Canadian Sleep Society | Société Canadienne du Sommeil

6th Conference of the Canadian Sleep Society

October 4-6, 2013
Halifax, Nova Scotia

ABSTRACTS

Canadian Sleep Society Société Canadienne du Sommeil

Contents

ORAL SESSIONS

Sunday, 6 October, 2013; 9:15-10:30 am

Oral Session 1: Sleep Restriction and Insomnia

DISRUPTION OF PSYCHOMOTOR VIGILANCE TASK PERFORMANCE DURING CHRONIC SLEEP RESTRICTION IN RATS: EVIDENCE FOR ALLOSTASIS

Presenting Author: Samuel Deurveilher, Dalhousie University
Additional Authors:
Jacquelyn Bush, Dalhousie
Benjamin Rusak, Dalhousie University
Gail Eskes, Dalhousie University
Kazue Semba, Dalhousie University

IMPACT OF MENSTRUAL CYCLE PHASE ON METABOLIC EFFECTS OF SLEEP RESTRICTION

Presenting Author: Amanda LeRoux, Dalhousie University
Additional Authors:
Lisa Wright, Dalhousie University
Tara Perrot, Dalhousie University
Benjamin Rusak, Dalhousie University

TYPES OF INSOMNIA: IS HYPERAROUSAL ALSO PRESENT DURING NAPPING?

Presenting Author: Alexandra D. Pérusse, Université Laval
Additional Authors:
Isabelle Turcotte, Université Laval
Jason Ellis, Northumbria Centre for Sleep Research
Célyne H. Bastien, Université Laval

SLEEP DYSFUNCTION IN ONTARIO WORKERS WITH HEAD INJURY: PRELIMINARY FINDINGS

Presenting Author: Tatyana Mollayeva, University of Toronto
Additional Authors:
Colin Shapiro, University of Toronto
Angela Colantonio University of Toronto,

BRAIN-DERIVED NEUROTROPHIC FACTOR (BNDF) AS A POTENTIAL MOLECULAR MARKER FOR ALLOSTATIC SLEEP ADAPTATION TO CHRONIC SLEEP RESTRICTION IN RATS.

Presenting Author: Jessica Wallingford, Dalhousie University, Department of Medical Neuroscience
Additional Authors:
S. Deurveilher, Dalhousie University, Department of Medical Neuroscience
R.W. Currie, Dalhousie University, Department of Medical Neuroscience
J.P. Fawcett, Dalhousie University, Departments of Pharmacology and Surgery
K. Semba, Dalhousie University, Departments of Medical Neuroscience, Psychology & Neuroscience and Psychiatry

Oral Session 2: Treatment

EARLY ACCESS TO COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA: A CASE SERIES STUDY IN PRIMARY CARE

Presenting Author: Judith Davidson, Kingston Family Health Team and Queen's University Departments of Psychology and Oncology
Additional Authors:

CLINICAL PROFILE OF SUVOREXANT, AN OREXIN RECEPTOR ANTAGONIST, OVER 3 MONTHS IN PATIENTS WITH PRIMARY INSOMNIA: INTEGRATED RESULTS FROM PHASE- 3 TRIALS

Presenting Author: W. Joseph Herring, Merck, Whitehouse Station, NJ
Additional Authors:
Neely Ivgy-May, Merck, Whitehouse Station, NJ
Kathryn Connor, Merck, Whitehouse Station, NJ
Duane Snavely, Merck, Whitehouse Station, NJ
Ellen Synder, Merck, Whitehouse Station, NJ
Kenneth Liu, Merck, Whitehouse Station, NJ
Thomas Roth, Henry Ford Hospital, Detroit, MI
David Michelson, Merck, Whitehouse Station, NJ

SLEEP ATTITUDES AND BELIEFS AMONG CANADIAN PEDIATRIC HEALTH PROFESSIONALS

Presenting Author: Aimee Coulombe, Dalhousie University
Additional Authors:
Melissa Howlette, Dalhousie University
Penny Corkum, Dalhousie University

PULLING THE MANDIBLE OR PUSHING THE AIR - CAN A REMOTELY CONTROLLED MANDIBULAR POSITIONER HELP SELECT OSA PATIENTS FOR ORAL APPLIANCE THERAPY?

Presenting Author: John Remmers, University of Calgary

THE IMPACT OF COMORBID ANXIETY ON SLEEP IN ADHD CHILDREN AND THE EFFECT OF A COGNITIVE-BEHAVIOURAL THERAPY FOR ANXIETY.

Presenting Author: Roger Godbout, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Additional Authors:
Maxime Beriault, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Lyse Turgeon, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Melanie Labrosse, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Martine Verreault, ADHD Clinic, Hôpital Rivière-des-Prairies, Montréal
Caroline Berthiaume, Anxiety Clinic, Hôpital Rivière-des-Prairies, Montréal
Philippe Lageix, ADHD Clinic, Hôpital Rivière-des-Prairies, Montréal

Oral Session 3: Brain Matters

CHRONIC SLEEP RESTRICTION INDUCES NEURONAL ΔFOSB IN SPECIFIC THALAMIC AND HYPOTHALAMIC NUCLEI IN RATS

Presenting Author: Shannon Hall, Dalhousie University
Additional Authors:
Samuel Deurveilher, Dalhousie University
Joan Burns, Dalhousie University
Kazue Semba, Dalhousie University

PERIODIC LIMB MOVEMENTS ARE ASSOCIATED WITH WHITE MATTER HYPERINTENSITIES IN HIGH-RISK TIA AND MINOR STROKE PATIENTS

Presenting Author: Mark Boulos, Sunnybrook Health Sciences Centre and University of Toronto
Additional Authors:
Brian Murray, Sunnybrook Health Sciences Centre and University of Toronto
Ryan Muir, Sunnybrook Health Sciences Centre and University of Toronto
Paul Wolfe, Sunnybrook Health Sciences Centre and University of Toronto
Dana Jewell, Sunnybrook Health Sciences Centre and University of Toronto
Sandra Black, Sunnybrook Health Sciences Centre and University of Toronto
Richard Swartz, Sunnybrook Health Sciences Centre and University of Toronto

SOREMS IN SLEEP CLINIC PATIENTS: A RELIABLE INDICATOR OF NARCOLEPSY?

Presenting Author: Sharon Chung, Department of Psychiatry, Toronto Western Hospital, University Health Network
Additional Authors:
Chris Y. Kim, Department of Psychiatry, Toronto Western Hospital, University Health Network
Alan Ong, Department of Psychiatry, Toronto Western Hospital, University Health Network
Colin M. Shapiro, Department of Psychiatry, Toronto Western Hospital, University Health Network

OPTOGENETIC DISSECTION OF THE MCH SYSTEM: IMPLICATIONS FOR SLEEP-STATE MODULATION

Presenting Author: Sonia Jego, McGill University

IDENTIFICATION OF A DIRECT INHIBITORY PATHWAY FROM LATERAL HYPOTHALAMUS TO THE RETICULAR THALAMIC NUCLEUS: A NEW AROUSAL CIRCUIT?

Presenting Author: Carolina Gutierrez Herrera, McGill University/Douglas Mental Health University Institute
Additional Authors:
Sonia Jego, McGill University/Douglas Mental Health University Institute
Jessica Colby-Milley, McGill University/Douglas Mental Health University Institute
Stephen Glasgow, McGill University/Douglas Mental Health University Institute
Antoine Adamantidis, McGill University/Douglas Mental Health University Institute

ORAL ABSTRACTS

Oral Session 1

DISRUPTION OF PSYCHOMOTOR VIGILANCE TASK PERFORMANCE DURING CHRONIC SLEEP RESTRICTION IN RATS: EVIDENCE FOR ALLOSTASIS

Presenting Author: Deurveilher, Samuel, Dalhousie University

Additional Authors and Affiliations:
Bush, Jacquelyn; Dalhousie
Rusak, Benjamin; Dalhousie University
Eskes, Gail; Dalhousie University
Semba, Kazue; Dalhousie University

Abstract:
Chronic sleep restriction (CSR) impairs sustained attention in humans, as commonly assessed with the psychomotor vigilance task (PVT). We recently developed a rat model of CSR featuring polyphasic sleep deprivation (3 h on/1 h off, using slowly rotating wheels) for 4 days, and showed that this protocol induced both homeostatic and allostatic (adaptive) changes in sleep parameters. Here, we examined whether the same CSR protocol disrupts performance on a rat version of PVT. Adult male rats were trained to press a bar after they detected an irregularly presented 0.5 s light stimulus to obtain a water reward. Once daily performance became stable, CSR rats (n=12) underwent the 3/1 protocol (starting at lights-on), and PVT performance was tested daily after the first 1 h sleep opportunity during 100 h of CSR, followed by 96 h of recovery. Exercise control (EC) rats (n=7) were allowed to rotate wheels freely and were tested daily at the same time as the CSR group. The average latency of correct responses, percentage of lapses, and percentage of omissions all increased significantly, whereas the percentage of correct responses decreased significantly, after 28 h of sleep restriction. Subsequently, all measures of performance recovered somewhat but, except for response latency, remained significantly worse than at baseline throughout the 100 h of CSR, and returned to baseline levels on the first or second recovery day. The EC group showed no significant changes. The 3/1 CSR protocol disrupted performance on a test of sustained attention in rats within a day. The performance improvement after longer periods of CSR suggests allostatic adaptation, which contrasts to the previously reported increasing deterioration in human PVT performance during CSR. Recovery was complete within 2 days following CSR.

Oral Session 1

IMPACT OF MENSTRUAL CYCLE PHASE ON METABOLIC EFFECTS OF SLEEP RESTRICTION

Presenting Author: LeRoux, Amanda, Dalhousie University

Additional Authors and Affiliations:
Wright, Lisa; Dalhousie University
Perrot, Tara; Dalhousie University
Rusak, Benjamin; Dalhousie University

Abstract:

Introduction: There is extensive evidence that sleep restriction alters metabolic function in healthy, young men, increasing afternoon cortisol levels and modifying levels of other hormones that regulate metabolism. Recent studies have confirmed these effects in young women, but have not investigated whether menstrual cycle phase alters these responses.

Methods: We assessed effects of one night of limiting sleep to 3 h on cortisol levels in two groups of women at different points in their menstrual cycles: mid-follicular and mid-luteal. Eighteen healthy, young women, not taking oral contraceptives (age: 21.8 ± 0.54; BMI: 22.6 ± 0.63, mean ± SEM) were studied. Participants' baseline sleep durations, eating habits and menstrual cycles were monitored. Salivary samples were collected at six times (08:00, 08:30, 11:00, 14:00, 17:00, 20:00) during two consecutive days: first after a 10 h overnight sleep opportunity (Baseline) and then after a night with a 3 h sleep opportunity (Sleep Restricted). All were awakened at the same time of day.

Results: Women in the follicular phase showed a significant decrease ($p = 0.004$) in their cortisol awakening responses (CAR) after sleep restriction and a sustained elevation in afternoon/evening cortisol levels ($p = 0.005$), as has been reported for men. Women in the luteal phase showed neither a depressed CAR, nor an increase in afternoon/evening cortisol levels.

Conclusion: Menstrual cycle phase dramatically altered the responses of healthy, young women to a single night of sleep restriction, implicating effects of spontaneous changes in endocrine status on metabolic responses to sleep loss.

Oral Session 1

TYPES OF INSOMNIA: IS HYPERAROUSAL ALSO PRESENT DURING NAPPING?

Presenting Author: D. Pérusse, Alexandra, Université Laval

Additional Authors and Affiliations:
Turcotte, Isabelle; Université Laval
Ellis, Jason; Northumbria Centre for Sleep Research
Bastien, Célyne H.; Université Laval

Abstract:

Introduction: The objective of this study was to examine if sleep during napping differs between good sleepers (GS) and insomnia sufferers (INS) (subdivided in paradoxical 'PARA-I' and psychophysiological 'PSY-I') following a mentally challenging battery of cognitive testing.

Methods: 14 PSY-I [Mean age=36.0(8.2)], 12 PARA-I [36.5(8.7)] and 23 GS [31.0(5.8)] slept for 4 consecutive nights in the laboratory where PSG was recorded. Upon awakening on mornings 2 and 3, cognitive testing (lasting between 90 to 120 minutes) was administered, followed by the completion of the Stanford Sleepiness Scale and then by a 20 minute nap opportunity.

Results: One-way ANOVAs (p=0.000) revealed that groups significantly differed on subjective sleep measures such as SOL, WASO, TST and SE, collected from sleep diaries. On objective nap parameters, repeated measures ANOVAs showed that GS had a longer TST (p=0.013) and a better SE (p=0.015), than PSY-I and PARA-I and both groups of INS were awake significantly longer than GS (p=0.002). Also, PARA-I took significantly more time than GS to fall asleep (p=0.001). Subjectively reported sleepiness was comparable across the three groups. Bilateral Pearson's correlations revealed positives relationships between SE over the night and SE over the nap the following day.

Conclusions: Results show that GS slept better than INS during naps following prolonged cognitive testing, suggesting that, in INS, hyperarousal predominates over mental fatigue resulting from these tests. These results may parallel what is observed at night when INS experience increased cognitive load but are unable to fall asleep, confirming once more that insomnia is a 24-hour problem in the hyperarousal domain. However, these exploratory results need to be replicated with larger groups of participants.

Acknowledgments: This study was supported by les Fonds de la Recherche en Santé du Québec.

Oral Session 1

SLEEP DYSFUNCTION IN ONTARIO WORKERS WITH HEAD INJURY: PRELIMINARY FINDINGS

Presenting Author: Mollayeva, Tatyana, University of Toronto

Additional Authors and Affiliations:
Shapiro, Colin; University of Toronto
University of Toronto, Angela Colantonio;

Abstract:

Background: The deleterious effects of poor sleep in persons who sustained head trauma have been reported for many years. Future progress depends on an improved understanding of the interaction between sleep disturbance and disability.

Aim: To assess sleep functioning in a group of workers at least 3 months post injury; to review links between sleep dysfunction and disability.

Methods: Cross-sectional study. Information on the pre-morbid sleep status was collected. Current sleep functioning was assessed by scales, in accordance with the categories of the ICSD; in addition to psychological status and pain. Disability was evaluated by the Shannah Disability Scale.

Findings: Fifty four Ontario workers (male-61%, female-39%) with head trauma: mean age 46.8±10.9; median time since injury 206 (Q1-Q3:152-417) days. Work status: disability (68.5%), part-time (20.4%), full-time (11.1%). Pre-morbid sleep disorders were reported by 13.5%, all sleep apnea; 33 % compliant with treatment. Eighty five percent reported insomnia (mild-severe range), of various underlying cause. Strong positive association was found between outcome of interest (disability, total score) and insomnia ($r=0.42$, $p=0.0018$), and depression (total scores) ($r=0.53$, $p<0.0001$); moderate positive association between depression and insomnia ($r=0.34$, $p=0.0138$).

Conclusions: Sleep dysfunction rates are striking in head injured workers. Screening for sleep dysfunction should be routine; positive findings call for detailed diagnosis. Management should acknowledge the multifactorial etiology of sleep dysfunction, to alleviate disability rates.

Oral Session 1

BRAIN-DERIVED NEUROTROPHIC FACTOR (BNDF) AS A POTENTIAL MOLECULAR MARKER FOR ALLOSTATIC SLEEP ADAPTATION TO CHRONIC SLEEP RESTRICTION IN RATS.

Presenting Author: Wallingford, Jessica, Dalhousie University, Department of Medical Neuroscience

Additional Authors and Affiliations:
Deurveilher, S.; Dalhousie University, Department of Medical Neuroscience
Currie, R.W.; Dalhousie University, Department of Medical Neuroscience
Fawcett, J.P.; Dalhousie University, Departments of Pharmacology and Surgery
Semba, K.; Dalhousie University, Departments of Medical Neuroscience, Psychology & Neuroscience and Psychiatry

Abstract:

Chronic sleep restriction (CSR) is common in our society and has various performance and health consequences. We developed a rat model of CSR in which cycles of 3h of sleep deprivation (using slowly rotating wheels) and 1h of sleep opportunity are imposed for 4 days. This protocol initiated both homeostatic and allostatic (adaptive) changes in sleep parameters; notably, non-rapid eye movement sleep (NREM) EEG delta power, a measure of sleep intensity, increased initially but this increase gradually declined. To understand underlying mechanisms, we examined the levels of BDNF, which is involved in NREM delta regulation, during the same CSR schedule. Adult male rats were divided into 4 groups (n=6/group): SR2 and SR5 rats were housed in motorized wheels and underwent the 3/1 protocol for 28h and 99h, respectively; locked wheel controls (LW) were kept in stationary wheels for 9-10 days; and exercise controls (EC) were housed in unlocked wheels, which turned freely, for 10 days. Frontal cortex (FC) and basal forebrain (BF), two brain regions involved in EEG regulation, were analyzed for their BDNF contents via western blot. We found similar patterns in BDNF levels in the FC and BF. The SR2 group showed the highest BDNF levels (SR2 > LW, EC for both regions), while the SR5 group showed BDNF levels slightly lower than the SR2 group but still higher than the LW group (SR5 > LW for FC). The EC and LW controls showed similarly low BDNF levels. Thus, the 3/1 protocol increased BDNF levels in the FC and BF after 28h, but this increase attenuated after 99h of CSR, in parallel with the previously reported changes in NREM delta power. These results suggest that changes in BDNF levels may constitute a component of the molecular mechanisms underlying allostatic adaptations to CSR.

Oral Session 2

EARLY ACCESS TO COGNITIVE BEHAVIOURAL THERAPY FOR INSOMNIA: A CASE SERIES STUDY IN PRIMARY CARE

Presenting Author: Davidson, Judith, Kingston Family Health Team and Queen's University Departments of Psychology and Oncology

Additional Authors and Affiliations:

Abstract:

Introduction: Currently, the recommended treatment for chronic insomnia, cognitive behavioural therapy (CBT-I), is rarely available to Canadians. In an effort to enhance early access to treatment, we designed a group CBT-I program for primary care patients. The program is offered shortly after the patient reports insomnia to the family physician. We present data from the first 53 patients who took the program.

Methods: A 6-session group CBT-I program is offered to patients of the Kingston Family Health Team who have chronic insomnia. Each session (2 hours) is co-led by a psychologist with a background in behavioural sleep medicine and a clinical psychology graduate student. The program includes education about sleep and insomnia, stimulus control therapy, sleep restriction, cognitive therapy, relaxation and maintenance. Outcome measures are weekly means from sleep diaries, the Insomnia Severity Index (ISI), and the Hospital Anxiety and Depression Scale. Paired t-tests were used to compare initial and post-treatment (week 6) data. Clinical treatment response was also examined using ISI cut-offs (Morin et al., 2011)

Results: Of the 53 patients, 45 were women; mean age was 54.6 yrs (range 30-78). Significant reductions were seen in sleep onset latency, wake after sleep onset, number of awakenings, hypnotic medication use, ISI score and mood scores (all $p<.001$). Significant increases were seen in total sleep time ($p=.004$), sleep efficiency ($p<.001$) and ratings of sleep quality ($p<.001$). 66% of patients showed at least moderate improvement (ISI score >7 reduction) and 89% no longer had clinically significant insomnia (ISI score <14) by the 6th session. Wait list data for a subset of patients (n=31) showed no improvement in sleep with simply the passage of time.

Conclusion: This demonstrates effectiveness of a group CBT-I program as delivered in primary care. Programs offered through primary care teams can provide early access to effective insomnia treatment.

Oral Session 2

CLINICAL PROFILE OF SUVOREXANT, AN OREXIN RECEPTOR ANTAGONIST, OVER 3 MONTHS IN PATIENTS WITH PRIMARY INSOMNIA: INTEGRATED RESULTS FROM PHASE- 3 TRIALS

Presenting Author: Herring, W. Joseph, Merck, Whitehouse Station, NJ

Additional Authors and Affiliations:
Ivgy-May, Neely; Merck, Whitehouse Station, NJ
Connor, Kathryn; Merck, Whitehouse Station, NJ
Snavely, Duane; Merck, Whitehouse Station, NJ
Synder, Ellen; Merck, Whitehouse Station, NJ
Liu, Kenneth; Merck, Whitehouse Station, NJ
Roth, Thomas; Henry Ford Hospital, Detroit, MI
Michelson, David; Merck, Whitehouse Station, NJ

Abstract:
Introduction: Suvorexant is an orexin receptor antagonist being investigated for treatment of insomnia. Here we report results from pre-defined analyses of pooled 3-month efficacy and safety data from suvorexant Phase-3 trials.

Methods: The efficacy analysis included two similarly–designed, randomized, double-blind, placebo-controlled, parallel-group, 3-month trials in non-elderly (18-64 years) and elderly (≥65 years) patients with primary insomnia. Two doses were evaluated within each age group: 40mg or 20mg for non-elderly and 30mg or 15mg for elderly patients. Efficacy was assessed by polysomnographic endpoints and by patient-reported outcomes. The safety analysis included the two 3-month trials plus 3-month data from a 1-year safety trial. In addition to routine safety assessments, systematic assessment for special safety considerations was pre-specified (e.g., withdrawal, rebound, residual effects, abuse potential, suicidality, and cataplexy). Since suvorexant doses for each age group were matched for pharmacokinetic exposures, evaluations for suvorexant high-dose (40mg/30mg) and suvorexant low-dose (20mg/15mg) were conducted on the combined age groups.

Results: The pooled efficacy dataset included 2,030 treated patients; 1,263 on suvorexant and 767 on placebo. Suvorexant high-dose improved all primary and secondary objective and subjective endpoints of sleep maintenance and sleep onset compared to placebo. A similar pattern was observed for suvorexant low-dose, although the magnitude of response was generally smaller. For the safety analysis, of 2,809 patients treated, 2,426 (86%) completed at least 3 months of treatment, including 1,552 patients on suvorexant and 874 on placebo. Suvorexant was generally well-tolerated, regardless of dose or age. The rate of discontinuation due to adverse-events was low. The most frequently reported adverse-events were somnolence and fatigue which were generally transient and mild-to-moderate in intensity. No serious or unusual safety signals emerged based on evaluation of pre-specified safety considerations.

Conclusion: Suvorexant was effective and well-tolerated over 3-months in non-elderly and elderly adult patients with primary insomnia.
Funding: Merck

Oral Session 2

SLEEP ATTITUDES AND BELIEFS AMONG CANADIAN PEDIATRIC HEALTH PROFESSIONALS

Presenting Author: Coulombe, Aimee, Dalhousie University

Additional Authors and Affiliations:
Howlette, Melissa; Dalhousie University
Corkum, Penny; Dalhousie University

Abstract:

Background: The prevalence of behavioral sleep problems among Canadian children far exceeds our capacity to provide evidence-based services. The present study, exploring health professionals' attitudes and beliefs about sleep, is part of a larger project investigating facilitators of and barriers to pediatric sleep-related care.

Methods: One-hundred and seventy physicians (family doctors, pediatricians, psychiatrists), psychologists, nurses, and social workers, practicing independently in Canada and seeing generally physically healthy 1- to 10-year olds, completed online self-report questionnaires. The Sleep Attitudes and Beliefs Scale (SABS) measured agreement that sleep problems are modifiable, responsive to treatment, intrinsic vs. extrinsic in nature, and have an impact on children and families. An author-developed measure examined the frequency of engaging in a variety of evidence-based practices (e.g., screening, addressing sleep hygiene).

Results: Health professionals endorsed moderate to high agreement that sleep problems are modifiable and responsive to treatment, moderate agreement that they are extrinsic in nature, and high agreement that they have an impact on children and families. A regression examining SABS scores as predictors of evidence-based practice was significant $R2 = .11$, $F(4, 169) = 5.17$, $p = .001$; beliefs about the impact of sleep problems may be particularly salient for evidence-based practice $\beta = .42$, $t = 3.46$, $p = .001$.

Conclusion: Current efforts to increase the provision of sleep-related care are largely focused on education. Our quantitative results are consistent with qualitative work- conducted as part of the larger research project- demonstrating that professionals who believe in the importance of sleep tend to seek out sleep-related education and practice opportunities. Advocacy efforts emphasizing the impact of sleep problems could encourage greater involvement in sleep-related evidence-based care.

Oral Session 2

PULLING THE MANDIBLE OR PUSHING THE AIR - CAN A REMOTELY CONTROLLED MANDIBULAR POSITIONER HELP SELECT OSA PATIENTS FOR ORAL APPLIANCE THERAPY?

Presenting Author: Remmers, John, University of Calgary

Additional Authors and Affiliations:

Abstract:

Introduction - The clinical utility of oral appliance therapy (OAT) in treating obstructive sleep apnea (OSA) is limited by its relatively low efficaciousness rate, highlighting the need for a method of selecting favorable candidates for this therapy. We have carried out a prospective study of the accuracy of a new theranostic test, MATRx (Zephyr Sleep Technologies), in predicting therapeutic outcome with OAT. This test employs a remotely controlled mandibular positioner (RCMP) to induce graded protrusion during sleep.

Methods - 67 OSA subjects meeting broad inclusion criteria (AHI>10hr-1, BMI<40kg/m-2) underwent a polysomnographic MATRx test and then received a therapeutic oral appliance (SomnoDent, SomnoMed). Baseline and outcome studies were performed with a validated portable monitor (Snoresat, Sagatech). Criteria for prediction of therapeutic success (<2 respiratory events/5 min REM sleep) and for outcome treatment success (AHI<10hr-1 & 50% reduction from baseline AHI) were pre-established. Both the polysomnogram interpreter and the therapeutic dentist were blinded.

Results – The overall therapeutic success rate was 58%. The test correctly identified therapeutic successes with high accuracy (PPV=94%; specificity=92%) and therapeutic failures with less, but significant, accuracy (NPV=83%; sensitivity=86%). Target protrusion values provided efficacious therapy in 87% of cases.

Conclusions - The MATRx theranostic test accurately identifies OSA patients who will experience therapeutic success with OAT. The test also provides an efficacious target protrusive position.

Oral Session 2

THE IMPACT OF COMORBID ANXIETY ON SLEEP IN ADHD CHILDREN AND THE EFFECT OF A COGNITIVE-BEHAVIOURAL THERAPY FOR ANXIETY.

Presenting Author: Godbout, Roger, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal

Additional Authors and Affiliations:
Beriault, Maxime; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Turgeon, Lyse; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Labrosse, Melanie; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal
Verreault, Martine; ADHD Clinic, Hôpital Rivière-des-Prairies, Montréal
Berthiaume, Caroline; Anxiety Clinic, Hôpital Rivière-des-Prairies, Montréal
Lageix, Philippe; ADHD Clinic, Hôpital Rivière-des-Prairies, Montréal

Abstract:

Children with Attention Deficit Hyperactivity Disorder (ADHD) are reported to show more sleep problems than children from non-clinical populations. This difference could partly be explained by comorbid anxiety. The first goal of this study was to examine the impact of comorbid anxiety on sleep difficulties in children with ADHD. The second goal was to measure the effect of a cognitive-behavioral therapy on sleep quality. Methods: 57 children (42 boys, 15 girls) aged between 8 and 12 years were assessed by a semistructured diagnostic interview (ADIS-C). Four groups were formed: ADHD only (n = 20); ADHD + Anxiety disorder (n = 20); Anxiety disorder (n = 8); and normal controls (n = 9). Parents filled the Child Sleep Habits Questionnaire (CSHQ). A subgroup of 10 children took part to a 10-week-session cognitive-behavioral therapy (CBT) program for anxiety.

Results: Parents of each of the three clinical groups reported more sleep difficulties in their children than the control group. ADHD + Anxiety children were reported to have more sleep difficulties than the ADHD-only group and the control group but no more than the Anxiety group. Further analyses suggested sleep difficulties in children with ADHD are more associated with anxiety than with ADHD per se, including sleep latency. However, bedtime resistance and parasomnias were more related with ADHD than with onset anxiety. CBT for anxiety in children with ADHD + comorbid anxiety successfully reduced sleep onset latency and marginally improved the total score of sleep difficulties.

Conclusions: Comorbid anxiety is associated with specific sleep difficulties in children with ADHD. CBT program specifically aimed at reducing anxiety can reduce sleep difficulties in children with ADHD + Anxiety.

Oral Session 3

CHRONIC SLEEP RESTRICTION INDUCES NEURONAL ΔFOSB IN SPECIFIC THALAMIC AND HYPOTHALAMIC NUCLEI IN RATS

Presenting Author: Hall, Shannon, Dalhousie University

Additional Authors and Affiliations:
Deurveilher, Samuel; Dalhousie University
Burns, Joan; Dalhousie University
Semba, Kazue; Dalhousie University

Abstract:

Chronic sleep restriction (CSR) is common in our society and has adverse behavioural/health consequences. To understand underlying mechanisms, we developed a rat model of CSR featuring polyphasic periods of sleep deprivation using slow rotation of activity wheels (3h on/1h off) for 4 days, and showed that this protocol induced both homeostatic and allostatic (adaptive) changes in sleep patterns. Here, we examined the pattern of chronic neuronal activation, assessed with FosB/ ΔFosB induction, following the same CSR protocol. Adult male rats were divided into 4 groups (n=8-9/group): CSR rats were housed in motorized wheels and underwent the 3/1 protocol for 99h; locked wheel controls (LW) were kept in stationary wheels for 9 days; exercise controls (EC) were housed in unlocked wheels, which they turned freely, for 9 days; and home cage controls (HC) remained in standard housing without wheels for >2 weeks. At the end of the experiment, brains were processed for FosB/ ΔFosB immunohistochemistry using an anti-FosB(N) antibody recognizing the N-terminus region common to FosB and ΔFosB, and an anti-FosB(C) antibody recognizing the C terminus region of FosB, absent in ΔFosB. The number of darkly-stained FosB(N)+ neurons increased significantly after CSR in the paraventricular thalamic nucleus, medial preoptic area (CSR > LW, EC, HC), ventrolateral preoptic nucleus, and perifornical area (CSR > HC). No significant changes occurred in the tuberomammillary nucleus, dorsal raphe nucleus, locus coeruleus, or selected limbic areas. The number of FosB(C)+ neurons was generally low, suggesting that most of the FosB(N) immunoreactivity represented ΔFosB. Several brain regions showed selective increases in ΔFosB following 99h of CSR, including specific wake/sleep-regulatory regions and a midline thalamic nucleus involved in habituation to various types of chronic stress, suggesting their role in the mechanisms underlying allostatic sleep changes and other behavioural/physiological responses to CSR.

Oral Session 3

PERIODIC LIMB MOVEMENTS ARE ASSOCIATED WITH WHITE MATTER HYPERINTENSITIES IN HIGH-RISK TIA AND MINOR STROKE PATIENTS

Presenting Author: Boulos, Mark, Sunnybrook Health Sciences Centre and University of Toronto

Additional Authors and Affiliations:
Murray, Brian; Sunnybrook Health Sciences Centre and University of Toronto
Muir, Ryan; Sunnybrook Health Sciences Centre and University of Toronto
Wolfe, Paul; Sunnybrook Health Sciences Centre and University of Toronto
Jewell, Dana; Sunnybrook Health Sciences Centre and University of Toronto
Black, Sandra; Sunnybrook Health Sciences Centre and University of Toronto
Swartz, Richard; Sunnybrook Health Sciences Centre and University of Toronto

Abstract:

INTRODUCTION: The clinical significance of periodic limb movements during sleep (PLMs) is unknown. PLMs are associated with transient but significant increases in night-time blood pressure and autonomic hyperactivity; emerging evidence suggests a link with vascular disease. While obstructive sleep apnea (OSA) may be associated with white matter hyperintensities (WMH), the relationship between PLMs and WMH is unclear.

METHODS: We prospectively recruited high-risk TIA or minor stroke patients who presented within two weeks of their acute cerebrovascular events. Patients underwent polysomnography as well as magnetic resonance imaging (MRI) or computed tomography (CT) of the brain. Polysomnography was scored according to criteria from the American Academy of Sleep Medicine. WMHs were assessed using the Age Related White Matter Changes (ARWMC) scale and infarction volume was calculated using Analyze 8.0 Software. Pearson or Spearman correlation coefficients were calculated between ARWMC and age, gender, infarction volume, vascular risk factors (VRFs), prior vascular events, polysomnography parameters, cognition and neurological status. Significant variables were entered into a linear regression model with ARWMC as the outcome.

RESULTS: Forty patients were assessed (mean age 66.3 years, 63% male, mean NIHSS 0.74). Twenty-one patients presented with stroke. VRFs included: hypertension (50%), hyperlipidemia (51%), diabetes (23%), and prior stroke (20%). The mean ARWMC score was 6.95 (range 0-22). ARWMC score correlated with PLM index ($r=0.377$, $p=0.016$) and presentation with acute stroke ($rho=0.418$, $p=0.007$), but not age, VRFs, infarction volume, apnea-hypopnea index or other variables. Linear regression analysis revealed that PLM index ($\beta=0.377$, $R^2=0.142$, $p=0.016$) had the strongest association with the ARWMC.

CONCLUSIONS: PLM index was positively associated with the extent of white matter hyperintensities. Whether PLMs are implicated in the pathogenesis of WMHs or are simply a marker of vascular disease remains uncertain. Future studies should explore causality with vascular disease, and whether treatment of PLMs reduces incident vascular disease.

Oral Session 3

SOREMS IN SLEEP CLINIC PATIENTS: A RELIABLE INDICATOR OF NARCOLEPSY?

Presenting Author: Chung, Sharon, Department of Psychiatry, Toronto Western Hospital, University Health Network

Additional Authors and Affiliations:
Kim, Chris Y.; Department of Psychiatry, Toronto Western Hospital, University Health Network
Ong, Alan; Department of Psychiatry, Toronto Western Hospital, University Health Network
Shapiro, Colin M.; Department of Psychiatry, Toronto Western Hospital, University Health Network

Abstract:

INTRODUCTION: Sleep-onset rapid eye movement (SOREM) during daytime naps is recognized as a main diagnostic feature of narcolepsy. However, SOREMs have been reported to occur in other disorders. This study set out to answer three questions: 1) whether the majority of patients with SOREMs are diagnosed with narcolepsy; 2) if the number of SOREMs is linked with the degree of daytime sleepiness; and, 3) whether patients with SOREMs are sleepier than patients without SOREMs.

METHODS: One hundred and eighty-five charts of sleep clinic patients with SOREMs on the Multiple Sleep Latency Test (MSLT) or Maintenance of Wakefulness Test (MWT) were compared to 178 charts from clinic patients without SOREMs on the MSLT or MWT (control group). Information was collected from the initial, diagnostic sleep study.

RESULTS: Patients with SOREMs were almost as frequently diagnosed with narcolepsy as with obstructive sleep apnea (OSA) or depression/anxiety. Subjective measures of sleepiness, alertness and fatigue were not different between the SOREM and control groups. The SOREM group did not exhibit shorter mean sleep onset latencies on the MSLT or MWT but a greater number of SOREMs was associated with increased sleepiness on the MSLT, but not on the MWT or subjective measures of sleepiness.

CONCLUSION: SOREMs occur across a wide variety of sleep and psychiatric disorders. Patients with SOREMs were not sleepier, more fatigued or less alert than those without SOREMs. The findings of this study indicate that SOREMs are not an accurate or specific diagnostic marker of narcolepsy.

Oral Session 3

OPTOGENETIC DISSECTION OF THE MCH SYSTEM: IMPLICATIONS FOR SLEEP-STATE MODULATION

Presenting Author: Jego, Sonia, McGill University

Abstract:

The hypothalamus consists of intermingled inhibitory and excitatory neural circuits. The activity of these circuits correlates with vigilance states, including wakefulness, non-Rapid Eye Movement (REM) sleep and REM sleep. Recent evidence suggests that neurons expressing Melanin-Concentrating Hormone (MCH) are potentially sleep-promoting [1-3]; however, the extent of their ability to selectively modulate sleep states remains unclear. To investigate the specific role of MCH neurons in the modulation of sleep states, we first genetically targeted the expression of excitatory (ChETA, SSFO) or inhibitory (eNpHR3.0) opsins to MCH neurons using an engineered mouse model. We then showed that we could optically activate (ChETA, SSFO) or inhibit (eNpHR3.0) MCH neurons with high reliability. Using real-time detection of vigilance state changes with EEG/EMG recordings, we next found that bilateral optogenetic activation of MCH neurons during NREM sleep increased the probability of NREM-to-REM sleep transitions, while MCH neuron activation during REM sleep extended REM sleep duration. These results were confirmed through the use of a step function opsin (SSFO) which increases excitability of targeted cells through sustained depolarization [4]. In contrast, we showed that optogenetic silencing of MCH neurons during REM sleep reduced the amplitude of the cortical theta rhythm concomitant to an increase of oscillation strength in the slow theta range (3 to 5 Hz). Using an unbiased automatic detection of the slow theta events, we found that their occurrence was significantly increased in NpHR3.0 transfected animals compared to EYFP-expressing controls suggesting that these events are physiological, but rare, in natural sleep. Finally, we demonstrated that optical activation of MCH terminals induced fast GABAA-mediated inhibitory currents in local wake-promoting histaminergic (HA) neurons. This inhibitory tone was enhanced by optogenetically-induced MCH peptide release.

Collectively, these results support a causal role for MCH neurons in the onset and maintenance of cortical REM sleep in the mammalian brain.

Oral Session 3

IDENTIFICATION OF A DIRECT INHIBITORY PATHWAY FROM LATERAL HYPOTHALAMUS TO THE RETICULAR THALAMIC NUCLEUS: A NEW AROUSAL CIRCUIT?

Presenting Author: Gutierrez Herrera, Carolina, McGill University/Douglas Mental Health University Institute

Additional Authors and Affiliations:
Jego, Sonia; McGill University/Douglas Mental Health University Institute
Colby-Milley, Jessica; McGill University/Douglas Mental Health University Institute
Glasgow, Stephen; McGill University/Douglas Mental Health University Institute
Adamantidis, Antoine; McGill University/Douglas Mental Health University Institute

Abstract:

The sleep-wake cycle is a highly-conserved physiological process across all vertebrates that result from a complex, yet undefined, inhibitory/excitatory balance between neural circuits distributed throughout the brain. Here, we investigate the role of inhibitory GABA cells from the lateral hypothalamus (LH) on sleep-wake states. Subpopulations of LH GABA cells are active during wake, as well as both NREM or REM sleep states, suggesting a strong anatomical and functional heterogeneity. Here, we selectively target the expression of ChETA, a fast channelrhodopsin-2 mutant opsin, to the LH GABA cells in VGAT::Cre mice. We identified anatomical and functional connections between LH GABA neurons and neurons located in the septum, periaqueductal grey area, ventral-tegmental area, locus coeruleus, ventral tegmental area and reticular thalamic nucleus (RTN). Using a semi-chronic optical stimulation, we found that bilateral optical activation of LH GABA cells at 20 Hz, but not 1 Hz, resulted in a 2-fold increase in wake duration. We further found that state-specific optogenetic activation of LH GABA (1 and 20 Hz) during NREM or REM sleep induced a rapid switch to wakefulness and significantly increases wakefulness duration in ChETA compare to control animals. Interestingly, we found that local optical activation of the LH GABA terminals in the RTN at 20 Hz was sufficient to induce NREM sleep-to-wake transitions. Collectively, our results identified a new LH GABA-RTN arousal circuit that contribute to sleep-wake regulation

POSTER PRESENTATIONS

Aging

P001 **CHARACTERISTICS OF OLDER ADULTS WHO ARE NAPPING**

Presenting Author: Alex Hamel, Université du Québec à Trois-Rivières
Additional Authors:
Sophie Desjardins, Université du Québec à Trois-Rivières
Jonathan Loranger, Université du Québec à Trois-Rivières
Sylvie Lapierre, Université du Québec à Trois-Rivières
Lyson Marcoux, Université du Québec à Trois-Rivières

P002 **GREY MATTER ATROPHY MEDIATES THE DECREASE OF SLOW WAVE DENSITY IN THE MIDDLE YEARS OF LIFE**

Presenting Author: Jonathan Dubé, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Additional Authors:
Marjolaine Lafortune, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Christophe Bedetti, (1) Centre de recherche de l'Hôpital du Sacré-Coeur de Montréal, Canada (2) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Alex Latulipe-Loiselle, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Nicolas Martin, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Maude Bouchard, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Julien Doyon, (1) Département de psychologie, Université de Montréal, Canada (2)Unité de Neuroimagerie fonctionelle, Centre de recherche de l'Institut universitaire de Montréal, Canada
Allan Evans, (1) Department of Neurology, Montreal Neurological Institute and Hospital City, Canada
Julie Carrier, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada

P003 **SLEEP ENVIRONMENT IN THE ELDERLY**

Presenting Author: Jonathan Loranger, Université du Québec à Trois-Rivières
Additional Authors:
Sophie Desjardins, Université du Québec à Trois-Rivières
Alex Hamel, Université du Québec à Trois-Rivières
Sylvie Lapierre, Université du Québec à Trois-Rivières
Lyson Marcoux, Université du Québec à Trois-Rivières

P004 **INTERHEMISPHERIC EEG COHERENCE IN NREM SLEEP IS LINKED TO WHITE MATTER INTEGRITY OF CORPUS CALLOSUM IN OLDER SUBJECTS**

Presenting Author: Maude Bouchard, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Additional Authors:
Marjolaine Lafortune, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Christophe Bedetti, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Thaïna Rosinvil, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal
Nicolas Martin, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2-Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Jonathan Dubé, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2-Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Pierre-Olivier Gaudreault, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Jonathan Godbout, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal
Jean-Marc Lina, 4-École de Technologie Supérieure (ETS)
Julie Carrier, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2-Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal

P005 **SAFETY PROFILE OF DOXEPIN 3 AND 6 MG IN ELDERLY INSOMNIA PATIENTS: AN EXAMINATION OF THE DATA THAT INFLUENCED RECENT UPDATES TO THE BEERS CRITERIA**

Presenting Author: H Heith Durrence, Paladin Labs (Somaxon)
Additional Authors:
Brian T. Dorsey,

Breathing

P006 **IS THERE A GENDER-BIAS FOR UNDER-REPORTING OF OBSTRUCTIVE SLEEP APNEA (OSA) USING A PORTABLE MONITOR?**

Presenting Author: Helen Driver, Queen's University and Kingston General Hospital
Additional Authors:
Effie Pereira, Queen's University
Steven Stewart, Queen's University
Michael Fitzpatrick, Queen's University and Kingston General Hospital

P007 **"WHEN YOU KNOW BETTER, YOU DO BETTER". USING AN EDUCATIONAL BOOKLET TO ENHANCE CPAP COMPLIANCE**

Presenting Author: Colin Shapiro, University Health Network ,University of Toronto
Additional Authors:
Dora Zalai, Ryerson University

P008 **REM-RELATED OBSTRUCTIVE SLEEP APNEA IN NON-OBESE ADULTS WITH TREATMENT RESISTANT DEPRESSION AND INSOMNIA: A PRELIMINARY STUDY**
Presenting Author: Payman Hajiazim, University of Toronto
Additional Authors:
Tatyana Mollayeva, University of Toronto
Colin Shapiro, University of Toronto

Dreams

P009 **DOES DREAM RECALL CAPACITY INFLUENCE THE PERFORMANCE AND LEARNING OF A VISUO-MOTOR TASK?**
Presenting Author: Gaelle Dumel, Center for Advanced Research in Sleep Medicine
Additional Authors:
Louis-Philippe Marquis, Centre for Advanced Research in Sleep Medicine
Cloe Blanchette-Carriere, Center for Advanced Research in Sleep Medicine
Tore Nielsen, Center for Advanced Research in Sleep Medicine

P010 **OVERNIGHT IMPROVEMENTS ON TWO REM SLEEP-SENSITIVE TASKS ARE ASSOCIATED DIFFERENTIALLY BOTH REM AND NREM SLEEP CHANGES AND AWAKENINGS FOR DREAM RECALL**
Presenting Author: Tore Nielsen, Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Additional Authors:
Michelle Carr, Dept. Biomedical Sciences,Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Gaelle Dumel, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Isabelle Godin, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Elizaveta Solomonova, Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Jessica Lara-Carrasco, Dept. Psychology,Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Tyna Paquette, CARSM, Hôpital du Sacré-Coeur de Montréal
Christian O'Reilly, Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

P011 **THE DREAMS OF ADOLESCENT CANADIANS: EXPLORATION OF GENDER DIFFERENCES**
Presenting Author: Allyson Dale, University of Ottawa
Additional Authors:
Christina Wong, University of Ottawa
Joseph De Koninck, University of Ottawa

Epidemiology

P012 **SLEEP PATTERNS AND SLEEP DISORDERS AMONG UNIVERSITY STUDENTS IN LEBANON**
Presenting Author: Fida Tannous, University of Holy Spirit Kasik, Lebanon
Additional Authors:
Shafika Assaad, Lebanese University Medical School, Lebanon
Christy Costanian, Queen's University, England

P013 **EVALUATION OF OSA DISEASE SEVERITY AND DEMOGRAPHICS AT A TERTIARY SLEEP DISORDER CENTER**

Presenting Author: Samuel Stewart, University of Saskatchewan
Additional Authors:
Scott McCae, Saskatoon City Hospital
John Reid, University of Saskatchewan
John Gjevre, University of Saskatchewan
Mark Fenton, University of Saskatchewan
David Cotton, University of Saskatchewan
Robert Skomro, University of Saskatchewan

P014 **IMPACT OF INTRODUCTION OF HM PATHWAY ON PSG WAIT TIMES AT A TERTIARY SLEEP DISORDERS CENTER**

Presenting Author: Samuel Alan Stewart, University of Saskatchewan
Additional Authors:
Scott McCrae, Saskatoon City Hospital
John Reid, University of Saskatchewan
John Gjevre, University of Saskatchewan
Mark Fenton, University of Saskatchewan
David Cotton, University of Saskatchewan
Robert Skomro, University of Saskatchewan

P015 **CARE MANAGEMENT PATHWAY NAVIGATION AT A TERTIARY SLEEP DISORDER CENTER**

Presenting Author: Samuel Stewart, University of Saskatchewan
Additional Authors:
Scott McCrae, University of Saskatchewan
John Reid, University of Saskatchewan
John Gjevre, University of Saskatchewan
Mark Fenton, University of Saskatchewan
David Cotton, University of Saskatchewan
Robert Skomro, University of Saskatchewan

Instrumentation & Methodology

P016 **COMPARISON OF AN AUTOMATED POLYSOMNOGRAPHY SCORING SYSTEM VERSUS COMPUTER-ASSISTED MANUAL SCORING**

Presenting Author: Kevin MacDonald, Brock University
Additional Authors:
Olga Iakovenko, MedSleep
Adam Blackman, MedSleep

P017 **VALIDATION OF BODYMEDIA'S SENSEWEAR™ ARMBAND FOR DETERMINING SLEEP AND WAKE IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA**

Presenting Author: Muhammad Munir Sharif, King Saud University
Additional Authors:
Ahmed S. BaHammam, King Saud University

P018 **NIGHTLY VARIATIONS IN SLEEP POLYGRAPHY**

Presenting Author: Neil M. Skjodt, Canadian Centre for Behavioural Neuroscience
Additional Authors:
Ronald S. Platt, SagaTech Electronics, Inc.

P019 **CONCORDANCE OF ACTIGRAPHY AND POLYSOMNOGRAPHY IN SCHOOL-AGED CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND THEIR TYPICALLY DEVELOPING PEERS**

Presenting Author: Melissa Gendron, Dalhousie University
Additional Authors:
Jessica Walton, Dalhousie University
Penny Corkum, Dalhousie University
Benjamin Rusak, Dalhousie
Pantelis Andreou, Dalhousie University
Malgorzata Rajda, Dalhousie University

Narcolepsy and Parasomnia

P020 **GAMMA HYDROXYBUTYRIC ACID PREVENTS CATAPLEXY IN NARCOLEPTIC MICE BY AN AMYGDALA DEPENDENT MECHANISM**

Presenting Author: Zoltan Torontali, University of Toronto
Additional Authors:
Jimmy Fraigne, University of Toronto
John Peever, University of Toronto

P021 **IMMUNE MEDIATED CHILDHOOD NARCOLEPSY**

Presenting Author: Richard Knudsen, UCDMC
Additional Authors:

P022 **REDUCED SLOW-WAVE AND THETA ACTIVITY IN IDIOPATHIC NIGHTMARE SUFFERERS**

Presenting Author: Louis-Philippe Marquis, Dept. Psychology, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Additional Authors:
Tyna Paquette, CARSM, Hôpital du Sacré-Coeur de Montréal
Vickie Lamoureux-Tremblay, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Tore Nielsen, Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

P023 **IDIOPATHIC SLEEP PARALYSIS SUFFERERS HAVE LONGER NREM STAGE 4 SLEEP AND NO INCREASE IN REM DENSITY ACROSS SLEEP CYCLES.**

Presenting Author: Elizaveta Solomonova, Université de Montréal
Additional Authors:
Tomoka Takeuchi, Canada Foundation for Innovation
Tore Nielsen, Université de Montréal

P024 **QUANTITATIVE EEG CHANGES IN IDIOPATHIC NIGHTMARE SUFFERERS**

Presenting Author: Tyna Paquette, CARSM, Hôpital du Sacré-Coeur de Montréal
Additional Authors:
Louis-Philippe Marquis, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Vickie Lamoureux-Tremblay, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Tore Nielsen, Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

P025 **ACROSS-NIGHT CHANGES IN THETA AND ALPHA POWER IN IDIOPATHIC NIGHTMARE SUFFERERS**

Presenting Author: Tyna Paquette, CARSM, Hôpital du Sacré-Coeur de Montréal

Additional Authors:
Louis-Philppe Marquis, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Vickie Lamoureux-Tremblay, Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Tore Nielsen, Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Pediatrics

P026 **BETTER NIGHTS, BETTER DAYS: DEVELOPMENT OF A PAN-CANADIAN WEB-BASED INTERVENTION FOR CHILDREN WITH BEHAVIOURAL INSOMNIA**

Presenting Author: Penny Corkum, Dalhousie University, Associate Professor
Additional Authors:
Aimee Coulombe, Dalhousie University
Christine Chambers, Dalhousie University
Roger Godbout, Universite de Montreal
Reut Gruber, McGill University
Wendy Hall, University of British Columbia
Graham Reid, Western University
Robyn Stremler, University of Toronto
Shelly Weiss, Hospital for Sick Children
Manisha Witmans, University of Alberta

P027 **ENGAGING ONLINE: HOW THE BETTER NIGHTS, BETTER DAYS TRAINEE PROGRAM IS PROVIDING LEARNING OPPORTUNITIES IN PEDIATRIC SLEEP TO TRAINEES ACROSS THE COUNTRY**

Presenting Author: Penny Corkum, Dalhousie University, Associate Professor
Additional Authors:
Christine Chambers, Dalhousie University, Associate Professor
Aimee Coulombe, Dalhousie University
Roger Godbout, Universite de Montreal
Reut Gruber, McGill University
Wendy Hall, University of British Columbia
Graham Reid, Western University
Robyn Stremler, University of Toronto
Shelly Weiss, The Hospital for Sick Children
Manisha Witmans, University of Alberta

P028 **STUDIES OF SLEEP IN FAMILY CAREGIVERS OF CHILDREN DEPENDENT ON MEDICAL TECHNOLOGY**

Presenting Author: Krista Keilty, The Hospital for Sick Children, University of Toronto
Additional Authors:
Eyal Cohen, The Hospital for Sick Children, University of Toronto
Michelle Ho, The Hospital for Sick Children, University of Toronto
Karen Spalding, The Hospital for Sick Children, University of Toronto, Ryerson University
Robyn Stremler, The Hospital for Sick Children, University of Toronto

P029 **SLEEP PROBLEMS IN CHILDREN WITH A HISTORY OF EXTREME PRETERM BIRTH**

Presenting Author: Farah Chowdhury, Department of Pediatrics, Queen's University
Additional Authors:
Bernard Thébaud, Children's Hospital of Eastern Ontario & Ottawa Hospital Research Institute
Barbara Kamstra, Department of Pediatrics and the Women & Children's Health Research Institute, University of Alberta
Andrew Lovering, Faculty of Human Physiology, University of Oregon, Eugene, OR
Leonora Hendson, Pediatrics/Medicine and Dentistry/University of Alberta and Glenrose Rehabilitation Hospital
Carina Majaesic, Department of Pediatrics, Faculty of Medicine, University of Alberta
Ian Adatia, Department of Pediatrics and the Women & Children's Health Research Institute, University of Alberta
David Nicholas, Department of Pediatrics, University of Alberta
Richard Thomson, Department of Biomedical Engineering, University of Alberta
Michael Stickland, Department of Medicine, University of Alberta

P030 **RELAX TO SLEEP PROGRAM ON HOSPITALIZED CHILDREN: A PILOT RCT**

Presenting Author: Efrosini Papaconstantinou, University of Toronto
Additional Authors:
Robyn Stremler, University of Toronto
Ellen Hodnett, University of Toronto

P031 **SLEEP SPINDLES ARE ASSOCIATED WITH IQ IN HEALTHY SCHOOL-AGE CHILDREN**

Presenting Author: Reut Gruber, McGill University
Additional Authors:
Merrill Wise, Methodist Healthcare Sleep Disorders Centre, Memphis, TN
Sonia Frenette, Center for Advanced Research in Sleep Medicine, Hospital du Sacre-Coeur de Montreal
Julie Carrier, Montreal University

P032 **SLEEP LAB ADAPTATION IN CHILDREN WITH ADHD AND THEIR TYPICALLY DEVELOPING PEERS**

Presenting Author: Meredith Bessey, Department of Psychology & Neuroscience, Dalhousie University
Additional Authors:
Jennifer Richards, Department of Psychology & Neuroscience, Dalhousie University
Penny Corkum, Department of Psychology & Neuroscience, Dalhousie University

P033 **USING INCENTIVES TO IMPROVE PEDIATRIC PAP ADHERENCE: A QUALITY IMPROVEMENT STUDY**

Presenting Author: Adele Baker, Sick Kids Hospital
Additional Authors:
Andrea Fretz, Sick Kids Hospital
Allison Zweerink, Sick Kids Hospital
Debra Medin, Sick Kids Hospital
Indra Narang, Sick Kids Hospital
Reshma Amin, Sick Kids Hospital

P034 **MOTIVATING TEENS TO SLEEP MORE STUDY: PRELIMINARY RESULTS**

Presenting Author: Jamie Cassoff, McGill University, Douglas Mental Health University Institute
Additional Authors:
Florida Rushani, McGill University
Bärbel Knäuper, McGill University
Reut Gruber, Douglas Mental Health University Institute

P035 **MOVING RESEARCH INTO PRACTICE: TRANSLATING THE ROCKY SLEEP BEHAVIORAL INTERVENTION FOR PARENTS WITH 6-8-MONTH-OLD INFANTS**

Presenting Author: Wendy Hall, University of British Columbia
Additional Authors:
Joanne Wooldridge, Vancouver Coastal Health Authority
Valerie Munroe, Vancouver Coastal Health Authority
Radhika Bhagat, Vancouver Coastal Health Authority
Kathy Triolet, Vancouver Coastal Health Authority
Kathy Hydamaka, Vancouver Coastal Health Authority
Lillian Tse, Vancouver Coastal Health Authority

P036 **FEASIBILITY, ACCEPTABILITY AND ESTIMATED EFFECTS OF REDUCING NICU LIGHT AND NOISE DURING KANGAROO MOTHER CARE ON PRETERM INFANTS' AND MOTHERS' OUTCOMES**

Presenting Author: Marilyn Aita, University of Toronto and McGill University
Additional Authors:
Robyn Stremler, University of Toronto
Nancy Feeley, McGill University
Keith Barrington, CHU Sainte-Justine
Anne-Monique Nuyt, CHU Sainte-Justine

P037 **MEMORY CONSOLIDATION IN CHILDREN WITH EPILEPSY. DOES SLEEP MATTER?**

Presenting Author: Shama Sud, University of Toronto, Hospital for Sick Children
Additional Authors:
Yair Sadaka, Ben Gurion University
Colin Massicote, Hospital for Sick Children
Mary Lou Smith, Hospital for Sick Children
Laura Bradbury, Hospital for Sick Children
Shelly Weiss, Hospital for Sick Children

P038 **CLINICAL PRESENTATION OF CHILDHOOD NARCOLEPSY**

Presenting Author: Allison Zweerink, The Hospital for Sick Children
Additional Authors:
Reshma Amin, The Hospital for Sick Children
Shelly Weiss, The Hospital for Sick Children
Indra Narang, The Hospital for Sick Children

P039 **A RETROSPECTIVE REVIEW OF THE PREVALENCE OF PHOX2B MUTATIONS IN A COHORT OF CHILDREN WITH CENTRAL HYPOVENTILATION**

Presenting Author: Allison Zweerink, The Hospital for Sick Children
Additional Authors:
Theo Moraes, The Hospital for Sick Children
Reshma Amin, The Hospital for Sick Children

P040 **OBESITY AND OBSTRUCTIVE SLEEP APNEA IN CHILDREN LESS THAN EIGHT YEARS OF AGE**

Presenting Author: Reshma Amin, The Hospital for Sick Children
Additional Authors:
Dennison Lai, The Hospital for Sick Children
Allison Zweerink, The Hospital for Sick Children
Indra Narang, The Hospital for Sick Children

P041 **A USABILITY STUDY FOR THE BETTER NIGHTS, BETTER DAYS WEB-BASED INTERVENTION FOR PEDIATRIC INSOMNIA**
Presenting Author: Tamara Speth, Dalhousie University
Additional Authors:
Penny Corkum, Dalhousie University
Aimee Coulombe, Dalhousie University

P042 **PARASOMNIA IN CHILDREN: OF CLINICAL SIGNIFICANCE?**
Presenting Author: Soumya Mikkilineni, The Youthdale Child and Adolescent Sleep Centre
Additional Authors:
Sharon A. Chung, The Youthdale Child and Adolescent Sleep Centre
Louis Van Zyl, The Youthdale Child and Adolescent Sleep Centre
Colin M. Shapiro, The Youthdale Child and Adolescent Sleep Centre

Sleep Disorders

P043 **REDUCED SLEEP SPINDLE AMPLITUDE AND DENSITY IN IDIOPATHIC NIGHTMARE SUFFERERS**
Presenting Author: Vickie Lamoureux-Tremblay, Center for Advanced Research in Sleep Medicine
Additional Authors:
Tyna Paquette, Center for Advanced Research in Sleep Medicine
Tore Nielsen Center for Advanced Research in Sleep Medicine,

P044 **DESCRIPTIVE SLEEP PROFILE IN DRIVING STUDY PARTICIPANTS WITH OSA VS CONTROLS: A PRELIMINARY ANALYSIS (PART 1)**
Presenting Author: Dorrie Rizzo, Jewish General Hospital, Université de Montréal
Additional Authors:
Gilles Lavigne, Université de Montréal
Jacques Bergeron, Université de Montréal
Laura Creti, Jewish General Hospital, McGill
Marc Baltzan, OSR Medical, McGill
Kateri Champagne, OSR Medical
Sally Bailes, Jewish General Hospital, McGill
Catherine Fichten, Jewish General Hospital, Dawson College
Eva Libman, Jewish General Hospital, McGill

P045 **DICHOTOMUS PATTERNS OF SELF-REPORTED DRIVING OFFENSES AND QUEBEC DRIVING RECORDS BETWEEN PARTICIPANTS WITH OSA VS CONTROLS: A PRELIMINARY ANALYSIS (PART 2)**
Presenting Author: Dorrie Rizzo, Jewish General Hospital, Université de Montréal
Additional Authors:
Gilles Lavigne, Université de Montréal
Jacques Bergeron, Université de Montréal
Laura Creti, Jewish General Hospital, McGill
Marc Baltzan, OSR Medical, McGill
Kateri Champagne, OSR Medical
Sally Bailes, Jewish General Hospital, McGill
Catherine Fichten, Jewish General Hospital, Dawson College
Eva Libman, Jewish General Hospital, McGill

P046 **CAN THE PRIMARY CARE PHYSICIAN DISTINGUISH CHRONIC INSOMNIA FROM OBSTRUCTIVE SLEEP APNEA ON THE BASIS OF A SYMPTOM PROFILE? (STUDY 2)**

Presenting Author: Dorrie Rizzo, Jewish General Hospital, Université de Montréal
Additional Authors:
Sally Bailes, Jewish General Hospital, McGill University
Marc Baltzan, OSR Medical
Roland Grad, Jewish General Hospital, McGill University
Alan Pavilanis, St. Mary's Hospital
Dieu-Ly Tran, Jewish General Hospital, Université de Montréal
Laura Creti, Jewish General Hospital, McGill University
Catherine Frichten, Jewish General Hospital, Dawson College
Eva Libman, Jewish General Hospital, McGill University

P047 **EFFECTS OF OSA IN PATIENTS WITH COPD AND ASTHMA**

Presenting Author: Julieta Lazarte, University of Toronto
Additional Authors:
Ivone M. Ferreira, Asthma and Airways Centre Toronto, Centre for Sleep and Chronobiology, Toronto

P048 **CHALLENGING 'ADHD' IN PATIENTS WITH AN FETAL ALCOHOL SPECTRUM DISORDER AND SLEEP PROBLEMS**

Presenting Author: Osman Ipsiroglu, University of British Columbia

P049 **VANCOUVER-POLAR-BEARS-APP (VAPOBEARS-APP) FOR PRACTITIONERS AND A PAN-CANADIAN NATIONAL DATA BASE FOR CREATING EVIDENCE**

Presenting Author: Osman Ipsiroglu, University of British Columbia
Additional Authors:
Karen Spruyt, Assistant Professor of Developmental Neuropsychology, Vrije Universiteit russel, Faculty of Psychoilogy and Educational Science, Brussel, Belgium
Dean Elbe, University of British Columbia
Daniel Penn, Chief Operating Officer, Shift Health Paradigms
Elodie Portales, Neuroinformatics Core Manager at NeuroDevNet
Paul Pavlidis, University of British Columbia
Judith Owens, Professor of Pediatrics, George Washington University School of Medicine and Health Sciences

P050 **CAN THE PRIMARY CARE PHYSICIAN DISTINGUISH CHRONIC INSOMNIA OBSTRUCTIVE SLEEP APNEA ON THE BASIS OF A SYMPTOM PROFILE? (STUDY 1)**

Presenting Author: Sally Bailes, Jewish General Hospital, McGill
Additional Authors:
Dorrie Rizzo, Jewish General Hospital, Université de Montréal
Marc Baltzan, OSR Medical
Alan Pavilanis, St. Mary's Hospital
Roland Grad, Jewish General Hospital, McGill University
Laura Creti, Jewish General Hospital McGill University
Dieu-Ly Tran, Jewish General Hospital, Université de Montréal
Catherine Fichten, Jewish General Hospital, Dawson College
Eva Libman, Jewish General Hospital, McGill University

P051 **SHOULD SCREENING FOR OBSTRUCTIVE SLEEP APNEA BE ROUTINE FOR PRIMARY CARE PATIENTS WITH METABOLIC SYNDROME?**

Presenting Author: Sally Bailes, Jewish General Hospital, McGill
Additional Authors:
Dorrie Rizzo, Jewish General Hospital, Université de Montréal
Marc Baltzan, OSR Medical, McGill
Roland Grad, Jewish General Hospital, McGill
Alan Pavilanis, St-Mary's Hospital, McGill
Dieu-LY Tran, Jewish General Hospital,Université de Montréal
Laura Creti, Jewish General Hospital, McGill
Catherine Fichten, Jewish General Hospital, Dawson College
Eva Libman, Jewish General Hospital, McGill

P052 **SLEEP DISORDERS RELATED TO ATTENTION PROBLEMS IN ADOPTED CHILDREN**

Presenting Author: Shelly Weiss, Division of Neurology, Hospital for Sick Children and Department of Paediatrics, University of Toronto
Additional Authors:
Meghna Rajaprakash, Division of Neurology, Hospital for Sick Children and Faculty of Medicine, University of Toronto
Elizabeth Kerr, Division of Neurology, Hospital for Sick Children and Department of Paediatrics, University of Toronto
Benita Friedlander, Division of Neurology, Hospital for Sick Children

Sleep in Medical and Psychiatric Disorders

P053 **EXAMINATION OF POLYSOMNOGRAPHY IN HOSPITALIZED PATIENTS WITH ACUTE MODERATE-SEVERE TRAUMATIC BRAIN INJURY**

Presenting Author: Catherine Wiseman-Hakes, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Additional Authors:
Pierre-Olivier Gaudreault, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Catherine Duclos, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Francis Bernard, Department of Medicine, Hôpital du Sacré-Cœur de Montréal
Julie Carrier, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Hélène Blais, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Nadia Gosselin

P054 **SLEEP DISORDERS IN CHRONIC HEPATITIS C INFECTION**

Presenting Author: Colin Shapiro, University Health Network
Additional Authors:
Colleen E. Carney, Ryerson University
Kelly McShane, Ryerson University
Dora Zalai, Ryerson University
Katalin Fornadi, University Health Network
Morris Sherman, University Health Network

P055 **SLEEP REGULATION IN THE STOP NULL MOUSE MODEL OF SCHIZOPHRENIA**

Presenting Author: Maxine Profitt, Department of Medical Neuroscience, Dalhousie University
Additional Authors:
Samuel Deurveilher, Department of Medical Neuroscience, Dalhousie University
George Robertson, Departments of Psychiatry and Pharmacology, Dalhousie University
Benjamin Rusak, Departments of Psychiatry, Psychology & Neuroscience, and Pharmacology, Dalhousie University
Kazue Semba, Departments of Medical Neuroscience, Psychology & Neuroscience, and Psychiatry, Dalhousie University

P056 **ROLE OF SLEEP QUALITY AND QUANTITY IN MODERATING THE EFFECTIVENESS OF MEDICATION IN THE TREATMENT OF CHILDREN WITH ADHD**

Presenting Author: Jessica Morash, Capital District Health Authority
Additional Authors:
Penny Corkum, Dalhousie University
Melissa Gendron, Dalhousie University
Jessica Waldon, Dalhousie University

P057 **IS CORTISOL OUTPUT ASSOCIATED WITH POOR SLEEP IN ADULTS WITH AUTISM?**

Presenting Author: Marjolaine Chicoine, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.
Additional Authors:
Élyse Limoges, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.
Élyse Chevrier, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.
Sonia Lupien, Human Stress Laboratory, Institut universitaire de santé mentale de Montréal
Laurent Mottron, Autism Clinic, Hôpital Rivière-des-Prairies, Montréal.
Roger Godbout, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.

P058 **TREATMENT RESISTANT DEPRESSION AND OBSTRUCTIVE SLEEP APNEA: PREVALENCE, SLEEP QUALITY AND PERCEIVED GENERAL HEALTH**

Presenting Author: Michael Best, Queen's University
Additional Authors:
Michael Fitzpatrick, Queen's University
Roumen Milev, Queen's University
Christopher Bowie, Queen's University
Ruzica Jokic, Queen's University

P059 **SLEEP DISTURBANCE AND DAYTIME SLEEPINESS INCREASE DEMENTIA RISK IN HEALTHY INDIVIDUALS INDEPENDENT OF OVERALL HEALTH STATUS**

Presenting Author: Roxanne Sterniczuk, Dalhousie University
Additional Authors:
Joshua Armstrong, Dalhousie University
Benjamin Rusak, Dalhousie University
Kenneth Rockwood, Dalhousie University

Sleep: Cognition and Behaviour

P060 **COGNITIVE CONSEQUENCES OF SLEEP DEPRIVATION AND SHIFT WORK FOR UNDERGROUND MINERS**
Presenting Author: Alexandra Clement, Laurentian University
Additional Authors:
Glenn Legault, Laurentian University

P061 **INFLUENCE OF ECOLOGICALLY VALID SOUNDS ON THE EVOKED K-COMPLEX**
Presenting Author: Kenneth Campbell, University of Ottawa
Additional Authors:
Paniz Tavakoli, University of Ottawa
Allyson Dale, University of Ottawa
Aziza Byron-Alhassan, University of Ottawa
Kenneth Campbell, University of Ottawa

P062 **FRONTAL SLEEP SPINDLES IN INSOMNIA: AN EXPLORATORY STUDY**
Presenting Author: Patrick St-Hilaire, École de Psychologie, Université Laval, Québec, Qc, Canada
Additional Authors:
Frédérick Desmarais, École de Psychologie, Université Laval, Québec, Qc, Canada
Jérémie Lefrançois, École de Psychologie, Université Laval, Québec, Qc, Canada
Alexandra Pérusse, École de Psychologie, Université Laval, Québec, Qc, Canada
Célyne Bastien, École de Psychologie, Université Laval, Québec, Qc, Canada

P063 **REM SLEEP ASSOCIATIVE MEMORY RECONSOLIDATION**
Presenting Author: Michelle Carr, University of Montreal

P064 **SCENT-CUED REACTIVATION DURING SLEEP AS A STRATEGY TO IMPROVE MEMORY OF TEXT**
Presenting Author: Kevin MacDonald, Brock University
Additional Authors:
Geoff Carre, Cape Breton University

P065 **PROBING THE CAUSAL ROLE OF STAGE 2 SLEEP IN MOTOR MEMORY CONSOLIDATION**
Presenting Author: Samuel Laventure, Université de Montréal
Additional Authors:
Stuart Fogel, Université de Montréal
Geneviève Albouy, Université de Montréal
Ovidiu Lundu, Université de Montréal
Bradley King, Université de Montréal
Pénélope Sévigny-Dupont, Université de Montréal
Julie Carrier, Université de Montréal
Julien Doyon, Université de Montréal

P066 **IMPACT OF SLEEP RESTRICTION ON DAYTIME MOVEMENT IN TYPICALLY DEVELOPING CHILDREN**
Presenting Author: Abbey Poirier, Dalhousie University
Additional Authors:
Jennifer Vriend, Dalhousie University
Fiona Davidson, Dalhousie University
Melissa Gendron, Dalhousie University
Penny Corkum, Dalhousie University

P067 **APPLICATION OF GOAL ATTAINMENT SCALING (GAS) IN CHILDREN WITH NEURODEVELOPMENTAL DISABILITIES (NDD/D) AND WILLIS EKBOM DISEASE (WED)**

Presenting Author: Osman Ipsiroglu, Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics
Additional Authors:
Sravan Jaggumantri, Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics
Tracy Pham, Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics

P068 **EFFECTS OF TYPE OF FEEDBACK ON DRIVING SIMULATOR PERFORMANCE DURING PROLONGED WAKEFULNESS**

Presenting Author: Alistair MacLean, Queen's University
Additional Authors:
Erin Blanchard, Queen's University

P069 **SLEEP DEPRIVATION IMPAIRS FUNCTIONAL MUSCLE RECOVERY FOLLOWING INJURY**

Presenting Author: Peter B. Schwarz, Departments of Cell & Systems Biology, University of Toronto
Additional Authors:
Wesley Graham, Departments of Cell & Systems Biology, University of Toronto
Fangming Li, Departments of Cell & Systems Biology, University of Toronto
Marius Locke, Kinesiology & Physical Education, University of Toronto
John H. Peever, Departments of Cell & Systems Biology, University of Toronto

2013 POSTER PRESENTING AUTHORS

POSTER ABSTRACTS

Aging

P001

CHARACTERISTICS OF OLDER ADULTS WHO ARE NAPPING

Presenting Author: Hamel, Alex, Université du Québec à Trois-Rivières

Additional Authors and Affiliations:
Desjardins, Sophie; Université du Québec à Trois-Rivières
Loranger, Jonathan; Université du Québec à Trois-Rivières
Lapierre, Sylvie; Université du Québec à Trois-Rivières
Marcoux, Lyson; Université du Québec à Trois-Rivières

Abstract:

Introduction: Napping is recognized as a common practice among the elderly. Almost 25% of the older adults take a daily nap. However the literature tells us little about those who practice it. The objective of this study was to investigate the characteristics of seniors who are napping.

Methods: A sample of 624 elderly people aged 65 to 93 was recruited from the community. Seventy percent of them were women. Information was obtained on frequency, duration, and time of napping. We evaluated quality of sleep using the Insomnia Severity Index. Other characteristics of subjects such as their body mass index were collected.

Results: Men are more likely than women to take a nap and nap frequency increases with age. However the frequency of naps does not seem to be related to the self-reported quality of sleep or body mass index. The subjects with normal weight are more likely than those who are overweight or underweight to take naps under 20 minutes. The nap duration is typically shorter in women than in men, but it is not related to their sleep quality. Half of seniors take their last nap of the day before 13:30. Time of napping was not associated with any particular characteristics of the subjects.

Conclusion: Our results suggest that older people who are napping have different profiles. The characteristics of the nap itself vary greatly from one person to another. This raises the importance of considering all of these factors in future studies.
Acknowledgements: Research supported by the Fonds québécois de recherche sur la société et la culture.

P002

GREY MATTER ATROPHY MEDIATES THE DECREASE OF SLOW WAVE DENSITY IN THE MIDDLE YEARS OF LIFE

Presenting Author: Dubé, Jonathan, (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada

Additional Authors and Affiliations:
Lafortune, Marjolaine; (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Bedetti, Christophe; (1) Centre de recherche de l'Hôpital du Sacré-Coeur de Montréal, Canada (2) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Latulipe-Loiselle, Alex; (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Martin, Nicolas; (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Bouchard, Maude; (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada
Doyon, Julien; (1) Département de psychologie, Université de Montréal, Canada (2)Unité de Neuroimagerie fonctionelle, Centre de recherche de l'Institut universitaire de Montréal, Canada
Evans, Allan; (1) Department of Neurology, Montreal Neurological Institute and Hospital City, Canada
Carrier, Julie; (1) Département de psychologie, Université de Montréal, Canada (2) Centre d'études avancées en médecine du sommeil, Canada (3) Centre de recherche de l'Institut universitaire de gériatrie de Montréal, Canada

Abstract:

Introduction: Recent magnetic resonance imaging (MRI) studies showed that grey matter volume is associated with slow wave (SW) variables in young subjects. SW undergoes significant alterations during aging. However, the extent to which brain atrophy contributes to the age effects on SW remains unknown. We sought to assess cerebral correlates of age-related changes in SW using cortical thickness (CT) MRI analyses.

Methods: Polysomnography was recorded in 30 young (20–30 y; 16 men) and 33 middle-aged (50-70 y; 15 men) subjects. Mean SW density between pairs of electrodes (Fp1-Fp2; F3-F4; C3-C4; P3-P4; O1-O2; T3-T4) was calculated for all-night non-rapid-eye-movement sleep. Subjects underwent a brain MRI, and CT was calculated over the entire cortical surface with the CIVET pipeline. Statistical parametric maps (SPMs) were produced using SurfStat. Mediation analyses were performed using SPSS to investigate the contribution of CT in the age–related reduction of SW density.

Results: Compared to the young, middle-aged subjects showed lower SW density ($p<0.05$) on all derivations, particularly in frontal regions. Also, CT was negatively associated with age in several areas, including precentral/temporal/parietal and occipital cortices ($p<0.001$, RFT-corrected). For those regions, and controlling for the effects of age, SPMs analyses revealed a positive association between CT and SW density on frontal derivations ($p<0.001$, RFT-corrected). Importantly, mediation analyses showed that the relationship between age and SW density was no longer significant when controlling for CT in infero-temporal and precentral gyri. Effect size showed that there was a strong mediation effect by CT in the reduction of SW density during aging ($K2=0.44$, $p<0.0001$).
Interpretation: Our results showed that grey matter reduction in temporal and precentral gyri could explain the decrease of SW density during the middle years of life. Future studies should explore the potential relationship between brain integrity and sleep-related cognitive functions during aging.

P003

SLEEP ENVIRONMENT IN THE ELDERLY

Presenting Author: Loranger, Jonathan, Université du Québec à Trois-Rivières

Additional Authors and Affiliations:
Desjardins, Sophie; Université du Québec à Trois-Rivières
Hamel, Alex; Université du Québec à Trois-Rivières
Lapierre, Sylvie; Université du Québec à Trois-Rivières
Marcoux, Lyson; Université du Québec à Trois-Rivières

Abstract:

Introduction: Few studies have provided data about the sleep environment of adults aged 65 years and over. Since the elderly are often struggling with illness or pain, a calm and comfortable sleep environment seems even more important. Our aim was to describe the sleep environment of male and female community-dwelling elderly and to determine the association between the sleep environment of older people and the quality of their sleep.

Methods: The sample included 188 male and 436 female subjects aged 65 years and over (79.7±5.0 years old). Participants answered questions about the comfort of their pillow, the comfort of their mattress, the noise and the luminosity of their bedroom at night and in the morning. Sleep quality was assessed using the Insomnia Severity Index.

Results: About 20% of seniors evaluate their pillow and their mattress as uncomfortable. More than 8% of participants reported that their bedroom is moderately or very noisy at night and more than 10% in the morning. More than 10% of people say their bedroom is moderately or very bright at night. In the morning, nearly 45% of subjects make the same assertion. For all variables in the study, it is women who tend to report environments less conducive to sleep. Sleep quality of women is also lower than that of men ($F=4.48$, $p<0.05$). Against all expectations, it often happens that the worst sleepers were those with the best sleeping environments.

Conclusion: A significant proportion of elderly people are sleeping in environments not conducive to sleep. However, poor sleepers seem to be those who seek to have the best possible sleep environment. Research is required to understand what makes some seniors sleep very well in environments that are not conducive to sleep.

Acknowledgements: Research supported by the Fonds québécois de recherche sur la société et la culture.

P004

INTERHEMISPHERIC EEG COHERENCE IN NREM SLEEP IS LINKED TO WHITE MATTER INTEGRITY OF CORPUS CALLOSUM IN OLDER SUBJECTS

Presenting Author: Bouchard, Maude, 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal

Additional Authors and Affiliations:
Lafortune, Marjolaine; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Bedetti, Christophe; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Rosinvil, Thaïna; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal
Martin, Nicolas; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Dubé, Jonathan; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Gaudreault, Pierre-Olivier; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal
Godbout, Jonathan; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal
Lina, Jean-Marc; 4-École de Technologie Supérieure (ETS)
Carrier, Julie; 1-Center for advanced research in sleep medicine (CARSM), Hôpital du Sacré-Cœur de Montréal 2- Department of Psychology, Université de Montréal 3-Research Center, Institut Universitaire de Gériatrie de Montréal

Abstract:

Introduction: Considerable changes happen in NREM sleep synchronization with aging, such as a reduction in delta and sigma spectral activity. The brain also undergoes a decrease in white matter integrity with aging. Here, we aimed to asses whether interhemispheric coherence in delta and sigma is linked to white matter integrity of the corpus callosum in young and older subjects.
Method: One night polysomnographic recording was performed in thirty young (22.9y ± 2.8) and 30 older (59.6y ± 5.6) healthy subjects. Coherence between pairs of electrodes (Fp1-Fp2; F3-F4; C3-C4; P3-P4; O1-O2) was computed for delta (1-4Hz) and sigma frequency bands (12-14Hz) during the first 30 minutes of artifact-free consolidated NREM sleep. Integrity of the corpus callosum was assessed with diffusion magnetic resonance imaging (dMRI) using fractional anisotropy (FA) and mean diffusivity (MD).
Results: Compared to young individuals, older subjects showed lower interhemispheric coherence for the sigma band in C3-C4 ($p<.01$) and P3-P4 ($p<.05$). Coherence also tended to be lower for the delta band in

Fp1-Fp2 (p=.075). For white matter integrity, FA was lower and MD was higher in older than in young subjects (FA: p<.00001; MD: p<.02). Older subjects showed positive correlations between FA and sigma coherence in Fp1-Fp2 (r = .65; p<.001) and F3-F4 (r =.39; p<.05) and between FA and delta coherence in Fp1-Fp2 (r = .54; p<.01). Older subjects also showed a negative correlation between MD and sigma coherence in Fp1-Fp2 (r = -.49; p<.01). No significant correlation was found in the young subjects.

Conclusion: In older subjects only, better interhemispheric coherence in delta and sigma frequencies in anterior regions is associated with higher integrity of white fibers in the corpus callosum. These results show that EEG coherence could be sensitive to the white matter loss accompanying aging. The functional implications of these results should be investigated next.

P005

SAFETY PROFILE OF DOXEPIN 3 AND 6 MG IN ELDERLY INSOMNIA PATIENTS: AN EXAMINATION OF THE DATA THAT INFLUENCED RECENT UPDATES TO THE BEERS CRITERIA

Presenting Author: Durrence, H Heith, Paladin Labs (Somaxon)

Additional Authors and Affiliations:
Dorsey, Brian T.

Abstract:

The American Geriatrics Society updated the Beers Criteria for potentially inappropriate medication use in older adults in 2012. Specifically, the recent changes clarified that doxepin (DXP) doses ≤6 mg are considered appropriate for use in the elderly population. This report reviews safety data of DXP (Silenor) 3 and 6mg in elderly insomnia patients that were the basis for these changes.

Safety endpoints from 2 double-blind placebo-controlled trials of elderly insomnia patients are reported. Study A was a 12-week trial and Study B was a 4-week trial. Safety endpoints assessed include adverse event (AE) reporting, next-day residual effects, and sleep architecture.

Overall, DXP 3 and 6mg were well-tolerated in both studies, with no apparent dose-related effects on safety and lower rates of study discontinuations compared with placebo (PBO). Rates of treatment-emergent AEs for DXP 3 and 6 mg were similar to PBO in both studies. In Study A, 52% of PBO patients and 38% of DXP 3 mg patients experienced an AE. In Study B, 27% of PBO patients and 31% of DXP 6 mg patients experienced an AE. In both trials, the most common AEs were headache and somnolence. In terms of next-day residual effects, there were no significant differences between PBO and DXP 3 mg at any time point in Study A. There were no reports of complex sleep behaviors, memory impairment or cognitive disorder in any DXP-treated patient.

Data from these studies of elderly insomnia patients indicate that DXP 3 and 6mg were both highly efficacious and well-tolerated. Further, there was no evidence of REM suppression or anticholinergic effects, and no reports of complex sleep behaviors, memory impairment, or amnesia. Most relevant for this patient population, DXP at these doses significantly improved endpoints associated with sleep maintenance and early morning awakenings without evidence of next-day residual effects.

Breathing

P006

IS THERE A GENDER-BIAS FOR UNDER-REPORTING OF OBSTRUCTIVE SLEEP APNEA (OSA) USING A PORTABLE MONITOR?

Presenting Author: Driver, Helen, Queen's University and Kingston General Hospital

Additional Authors and Affiliations:
Pereira, Effie; Queen's University
Stewart, Steven; Queen's University
Fitzpatrick, Michael; Queen's University and Kingston General Hospital

Abstract:

Introduction: We've previously reported a gender-bias in under-reporting the rate of respiratory events for females versus males using portable monitor (PM) derived respiratory disturbance index (RDI) compared with in-laboratory polysomnography (PSG) derived apnea-hypopnea index (AHI) recorded on the same night. In a subsequent study, we have investigated the RDI from at-home PM compared with AHI recorded on a subsequent night in-laboratory.

Methods: 44 females and 84 males (mean ± SD: age 50.5 ± 12.4 years, BMI 31.2 ± 6.6 kg/m2) had at-home PM followed within 3 months by in-laboratory PSG. Both the Level III PM (MediByte; Braebon Medical Corporation) and PSG (Sandman Elite SD32+ (Natus [Embla]) included a nasal cannula pressure transducer airflow signal. Hypopneas were scored as a reduction in pressure-derived airflow of ≥50% from baseline for at least 10 seconds followed by at least a 3% oxygen desaturation and/or an arousal for PSG (alternative criteria).

Results: For women and men respectively, the mean± SD for the PM-RDI 19.4 ± 19.7/hr and 22.6 ± 19.8/hr and the PSG- AHI was 27.2 ± 27.9/hr and 36.3 ± 26.9/hr. For all 128 participants, the mean difference between the PM-RDI and the PSG-AHI, showed under-reporting by the PM by -11.6 ± 19.9 events/hr, limits of agreement (± 2SDs) +28 and -51; under-reporting by the PM for women was -7.7 ± 17.7 events/hr and for men -13.7 ± 20.7 events/hr. Categorizing men into non-obese (n=37) and obese (n=47) based on BMI > 30 kg/m2, non-obese men PM-RDI 19.7± 18.3/hr and PSG-AHI 24.9 ± 20.8/hr and obese men PM-RDI 27.6± 19/hr and PSG-AHI 43.1 ± 30.3/hr. The PM- RDI under-reported the rate of respiratory events for women as well as non-obese men by 27% ($p < 0.001$, IRR = 0.73, 95% CI: 0.70, 0.75); for obese men, under-reporting was by 38% ($p < 0.001$, IRR = 0.62, 95% CI: 0.60, 0.64).

Conclusion: There was no gender-bias for under-reporting respiratory events using a PM, rather under-reporting was greatest for obese men.

P007

"WHEN YOU KNOW BETTER, YOU DO BETTER". USING AN EDUCATIONAL BOOKLET TO ENHANCE CPAP COMPLIANCE

Presenting Author: Shapiro, Colin, University Health Network ,University of Toronto

Additional Authors and Affiliations:
Zalai, Dora; Ryerson University

Abstract:

INTRODUCTION: Untreated obstructive sleep apnea (OSA) has severe health ramifications and economic impact. Placing this information in an easily accessible form can have benefits for those affected with CPAP compliance difficulties. The objective of this study was to determine the association between patient education and CPAP compliance.

METHODS: 200 consecutive patients of an urban sleep clinic and 200 patients in a small rural facility were enrolled in the study. 100 patients in each location received the standard consultation with their physicians after the diagnosis of OSA before receiving their CPAP machine. The other 100 patients received an educational booklet on OSA in addition to the standard consultation with their doctors. All patients had a one month and a one year follow up with the consultant. CPAP compliance was assessed at the one year follow up visit. Compliance was defined as a regular CPAP use five or more nights per week and a minimum of five hours each night.

RESULTS: At one year follow-up 75% patients in the standard consultation group in the urban location were compliant CPAP users. The compliance rate of patients who received the booklet was 87% at follow up. There was a significant association between the receiving the booklet and CPAP compliance ($\chi 2 = 4.68$, $p < .05$) in this group. In the rural location the compliance rate of 89% in the special education group was not significantly higher than the compliance rate of 82% in the control group.

CONCLUSION: Education was associated with high CPAP compliance in the less compliant group. In a review we have previously showed very high compliance rates at the rural center. This booklet appears to be a valuable tool for improving patient education and CPAP adherence.

P008

REM-RELATED OBSTRUCTIVE SLEEP APNEA IN NON-OBESE ADULTS WITH TREATMENT RESISTANT DEPRESSION AND INSOMNIA: A PRELIMINARY STUDY

Presenting Author: Hajiazim, Payman, University of Toronto

Additional Authors and Affiliations:
Mollayeva, Tatyana; University of Toronto
Shapiro, Colin; University of Toronto

Abstract:

Background: Recently, there has been increased recognition of the link between OSA and depression. Sleep changes are intrinsic to depressive disorders, most notably REM sleep. In younger and non-obese patients, OSA may occur predominately in REM sleep. If REM-related OSA patients do not present with daytime drowsiness/sleepiness and Apnea-Hypopnea index is within norms, they may be left untreated. The aim of this study was 1) to identify the prevalence of REM-related OSA in non-obese patients with treatment-resistant depression referred to overnight sleep studies for investigation of persistent insomnia; 2) to review its relationship with other factors.

Methods: A retrospective medical chart review of a selective sample of patients with long histories of major depression with poor response to treatment who underwent sleep studies at West Parry Sound Health Centre Sleep Clinic between Mays 2012-13 for the assessment of persistent chronic insomnia. Findings: Seventeen patients (29 % males, 71% females) met inclusion criteria. Mean age was 30.7, BMI average was less than 35. OSA diagnosis was confirmed in 77% of cases, of which 62% had REM–related OSA only and whose life-time prevalence of depression was 75%. Chronic pain was reported by 75% of the patients with REM-related OSA.

Conclusions: Insomnia, REM-related OSA and treatment-resistant depression may be co-occurring. Other variables associated with insomnia include female sex, chronic pain, and psychiatric diagnosis. Collectively, our results suggest REM-related OSA is highly prevalent in younger non-obese patients with insomnia and treatment-resistant depression and is associated with chronic pain. While the REM–related OSA on its own can lead to poorer health outcomes in sufferers, its clinical significance and relationship with treatment-resistant depression and chronic pain is still unclear. More research in this direction is warranted.

Dreams

P009

DOES DREAM RECALL CAPACITY INFLUENCE THE PERFORMANCE AND LEARNING OF A VISUO-MOTOR TASK?

Presenting Author: Dumel, Gaelle, Center for Advanced Research in Sleep Medicine

Additional Authors and Affiliations:
Marquis, Louis-Philippe; Centre for Advanced Research in Sleep Medicine
Blanchette-Carriere, Cloe; Center for Advanced Research in Sleep Medicine
Nielsen, Tore; Center for Advanced Research in Sleep Medicine

Abstract:

Introduction: Many studies report that REM sleep plays an important role in learning; some even find that dreaming of a learning task is associated with enhanced task performance (e.g., Wamsley). The aim of the present study was to examine if performance and improvement on a REM sleep-sensitive visuo-motor task is associated with dream recall capacity (DRC).

Methods: Thirty-five healthy participants were recruited to sleep one night in the laboratory (visit 1) and to return for a post-lab visit 1 week later (visit 2). The Mirror-Tracing task was performed three times: in the evening 30min prior to sleep (T1), in the morning 30min after waking up (T2), and at visit 2 (T3). Task performance was scored for #errors/minute at each time task improvement was calculated as scores for T1-T2 and T2-T3. All participants completed the Inventory of Dreams: Experiences and Attitudes that evaluates different factors including DRC (1-5scale, 1= very low DRC vs 5= very high DRC). DRC was used to separate subjects into two groups: Low-Recallers obtained a score <3 (N=15, 6 males, 9 females, 24.9±4.6 yrs); High-Recallers obtained a score ≥3 (N=20, 11 males, 9 females, 24.7±3.8 yrs).

Results: Mann-Whitney tests revealed a group difference at T1, with higher #errors/minute for Low-Recallers (Zadj = 2.53, p=0.01), but no differences at T2 (Zadj = 1.43, p=0.15) or T3 (Zadj = 1.50, p = 0.13). Groups differed on task improvement between T1 and T2, with greater improvement for Low-Recallers (Zadj=2.60, p<0.01). The latter improvement brought Low-Recallers up to the level of High-Recallers.

Conclusion: Low-Recallers show inferior performance on the Mirror-Tracing task but improve their performance to the level of High-Recallers after a single night of sleep. Results suggest a possible REM sleep deficit for Low-Recallers, a hypothesis that will be tested with further analyses of their REM and NREM laboratory sleep.

P010

OVERNIGHT IMPROVEMENTS ON TWO REM SLEEP-SENSITIVE TASKS ARE ASSOCIATED DIFFERENTIALLY BOTH REM AND NREM SLEEP CHANGES AND AWAKENINGS FOR DREAM RECALL

Presenting Author: Nielsen, Tore, Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Additional Authors and Affiliations:
Carr, Michelle; Dept. Biomedical Sciences,Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Dumel, Gaelle; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Godin, Isabelle; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Solomonova, Elizaveta; Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Lara-Carrasco, Jessica; Dept. Psychology,Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Paquette, Tyna; CARSM, Hôpital du Sacré-Coeur de Montréal
O'Reilly, Christian; Dept. Psychiatry, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Abstract:

Introduction: The contribution of specific sleep stages to memory consolidation effects remains controversial, with 'dual-process,' 'sequential,' and 'sleep organization' models having been proposed. Participants were administered two REM sleep-sensitive tasks in the same experiment to determine whether these would lead to changes in REM sleep, NREM sleep, or both.

Methods: Twenty-two participants (mean age: 25.0 ± 5.0), 15 women and 7 men, were administered the Corsi Block Tapping (CBT) task and the Tower of Hanoi (ToH) pre- and post-sleep with overnight PSG; task-improved and non-improved groups were compared on primary sleep measures: minutes and % of sleep stages (REM, N1, N2, N3), #awakenings for dream reporting, post-awakening presence/absence of a recalled dream.

Results: CBT improvement was associated with more REM minutes (p=.013) and higher %REM (p=.018); ToH improvement with more N2 minutes (p=.024) and higher %N2 (p=.044) and fewer N3 minutes (p=.036) and lower %N3 (p=.005). Correlations were found between CBT improvement and REM minutes (r(22)=.662, p=.001) and %REM (r22=.540, p=.010), and between ToH improvement and N2 minutes (r(19)=-.408, p=.083) and %N2 (r(19)=-.468, p=.043). Partialling out evening performance scores eliminated the ToH/N2-N3 effects, but not the CBT/REM effect, suggesting that the former may be due to group trait differences. #REM (but not #N2) awakenings for dream reporting were associated with CBT (p=.056), but not ToH, improvements; this CBT effect was reduced (p=.148) when controlling for REM time. Recall of dream content was not associated with task improvement.

Conclusions: Non-replication of one of 2 REM-sensitive task effects challenges both 'dual-process' and 'sequential' or 'sleep organization' models of sleep-dependent learning. Results rather point to learning

capacity limitations on REM sleep. Experimental disruptions of sleep for sampling dreaming may not perturb sleep-dependent effects; they may even enhance them.

Supported by research grants from the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

P011

THE DREAMS OF ADOLESCENT CANADIANS: EXPLORATION OF GENDER DIFFERENCES

Presenting Author: Dale, Allyson, University of Ottawa

Additional Authors and Affiliations:
Wong, Christina; University of Ottawa
De Koninck, Joseph; University of Ottawa

Abstract:

Previous studies in Europe and the United States found that adolescent males have more males and experience more total aggression in their dreams while adolescent females have more females and a higher befriender percentage. The current study attempts to replicate previous findings and explore additional features in the dreams of adolescent Canadians. Fifty males and 50 females, ages 12-17, kept a diary of day's events and dreams for 10 days. One dream per participant was scored by two independent judges, with inter-rater reliability, using the Hall and Van de Castle method of content analysis. All variables were controlled for dream report length by dividing by word count. Dream SAT was used for statistical comparisons and a control was used for multiple comparisons with a family-wise error rate. Independent samples t-tests revealed that females had significantly more female ($t(98) = -2.785$, $p = .006$) and family characters ($t(98) = -2.683$, $p = .009$.), whereas males had significantly more strangers ($t(61) = 3.578$, $p = .001$). Males had both more total aggression ($t (74) = 2.452$, $p = .017$), and more aggression causing physical harm ($t (60) = 2.349$, $p = .022$). Females were more often the befrienders in dreams than males when examining friendliness ($t (50) = 3.144$, $p = .003$). In addition, variables in Dream SAT measuring positive and negative tone revealed that males had more negatively toned dreams than females ($t (87) = 2.653$, $p = .009$). The results of the current study support previous research on gender differences in the dreams of adolescents and stress the early appearance of aggression and strangers in male dreams compared to female dreams. Future research should examine the evolution of these differences from adolescence to young adulthood.

Epidemiology

P012

SLEEP PATTERNS AND SLEEP DISORDERS AMONG UNIVERSITY STUDENTS IN LEBANON

Presenting Author: Tannous, Fida, University of Holy Spirit Kasik, Lebanon

Additional Authors and Affiliations:
Assaad, Shafika; Lebanese University Medical School, Lebanon
Costanian, Christy; Queen's University, England

Abstract:

AIM: The aim of this research was to study sleep habits and sleep disorders in a population of university students across Lebanon by using the Pittsburg Sleep Quality Index as a tool to investigate sleep quality.

METHODS: Sleep habits and problems were investigated using a convenience sample of students mainly aged between 20 and 23 years old, from six universities across Lebanon. The study was carried out during 2012. A self- administrated questionnaire was used. All data were coded, entered, and then analyzed using the Statistical Package for Social Sciences program (SPSS), version 18.

RESULTS: 735 students responded, of which 61.1% were between the age of 20 and 23 years old. Reported mean duration of night sleep was 6.67±1.67 hours. 58.4% woke up between 6 and 8 am, and 40.4% went to bed after midnight. The average of sleep latency was 24.64±1.1 minutes. 21.1% of the students reported using medications to enhance sleep. Around 41% of the study sample had trouble maintaining enthusiasm to accomplish tasks, and more than 50% had daytime sleepiness. Sleep quality was reported as fairly good in 47.3% and fairly poor in 23.8%. Poor sleep quality was significantly associated with daytime dysfunction and sleep- enhancing medication using.

CONCLUSION: Recent studies showed that sleep disorders are a cause of mental illness. Insomnia was common among Lebanese students which predispose them to depression and mood disorders.

P013

EVALUATION OF OSA DISEASE SEVERITY AND DEMOGRAPHICS AT A TERTIARY SLEEP DISORDER CENTER

Presenting Author: Stewart, Samuel, University of Saskatchewan

Additional Authors and Affiliations:
McCae, Scott; Saskatoon City Hospital
Reid, John; University of Saskatchewan
Gjevre, John; University of Saskatchewan
Fenton, Mark; University of Saskatchewan
Cotton, David; University of Saskatchewan
Skomro, Robert; University of Saskatchewan

Abstract:

BACKGROUND: The sleep lab for the Saskatoon Health Region has been gathering all patient data entering both home monitoring (Sleepwell) and in hospital management (Sleeplab) since 2008. This project studied disease severity in both groups over time and between units, along with the effect of patient demographics.

METHODS: All patients referred to the SDC services between 2008 and 2012 were extracted from the database (N=8198). Demographic information including age, gender, BMI, AHI at first appointment were extracted, along with treatment information from both Sleeplab and Sleepwell.

RESULTS: From 2008-2012 patients' BMI and average age have increased, and recently there has been a marked difference in the BMI and ages between units, with Sleeplab patients being more overweight (1.51 units higher in 2012, P=0.001) and older (1.13 years, P=0.001). Patients from Sleepwell were more likely to Mild or Moderate disease (5 < AHI < 30) (OR=1.64, 95% CI: [1.46, 1.84], P<0.0001). Controlling for BMI, age and gender did not change this effect, though all three significantly relate to disease severity, demonstrating that patients with mild/moderate AHI have lower BMI, are younger and are more likely to be female. Location was also related to disease severity, with average AHI of patients from Saskatoon of 25.05 vs. 30.41 for non-Saskatoon patients (P<0.0001).

CONCLUSION: Patients with mild/moderate AHI are slimmer and younger than patients with extreme AHI levels, and they are treated at home more often than in lab. These differences should be taken into consideration when managing patients, particularly as our patient demographics change. Patients from outside Saskatoon tend to be sicker, indicating that the decision to treat may be influenced by ease of access.

P014

IMPACT OF INTRODUCTION OF HM PATHWAY ON PSG WAIT TIMES AT A TERTIARY SLEEP DISORDERS CENTER

Presenting Author: Stewart, Samuel Alan, University of Saskatchewan

Additional Authors and Affiliations:
McCrae, Scott; Saskatoon City Hospital
Reid, John; University of Saskatchewan
Gjevre, John; University of Saskatchewan
Fenton, Mark; University of Saskatchewan
Cotton, David; University of Saskatchewan
Skomro, Robert; University of Saskatchewan

Abstract:

BACKGROUND: Timely access to treatment is one of the key challenges in managing patients with chronic sleeping problems. The introduction of level III home monitoring programs provides an alternative to in-hospital evaluation, allowing for more patients to be seen in a timely manner. We have analyzed our PSG (Sleeplab) and home monitoring (Sleepwell) records from the last 5 years to evaluate how the introduction of HM has improved wait times for treatment at SHR.

METHODS: We retrospectively investigated 4 year wait times for all patients from 2009-2012: for patients in the HM pathway we measured time from referral to level III and time from level III to auto study. For patients in the PSG pathway we measured time from referral to appointment in the lab. Indicate the number of patients in each arm

RESULTS: In all three time intervals we saw a significant improvement in wait times. Using cumulative incidence analysis we found a median time to Level III testing of 40 days in 2012, compared to medians of 136, 66 and 62 for 2009-2011, a significant improvement ($P<0.0001$). Median time from Level III testing to auto CPAP was 43 days, compared to values of 81, 87 and 98 for 2009-2012 ($P=0.001$). Likewise median time in-lab PSG referral to appointment was 126 days, an improvement over medians of 670, 321, 432 and 146 for 2008-2012 ($P<0.0001$). Extending the models to account for distance from hospital and health metrics did not change the results.

CONCLUSION: Through a concerted effort of the sleep clinicians in Saskatoon and the introduction of an HM program we have managed to significantly reduce wait times for patients. The gap between Sleeplab and Sleepwell wait times demonstrates that Sleepwell is the better choice when appropriate to ensure that patients are receiving timely treatment.

P015

CARE MANAGEMENT PATHWAY NAVIGATION AT A TERTIARY SLEEP DISORDER CENTER

Presenting Author: Stewart, Samuel, University of Saskatchewan

Additional Authors and Affiliations:
McCrae, Scott; University of Saskatchewan
Reid, John; University of Saskatchewan
Gjevre, John; University of Saskatchewan
Fenton, Mark; University of Saskatchewan
Cotton, David; University of Saskatchewan
Skomro, Robert; University of Saskatchewan

Abstract:

BACKGROUND: The sleep lab for the Saskatoon Health Region has been using a combination of PSG (Sleeplab) and home monitoring (Sleepwell) to manage their patients since 2008, but there is no strict care pathway for assignment of individuals to Sleepwell vs. Sleeplab. This project is reviewing the results from the last 5 years to look at the use of both programs, along with treatment outcomes and the difference between urban and rural patients.

METHODS: All patients referred to the SDC services between 2008 and 2013 were extracted (N=8966). Their primary treatment method, final treatment outcome (CPAP pressure) and postal code were extracted. Distance to hospital was calculated from postal codes using Canada Post's approximation files.

RESULTS: Since 2008 the proportion of patients assigned to Sleepwell has increased significantly, from 18.8% in 2008 to 43.7% in 2012 ($P<0.0001$). Patients assigned to Sleepwell ended their studies with higher CPAP pressures (11.19 vs. 10.51, $P<0.0001$), and had a smaller range of CPAP pressures (SD=1.64 vs. 2.93). Location was found to be a statistically significant but minor contributor to assignment to Sleeplab: your odds of going to the lab increase 1.04 times when distance from hospital is doubled (95% CI: [1.02, 1.07], P=.001).

CONCLUSION: The use of Sleepwell has increased substantially since its inception, and is approaching a majority of patient assignments. Sleepwell patients tend to end their studies with higher final pressures, but also within a lower range, suggesting that the extreme patients are being assigned more often to Sleeplab.

Instrumentation & Methodology

P016

COMPARISON OF AN AUTOMATED POLYSOMNOGRAPHY SCORING SYSTEM VERSUS COMPUTER-ASSISTED MANUAL SCORING

Presenting Author: MacDonald, Kevin, Brock University

Additional Authors and Affiliations:
Iakovenko, Olga; MedSleep
Blackman, Adam; MedSleep

Abstract:

Ninety-four polysomnograms conducted across four MedSleep sleep clinic sites scored by both computer-assisted manual human scorers and an automated scoring system (YST-Limited, Winnipeg, Canada) were used to compare the agreement between these two scoring methods. The sample of patients selected contained 58 diagnosed with obstructive sleep apnea (OSA), 13 diagnosed with insomnia, 9 diagnosed with excessive daytime sleepiness, and the remaining 14 diagnosed with periodic limb movement disorder (5), restless leg syndrome (3), narcolepsy (2), REM behaviour disorder (2), or chronic fatigue syndrome (2). Variables examined included sleep staging variables, arousals, and respiratory events. Krippendorff's alpha was calculated for each variables in the total sample as well as the OSA patients separately to obtain an index of the inter-rater reliability between human and automated scoring. Good inter-rater reliability was found across in the entire clinical sample for only total sleep time time ($\alpha = 0.89$), time in stage 2 sleep ($\alpha = 0.83$), and sleep efficiency ($\alpha = 0.80$). Many measures of arousals and other sleep staging variables showed inter-rater reliability estimates less than 0.6. Inter-rater reliability estimates for arousals, apneas, and hypopneas in the OSA sample were all found to be less than 0.8. Case-by-case investigation suggests that poor reliability for sleep staging variables may be a result of fair agreement in most cases, but exceptionally poor agreement in differentiating sleep stages in a minority of cases. Although not examined here, poor reliability in sleep staging and arousal measures should be considered with evidence that subjectivity in these measures results in imperfect reliability even among expert scorers (Danker-Hopfe et al., 2009; Malhotra et al., 2013). Despite some current short-comings, it is concluded that the automated scoring system under development has a potential role in complementing human scoring for at least some sleep variables given further refinements.

P017

VALIDATION OF BODYMEDIA'S SENSEWEAR™ ARMBAND FOR DETERMINING SLEEP AND WAKE IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

Presenting Author: Sharif, Muhammad Munir, King Saud University

Additional Authors and Affiliations:
BaHammam, Ahmed S.; King Saud University

Abstract:

Introduction: The BodyMedia's SenseWear™ Armband (BSA) is a portable device that measures skin temperature, galvanic skin response, heat flux, and body acceleration (accelerometry). Accelerometry is measured using a two-axis micro-electronic mechanical sensor and the device has a built in algorithm that can identify sleep and wakefulness based on arm movement. Obstructive sleep apnea (OSA) is a special group of patients who have excessive movements during sleep, which may affect the accuracy of BSA algorithm in scoring sleep and wake.

Objectives: To evaluate the validity of the BSA device in detecting sleep-wake pattern and sleep efficiency in patients with obstructive sleep apnea (OSA).
Material and Methods: Simultaneous overnight recordings of in-laboratory polysomnography (PSG) (using EEG channels F3-F4, C3-C4, O1-O2, and M1-M2) and BSA were performed on (1) 107 OSA (mean age of 45.2±14.3 years, BMI 34.6±8.5, mean apnea hypopnea index of 43±35.7/hr and (2) 30 controls matched with OSA patients for age and body mass index (BMI). PSG was scored manually according to the American Academy of Sleep Medicine guidelines.

Results: There was no significant difference in both OSA and control patients between BSA and PSG with regard to total sleep time, total wake up time and sleep efficiency. There were also strong correlations between BSA and PSG with regard to total sleep time ($r=0.84$; $p<0.001$), total wake up time ($r=0.61$;$p<0.001$) and sleep efficiency ($r=0.52$;$p<0.001$). Bland Altman plots showed strong agreement between total sleep time, wake up time and sleep efficiency for both OSA and the controls.

Conclusion: Results suggest that BSA is a reliable method for determining sleep in patients with and without OSA when compared against the gold standard(PSG). BSA can be a useful tool in determining sleep in patients with OSA and can be combined with portable sleep studies to determine TST.

P018

NIGHTLY VARIATIONS IN SLEEP POLYGRAPHY

Presenting Author: Skjodt, Neil M., Canadian Centre for Behavioural Neuroscience

Additional Authors and Affiliations:
Platt, Ronald S.; SagaTech Electronics, Inc.

Abstract:

Introduction: We aimed to quantify the clinical significance and possible clustering of recently described nightly variations in home sleep polygraphy (ERS 2013 abstract 855387).

Methods: We did descriptive, Bland-Altman, and cluster analyses of subjects with two nights of technically acceptable polygraphy referred to a web portal for specialist interpretation (R 3.0.1, libraries: ResearchMethods 1.4, mclust 4.1).

Results: 1 011 of 23 599 (4.3%) subjects had two acceptable nights of polygraphy. This cohort had a moderate pre-polygraphy risk of sleep apnea (median:59.8; IQR 42.0-84.9%) based on adjusted neck circumference. The median difference between the first and second nights' estimated RDIs was 0.32 / h (range [- 78.1, 68.1 / h], IQR [-3.3, 4.0 / h]). Bland-Altman analysis of estimated RDI results showed minimal bias but moderate disagreement (95% CI [-22, 23/h]) owing to mid-range (20 to 35/h) symmetrically distributed outliers. Weighted sums of squares analyses suggested 3 to 5 clusters of differences in nightly RDI.

Conclusions: Repeated sleep polygraphy is: 1.) rarely used, 2.) ordered in moderate OSA risk subjects, and 3.) shows infrequent but wide variation with two to four clusters of atypical patients. These clusters suggest unrecognized variations in the natural history of sleep apnea.

P019

CONCORDANCE OF ACTIGRAPHY AND POLYSOMNOGRAPHY IN SCHOOL-AGED CHILDREN WITH ATTENTION-DEFICIT/HYPERACTIVITY DISORDER AND THEIR TYPICALLY DEVELOPING PEERS

Presenting Author: Gendron, Melissa, Dalhousie University

Additional Authors and Affiliations:
Walton, Jessica; Dalhousie University
Corkum, Penny; Dalhousie University
Rusak, Benjamin; Dalhousie
Andreou, Pantelis; Dalhousie University
Rajda, Malgorzata; Dalhousie University

Abstract:

Introduction and Objectives: Actigraphy has become an increasingly popular indirect measure of sleep over the past 20 years. In adult populations, actigraphy has been shown to estimate sleep reliably in comparison to polysomnography (PSG). However, there is very little evidence on the correlation between actigraphic and PSG sleep measures in typically developing (TD) children, and no evidence related to children who have attention-deficit/hyperactivity disorder (ADHD). The objectives of this study were as follows: 1) to compare PSG-derived total sleep duration, sleep latency, and sleep efficiency to the same variables estimated by actigraphy; 2) to examine whether the correlation between PSG and actigraphy estimates of sleep variables differ between children with ADHD and TD children; and 3) to determine whether these correlations are altered when children with ADHD are treated with methylphenidate.

Materials and Methods: There were 48 participants aged 6-12 years, including 24 children with ADHD and 24 TD controls. All participants completed a one-week baseline assessment during which their typical sleep and daytime functioning were assessed. Following the baseline week, participants in the ADHD group completed a blinded 4-week randomized control trial of Biphentin®, an extended release formulation of methylphenidate hydrochloride (MPH). At the end of each study week (Baseline, MPH, and Placebo) participants were studied in a sleep research laboratory, where overnight PSG and actigraphy was recorded concurrently.

Results and Conclusions: The results demonstrate that while PSG and actigraphy are significantly correlated on some sleep measures and that actigraphy generally provides reasonable estimates of sleep variables in comparison to PSG, there is very large inter-individual variability, particularly for children with ADHD who are not taking medication. The results highlight weak correlations between actigraphy and PSG for some sleep variables and for some groups.

Narcolepsy and Parasomnia

P020

GAMMA HYDROXYBUTYRIC ACID PREVENTS CATAPLEXY IN NARCOLEPTIC MICE BY AN AMYGDALA DEPENDENT MECHANISM

Presenting Author: Torontali, Zoltan, University of Toronto

Additional Authors and Affiliations:
Fraigne, Jimmy; University of Toronto
Peever, John; University of Toronto

Abstract:

Background: Narcolepsy is characterized by excessive sleepiness and cataplexy – the uncontrollable onset of skeletal muscle paralysis during wakefulness. Cataplexy is typically triggered by strong emotional stimuli such as laughter or elation. The amygdala has long been hypothesized to be involved in triggering cataplexy. We recently reported that amygdala lesions virtually eliminated cataplectic attacks in narcoleptic mice (i.e., orexin knockouts). Here, we aimed to determine if optogenetic stimulation of amygdala neurons would promote cataplexy. Gamma hydroxybutyric acid (GHB), the only FDA approved treatment for cataplexy, appears to act by a GABAB receptor-mediated mechanism; however, the neural structures through which it acts is unknown. Using receptor pharmacology, we aimed to determine if GHB prevents cataplexy by inhibiting amygdala neurons.

Methods: Study #1: To manipulate the activity of amygdala neurons, we bilaterally infused 200nL of an adeno-associated viral vector containing the channelrhodopsin construct (AAV-hsyn-hChR2(H134R)-eYFP) into the amygdala of 4 orexin knockout mice. Neurons were stimulated with 5ms blue light pulse (473nm) trains at 20Hz for 10 seconds every minute during three hours of the dark phase. Study #2: We inhibited neurons in the region of the amygdala by reverse microdialysis of 0.5mM baclofen (i.e., GABAB agonist) or 0.5mM GHB in 4 orexin knockout mice. Reverse microdialysis of these drugs was performed during three hours of the dark phase at a rate of 1µl/min.

Results: We found that semi-chronic bilateral light activation of amygdala neurons at 20Hz led to a 4-fold increase in cataplexy (from 2±1 to 10±3 events). Pharmacological inhibition of amygdala neurons with GABAB agonist and GHB, similarly abolished cataplexy in narcoleptic mice (from 8±2 to 0 events).

Conclusion: Our results support the hypothesis that the amygdala plays a major role in triggering emotion-induced cataplexy. Moreover, these results indicate that GHB might prevent cataplexy by a GABAB-mediated inhibition of the amygdala region.

P021

IMMUNE MEDIATED CHILDHOOD NARCOLEPSY

Presenting Author: Knudsen, Richard, UCDMC

Abstract:
" TO ADJUVANT OR NOT TO ADJUVANT "
The incidence of Narcolepsy with Cataplexy (NWC) is rising globally. Epidemiologic and medical data support that the upsurge – in secondary NWC- may likely stem, in part, from H1N1 infection and/or H1N1 [Swine flu] vaccination, as administered worldwide in years 2009-10 with the intention of granting seroprotection from seasonal flu.

The Finnish National Institute of Health and Welfare, in 2010, recommended that the vaccination with Pandemrix vaccine be discontinued until an explanation was found for the rise in cases of NWC in children and adolescents. They observed a greater than 9-fold increase in NWC nationwide; this was also noted in Sweden, another signaling nation, and in Germany, France, Brazil, and other countries. The United States experienced no major rise; their FDA was wary of adjuvants thus did not approve Pandemrix. Canada approved a similar but different inoculation, named Arepanrix- - and the possible untoward side effects are presently under intense investigation.

Pandemrix was designed, by GSK, with a certain 'hyperimmune' adjuvant entitled AS03, deliberating geared to 'turbo-charge' the potency of the vaccine. The adjuvant was comprised of squalene (shark liver oil) & tocopherol. These two added ingredients were intended to bolster (perhaps over-charge) the recipient's immune response and thus obviate the need for a second booster shot later on. This would expedite the rollout of the campaign to prevent worldwide pandemic spread of the Swine flu.
It is established that NWC has a potential autoimmune basis. The seeming combination of genetic predisposition (HLA DQB1*0602) plus immune challenge triggers, by way of other unmapped biological mechanisms, cellular death of the lateral hypothalamic orexingeric neurons nested in the diencephalon so critical for stabilization of the wake/sleep states.

The particularly suspectable youths, under twenty years of age, is a notable factor. Perhaps that subpopulation has an overwhelmed immune system from other numerous inoculations administered over time. This is speculative.

It is a medical tragedy to witness the precipitation of a chronic, life long incurable sleep disorder in kids. There are 800 cases of NWC reportedly linked to H1N1. Practitioners must hope for avoidance of a reactionary public 'vaccine scare' but – on balance – must also work, out of dedicated concern for public safety, toward achieving 'clean' biologicals which are devoid of the elicitation of a neurodegenerative syndrome.

P022

REDUCED SLOW-WAVE AND THETA ACTIVITY IN IDIOPATHIC NIGHTMARE SUFFERERS

Presenting Author: Marquis, Louis-Philippe, Dept. Psychology, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Additional Authors and Affiliations:
Paquette, Tyna; CARSM, Hôpital du Sacré-Coeur de Montréal
Lamoureux-Tremblay, Vickie; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Nielsen, Tore; Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Abstract:
Introduction: Idiopathic NM sufferers (NM) show signs of altered REM sleep pressure: greater REM sleep latency, frequent skipped early REM periods. We examined if this might be explicable by increased SWS pressure.

Methods: Eight NM (28.8±4.7 yrs; 4F) and 13 CTL (27.1±6.0 yrs; 9F) subjects (age: T19=-0.667, p=0.51) underwent one night of undisturbed PSG (standard scoring). For C3, artifact-free FFTs (4-sec epochs) were generated and
each NREM period was divided and epochs averaged in 20 equal divisions, and REM periods in 5 equal parts. Activity was obtained for delta (0.5-4Hz) and theta (4-8Hz) frequency bands, values were log-transformed (power+1) for statistical analyses.

Results: Independent samples t-tests for each 20-5 division revealed significantly ($p \leq 0.05$) lower delta activity for NM than for CTL subjects for NREM sleep, for post-REM2 (divisions 3 to 6), pre- (18 to 20) and for post-REM3 (1,2). In all cases, NM subjects showed lower delta power. Theta power was lower in NM subjects for most NREM1 and NREM3 divisions, and for NREM2 divisions 9, 11 and 13 ($p \leq 0.05$). All other NREM divisions were marginal ($p \leq 0.10$) in the same direction.

Conclusion: Reduced delta and theta power in NM subjects are more salient during or close to a REM period. These observations implicate an interaction between REM and NREM sleep in NM pathology and support the notion that altered SWS pressure may influence what is generally considered to be a REM sleep pathology. Closer examination of EEG dynamics in this sleep problem are clearly warranted.
Supported by research grants from the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

P023

IDIOPATHIC SLEEP PARALYSIS SUFFERERS HAVE LONGER NREM STAGE 4 SLEEP AND NO INCREASE IN REM DENSITY ACROSS SLEEP CYCLES.

Presenting Author: Solomonova, Elizaveta, Université de Montréal

Additional Authors and Affiliations:
Takeuchi, Tomoka; Canada Foundation for Innovation
Nielsen, Tore; Université de Montréal

Abstract:
Introduction: Isolated sleep paralysis (ISP) is a benign, REM sleep-related, state-dissociation parasomnia characterized by REM sleep intrusions (atonia, hallucinations) into waking consciousness at sleep onset or upon awakening. Changes in REM density (REMD), as a marker of REM sleep regulation, have never been studied in the ISP population. The present study's objectives are to compare sleep architecture and REMD in a group of ISP sufferers and non-ISP controls (CTL).

Methods: 17 participants (18-30yrs), 8 ISP (3m, 5f) with recent and frequent ISP episodes and 9 CTL (4m, 5f) without ISP slept uninterrupted for 2 consecutive nights (N1 and N2) in the laboratory with a standard PSG recording montage. Sleep stages were scored according to Rechtschaffen and Kales criteria. Mean REMD (#REM/min REM) was calculated for vertical and horizontal EOG channels using in-house eye movement detection software.

Results: Independent samples t-tests revealed no significant group differences on N1 or N2 for sleep duration, sleep efficiency, wake duration, min or % of NREM Stage1, Stage2, Stage3 or REM sleep. The ISP group had longer NREM Stage4 duration in minutes on both N1: $t(14)=-2.11$, $p=.043$, M(ISP)=66.6±25.22, M(CTL)=42.0±21.35; and N2: $t(15)=-2.2$, $p=0.48$, M(ISP)=75.7±29.13, M(CTL)=50.8±17.78.
REMD was assessed only on N2. No significant differences were found for REMD between ISP and CTL groups. Repeated measures ANOVA (with REM cycles 1, 2, 3, 4 as repeated measures) revealed a linear (increasing) trend for the CTL group $F(1)=13.40$, $p=.006$. However, no trend was observed for the ISP group.

Conclusion: The results suggest a general NREM-REM regulation abnormality in the ISP group, with increased slow-wave sleep pressure and a flattening of the normal increase in REM density across the night. Such dysregulation may increase the probability of state dissociation episodes.
Disclaimer: This work does not necessarily represent the official position of the Canada Foundation for Innovation.

P024

QUANTITATIVE EEG CHANGES IN IDIOPATHIC NIGHTMARE SUFFERERS

Presenting Author: Paquette, Tyna, CARSM, Hôpital du Sacré-Coeur de Montréal

Additional Authors and Affiliations:
Marquis, Louis-Philippe; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Lamoureux-Tremblay, Vickie; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Nielsen, Tore; Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Abstract:

Introduction: Quantitative EEG (qEEG) has been studied in PTSD patients with nightmares, but not in idiopathic NM sufferers (NM). We assessed sleep EEG power for NM and control (CTL) subjects.

Methods: Eight NM (28.8±4.7 yrs; 4F) and 13 CTL (27.1±6.0 yrs; 9F) subjects (age: T(19)=-0.667, p=0.51) underwent one night of undisturbed PSG (standard scoring). For C3, artifact-free FFTs (4-sec epochs) were generated and spectral activity averaged for the 1st 4 sleep cycles, for 4 sleep stages, and for the whole-night. Spectral values were log-transformed (power+1) for analyses. Classical frequency bands and total power (0.5 to 32Hz) were examined. NM subjects scored higher than CTLs on depression (BDI-II) and anxiety (STAI-state) (p<.05).

Results: Whole-night power was marginally lower for NM (314.0±127.7) than CTL (428.9±175.8 μV2; F(1,19)=3.100, p=0.094). A whole-night MANOVA with Group (NM, CTL) as independent variables and Spectral Bands (Delta, Theta, Alpha, Sigma, Beta1, Beta2) as dependent variables showed a marginal multivariate effect (F(6,14)=2.212, p=0.104); univariate ANOVAs revealed lower power for NM than CTL in Theta (4-8Hz; NM: 26.0±9.4, CTL: 41.7±17.1 μV2; p=0.006), Alpha (8-12Hz; NM: 9.7±4.5 μV2, CTL: 17.8±8.6; p=0.007) and Beta1 (14-22Hz; NM: 3.8±1.2 μV2, CTL: 6.5±2.8; p=0.012) bands. A similar MANOVA with Sleep Stages (NR1, NR2, NR3, REM) as dependent variables showed a multivariate effect (F(4,16)=5.082, p=0.008); lower power was seen for NM in NR1 (NM: 82.5±21.0, CTL: 116.4±48.7 μV2; p=0.041), NR2 (NM: 202.4±52.1, CTL: 324.2±103.5 μV2; p=0.002) and REM (NM: 66.5±22.3, CTL: 113.5±46.7 μV2; p=0.003). Co-varying depression, state anxiety, or sex did not eliminate differences.

Conclusion: Reduced power in NM subjects resembles similar reductions during wakefulness for individuals reporting early life stress (McFarlane et al., J Integr Neurosci 2005;4:27-40), suggesting that early life adversity contributes to both EEG power changes and nightmares.
Supported by research grants from the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

P025

ACROSS-NIGHT CHANGES IN THETA AND ALPHA POWER IN IDIOPATHIC NIGHTMARE SUFFERERS

Presenting Author: Paquette, Tyna, CARSM, Hôpital du Sacré-Coeur de Montréal

Additional Authors and Affiliations:
Marquis, Louis-Philppe; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Lamoureux-Tremblay, Vickie; Dept. Psychology, Université de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal
Nielsen, Tore; Dept. Psychiatry, Universté de Montréal; CARSM, Hôpital du Sacré-Coeur de Montréal

Abstract:
Introduction: Quantitative EEG has been studied in PTSD patients with nightmares, but not idiopathic NM sufferers (NM). We assessed sleep EEG power changes across the night for NM and control (CTL) subjects.

Methods: Eight NM (4F; 28.8±4.7 yrs) and 13 CTL (9F; 27.1±6.0 yrs) subjects (age: p=0.51) underwent one night of undisturbed PSG (standard scoring). For C3, artifact-free FFTs (4-sec epochs) were generated and spectral activity averaged for the 1st 4 sleep cycles for Theta (4-8Hz) and Alpha (8-12Hz) bands. Spectral values were log-transformed (power+1) for analyses.

Results: A repeated measures ANOVA for Theta power by sleep cycle (1-4) and group (NM, CTL) irrespective of sleep stage revealed a significant interaction ($F(3,57)=2.899$, $p \leq 0.05$), a main effect for sleep cycle ($F(3,19)=103.37$, $p \leq 0.0001$) and a main effect for group ($F(1,19)=10.349$, $p \leq 0.005$). Post-hoc analyses revealed that NM subjects started with lower Theta power and were lower for all Cycles; Theta power decreased more rapidly from Cycle 1 to 2 and reached a nadir by Cycle 3 (within Gp contrasts Cycle 1-2 and 2-3 ($p \leq 0.005$); 3-4 (ns)). CTLs showed a progressive linear decrease across Cycles (linear trend, $p \leq 0.0001$). A similar repeated measures ANOVA for Alpha power revealed a marginal interaction ($F(3,57)=2.571$, $p=0.063$), a sleep cycle effect ($F(3,19)=16.808$, $p=0.001$) and a group effect ($F(1,19)=9.990$, $p=0.005$). NM subjects showed lower power in all cycles ($p \leq 0.03$) and failed to decrease across cycles as did CTL subjects (Cycle 1 vs 4 contrasts – CTL: linear trend, $p \leq 0.0006$; NM: ns).

Conclusion: Reduced power in NM subjects resembles similar waking-state reductions among individuals reporting early life stress (McFarlane et al., J Integr Neurosci 2005;4:27-40), suggesting that early life adversity may contribute to both EEG power changes and nightmares. Abnormal flattening across the night may reflect alterations in sleep regulation contributing to nightmare pathology (see companion abstract on Delta power).

Supported by research grants from the Canadian Institutes of Health Research (CIHR) and the Natural Sciences and Engineering Research Council of Canada (NSERC)

Pediatrics

P026

BETTER NIGHTS, BETTER DAYS: DEVELOPMENT OF A PAN-CANADIAN WEB-BASED INTERVENTION FOR CHILDREN WITH BEHAVIOURAL INSOMNIA

Presenting Author: Corkum, Penny, Dalhousie University, Associate Professor

Additional Authors and Affiliations:
Coulombe, Aimee; Dalhousie University
Chambers, Christine; Dalhousie University
Godbout, Roger; Universite de Montreal
Gruber, Reut; McGill University
Hall, Wendy; University of British Columbia
Reid, Graham; Western University
Stremler, Robyn; University of Toronto
Weiss, Shelly; Hospital for Sick Children
Witmans, Manisha; University of Alberta

Abstract:

Introduction: Up to 30% of children experience insomnia due primarily to behavioural factors. Despite the prevalence of behavioural insomnia and negative effects on children's health and development, such as increased risk for behavioural problems, very few children receive evidence-based treatment. Our team's purpose is to overcome barriers to treatment by developing and testing a sustainable evidence-based web intervention for parents to treat behavioural insomnia in children aged 1 to 10 years old.

Methods: Evidence-based content and delivery modes were employed to develop a web-based intervention aimed at parents of 1- to 10- year-olds. Intervention content was derived from two booklet and telephone-based empirically-supported interventions, clinical literature, and expertise from the Better Nights Better Days management team.
Intervention delivery was developed using behaviour change and social cognitive theories; differences in cognitive processing of electronic vs. written texts, expectations of web-based materials, and web-based behavioural tendencies; and sustainability concerns regarding human support.

Results: The interactive web-based intervention covers five areas: 1- General sleep and behaviour change information; 2- Sleep hygiene and routines; 3- Settling to sleep; 4- Returning to sleep and early waking; 5- Relapse prevention. Minimal text-based information is provided as key information is conveyed in video format. Interactive activities, such as completing quizzes and sleep diaries online are also included. The electronic medium controls the order in which parents work through sessions and allows for immediate feedback to parents.

Conclusion: In addition to evidence-based clinical sleep science, web-based sleep interventions must consider behaviour change theory, cognitive processing of electronic media, expectations of web-based

products, and sustainability. The proposed role for the intervention within the health system must be considered early in the development process. The next step for this multi-phased Canadian study will be conducting usability studies (summer 2013) followed by a national RCT to evaluate the efficacy of this web-based intervention.

P027

ENGAGING ONLINE: HOW THE BETTER NIGHTS, BETTER DAYS TRAINEE PROGRAM IS PROVIDING LEARNING OPPORTUNITIES IN PEDIATRIC SLEEP TO TRAINEES ACROSS THE COUNTRY

Presenting Author: Corkum, Penny, Dalhousie University, Associate Professor

Additional Authors and Affiliations:
Chambers, Christine; Dalhousie University, Associate Professor
Coulombe, Aimee; Dalhousie University
Godbout, Roger; Universite de Montreal
Gruber, Reut; McGill University
Hall, Wendy; University of British Columbia
Reid, Graham; Western University
Stremler, Robyn; University of Toronto
Weiss, Shelly; The Hospital for Sick Children
Witmans, Manisha; University of Alberta

Abstract:

Introduction: There is a pressing need to increase clinical and research capacity in pediatric sleep in Canada. The Better Nights, Better Days (BNBD) grant, funded by the Canadian Institutes of Health Research, provides trainees the opportunity to learn from leading pediatric sleep experts in the country. The BNBD Trainee Program is conducted primarily online, supplemented with an annual in-person institute and funding program. Its objectives are to increase trainees' exposure to a range of research topics and methodologies, develop their knowledge of assessment and treatment, and facilitate their identification of opportunities for continued involvement in pediatric sleep post-training.

Methods: To meet these objectives, trainees are eligible to apply for summer studentship awards, travel grants, and graduate student stipends. An online learning platform is used to deliver monthly pediatric sleep presentations. The platform provides access to a moderated discussion board, real-time chat during presentations, and a secure presentation archive. The first in-person institute will coincide with CSS 2013.

Results: In its first year, 14 trainees from 2 disciplines (psychology and nursing) and 4 provinces (British Columbia, Ontario, Quebec, Nova Scotia) participated in the program. Online presentations included: infant and toddler sleep; sleep, cognitive functioning, and mental health; increasing access to sleep interventions; and sleep interventions for hospitalized children Four trainees have received support; two travel grants, and one summer studentship were awarded, in addition to funding a full-time post-doctoral fellow.

Conclusion: The BNBD trainee program provides comprehensive learning and funding opportunities to inter-disciplinary pediatric sleep trainees, building research and clinical capacity for pediatric sleep in Canada. Learning is heightened by the timely and flexible access to live and recorded presentations online, opportunities to present research at academic conferences, collaborations and discussions with peers and mentors, and interactions with other trainees from across the country.

P028

STUDIES OF SLEEP IN FAMILY CAREGIVERS OF CHILDREN DEPENDENT ON MEDICAL TECHNOLOGY

Presenting Author: Keilty, Krista, The Hospital for Sick Children, University of Toronto

Additional Authors and Affiliations:
Cohen, Eyal; The Hospital for Sick Children, University of Toronto
Ho, Michelle; The Hospital for Sick Children, University of Toronto
Spalding, Karen; The Hospital for Sick Children, University of Toronto, Ryerson University
Stremler, Robyn; The Hospital for Sick Children, University of Toronto

Abstract:

Background: The number of children who depend on medical technology (CMT) including those on long-term mechanical ventilation is on the rise. Society relies on family caregivers of CMT to provide highly skilled and vigilant care in their homes 24-hours per day. This extraordinary responsibility has been linked to chronic sleep disturbance that places family caregivers at risk of negative health and related outcomes.

Methods: Sleep in family caregivers of CMT was the focus of a systematic review of the literature. Relevant databases were searched and search terms included: caregiver*, carer*, parent*, mother*, father*, grandparent* AND sleep*, sleep deprivation*.

Main results: Nine studies met criteria for inclusion. Study methods were highly varied thereby precluding a metasynthesis. The majority of studies reported using cross-sectional designs. Participants included both mothers and fathers. Characteristics of the CMT were not consistently defined. A small number of studies included validated sleep measures and none carried out objective sleep measurement.

Significant results: Reports of sleep disturbance were highly variable. Studies reported that family caregivers of CMT got less than 6 hours of sleep/night and one full hour less than family caregivers of children with cystic fibrosis and/or healthy children. Poor sleep quality was also self-reported. These findings, together with qualitative accounts suggest that family caregivers of CMT experience significant sleep restriction; poor sleep quality, and are at risk for negative consequences of chronic sleep deprivation.

Conclusions: This review determined that there are limitations to what is known about the associations among sleep and health in family caregivers of CMT. It also suggested that sleep disturbance is likely influenced by multiple factors (i.e. caregiver, child and environmental). Overall given the lack of objective data, this review signals the need for further investigation of sleep disturbance and related outcomes in family caregivers of CMT.

P029

SLEEP PROBLEMS IN CHILDREN WITH A HISTORY OF EXTREME PRETERM BIRTH

Presenting Author: Chowdhury, Farah, Department of Pediatrics, Queen's University

Additional Authors and Affiliations:
Thébaud, Bernard; Children's Hospital of Eastern Ontario & Ottawa Hospital Research Institute
Kamstra, Barbara; Department of Pediatrics and the Women & Children's Health Research Institute, University of Alberta
Lovering, Andrew; Faculty of Human Physiology, University of Oregon, Eugene, OR
Hendson, Leonora; Pediatrics/Medicine and Dentistry/University of Alberta and Glenrose Rehabilitation Hospital
Majaesic, Carina; Department of Pediatrics, Faculty of Medicine, University of Alberta
Adatia, Ian; Department of Pediatrics and the Women & Children's Health Research Institute, University of Alberta
Nicholas, David; Department of Pediatrics, University of Alberta
Thomson, Richard; Department of Biomedical Engineering, University of Alberta
Stickland, Michael; Department of Medicine, University of Alberta

Abstract:

Background: There is little information on the long-term outcomes of extreme prematurity. Current evidence suggests that premature birth predispose to sleep-disordered breathing with less information on sleep problems as a whole in this population. The aim of this study is to assess sleep problems in a cohort of children with a history of extreme premature birth.

Methods: Subjects were recruited from a cohort of infants born between 1997 and 2002 and cared for in the Northern Alberta Neonatal Intensive Care Program. The overall project focused on cardio-respiratory outcomes. Children were included if they were able to pedal a bike. Preterm infants were sub-classified as preterm and preterm with bronchopulmonary dysplasia (preterm +BPD). Control children had no significant respiratory illnesses. Data was collected with respect to lung function and cardio-pulmonary exercise testing (CPET) in addition to parents completing the Child Sleep Habits Questionnaire (CSHQ) and the Child Behaviour Checklist (CBCL).

Results: Data is available from 121 children to date (42 control, 43 preterm, 36 preterm+BPD). Preterm infants were born at a mean gestational age of 26 weeks. Children were seen for follow-up at a mean age of 12.3±1.8 years with no age difference between groups. CSHQ Total Sleep Disturbance and Subscale Scores did not differ between groups. Reported sleep times also did not differ by group with a mean of 9:19±0:58. Response with respect to sleep based on the CBCL showed differences with respect to sleep disturbance (control 0%; preterm 4.5%; preterm+BPD 18.9%, LR 13.6, $p<0.01$) and sleep less than other children (control 9.3%, preterm 18.2.8%, preterm+BPD 21.6%, LR 13.9, $p<0.05$).

Conclusion: Parents endorsement of sleep disturbance and sleeping less than other children is higher in children with a history of preterm birth compared to control children despite similar sleep disturbance

scores on a more detailed instrument. Further analysis is needed to understand the discrepancy between different measures of sleep disturbance in this population.

P030

RELAX TO SLEEP PROGRAM ON HOSPITALIZED CHILDREN: A PILOT RCT

Presenting Author: Papaconstantinou, Efrosini, University of Toronto

Additional Authors and Affiliations:
Stremler, Robyn; University of Toronto
Hodnett, Ellen; University of Toronto

Abstract:

Introduction/Background: Sleep is a biological process essential for health. Being hospitalized can exacerbate common sleep difficulties in children. Although sleep interventions exist for healthy children in the community, interventions aimed at hospitalized children need to be developed and piloted with rigorous evaluative methods. The primary purpose of this study is to examine the feasibility and acceptability of the RELAX TO SLEEP program on hospitalized children. Although this study was a pilot study, comparisons were made to examine sleep outcomes between the intervention group and the control group including.

Method/Process: This pilot randomized controlled trial, was conducted at a quaternary level pediatric hospital. The RELAX TO SLEEP program consisted of two components: 1) parental education on sleep; and 2) relaxation breathing for the child. Consenting children who were hospitalized and met the eligibility criteria and their parent(s) were randomized to either the intervention group or the usual care group. Both groups wore actigraphs, a small device the size of a wrist-watch which objectively measures periods of sleep and wakefulness. Children wore the actigraphs for 3 nights and completed sleep diaries every morning. Between the fifth and tenth day post- discharge, families were contacted via telephone to complete a final questionnaire.

Outcomes: Baseline data on demographics, reason for hospitalization, usual sleep habits, and anxiety levels were collected prior to randomization. All sleep outcomes were measured using actigraphy while the child was in hospital. The Post-Hospital Behaviour Questionnaire (PHBQ) and acceptability was completed at the end of the study period, via telephone, between day five and ten post-discharge.
Conclusions and Impact: The RELAX TO SLEEP program proposed in this study has the potential to increase total nighttime sleep duration. Furthermore, the behavioural component of the RELAX TO SLEEP program may be utilized during pain or painful procedures, or used in the home during the post-hospitalization period.

P031

SLEEP SPINDLES ARE ASSOCIATED WITH IQ IN HEALTHY SCHOOL-AGE CHILDREN

Presenting Author: Gruber, Reut, McGill University

Additional Authors and Affiliations:
Wise, Merrill; Methodist Healthcare Sleep Disorders Centre, Memphis, TN
Frenette, Sonia; Center for Advanced Research in Sleep Medicine, Hospital du Sacre-Coeur de Montreal
Carrier, Julie; Montreal University

Abstract:

Recent studies suggest that sleep is associated with IQ measures in children, but the underlying mechanism remains unknown. An association between sleep spindles and IQ has been found in adults, but only two previous studies explored this topic in children. The goal of this study was to examine whether sleep spindle activity was associated with performance on the subscales of the Wechsler Intelligence Scale for Children-IV (WISC-IV).

29 typically developing school-age children participated in the study. Children were told to not consume caffeine-containing products, and parents were instructed to maintain the child's habitual sleep-wake schedule, to keep a sleep diary containing detailed information on bedtime and wake-up time, and any medication given in the week prior to participation in the study. Day-time sleepiness was assessed using the Modified Epworth Sleepiness Scale. Standard overnight multichannel PSG evaluation was performed at each child's home by an ex¬perienced sleep technician using a portable PSG device. Cognitive performance was assessed in the laboratory using the WISC-IV test.

Multiple linear regression analyses were performed to determine associations between the frequency, amplitude, duration, and density of sleep spindles and performance on WISC-IV subscales. We found that sleep spindle frequency was negatively associated with scores on the perceptual reasoning ($R2 = 0.53$, $p < 0.05$) and working memory ($R2 = 0.51$, $p < 0.05$) WISC-IV subscales independent of age, gender, and pubertal status. Sleep spindle amplitude, duration, or density were not associated with performance on IQ test.

The data suggest the existence of an inverse relationship between sleep spindle frequency and efficient cognitive processing.

P032

SLEEP LAB ADAPTATION IN CHILDREN WITH ADHD AND THEIR TYPICALLY DEVELOPING PEERS

Presenting Author: Bessey, Meredith, Department of Psychology & Neuroscience, Dalhousie University

Additional Authors and Affiliations:
Richards, Jennifer; Department of Psychology & Neuroscience, Dalhousie University
Corkum, Penny; Department of Psychology & Neuroscience, Dalhousie University

Abstract:

Introduction: There are inconsistent findings regarding the type and frequency of sleep problems in children with attention-deficit/hyperactivity disorder (ADHD). High rates of sleep problems are consistently found on parent reports, but are not always verified on polysomnography (PSG). It is hypothesized that this discrepancy may be due to differential sleep lab adaptation (i.e., how well or how poorly children adjust to a sleep lab environment). Research has not investigated this specific question, although some evidence indicates that children with ADHD may demonstrate a stronger first night effect compared to typically developing (TD) children.

Methods: Actigraphy variables were compared between the home environment and the sleep lab during PSG collection for children with ADHD (n = 25) and TD children (n = 25). Further, sleep lab adaptation reports from parent and child were compared between groups. Children with ADHD were rigorously diagnosed and did not have comorbid mental health disorders.

Results: Actigraphy variables revealed that both groups of children slept for significantly less time in the sleep lab than at home. Additionally, TD children, but not children with ADHD, had improved sleep efficiency in the sleep lab. Sleep onset latency did not differ across environments, nor was there a group interaction. Parents and children did not report significant differences between the two groups in how the children adapted to the sleep lab.

Conclusions: For some sleep variables, data collected in the sleep lab may not be representative of children's sleep in the home environment. Based on actigraphy data, there was no differential impact on sleep for children with ADHD; therefore, sleep lab adaptation is not a likely reason for the discrepancy between parent report and PSG findings. It is more likely that the discrepancy is due to the heterogeneity of ADHD in terms of symptom presentation, comorbidities, and medication.

P033

USING INCENTIVES TO IMPROVE PEDIATRIC PAP ADHERENCE: A QUALITY IMPROVEMENT STUDY

Presenting Author: Baker, Adele, Sick Kids Hospital

Additional Authors and Affiliations:
Fretz, Andrea; Sick Kids Hospital
Zweerink, Allison; Sick Kids Hospital
Medin, Debra; Sick Kids Hospital
Narang, Indra; Sick Kids Hospital
Amin, Reshma; Sick Kids Hospital

Abstract:

PAP adherence in pediatrics is challenging and there is limited research describing successful adherence programs. Our aim was to improve PAP adherence in pediatric patients by the implementation of an incentive program.

Children with poor adherence to PAP therapy despite receiving standard of care in our pediatric sleep center were enrolled in the incentive program. Children were assessed to determine barriers to PAP adherence. Education, therapeutic play, emotional support and new strategies were provided. A goal was created with the child and family for the 1 month follow-up. A reward that aligned with the child's interests was provided if the goal was met. Follow up and an adherence download was arranged at 1,3,6 and 12 months post enrollment. Our goal was to achieve PAP adherence for 80% of total sleep time (TST).

To date we have enrolled 12 patients (6 male). Underlying diagnoses include Trisomy 21 (n=3); Prader-Willi Syndrome (n= 1); obesity (n=1); achondroplasia (n= 1); brainstem glioma (n=1); post-heart transplant (n=1); Tetralogy of Fallot (n=1); hypotonia (n=1); neurofibromatosis (n=1) and Goldenhar Syndrome (n=1). Median age 9 (range=5-14) years. PAP therapy had been prescribed for a median of 1.5 (range=0.1-8.0) years. At enrollment, PAP therapy usage was a median of 10% (range= 0-60%) of TST. At 1 month follow up, PAP adherence improved to a median of 45% (range 0-75%) of TST. Eleven children earned a reward. To date, 7/12 children have had a 3 month follow up. The median adherence was 30% (range 0%-90%) of TST; 6 children received a reward.

Our preliminary results suggest that PAP adherence can be improved with incentives. However, a larger population of children with a longer follow up period is required to see if these effects are both consistent and long-lasting. Further results will be available at the time of the meeting.

P034

MOTIVATING TEENS TO SLEEP MORE STUDY: PRELIMINARY RESULTS

Presenting Author: Cassoff, Jamie, McGill University, Douglas Mental Health University Institute

Additional Authors and Affiliations:
Rushani, Florida; McGill University
Knäuper, Bärbel; McGill University
Gruber, Reut; Douglas Mental Health University Institute

Abstract:

Introduction: Adolescent sleep deprivation is a prevalent issue associated with negative health outcomes. Sleep interventions are successful in increasing sleep knowledge but not in ameliorating sleep behaviour. The objective of this study was to evaluate the effectiveness of the Motivating Teens to Sleep More (MTSM) program with embedded sleep education compared to sleep education alone. The MTSM program incorporates a motivational interviewing style, stage-based techniques, and personalized activities. Expected outcomes included prolonged sleep duration, enhanced readiness to advance bedtime, increased sleep-related self-efficacy and more positive attitudes towards sleep.

Methods: Twelve participants were thus far recruited from a Montreal high school and randomly assigned to the MTSM or control condition, which each consisted of four 1-hour, one-on-one, sessions. Sleep duration was assessed by self-reported sleep logs completed for one week before the program, in the middle of the program and following program completion. Actigraphy assessments were completed before and after the program. Psychological variables were assessed by online questionnaires.
Results: Sleep logs and actigraphy sleep duration data were strongly correlated ($r(10) = .80$, $p = .002$).Self-reported sleep duration ($F(2, 9) = 6.39$, $p = .007$), sleep-related self-efficacy ($F(2, 9) = 10.09$, $p = .001$), positive attitudes toward sleep ($F(2, 9) = 50.56$, $p < .001$), and readiness to advance bedtime ($F(2, 9)= 31.15$, $p < .001$) significantly increased in both conditions following program completion.

Conclusions: Results are preliminary because the target sample size of n = 15 per condition has not yet been reached. The preliminary data suggest that the MTSM program and sleep education sessions were effective in prolonging sleep and enhancing positive attitudes, sleep self-efficacy, and readiness to advance bedtime. The one-on-one dynamic between the interventionist and participants may account for the efficacy of both conditions.
Acknowledgements: The teachers, staff and students at Bialik High School.

P035

MOVING RESEARCH INTO PRACTICE: TRANSLATING THE ROCKY SLEEP BEHAVIORAL INTERVENTION FOR PARENTS WITH 6-8-MONTH-OLD INFANTS

Presenting Author: Hall, Wendy, University of British Columbia

Additional Authors and Affiliations:
Wooldridge, Joanne; Vancouver Coastal Health Authority
Munroe, Valerie; Vancouver Coastal Health Authority
Bhagat, Radhika; Vancouver Coastal Health Authority
Triolet, Kathy; Vancouver Coastal Health Authority
Hydamaka, Kathy; Vancouver Coastal Health Authority
Tse, Lillian; Vancouver Coastal Health Authority

Abstract:

Introduction: Infant behavioral sleep problems affect 20 - 30% of infants and contribute to parental fatigue, depression, and sleeplessness. Interventions directed at changing parents' behaviors have reduced infant night waking, decreased parental fatigue and improved mood and sleep; however, less than 1% of children receive evidence-based interventions for sleep problems. Interventions have not been offered through system-wide approaches.

Methods:
- Our trial aimed to improve infant sleep by providing parents with a cognitive-behavioral intervention for 6-8-month old infants (waking and crying >2x at night, 4 days a week).
- Public health nurses were co-investigators on the grant application.
- We trained public health nurses (PHNs) to deliver the sleep intervention and ran the group sessions in public health units.
- Experimental groups received a 2-hour teaching sessionon sleep and 2 weeks of bi-weekly telephone support delivered by PHNs.
- Co-investigators shared their success with the intervention with other PHNs in the system

Results:
The primary and secondary outcomes for the trial were supported. The principal investigator and the co-investigators, who included public health nursing leaders in Vancouver Coastal, met to build support and plan to move the intervention into regular PHN programming. PHNs in Vancouver Coastal wanted to provide an evidence-based intervention. The principal investigator designed study-based materials for parental education (general sleep information and specific information about the intervention), and PHN training. Internal Innovations funding was obtained to support training frontline PHNs. Training began in January 2013, with online materials available to support future trainees.

Conclusion:
The success of this translation of research to practice supports engagement of primary care providers throughout the research process. Only through system-wide approaches will significant proportions of parents with infants with behavioral sleep problems be offered evidence-based interventions.

P036

FEASIBILITY, ACCEPTABILITY AND ESTIMATED EFFECTS OF REDUCING NICU LIGHT AND NOISE DURING KANGAROO MOTHER CARE ON PRETERM INFANTS' AND MOTHERS' OUTCOMES

Presenting Author: Aita, Marilyn, University of Toronto and McGill University

Additional Authors and Affiliations:
Stremler, Robyn; University of Toronto
Feeley, Nancy; McGill University
Barrington, Keith; CHU Sainte-Justine
Nuyt, Anne-Monique; CHU Sainte-Justine

Abstract:

Background. Kangaroo mother care (KMC), where preterm infants are in skin-to-skin contact with their mother, is an intervention improving infants' growth and development and mothers' well-being. KMC benefits range from increasing quiet sleep periods in infants during the episode and at term age to decreasing maternal symptoms of post-partum depression. As Neonatal Intensive Care Unit (NICU)'s light and noise have been reported as factors influencing infants' and mothers' during KMC, experiencing KMC in a dimmed and quiet environment could therefore be beneficial for the infants' and mothers' outcomes.

Purpose. Evaluate the feasibility and acceptability of an intervention combining NICU light and noise reduction with KMC, and estimate its effect on preterm infants' physiological stability and sleep-wake states, as well as mothers' anxiety and salivary cortisol levels.

Methods. Pilot RCT where 30 dyads of mothers and infants born between 28 to 32 weeks of gestation will be recruited from a level III NICU university affiliated hospital. Each dyad will be randomly allocated to a group of KMC combined with NICU light and noise reduction or to KMC only. Intervention's feasibility and acceptability will be assessed by a logbook and questionnaires that will be completed by a research assistant, mothers and neonatal nurses. Preterm infants' physiological stability will be assessed using the Stability of the CardioRespiratory System Score in Premature Infants (Fischer, 1998), while sleep-wake states will be videotaped and coded according to Holdtich-Davis et al. (2004)'s validated classification. Maternal anxiety will be assessed by the State-Trait Inventory Scale (Spielberger et al., 1970), and salivary cortisol levels by saliva collection and analysis.

Results. To come. Implications. Findings of this pilot study may support a full-scale RCT and will provide direction towards a developmentally sounded environment promoting mothers' well-being and encouraging periods of rest long enough to allow infants' optimal growth and development.

P037

MEMORY CONSOLIDATION IN CHILDREN WITH EPILEPSY. DOES SLEEP MATTER?

Presenting Author: Sud, Shama, University of Toronto, Hospital for Sick Children

Additional Authors and Affiliations:
Sadaka, Yair; Ben Gurion University
Massicote, Colin; Hospital for Sick Children
Smith, Mary Lou; Hospital for Sick Children
Bradbury, Laura; Hospital for Sick Children
Weiss, Shelly; Hospital for Sick Children

Abstract:
Introduction: Children with epilepsy have frequent sleep disturbance and challenges in memory and learning. There is little research on the consolidation of memory during sleep in this population. The goal of this study was to determine whether children with epilepsy consolidate memories during sleep as has been demonstrated in typically developing children.

Methods: This study was a prospective evaluation of children with epilepsy to determine if sleep improved declarative memory (using word lists) as compared to memory following a waking period of similar duration. The study was conducted in subjects with epilepsy in the Epilepsy Monitoring Unit (EMU) at a single center. In the sleep recall condition, the learning trials were presented in the evening and delayed recall of the words was tested in the morning. In the wake condition, the learning took place in the morning and the delayed recall took place later in the day. Subjects wore an actigraph to evaluate sleep/wake patterns. Data regarding the child's epilepsy, anti-epileptic medications, frequency of interictal epileptiform discharges (IEDs) was also evaluated.

Results: Ten children (ages 8-14 years) participated in the study. Seven of the 10 children remembered more words in the sleep condition than the awake condition. This was determined relative to the number of words the child was able to retain on the final learning trial and reached statistical significance ($p=0.03$). There was no significant difference between children for the frequency of IED's or seizures.

Conclusions: In this small pilot study, we demonstrated that children with epilepsy, despite having IEDs demonstrated the importance of sleep for declarative memory consolidation during sleep with the majority showing a better declarative memory following a sleep vs. a waking period. This may have important implications for further understanding co-morbid problems with memory and cognition often reported in children with epilepsy.

P038

CLINICAL PRESENTATION OF CHILDHOOD NARCOLEPSY

Presenting Author: Zweerink, Allison, The Hospital for Sick Children

Additional Authors and Affiliations:
Amin, Reshma; The Hospital for Sick Children
Weiss, Shelly; The Hospital for Sick Children
Narang, Indra; The Hospital for Sick Children

Abstract:

Narcolepsy is a lifelong neurological disorder which is characterized by severe and persistent daytime sleepiness, with or without cataplexy. Symptoms typically develop after puberty, between the ages of 15 and 30 years; however symptoms are being identified at a much earlier age. The objective of this study is to review the clinical presentation of childhood narcolepsy in one Canadian sleep centre.

We retrospectively reviewed medical records, polysomnograms and multiple sleep latency tests (MSLT) of patients with narcolepsy who presented to the sleep disorders clinic at The Hospital for Sick Children. Sixteen patients were identified. Eleven (69%) were male. The mean age at time of initial assessment was 10.3 years (range 5-16). Of the 16 children, 16 (100%) presented with excessive daytime sleepiness (EDS). 12 (75%) with cataplexy, 6 (38%) with night awakenings, 5 (31%) with hallucinations and 8 (50%) with weight gain. Five (31%) of the children had the H1N1 vaccination. Fourteen (87.5%) children had magnetic resonance imaging (MRI). Twelve (86%) of those MRIs were normal. Thirteen (82%) children underwent a MSLT and genetic HLA testing. All 13 children had an abnormal MSLT and positive genetic HLA testing.

Narcolepsy is increasingly being recognized as a childhood disorder. In our review, all patients presented with excessive daytime sleepiness and 75% had cataplexy. H1N1 vaccination was not given to the majority of these patients. As childhood narcolepsy is becoming increasingly more prevalent, more research is needed to understand the recent increase in number, as well as the clinical presentation and management.

P039

A RETROSPECTIVE REVIEW OF THE PREVALENCE OF PHOX2B MUTATIONS IN A COHORT OF CHILDREN WITH CENTRAL HYPOVENTILATION

Presenting Author: Zweerink, Allison, The Hospital for Sick Children

Additional Authors and Affiliations:
Moraes, Theo; The Hospital for Sick Children
Amin, Reshma; The Hospital for Sick Children

Abstract:

Congenital Central Hypoventilation Syndrome (CCHS), a rare genetic cause of central hypoventilation, is diagnosed by the presence of a PHOX2B mutation and a characteristic clinical phenotype. The prevalence of PHOX2B mutations among children with central hypoventilation in the absence of cardiac, metabolic or neurological causes is unknown. Our aim was to determine the prevalence of PHOX2B mutations among a cohort of children with central hypoventilation for whom PHOX2B genetics were obtained.

We retrospectively reviewed patients who had undergone genetic testing for PHOX2B at the Hospital for Sick Children between January 1, 2006 and December 31, 2012. Data was collected on patient demographics, reason for and results of PHOX2B testing, and the patient's current status.
Sixty four children were identified. Thirty three (52%) were female. The current mean age was 8.60 years (range 0.5-23). The mean age at time of testing was 5.25 years (range 0 – 18). Of the 64 children, 37 (58%) were tested due to hypoventilation and/or apneas, 6 (9%) due to family history of CCHS, 19 (30%) due to suspicion based on CCHS associations (ie. Hirschsprungs, neuroblastoma) and 4 (6%) were tested for other reasons. There were 14 (22%) positive PHOX2B results. Nine of these children were tested due to hypoventilation and/or apneas. Of the 37 children tested for hypoventilation and/or apneas, 9 (24%) were found to have CCHS. Seven of the nine children with CCHS are alive. Of the remaining 28 children, 26 are living.

Although, CCHS is a rare genetic cause of central hypoventilation, in our review, 24% of children with hypoventilation referred for PHOX2B testing had a confirmed PHOX2B mutation. Therefore, we conclude that PHOX2B testing should be performed in all patients with hypoventilation, in the absence of cardiac, metabolic or neurological causes.

P040

OBESITY AND OBSTRUCTIVE SLEEP APNEA IN CHILDREN LESS THAN EIGHT YEARS OF AGE

Presenting Author: Amin, Reshma, The Hospital for Sick Children

Additional Authors and Affiliations:
Lai, Dennison; The Hospital for Sick Children
Zweerink, Allison; The Hospital for Sick Children
Narang, Indra; The Hospital for Sick Children

Abstract:

There are an increasing number of children < 8 years of age who are obese. Obstructive sleep apnea significantly complicates obesity. Our aim was to describe the polysomnographic findings of a cohort of referred obese children < 8 years of age and compare these to lean children.

We retrospectively reviewed obese children, < 8 years of age that underwent polysomnograms (PSG) at SickKids hospital between January 1, 2006 and Dec 31, 2011. The obese cohort was age and sex matched with lean children. Data was collected on patient demographics, clinical history and polysomnograms (PSG). PSGs were performed in accordance with American Academy of Sleep Medicine guidelines.
We compared 22 obese with 22 lean children. There were 55% males. The mean age ± SD of each of the obese and lean cohorts was 5.12 ± 2.1 years. The mean ± SD BMI for obese and lean children was 31.69 ± 5.20 and 15.73 ± 3.13, p <0.0001, respectively. Seventy-three percent (16/22) of each of the two cohorts had OSA. The mean ± SD of the obstructive apnea-hypopnea index (AHI) was 22.19 ± 31.22 in obese and 9.52 ±11.6 in lean controls, p=0.082. The mean ± SD oxygen saturation nadir in obese and lean children was 78% ± 18 and 87% ± 9 respectively (p<0.05). The minimum and maximum respiratory rates were significantly higher amongst obese as compared to lean children, p=0.0017 and p=0.0018, respectively. In the obese cohort, the obstructive AHI correlated with oxygen saturation nadir (r2=0.74, p<0.0001) and maximum respiratory rate (r2=0.45, p=0.007).

Obese children had more severe OSA AHI, lower oxygen saturation nadir and higher respiratory rates than lean children. This suggests that obese children have increased cardiorespiratory compromise during sleep than their age matched lean peers. Early diagnosis and intervention is paramount to reducing co-morbidity in obese children.

P041

A USABILITY STUDY FOR THE BETTER NIGHTS, BETTER DAYS WEB-BASED INTERVENTION FOR PEDIATRIC INSOMNIA

Presenting Author: Speth, Tamara, Dalhousie University

Additional Authors and Affiliations:
Corkum, Penny; Dalhousie University
Coulombe, Aimee; Dalhousie University

Abstract:

Introduction: Pediatric insomnia is highly prevalent and pervasive, affecting children and caregivers. While effective behavioural treatments exist, they are difficult to access. Better Nights, Better Days (BNBD), a web-based behavioural intervention for pediatric insomnia, was designed to overcome accessibility issues. The purpose of the current usability study is to ensure that the intervention is delivered in a manner that will enhance treatment adherence, satisfaction, and ultimately effectiveness.

Methods: Data collection will involve an evaluation of the intervention by three groups of individuals: the BNBD Management Team and Advisors, which includes leading pediatric sleep researchers and clinicians; 20 non-sleep specialist health care professionals (e.g., physicians, psychologists); and 15 parents who have a child with insomnia. Participants will provide feedback based on Morville's "user experience honeycomb" about the intervention's perceived usefulness, usability, desirability, value, accessibility, and credibility, using an online author-created questionnaire. Data will be collected will in three waves (April to June 2013), allowing feedback to iteratively inform intervention development.

Results: Quantitative (e.g., user experience ratings) and qualitative (e.g., open ended feedback) data will be presented. Qualitative feedback will be focused on the dimensions of usability derived from Morville's "user experience honeycomb", and will be used to interpret user experience ratings and direct improvements to the intervention at each wave.

Conclusions: The current study will allow researchers to ensure an enjoyable and effective user experience and help improve the sustainability of the intervention. It is expected that improvements made based on the dimensions of usability previously outlined will lead to greater adherence once the intervention is finalized, which is critical, as adherence has been strongly linked to effectiveness. Next steps include a small pilot study of the intervention conducted with a new group of 18 parents (October 2013), followed by a full RCT beginning January 2014.

P042

PARASOMNIA IN CHILDREN: OF CLINICAL SIGNIFICANCE?

Presenting Author: Mikkilineni, Soumya, The Youthdale Child and Adolescent Sleep Centre

Additional Authors and Affiliations:
Chung, Sharon A.; The Youthdale Child and Adolescent Sleep Centre
Van Zyl, Louis; The Youthdale Child and Adolescent Sleep Centre
Shapiro, Colin M.; The Youthdale Child and Adolescent Sleep Centre

Abstract:

INTRODUCTION: Parasomnias are common in children. General clinical opinion is that childhood parasomnias are not a significant concern since they are self-limiting. The aim of this study was to investigate daytime sleepiness, alertness, ADHD-related behaviour and symptoms indicative of depression and anxiety among children with parasomnia.

METHODS: A retrospective analysis was conducted of charts of children who been referred for an overnight polysomnographic (PSG) sleep assessment and who had responded to a questionnaire battery (including the Pediatric Daytime Sleepiness Scale (PDSS), the THAT alertness scale, the SNAP assessment for ADHD symptoms, the Centre for Epidemiologic Studies in Depression scale modified for children (CES-DC), and the SCARED anxiety scale) at the Youthdale Child and Adolescent Sleep Centre.
RESULTS: Of the charts reviewed, 24% of children (51 of 217 charts) were diagnosed with parasomnia or arousals originating from slow wave sleep. A final set of 17 charts wherein the questionnaire batteries had been completed were included in this study. Among the 17 children (age 5-17, 35% girls) diagnosed with parasomnia, 35% endorsed being excessive daytime sleepiness on the PDSS, 94% scored as having impaired alertness on the THAT, 69% had ADHD-like behaviour, 54% had symptoms indicative of depression (CES-DC) and 35% had symptoms of anxiety (SCARED).

CONCLUSION: This study finds that parasomnias in children are not benign. Over one-third of the children diagnosed with parasomnia at our clinic have excessive daytime sleepiness and symptoms of anxiety, over half have depressive symptoms and ADHD-type behaviour and the vast majority endorse poor alertness. The aforementioned symptoms are associated with reduced quality of life and poorer academic learning and performance, and as such, sleep physicians need to pay more attention to daytime symptoms, mood and ADHD-like behaviour in children diagnosed with parasomnias.

Sleep Disorders

P043

REDUCED SLEEP SPINDLE AMPLITUDE AND DENSITY IN IDIOPATHIC NIGHTMARE SUFFERERS

Presenting Author: Lamoureux-Tremblay, Vickie, Center for Advanced Research in Sleep Medicine

Additional Authors and Affiliations:
Paquette, Tyna; Center for Advanced Research in Sleep Medicine
Center for Advanced Research in Sleep Medicine, Tore Nielsen;

Abstract:

Introduction: Sleep plays a role in fear conditioning and nightmares are often linked to stressful episodic memories that may adversely affect fear extinction processes. The latter implicate spindle-related cortical areas such as thalamus, hippocampus and medial prefrontal cortex. We therefore investigated whether sleep spindle activity of individuals with frequent nightmares (NM) differs from that of a control group (CTRL).

Methods: Polysomnographic (PSG) recordings that included O1, O2, C3 and C4 were performed on 14 idiopathic NM and 15 CTRL subjects following an adaptation night in the laboratory. We excluded subjects with abnormal sleep cycles and one NM subject outlier (NM: n=8, 31.88±2.55 yrs; CTRL: n=12, 27.5±1.76 yrs). An automatic algorithm was used to detect and quantify the density and amplitude of stage 2 spindles (11-16 Hz). Artifacts were manually rejected by trained scorers. Density was defined as the #spindles/#min of sleep; amplitude was assessed peak-to-trough. Groups were compared using Mann-Whitney non-parametric tests.

Results: NM subjects had lower spindle amplitude than did CTRL subjects in Occipital ($p \leq .005$) and Central ($p \leq .025$) regions. For all 1st four sleep cycles, NM subjects had lower amplitude in Occipital (all $p \leq 0.007$) and Central (all $p \leq 0.05$) regions. NM subjects also had lower spindle density than did CTRL subjects at O1 ($p = .037$), C3 ($p = .064$) and C4 ($p = .090$), but not O2 ($p = .165$). By sleep cycles, spindle density didn't differentiate groups for cycle 2 and cycle 3, whereas NM subjects had lower density for cycle 1 at O2 ($p = .037$) and for cycle 4 at O1 ($p = .004$).

Conclusion: NM subjects differed from CTRL on both stage 2 spindle amplitude and density. Differences were especially pronounced for amplitude, which may indicate that NM subjects have a problem in event-related synchronization. Nightmare sufferers may have a NREM sleep dysfunction that is related to deficits in fear extinction processes.

P044

DESCRIPTIVE SLEEP PROFILE IN DRIVING STUDY PARTICIPANTS WITH OSA VS CONTROLS: A PRELIMINARY ANALYSIS (PART 1)

Presenting Author: Rizzo, Dorrie, Jewish General Hospital, Université de Montréal

Additional Authors and Affiliations:
Lavigne, Gilles; Université de Montréal
Bergeron, Jacques; Université de Montréal
Creti, Laura; Jewish General Hospital, McGill
Baltzan, Marc; OSR Medical, McGill
Champagne, Kateri; OSR Medical
Bailes, Sally; Jewish General Hospital, McGill
Fichten, Catherine; Jewish General Hospital, Dawson College
Libman, Eva; Jewish General Hospital, McGill

Abstract:

INTRODUCTION: Much of the research literature assessing motor vehicle accident risk focuses on the experience of "sleepiness at the wheel" as a key reason for highway accidents and fatal crashes. Part1 of our study aims to demonstrate distinct sleep-related profiles for participants with OSA and Control participants. Participants were compared on self-reported sleep-related symptoms (daytime sleepiness, sleep-disorder symptoms, daytime symptoms and insomnia).

METHODS: Population: 20 adults, age and gender-matched, (10 males, 10 females) aged 35-71 (M=52.25, SD=10.97). OSA participants were recruited from sleep clinics after receiving positive polysomnography results and before beginning treatment. Controls are a convenience sample, screened for OSA. Measures: 1) The Sleep Symptom Checklist (SSC), a validated 21-item self-report screening instrument that includes 4 subscales: Sleep Disorder, Daytime Distress, Insomnia and Psychological Distress. Participants rated each symptom from 0 (not severe) to 3 (very severe); 2) The Empirical Sleepiness/Fatigue Subscales (ESFS), measuring distinct sleepiness and fatigue scales; the Sleepiness Scale is limited to the experience of daytime sleep tendency, while the Fatigue Scale is associated more broadly with insomnia, psychological maladjustment, and poorer perceived health function.

RESULTS: Independent t-tests were carried out on all measures to compare scores of OSA and Control samples. The ESFS demonstrated that individuals with OSA (M=6.8, SD=4.18) were significantly more sleepy than Controls (M=3, SD=3.06), t(18)=2.32, p=.034). The groups did not show significant differences on fatigue. Scores on the SSC indicate that participants with OSA had significantly higher severity scores than those in the Control group on all 4 subscales (p=.003 to .025).

CONCLUSIONS: These preliminary findings clearly indicate that individuals with OSA experience more daytime sleepiness than Controls. In addition, the OSA group reported significantly worse symptom scores than Controls in all 4 SSC domains. These differences in perceived distress confirm the rationale for comparing these groups on their driving risk.

P045

DICHOTOMUS PATTERNS OF SELF-REPORTED DRIVING OFFENSES AND QUEBEC DRIVING RECORDS BETWEEN PARTICIPANTS WITH OSA VS CONTROLS: A PRELIMINARY ANALYSIS (PART 2)

Presenting Author: Rizzo, Dorrie, Jewish General Hospital, Université de Montréal

Additional Authors and Affiliations:
Lavigne, Gilles; Université de Montréal
Bergeron, Jacques; Université de Montréal
Creti, Laura; Jewish General Hospital, McGill
Baltzan, Marc; OSR Medical, McGill
Champagne, Kateri; OSR Medical
Bailes, Sally; Jewish General Hospital, McGill
Fichten, Catherine; Jewish General Hospital, Dawson College
Libman, Eva; Jewish General Hospital, McGill

Abstract:

INTRODUCTION: Problematic daytime sleepiness has been implicated in increased crash risk, and individuals with obstructive sleep apnea (OSA) have commonly been involved in indicating this association. This study aims to compare participants with OSA and Control participants on self-reported vs. actual data from provincial driving records.

METHODS: Population: 20 adults, age and gender-matched (10 males, 10 females) aged 35-71 (M=52.25, SD=10.97), with a valid Quebec driver's license and living in the province for the last five years. Participants with OSA were recruited from sleep clinics after receiving their polysomnography results from their doctor and before beginning treatment. Controls were a convenience sample, screened for OSA. Measures: 1) Driving records from the Société Automobile du Québec—SAAQ; this includes infractions and accidents; 2) The Infractions Checklist (IC), a 35-item self-report measure where respondents indicate how often they committed each of the violations listed on the SAAQ driving record; 3) A self-report measure on their driving habits.

RESULTS: T-tests on self-reported driving habits showed that participants with OSA drive more than twice as many kilometers weekly as do Controls (p=.078). The IC ratings showed that participants with OSA self-report twice (M=20.8) as many violations as Control participants (M=10.8); non-significant differences. However, provincial driving records show that Controls (16 violations) had twice as many violations as the OSAs (8 violations); yielding an odds ratio of 4 (p=.024).

CONCLUSIONS: Results show that individuals with OSA report more violations than the actual number of violations their driving records indicate, while Controls commit more violations than they self-report. This preliminary study demonstrates an interesting and opposing pattern, suggesting that assessments solely based on self may not be reliable. Clearly, relative driving risk with respect to individuals with and without OSA needs further evaluation in a direct driving context, and will be further controlled in our ongoing larger sample study design.

P046

CAN THE PRIMARY CARE PHYSICIAN DISTINGUISH CHRONIC INSOMNIA FROM OBSTRUCTIVE SLEEP APNEA ON THE BASIS OF A SYMPTOM PROFILE? (STUDY 2)

Presenting Author: Rizzo, Dorrie, Jewish General Hospital, Université de Montréal

Additional Authors and Affiliations:
Bailes, Sally; Jewish General Hospital, McGill University
Baltzan, Marc; OSR Medical
Grad, Roland; Jewish General Hospital, McGill University
Pavilanis, Alan; St. Mary's Hospital
Tran, Dieu-Ly; Jewish General Hospital, Université de Montréal
Creti, Laura; Jewish General Hospital, McGill University
Frichten, Catherine; Jewish General Hospital, Dawson College
Libman, Eva; Jewish General Hospital, McGill University

Abstract:

INTRODUCTION: Both obstructive sleep apnea (OSA) and chronic insomnia are common in general medical practice. OSA symptoms are varied and include complaints of poor sleep in addition to the “classic” signs of daytime sleepiness and loud snoring. The disrupted sleep characteristics of both conditions can have a similar impact on daytime and psychological functioning.

Methods: This is a validation study with 76 participants with OSA from a previous investigation. They were not included in Study 1. Participants were recruited in primary care settings and all underwent overnight PSG where they were diagnosed with OSA.32 of the participants had insomnia (OSA-I) and 44 did not (OSA). OSA was determined by an AHI cutoff of 10, and insomnia was self-reported by answering the question: “Do you have insomnia?” (yes/no).

Results: The 2 groups (OSA, OSA-I) were compared using an independent t-test on the 4 SSC subscale scores. As found in Study 1, the comparison between the OSA-I and OSA groups showed significantly different Insomnia SSC scores. The OSA-I group had higher Insomnia scores, and showed no other significant difference on the other SSC subscales.

CONCLUSIONS: The SSC has demonstrable potential to be used as a screening tool to distinguish chronic insomnia from possible OSA in primary care. Notably, OSA patients in primary care may present substantial insomnia and elevated scores of daytime symptoms or sleep disorder, but fail to show elevated psychological distress. The distinguishing feature for chronic insomnia was elevated SSC Psychological Distress scores. This was not the case for individuals with insomnia in the context of OSA. Future studies will 1) continue to test the validity of the SSC as a screening tool for both OSA and for chronic and 2) explore more fully whether a distinctive insomnia profile can be discerned in the context of other sleep disorders.

P047

EFFECTS OF OSA IN PATIENTS WITH COPD AND ASTHMA

Presenting Author: Lazarte, Julieta, University of Toronto

Additional Authors and Affiliations:
Ferreira, Ivone M.; Asthma and Airways Centre Toronto, Centre for Sleep and Chronobiology, Toronto

Abstract:

Background: COPD, Asthma (AS) and OSA are common diseases and many individuals are expected to have them in combination.

Objectives: To investigate if OSA had significant impact on sleep, physical symptoms, and mood in patients with AS and COPD and if these patients had similar response to treatment with nasal CPAP.

Methods: We included 85 patients; 34 with COPD&OSA (mean age 68.5 ±10.1 years, B.M.I 35.3 ±12.3 kg/m2), 34 with OSA (mean age 56.1±12 years, B.M.I 35.3 ±6.8 kg/m2) and 17 with OSA&AS (mean age 62 ±13.7 years, B.M.I 39.4 ±6.8 kg/m2). They had PSG, PFT, answered Beck inventory, WPS, Sleep Assessment Questionnaire and the Epworth Sleepiness scale (ESS). Age, BMI, gender and baseline AHI were compared for the 3 groups using the Chi-square test for gender and the Kruskal-Wallis test for the others. Mann-Whitney test was used for pairwise comparisons where appropriate, ANCOVA for group comparisons in order to adjust for baseline values and regression analysis for comparison of the questionnaires.

Results: Median AHI was higher in OSA group as compared to OSA&AS p=0.002 and COPD&OSA p=0.05. Median age was higher in COPD&OSA than in OSA group p=0.0002. Median BMI was significantly higher for the OSA&AS when compared to COPD&OSA p=0.03 and borderline higher when compared to OSA p=0.06. Regression analysis did not find significant differences in the Beck score, WPS, SAQ and ESS between the three groups. Comparing COPD&OSA and OSA&AS the former had higher RA (p=0.008). For OSA and OSA&AS there was lower AHI (p=0.001) and RA (p=0.001) in OSA&AS. There were no significant differences after treatment between the groups with the ANCOVA models.

Conclusion: Despite lower AHI, patients with COPD&OSA and OSA&AS had similar SE, daytime sleepiness, Beck Score, WPS and SAQ to OSA patients, suggesting that OSA has a negative impact in these patients.

P048

CHALLENGING 'ADHD' IN PATIENTS WITH AN FETAL ALCOHOL SPECTRUM DISORDER AND SLEEP PROBLEMS

Presenting Author: Ipsiroglu, Osman, University of British Columbia

Abstract:

Introduction: Up to 85% of children with a Fetal Alcohol Spectrum Disorder (FASD) have sleep problems (SPs), in comparison to 9-50% of typically developing children. In the face of multiple behavioural co-morbidities, SPs often remain unreported/unrecognized. Given the complex course of their lives (e.g. placements), SPs and their sequelae are often explained by posttraumatic stress and melatonin and/or psychotropic substances are mainstays of therapeutic interventions. Current clinical explanatory models of challenging behaviours miss genetic neurological disorders such as Restless Legs Syndrome (RLS), which may be a primary and/or secondary cause of insomnia and/or non-restorative sleep and subsequent challenging behaviours. In RLS, moving the affected body parts modulates the sensations and provides temporary relief; children and teenagers with RLS show ADHD like restless day and nighttime behaviours.

Methods: We conduct "Comprehensive Clinical Sleep Assessments", a clinical practice strategy based on therapeutic emplotment, in which clinical history taking utilizes qualitative interviews and incorporate patients' and parents' contributions in recognizing RLS related SPs and sequelae.

Results: We report a case series of 20 children who, in addition to their FASD, were diagnosed with RLS and/or a RLS like presentation. In 6/20 individuals, the diagnosis of familial RLS with a positive family history was established, including parental use of recreational drugs for self-medication of SPs; in 2/20 we are currently challenging the diagnostic pillar 'Static Encephalopathy'. All these children were medicated, with slight or without improvement of their challenging daytime behaviours and/or SPs.

Conclusion: Recognition of RLS is important as causal treatment is available and as ADHD medications and other psychotropic drugs (e.g. SSRIs) may result in further deterioration. Novel sleep assessment concepts with an extended medication history for behavioural medication side effects are necessary for unravelling clinical challenging behaviours, due to chronic discomfort and clinically diagnosing RLS.

P049

VANCOUVER-POLAR-BEARS-APP (VAPOBEARS-APP) FOR PRACTITIONERS AND A PAN-CANADIAN NATIONAL DATA BASE FOR CREATING EVIDENCE

Presenting Author: Ipsiroglu, Osman, University of British Columbia

Additional Authors and Affiliations:
Spruyt, Karen; Assistant Professor of Developmental Neuropsychology, Vrije Universiteit russel, Faculty of Psychoilogy and Educational Science, Brussel, Belgium
Elbe, Dean; University of British Columbia
Penn, Daniel; Chief Operating Officer, Shift Health Paradigms
Portales, Elodie; Neuroinformatics Core Manager at NeuroDevNet
Pavlidis, Paul; University of British Columbia
Owens, Judith; Professor of Pediatrics, George Washington University School of Medicine and Health Sciences

Abstract:

Introduction: Up to 85% of children with Fetal Alcohol Spectrum Disorders (FASD) experience sleep problems (SPs). Challenging behaviours of children with an FASD are usually associated with brain damage due to prenatal alcohol exposure; assessment concepts, which investigate “challenging behaviours” as a possible cause of SPs, are missing. In order to develop a framework for a structured approach to SPs and to determine skills and knowledge necessary to assess children with an FASD and SPs, we investigate screening and assessment at Tier-Service Level I.

Methods: We utilized the BEARS screening concept with focus on daytime (excessive-daytime-sleepiness) and nighttime behaviours (awakenings, snoring), transitions and routines (bedtime, regularity). The five domains were conceptually widened (e.g. excessive-daytime-sleepiness to excessive-daytime-behaviours) and standardized descriptive questions, which are asked in a semi-structured interview, were added (e.g. bedtime: ‘refuses going to bed’). Areas that are further explored are: co-morbidities describing functional impairments (e.g. attention: poor attention or concentration, distractibility, hyperactivity); medications; scales for subjective assessment of severity and impacted wellbeing of the child and caregivers and the sources of additional stress and re¬ge¬ne¬ration for the family.

Results: The VaPoBEARS-APP consists of 12 sections with 21 items and 63 (sub-) questions, which pop-up when the key section or item question has been answered with yes. An immediate printable PDF-document enables quality control of the collected data in clinical use; the anonymized data is encrypted and sent to a central REDCap database.

Conclusion: The VaPoBEARS-APP structures screening and supports the clinical hypothesis generation. The REDCap database allows a standardized data collection among participating clinical research sites. Both tools will be instrumental in developing a shared language among practitioners, thus supporting knowledge dissemination and function based assessment concepts. Validation of the VaPoBEARS-APP in different settings is the next step in this Pan-Canadian participatory research endeavour.

P050

CAN THE PRIMARY CARE PHYSICIAN DISTINGUISH CHRONIC INSOMNIA OBSTRUCTIVE SLEEP APNEA ON THE BASIS OF A SYMPTOM PROFILE? (STUDY 1)

Presenting Author: Bailes, Sally, Jewish General Hospital, McGill

Additional Authors and Affiliations:
Rizzo, Dorrie; Jewish General Hospital, Université de Montréal
Baltzan, Marc; OSR Medical
Pavilanis, Alan; St. Mary's Hospital
Grad, Roland; Jewish General Hospital, McGill University
Creti, Laura; Jewish General Hospital McGill University
Tran, Dieu-Ly; Jewish General Hospital, Université de Montréal
Fichten, Catherine; Jewish General Hospital, Dawson College
Libman, Eva; Jewish General Hospital, McGill University

Abstract:

INTRODUCTION: We developed and validated the Sleep Symptom Checklist (SSC) as a brief screening tool to identify patients who have a high likelihood of obstructive sleep apnea (OSA). In the present study, we investigate whether the four SSC subscales (Insomnia, Daytime Distress, Sleep Disorder, Psychological Distress) show an identifiable pattern for individuals with chronic insomnia that is distinct from the pattern for individuals with a diagnosis of OSA.

Methods: Participants were 56 primary care patients diagnosed with OSA, 56 patients seeking cognitive-behaviour therapy for insomnia (CBT-I), and 16 community and primary care participants with no OSA and no diagnosable insomnia (Control). Primary care participants underwent overnight polysomnography (PSG). Most CBT-I participants had been screened for OSA by PSG or had been referred for CBT-I treatment by a sleep medicine specialist. Control participants were screened for OSA using a home monitoring device or PSG. They were screened for chronic insomnia via questionnaire. All completed the SSC.

Results: The 3 groups (OSA, CBT-I, Control) were compared using ANOVA on the 4 SSC subscale scores. Distinct SSC subscale patterns emerged. While the OSA and CBT-I groups showed worse scores on all 4 subscales compared to Controls, the CBT-I group had worse Insomnia as well as Psychological Distress scores than the OSA group who, in turn, were characterized by moderately high Insomnia scores, higher Sleep Disorder scores and lower Psychological Distress scores than the other two groups. The OSA and CBT-I groups did not differ on Daytime Distress scores.

CONCLUSIONS:
The SSC has demonstrable potential to be used as a screening tool to distinguish chronic insomnia from possible OSA in primary care. Notably, OSA patients in primary care may present substantial insomnia and elevated scores of daytime symptoms or sleep disorder, but fail to show elevated psychological distress.

P051

SHOULD SCREENING FOR OBSTRUCTIVE SLEEP APNEA BE ROUTINE FOR PRIMARY CARE PATIENTS WITH METABOLIC SYNDROME?

Presenting Author: Bailes, Sally, Jewish General Hospital, McGill

Additional Authors and Affiliations:
Rizzo, Dorrie; Jewish General Hospital, Université de Montréal
Baltzan, Marc; OSR Medical, McGill
Grad, Roland; Jewish General Hospital, McGill
Pavilanis, Alan; St-Mary's Hospital, McGill
Tran, Dieu-LY; Jewish General Hospital,Université de Montréal
Creti, Laura; Jewish General Hospital, McGill
Fichten, Catherine; Jewish General Hospital, Dawson College
Libman, Eva; Jewish General Hospital, McGill

Abstract:

Introduction: Obstructive sleep apnea (OSA), though very prevalent in older, primary care patients, is under-recognized and under-treated. It's difficult to detect based on patient-reported symptoms alone. At the same time, a large percentage of older, primary care patients are diagnosed and treated for components of the metabolic syndrome (MSC) (i.e., hypertension, hyperlipidemia, diabetes, obesity). Recent research has shown that OSA may be an independent risk factor for the metabolic syndrome. This study examines the presence and severity of OSA in a previously unscreened sample of older, primary care patients with and without MSCs.

Method: A sample of 56 patients (64% women, mean age = 54) were recruited from two Montreal family practice settings. Participants were offered an overnight polysomnography study in a board certified sleep laboratory. Data were collected regarding their current health status, including BMI, diagnoses of hypertension, hyperlipidemia, and diabetes.

Results: A very high percentage of the participants (87%) received a diagnosis of OSA. Of those with OSA, 57% percent had a current diagnosis of one or more MSCs. Of those with at least one MSC, 85% had OSA. The mean respiratory disturbance index (RDI) increased and the mean oxygen saturation (SpO2) decreased with increasing number of MSCs. The presence of either hypertension or diabetes was associated with RDIs in the clinically severe range, RDI > 30. The presence of diabetes (n = 10) was associated with the most severe reduction of SpO2.

Conclusions: In this previously unscreened, older primary care sample, we found a high presence of OSA. The presence of metabolic syndrome was associated with increased severity of respiratory disturbance and oxygen desaturation. Though these results may be limited to patients motivated to pursue a sleep assessment, they suggest that the presence of metabolic syndrome, particularly hypertension or diabetes, should prompt a referral for OSA screening.

P052

SLEEP DISORDERS RELATED TO ATTENTION PROBLEMS IN ADOPTED CHILDREN

Presenting Author: Weiss, Shelly, Division of Neurology, Hospital for Sick Children and Department of Paediatrics, University of Toronto

Additional Authors and Affiliations:
Rajaprakash, Meghna; Division of Neurology, Hospital for Sick Children and Faculty of Medicine, University of Toronto
Kerr, Elizabeth; Division of Neurology, Hospital for Sick Children and Department of Paediatrics, University of Toronto
Friedlander, Benita; Division of Neurology, Hospital for Sick Children

Abstract:

Introduction: Sleep problems occur in up to 25% of children and are increased in children who have symptoms of inattention/hyperactivity and attachment issues. Research shows that foster children display sleep problems, but no previous studies have evaluated sleep in adopted children (AC).

Objective: To determine the prevalence and etiology of sleep disorders of AC.

Methods: Participants were recruited (April-May 2013) through a notice sent to parents on the listserve of Adoption Council of Canada and through discussion with families attending an Ontario Ministry of Child and Social Service meeting. Families were eligible to participate if their child was between 2-7 years of age. Thirty parent questionnaires, measuring demographics, behavior, parent/child relationship, and sleep problems, were sent to families. Responses were analyzed using descriptive statistics and correlations. T-tests were used comparing children reported to be good vs. poor-sleepers.

Results: 63% responded (N = 19). 12 children (63%) had sleep problems based on the Children's Sleep Habits Questionnaire. Further analyses of those reporting sleep problems showed a significant increase in parasomnias ($p < 0.006$) as well as a trend to issues with sleep onset delay and sleep duration. As compared to good-sleepers, children reporting sleep problems also had more attention problems and lower scores on adaptability ($p < 0.02$). Additionally, a trend-level group difference was observed in parenting confidence scores, which correlated significantly with attention problems in AC ($p = 0.002$).

Conclusions: Sleep disorders (especially parasomnias) were frequently reported in adopted children. In addition, those reporting sleep problems showed more attention problems and lower adaptability. Increased attention problems were correlated with lower parental confidence scores and parents of poor sleepers reported less comfort and control in parenting as compared to parents of good sleepers. Further research in this area will help to develop targeted interventions to prevent sleep disorders in AC.

P053

EXAMINATION OF POLYSOMNOGRAPHY IN HOSPITALIZED PATIENTS WITH ACUTE MODERATE-SEVERE TRAUMATIC BRAIN INJURY

Presenting Author: Wiseman-Hakes, Catherine, Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal

Additional Authors and Affiliations:
Gaudreault, Pierre-Olivier; Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Duclos, Catherine; Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Bernard, Francis; Department of Medicine, Hôpital du Sacré-Cœur de Montréal
Carrier, Julie; Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Blais, Hélène; Centre for Advanced Research in Sleep Medicine, Hôpital du Sacré-Cœur de Montréal
Gosselin, Nadia;

Abstract:

Introduction: Complaints of disturbed sleep and excessive daytime sleepiness have been well established as being among the most pervasive and enduring sequelae following traumatic brain injury (TBI). Current research suggests that sleep disorders begin in the acute stage with altered rest-activity cycles as evidenced from actigraphy. In the chronic stage, studies involving polysomnography (PSG) have identified a number of changes in sleep architecture including reductions in total sleep time, sleep efficiency, and N3 sleep, and increased stage N1 sleep. For those with severe TBI, hypersomnia and increased sleep need have been identified as being the most common sleep complaint. However, there has not yet been an examination of sleep architecture in the acute stage of TBI. The objective of this study was to examine the sleep architecture of adults with acute moderate-severe TBI, and to compare these findings with the sleep architecture of age- and sex-matched healthy controls.

Methods: Six adults (4 males; 25±11.3 yrs), with moderate-severe TBI underwent 24-h (PSG) on average 21 days (range 7-38) during their acute hospital stay. Results were compared with those of 11 healthy controls (7 males; 25±10.5 yrs); who underwent in-laboratory PSG.

Results: The TBI group tended to have a longer total sleep duration (TBI: 8.1±2.1h; Controls: 6.6±1.7h p=0.12), greater total wake duration (TBI: 159±104.7 min; Controls: 53.6±47 min, p=0.04), higher number of arousals and micro-arousals per hour of sleep (p=0.009), and greater number of sleep cycles (p=0.02). No group difference was found for percentage of each sleep stage

Conclusions: Our preliminary findings indicate that even in this very early stage, hospitalized patients with acute severe TBI experience a longer sleep duration, with greater sleep fragmentation in comparison to control subjects. Additional research is needed to further elucidate and determine the course of these disturbances, and their relationship with clinical and neurological outcomes.

P054

SLEEP DISORDERS IN CHRONIC HEPATITIS C INFECTION

Presenting Author: Shapiro, Colin, University Health Network

Additional Authors and Affiliations:
Carney, Colleen E.; Ryerson University
McShane, Kelly; Ryerson University
Zalai, Dora; Ryerson University
Fornadi, Katalin; University Health Network
Sherman, Morris; University Health Network

Abstract:

Introduction: Fatigue is the leading patient reported concerns in chronic hepatitis C (HCV) infection. Limited evidence suggests that sleep complaints are common in patients the contribution of specific sleep disorders to fatigue is unknown in this population. The objective was to evaluate the contribution of insomnia and obstructive sleep apnea (OSA) to fatigue in patients with choric HCV infection.
Methods: Treatment seeking participants with chronic HCV infection (N = 115; 36% females; mean age = 56) were enrolled in a mixed design study on fatigue. Fatigue was assessed with the Fatigue Severity Scale (FSS); insomnia with the Insomnia Severity Index (ISI); excessive daytime sleepiness with the Epworth Sleepiness Scale (ESS) and the risk for OSA with the STOP-BANG questionnaire.

Results: Sixty percent of the sample had severe fatigue (FSS≥4; median 4.67). More than one third of the sample reported clinical insomnia. Seventy one percent scored ≥3 on the STOP-BANG indicating a possibility of OSA. Only 7 % of the sample had been diagnosed with OSA. A one way ANOVA and post hoc tests indicated that participants with insomnia/with a combination of insomnia and potentially moderate/severe OSA had significantly higher fatigue than those without sleep problems or with a possible OSA only. Only patients with a combination of insomnia and OSA symptoms reported excessive daytime sleepiness.

Conclusion: Insomnia and OSA may affect 50% of patients with HCV infection treated in tertiary liver centers. OSA is severely underdiagnosed and treated. Patients with insomnia or a combination of insomnia and OSA report the most severe fatigue. Excessive daytime sleepiness is not a sensitive marker of sleep disorders in this group, as only those with comorbid sleep disorders reported excessive sleepiness. Screening and treatment of insomnia and OSA may alleviate the burden of fatigue of a significant proportion of patients with chronic HCV infection.

P055

SLEEP REGULATION IN THE STOP NULL MOUSE MODEL OF SCHIZOPHRENIA

Presenting Author: Profitt, Maxine, Department of Medical Neuroscience, Dalhousie University

Additional Authors and Affiliations:
Deurveilher, Samuel; Department of Medical Neuroscience, Dalhousie University
Robertson, George; Departments of Psychiatry and Pharmacology, Dalhousie University
Rusak, Benjamin; Departments of Psychiatry, Psychology & Neuroscience, and Pharmacology, Dalhousie University
Semba, Kazue; Departments of Medical Neuroscience, Psychology & Neuroscience, and Psychiatry, Dalhousie University

Abstract:

Disruption of sleep-wake cycles is common in patients with schizophrenia, and may correlate with symptoms of cognitive and affective abnormalities. Transgenic mice deficient in the cytoskeletal-associated protein Stable Tubule Only Polypeptide (STOP) show cognitive, behavioural and neurobiological deficits that mimic those seen in patients with schizophrenia, but there is little evidence of sleep changes in these mice. We characterized baseline sleep and recovery sleep following sleep deprivation in STOP-null mice. Adult male STOP-null (KO; n=7) and wild-type (WT; n=8) mice were implanted with electroencephalogram (EEG) and electromyogram (EMG) electrodes. EEG and EMG were recorded during a 24 h baseline period (in a 12:12 light-dark cycle), followed by 6 h of sleep deprivation (via 'gentle handling' in the second half of the light phase) and a 24 h recovery period. During the 24 h baseline period, the KO mice spent more time awake and less time in non-rapid eye movement (NREM) and REM sleep than the WT mice. The KO mice had more wake and NREM sleep episodes, and shorter NREM and REM sleep episodes compared to WT mice, particularly during the 12 h dark phase. Following sleep deprivation, during the first 2 h of recovery, which occurred in the early dark phase, both groups showed increased NREM and REM sleep amounts and NREM EEG delta power relative to corresponding baseline periods, but the rebound increases were less robust in the KO mice. These findings indicate that the STOP-null mice sleep less and their sleep is more fragmented compared to WT mice. Smaller increases in sleep early in the recovery period may reflect an impaired ability of STOP-null mice to compensate for sleep loss. These results are consistent with the sleep patterns observed in patients with schizophrenia, including reduced sleep time and fragmented sleep.
Funding: CHRF, DPRF

P056

ROLE OF SLEEP QUALITY AND QUANTITY IN MODERATING THE EFFECTIVENESS OF MEDICATION IN THE TREATMENT OF CHILDREN WITH ADHD

Presenting Author: Morash, Jessica, Capital District Health Authority

Additional Authors and Affiliations:
Corkum, Penny; Dalhousie University
Gendron, Melissa; Dalhousie University
Waldon, Jessica; Dalhousie University

Abstract:

Stimulant medications are effective in reducing ADHD symptoms and improving cognitive functioning. There is some research that suggests that sleep may impact the effectiveness of stimulant medication, although this has never been tested in children with ADHD being treated with long-acting stimulant medication. As such, the current study examined: 1) whether long-acting stimulant medication (Biphentin®) is effective in improving performance on measures of memory, attention, and academic productivity; and 2) if sleep impacts the relationship between medication and performance. Participants were 21 children (mean age = 9.1 years) newly diagnosed with ADHD and medication naïve, who participated in a four week blinded randomized controlled trial of long-acting MPH (2 weeks of medication and 2 weeks of placebo). Participants underwent assessments of sleep (i.e., polysomnography and actigraphy) and of cognitive performance (i.e., ANT-I, Finger Windows from WRAML-2, Digit Span from WISC-IV, Math Fluency from WJ-III). Long-acting stimulant medication was found to be an effective treatment for enhancing alerting attention, executive attention, working memory, and academic productivity. Moreover, sleep duration was found to impact the treatment response to medication. These results underscore the importance of evaluating and monitoring sleep when prescribing stimulant medication as a treatment for ADHD in children.

P057

IS CORTISOL OUTPUT ASSOCIATED WITH POOR SLEEP IN ADULTS WITH AUTISM?

Presenting Author: Chicoine, Marjolaine, Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.

Additional Authors and Affiliations:
Limoges, Élyse; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.
Chevrier, Élyse; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.
Lupien, Sonia; Human Stress Laboratory, Institut universitaire de santé mentale de Montréal
Mottron, Laurent; Autism Clinic, Hôpital Rivière-des-Prairies, Montréal.
Godbout, Roger; Sleep Laboratory and Clinic, Hôpital Rivière-des-Prairies, Montréal.

Abstract:

Higher cortisol output is known to correlate with poor sleep. Sleep in autism is characterized by disorders such as increased awakenings and less slow wave sleep (SWS) compared to typically developed individuals. This study explores the relationship between saliva cortisol levels and sleep in young adults with and without autism. It was predicted that higher salivary cortisol output would be associated with increased signs of poor sleep.

Thirteen individuals with autism (12M, 1F, 22.15±3.67 years) and 12 typically developed individuals (11M, 1F, 21.75±4.18 years) were recorded for two consecutive nights. Saliva cortisol was measured five times in the evening and twice in the morning. The association between cortisol levels and signs of poor sleep was tested in both groups of participants using Pearson correlation coefficients.

The group of typically developing participants showed the expected significant positive correlation between cortisol levels and the number and duration of nocturnal awakenings as well as a significant negative correlation with sleep efficiency. Typically developing participants also showed a negative correlation between cortisol and EEG delta activity in SWS over occipital region. In autistic participants, cortisol was correlated negatively with the duration of stage 4 SWS and with EEG delta activity over prefrontal and central regions but not with the number and duration of nocturnal awakenings.
As for typically developed individuals, young adults with autism showed a positive association between high salivary cortisol output and poor sleep but the relationship pattern is different: SWS and slow EEG activity rather than awakening per se were associated with cortisol. This atypical relationship pattern between sleep and cortisol levels possibly reflects an alternative coupling between neuronal and endocrine mechanisms of sleep control in autism.

P058

TREATMENT RESISTANT DEPRESSION AND OBSTRUCTIVE SLEEP APNEA: PREVALENCE, SLEEP QUALITY AND PERCEIVED GENERAL HEALTH

Presenting Author: Best, Michael, Queen's University

Additional Authors and Affiliations:
Fitzpatrick, Michael; Queen's University
Milev, Roumen; Queen's University
Bowie, Christopher; Queen's University
Jokic, Ruzica; Queen's University

Abstract:

Introduction: Obstructive sleep apnea (OSA) and major depressive disorder (MDD) can result in significant functional impairment as a result of symptoms common to both disorders. The current study aimed to explore the association between objective and subjective sleep quality with symptoms, general health, and measures of fatigue in individuals with treatment resistant depression (TRD).

Method: 81 individuals with TRD, referred to a tertiary care facility, completed questionnaires relating to mood, sleep quality, anxiety, general health, and fatigue. Subjective sleep quality was assessed using the Pittsburgh sleep quality index (PSQI). Participants also underwent an at-home polysomnograph in order to investigate the prevalence of co-morbid sleep disorders, specifically OSA.

Results: 51% of the individuals in this study had an apnea/hypopnea index (AHI) greater than 5 (indicative of mild obstructive sleep apnea), which is a significantly greater percentage than the estimates of undiagnosed OSA in the general population (30%), $p < .001$. There was no relationship between AHI and PSQI, $p = .689$. PSQI significantly moderated the relationship between AHI and fatigue, $p = .03$, such that greater AHI led to greater fatigue, but only for participants who subjectively reported poor sleep quality, $p = .02$. There was a marginal moderation effect of PSQI on the relationship between AHI and general health, $p = .08$. There was no relationship between AHI and depressive symptoms, $p = .192$, or anxiety symptoms, $p = .789$, and there was no moderating effect of subjective sleep quality, $ps > .165$.

Discussion: It appears that the prevalence of undiagnosed OSA among people with TRD is far greater than among the general population. Neither objective nor subjective measures of sleep are enough to predict fatigue or general health in this population, but the interaction between the two is important for the assessment of general well-being in patients with TRD.

Sleep: Cognition and Behaviour

P059

SLEEP DISTURBANCE AND DAYTIME SLEEPINESS INCREASE DEMENTIA RISK IN HEALTHY INDIVIDUALS INDEPENDENT OF OVERALL HEALTH STATUS

Presenting Author: Sterniczuk, Roxanne, Dalhousie University

Additional Authors and Affiliations:
Armstrong, Joshua; Dalhousie University
Rusak, Benjamin; Dalhousie University
Rockwood, Kenneth; Dalhousie University

Abstract:

Introduction: Previous analyses on data from the Honolulu-Asia Aging Study (HAAS) of dementia demonstrated that daytime sleepiness and insomnia are strongly associated with the development of incident dementia. The present study examined the relationship between sleep disturbance and overall health status, as measured by a frailty index (FI), in predicting dementia diagnosis.

Method: Secondary analyses were conducted on cognitively healthy older males who participated in the HAAS (i.e., waves 4 and 5; N = 3,137). Only those individuals who scored at least 74 points or greater on the Cognitive Abilities Screening Instrument (CASI) and did not have Alzheimer's disease (as determined by a consensus panel) were chosen at baseline. A 9-item 'sleep disturbance index' consisting of factors related to nighttime insomnia and daytime sleepiness, was compared to a 60-item FI.

Results: Controlling for age, education, body mass index, and FI, the 'sleep disturbance index' was significantly predictive of incident dementia (as determined by a consensus panel; n = 99), after an average of 2.9 years. Individual items 'waking up several times at night' and 'sleepy most of the day', were strong predictors in risk models that included the FI; however the FI was not a significant predictor in our models.

Conclusion: Sleep disturbance appears to be an important risk factor in the preclinical stage of incident dementia (i.e., prior to the manifestation of cognitive decline). Sleep-related questioning should be of particular importance when screening those at risk for dementia.
Support: CIHR, Killam Trusts

P060

COGNITIVE CONSEQUENCES OF SLEEP DEPRIVATION AND SHIFT WORK FOR UNDERGROUND MINERS

Presenting Author: Clement, Alexandra, Laurentian University

Additional Authors and Affiliations:
Legault, Glenn; Laurentian University

Abstract:

Introduction: Underground miners work in potentially dangerous environments where a lapse in attention due to fatigue could quickly put workers at risk of injury or worse. These workers may experience significant cognitive impairment due to the combined effects of sleep deprivation and circadian rhythm disruption resulting from shift work. Workers performing at less than peak levels of cognition increase the possibility of workplace accidents. This study will investigate the effects of multiple fatigue-inducing factors on the cognition of miners on and off the job.

Methods: To date, data has been collected from 12 participants (male developmental miners, age 40.8 ± 4.9) for up to 30 consecutive days – including day and night shifts and days off. Participants completed subjective sleep questionnaires at the beginning of the study [Epworth Sleepiness Scale (ESS) and the Pittsburgh Sleep Quality Index (PSQI)]. Sleep logs and actigraphy were collected for the duration of the study. Participants also completed the psychomotor vigilance task – brief version (PVT-B) up to four times daily while enrolled in the study.

Results: Preliminary analyses suggest that participants were experiencing poor sleep quality (Global PSQI score mean = 6.25 ± 2.7) and poor sleep efficiency. Sleep efficiency, although not significantly different between shift types, was consistently at or below the 85% level ($p=0.103$). Total sleep time during day shifts (319.8 ± 47.2 mins) was significantly shorter than that obtained on days off (369.8 ± 64.1 mins; $p=0.012$) but no differences were found between night shifts (339.5 ± 60.3 mins) and other shift types.

Conclusions: Data collection and analysis are on-going. Initial observations are indicative of poor sleep quality and efficiency prior to beginning a shift. Further analysis will help determine whether the cognitive function of participants is being impaired by insufficient sleep quality and quantity, potentially resulting from poor adaption to rotating shifts.

P061

INFLUENCE OF ECOLOGICALLY VALID SOUNDS ON THE EVOKED K-COMPLEX

Presenting Author: Campbell, Kenneth, University of Ottawa

Additional Authors and Affiliations:
Dale, Allyson; University of Ottawa
Byron-Alhassan, Aziza; University of Ottawa
Tavakoli, Paniz; University of Ottawa

Abstract:

Introduction: The K-Complex was first described almost 75 years ago as an extremely large waveform that could be elicited by an external stimulus during NREM sleep. The evoked K-Complex consists of an early negative wave peaking at about 350 ms ('N350'), followed by a second much larger amplitude negative wave peaking at about 550 ms ('N550') after stimulus onset. In most studies, the K-Complex is elicited by brief duration, pure tones. These are unlikely to occur in the natural environment. The present study therefore employed longer duration, ecologically valid stimuli.

Methods: Nine young adults spent a single night in the laboratory. They were presented with four different 300 ms duration stimuli: 80 dB SPL pure tones, louder 90 dB SPL pure tones, 80 dB peak SPL white noise bursts, and different environmental sounds having an average intensity of 80 dB SPL. The stimuli were presented at random every 15 s in blocks of 40 stimuli during early and late stage 2 sleep. EEG was recorded from 63 electrode sites.

Results: Environmental sounds elicited the highest proportion (.60) and the lower intensity pure tone; the lowest proportion (.43) of K-Complexes but the difference was not significant. The amplitude of the N550 component was somewhat larger following the presentation of the environmental sounds and loud pure tone stimuli compared to the lower intensity tones ($p < .05$).

Conclusion: Previous research has indicated that the N550 component obeys an all-or-none phenomenon. When it is elicited, its amplitude does not vary. The present study indicates that there may be small variation in its amplitude, especially if ecologically relevant stimuli are presented or if the stimulus is very loud and has a long duration.

Acknowledgements: This research was funded by the Natural Sciences and Engineering Research Council of Canada (NSERC).

P062

FRONTAL SLEEP SPINDLES IN INSOMNIA: AN EXPLORATORY STUDY

Presenting Author: St-Hilaire, Patrick, École de Psychologie, Université Laval, Québec, Qc, Canada

Additional Authors and Affiliations:
Desmarais, Frédérick; École de Psychologie, Université Laval, Québec, Qc, Canada
Lefrançois, Jérémie; École de Psychologie, Université Laval, Québec, Qc, Canada
Pérusse, Alexandra; École de Psychologie, Université Laval, Québec, Qc, Canada
Bastien, Célyne; École de Psychologie, Université Laval, Québec, Qc, Canada

Abstract:

Introduction: It has been shown that cortical hyperactivation is present in insomnia sufferers (INS) compared to good sleepers (GS). This difference might affect sleep protection mechanisms in reducing the occurrence of sleep spindles. The objective of this study was to document the microstructure of stage 2 sleep in INS (subdivided in paradoxical 'PARA-I' and psychophysiological 'PSY-I') by comparing the occurrence of frontal sleep spindles with GS.

Methods: 12 PARA-I (mean age = 36.9 ± 9.1), 12 PSY-I (36.4 ± 8.8) and 12 GS (30.7 ± 6.1) completed four consecutive polysomnographic nights in laboratory. To determine whether differences exist between groups, frontal sleep spindles were manually scored during stage 2 sleep on nights 2 and 3. The early and late portions of the night were treated independently. Total number of sleep spindles and the density (number of sleep spindles per minute) were calculated. Spindles lasting between 0.5 and 1.5 seconds, having a frequency from 11 to 15 Hz and an amplitude ranging from 20 to 40 mV were included.

Results: Repeated measures ANOVAs revealed no significant difference between INS and GS according to the total number ($p=.32$) and density ($p=.24$) of frontal sleep spindles. Subsequently, additional repeated measures ANOVAs performed between PARA-I, PSY-I and GS showed no significant effect of groups on the number of frontal sleep spindles ($p=.60$) and density ($p=.50$). Finally, independent samples t tests revealed no effect of time or night on the occurrence of sleep spindles.

Conclusions: These results suggest a similarity between sleep protection mechanisms in both types of INS compared to GS, corroborating previous studies on sleep spindles. It supports the idea that sleep protection mechanisms, expressed by the presence of sleep spindles, do not seem to be deficient in INS. However, hyperactivation in INS can affect other sleep protection mechanisms such as K complexes.

P063

REM SLEEP ASSOCIATIVE MEMORY RECONSOLIDATION

Presenting Author: Carr, Michelle, University of Montreal

Abstract:

Introduction: REM sleep facilitates memory consolidation by providing access to broader associative networks. We developed the Word Associations Task (WAT) to assess breadth of network access as indicated by word associations that are atypical according to existing norms.

Methods: We compared performance of healthy subjects (N=59, Age=23.66±4.25) on an emotional WAT given before (Baseline) and after sleep (Post and Primed). For the Primed task, subjects associated to 6 words that had been memorized before sleep.
Four groups were compared. 'NoNAP' subjects stayed awake while other groups were given a 2-hour daytime nap opportunity: 'NREM' subjects had 80 min of sleep containing only NREM; 'REM' subjects were awakened 10 min into the first REM; 'RNR' subjects completed one cycle and were awakened 10 min into a new NREM period.

Results: A 3 x 4, Conditions (Baseline, Post, Primed) x Group (NoNAP, NREM, REM, RNR) repeated-measures ANOVA showed an interaction effect ($F(6,106)=3.900$, $p=.001$). Scores for the NoNAP group did not change over Conditions (N=9, baseline= .667±.124, post=.728±.098, primed =.630±.167). Nor did scores for the NREM group (N=21, baseline=.683±.154, post=.661±.200, primed = .619±.210). However, REM group had higher scores for the primed task (N=21, .796±.131) than baseline (.675±.184; $F(1,53)=6.884$, $p=.011$) and post task (.606±.179; $F(1,53)=20.707$, $p=.00003$). Unexpectedly, scores for the RNR group did not change over Conditions (N=6, baseline=.648±.084, post=.630±.167, primed=.593±.218).

Scores did not differ between NoNAP, NREM, and RNR groups. However, the REM group had higher scores than the NREM ($F(1,53)=10.402$, $p=.002$), NoNAP ($F(1,53)=5.518$, $p=.023$) and RNR ($F(1,53)=6.106$, $p=.017$) groups on Primed task.

Conclusion: Daytime sleep containing REM facilitates access to atypical associations for words that have been previously committed to memory. However, subjects having a second NREM episode did not show this effect, suggesting that re-entering NREM sleep causes memory traces to be re-consolidated by NREM mechanisms.

P064

SCENT-CUED REACTIVATION DURING SLEEP AS A STRATEGY TO IMPROVE MEMORY OF TEXT

Presenting Author: MacDonald, Kevin, Brock University

Additional Authors and Affiliations:
Carre, Geoff; Cape Breton University

Abstract:

By using scent to cue memories during sleep, Rasch, Büchel, Gais, and Born (2007) demonstrated that memory reactivation likely plays a causal role in the consolidation processes of declarative memories. In their study, re-exposure during slow-wave sleep to a scent present during learning was found to lead to better performance on a card matching memory task the following day. The current research tested whether the rigorous laboratory procedure implemented by Rasch et al. (2007) could be adapted and used as a self-administered method to improve one's declarative memory in a practical sense. This called for scent presentation to be non-specific to slow-wave sleep and delivered over the entire night and for the memory task to be more typical of material that one may be required to learn in daily life. In addition, the current research sought to investigate the role emotional salience in the scent-cued reactivation process. Participants (n = 29) learned either emotionally charged or neutral narratives in the presence of a scent, and half of each group were given functioning air-fresheners to re-expose them to that scent during sleep. On a surprise recall test the next morning, participants were asked to rewrite the narratives word for word from memory. An analysis of covariance removing unwanted variance from hours slept and sleep quality found that the scent-cueing process resulted in significantly better recall of the neutral, but not the emotional narratives, which were well recalled regardless of scent presentation. This finding supports the idea of scent-cued reactivation as a simple strategy one, such as a student, could use to aid next-day memory of text material.

P065

PROBING THE CAUSAL ROLE OF STAGE 2 SLEEP IN MOTOR MEMORY CONSOLIDATION

Presenting Author: Laventure, Samuel, Université de Montréal

Additional Authors and Affiliations:
Fogel, Stuart; Université de Montréal
Albouy, Geneviève; Université de Montréal
Lundu, Ovidiu; Université de Montréal
King, Bradley; Université de Montréal
Sévigny-Dupont, Pénélope; Université de Montréal
Carrier, Julie; Université de Montréal
Doyon, Julien; Université de Montréal

Abstract:

Motor sequence learning refers to the process by which simple, stereotyped movement elements come to be performed effortlessly as a unitary sequence through multiple sessions of practice. Numerous studies have convincingly demonstrated that sleep (at night and daytime) plays a critical role in the consolidation of motor sequence learning. Yet there is no consensus regarding the sleep stages implicated in the consolidation of various motor skills. Mounting evidence indicates that Stage 2 sleep and spindle activity in particular, are critical for motor memory consolidation to occur, but most of those studies are only correlational in nature.

In this study, we probed a possible causal role of stage 2 sleep in motor memory consolidation using an olfactory stimulation/motor sequence learning (MSL) conditioning protocol. We conditioned a first group of participants with a rose-like odor during learning of a sequence of finger movements, and re-exposed them to the odor during stage 2 sleep (ST2). A second group was conditioned with the same odor while doing the MSL task, but was re-exposed during REM sleep (REM). Finally, a third group was not conditioned with the odor during the MSL task, but was exposed to it during stage 2 sleep (CTL). All subjects were re-tested the next morning 2 hours after waking up.

Analysis of gains in performance revealed a significant interaction between the experimental manipulation and participant's gender ((F(2, 66) = 4.63, p = .01). Gains were significantly higher for men than women in the ST2 group (p = .01). Also, results demonstrated that men in the ST2 group showed greater gains in performance than those in the CTL (p = .03), but not the REM group (p = .76). These findings strongly support the proposal that the association between stage 2 sleep and motor memory consolidation is critical, but not necessarily specific.

P066

IMPACT OF SLEEP RESTRICTION ON DAYTIME MOVEMENT IN TYPICALLY DEVELOPING CHILDREN

Presenting Author: Poirier, Abbey, Dalhousie University

Additional Authors and Affiliations:
Vriend, Jennifer; Dalhousie University
Davidson, Fiona; Dalhousie University
Gendron, Melissa; Dalhousie University
Corkum, Penny; Dalhousie University

Abstract:

Research has shown that reduced sleep duration is related to a range of negative outcomes for children, including poorer learning, mental and physical health. There is also a common belief that reduced sleep leads to an increase in daytime hyperactivity and overall movement. Subjective measures of hyperactivity (i.e., parent questionnaires) suggest that children show hyperactive behaviours following sleep restriction, typical of those seen in children with ADHD. However, these findings have yet to be supported by objective measures. The current study examines the effects of extending versus restricting sleep on subjective (questionnaires) and objective (actigraphy) measures of daytime movement in 25 typically developing children aged 8-12 years old. Using a within-subjects design, sleep duration was measured during baseline (BL) condition, and then sleep was extended and restricted by 1 hour, for 4 nights in each condition. Actigraphy, a wrist watch-like acceleration sensor, was used as the objective measure of movement. Participants wore the actigraph 24 hours each day for all conditions. Subjective measures showed an increase in ADHD symptoms following sleep restriction due to poorer attention, not hyperactivity. No differences were found for mean or median daytime activity as measured by actigraphy; however, the standard deviation of activity was significantly higher following sleep restriction. Contrary to the popular belief that sleep restriction results in increased activity, this study is consistent with previous experimental sleep studies that did not find any changes in daytime activity levels. There was however and increase in the variability of activity, which may be what is being noted by adults who are interacting with sleepy children.

P067

APPLICATION OF GOAL ATTAINMENT SCALING (GAS) IN CHILDREN WITH NEURODEVELOPMENTAL DISABILITIES (NDD/D) AND WILLIS EKBOM DISEASE (WED)

Presenting Author: Ipsiroglu, Osman, Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics

Additional Authors and Affiliations:
Jaggumantri, Sravan; Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics
Pham, Tracy; Sleep Research Lab (Div. of Developmental Paediatrics, Sunny Hill Health Center for Children), Department of Paediatrics

Abstract:

Introduction: Up to 90% of children with NDD/D struggle with severe chronic sleep problems, mainly falling asleep and sleep maintenance. WED related discomfort seems to be a main cause. A tool to evaluate tailored therapeutic interventions and individual progress is GAS. According to our knowledge, this is the first investigation of applying GAS in the assessment of pediatric sleep patients.

Methods. Following assessments, a structured GAS form is provided for parents, community-based therapists and teachers to record their goals and concerns and rank them according to importance level (1; not important to 10; very important). Parents monitor therapeutic effects and/or side effects and evaluate changes in goals and concerns based on a 5 point scale [2 Achieved, 1 Achieved Somewhat, 0 No Change, -1 Worsened Somewhat, -2 Worsened]. The different GAS are then evaluated at follow up with the family or community-based conference setting, and treatment plans are reviewed and modified according to this evaluation.

Results. Completed GAS (n=19/23) results can be grouped into 3 main topics; affected daytime behaviours (e.g. social-emotional, structure-routines, academic skills), abilities (e.g. body awareness, fine motor, coordination) and sleep related goals (e.g. falling asleep, sleep maintenance, self-soothing) all affecting daytime sequelae and co-morbidities. The identification and discussion of ranked goals helped to (1) develop a shared language in all cases; (2) agree on therapeutic strategies (e.g. in behavioral intervention, or titration of medication); (3) monitor accurately improvements and/or deterioration of day and nighttime behaviours. Given the structured re-assessment of GAS at follow up, any change in therapeutic priorities was visible.

Conclusion. Sleep impacts social, emotional and physical well-being. The development of a mutually shared language through GAS allows us to work with all involved parties, not only with the child and parents, without medicalizing all therapeutic goals, and thus increasing adherence in patient care.

P068

EFFECTS OF TYPE OF FEEDBACK ON DRIVING SIMULATOR PERFORMANCE DURING PROLONGED WAKEFULNESS

Presenting Author: MacLean, Alistair, Queen's University

Additional Authors and Affiliations:
Blanchard, Erin; Queen's University

Abstract:

Introduction & Objectives: A previous study (Krell, 2008) in our laboratory demonstrated that visual feedback improved simulated driving performance and increased self-reported sleepiness. Evidence that visual tasks decline more rapidly during prolonged wakefulness (Raidy and Scharff, 2005) led us to hypothesise that auditory feedback would be more effective than visual in improving driving performance during prolonged wakefulness.

Materials & Methods: Participants (12F; 12M; Mean age = 19.5y) completed four simulated, 45-minute driving sessions in the York Driving Simulator at 2400, 0200, 0400 and 0600. Feedback was provided if participants exceeded a safe-zone defined as being within 1m of the centre of the right-hand lane and within ±10km of the speed limit. Each participant experienced: no feedback, visual feedback and auditory feedback in random order for 15 minutes during each session. Stanford Sleepiness Scale ratings were obtained before each session and after each feedback condition.

Results: Compared to the control condition (87.1%) both visual (95.8%) and auditory (97.0%) feedback conditions led to more time being spent inside the safe-zone ($F(2,48) = 12.97$, $p=0.001$). There was no statistically significant difference between the two feedback conditions although the results were in the predicted direction. There were no statistically significant differences for self-reported sleepiness ($F(2,48) = 0.23$, $p=0.79$).

Conclusion: Contrary to hypothesis, while both visual and auditory feedback improved performance, auditory feedback was not significantly superior to visual feedback. It is possible that ceiling effects had a role to play in the lack of differentiation between the two types of feedback.

Acknowledgements: This research was supported by a grant from Queen's University to A.W. MacLean. We are grateful to Martin York for support of the York Driving Simulator.

P069

SLEEP DEPRIVATION IMPAIRS FUNCTIONAL MUSCLE RECOVERY FOLLOWING INJURY

Presenting Author: Schwarz, Peter B., Departments of Cell & Systems Biology, University of Toronto

Additional Authors and Affiliations:
Graham, Wesley; Departments of Cell & Systems Biology, University of Toronto
Li, Fangming; Departments of Cell & Systems Biology, University of Toronto
Locke, Marius; Kinesiology & Physical Education, University of Toronto
Peever, John H.; Departments of Cell & Systems Biology, University of Toronto

Abstract:

Introduction: Skeletal muscles possess the ability to completely regenerate following muscular injury. Sleep is believed to play an important role in this regenerative process; however, the nature of this role has not been previously tested. Our aim was to investigate the effects of sleep deprivation on molecular, histological and functional indices of muscle repair following myotoxic injury.

Methods: Male rats were injected with 1.5% bupivacaine into the masseter muscle to induce myotoxic damage. Subjects were either sleep deprived for 8 hours during the light period using a forced locomotion activity wheel, or served as activity controls. They were subsequently sacrificed at 2, 7 or 14 days post-injection. Western Blot analysis was used to assay for protein expression of positive (MyoD, myogenin) and negative (myostatin) molecular repair markers. Evans Blue Dye staining for damaged muscle fibres was used to examine histopathology. Functional muscle repair was evaluated after 2 weeks using in situ contractility testing to measure the force-frequency relationship during isometric contractions.

Results: Sleep deprivation suppressed MyoD protein levels in the masseter at 2 and 7 days, and myogenin at 2 days post-injection, compared to activity controls. Myostatin levels were unaffected. Histopathology revealed no effect of sleep deprivation on the extent of muscle fibre degeneration following injury. The force-frequency curve tended to shift downward and to the right in response to sleep loss, indicating compromised contractile force at moderate to high stimulation frequencies.

Conclusion: We demonstrate that sleep loss impairs functional recovery of the masseter muscle following myotoxic injury. Specifically, 8 hours of sleep deprivation acutely down-regulated molecular markers of muscle repair and resulted in contractile function deficits during recovery. Together, these findings suggest that sleep normally plays a permissive role in the regeneration of damaged muscle tissue.