**Phase-Dependent Treatment of Delayed Sleep Phase Syndrome with Melatonin**

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**Study Objective:** Delayed sleep phase syndrome (DSPS) is a circadian-rhythm sleep disorder characterized by abnormally late sleep and wake times. Melatonin, taken in the evening, advances sleep and circadian phase in patients with DSPS. However, little is known about the most effective dose or time of administration. In the present study, we tested the effectiveness of melatonin to advance the timing of sleep and circadian phase in individuals with DSPS.

**Design:** Following baseline assessment of sleep and circadian phase, subjects were randomly assigned to 1 of 3 treatment groups. The administration of melatonin (0.3 or 3.0 mg) or placebo was double-blinded.

**Setting:** All procedures were conducted on an outpatient basis.

**Participants:** Thirteen subjects with DSPS, recruited via flyers, advertisements, and referrals from the Sleep Clinic, completed this study.

**Interventions:** Melatonin (0.3 or 3.0 mg) or placebo was administered between 1.5 and 6.5 hours prior to dim light melatonin onset for a 4-week period.

**Measurements and Results:** Both doses of melatonin advanced the circadian phase of endogenous melatonin. The magnitude of phase advance in dim-light melatonin onset correlated strongly with the time of melatonin administration, with earlier times being more effective ($R^2 = 0.94$, $P < .0001$). Similar, though weaker, relationships were obtained between the timing of melatonin administration and changes in sleep time.

**Conclusions:** These results indicate that melatonin advances the circadian clock and sleep in patients with DSPS in a phase-dependent manner. This is the first study that reports a relationship between timing of melatonin administration and phase changes in patients with DSPS.

**Keywords:** Circadian rhythms, melatonin, delayed sleep phase syndrome

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**Self-Help Treatment for Insomnia: a Randomized Controlled Trial**

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**Study Objectives:** Insomnia is a prevalent health complaint that often remains untreated. Several interventions are efficacious but they are not widely available. This study evaluated the efficacy of a self-help behavioral intervention for insomnia.

**Design:** The study used a 2 (conditions; self-help treatment, no treatment control) × 3 (assessments; pretreatment, posttreatment, 6-month follow-up) mixed factorial design.

**Setting:** This study was part of a larger epidemiologic study conducted with a randomly selected sample of 2001 adults of the province of Québec in Canada.

**Participants:** One-hundred ninety-two adults (n = 127 women, 65 men; mean age, 46 years) with insomnia, selected from a larger community-based epidemiologic sample, were randomly assigned to self-help treatment (n = 96) or no-treatment control (n = 96).

**Interventions:** The self-help intervention included 6 educational booklets mailed weekly to participants and providing information about insomnia, healthy sleep practices, and behavioral sleep scheduling and cognitive strategies.

**Measurements and Results:** Participants completed sleep diaries and questionnaires at pretreatment, posttreatment, and 6-month follow-up. Significant but modest improvements were obtained on subjective sleep parameters for treatment but not control participants. Treated participants averaged nightly gains of 21 minutes of sleep and a reduction of 20 minutes of wakefulness, with a corresponding increase of 4% in sleep efficiency. Improvements were also obtained on measures of insomnia severity (Insomnia Severity Index) and of sleep quality (Pittsburgh Sleep Quality Index), and those changes were maintained at follow-up.

**Conclusions:** A self-help behavioral intervention was effective in alleviating a broad range of insomnia symptomatology in a community sample. Self-help may be a promising approach to make effective intervention more widely available.

**Keywords:** Insomnia, sleep, sleep disorder, self-help, behavioral, treatment, intervention

**Citation:** Morin CM; Beaulieu-Bonneau S; LeBlanc M et al. Self-help treatment for insomnia: A randomized controlled trial. SLEEP 2005;28(10): 1319-1327.
The Maintenance of Wakefulness Test and Driving Simulator Performance

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Study Objectives: It has been suggested that the Maintenance of Wakefulness Test (MWT) may be clinically useful to assess fitness to drive, yet little is known about the actual relationship between sleep latency and driving performance. This study examined the ability of 2 MWT trials to predict driving-simulator performance in healthy individuals.

Design: Experimental

Setting: NA.

Patients or Participants: Twenty healthy volunteers (mean age 22.8 years; 9 men).

Interventions: NA.

Measurements and Results: The MWT and driving-simulator performance were examined under 2 conditions—partial sleep deprivation and a combination of partial sleep deprivation and alcohol consumption. Each subject was studied a week apart, with the order randomly assigned. Subjects completed a nighttime 70-minute AusEd driving simulation task and two 40-minute MWT trials, 1 before (MWT1) and 1 after (MWT2) the driving task. In the sleep-deprived condition, the MWT1 sleep latency was inversely correlated with braking reaction time. During the partial sleep deprivation and alcohol condition, the number of microsleeps during the driving task, steering deviation, braking reaction time, and crashes all negatively correlated with the MWT1 sleep latency. Additionally, construction of a receiver-operator characteristic curve revealed that MWT1 sleep latency in the partial sleep deprivation plus alcohol condition significantly discriminated subjects who had a crash from those who did not.

Conclusions: These results indicate that sleep latency on the MWT is a reasonable predictor of driving simulator performance in sleepy, alcohol-impaired, normal subjects. Further research is needed to examine the relationship between daytime MWT results and driving simulator performance in sleepy patients (e.g., those with obstructive sleep apnea) and in experimentally sleep-deprived normal subjects.

Keywords: MWT, Driving, sleepiness, alcohol

Citation: Banks S; Catcheside P; Lack LC et al. The maintenance of wakefulness test and driving simulator performance SLEEP 2005;28(11): 1381-1385.

Association of Psychiatric Disorders and Sleep Apnea in a Large Cohort

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Study Objectives: We conducted the present study to determine whether psychiatric disorders are commonly associated with sleep apnea in Veterans Health Administration beneficiaries.

Method: The Veterans Health Administration maintains several centralized databases containing healthcare data for more than 4 million veterans. We reviewed data from 1998 to 2001 and identified patient records having International Classification of Diseases-Ninth Edition-Clinical Modification codes indicating sleep apnea and various psychiatric conditions. Subsequently, we compared age, sex, ethnicity, and prevalence of comorbid psychiatric conditions for Veterans Health Administration beneficiaries with and without sleep apnea.

Results: Out of 4,060,504 unique cases, 118,105 were identified as having sleep apnea (estimated prevalence of 2.91%). Mean age at the time of diagnosis was 57.6 years. Psychiatric comorbid diagnoses in the sleep apnea group included depression (21.8%), anxiety (16.7%), post-traumatic stress disorder (11.9%), psychosis (5.1), and bipolar disorders (3.3%). Compared with patients not diagnosed with sleep apnea, a significantly greater prevalence (P < .0001) was found for mood disorders, anxiety, posttraumatic stress disorder, psychosis, and dementia in patients with sleep apnea.

Conclusions: Sleep apnea is associated with a higher prevalence of psychiatric comorbid conditions in Veterans Health Administration beneficiaries. This association suggests that patients with psychiatric disorders and coincident symptoms suggesting sleep-disordered breathing should be evaluated for sleep apnea.

Keywords: Sleep apnea/hypopnea syndrome, depression, psychosis, posttraumatic stress disorder (PTSD), anxiety, bipolar disorder

Citation: Sharafkhaneh A; Giray N; Richardson P et al. Association of psychiatric disorders and sleep apnea in a large cohort. SLEEP 2005;28(11): 1405-1411.
Association Between Atrial Fibrillation and Central Sleep Apnea
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Background: We previously described an association between atrial fibrillation and central sleep apnea in a group of patients with congestive heart failure. We hypothesized that the prevalence of atrial fibrillation might also be increased in patients with central sleep apnea in the absence of other cardiac disease.

Methods and Results: We compared the prevalence of atrial fibrillation in a series of 60 consecutive patients with idiopathic central sleep apnea (apnea-hypopnea index > 10 events per hour, > 50% central events) with that in 60 patients with obstructive sleep apnea (apnea-hypopnea index > 10, > 50% obstructive events) and 60 patients without sleep apnea (apnea-hypopnea index < 10), matched for age, sex, and body mass index. Subjects with a history of congestive heart failure, coronary artery disease, or stroke were excluded from the study. The prevalence of atrial fibrillation among patients with idiopathic central sleep apnea was found to be significantly higher than the prevalence among patients with obstructive sleep apnea or no sleep apnea (27%, 1.7%, and 3.3%, respectively, P<.001). However, hypertension was most common and oxygen desaturation most extreme among patients with obstructive sleep apnea.

Conclusions: We conclude that there is a markedly increased prevalence of atrial fibrillation among patients with idiopathic central sleep apnea in the absence of congestive heart failure. Moreover, the high prevalence of atrial fibrillation among patients with idiopathic central sleep apnea is not explainable by the presence of hypertension or nocturnal oxygen desaturation, since both of these were more strongly associated with obstructive sleep apnea.

Keywords: Periodic breathing, arrhythmia, respiration
Citation: Leung RST; Huber MA; Rogge T et al. Association between atrial fibrillation and central sleep apnea. SLEEP 2005;28(12): 1543-1546.

Experimental Restriction of Sleep Opportunity in Children: Effects on Teacher Ratings
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Study Objective: To determine the effects of experimental restriction of sleep opportunity on teacher ratings of academic performance and behavior in healthy normal children.

Design: Home-based, within-subjects design in which participants followed 3 week-long sleep schedules—Baseline (self-selected), Optimized, and Restricted—while attending school, with order of conditions counterbalanced (Optimized and Restricted).

Participants: Seventy-four children (39 boys; aged 6 to 12 years, mean = 10) screened for medical and psychological health.

Measurements and Results: Teachers masked to assigned hours of sleep completed paper-and-pencil questionnaires at the end of each study condition. Questionnaire items were selected from several published measures. Summary scores included Academic Problems, Hyperactive-Impulsive Behaviors, Internalizing, Oppositional-Aggressive, Sleepiness, Total Attention Problems, and Mean Severity of Attention Problems. Main effects of sleep condition were found for Academic Problems, Sleepiness, Total Attention Problems, and Mean Severity of Attention Problems. Restricting sleep increased ratings of Academic Problems (medium effect) relative to both Baseline (P < .01, ηp2 = .11) and Optimized (P < .05, ηp2 = .10) conditions and increased the Mean Severity of Attention Problems (medium effect) relative to Baseline (P < .01, ηp2 = .12).

Conclusions: These findings provide experimental support for widely held beliefs about the importance of sufficient time-in-bed for academic functioning in children. Reducing sleep opportunity had a direct effect on academic performance, as rated by teachers, even among healthy students with no history of behavioral problems or academic difficulty. Findings also support insufficient sleep as a direct source of variability in the manifestation of attention problems but not hyperactivity.

Keywords: Children, sleep restriction, academic performance, classroom behavior
Citation: Fallone G; Acebo C; Seifer R et al. Experimental restriction of sleep opportunity in children: effects on teacher ratings. SLEEP 2005;28(12): 1561-1567.