

# How PTSD Impacts *Sleep*

Sherri Kozubal,  
RRT, CRE, RPSGT, CCSH, CHt

# Objectives

What is Post Traumatic Stress Disorder?

Understanding the mechanisms and role of sleep.

Characteristics of sleep with PTSD.

Applications of mindset and breathwork in minimizing the impact of PTSD on sleep.

# Post traumatic stress disorder (PTSD)

- APA definition: a disorder that **may** result when an individual lives through or witnesses an event in which they believe that there is a threat to life or physical integrity and safety and experiences fear, terror, or helplessness.
- May occur from secondhand trauma as when loved one in danger or from repeated exposure.
- Subtypes are Chronic PTSD(symptoms persist >3mos) and Delayed PTSD(symptom onset 6months from event).
- Classified as a Trauma and Stressor Related Disorder (DSM5).



# Trauma

## The Event:

- Sudden, life threatening or perception of life-threatening events or experiences.
- Can be primary, secondhand, or repetitive in nature.

## The Effect:

- Post traumatic reactions are dependent on resiliency and generally short lived (< 1month).
- Symptoms < 4 weeks = Acute Stress Disorder.
- Symptoms > 4weeks = PTSD

# Symptoms of PTSD

## 4 Core Symptom Clusters (DSM-5)

1. Recurrent, involuntary and intrusive recollections of the event
2. Avoidance of stimuli associated with the trauma
3. Negative Alterations in cognitions or moods associated with the event, or numbing (or both)
4. Alterations in arousal and reactivity, including a heightened sensitivity to potential threat.

Symptoms lasting less than 4 weeks = Acute Stress Disorder.



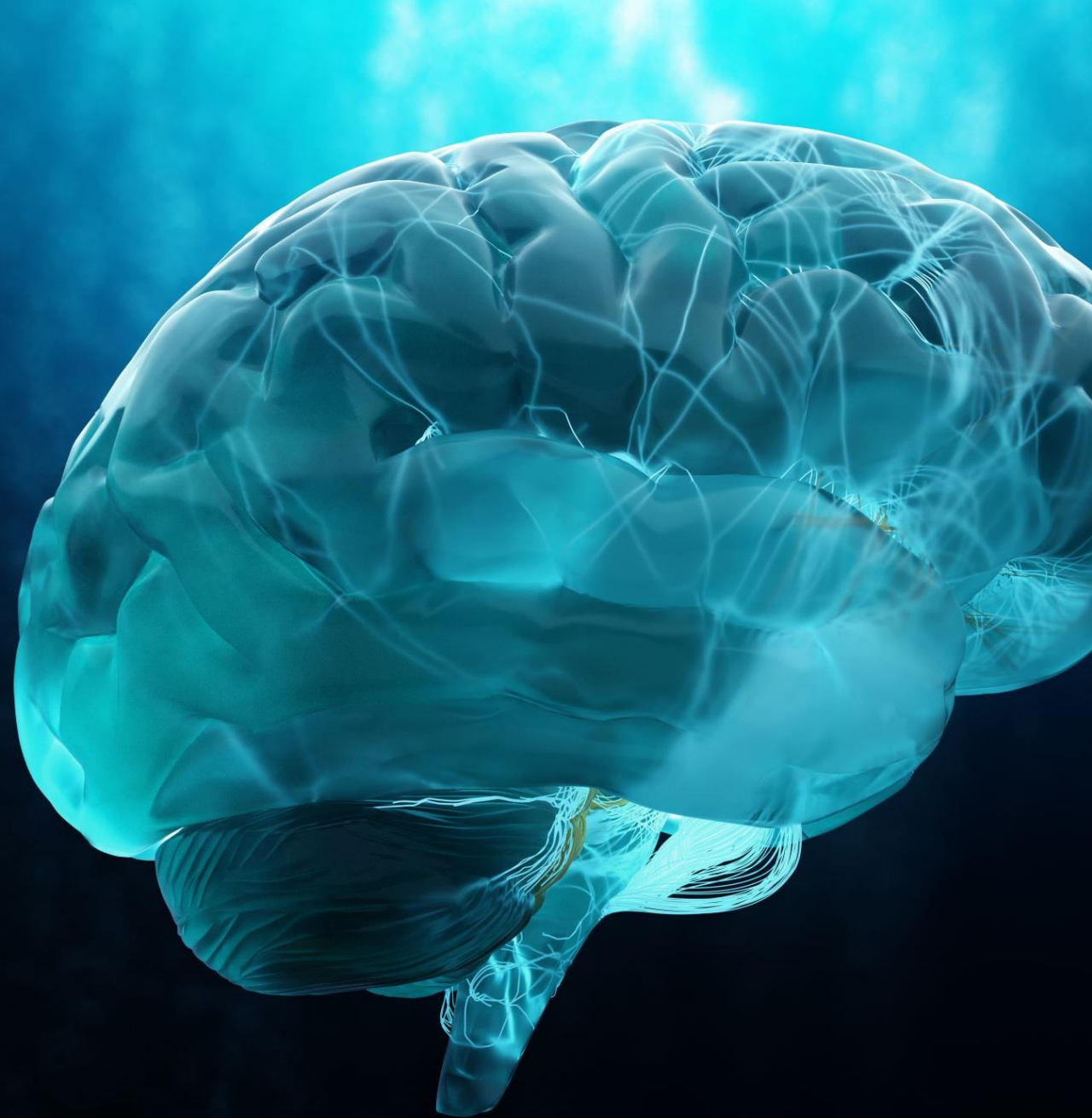
# PTSD Statistics

- **Lifetime Prevalence:** About 6% of American adults will experience PTSD at some point in their lives.
- **Gender Differences:** Women have a lifetime PTSD prevalence rate of 9.7%, compared to 3.6% in men.(sexual trauma)
- **First Responders:** Approximately 30% of first responders have mental health problems such as PTSD. 10 - 15% of those are actually diagnosed PTSD.
- More than 80% of first responders go through traumatic events while on the job.

# The Physical changes of PTSD

- Hippocampus: disrupted time and place tagging of memories = flashbacks; disrupted storing of fragmented memories = intrusive memories.
- Somatic memories: flashbacks with physical sensations such as choking, pushing, smell.
- Amygdala (no ability to distinguish between memory and real time threat): elevated secretion of neurotransmitters norepinephrine and serotonin (fight/flight reflex).
- Heightened activity in prefrontal cortex (difficulty regulating emotions).

Result is persistent anxiety, hypervigilance, and attempt to resolve the past.





# Subjective Experience of Brain Activity

**High Beta** - very focused, Alert, or Agitated (mind-body functions)

**Low Beta** - Integrated Focus and Relaxed (inhibited by movement)

**Alpha** - Induces calm for anxiety, creativity and mental resourcefulness are at their peak.

**Alpha-Theta border** - Abstract thinking, sensations (NLP), and self-control.

**Theta** - Intuition, recall, imagery, daydreaming, drowsy; “oneness”

**Delta** – Deep body relaxation, no conscious awareness.

**Gamma** – Calm, intense focus, “spiritual awakening”, listening to music.



# Sympathetic vs Parasympathetic Response

- Sympathetic tone is your fight/flight mode
- Parasympathetic tone is your rest/digest mode.
- We use both systems at all times but predominantly appropriate to the task.
- Thoughts and brain function determine which is predominant.
- Awareness can drive the tone for best response.





# Anxiety

- APA Definition: an **emotion** characterized by feelings of tension, worried thoughts, and physical changes like increased blood pressure.
- “Fight/Flight Mode”.
- Anxiety is a **future-oriented**, long-acting response broadly focused on a diffuse threat.
- Fear is a present-oriented, and short-lived response to a clearly identifiable and specific threat.

# APA Clinical Guideline for Treatment of PTSD

## **4 Strong Recommendations:**

- Cognitive Behavioral Therapy (CBT)
- Cognitive Processing Therapy (CPT)
- Cognitive Therapy (CT)
- Prolonged Exposure

## **4 Conditionally Recommended:**

- Brief Eclectic Psychotherapy (BEP)
- Eye Movement Desensitization and Reprocessing Therapy (EMDR)
- Narrative Exposure Therapy (NET)
- Medications (Sertraline, Paroxetine, Fluoxetine, Venlafaxine).

<https://www.apa.org/ptsd-guideline/treatments>



# What is Normal Sleep?

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Many factors: quality, timing, and duration.

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High Individual variability due to age, gender, cultural, demography and geography.

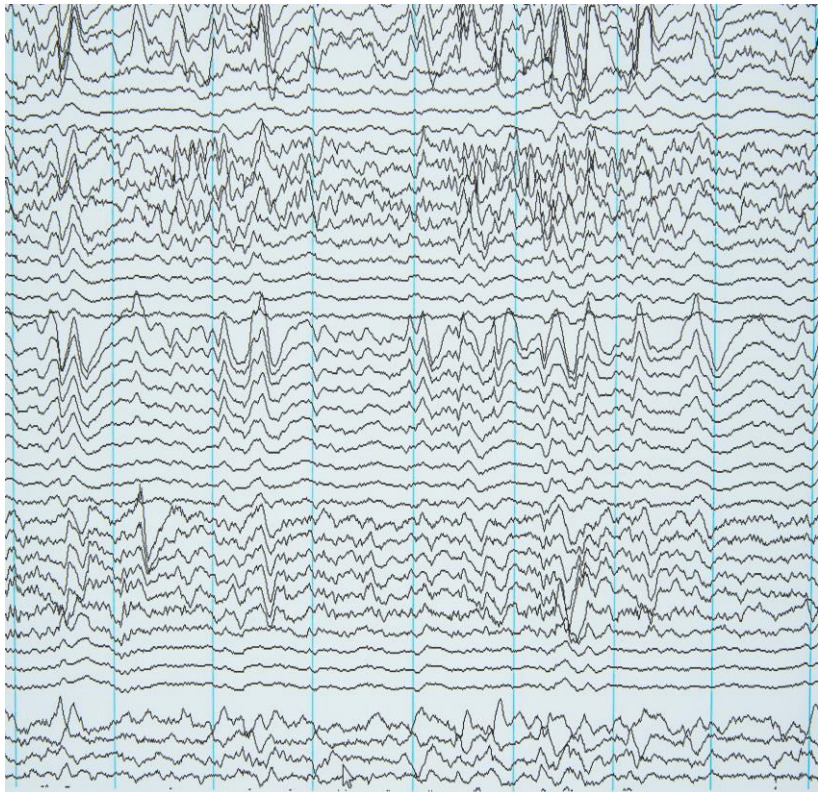
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Duration is influenced the most by all these factors.

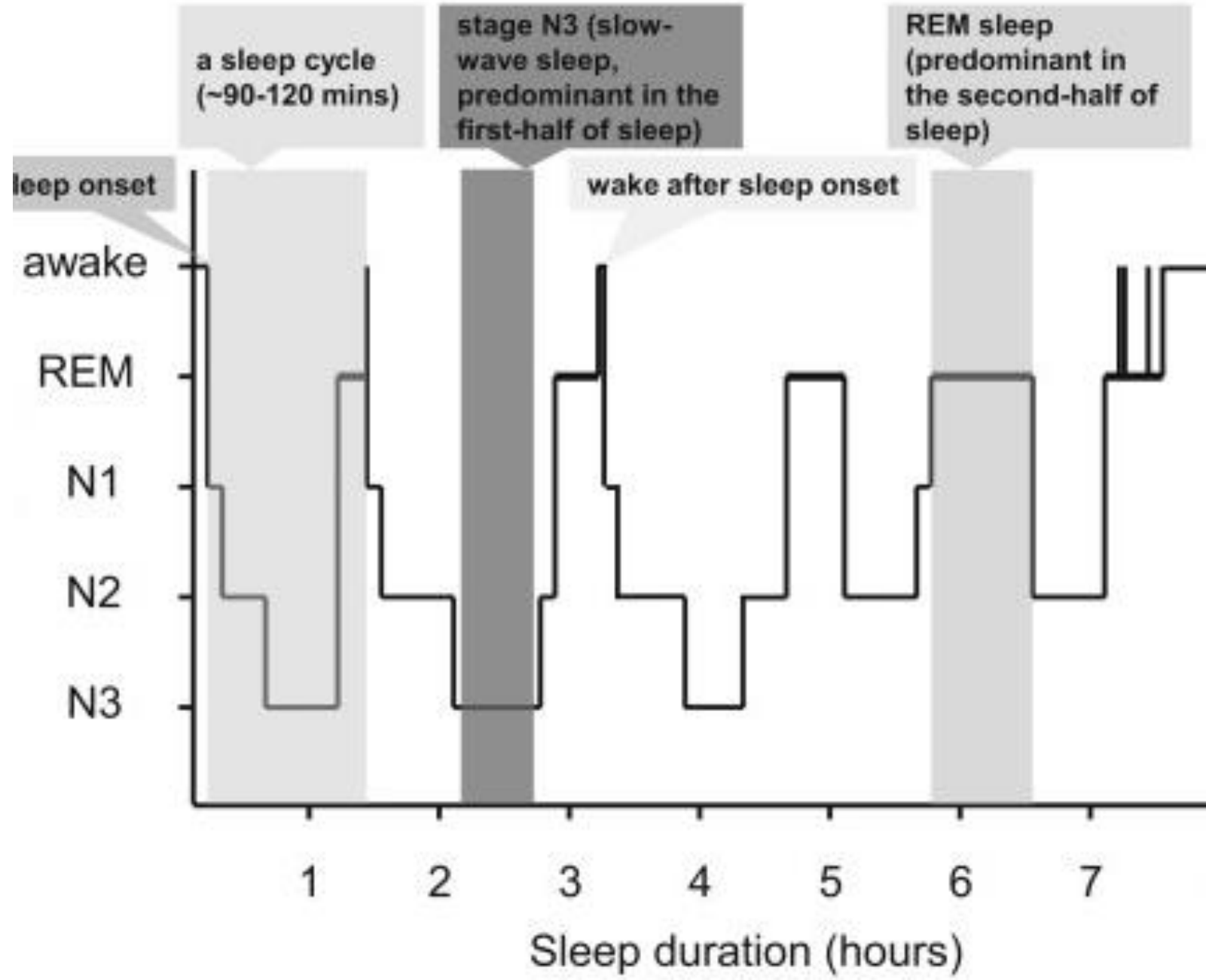
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Basis of AASM consensus for sleep amount necessary to support optimal health in adults as 7 – 9 hours.

# Sleep is like a dance



## Normal sleep architecture





# Progression of Consciousness: Falling Asleep

## Wake:

**High Beta** = ruminating, planning, fight/flight

**Low Beta** = quiet conversation

**Alpha Wave Activity** = close eyes and  
cleansing breath

## Sleep:

**Alpha-theta border** = NREM 1 Sleep

**Theta Wave Activity** = NREM 2 Sleep

**Delta Wave Activity** = NREM 3 Sleep  
(Growth Hormone).

**Theta Wave Activity** = REM Sleep

# Theories of sleep

**We dream in both NREM and REM. The difference is apparent in the theme.**

**NREM = Shopping list dreams, (body repair)**

**REM = Saving the world dreams (brain repair, processes emotions, consolidates memory)**

**There are many studies and theories around the function of NREM and REM for brain health and body.**

**We know that long term memory consolidation happens in NREM 3 and REM sleep.**

**We also are aware of “waves” of CSF that “wash” the brain with the largest amplitude waves, during Stage 3 sleep.**



# Sleep After Trauma

The image is a composite of two photographs. The left side shows a young child with brown hair sleeping peacefully, resting their head on a light-colored dog. The right side shows a young girl with long brown hair sitting at a desk, covering her face with both hands in a gesture of distress or despair. On the desk in front of her is an open notebook and a red marker. The background of the right side shows a bookshelf filled with books and a wooden door.

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Focus is on possible future threats and no estimate of resolution.

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Stuck in sympathetic tone.

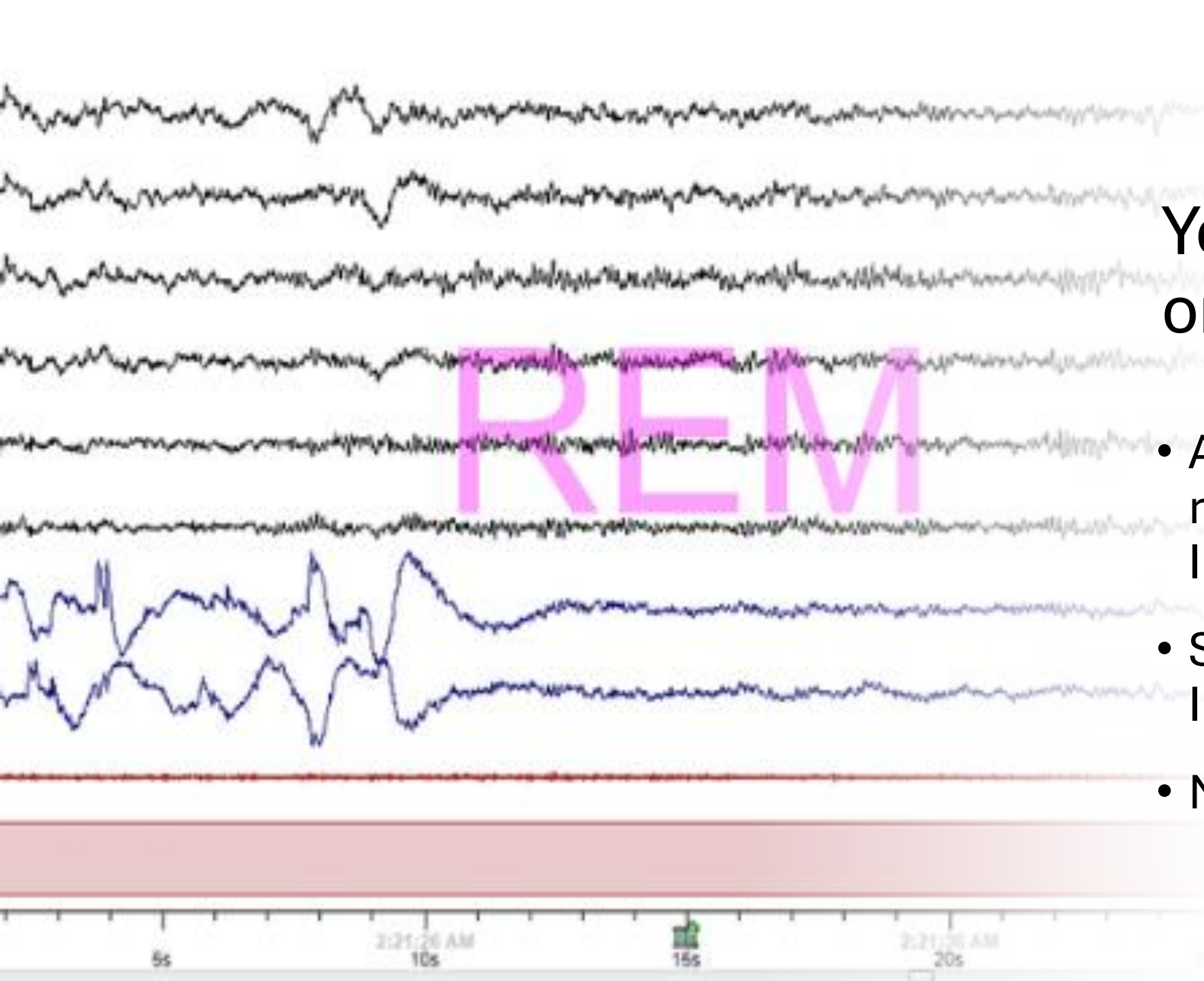
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Flashbacks in daytime, Nightmares at night.

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Non-restorative and interrupted.





## Your sleep brain on PTSD

- Alpha Intrusion: Non-restorative sleep, Insomnia
- Sleep fragmentation: Insomnia
- Nightmares

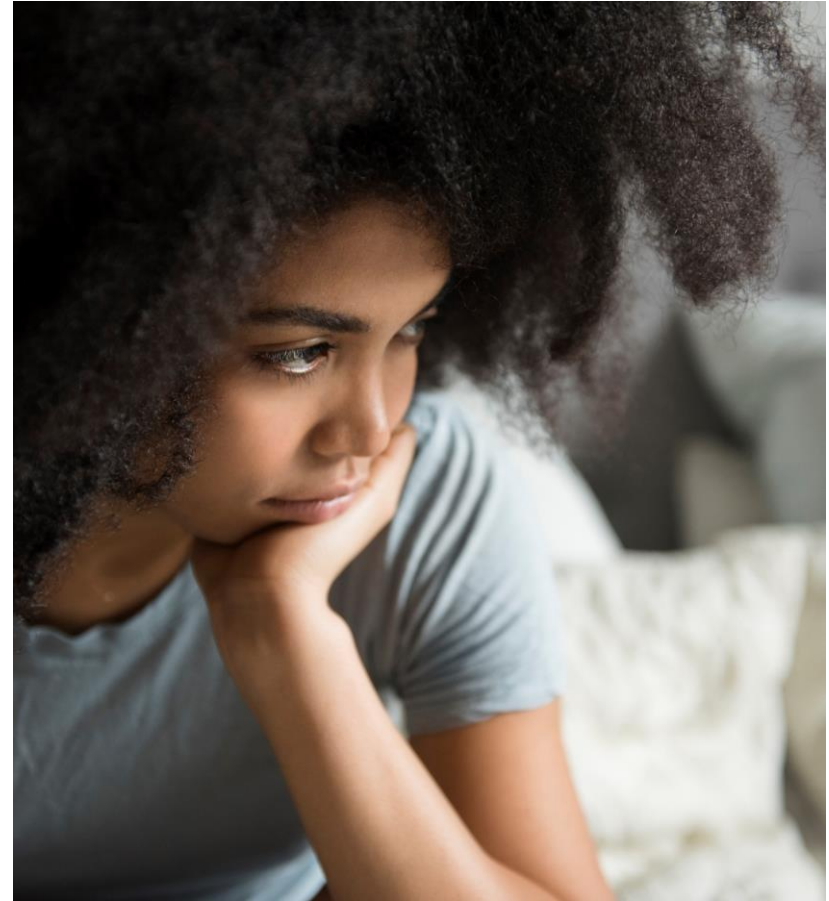
# INSOMNIA DISORDER

Defined in the ICSD-3 as a complaint of trouble initiating or maintaining sleep...associated with daytime consequences and is not attributable to environmental circumstances or inadequate opportunity to sleep.

Includes both Acute and Chronic Insomnia. Chronic = 3x/week > 3mths

Daytime sleepiness, fatigue, and decreased immune function.

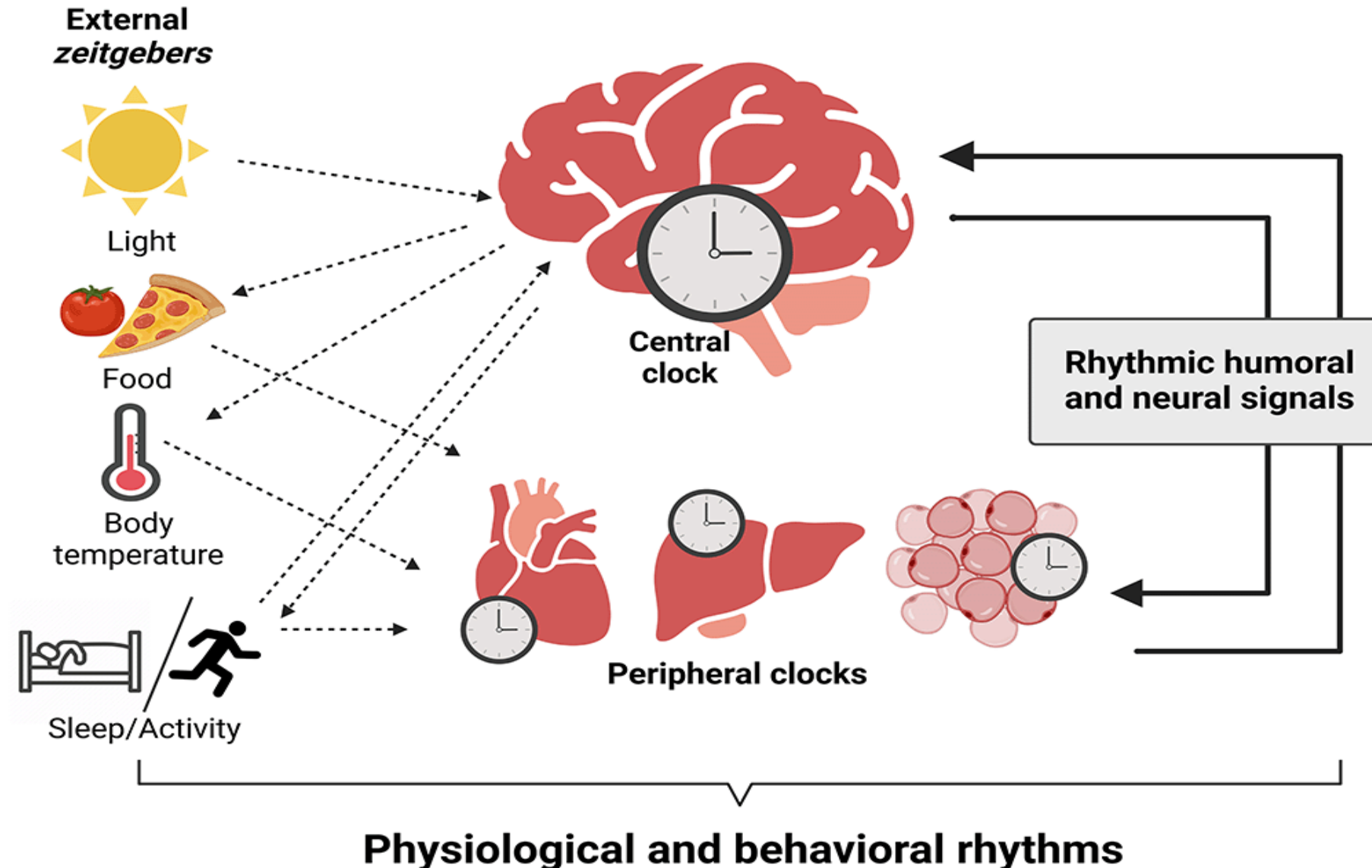
Impaired cognitive process, depression/anxiety, and memory deficits



# Things that keep you awake



Figure 1. Organization of the circadian system in mammals.



# The gut-brain



**Contains 500 million neurons working independent of the brain.**



**Controls activity of the brain with Serotonin and Vagus Nerve**



**95% of Serotonin (happy hormone) is made in the gut.**



**Most of vagus nerve signal goes one way – gut to brain.**

# Electrophysiological Evidence of Intuition: Part 2. A System-Wide Process?

Rollin McCraty, Mike Atkinson, and Raymond Trevor Bradley

Published Online: 5 Jul 2004 | <https://doi.org/10.1089/107555304323062310>

**Conclusions:** Overall, our data suggest that the heart and brain, together, are involved in receiving, processing, and decoding intuitive information. On the basis of these results and those of other research, it would thus appear that intuitive perception is a system-wide process in which both the heart and brain (and possibly other bodily systems) play a critical role. To account for the study's results, Part 3 will develop a theory based on holographic principles explaining how intuitive perception accesses a field of energy into which information about "future" events is spectrally enfolded.



## The heart-brain

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**Contains 40,000 neurons working independent of the brain.**

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**Controls electrical activity of the brain chemically and electrically.**

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**Receives intuitive information before the brain.**

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**Heart controls the brain more than the brain controls the heart.**

# Sleep Management for PTSD: APA Recommendations

- Maintain a regular sleep schedule
- Create a “Sleep-Conducive” Environment: Keep your bedroom cool, dark, and quiet. Reserve the bedroom for sleep and sex only.
- Practice Good Sleep Hygiene: diet, exercise, set and setting.
- Limit Naps: keep it short and early in the day.
- Seek Professional Help if sleep problems persist.

# AASM MANAGEMENT OF SLEEP DISTURBANCES

#1. Address current sleep hygiene practices and bring attention to timing, quality and quantity of sleep.

From a CBT-I point of view. Education, Holistic Approach of Patient Care, and Psych/Behavioral Therapies are implemented.

Encourage activities that alleviate stress load prior to bed, optimize hormonal pressure to sleep, and minimize extrinsic stressors/stimuli.



# INSOMNIA INTERVENTIONS

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Psychological and Behavioral Interventions are Primary Interventions for all ages and chronic hypnotic users.

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CBT-I is the recommended, first-line treatment, BTI is the alternative when availability is a factor


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**BTI:** An abbreviated version of CBT-I, emphasizing the behavioral components.

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Behavioral Therapy = Stimulus Control Therapy, Relaxation Therapy, and Education re behaviors that influence sleep.



A close-up, slightly blurred image of a clock face. The clock has a white face with black numbers and hands. A white rectangular box is overlaid on the center of the clock, containing the text 'The 10-3-2-1-0 Rule'. The background is a soft, out-of-focus blue and white.

## The 10-3-2-1-0 Rule

- Recommendations of when to stop behaviours that negatively impact your sleep.
- **10 hours before** – stop drinking caffeine
- **3 hours before** - stop eating and drinking alcohol
- **2 hours before** – stop working
- **1 hour before** – avoid screen time
- **0 times** - you should hit snooze button



Soft lighting = Melatonin and pressure to sleep.



Meditation or Apps on Guided Meditation = Mindfulness training



Listening to calming music = Calming tones are monotonous and shift the brain into theta state or hypnosis.



Supplementation – Metabolites like Mg, Calcium etc support healthy sleep cycles. Tranquilizers etc often suppress REM or Deep sleep.



Taking a bath – physical cues of weightlessness and warmth are reminiscent of the weightlessness of sleep.



Subtle stretching – releases muscle fascia, reducing stress physically and mentally

# SLEEP HYGIENE

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Create a routine based on your preferences and suggestibility and stick to it!

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Don't get stuck on rules. Your best sleep routine will be unique.

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Finding your recipe for sleep is about knowledge and awareness of your mind body connection and perception of the world.

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It's ok to have a "bad" night. What is your body trying to tell you?

BUILDING YOUR  
ROUTINE:

TOOLS AND  
TIMING



# COGNITIVE BEHAVIORAL THERAPY FOR INSOMNIA (CBT-I)

CBT-I = Cognitive Therapy, Stimulus Control, Sleep Restriction, Sleep Hygiene and Relaxation.

Based on the idea that the way you think and feel about something can affect what you do. (perception)

Ex. Stress leads to poor, uncharacteristic decisions and calm leads to characteristic, balanced decisions.

Key concept of CBT is that these thought and behavior patterns can be changed.

Availability and cost can be an issue due to training needed.

# STIMULUS CONTROL THERAPY

Learned behavior = Negative Experience = Cyclical Insomnia.

Reassociate sleep with the positive by waiting until we are tired to go to bed and utilizing the bed for sleep and sex only.

Adding in other stimulating “wake” activities cues our bodies and brains that bed is for wake time

Reassociating bed with positive in a repetitive way gives rise to new positive associations with bed.



# CBT AND THE MIND BODY CONNECTION

- **The Mind-Body Connection: Mental and emotional health can impact physical health and vice versa.**
- **CBT primarily targets cognitive processes, but also acknowledges that changing thoughts can lead to changes in emotions, behaviors, and perhaps physical well-being.**
- **Knowledge and Awareness are the starting points of conscious and creative thoughts.**
- **Creativity = conscious action toward thriving.**
- **Reaction = unconscious reflex for survival.**
- **A healthy mindset may be a balance of both.**



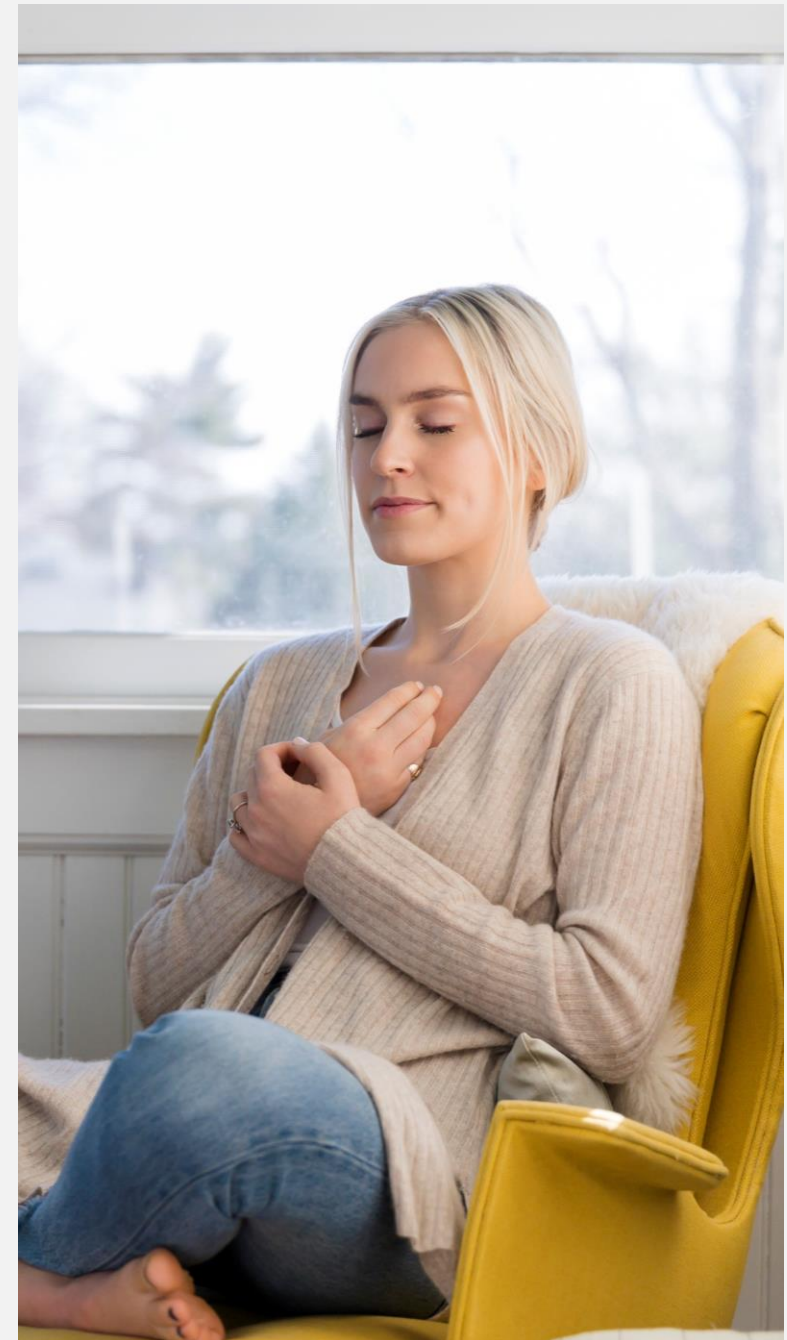
# RELAXATION THERAPY

Somatic tension reduction - Abdominal breathing,  
Progressive muscle relaxation and Autogenic training

Cognitive Arousal Reduction – Guided Imagery Training and  
Meditation ( further reduction would be in Hypnosis range)

Depending on one's suggestibility, one method will be more  
effective than the other.

People with PTSD or ADD need guidance in person or  
through media to relax on their own.





# Mindset



- APA: A state of mind that influences how people think about and then enact their goal-directed activities in ways that may systematically promote or interfere with optimal functioning.
- PTSD = Fight/Flight mindset.
- Sleep = Rest/Regenerate mindset.



# Training the Brain

**High Beta** - Increased focus, alertness, or agitation (++ in ADD)

**Low Beta** – Relaxed focus and attention.

**Alpha** - Low alpha: 8-10: inner-awareness of self, mind/body integration, balance; High alpha: 10-12: centering, healing, mind/body connection

**Alpha-theta border** - increase in sensation, abstract thinking and self-control.

**Theta Wave Activity** - Enhanced: drifting, trance-like state; Suppressed: improve concentration, attentiveness.

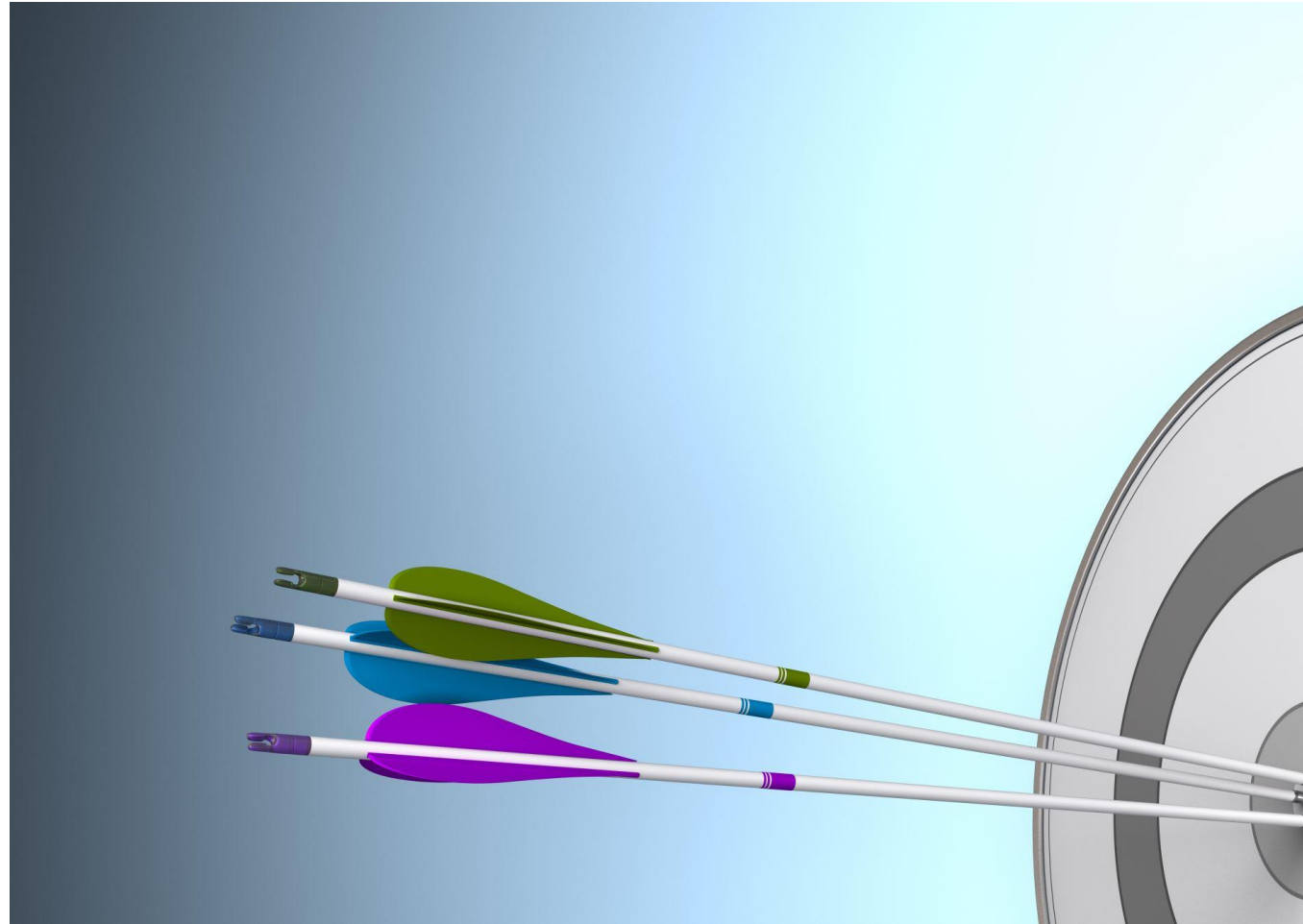
**Delta Wave Activity** – Deep Relaxation Growth Hormone secretion for body repair and regeneration.



# mindset generators

- meditation
- visualization
- setting intentions
- mindfulness practices (present moment)
- physical activity
- breathwork
- internal dialogue
- external environment

# Intention and Focus



- “Where your focus goes, energy flows”.
- Intention directs your CNS.
- Yogic breathing toward empowerment.
- Mindfulness + breathwork reconnects mind, body, and soul components.
- Thoughts, hormones, emotions, and body response may together create an overall response to environment.

# What is Hypnosis?

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Hypnosis is a state of consciousness involving focused attention and reduced peripheral awareness characterized by a capacity for response to suggestion.

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Everyone has been in a level of Hypnosis through intensely focused activity.

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Ability to be actively hypnotized is individual, although most people can be.

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Alpha, Theta, Delta, and Gamma brain activity present.



# Progression of Consciousness: Hypnosis or Meditation

**Beta Wave Activity-** Use Somatic exercises (Progressive Muscle Relaxation, Breathing Exercises) to drop from high Beta, 40Hz (Fear mentality) into low Beta, 14Hz (problem solving/reasoning).

**Alpha Wave Activity** – Gateway to subconscious mind, optimal space for neurolinguistic programming (NLP), learning, concentration.

**Alpha-theta border** – State of conscious creation. Hypnosis, Imprinting, Timeline Therapy.

**Theta Wave Activity** - Complete Subconscious, Highest Suggestibility state. Strong in Internal focus, meditation, prayer

**Delta Wave Activity** – Somnambulism for healing/regeneration or surgical procedures.

**Gamma Wave Activity** – Intense focus due to years of practice (monks).

**Return to consciousness** = Reverse of process.

# Breathwork as a Tool for Insomnia

## Hallmarks of Insomnia:

1. **Difficulty falling asleep at night.**
2. **Waking up frequently during the night.**
3. **Waking up too early.**
4. **Daytime fatigue or sleepiness.**
5. **Irritability, depression, or anxiety.**
6. **Difficulty with focus and memory.**
7. **Increased errors or accidents.**
8. **Persistent worries about sleep.**

## Breathwork benefits:

1. **Facilitates shift in CNS tone.**
2. **Practice during day = PNS tone = solid sleep.**
3. **Use anywhere, anytime.**
4. **More PNS=more sleep=clear brain and body.**
5. **Reconnects awareness to body.**
6. **Takes only 3 deep breaths**
7. **Adapt to suit need.**



# breathwork

- Structured, intentional breathing exercises or techniques that aim to improve physical and mental well being.
- Focus is present moment.





# breathwork techniques

- box breathing
- cyclic sighing
- diaphragmatic
- coordinated breathing
- pursed lip breathing
- 4-7-8 Andrew Weil (based on pranayama)
- yogic breathing (pranayama)
- mindful breathing



# diaphragmatic breathing

- the backbone of most breathwork techniques
- stimulates vagus nerve and activation of PNS
- Increased SV and VT trigger decreased SNS.
- Increases HRV and improves prognosis.

# THE POWER OF BREATH: DIAPHRAGMATIC BREATHING



Diaphragmatic breathing is sometimes referred to as belly, deep, relaxed, or abdominal breathing. It optimizes use of the main muscle of breathing, the diaphragm, resulting in slower, deeper breathing. It can be an important skill in a Veteran's self-management toolbox. With practice, most clinicians can teach it to their patients in 5-10 minutes.

“The Power of Breath” was written by Janice Singles, PsyD and Shilagh Mirgain, PhD and Adrienne Hampton, MD (2016) and updated by Janice Singles, PsyD and Shilagh Mirgain, PhD (2023). This **Whole Health tool** was made possible through a collaborative effort between the University of Wisconsin Integrative Health Program, VA Office of Patient Centered Care and Cultural Transformation, and Pacific Institute for Research and Evaluation.



# A scenario of mutual interactions

- **Conclusions:** Slow breathing techniques act enhancing autonomic, cerebral and psychological flexibility in a scenario of mutual interactions: we found evidence of links between parasympathetic activity (increased HRV and LF power), CNS activities (increased EEG alpha power and decreased EEG theta power) related to emotional control and psychological well-being in healthy subjects. Our hypothesis considers two different mechanisms for explaining psychophysiological changes induced by voluntary control of slow breathing: one is related to a **voluntary regulation** of internal bodily states (interoception), the other is associated to the **role of mechanoreceptors** within the nasal vault in translating slow breathing in a modulation of olfactory bulb activity, which in turn tunes the activity of the entire cortical mantle.

> [Front Hum Neurosci.](#) 2018 Sep 7:12:353. doi: 10.3389/fnhum.2018.00353. eCollection 2018.

## How Breath-Control Can Change Your Life: A Systematic Review on Psycho-Physiological Correlates of Slow Breathing

Andrea Zaccaro <sup>1</sup>, Andrea Piarulli <sup>1 2</sup>, Marco Laurino <sup>3</sup>, Erika Garbella <sup>4</sup>, Danilo Menicucci <sup>1</sup>, Bruno Neri <sup>5</sup>, Angelo Gemignani <sup>1 3 6</sup>

Affiliations + expand

PMID: 30245619 PMID: [PMC6137615](#) DOI: [10.3389/fnhum.2018.00353](#)

### Abstract

**Background:** The psycho-physiological changes in brain-body interaction observed in most of

# Short Term vs Long Term Slow Breathing

## Short-term:

Reduces oxygen consumption, HR, and BP. Increases the amplitude of theta and delta waves (indicating predominant parasympathetic tone), decreases the sympathetic activity, and improves the sympathovagal balance (HRV) (Chinagudi et al., [2014](#)).



## Long-term:

Reduces the risk of developing CVD and T2DM (endothelial function) and improves pulmonary function (RV and deadspace ventilation)(Jerath et al., [2006](#); Russo et al., [2017](#)).



Review article

## Effects of *Bhramari Pranayama* on health – A systematic review

Maheshkumar Kuppusamy<sup>a</sup>  , Dilara Kamaldeen<sup>a</sup>, Ravishankar Pitani<sup>b</sup>, Julius Amaldas<sup>c</sup>,  
Poonguzhali Shanmugam<sup>d</sup>



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“Practicing pranayama regularly has a positive impact on cardiovascular and respiratory functions and improves the autonomic system towards parasympathetic (vagal tone) dominance.”



## **LONG TERM STRATEGY: CREATING THE WORLD YOU WISH TO LIVE IN**

**Hypnosis, Meditation and Mindfulness facilitate ease of consciousness shift.**

**Calm states become more familiar states of consciousness.**

**Know what normal sleep looks like for you.**

**Remove barriers to sleep and replace them with something that fills all your needs.**

**Add supports to your sleep in the area you value most.**

**Make one small change a week toward your goal and stick with it.**



# Summary

- PTSD is a Trauma and Stressor Related disorder that impacts sleep through brain changes.
- Treatment is through qualified healthcare practitioners and can be very successful.
- CBT is the most common approach and most commonly involves Breathwork and forms of meditation that focus on supporting health.
- Medications are often used as a complementary piece to psychological support either short or long term.



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