

A grayscale photograph of a person sleeping in a bed, with their hands clasped near their face. The image is used as a background for the text.

Sleep As An Altered State Of Consciousness

Eva Libman, PhD

16th annual JGH Psychiatry Research Day

Research team

Eva Libman, PhD

Catherine Fichten, PhD

Sally Bailes, PhD

Laura Creti, PhD

Dorrie Rizzo, PhD

Collaborators

Marc Baltzan, Msc, MDCM, FRCP(C), FAASM, Mount-Sinai Hospital

Roland Grad, MD, Msc, Goldman Herzi, McGill University

Nelly Huynh, PhD, Université de Montréal

Gilles Lavigne, DMD, PhD, U de M, CÉAMS, Hôpital du Sacré-Coeur

R. John Kimoff, MD, FRCP(C), MUHC

Réseau de recherche en sécurité routière (RRSR)



HÔPITAL MONT-SINAI - MONTRÉAL
MOUNT SINAI HOSPITAL MONTREAL



Faculté de médecine dentaire



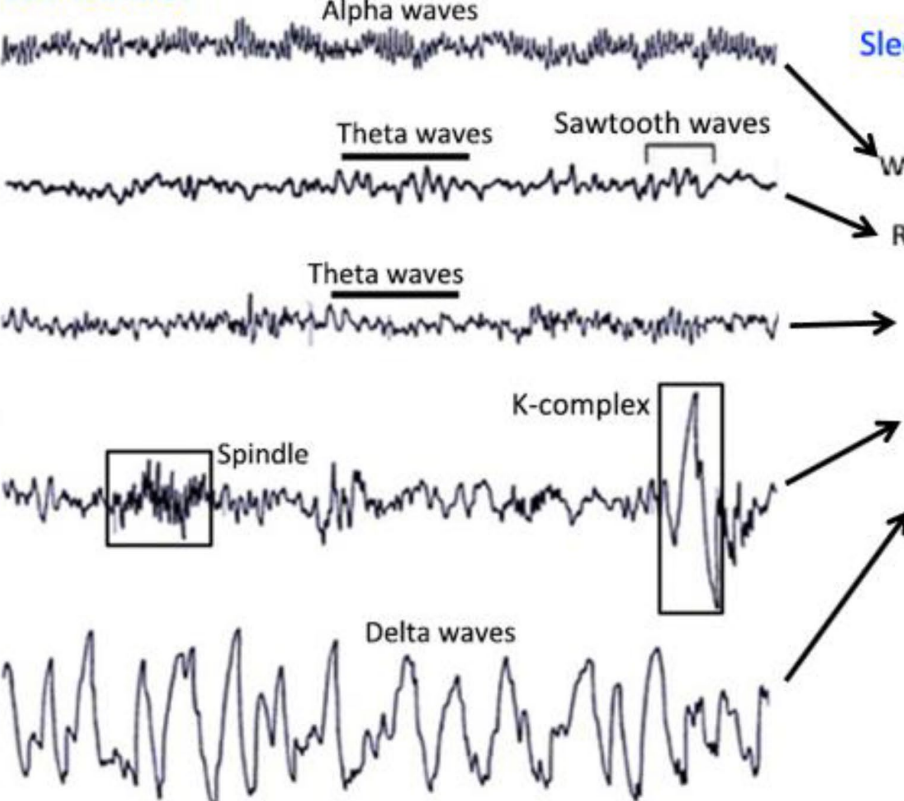


Absolute Signs of Sleep

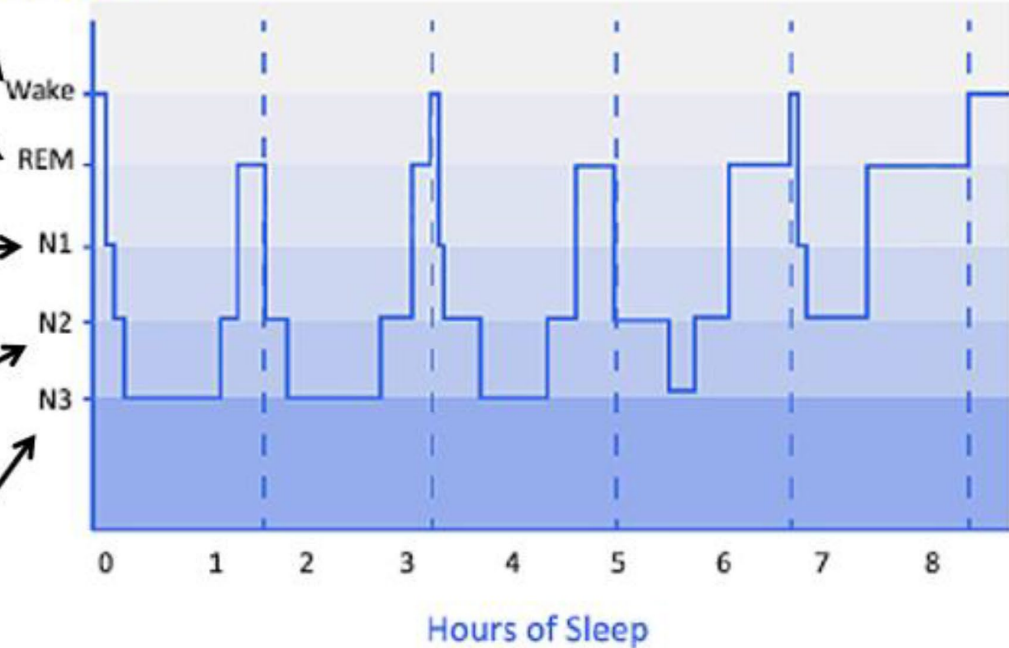
- perceptual wall between conscious mind and outside world
- immediately reversible
- occurs naturally
- occurs periodically

Sleep stages

EEG features



Sleep stage



Pan, J., Wu, J., Liu, J., Wu, J., & Wang, F. (2021). A Systematic Review of Sleep in Patients with Disorders of Consciousness: From Diagnosis to Prognosis. *Brain Sciences*, 11(8), 1072.

The importance of Sleep

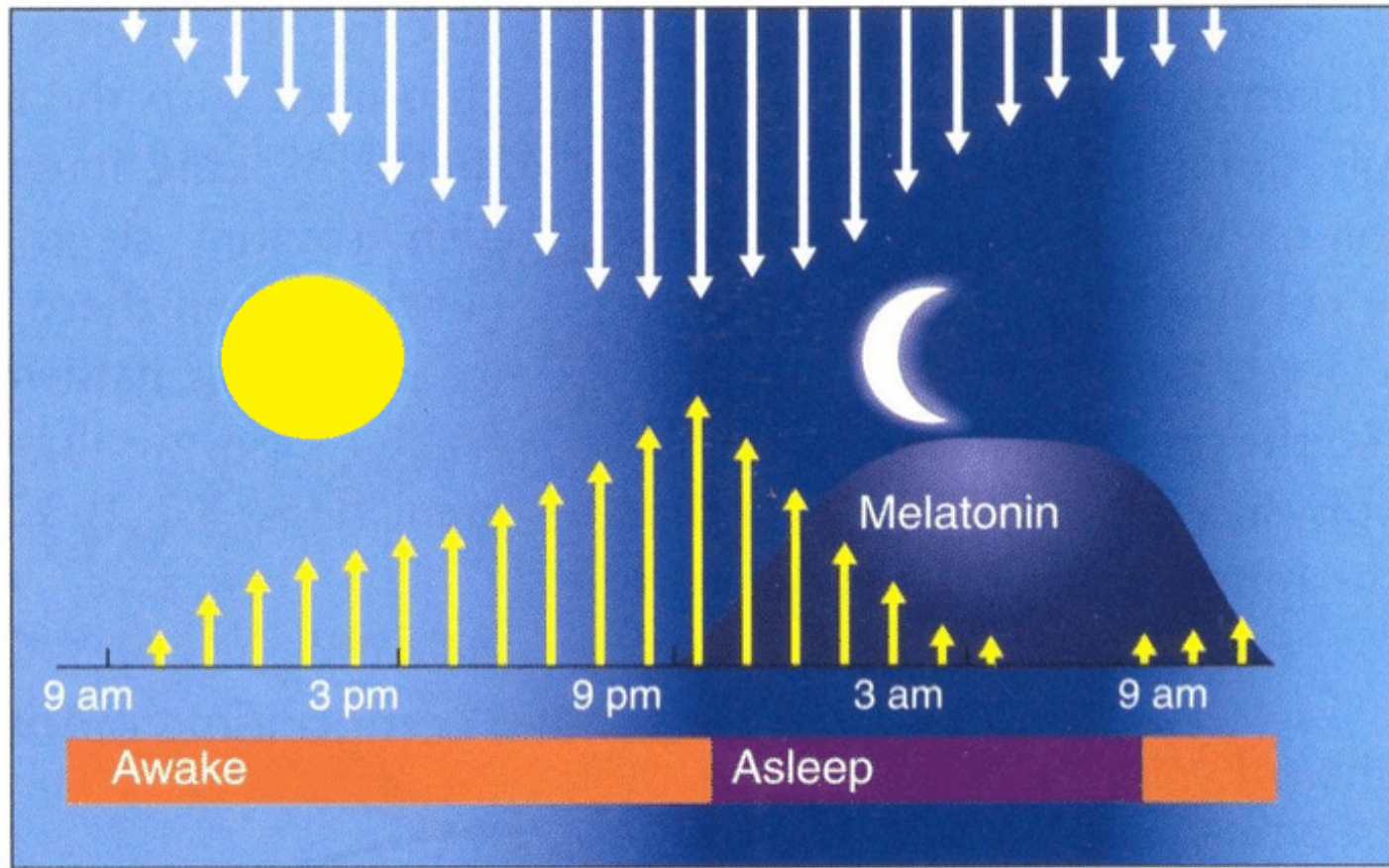
- The importance of Sleep
- Essential
- Universal
- Negative consequences of sleep loss



Two-Process Model of Sleep

**Homeostatic
Sleep Drive**

**Circadian
Alerting
Signal (SCN)**



Stages of Sleep

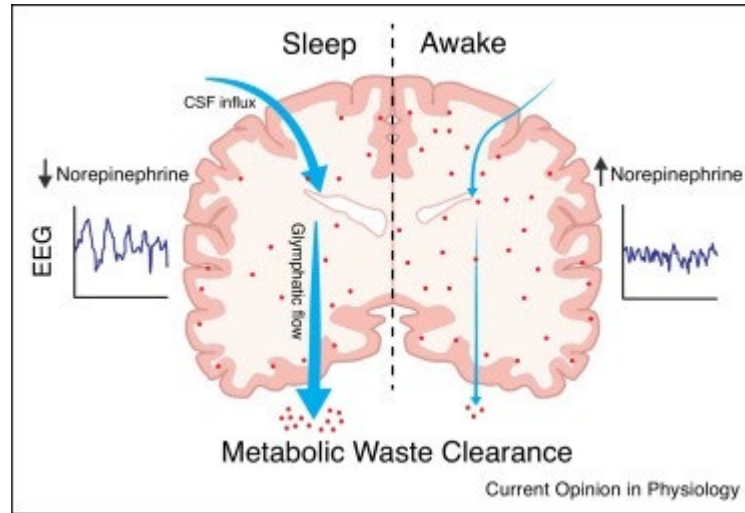
- Stage 1 (light sleep)
- Stage 2
- Stage 3 (deep sleep)
- NREM
- REM

Dreams and Dreaming

- When Do We Dream and Why?
- Do psychedelic effects and dreaming reflect similar altered states of consciousness?
- Example: hypnopompic hallucinations

Function of Sleep Stages

- Learning and memory
- Glymphatic system:



Hauglund, N. L., Pavan, C., & Nedergaard, M. (2020). Cleaning the sleeping brain—the potential restorative function of the glymphatic system. *Current Opinion in Physiology*, 15, 1-6.

Our Research Program: Impact of Sleep Disorder

1980-97

- Aging (individual differences and resilience)
- Insomnia (sleep, insomnia and aging)
- Measurement: controversy about self-report and objective measures
- Polysomnography as an objective measure

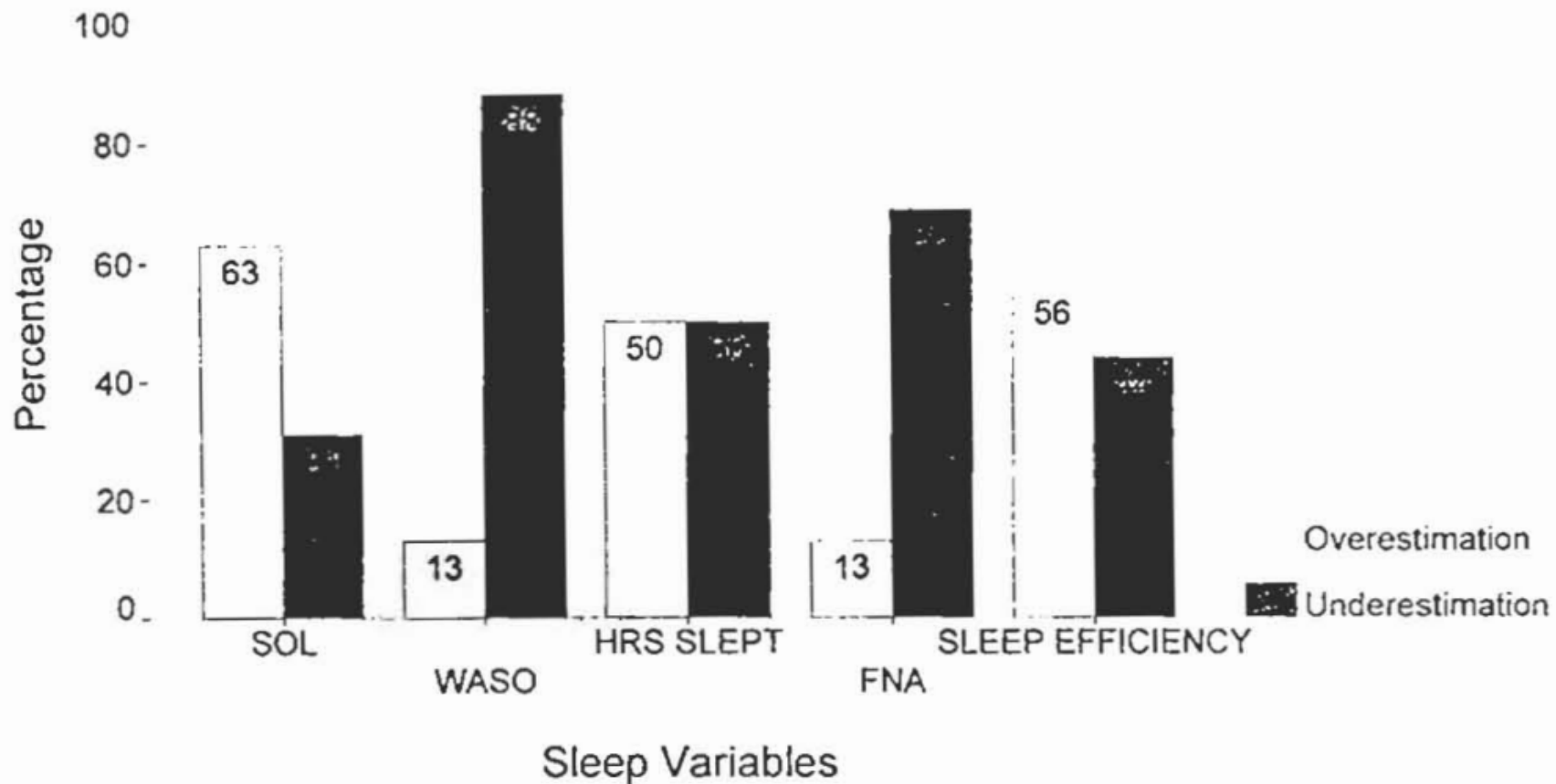


Fig. 1. Percentage of instances of over- and underestimation of sleep parameters on self-report compared to PSG.

SEARCH ▶

BROWSE ▶

Recent S

A comparison of reported and recorded sleep in older poor sleepers.

[EXPORT](#) [★ Add To My List](#) [✉](#) [🖨](#) [🔗](#)

Database: APA PsycInfo

Journal Article

[Libman, E.](#) [Creti, L.](#) [Levy, R. D.](#) [Brender, W.](#) [Fichten, C. S.](#)

Citation

Libman, E., Creti, L., Levy, R. D., Brender, W., & Fichten, C. S. (1997). A comparison of reported and recorded sleep in older poor sleepers. *Journal of Clinical Geropsychology*, 3(3), 199–211.

Abstract

Nocturnal sleep was monitored by both polysomnography (PSG) and sleep diaries in a community sample of 9 older individuals (aged 61–85 yrs) complaining of disorders of initiating and maintaining sleep (DIMS). Comparisons on frequency and duration of nocturnal awakenings, total sleep time, and sleep efficiency indicated less reported awake time during the night and less frequent awakenings than PSG evaluation. There was also a trend for Ss to report longer times to fall asleep than PSG evaluation indicated. Although physical disorders were screened using questionnaire and interview, PSG identified myoclonus in 4 Ss and obstructive sleep apnea in 1. Results and low correlations between scores on the same sleep parameters using the 2 different measurement modalities emphasize (1) the importance of more extensive use of PSG monitoring for older individuals with insomnia, and (2) underscore the need for focused studies of time estimation of both sleep and wake time parameters in poor sleepers with sleep maintenance problems. (PsycInfo Database Record (c) 2021 APA, all rights reserved)

Prevalence of OSA

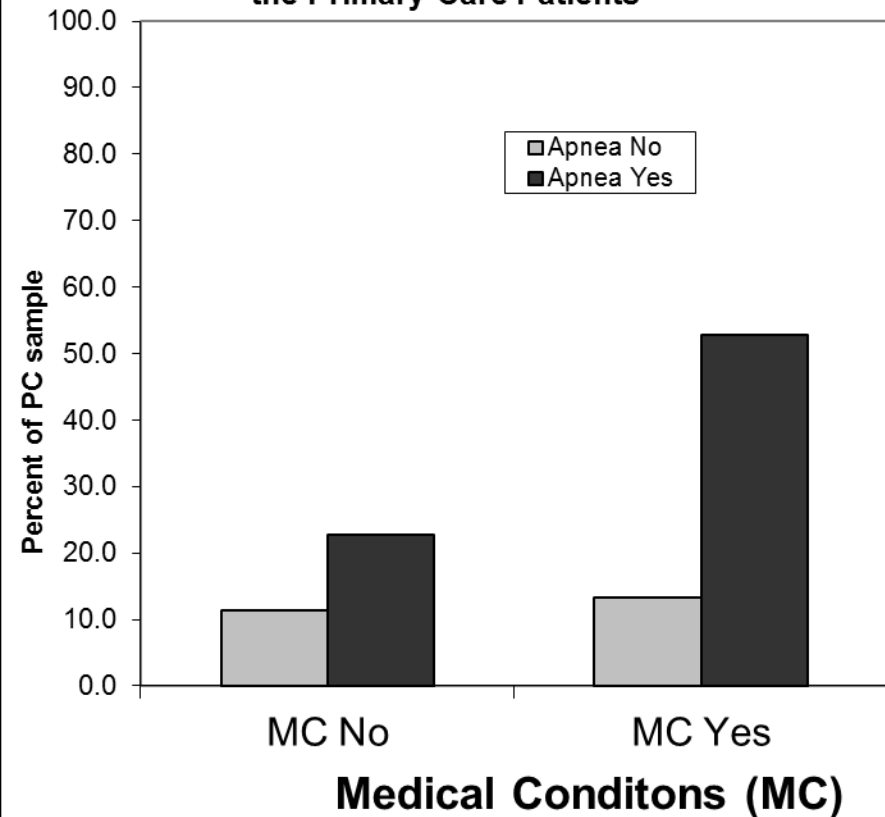
- Varies from 2% to 50% in adult general population
- Depends on recruitment, testing methods
- Varies with age, obesity
- Varies with other co-morbidities

Sources of High Prevalence Estimates

- Sub-groups of OSA co-morbidities
(e.g. hypertension, diabetes)
- Settings
(e.g. sleep clinics)
- Gender

Metabolic Syndrome and OSA

Figure 1: Medical Conditions (MC) and Apnea in the Primary Care Patients



Family Practice, 2017, Vol. 34, No. 4, 467-472
doi:10.1093/fampra/cmz008
Advance Access publication 23 February 2017

OXFORD

Health Service Research

The challenge of identifying family medicine patients with obstructive sleep apnea: addressing the question of gender inequality

Sally Bailes^{a,b,*}, Catherine S Fichten^{a,b,f}, Dorrie Rizzo^{a,g}, Marc Baltzan^{b,c,d}, Roland Grad^{a,b}, Alan Pavilanis^{b,e}, Laura Creti^{a,b}, Rhonda Amsel^b and Eva Libman^{a,b}

SLEEP SYMPTOM CHECKLIST

FOR THE PATIENT	SEVERITY				Notes:
For each symptom, check (✓) how SEVERE it was during the past month. 0 = not at all 1 = mildly 2 = moderately 3 = very					
Waking up and trouble getting back to sleep	0	1	2	3	Σ= insomnia subscale
Insomnia	0	1	2	3	
Trouble falling asleep	0	1	2	3	
Poor sleep quality	0	1	2	3	
Waking up too early in the morning	0	1	2	3	
Waking often to urinate	0	1	2	3	
Daytime sleepiness	0	1	2	3	
Lack of vitality or energy	0	1	2	3	Σ= daytime aspects subscale
Bodily pain	0	1	2	3	
Daytime fatigue	0	1	2	3	
Limited in doing things because of health	0	1	2	3	
Sleep is non-refreshing	0	1	2	3	
Waking with a headache	0	1	2	3	Σ= sleep disorder subscale
Snoring	0	1	2	3	
Interruption of breathing during sleep	0	1	2	3	
Legs or arms jerk at night	0	1	2	3	
Falling asleep during the day when not wanted	0	1	2	3	
Waking with a dry mouth	0	1	2	3	
Discomfort in legs with strong urge to move	0	1	2	3	
Depression	0	1	2	3	Σ= psychological maladjustments subscale
Anxiety	0	1	2	3	
Poor emotional well-being	0	1	2	3	

Identification of Sleep Apnea Symptom Profiles - Results

- SSC profile distinguished OSA patients from chronic insomnia
- Daytime sleepiness and fatigue did not distinguish the two groups
- 85% of men and 75% of women had diagnosed OSA, of similar severity
- None of these patients had been suspected of having OSA
- Could routinely offering OSA testing be the answer for identifying OSA?

1073

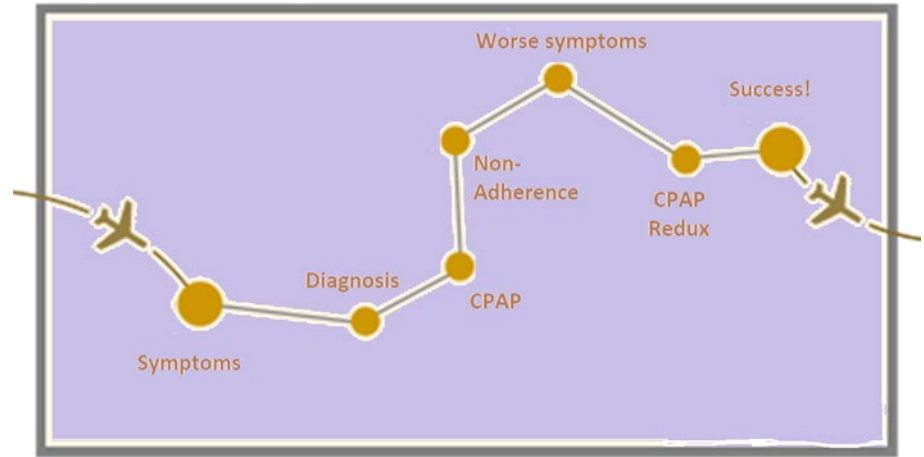
WHAT HAPPENS TO PATIENTS AFTER A DIAGNOSIS OF SLEEP APNEA?

Bailes S¹, Rizzo D², Tran D², Creti L¹, Grad R¹, Baltzan M³, Pavilanis A⁴, Fichten C¹, Libman E¹

¹Jewish General Hospital, Montreal, QC, CANADA, ²Jewish General Hospital, Montréal, QC, CANADA, ³Mount-Sinai Hospital, Montréal, QC, CANADA, ⁴St-Mary's Hospital, Montréal, QC, CANADA

SLEEP, Volume 41, Abstract Supplement, 2018

OSA TRAJECTORY



- Year 7 of long term prospective follow-up
- Improve evaluation of OSA in primary care patients
- Better understand the course of OSA and its related risk factors over time

Impact of the novel coronavirus disease (COVID-19) on treatment adherence and sleep duration in patients with obstructive sleep apnea treated with positive airway pressure

- Treating OSA may moderate OSA-induced cardiovascular symptoms
- Potential compounded risk when a patient already afflicted with OSA contracts COVID-19 disease
- Treating OSA symptoms might improve COVID-19 outcomes

Rizzo, D., Libman, E., Baltzan, M., Fichten, C., Bailes, S. (2020, accepted). Impact of the COVID-19 Pandemic on Obstructive Sleep Apnea (OSA): Recommendations for Symptom Management. Journal of Clinical Sleep Medicine.

Impact of the novel coronavirus disease (COVID-19) on treatment adherence and sleep duration in patients with obstructive sleep apnea treated with positive airway pressure

- How can patients be identified for possible OSA while sleep clinic testing is temporarily unavailable or limited?
- What measures can be suggested to improve sleep health until proper diagnosis and treatment become safe and available again?

Rizzo, D., Libman, E., Baltzan, M., Fichten, C., Bailes, S. (2020, accepted). Impact of the COVID-19 Pandemic on Obstructive Sleep Apnea (OSA): Recommendations for Symptom Management. Journal of Clinical Sleep Medicine.

Impact of the novel coronavirus disease (COVID-19) on treatment adherence and sleep duration in patients with obstructive sleep apnea treated with positive airway pressure

- Family physicians continue to provide ^{Behavioral Interventions} medical follow-ups during the pandemic
- SSC to the rescue
- Lifestyle behavioural techniques can be recommended
- Treat co-existing insomnia

Rizzo, D., Libman, E., Baltzan, M., Fichten, C., Bailes, S. (2020, accepted). Impact of the COVID-19 Pandemic on Obstructive Sleep Apnea (OSA): Recommendations for Symptom Management. Journal of Clinical Sleep Medicine.

2018 Ushered In A New Research Direction: Driving with Obstructive Sleep Apnea

- Policies,
- Behaviors and screening measures

DRIVING VIOLATIONS INVENTORY

0 = *never*
 1 = *hardly ever*
 2 = *occasionally*
 3 = *quite often*
 4 = *frequently*
 5 = *nearly always*

For each item below, please indicate how often this has happened in the past five (5) years.

1. Excessive Speeding by 11 to 20 km/h	0	1	2	3	4	5
2. Excessive Speeding by 21 to 30 km/h	0	1	2	3	4	5
3. Excessive Speeding by 31 to 45 km/h	0	1	2	3	4	5
4. Excessive Speeding by more than 45k/h	0	1	2	3	4	5
5. Excessive speeding through road work	0	1	2	3	4	5
6. Prohibited passing on the left	0	1	2	3	4	5
7. Prohibited passing on the right	0	1	2	3	4	5
8. Prohibited passing in a lane reserved for oncoming traffic	0	1	2	3	4	5
9. Accelerating when being passed	0	1	2	3	4	5
10. Passing a bicycle too closely in a travel lane	0	1	2	3	4	5
11. Zigzagging to pass	0	1	2	3	4	5
12. Failure to obey a red traffic light	0	1	2	3	4	5
13. Failure to obey a stop sign	0	1	2	3	4	5
14. Failure to come to a mandatory stop at a level crossing	0	1	2	3	4	5
15. Failure to stop before turning right at a red traffic light (where permitted)	0	1	2	3	4	5
16. Passing a school bus	0	1	2	3	4	5
17. Failure to obey the order or signal of a peace officer, school crossing guard or flag person	0	1	2	3	4	5
18. Prohibited driving in reverse	0	1	2	3	4	5
19. Prohibited crossing of a line marking off lanes	0	1	2	3	4	5
20. Speeding or reckless driving	0	1	2	3	4	5
21. Driving for a wager or stake or in a race	0	1	2	3	4	5
22. Prohibited use of a tunnel by a vehicle carrying dangerous substances	0	1	2	3	4	5
23. Driving at a speed too fast for weather or road conditions	0	1	2	3	4	5
24. Tailgating	0	1	2	3	4	5
25. Sudden braking without cause	0	1	2	3	4	5
26. Failure to yield to pedestrians and cyclists at an intersection	0	1	2	3	4	5
27. Failure to yield to oncoming traffic	0	1	2	3	4	5
28. Failure to wear a seat belt	0	1	2	3	4	5
29. Failure of a driver involved in an accident to do his or her duty	0	1	2	3	4	5
30. Driving with the presence of alcohol in the body	0	1	2	3	4	5
31. Failure to provide a breath sample	0	1	2	3	4	5
32. Driving while using a hand-held device that includes a telephone function	0	1	2	3	4	5

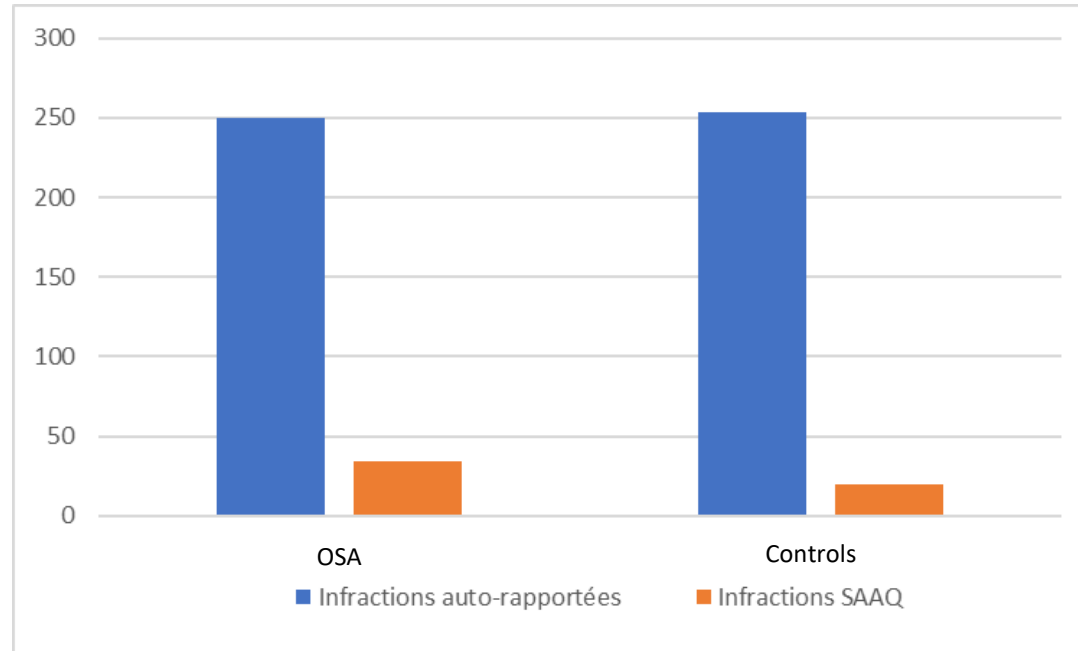


Self-reported driving violations and SAAQ violations, OSA and Control groups

	n	M	SD	t	p	cohen's d
Self-reported driving violations (Questionnaire)						
OSA	29	8.62	5.07	-0.063	0.95	0.016
Controls	29	8.72	7.16			
SAAQ violations						
OSA	29	1.17	1.36	1.447	0.153	0.378
Controls	29	0.69	1.17			

No significant differences between means

Sum of driving violations, OSA and Control groups



Both groups report more violations than those that were found in their official SAAQ files.

Mann-Whitney: no differences between the groups.



Findings

TRANSPORTATION RESEARCH
Part F: Traffic Psychology and Behaviour

Home Reports

TRF_2018_234 | Full Length Article

Self-reported driving violations as a putative mirror measure of real-world driving quality in individuals with and without Obstructive Sleep Apnea

Dorrie Rizzo | Jewish General Hospital, Psychiatry, 4333 Cote-Ste-Catherine rd, B-28, Canada.

PDF

Zip File

Linked Data

Status: **Under Review (121 days)** | Submitted: 08/Apr/2018

- No significant differences for offenses between the two groups;
- 30.8% of OSA participants do not experience sleepiness;
- Drivers with OSA are not more sleepy than drivers without OSA.



Current driving study (post-doc)

Driving Performance and Brain Activity in Individuals with Obstructive Sleep Apnea



RÉSEAU DE RECHERCHE
EN SÉCURITÉ ROUTIÈRE

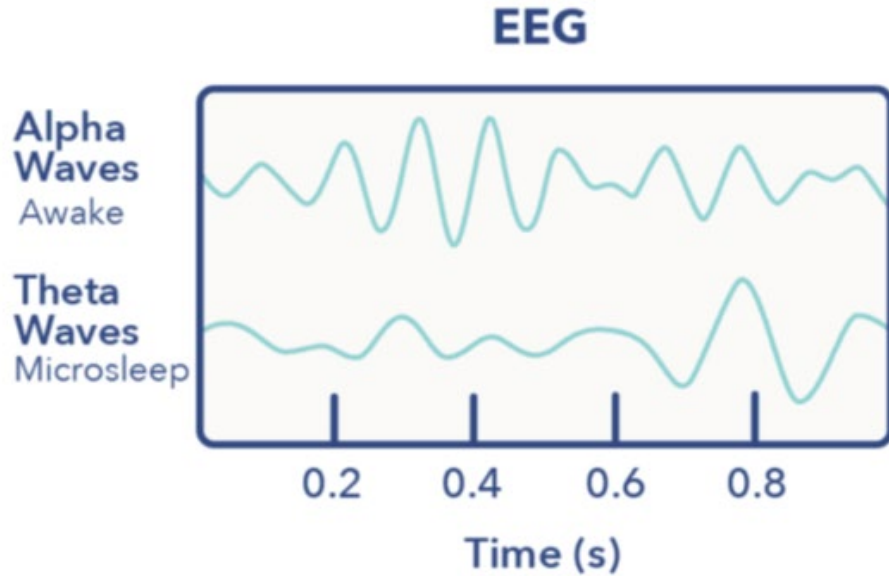
Transports
Québec 

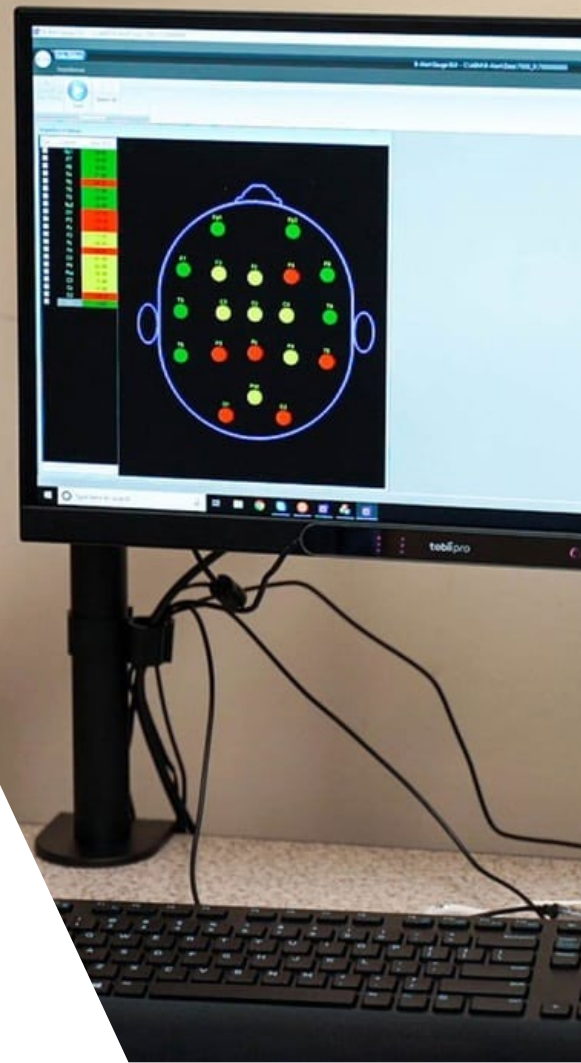


UNIVERSITÉ DE
SHERBROOKE

Microsleep event

- Theta wave activity as the background rhythm of the brain.
- Quick, short-term shift to activity commonly associated with light sleep.







Future contributions?

- Development of consensus guidelines
- Influence Canadian policy-making
- Characteristics associated with dangerous driving
- Work with policy-makers
- Enhanced road safety