

# Yoga and Holistic Interventions for the PCS Patient

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# Financial Disclosure

- Full time employee at Emerson Hospital
- Sole proprietor of private practice: Healthy Expression
- Receive royalties/stipend for continuing education courses on Northern Speech Services, Motivations Inc, and SpeechPathology.com
- Receive royalties for publications through Lash Associates
- Yoga instructor at Black Crow Yoga Arlington, and BAMSI

# Intention Setting

Intention, thought, action...

## Learning Objectives:

1. Describe the benefits of yoga for individuals with PCS
2. Identify potential complimentary medicine options for individuals with PCS.
3. Describe specific recommendations for sleep and nutrition to support recovery from PCS.

My Intention: Encourage a holistic lens of treatment for PCS patients to maximize rehabilitative outcomes

Your Intention: What would **you** like to get out of this course?

# Agenda

|  |               |
|--|---------------|
| <b>Optimizing Wellness with Lifestyle and CAM Approaches</b>       | <b>10 min</b> |
| <b>Lifestyle</b>   |               |
| Sleep  | 5 min         |
| Diet   | 5 min         |
| Exercise   | 2 min         |
| Yoga and PCS   | 10 min        |
| <b>Complementary and Alternative Approaches for PCS Management</b> |               |
| CAM to address specific symptoms                                   | 10 min        |
| Acupuncture  | 10 min        |
| Massage  | 5 min         |
| Counseling   | 2 min         |
| <b>Questions &amp; Discussion</b>                                  | <b>5 min</b>  |

# Optimizing Wellness with Lifestyle and CAM Approaches

*"Patients who use holistic wellness practices in addition to the standard course of rehab often demonstrate enhanced functional outcomes."*

*"Stress reduction techniques and regular physical activity are essential components to concussion recovery plan of care"*

*"I explain to all my patients that treating and managing their mental health is just as important as treating physical and cognitive symptoms after a concussion"*

*"I often see a drastic difference in severity and duration of symptoms in patients who regularly exercise vs. patients who do not."*

# Holistic Interventions, Defined

## *philosophy*

characterized by comprehension of the parts of something as intimately interconnected and explicable only by reference to the whole.

## *medicine*

characterized by the treatment of the whole person, taking into account mental and social factors, rather than just the symptoms of a disease.

*Concussion Management must be holistic due to the inherently broad impact of this diagnosis*

# Highlighted PCS Symptoms and Disorders

- Disordered sleep
- Pain
- Anxiety and depression
- Emotional lability
- Hypersensitivity to sensory input
- Executive function and attention issues



# Our patients are googling...

- Patients are savvy and self advocating
- Be informed about what the research does (and does not) say about the efficacy of lifestyle and CAM approaches
- With a strong understanding of the modalities & theoretical rationale you can more confidently provide guidance and recommendations



# Lifestyle Considerations

Sleep, Diet, and Exercise

# Optimizing Wellness

*Lifestyle modifications lay the groundwork for healing*



*We operate in a world of specialties, so who's job is this?*

# Sleep



# Sleep Disorders in TBI

- Sleep disturbances affect 30-70% of individuals with TBI, including mTBI
- Damage to sleep regulating brain areas
  - Hypersomnia: rostral pons, caudal midbrain, thalamus
  - Sleep disordered breathing: cervical cord lesions
  - Circadian rhythm: nucleus suprachiasmatica

Viola-Saltzman, M., & Musleh, C. (2016). Traumatic brain injury-induced sleep disorders. *Neuropsychiatric disease and treatment*, 12, 339–348. doi:10.2147/NDT.S69105

# Sleep Disturbances in TBI

- Insomnia
  - Most common pattern – 50%
  - Difficulty initiating or maintaining sleep
  - Delayed or irregular sleep-wake phase
- Hypersomnia
  - Post TBI sleep apnea (whiplash)
- Parasomnias
  - sleepwalking, sleep terrors, REM movement disorder
- Fatigue
  - One year post – 53% report fatigue



Viola-Saltzman, M., & Musleh, C. (2016). Traumatic brain injury-induced sleep disorders. *Neuropsychiatric disease and treatment*, 12, 339–348. doi:10.2147/NDT.S69105

# Treatment of Sleep Disorders

- Pharmacological
  - “Benzodiazapines **“should be avoided”** secondary to cognitive side effects”
  - Melatonin and other herbal supplements – limited support in research
- Psychological and Behavioral Therapies
  - Relaxation Training
  - Mindfulness Meditation
  - Cognitive Behavioral Therapy
- Strategies/Modalities
  - Biofeedback
  - Paradoxical Intention (reverse psychology – try to stay awake)
  - Sleep Restriction Therapy
  - Acupuncture
  - Sleep hygiene education

Viola-Saltzman, M., & Musleh, C. (2016). Traumatic brain injury-induced sleep disorders. *Neuropsychiatric disease and treatment*, 12, 339–348. doi:10.2147/NDT.S69105

# Sleep Hygiene

- Keep a consistent bedtime and waketime
- Make sure your bedroom is quiet, dark, relaxing, and at a comfortable temperature
- Remove screens from the bedroom
- Avoid large meals, caffeine, and alcohol before bedtime
- Get some exercise during the day
- Establish a bedtime routine (warm shower, aromatic lotion, dim lighting)
- *Difficulty falling asleep*
  - Guided relaxation, meditation (yoga nidra)
- *Frequent waking*
  - Notepad at bedside for “brain dump”

Center for Disease Control and Prevention (July 15, 2016) *Tips for Better Sleep*.  
[https://www.cdc.gov/sleep/about\\_sleep/sleep\\_hygiene.html](https://www.cdc.gov/sleep/about_sleep/sleep_hygiene.html)

# Diet



# Diet

“Nutritional targets may reduce the secondary effects of TBI such as inflammation, Reactive Oxygen Species (ROS), and neuronal cell death”

Wahls (2015) – 39 subjects with mTBI, No subjects met the recommended dietary allowances (RDAs) for all 14 micronutrients (eg folate, magnesium, vitamin C and vitamin K)

- Lower neurobehavioral scores for subjects missing the most nutrients

Wahls, T, Rubenstein L, Hall M, Snetselaar L. (2014) Assessment of dietary adequacy for important brain micronutrients in patients presenting to a traumatic brain injury clinic for evaluation. *Nutritional Neuroscience*. 12(6):252-9

# Diet

Note emerging perspectives on the gut-brain connection (Enteric Nervous System)

- Gut-brain reciprocal signaling
- Symbiotic bacteria

Ketogenic diets – Free of sugar and calorie restricted (fasting), adequate protein, vitamins, and minerals

Liver produces Ketone Bodies (acetone, acetoacetate, beta-hydroxybutyrate)

- anti-epileptic
- **Not yet studied in brain injury\*\***

Chianese, R., Coccurello, R., Viggiano, A., Scafuro, M., Fiore, M., Coppola, G., ... Meccariello, R. (2018). Impact of Dietary Fats on Brain Functions. *Current neuropharmacology*, 16(7), 1059–1085.

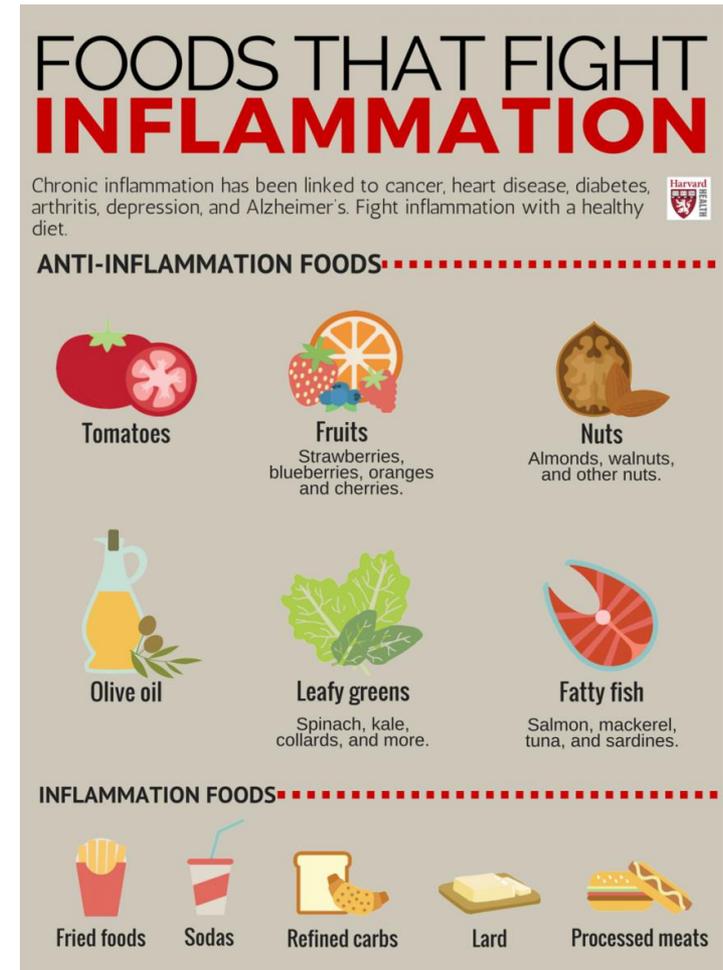
# Healthy/Anti-Inflammatory Diet

- Low sugar and artificial sweeteners
- High in “healthy” (unsaturated) fats
- Whole, nutrient dense and diverse foods

## Avoid:

- Processed foods
- ?? Gluten
- ?? Dairy
- ?? Exitotoxins
  - MSG, hydrolyzed vegetable protein, yeast extract, artificial sweeteners and colors

Chiu, T. (2018) Brain Save: The six week plan to heal your brain from concussions, brain injuries, & trauma



<https://www.health.harvard.edu/staying-healthy/foods-that-fight-inflammation>

# Diet - Supplementation

## Pre-clinical trials (Rodents and other small mammals)

- Vitamin D and progesterone: reduced inflammation and neuronal cell death
- Vitamin E: improved cognition/memory and oxidative stress
- Nicotanimide with progesterone: neuroprotection
- Folic acid: improved recovery in piglets but not mice
- Zinc: inflammation, apoptosis, autophagy, reduce depression and anxiety
- Curcumin
- Sulforaphane
- Resveratrol

# Diet- Supplementation

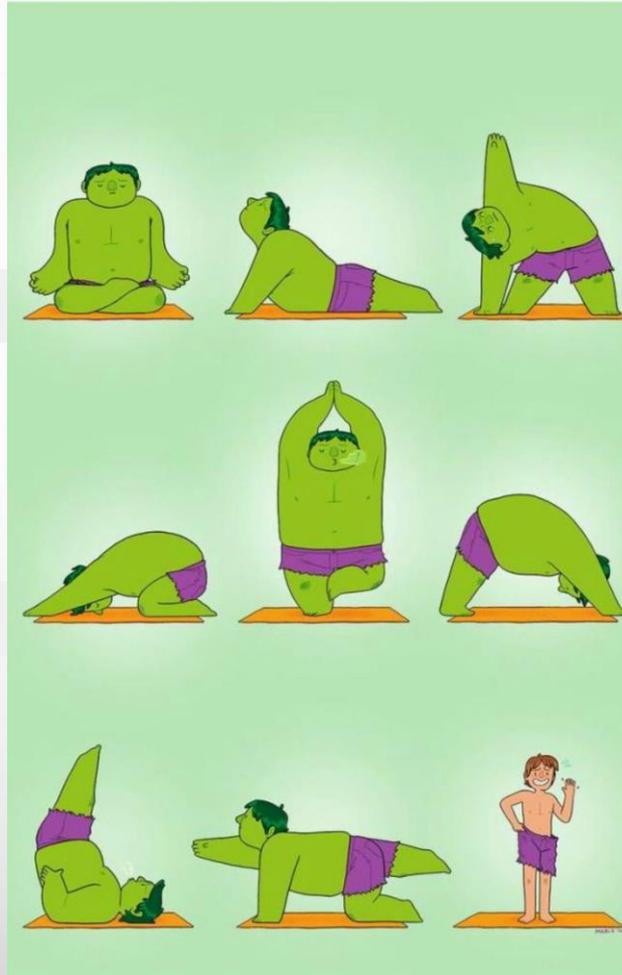
## Human Trials

- Magnesium: commonly depleted following TBI, but difficult for humans to absorb via supplementation
  - Co-administer w Mannitol may help bioavailability
  - Patients show decreased magnesium, likely contributing to sleep disturbances
- Omega 3 Fatty Acids – strong anti-inflammatory agents

Haar C, Peterson T, Martens K, Hoanes M. (2016) Vitamins and nutrients as primary treatments in experimental brain injury: Clinical implications for nutraceutical therapies. *Brain Research*, 114-129

Luke-Wold, B. Logsdon, A. Eltanahay, A., Turner, R., Bonasso, P., Knotts, C., Moeck, A., Maroon, JSupplements. Bailes, J., Rosen, C. (2018), nutrition, and alternative therapies for the treatment of traumatic brain injury. [Nutr Neurosci](#). 2018 Feb;21(2):79-91.

# Exercise



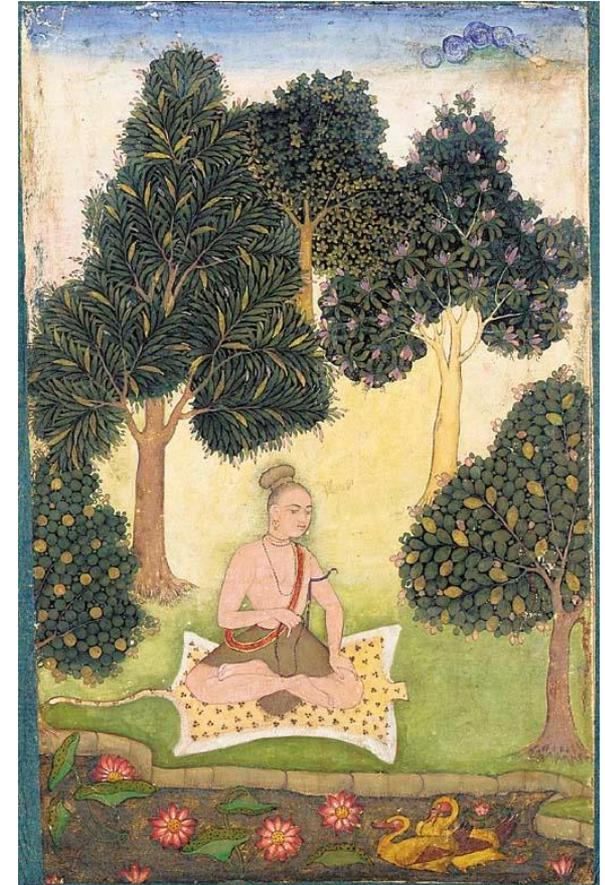
# Exercise

- Research shows that light aerobic exercise supports recovery from mTBI
- Exercise increases immune functions, decrease cellular inflammation, increases hippocampus size, decreases depression
- Promotes neuroplasticity

# Brief History of Yoga

A way to prepare the body for meditation

- Physical poses – asana
- Breathing techniques – pranayama
- Mind-body connection



# Yoga in Modern America

1. Fitness
2. Mind body connection

Many many many styles:

- Iyengar, Ashtanga, Anusara, Vinyasa, Hatha, Power, Baptiste, Bikram, Forrest, Shakti, Chakra Flow, Bhuti, Yin, Slow Flow...

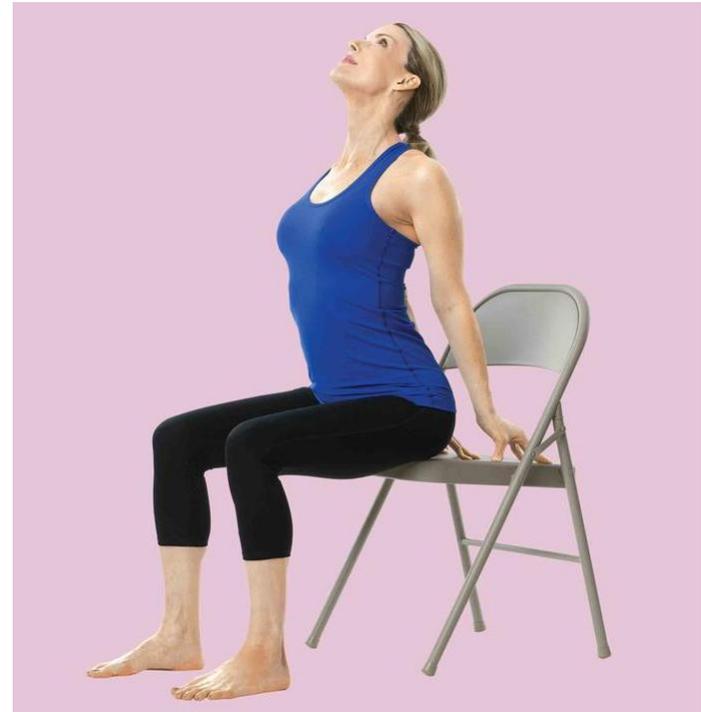
Some styles would be *excellent*  
for our patients

Some styles would be **BAD!**

**This is Yoga...**



**AND this is Yoga...**



## What to look for:

- Slow pace
- Simple flows
- Mild temperature and environment
- Focus on breathing

## Modifications for PCS

- Avoid inversions
- Avoid aggressive breath control (holding)
- Listen to your body

# Yoga Influences Recovery - pilot (2015)

**Participants:** 31 individuals s/p stroke, spinal cord injury, brain injury.

## **Methods:**

- Pilot study measuring feasibility and participant perception
- Group and/or individual yoga sessions, up to 4x/week
- Seated, wheelchair, bed, or focused on breathing only (eg spinal cord)
- Semistructured phone interview 1 month post

## **Results:**

- Adding yoga therapy to inpatient rehabilitation was feasible
- Perceived improvements in breathing, relaxation, and psychological wellbeing
- 97% said they would recommend yoga therapy

Schmid AA, DeBaun-Sprague E, Gilles AM, Maguire JM, Mueller AL, Miller KK, Van Puymbroeck M, and Schalk N (2015). Yoga influences recovery during inpatient rehabilitation: A pilot study, *International Journal of Yoga Therapy*, 25(1): 141-152.

# Love Your Brain

- Kevin Pearce – Olympic snowboarder and brain injury survivor
- 6 week Community Program
  - Yoga & Meditation (accommodations and considerations for BI)
  - Psychoeducation
  - Community Integration
- Trainings for yoga instructors and health care providers
- Outcomes research
- Clinical Affiliations



# Yoga – Quality of Life (2016)

**Participants:** 31 individuals s/p brain injury. 16 in the yoga program, 15 control (wait list)

## **Methods:**

- 8 week gentle yoga program (LoveYourBrain)
- Offered in the community
- Quality of Life After Brain Injury scale

## **Results:**

- Improvements in overall QOL and self-perception and negative emotions
- High attendance and satisfaction

Donnelly KZ, Linnea K, Grant DA & Lichtenstein J (2017). The feasibility and impact of a yoga pilot programme on the quality-of-life of adults with acquired brain injury, *Brain Injury*, 31(2): 208-214.

# Yoga – Community Based Rehab (2019)

**Participants:** 13 people with TBI who completed LoveYourBrain yoga program

**Methods:**

- Free community based 6 week gentle yoga program
- Self reported demographic questionnaire and semi-structured interview

**Results:**

- Reported improvements in strength, balance, flexibility, attentional control, self-efficacy, self-regulation
- About 50% sustained relationships built during program

Donnelly KZ, Goldberg, S., Fournier, D. (2019). A qualitative study of LoveYourBrain Yoga: a group based yoga with psychoeducation intervention to facilitate community integration for people with traumatic brain injury and their caregivers, Disability and Rehabilitation.

# Guided Practice



# Supporting Carryover of Lifestyle Changes

- Lifestyle modifications make excellent treatment goals!
  - Highly functional, measurable, great way to address cognition
- Consider cognitive linguistic status
- Patient centered goal setting
- Routines
- External aids (calendars and alarms)

# Complementary & Alternative Medicine

## (CAM Approaches)

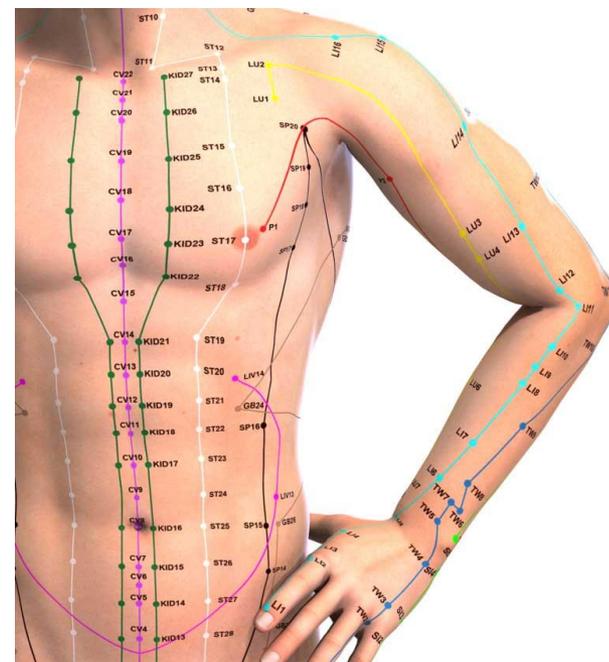
Acupuncture, Massage, and Counseling

# What is CAM?

- Complimentary and Alternative (Integrative) Medicine : “medical products and practices that are not part of standard medical care”
- “Traditional Medicine” – Chinese Medicine is 2,500 years old
- National Institute of Complementary and Integrative Health  
<https://nccih.nih.gov/>

# Acupuncture

- Technique of penetrating the skin with thin metallic needles. Manipulated by the hands or by electrical stimulation
- **Chinese Medicine:** health or illness are consequences of the state of balance of energy flow in the body “Qi”
- **Western Medicine:** needling points stimulates the neurohumeral system to release hormones and neuropeptides in the muscles, spinal cord, and brain. Influence the body’s internal regulatory system



Zollman, F.; Larson, E; Wasek-Throm, L; Cyborski, C; Bode, R. (2012) Acupuncture for Treatment of Insomnia in Patients with Traumatic Brain Injury: A Pilot Intervention Study *Journal of Head Trauma Rehabilitation* [27 \(2\): 135–142](#)

# Acupuncture for Treatment of Insomnia (2012)

**Participants:** 20 people, hx of TBI within 5 years and complaints of insomnia (15 or greater on Insomnia Severity Index)

## **Methods:**

- 8 control group: Behavioral interventions for insomnia
- 12 treatment group: acupuncture 2x/week for 5 weeks, plus behavioral
- Assessments of depression, cognitive impairment, ISI scores.
- Sleep was measured objectively with an actigraph (monitors movement).

## **Results:**

- Sleep time: no significant change
- Treatment group improved in Insomnia Severity Index Scores, cognitive scores, and depression.

Zollman, F.; Larson, E; Wasek-Throm, L; Cyborski, C; Bode, R. (2012) Acupuncture for Treatment of Insomnia in Patients with Traumatic Brain Injury: A Pilot Intervention Study *Journal of Head Trauma Rehabilitation* [27 \(2\): 135–142](#)

# Acupuncture – Cochrane Review (2013)

Studies Included: 4 RCTs, 294 participants total, all conducted in China (32 studies were excluded)

## Results:

- Acute phase: improved overall function on Glassgow Coma Scale, Glasgow Outcomes Score, motor speech functions
- Rehabilitation phase: improved overall function on Barthel Index, Modified Barthel Index, Fugl-Myer Assessment, muscle strength grading
- \*\* judged to carry high risk of bias, “methodological quality renders the results questionable”
- Cannot make conclusive judgements, further research recommended

Wong V, Che uk DKL, Lee S, Chu V. Acupuncture for acute management and rehabilitation of traumatic brain injury. Cochrane Database of Systematic Reviews 2013, Issue 3. A rt. No.: CD007700. DOI: 10.1002/14651858.CD007700.pub3

# Massage

Many patients report benefits of massage therapy to supplement Physical Therapy

## Case Study: Positive impact on concussion symptoms

- Release of myofascial tissues
- Hypertonicities in muscle groups originating from the cervical area
- Insertions in shoulder girdle
- Atlanto-occipital joint manipulation

Burns S. L. (2015). Concussion Treatment Using Massage Techniques: a Case Study. *International journal of therapeutic massage & bodywork*, 8(2), 12–17

# Counseling

- Counseling may be an important component of rehab
- Adjustment to changes in life/role since the injury
- Important for dealing with trauma which many of our patients have experienced
- Many of our patients have depression/anxiety
- After TBI over 50% have Major Depressive Disorder

# Other Modalities....

Need more research! But maybe not a bad idea ???

- Aromatherapy
- Reiki
- Biofeedback
- “Body Work”
- Float tank
- Sauna
- Music therapy
- Etc...

*With a strong understanding of the way by which many of these mind body techniques work, the clinician may feel more able to field questions and help patients weigh the pros and cons of attempting them, and set up realistic expectations.*

# Barriers/Solutions – Patient Side

- Awareness and education
- Prioritization of problem list
- Executive function disorder



# Barriers/Solutions – Clinician Side

- Availability of peer reviewed research and clinical consensus
- Time in sessions



# Questions and Comments



