Exploring the Neurobiology of Mind-Body-Spirit Unity

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“There is one addition that is indispensable to control this active body, or machine, and that is the mind. With that added, the whole machinery then works as man. The three, when united in full action, are able to exhibit the thing desired- complete”

A.T. Still DO

Our emotions and stresses become the fabric of our physiology

Our thoughts and feelings become chemicals and hormones

Our fears neural impulses reaching out to all areas of our body
Mood Effects on Inpatient Outcomes

- 73% risk of being readmitted
- Two fold increase risk of death
- Heart failure patients with more adverse prognosis
- Longer length of stay
- More falls
- Predictor of mortality in dialysis patients
Mood Effects on Outpatient Health

**Depression and Anxiety**

- Strongest predictor of decline in health status
- COPD patients: worse QOL and increased 3 yr mortality
- DM: increased risk of mortality, increased risk of micro/macrovascular complications
- Increased risk of stroke, MI and cardiac death
- Increased risk of all-cause mortality
- Severe mental disorders experience a 10-20 year life expectancy reduction

**Mechanisms**

- Health behaviors
- Non-adherence to treatment plans
- Alterations in physiology
- Heightened SNS activity
- Increased inflammation and hypercoagulability
- Endothelial dysfunction
STRESS

Primary Stress Hormones (HPA Axis)

Disregulation of Biological Pathways (insulin, glucose, lipids, neurotransmitters)

Impact to all major systems (organs, tissues, cells, DNA)
Trauma

• Altered chemical & hormonal networks, nerve firing patterns and processing of sensory information
• pre-verbal
• Function changes:
  • DLPFC
  • hippocampus
  • Thalamus
  • Amygdala
  • MPFC
  • Insula

Shift treatment to focus on strategies that bring regions of the brain back on-line
• 5 senses
• Chemical and electrical signals leading to alertness, fear, danger, comfort, security, love
• Our senses are linked to multiple pathways
  • Smell
  • Hearing
  • Touch
    • Oxytocin
Vagus nerve

- Afferent
- Interconnected with pathways that affect mood, memory and sense of self

Vagal Nerve Stimulation

Polyvagal theory

Autonomic nervous system integrated via neural circuits to striated muscles of the face and head

Social engagement system

Neuroception
Movement

How can we alter our neurobiology?
Process trauma?
Improve resilience and decrease stress?
Exercise

• Depression- neurobiological changes in the monoamine system, HPA axis, neurogenesis and neuroimmune system

• **Monoamines**
  - Endogenous Opioids, serotonin, NE, EPI, dopamine

• **Increase Growth (Neurotrophic factors)**
  - VEGF, BDNF, GDNF

• **Prevent Degeneration (Neuroprotective)**
  - Serotonin, Kynurenine pathway, Inflammation (cortisol & immune function), oxidative stress

• **Complex Neuro Circuitry**
  - multi synaptic circuits to movement, cognition and adrenal medulla

• **Neuroplasticity**
  - exercise leads to blood flow, trophic factors, immune function
Mindful Movement

• Window of Tolerance

• How you show up on your mat is how you show up in life

• Default Mode Network

• Challenge Vs. Threat

• “The Asana begins the moment you want to come out of it” B.K. S Iyengar
Power Poses

• “Where our bodies lead, our minds and emotions will follow”

• Slumped vs. upright posture
  • Confidence, self esteem, mood, productivity, memory, pain perception
  • Proprioceptive, interoceptive, vagal

• Can posture effect not only our musculoskeletal health and emotions - but decrease our stress response
Meditation

- Disrupts
  - stress pathways
  - automatic reactions and patterns
- Focused attention
  - strengthen neurologic pathways
Brain Structural & Functional Changes

- Thicker cortices
- Diminished age-related atrophy
- Increased gyrification
- Larger prefrontal cortex, insula, hippocampus, and cingulate cortex
- Smaller amygdala
- Areas of mood regulation, response control, learning, and memory
Mindful, stabilized attention creates stronger pathways to our self, identity and consciousness.

- Top Down Approach
  - Consciousness
- Bottom Up Approach
  - Interception
  - Physiologic safety
- Neuroplasticity
Telomere -TTAGGG
Breath

“What we call “I” is just a swinging door, which moves when we inhale and when we exhale”

~SHENRYU SUZUKI

Within each breath is a Stillpoint

Dysfunctional Respiration

- mouth breathing
- hyperventilation
  - altered ph
  - altered SNS
- less O2 delivery
- increase in anxiety
- thoracic breathing pattern
  increased tension

The way we breathe directly effects our emotional state
• Respiratory Sinus Arrhythmia and oscillations

• Slow deep breathing increases parasympathetic tone

• Improves HRV-autonomic flexibility

• 6 breaths per minute is the magic frequency
  • highest oscillations in heart rate variability
  • Most efficient gas exchange

• Alters baroreceptor activity
  • Connection with the amygdala

• Vagal Afferents

• Oscillations in treatment
“I don’t sing because I’m happy- I’m happy because I sing” ~William James
Community

- Loneliness leads to higher health care utilization in elderly
- Social isolation associated with an increased risk of CAD and stroke
  - comparable to smoking
  - greater than obesity and hypertension
- Loneliness and social stress activates the HPA axis
- Can lead to brain changes
- Powerful protection against trauma
Movement, Breath, Meditation, Mantra

• Get people moving
  • And Encourage good posture
• Teach them how to breathe
• Begin a daily meditation practice
• Chant, sing, pray
• Become part of a community
  • Social support

• For your neurobiology, physiology and life!
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