

Appendix A

Detailed Treatment Description

Session Tasks

- Session 1: Give equipment (Capnometer and audio player); provide manualized psychoeducation on PTSD hyperarousal and treatment rationale to practice achieving and/or maintaining 40 mmHg PCO₂ and 9 breaths per minute to prevent/reduce hyperventilation during acute distress; provide instruction for devices and on breathing exercises; practice breathing exercise in session; assign homework and give breathing exercise logs to be used at home during the ensuing weeks.
- Session 2: Download the previous week's capnometry data; review homework and troubleshoot as needed; provide manualized psychoeducation on sleep disturbances in PTSD; provide written and verbal sleep instructions and sleep logs.
- Sessions 3-5: Download the previous week's capnometry data; review breathing and sleep homework and troubleshoot as needed.

Homework

- Breathing exercises 2x per day (4 hours between exercises at minimum):
 - Listen to 17-minute recording of paced tones set to 9 breaths per minute
 - Match respiration rate and maintain pCO₂ at 40mmHg
 - Write respiration rate and pCO₂ on logs at specific intervals during the exercises
- Sleep monitoring:
 - Complete daily sleep log at bedtime to track sleep and adherence to instructions:

- Go to sleep only when drowsy
- Do not use bed for any activity besides sleep or sexual activity
- Get out of bed if unable to sleep
- Try to avoid daytime naps
- Get at least 30 minutes of sunlight exposure per day
- Minimize use of caffeine, cigarette, and alcohol intake, especially in evenings
- Exercise daily, but not too close to bedtime
- Do not eat too much or too little close to bedtime
- Track time in bed, sleep onset latency, total sleep time, sleep efficiency, sleep quality

Appendix B

Detailed Reporting of Missing Data

Table 1. Cell n's for Demographic and Clinical Characteristics

	PTSD Group <i>n</i> = 80	no-PTSD Group <i>n</i> = 68
Demographics	80	68
Relationship Status	79	68
Veteran Status	80	68
VA compensation for PTSD	79	68
Current mental health treatment	75	66
All trauma-related variables	80	68
Baseline PCO ₂	78	66
Baseline respiration rate	77	66
Sleep quality ^a	62	59
PTSD-specific sleep quality ^a	68	61
Reported Sleep Apnea	78	67
Beck Depression Inventory-II	75	65
Beck Anxiety Index	78	67
Aggression Questionnaire	76	67
Reported Traumatic Brain Injury	77	64
Other mental health diagnoses	80	68

Note. PCO₂ = partial pressure of carbon dioxide.

^aFive no-PTSD and four PTSD participants reporting untreated sleep apnea were excluded from sleep analyses.

Table 2. Cell n's for Primary Outcome Analyses from Baseline to First Follow-up.

	Immediate Treatment		Waitlist (Delayed Treatment)	
	Time 1	Time 2	Time 1	Time 2
	<i>n</i> = 47	<i>n</i> = 23	<i>n</i> = 33	<i>n</i> = 27
PCO ₂	45	23	33	27
Respiration Rate	44	23	33	26
CAPS total	47	23	33	27
CAPS hyperarousal	47	23	33	27
Beck Depression Inventory	44	20	31	35
Aggression Questionnaire	44	20	32	26
Sleep Quality ^a	31	17	29	19
PTSD-specific sleep quality ^a	37	19	30	24
Sleep onset latency ^{a,b}	40	19	31	25
Total sleep time ^{a,b}	38	19	31	24

Note. PCO₂ = partial pressure of carbon dioxide; CAPS = Clinician-Administered PTSD Scale.

^aThree Immediate treatment and one Waitlist subject were excluded from sleep analyses due to reported untreated sleep apnea.

^bDerived from Pittsburgh Sleep Quality Index.

Appendix C

Detailed Therapy Process Results

Measure	Mean (SD)	Scale Range	Interpretation
Expectancy of Improvement [*]	69.7 (23.9)	0-100	Good
Treatment credibility ⁺	6.44 (1.78)	0-9	Good
Working Alliance [^]	3.91 (0.86)	1-5	Very good
Therapist competence [§]	4.04 (0.78)	1-5	Very good
Therapist fidelity to specific treatment tasks [¶]	6.32 (0.58) to 6.88 (0.42)	1-7	Excellent

Note. Therapy expectancy measures administered at end of treatment session 1; participants and study therapists completed the alliance measure at end of treatment session 1 and treatment session 5. Trained research assistants and other study therapists rated therapist competence and adherence to protocol for randomly selected cases conducted by therapists unknown to them personally.

^{*}Expectancy of Improvement scale (Borkovec et al., 1987). Participants rate how confident he is that the treatment will “improve [his] condition” from “not at all” to “very”

⁺Credibility scales (Borkovec et al., 1987). Participants rate how logical the treatment seems.

[^]Working Alliance Inventory – Short Form Revised (Hatcher & Gillaspay, 2006), total score.

[§]Therapists were rated on general therapeutic skills, such as “collaboration,” “interpersonal effectiveness” and “pacing/effective use of time.”

[¶]Therapists were rated on how well they helped the participant implement the specific breathing and sleep instructions without deviating from the protocol.

