

The Rural Veterans Health Access Program

presents:

Amy Murphy, DO

Brain Injury Medicine

Physical Medicine and Rehabilitation

Cognition, fatigue and sleep
post TBI

Rural Veterans Health Access Program

**The Rural Veterans Health Access Program (RVHAP) is part of the Rural and Community Health Systems Section, Division of Public Health,
Alaska Department of Health and Social Services**

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The goal of the Rural Veterans Health Access program is to utilize telehealth and health information technology to enhance access and quality of mental health service and other health care services to veterans residing in rural areas.



To fulfill this goal the Alaska RVHAP supports telehealth networks that provide services in different settings to enhance access to and quality of mental health service and other healthcare services, to veterans residing in rural areas, including the provision of:

- Video-linked statewide availability of counseling with experienced mental health clinicians for trauma and other emotional health concerns
- Crisis intervention services

These services will also be provided to veterans' family members and other rural community members.



Traumatic Brain Injury is one of RVHAP's priorities for the primary group served, Veterans and their families and caregivers as well as other rural community members with TBI and their families and caregivers.

To increase care capacity in rural areas the Rural Veterans Health Access Program provides training for Alaskan medical and behavioral health clinicians and community health providers on TBI assessment and treatment and related TBI topics as well as treatment of post-traumatic stress disorders



**For more information on the RVHAP or this webinar contact the Program Director:
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**To access the recording and PowerPoint slides of this and other RVHAP TBI webinars visit
the RVHAP webpage
<http://dhss.alaska.gov/dph/HealthPlanning/Pages/veterans>**

Cognition, fatigue and sleep post TBI

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Objectives

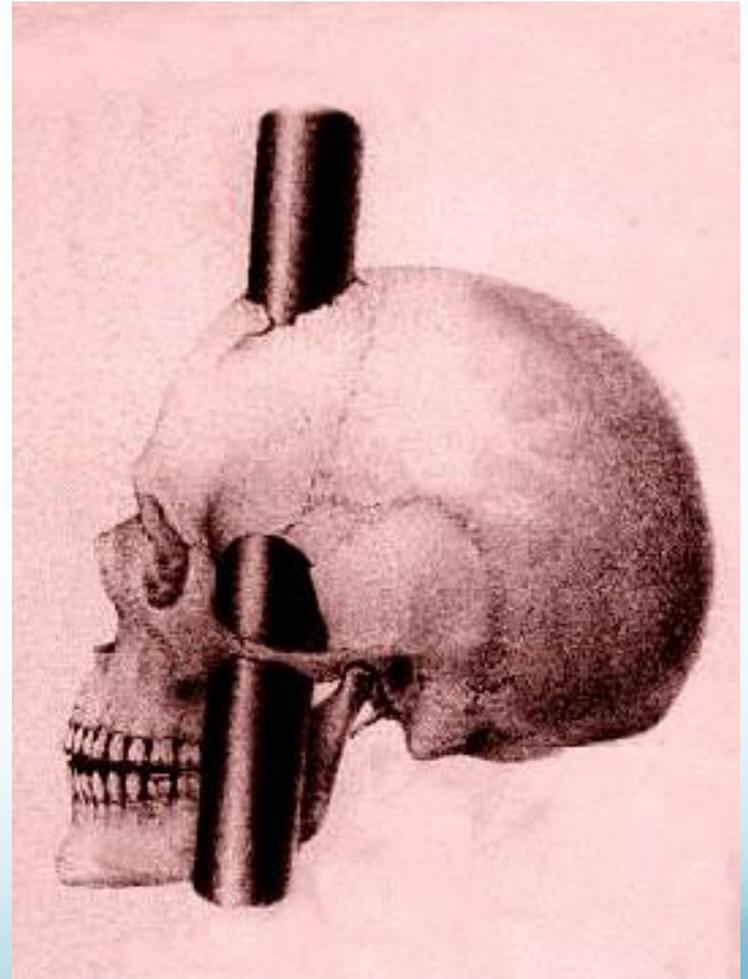
- Anatomy- briefly
- Physiology- even more briefly
- Current understanding
- Medical/pharmacologic treatments
- Non-pharmacologic treatments
- Further studies/testing/referrals

TBI

- National Brain Injury Association
 - TBI is an insult to the brain, not of a congenital or degenerative nature that may produce a diminished or altered state of consciousness which results in impairment of cognitive abilities or physical functioning. It can also result in the disturbance of cognitive abilities or physical functioning. These impairments may be either temporary or permanent and cause partial or total functional disability or psychosocial impairment.

Frontal Lobe

- Paralysis
- Sequencing
- Perseveration
- Attending
- Lability
- Social behavior
- Personality
- Problem solving
- Non-fluent aphasia



Parietal Lobe

- Inability to attend to more than one object at a time.
- Anomia
- Agraphia
- Alexia
- Left/Right confusion
- Dyscalculia
- Apraxia
- Inability to focus visual attention
- Hand-eye coordination



Occipital Lobe

- Visual field cuts
- Difficulty with locating objects in environment
- Difficulty in recognizing drawn objects
- Color agnosia
- Hallucinations
- Visual illusions
- Movement agnosia



Museum of Modern Art, New York

Temporal Lobes

- Prosopagnosia
- Fluent aphasia
- Short/long term memory
- Decreased interest in sex
- Inability to categorize objects
- Right lobe damage can cause persistent talking
- Aggression



Brain Stem

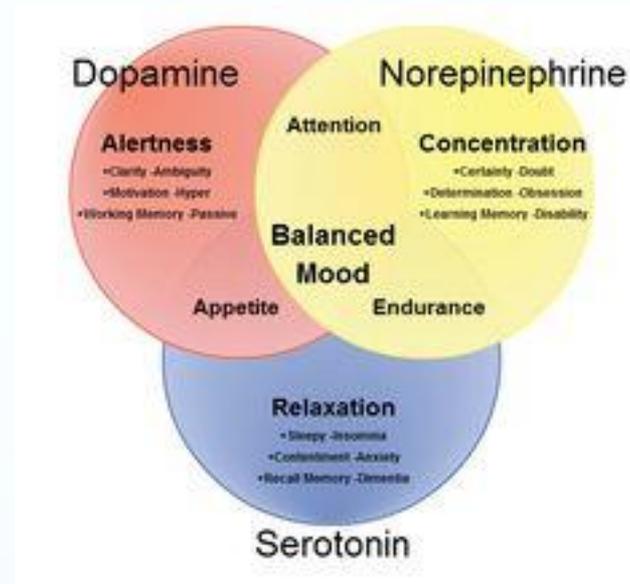
- Decreased respiratory vital capacity (speech)
- Dysphagia
- Organization/perception of the environment
- Balance/movement
- Vertigo
- Insomnia, sleep apnea
- Endocrine abnormalities

Cerebellum

- Coordination/balance
- Inability to reach out and grab objects.
- Tremor
- Vertigo
- Slurred Speech (Scanning Speech).
- Rapid movements

The neurotransmitter soup

- Excitatory
 - Glutamate
- Cholamines
 - Acetylcholine
- Catecholamines
 - Dopamine
 - Norepinephrine
 - Epinephrine
- Inhibitory
 - GABA
- Modulating
 - Serotonin
 - Melatonin

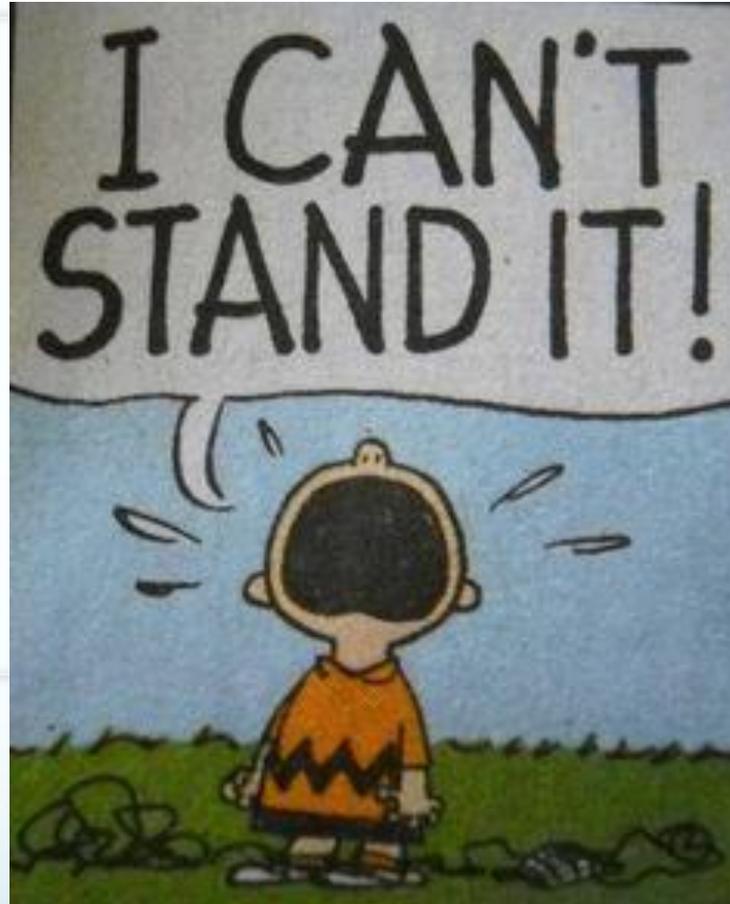


Plus hormonal influences (GAT)

The problem

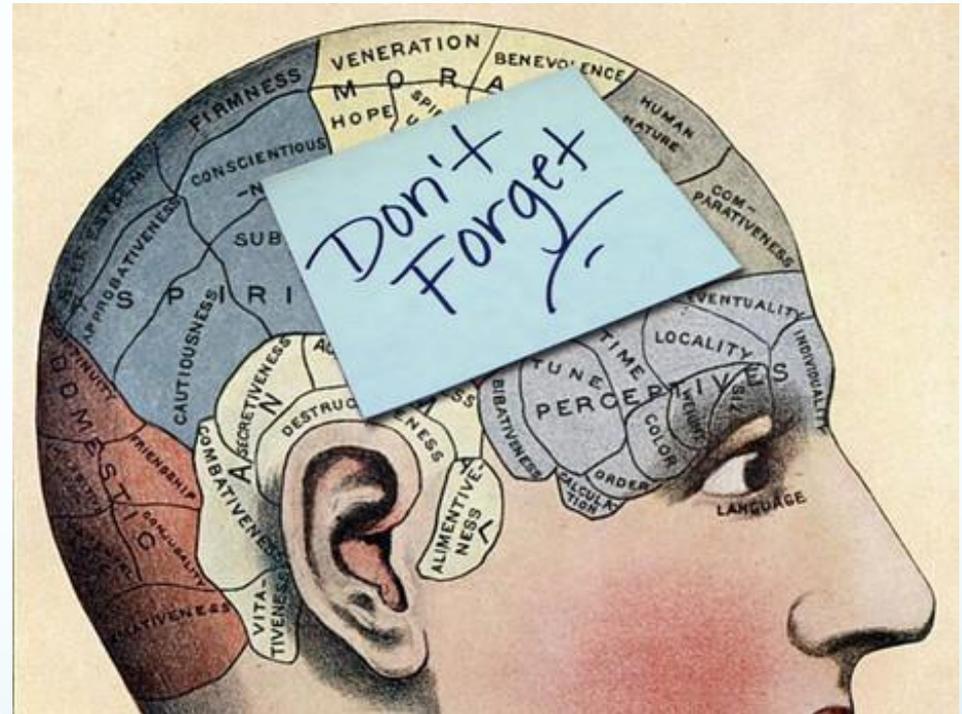
- Complex system
 - Neurotransmitter soup
 - Hormones involved
 - Delicate mix and balance
- Timing is everything
 - 12 months (longer)
- Improving recovery potential
 - Early recovery
- Rest and rehab
 - Rest- heal
 - Rehab- re-train

Neurogenic fatigue

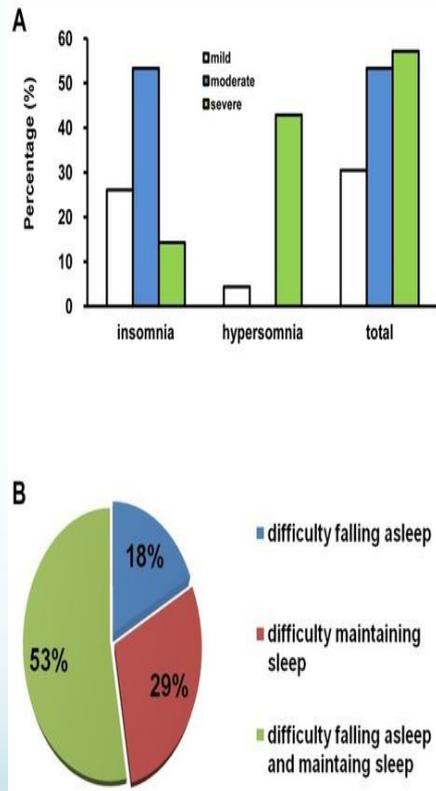


Cognition

- Initiation
- Processing speed
- Attention
- Memory
- “Multi-tasking”
- Input overload
- Fuzzy/groggy/unfocused

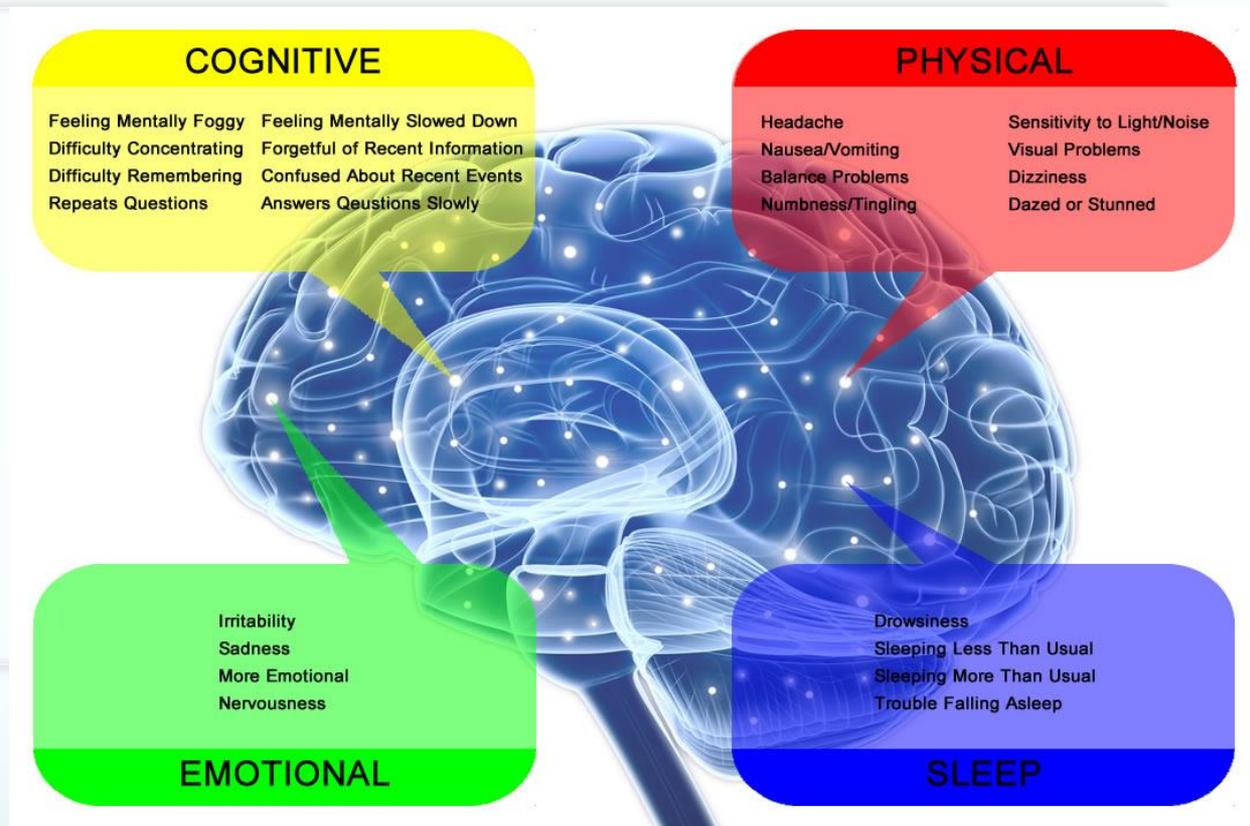


Sleep



The bucket/The car/The wall

Cognition



Pharmacologic treatments

General rules of thumb

- Start by removing sedating meds first
- Start low and go slow, one at a time
- Go with the most bang for the buck
- Alternatively- remember the impact on the system
- Always believe the patient regarding side effects
- Education is key

Pharmacologic treatments

- Dopamine- working memory, initiation, behavioral flexibility, decision making, wakefulness
- Noradrenergic- attention, autonomic/automatic systems. Closely intertwined with dopamine.
- Serotonin- spatial cognition, learning, memory, mood
- Acetylcholine- memory (arousal/attention)
- Glutamate (NMDA)- main excitatory neurotransmitter, consciousness, neglect, neuro-plasticity
- GABA (A)- main inhibitory neurotransmitter- agitation, increased firing/excitatory states, sedative
- Melatonin- sleep patterns, circadian rhythm, core body temp

Dopamine

- All agonists in some way
 - Receptors
 - Areas of the brain
 - Alternate activity
- Amantadine (NMDA)
- Bromocriptine
- Mirapex
- Provigil
- Ritalin (NE)
- Wellbutrin (NE)

Norepinephrine

- Agonists: alpha2 adrenergic- Tizanidine, Clonidine
- Antagonist- alpha1 adrenergic- Prazosin
- SNRI
 - Cymbalta
 - Effexor
 - Strattera
- NRI
 - TCA- Pamelor, Elavil (inhibit histamine and acetylcholine)
- DNRI's
 - Wellbutrin
 - Ritalin/Vyvanse

Acetylcholine and Glutamate

- Aricept- increases acetylcholine
- Amantadine and Namenda- blocks NMDA receptors (decreases glutamate)
 - Namenda- less bounding literature
 - Amantadine already discussed for dopamine
 - Additional boost immediate setting severe TBI

Serotonin

- SSRIs: Prozac, Zoloft, Lexapro
 - Great deal of studies supporting use
 - Just serotonin
- SNRIs: Cymbalta, Effexor, Strattera
 - Less studies, more neurochemical sites
 - Cymbalta- increases DA pre-frontal cortex
 - Strattera- ADHD/ADD
 - Effexor- depression/anxiety

GABA

- No benzodiazepines (GABA_A PAM)
- Anti-epileptic medications (increase GABA unknown)
 - Avoid Dilantin and Tegretol due to sedation
 - Depakote, Lamictal
- Baclofen (GABA_B)
- Lunesta and Ambien (GABA_A PAM non-benzodiazepine)
- Alcohol- indirect GABA agonist

Final thoughts on sleep

- All the above + histamine
- Melatonin
- Trazodone (SSRI)
- Prazosin (alpha antagonist- nightmares)
- Treating multiple co-morbidities
 - TCA long term issues
- Other than melatonin, the overall recommendation is to “start” with non-pharmacologic measures

Non-pharmacologic treatments

- Cognitive therapies
- Physical/Occupational therapy- endurance
- Sleep therapy: CBT, Neurofeedback, EMDR
- Therapy for mood/psychosocial stressors
- Behavior modification- avoiding triggers, power rest
- Diet/exercise- journal

Additional referrals

- Sleep medicine- up to 40% primary sleep disorder
- Neuroendocrinology- especially for pituitary based
- Gynecology/endocrinology- sex hormones/adrenal
- Behavioral health- stress
- Vocational rehabilitation
- Nutrition/dietician
- Alternative medicine

Summary

- Fatigue, cognition, sleep invariably entwined
- Approach as a cohesive unit as well as individually
- Non-pharmacologic is a must!
- Judicious with pharmacologic care
- Refer, refer, refer
- Support- it can be a long road

QUESTIONS?

*If not for Traumatic Brain Injury
I would not know
the darkness inside me*



*and the stars that twinkle
even in the dark.*

LOUISE MATHEWSON

A Life Interrupted: Living with Brain Injury

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