



Review of Sleep Disturbances in Parkinson's Disease

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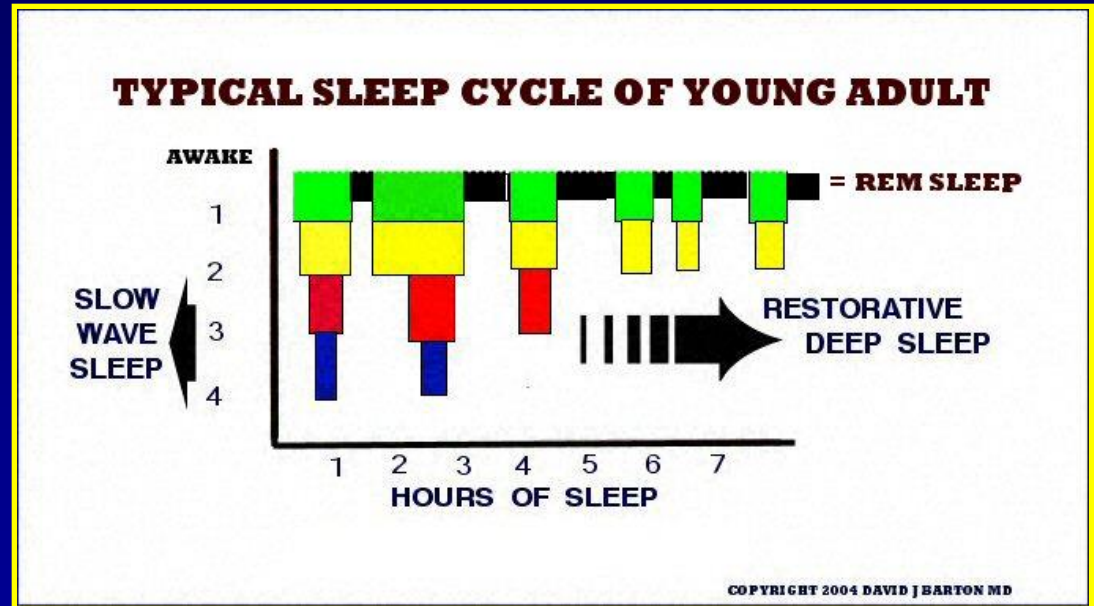
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SLEEP

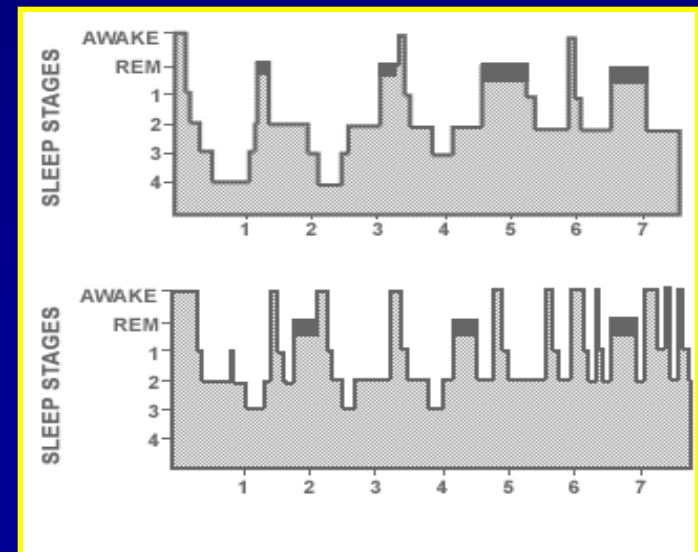
reversible behavioral state of unresponsiveness to the environment

- NREM sleep
 - stages 1- 4
- REM sleep



SLEEP IN AGING

- Changes in sleep stages
- Lower sleep efficiency
- Nighttime Arousals
- Daytime napping
- Sleep disorders



**AUTONOMIC
DYSFUNCTION**

**PRIMARY SLEEP
DISORDERS**

MEDICATIONS



RBD

SAS

RLS /
PLMS

PD NEURODEGENERATION

MOTOR SYMPTOMS OF PD

**NEUROPSYCHIATRIC
SYMPTOMS**

Sleep in Parkinson's disease

- Excessive daytime sleepiness (EDS)
- Nocturnal sleep disturbances
- As many as 80-90% of PD patients have some disturbance of sleep patterns

Nocturnal sleep disturbances in PD

- Recurrent symptoms of PD
- Sleep disordered breathing
- REM Sleep Behavior Disorder (RBD)
- RLS / PLM
- Other causes
 - Depression, nocturia, pain etc.

Nocturnal sleep disturbances

- Sleep fragmentation -

- The most common sleep disturbance in PD patients
- Multifactorial
 - Tremor
 - Akinesia
 - Rigidity
 - Dyskinesias
 - Dystonia with painful spasms
 - Nocturia
 - Co-existence of other sleep disorders

REM Sleep Behavior Disorder (RBD) in PD

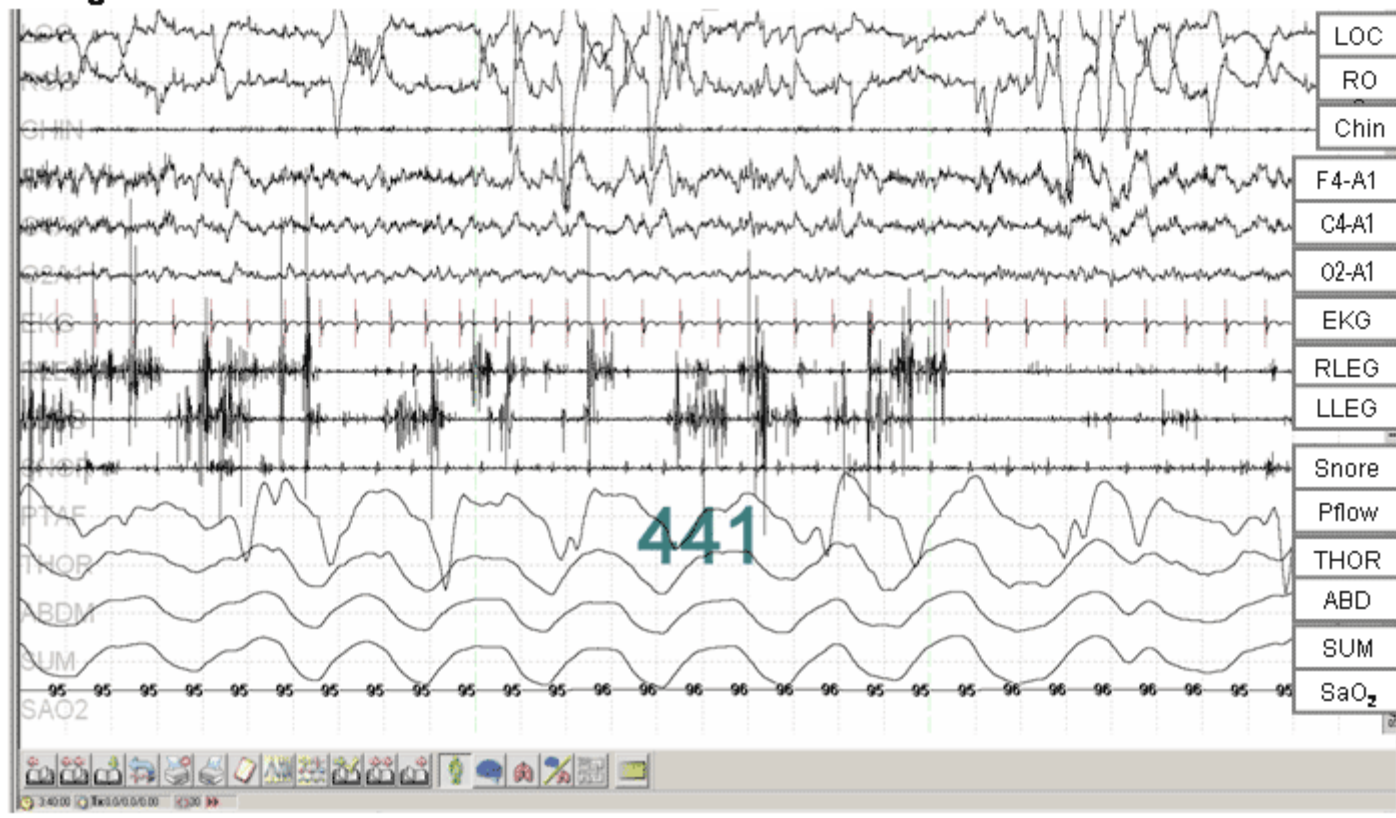


REM Sleep Behavior Disorder

Diagnostic Criteria

- A. Repeated episodes of sleep related vocalization and/or complex motor behaviors.
- B. These behaviors are documented by polysomnography to occur during REM sleep or, based on clinical history of dream enactment, are presumed to occur during REM sleep.
- C. Polysomnographic recording demonstrates REM sleep without atonia (RWA)
- D. The disturbance is not better explained by another sleep disorder, mental disorder, medication, or substance use.

Figure 1-Question



RBD in PD

- treatment -

- Protective measures
 - Clonazepam
 - Melatonin
-
- Antidepressants may worsen / unmask RBD symptoms

RESLESS LEGS SYNDROME (RLS)

- An urge to move associated with unpleasant sensations in legs
- The urge worsens during period of rest or inactivity
- The urge is partially or totally relieved by movement
- The urge worsens in the evening or night

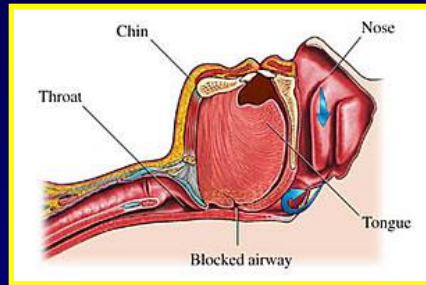
RLS and PD

- treatment -

- Dopaminergic agents
 - augmentation
- Benzodiazepines
- Calcium channel alpha-2-delta ligands
- Opioids
- Avoid dopamine blockers, anti-cholinergic and anti-histaminic medications

Sleep disordered breathing and PD

- Sleep apnea



- Obstructive, central, and mixed apneas may be equally represented in PD
- PD patients with OSA have normal body mass index
- No clear relationship between OSA and disease duration, severity, and medication regimen

Sleep disordered breathing and PD

- treatment -

- Positional therapy - avoid sleeping in supine position
- Weight loss – for patients with BMI >30
- Dental Appliance
- Several Surgical Treatments
- Main treatment – Positive Airway Pressure (PAP) therapy



EDS in PD

- Tandberg, 1999
 - Community based questionnaire study
 - EDS
 - 15.5% PD patients
 - 4% diabetes mellitus
 - 1% healthy controls

EDS in PD

- Causes -

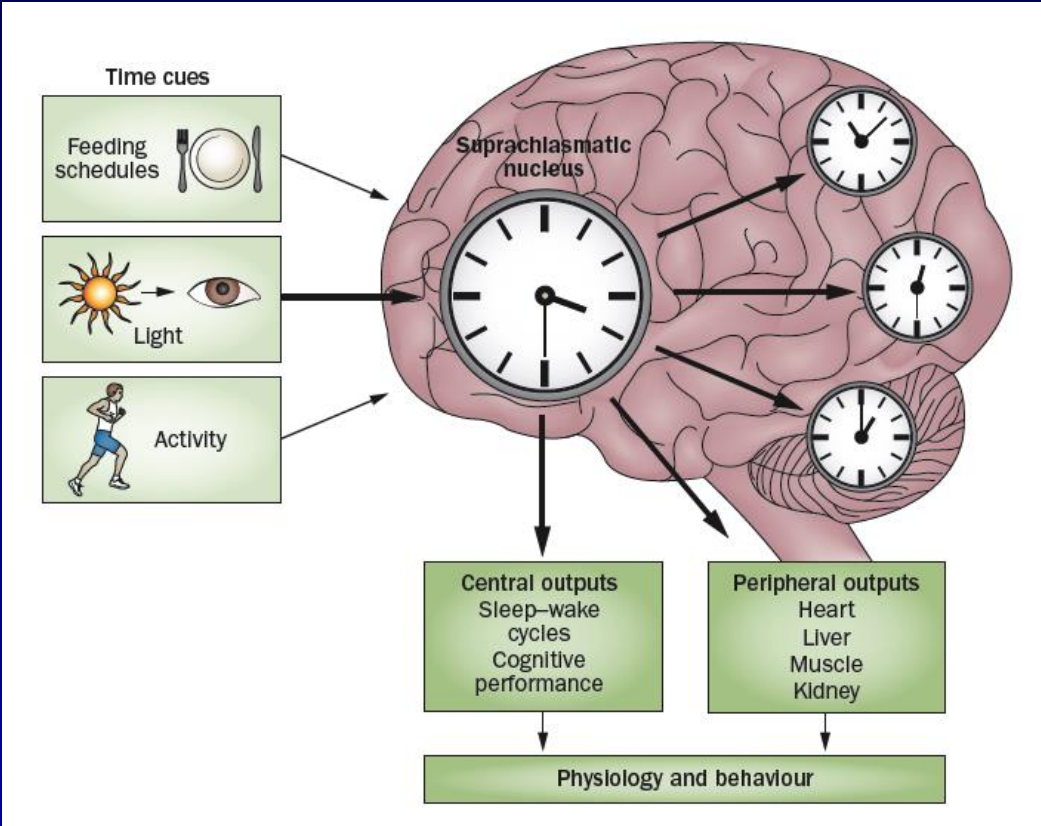
- Symptoms of PD
- Complex medication regimens
- Co-existent sleep disorders
- Age related changes in sleep architecture
- Primary neurodegeneration of PD

EDS in PD

- treatment -

- Sleep hygiene
- Co-existent sleep disorder
- Alterations of medication regimens
- Stimulants (dextroamphetamine, methylphenidate)
- Modafinil
 - Adler, 2003
 - Hogl, 2002
 - Ondo, 2005
- Melatonin
 - Dowling, 2005
- Caffeine
- Deep brain stimulation
- Sodium Oxybate

Circadian system



Light therapy in PD

JAMA Neurology | **Original Investigation**

Timed Light Therapy for Sleep and Daytime Sleepiness Associated With Parkinson Disease A Randomized Clinical Trial

Aleksandar Videnovic, MD, MSc; Elizabeth B. Klerman, MD, PhD; Wei Wang, PhD; Angelica Marconi, MS; Teresa Kuhta, DO; Phyllis C. Zee, MD, PhD

Bright light (10,000 lux) or dim-red light (<300 lux), twice daily (9:00-11:00 am and 5:00-7:00 pm) in 1-hour sessions

Improved daytime alertness and sleep quality

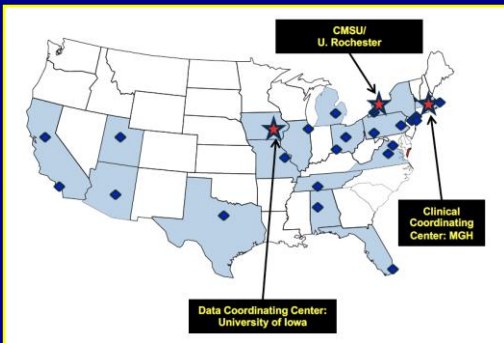




ENLITE PD

Evaluating a Novel Light Therapy
 Intervention to Ease Non-Motor Symptoms
 of Parkinson's Disease

- The **primary aims** of this trial are to (i) determine whether once- or twice-daily bright-white light therapy (BWLTL) improves sleep in Parkinson's disease sufficiently to carry forward in a phase III efficacy trial and, if so, (ii) to select the superior dose frequency to carry forward.
- The **key secondary aim** is to determine whether once-weekly BWLTL is a non-inferior control condition relative to twice-daily dim-red light therapy (DRLTL).
- **Additional secondary aims** will (i) estimate the effect of daily BWLTL on fatigue in PD, and (ii) determine whether patients adhere to light therapy.
- Several **exploratory aims**



Concluding Remarks

- Education about proper sleep hygiene
- Prompt diagnosis and treatment of co-existent primary sleep and psychiatric disorders
- Proper diagnosis of the main sleep problem
- Multidirectional approach: proper integration of cognitive-behavior therapy, medications, light exposure and exercise