Benefits of Yoga for Disorders of Gut-Brain Interaction (DGBI)

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Disclosures

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Objectives

• Understand the benefits that a Yoga and Mindfulness practice can have on patients with Disorders of Gut Brain Interaction (DGBI).

• Recognize the role stress plays in the development and expression of symptoms in certain subsets of patients with DGBIs and why yoga is beneficial.

• Stimulate interest in designing large prospective research studies to evaluate the benefits and safety of yoga therapy in DGBIs.
Gut Brain Communication

Have you ever had a ‘gut feeling’ that you should take a certain course of action?

Have you ever had a ‘gut wrenching’ experience that left you feeling sad or anxious?

Have you ever noticed that feeling of nausea or ‘butterflies in your stomach’ before a presentation?
Disorders of Gut-Brain Interaction (DGBI) Previously Known as Functional Disorders

• Defined by Rome IV Criteria (2016).
• Diagnosis based on symptoms with no definitive biomarkers or structural evidence of disease.
• Multiple disorders fall under the umbrella of DGBIs.
• Affects quality of life and is costly to the individual and Health Care System.
Gut-Brain
Bidirectional
Communication
Gut-Brain Axis

- The brain and gut send messages through nerve pathways, hormones, neurotransmitters, the immune system, and the microbiome.
  - Enteric Nervous System
  - Vagus nerve
  - ANS: Sympathetic (SNS) and Parasympathetic Nervous System (PNS)
  - Limbic System (amygdala, hypothalamus, anterior cingulate cortex (ACC))
  - Microbiome
  - Immune System

Disorders of Gut-brain Interaction

- Associated with **Dysregulation of the Gut-Brain Axis**
- Group of disorders that are classified by symptoms related to:
  - Motility Disturbance
  - Visceral Hypersensitivity
  - Altered Mucosal and Immune Function
  - Altered Gut Microbiota
  - Altered Central Nervous System (CNS) processing

Biopsychosocial Model for DGBIs

- Motility
- Sensation
- Immune Dysfunction
- Inflammation
- Altered microbiota
- Food/diet

- Early Life Trauma
- Personality trait
- Psychological state
- Life Stress
- Social support
- Coping mechanisms
- Social support

- Genetics
- Culture
- Environment
- Trauma
- Infection
- Parental Behaviors

**AMYGDALA PATHWAY**  
(threat that is a hard-wired reaction or a learned association)

- THREAT $\rightarrow$ Thalamus $\rightarrow$ Amygdala $\rightarrow$ Hypothalmus $\rightarrow$ Adrenal glands $\rightarrow$ Adrenaline $\rightarrow$ increase HR, BP, muscle tension $\rightarrow$ fight/flight/freeze $\rightarrow$ if stress prolonged $\rightarrow$ HPA $\rightarrow$ cortisol

**CORTEX PATHWAY**
.. A check on the Amygdala

- ANTICIPATION OF THREAT $\rightarrow$ cortex anticipates stress and looks for an explanation sometimes triggering a spiral of worry $\rightarrow$ Amygdala engages and triggers fight-or-flight reaction
Prevalence of DGBIs

Conclusions
- In a large-scale multinational study, we found that more than 40% of persons worldwide have FGIDs, which affect quality of life and health care use.

Graphical abstract
A global epidemiological study of functional GI disorders
- 73,076 adults surveyed (33 countries, 6 continents)
- Data collection: By Internet (24 countries, blue), by household interview (7 countries, yellow), or both methods (China and Turkey, green).

Prevalence of meeting criteria for at least one of 22 functional GI disorders (%):

<table>
<thead>
<tr>
<th></th>
<th>All Participants</th>
<th>Females</th>
<th>Males</th>
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<tr>
<td>Internet surveys</td>
<td>40.3</td>
<td>46.5</td>
<td>34.2</td>
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<tr>
<td>Household Surveys</td>
<td>20.7</td>
<td>23.1</td>
<td>18.3</td>
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Irritable Bowel Syndrome (IBS)

- Rome IV criteria
  - Recurrent abdominal pain on average at least 1 day/week during the previous 3 months that is associated with 2 or more of the following:
    - Related to defecation
    - Associated with a change in frequency of stool
    - Associated with a change in stool form or appearance
  - *Criterion fulfilled for the last 3 months with symptom onset at least 6 month prior to diagnosis

IBS

- Common Disorder of gut-brain interaction
- Estimated that 10-12% of adults in North America are affected
- More common in women and younger individuals
- 25-50% of GI visits and 10-15% of primary care visits
- Majority of patients believe that stress causes or triggers their symptoms
- Up to 50% of individuals with IBS symptoms don’t seek healthcare and individuals who do have symptoms for an average of 7 years prior to being diagnosed with IBS.

What if there was a medicine that could:

- Stimulate the parasympathetic nervous system and improve digestion
- Promote increased attention, self regulation and resilience
- Decrease psychological stress and anxiety
- Increase feelings of well-being and joy
- Improve flexibility, focus, and strength?
Yoga
Why DO Americans Practice Yoga?

- National Survey Data from 2012 showed that 94 percent of adults who practiced yoga did it for wellness-related reasons, while 17.5 percent did it to treat a specific health condition.
- 86 percent said it reduced stress.
- 67 percent said it helped them feel better emotionally.
- 63 percent said it motivated them to exercise more regularly.
- 59 percent said it improved sleep.
- 82 percent said it improved overall health and made them feel better.

Why IS Complementary and Alternative Medicine (CAM) Popular?

- Increased sense of control.
- Provide alternative to conventional therapies that have failed to alleviate symptoms.
- Attractive to patients who are unhappy with the ways their health care providers understand and explain illnesses or complaints.
- A 2018 review by Gan et al. reported prevalence of CAM for GI disorders to range from 23.6% - 44%, with the biggest users being women with higher incomes and education.

The word Yoga is derived from the Sanskrit “yaj” translated as ‘union’, ‘to yoke’, or ‘to join’. The goal of yoga is to achieve union of body, mind, and spirit.

- **Yoga is a Practice:** Physical discipline linking postures (asanas) with breath (pranayama)
- **Yoga is a State:** The state of yoga is a state where you are no longer a prisoner to the fluctuations of the mind.”Yoga chitta vritti nirodha” Sutra 1.2.
- **A Philosophy:** Borrowing from multiple sources (Vedas, Bhagavad Gita, Upanishads, Patanjali’s Yoga Sutras).
Benefits of Yoga

- Improved strength/flexibility
- Activation of PNS
- Increase vagal tone
- Downregulation of HPA axis
- Microbiome
- Decrease inflammation
- Improved circulation
  - Self regulation
  - Mindfulness
  - Resilience
  - Well-being
  - Neuroplasticity
  - Change in pain perception
  - Neurotransmitters
- As Socrates said ‘Know thyself’
- Understanding your dharma (purpose)
- Connection/Union

Integrative Medicine: Brings together conventional and complementary approaches for a holistic, patient-focused approach
Effect of Yoga in the Therapy of Irritable Bowel Syndrome: A Systematic Review

Dania Schumann,* Dennis Anheyer,* Romy Lauche,* ‡ Gustav Dobos,* Jost Langhorst,* and Holger Cramer,* ‡

- 6 RCTs with a total of 273 patients were included in the qualitative analysis. There was evidence for a beneficial effect of a yogic intervention over conventional treatment in IBS.
- The findings of this systematic review suggest that yoga might be a feasible and safe adjunctive treatment for people with IBS. Nevertheless, no recommendation can be made regarding yoga as a routine intervention for patients with IBS because of major flaws in study methods.
ACG Clinical Guideline 2020

• From the ACG Clinical Guideline: Management of Irritable Bowel Syndrome 2020
  
  – Recommendation: “We suggest that gut-directed psychotherapies (GDPs) be used to treat global IBS symptoms.” (Conditional recommendations; very low-quality evidence)
    • Cognitive behavioral therapy (CBT) and Gut-directed hypnotherapy
  
  – “behavioral interventions, offered in conjunction with effective medical and dietary therapies, are relatively low risk, and despite low quality evidence their NNT collectively remains 4 when the validated IBS symptom severity scale (IBS-SSS) is used as a primary outcome measure.”
Randomized Clinical Trial: Yoga vs a Low-FODMAP Diet in Patients With Irritable Bowel Syndrome

- Fifty-nine patients with irritable bowel syndrome.
- Single-blind, randomized controlled trial involving yoga or a low-FODMAP diet for 12 weeks.
- Primary outcome was change in GI symptoms (IBS-SSS).

Conclusions

- Patients with irritable bowel syndrome might benefit from yoga and a low-FODMAP diet, as both groups showed a reduction in gastrointestinal symptoms.

• Results:
  
  – 175 records identified, 15 met inclusion criteria.
  
  – Studies reported on seated or gentle yoga that included breath work, meditation, mantra repetition, or breathing exercises. For 14 of the 15 studies, study retention was 70% or higher.
  
• Overall, studies reported significant improvements in PTSD symptoms in participants in these interventions.
Postures (Asanas)

Warm Up

- **Benefits**
  - Tones abdominal and spinal muscles
  - Connects movement with breath
  - Improves gas, bloating, and discomfort
  - Encourages circulation to gut

- **Poses**
  - Cat Pose (Majaryasana)
  - Cow Pose (Bitilasana)
  - Wind-removing Pose (Apanasana)
  - Reclining hand-to-big toe Pose (Supta Pandangusthasana)
  - Happy Baby Pose (Ananda balasana)
  - Crocodile Pose (Makarasana)
  - Child’s Pose (Balasana)
  - Down Dog (Ado Mukha Svanasana)
  - Gate Pose (Parighasana)
Postures (Asanas)  
Backbends

• Benefits
  – Gentle pressure in prone backbends helps stretch abdominal muscles and strengthen lumbar support
  – Encourages circulation to the gut
  – Relieves abdominal cramping

• Examples
  – Cobra pose (Bjugangasana)
  – Sphinx pose
  – Locust pose (Shalabhasana)
  – Bow pose (Dhanurasana)
  – Bridge pose (Setu bandha sarvangasana)
Postures (Asanas) Twists

- **Benefits**
  - Gentle compression and release brings blood flow and encourages peristalsis and motility
  - Strengthens muscles surrounding the internal organs
  - Improves bloating and encourages movement of gas
  - Relieves tension around abdomen (reclined abdominal twist)

- **Postures**
  - ½ Lord of the Fishes Pose (Ardha Matsyendrasana)
  - Marichi’s Pose (Marichyasana)
  - Reclined Abdominal twist (Jathara Parivartanasana)
Standing Postures

- Benefits
  - Strengthens pelvic floor and core
  - Strengthens and tones muscles surrounding abdominal organs
  - Gentle compression and release encourages circulation

- Postures
  - Warrior I, II, III (Virabhadrasana I, II, III)
  - Triangle and Revolved Triangle (Trikonasana and Parivrtta Trikonasana)
  - Chair and Revolved Chair (Utkatasana and Parivrtta Utkatasana)
  - Revolved Side Angle (Parivrtta Parshvakonasana)
Postures (Asanas)
Forward Folds

- **Benefits**
  - Stimulates Parasympathetic Nervous System
  - Improves vagal tone
  - Tones the abdomen and pelvic floor

- **Postures**
  - Seated forward fold (Paschimottanasan)
  - Standing forward fold (Uttanasana)
  - Intense Side Stretch (Parsvottanasana)
  - Head to Knee Pose (Janu Sirsasana)
  - Prasarita Padottanasana (Wide legged forward fold)
Pranayama (Breathing Practices)

• **Benefits**
  
  – Tool for self-regulation. Redirects attention to present.
  
  – Breaks common pattern of ‘over breathing’ associated with stress and SNS stimulation.
  
  – Exhale longer than Inhale stimulates PNS.
  
  – Creates space between a stimulus and our response.
  
  – Changes relationship to stress and pain.
  
  – Diaphragmatic breathing improves lung capacity and vagal tone.
Relaxation

- **Benefits**
  - Soothes the nervous system
  - Allows for integration of practice

- **Postures**
  - Corpse Pose (Savasana)
  - Legs-up-the-wall pose (Viparita Karani)
  - Reclined Cobbler’s Pose (Supta Baddha Konasana)
Mindfulness Meditation

Mindfulness Meditation IS:
- Paying attention
- On purpose
- In the present moment
- Without judgement

Mindfulness Meditation IS NOT:
- The cessation of thought
- Thinking intently about something
Amygdala Pathway

• Less likely to react to threat or trigger as strong a fight-or-flight response.

• Amygdala is smaller and less reactive in people who practice mindfulness consistently

Cortex Pathway

• Cortex not as likely to anticipate threat.

• Mindfulness strengthens awareness and attention centers of cortex.

• Negative thoughts are less likely to trigger the amygdala

Effects of mindful-attention and compassion meditation training on amygdala response to emotional stimuli in an ordinary, non-meditative state

Gaëlle Desbordes¹,²*, Lobsang T. Negi³, Thaddeus W. W. Pace⁴, B. Alan Wallace⁵, Charles L. Raison⁶ and Eric L. Schwartz²,⁷.

Mindfulness-Based Stress Reduction (MBSR)

- Founded by Dr. Jon Kabat Zinn at the University of Massachusetts Medical Center.
- Author of multiple books on mindfulness and founded the Center for Mindfulness
  - Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness, Wherever You Go, There Your Are, Falling Awake
Food for THOUGHT: We Need Well Designed Studies to Evaluate the Benefits of Yoga in the Treatment of DGBI

- Future studies
  - Well designed studies that limit bias and report adverse events.
  - Utilize Rome Criteria for diagnosis.
  - Have clearly defined measurable endpoints using validated tools for measuring outcomes in IBS.
  - Use an intelligently designed Hatha Yoga sequence that incorporates breathing, postures, mindfulness meditation, and relaxation to target the gut/brain connection.
  - Include a comparison group and be performed 2-3x /week for at least 12 weeks with follow-up of at least 12 weeks.

Summary

• Yoga is a holistic therapeutic practice that has positive effects on DGBIs in the physical, psychological, and spiritual domains.

• Being knowledgeable about the benefits of CAM therapies improves the patient-provider relationship and expands the toolbox available to providers for the treatment of DGBIs.

• More well-designed studies are needed to show evidence of the benefits and safety of yoga as a complementary therapy for DGBIs.
“You can’t stop the waves from coming but you can learn to surf.”

–Jon Kabat-Zinn
NAMASTE!