Characterization of Neurodegenerative Disorder Risk and Severity

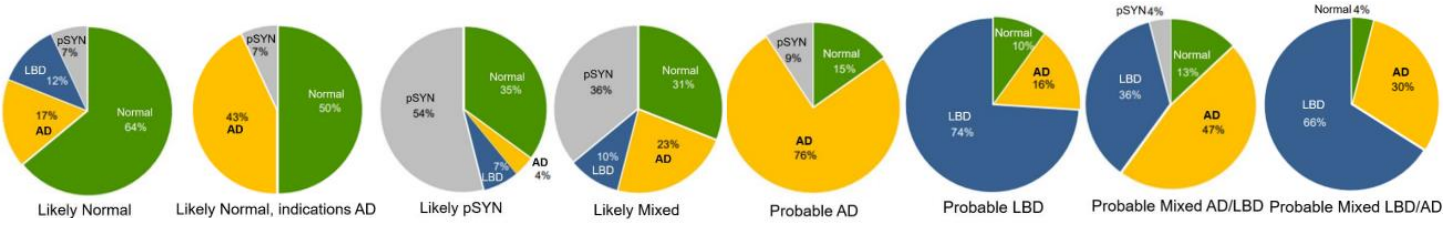
In community-based surveys, 87% of older adults want to know if they are at-risk for a neurodegenerative disorder (NDD), with 86% agreeing it would help them plan for the future. These surveys also identified what physicians should and should not do to assist their patients in matters relating to neurodegenerative disorders.

With support from the National Institute of Aging and using Sleep Profiler™, Advanced Brain Monitoring has brought together an international research consortium to validate newly discovered sleep biomarkers for use in phenotyping specific neurodegenerative disorders. The consortium has evaluated the system in patient with Lewy body disease (LBD), Alzheimer's dementia (AD), Parkinson's disease (PD), mild cognitive impairment (MCI), isolated REM sleep behavior disorder (iRBD), and in controls with normal cognition (CG).

Performance of Individual NDD Sleep Biomarkers

Sleep Biomarker	Disease Category(s)	Uninfected Category(s)	ROC: Area Under Curve	Sensitivity	Specificity
Lewy Body Dementia					
REM Time	LBD	AD, PD, MCI, iRBD, CG	0.78	0.63	0.93
Spindle Duration	LBD	AD, PD, MCI, iRBD, CG	0.74	0.84	0.63
Atypical N3	LBD	AD, PD, MCI, iRBD, CG	0.66	0.42	0.89
Synucleinopathy					
Non-REM Hypertonia	LBD, PD, iRBD	AD, MCI, CG	0.74	0.70	0.79
Autonomic Activation	LBD, PD, iRBD	AD, MCI, CG	0.65	0.54	0.75
Dementias & Cognitive Impairment					
Relative Theta	LBD, AD, MCI	PD, iRBD, CG	0.71	0.68	0.73
Theta/Alpha Ratio	LBD, AD, MCI	PD, iRBD, CG	0.63	0.52	0.74
NDD Condition					
Sleep Efficiency	LBD, AD, MCI, PD, iRBD	CG	0.65	0.41	0.89
Supine Sleep	LBD, AD, MCI, PD, iRBD	CG	0.61	0.63	0.59

After validating each of nine sleep biomarkers, we applied artificial intelligence to derive neurodegenerative disorder risk probabilities for the categories normal, Lewy body disorder, Alzheimer's disorder, or prodromal synucleinopathy and cross validated the risk and severity predictions in a range of at-risk patient populations.



Our 20-minute video describes the sleep biomarkers and provides across-group summaries and case studies showing changes in the risk severity scored that can occur in NDD patients while highlighting the benefit of longitudinal monitoring of at-risk patients.

When Sleep Profiler is used as a reimbursed diagnostic procedure in the U.S., it must be interpreted by a clinician boarded in neurology or sleep medicine.

SLEEP PROFILER NDD

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ADVANCED BRAIN MONITORING

Supporting Scientific Evidence

1. Proof-of-concept for characterization of neurodegenerative disorders using two non-REM biomarkers
2. Sleep Biomarker Phenotyping of Neurodegenerative Disorders Using Artificial Intelligence – A Pilot Study
3. Non-REM sleep with hypertonia in Parkinsonian Spectrum Disorders: A pilot investigation
4. Autonomic dysregulation during sleep in Parkinsonian Spectrum disorders – a proof-of-concept
5. The accuracy and reliability of sleep staging and sleep biomarkers in patients with Non-REM sleep with hypertonia in isolated REM sleep behavior disorder
6. Sleep Biomarker phenotyping of neurodegenerative disorders using artificial intelligence
7. Atypical N3 sleep: A biomarker for altered mental status in Lewy body disease?
8. Head position during sleep: Potential implications for patients with neurodegenerative disorders
9. Comparison of sleep and wake EEG biomarkers in mild cognitive impairment and Alzheimer's disease dementia
10. Sleep and sleep position: potential implications for patients with neurodegenerative disease
11. Collapsibility of the internal jugular veins in the lateral decubitus body position: A potential protective role of the cerebral venous outflow against neurodegeneration
12. A community-based survey of personal perspective regarding prodromal sleep screening for neurodegenerative disorders
13. Potential role of physicians in addressing the needs of those at-risk of a neurodegenerative disorder – A pilot study
14. Effects of deep sedation on sleep in critically ill medical patients on mechanical ventilation
15. Investigation of sleep metrics in the characterization of neurodegenerative disease
16. The accuracy, night-to-night variability, and stability of frontopolar sleep EEG biomarkers
17. Comparison of EMG power during sleep from the submental and frontalis muscles

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