- ▶ Maintain balance
  - ▶ Modify intestinal flora
  - ▶ Decrease overgrowth of pathogenic organisms



# Probiotics

## ► Probiotics

- GI system as an immune system, regulatory system, brain
- “gut microbe-brain-skin” axis
- Assist in management of IBS, constipation, diarrhea
- Help with delayed gastrointestinal transit time (GTT), particularly large bowel
- *Lactobacillus casei* has been shown to be helpful to reduce antibiotic-associated diarrhea
- Role of probiotics in bacteriuria and infection
- May be effective as adjunct treatment of eczema
- Generally considered to be safe
- Can increase gas production



# Probiotics

- ▶ **Probiotics:** *as treatment for SCI?.....*
- ▶ 2016 Journal of Experimental Medicine from lab of Dr. Popvich: “Gut dysbiosis impairs recovery after spinal cord injury.”
  - ▶ Dysbiosis = disruption when good bacteria are depleted or overrun by bad bacteria in the gut
  - ▶ Microbiome is disrupted by damage in the nervous system
  - ▶ Probiotics contain lactic-acid producing bacteria which activate gut-associated immune cells than can inhibit inflammation
  - ▶ May release molecules that promote neuronal growth & actually boost spinal cord recovery
  - ▶ Need to rebalance the body’s defense systems, immune response, and antibody protection in the body



# Probiotics

## ► Probiotics

- Some animal model studies showing better recovery of locomotor function when given probiotic supplements
  - Injured mice treated with VSL#3 (more potent than yogurt or kefir): 225 – 900 billion bacteria per serving >>
  - Possibly suppress inflammation and help prevent biochemical damage to the spinal cord after injury >>
  - Showed less spinal cord damage and were able to regain more hind limb movement
- These results have yet to be studied and/or confirmed in humans



# Turmeric

- ▶ “The Potential of Curcumin in Treatment of Spinal Cord Injury”
  - ▶ Primary polyphenol in turmeric: curcumin
  - ▶ Thought to have anti-inflammatory and anti-cancer properties
  - ▶ Activate spinal cord neural stem cells
  - ▶ Help reduce free-radical damage of the spinal cord
  - ▶ Animal studies: showing curcumin improved neurologic recovery after SCI



# Emerging Areas for UTI Prevention

- ▶ Bladder Botulinum Toxin injections
  - ▶ Reduction in symptomatic UTIs 6 months post-injection
  - ▶ Related to decrease in bladder irritation and bladder pressures >> less bladder reflux
- ▶ Bacterial Interference
  - ▶ Intentional bladder colonization with a bacterial strain of low virulence
  - ▶ Attempt to deter uropathogenic bacterial binding, internalization, and subsequent infection
  - ▶ One trial with 27 patients: low patient compliance



# Medical Cannabis

- Medical Marijuana, MMJ, THC
  - Used since ~2000 B.C.
- Used in a variety of populations: cancer, HIV, chronic pain, neurologic conditions, palliative care
- Used recreationally
- In SCI, used for pain and spasticity
- Analgesic, anticonvulsant, and antispasmodic properties
- Dependence and addiction
- Interactions with other medications
- Side effects
- Legal and financial considerations
  - Limited research
  - Remains illegal at Federal level





# Medical Cannabis

- ▶ 2017 study looking at how MC is used by persons living with chronic conditions (i.e. RA, Crohn's disease, SCI/D, cancer) in Illinois
- ▶ Approaches to using MC:
  - ▶ 1. as alternative to using prescription or OTC medications
  - ▶ 2. complementary use with prescription medications
  - ▶ 3. as a means for tapering off prescription medications
- ▶ Findings:
  - ▶ MC complements prescription meds for symptom management, alleviates med side effects, and provides an alternative to treatment
  - ▶ MC may be used intentionally to taper off prescription meds
    - ▶ Concerns for dependence, toxicity, and side effects



# 2014 SCI Wellness Summit

- ▶ “The Use of Medical Marijuana to Manage Symptoms in Spinal Cord Injury” by Dr. Greg Carter
- ▶ “The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence of Recommendations for Research”
  - ▶ National Academies of Sciences, Engineering, and Medicine
  - ▶ Released January 2017
  - ▶ Relevant articles since 1999: >10,000 scientific abstracts
  - ▶ Arrived at nearly 100 different research conclusions related to cannabis or cannabinoid use and health
    - ▶ *“... insufficient or no evidence to support or refute... that cannabis or cannabinoids are an effective treatment for symptoms of spasticity in patients with .... spinal cord injury.”*

# Alternative Diets

- Anti-inflammatory
  - Gluten Free
  - Dairy Free
  - Whole 30
- Paleo
- Ketogenic
- Low GI
  - Slow Carb
- Vegan plant-based





# Advantages of CAM

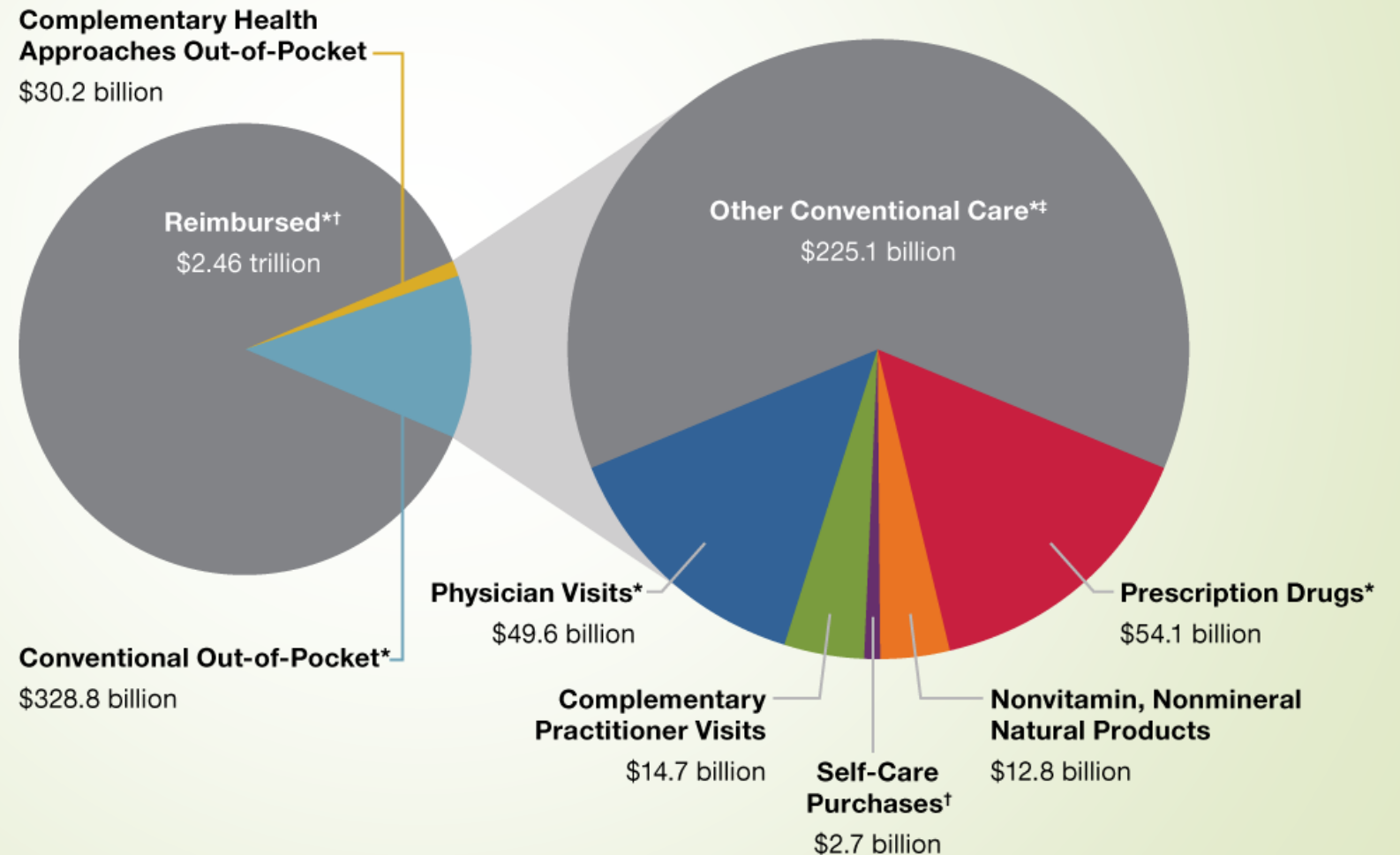
- ▶ Minimize use of pharmacologic medications & side effects
- ▶ More frequent treatments and maintenance therapies
- ▶ Delay surgical interventions and post-operative dependence
  - ▶ RTC surgery
  - ▶ CTS surgery
- ▶ More active participant in the healing process



# Barriers and Challenges

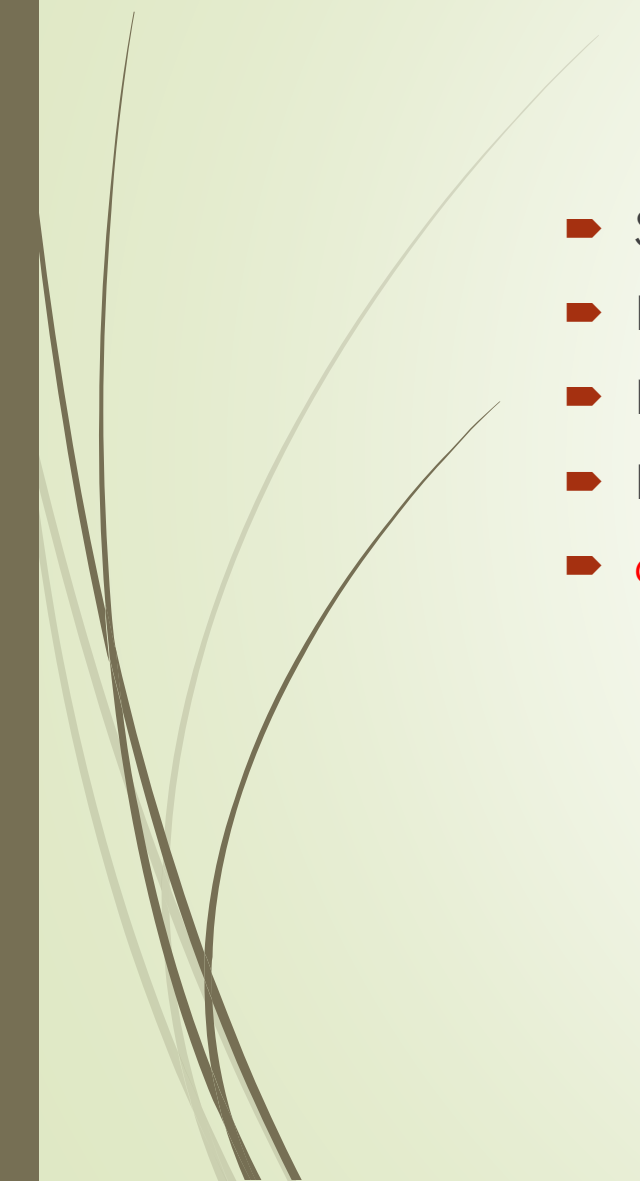
- ▶ Lack of knowledge
- ▶ Accessibility
  - ▶ WC/seated level treatments
  - ▶ Building/office access
  - ▶ Transfers
- ▶ Cost, Lack of Coverage
  - ▶ Private Insurance
  - ▶ Public or Government Programs
  - ▶ Private Pay
- ▶ Provider (HCP) unfamiliarity or lack of support
  - ▶ SCI/D unfamiliarity
- ▶ Stigma, skepticism of effectiveness

# Cost: National Health Expenditure Data for 2012





# Local Resources

- ▶ Seattle Integrative Medicine
  - ▶ Bastyr Center for Natural Health
  - ▶ Northwest Natural Health
  - ▶ Evergreen Center for Integrative Medicine
  - ▶ *and many many more.....*
- 





# National / Online Resources

- ▶ University of Alabama (UAB) Spinal Cord Injury Model System Information Network
  - ▶ Health Management section
    - ▶ CAM
      - ▶ General Overview
      - ▶ Medical MJ
      - ▶ Art and Music Therapy
      - ▶ Hypnosis
      - ▶ Acupuncture
      - ▶ Aromatherapy
      - ▶ Massage
      - ▶ Meditation
      - ▶ Herbs and Herbal Medicine
      - ▶ Spirituality



# National / Online Resources



- ▶ Christopher & Dana Reeve Foundation
- ▶ Paralyzed Veteran's Association (PVA)
- ▶ National Spinal Cord Injury Association (NSCIA)
- ▶ Disabled Sports USA (adaptive Tai-Chi)
  - ▶ [www.disabledsportsusa.org](http://www.disabledsportsusa.org)
- ▶ International Association of Yoga Therapists
- ▶ National Center on Health, Physical Activity, and Disability (NCHPAD)
- ▶ National Center for Complementary and Integrative Health (NCCIH)
  - ▶ <https://nccih.nih.gov>
  - ▶ Advice for choosing a practitioner, evaluating resources online, etc.

# Thank You

- Questions
- Shared experiences
- Contact: [juan.asanza@va.gov](mailto:juan.asanza@va.gov)

