

Supplemental Material

Abnormal REM Sleep Atonia Control in Chronic Post-Traumatic Stress Disorder and Possible Trauma-associated Sleep Disorder

John C. Feemster,¹⁻⁴ Tyler A. Steele,¹⁻⁴ Kyle P. Palermo,^{1,5} Christy A. Ralston,^{1,6} Yumeng Tao,^{1,6} David A. Bauer,^{1,5} Liam Edgar,¹ Sonia Rivera,¹ Maxwell Walters-Smith,¹ Thomas R. Gossard,¹⁻³ Luke D. Teigen,¹⁻³ Paul C. Timm,¹⁻³ Jarrett W. Richardson,^{1-2,7} R. Robert Auger,^{1-2,7} Bhanuprakash Kolla,^{1-2,7} Stuart J. McCarter, M.D.,¹⁻⁴ Bradley F. Boeve,^{1-2,4} Michael H. Silber,^{1-2,4} Erik K. St. Louis,^{1-4,8}

From the Mayo Center for Sleep Medicine (1), Division of Pulmonary and Critical Care Medicine(2), Departments of Medicine (3), Neurology (4), and Psychiatry,(7) Mayo Clinic and Foundation, Rochester, Minnesota; Mayo Clinic Health System Southwest Wisconsin, La Crosse, Wisconsin (8); St. Olaf College, Northfield, MN (5); and Cornell College, Mount Vernon, Iowa (6)

Correspondence to:

Erik K. St. Louis, M.D., M.S.
Mayo Center for Sleep Medicine
Departments of Medicine and Neurology
Mayo Clinic College of Medicine
200 First Street Southwest
Rochester, Minnesota 55905
Phone: (507) 266-7456
Fax: (507) 266-7772
Email: stlouis.erik@mayo.edu

Tables

Supplemental Table 1. Antecedent Traumatic Experiences in Patients with PTSD, Stratified by Patients with and without Dream Enactment Behavior (DEB). There were no significant differences in traumatic experience histories between PTSD patients with or without DEB.

Supplemental Table 2. Clinical Historical and Polysomnographic Characteristics of Patients with PTSD with and without Dream Enactment Behavior (DEB).

Supplemental Table 3. PTSD Patients with and without Dream Enactment Behavior (DEB) Meeting RBD or 95th Normative Percentile RSWA Criteria at the Time of PSG

Supplemental Table 4. Comparative Normative RSWA Percentiles Between PTSD Patients with and without Dream Enactment Behavior (DEB), Idiopathic/Isolated RBD Patients, and Controls.

Figures

Supplemental Figure 1. Quantitative REM sleep (REM sleep without atonia) analyses Using the AASM Method for Determination of Phasic Muscle Activity in PTSD Patients with and without Dream Enactment Behavior, IRBD Patients, and Controls.

Supplemental Table 1. Antecedent Traumatic Experiences in Patients with PTSD, Stratified by Patients with and without Dream Enactment Behavior (DEB). There were no significant differences in traumatic experience histories between PTSD patients with or without DEB.

	Domestic Abuse	Sexual Assault	Childhood Abuse	Military Veteran	Car Accident	Other/Unknown
Total Subjects (n)	5	10	5	4	4	8
PTSD Group, No DEB (n)	3	2	4	1	3	5
PTSD with DEB Group (n)	2	8	1	3	1	3

Supplemental Table 2. Clinical Historical and Polysomnographic Characteristics of Patients with PTSD with and without Dream Enactment Behavior (DEB).

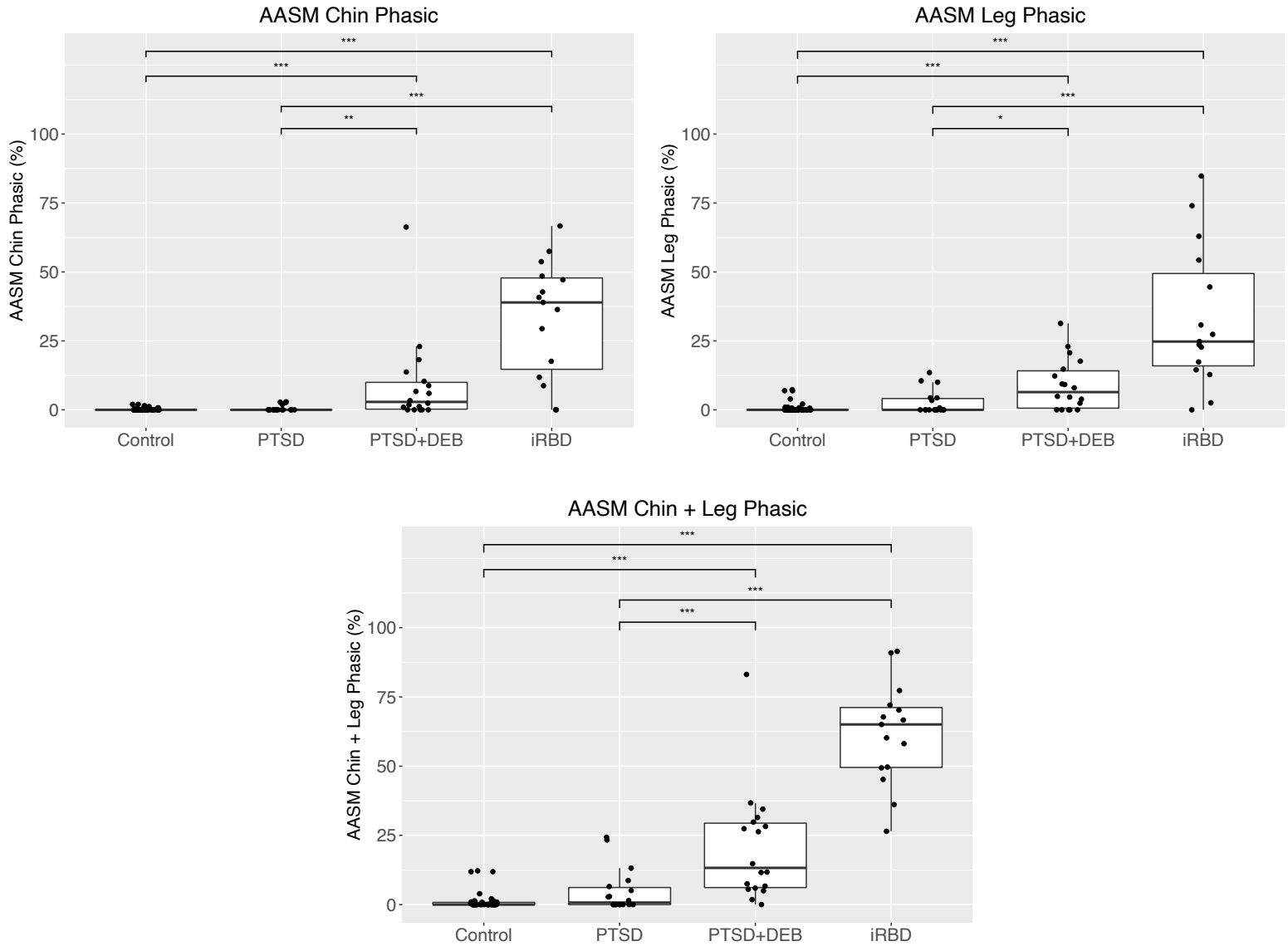
	Onset After Combat or other traumatic experience (n)	History of altered dream mentation that is related to prior experience (n)	Self or witnessed reports of disruptive nocturnal behaviors (n)	Autonomic hyperarousal on PSG monitoring (n)	Dream Enactment behavior (n)
Total PTSD Subjects (n=36)	10 (28%)	11 (31%)	17 (47%)	0	18 (50%)
PTSD Group, No DEB (n =18)	3 (17%)	2 (11%)	2 (11%)	0	0
PTSD with DEB Group (n = 18)	7 (39%)	9 (50%)	15 (83%)	0	18 (100%)

Supplemental Table 3. PTSD Patients with and without Dream Enactment Behavior (DEB) Meeting RBD or 95th Normative Percentile RSWA Criteria at the Time of PSG

	RBD RSWA Threshold Met or Exceeded (n)	95th Normative Percentile RSWA Met or Exceeded (n)
Total PTSD Subjects (n=36)	34 (94%)	32 (89%)
PTSD Group, No DEB (n=18)	16 (89%)	14 (78%)
PTSD with DEB Group (n=18)	18 (100%)	18 (100%)

Supplemental Table 4. Comparative Normative RSWA Percentiles Between PTSD Patients with and without Dream Enactment Behavior (DEB), Idiopathic/Isolated RBD Patients, and Controls.

	Control ^A	PTSD ^B	PTSD+DEB ^C	iRBD ^D	P < 0.05	P < 0.025
Average SM Duration (Percentile)	57.4 (29.3)	64.2 (38.9)	67.7 (21.5)	93.3 (14.3)	D > A,B,C	D > A,B,C
Average AT Duration (Percentile)	52.1 (27.2)	62.1 (29.8)	81.3 (25.4)	89.1 (10.3)	C,D > A D > B C > B	C,D > A D > B
SM Phasic Density (Percentile)	51.7 (29.7)	85.2 (18.9)	94.8 (11.6)	94.5 (14.6)	B,C,D > A D > B	B,C,D > A
AT Phasic Density (Percentile)	52.9 (28.4)	73.4 (32.0)	89.6 (24.2)	92.4 (10.7)	B,C,D > A C,D > B	B,C,D > A C,D > B
SM Any Density (Percentile)	51.8 (29.6)	86.1 (19.4)	92.6 (14.1)	94.5 (14.6)	B,C,D > A D > B	B,C,D > A
AT Any Density (Percentile)	52.9 (28.4)	73.1 (32.4)	93.7 (13.7)	92.4 (10.7)	B,C,D > A C,D > B	B,C,D > A C,D > B
SM+AT Phasic Density (Percentile)	31.9 (28.9)	60.3 (35.7)	83.1 (31.5)	89.8 (15.3)	B,C,D > A C,D > B	B,C,D > A C,D > B
SM+AT Any Density (Percentile)	31.9 (28.9)	59.9 (35.8)	85.7 (26.8)	89.8 (15.3)	B,C,D > A C,D > B	B,C,D > A C,D > B



Supplemental Figure 1. Quantitative REM sleep (REM sleep without atonia) analyses Using the AASM Method for Determination of Phasic Muscle Activity in PTSD Patients with and without Dream Enactment Behavior, IRBD Patients, and Controls. Shown are group differences between phasic RSWA metrics in the chin (SM, submental) and leg (AT, anterior tibialis) between PTSD patients with and without dream enactment (PTSD+DEB, PTSD) patients, idiopathic/isolated RBD (iRBD) patients, and age- and sex-matched controls. Levels of significant group differences are designated by one asterisk (*) = $p < 0.025$; two asterisks (**) = $p < 0.01$; and three asterisks (***) = $p < 0.001$.