Supplement 1. Additional methodological detail for actigraphy collection, scoring, and analysis.

Collection

In addition to in-person assistance with actigraphy collection and watch placement, parents were provided a sheet listing standard MotionWatch 8 instructions, including: 1) placement options (wrist, ankle, upper arm), 2) need to remove the watch prior to bathing, 3) need to record when the watch is removed and placed back on, 4) instructions to shake the watch when re-applying to the child to facilitate easy identification of watch placement on the recording, and 5) the desire to have the child wear the watch for at least one 24-hour period during the lead-in to ensure good tolerability to the watch and to provide some estimate of activity during waking periods. Parents were also given the option to use a social story regarding the watch with their child. If this option was chosen, the parent was instructed in the use of social stories. At the baseline visit, parents were also given brief instructions in to methods to promote desensitization such as distraction, response blocking, and planned ignoring. Parents were given practice using the sleep diary and specific instructions for completing the diary as soon as possible after each event (bedtime, wake time, etc.). The research coordinator quizzed the parent on all aspects of study procedures to further increase compliance with MotionWatch procedures and completion of the study diary.

Scoring

Actigraphy data was downloaded to the computer by the research coordinator using the supplied software and transferred to a secure server which could be accessed at a separate location by the sleep team. The sleep team did not have any contact with participants and remained blinded to treatment conditions. Actigraphy data were scored with reference to sleep diary information to facilitate more accurate identification of sleep onset and waking. These data were considered the primary outcomes (sleep duration, sleep efficiency, latency to sleep, and WASO).

Analysis

Actigraphy data without reference to sleep diary information (actigraphy only) was also scored. However, this data were not considered as efficacy outcomes to control Type 1 error and because these data were expected to produce less accurate parameters, particularly for latency to sleep. Post-hoc analysis of actigraphy only data indicated higher within-person variability than for actigraphy based on sleep diary information. As a result, there were no significant treatment condition differences for sleep duration, sleep efficiency, or WASO (largest $F(1,24)=1.83$, $p=.189$), with only a 9-minute increase in sleep duration. Latency to sleep was not analyzed as these data were expected to be unreliable and highly non-normal distributions with most individuals having 0-minute latency scores who employed the use of nocturnal actigraphy instead of 24 hour actigraphy.

Supplement 2. Primary and secondary tolerability and efficacy measures.

Primary Tolerability
Drop-Out Due to STS Mattress Use
Primary Efficacy
Parent-Reported Sleep Quality
Secondary Tolerability
Drop-Out For Any Reason
STS Mattress Tolerance
STS Mattress Ease-of-Use
Secondary Efficacy – Sleep Diary
Sleep Duration
WASO
Ease of Falling Asleep
Level of Challenging Behavior
Secondary Efficacy – Actigraphy
Sleep Duration
Sleep Efficiency
Latency to Sleep
WASO
Secondary Efficacy – Parent-Report
Autism Traits (SRS-2 Total T-Score)
Other Psychopathology Symptoms (ABC Total Raw)
Sensory Symptoms (SSP Total Raw)
Child and Family Quality of Life (CFQL Total Raw)
Communication Level (CCC-2 Composite)
Sleep Difficulties (FISH Total Raw) (CSHQ Total Raw)

Note. STS=Sound-to-Sleep system. WASO=Wake after sleep onset. SRS-2=Social Responsiveness Scale – Second Edition, ABC=Aberrant Behavior Checklist, SSP=Short Sensory Profile, CCC-2= Children's Communication Checklist – Second Edition, FISH=Family Inventory of Sleep Habits, CSHQ=Child Sleep Habits Questionnaire.

Supplement 3. Parent-reported child tolerance and ease of use of the STS mattress technology.