Can ME/CFS and Fibromyalgia Research Help You Sleep?

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What can be done to treat sleep?

Treat the source of sleep disruptions
Some medications may disrupt sleep architecture or contribute to primary sleep disorders

- Caffeine, stimulants
- Decongestants (pseudoephedrine)
- Antidepressants (fluoxetine, sertraline…)
- Opioids
- Benzodiazepines
- Drugs that increase dopamine (inhibit melatonin release)
- polypharmacy (taking too many drugs!)
Treatable comorbid conditions may contribute to fatigue and sleep disturbances

- Pain conditions
- Mental health conditions
- Urinary frequency disorders
- Snoring spouse, active pets, etc…
- Primary sleep disorders
  - Obstructive sleep apnea, airway resistance
  - Central sleep apnea
  - Movement disorders (RLS, myoclonus)
  - Narcolepsy (MSLT on no medications)
ME/CFS/FM
sleep research

• Sleep disturbances are common
  – Included in all CFS ME/CFS, ME and FM case definitions or symptom criteria
  – Present in >90% of all diagnosed (Jason)

• Sleep abnormal in
  – **Quality** (light, restless, interrupted, heavy)
  – **Duration/timing** (delayed, prolonged, irregular)
MECFS/FM research

1. Polysomnography (sleep studies)

2. Central sensitivity, sensory amplification and hyperalgesia (increased pain and sensation)

3. Autonomic nervous system
   Sympathetic : Parasympathetic

4. HPA-axis (hypothalamus-Pituitary-Adrenal …)
1. Polysomnography (PSG)

- PSG reveals Primary Sleep Disorders
  - Common in ME/CFS and FM patients*
- PSG is non-diagnostic in ME/CFS/FM**
  but does show:
  - Delayed sleep onset
  - Fragmentation of sleep
  - Increased alpha sleep (dozing, light sleep)
  - Decreased delta (slow wave, deep sleep)

EEG Patterns in Sleep and Wakefulness

An EEG is a recording of electrical activity in the brain. It is used to study brain waves and their relationship to sleep and wakefulness. The diagram shows a range of EEG patterns:

- **Awake**: Low-voltage, high-frequency beta waves
- **Drowsy**: Alpha waves prominent
- **Stage 1 sleep**: Theta waves prominent
- **Stage 2 sleep**: Sleep spindles and mixed EEG activity
- **Slow wave sleep (stage 3 and stage 4 sleep)**: Progressively more delta waves (stage 4 shown)
- **REM sleep**: Low-voltage, high-frequency waves

http://www.unc.edu/~ejw/sleepEEG.html
Polysomnography (PSG)

Can tell us about "primary sleep disorders" but, so far, not much about what primarily disturbs ME/CFS sleep
2. Central Sensitivity

• Pain amplification/hyperalgesia (FM)
  – Pain causes alpha waves that disrupt sleep*

• Sensory amplification in ME/CFS/FM

• Central “overload” PEM in ME/CFS/FM
  – Tired but wired
  – Too exhausted to sleep
  – “over-signalling”

*Modofsky 2008
Calm Central Sensitivity

• Prevent over-signaling. Pace.
• Sleep wind down: Quiet. Dark. Good temp.
• Reduce activation (no bright screens)
• Medications
  – gabapentin or Lyrica/pregabalin
  – low dose naltrexone (LDN)*
  – low dose clonazepam
    • habituating and long acting
  – amitriptyline, doxepin, cyclobenzaprine

*Younger 2014
3. Autonomic Nervous System

• **Sympathetic**  >> *parasympathetic*
  – Adrenalin/epinephrine and NA/NE
  – Adrenal gland, alpha and beta receptors throughout the body.

  – Increased HR (heart rate) and decreased HRV (heart rate variability) during sleep.
    • increased sympathetic tone
    • decreased vagal tone (parasympathetic)

Boneva 2007, Burton 2010
Autonomic Nervous System

- If… **Sympathetic** > _parasympathetic_ …then
- Change to: **Parasympathetic** > **Sympathetic**
  Deep breathing and relaxation exercises.
  Push back thoughts of worries and stress
  Read a boring book before bed.
  Calming, not activating, activities

- Beta receptor blockade/inhibition:
  10-20 mg propranolol 2-3 hours before bed?
4. HPA-axis*

- Attenuated (reduced) AM cortisol production.
- Loss of normal circadian rhythm changes in cortisol levels. (less pm dip and am peak)
- Overall cortisol levels are lower than average (low normal)
- Adrenals and pituitary seem to work OK
- Hypothalamus?

Cortisol is secreted during the day in response to stress, including sleep deprivation. Elevated PM cortisol can then impair sleep!

http://www.precisionnutrition.com/all-about-cortisol
Excess cortisol supplementation reduces native cortisol production from the adrenal gland.

Hydrocortisone (cortisol)

http://www.precisionnutrition.com/all-about-cortisol
Hypothalamus

Routine feedback messages via the blood stream and autonomic nervous system

Pituitary

Adrenal: cortisol
Thyroid: T4
Gonads: EstProgTest
Circulatory: fluid, BP

HP-A, HP-T, HP-G, HP
hypothalamus
Treating sleep with medications

- Unlikely to cure ME/CFS/FM
  - May reduce pain and daytime somnolence

- Sleep disturbances are one of the more "treatable" aspects of illness (fixing "unrefreshing" may be more challenging)

Proven benefits and risks of meds unknown
Somnolence may be more treatable

- Sleep deprivation (all causes)
- Medications that cause sleepiness
- Illness (neurologic, endocrine, inflammation)

ESS (Epworth Sleepiness Scale)
General Recommendations:

• Improve sleep hygiene (routine timing, environment).
• Identify stimulating medication impacts on sleep.
• Daytime activity. Get physically tired---but not exhausted, “wound up” or relapsing (PEM).
• Be wary of long or late naps.
• Minimize sedating drugs during the day.
• Aim at all the CAUSES of sleep disruption.
• Simplify use of medications and use them skillfully:
  – Sleep onset (wind down, establish cycles, short acting drugs, earlier dosing of longer acting sedating medications)
  – Light sleep and frequent awakening (reduce interruptions, low dose longer acting meds)
  – Early morning awakening (med rebound or withdrawal? Too much sleep? Establish cycles…)
Natural sleep (drug free) is best, but chronically disrupted or inadequate sleep may be insidiously harmful as well.

There is no perfect medication for sleep. Almost all have some adverse effects.

Work toward restorative sleep.
ME/CFS/FM research may lead to strategies for better sleep

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Thank You!

Our Mission:
Make ME/CFS understood, diagnosable and treatable.

Our Strategy:
Stimulate participatory research aimed at the early detection, objective diagnosis and effective treatment of ME/CFS through expanded public, private and commercial investment.