

**Understanding and Addressing
Sleep Problems
of Children and Young Adults with ASD**

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For article describing this assessment and treatment model go to:
<http://onlinelibrary.wiley.com/doi/10.1002/jaba.16/pdf>

**Autism, Problem Behavior,
& Behavior Analysis**

- Important assumptions of Behavior Analysis:
Sleep problems are viewed as skill deficits which can be addressed by teaching relevant skills
- The approach is....
 - Effective
 - Practical
 - Hopeful
 - Dignifying

Good Sleep

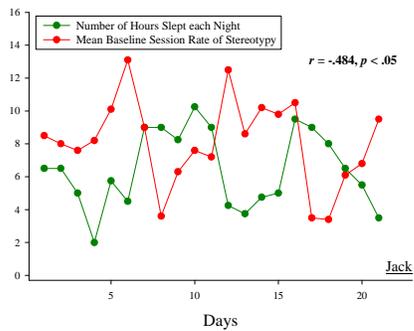
- Falling asleep quickly
- Staying asleep through the night
- Rising without much trouble each morning
- Not feeling drowsy during the day

Why is Good Sleep Important?

- Good sleep is restorative; without it, children are:
 - more irritable
 - more easily fatigued
 - more likely to suffer from unintentional injury
 - less likely to follow instructions
 - less likely to learn academic concepts
 - more likely to engage in problem behavior (SIB, tantrums)

(Dahl, 1996; Gruber et al., 2010; Koulouglioti, Cole, & Kitzman, 2008; Richman, 1981; Schreck, Mulick, & Smith, 2004; Wiggs & Stores, 1996)

*Example: Without good sleep, people with autism may be more likely to engage in **stereotypy***



Why is Good Sleep Important?

- Persistent sleep problems in childhood are also associated with:
 - childhood and adult obesity
 - adolescent behavioral and emotional problems
 - anxiety in adulthood
 - sleep problems through adulthood

(Bell & Zimmerman, 2010)

Why is Good Sleep Important?

- **Children’s sleep problems can lead to:**
 - **Maternal malaise and depression**
 - **Parental sleep problems**
 - **Erosion of the parent’s relationship with each other and with their children**

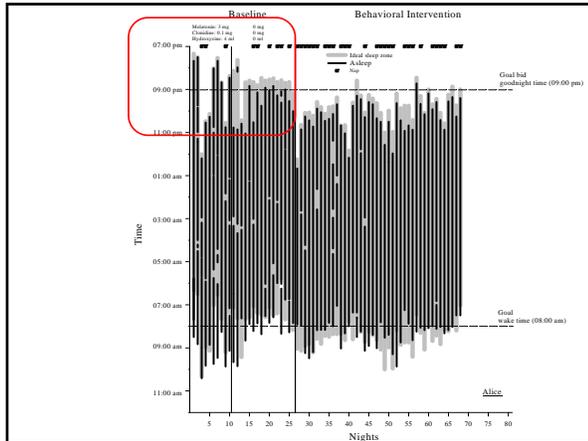
(Chavin & Tinson, 1980; Kataria, Swanson, & Trevathan, 1987; Meltzer & Mindell, 2007; Richman, 1981)

How Prevalent are Sleep Problems?

- **Sleep problems are prevalent**
 - **35 - 50% of young children**
(Holliday, Sibbald, & Tooley, 1987; Johnson, 1991; Polimeni, Richdale, & Francis, 2005; Richman, 1981)
 - **63-73% of children diagnosed with autism**
(Johnson, 1991; Polimeni et al., 2005; Souders et al., 2009; Richdale, 1999; Richdale & Schreck, 2009)
- **Sleep problems are persistent—they do not typically remit with time**
(Jenkins, Owen, Bax, & Hart, 1984; Kataria et al., 1987; Pollock, 1992)

Treatment Options?

- **Parents are likely to consult with pediatricians**
 - **despite only 5 hr of training** (Mindell et al., 1994)
- **81% of children’s visits to pediatricians, psychiatrists, or family physicians for sleep problems have resulted in a prescription for a medication** (Stojanovski et al., 2007)
 - **despite no FDA approval, no medication labeled for pediatric insomnia, no (or inconsistent) efficacy signal in literature**



Melatonin?

- There is evidence to suggest that:
 - It can decrease sleep onset delay without increasing night awakenings
 - The side effects of melatonin are less than any other prescribed or OTC drug for improving sleep
 - The smaller/younger the child, the higher the dose needed for an effect to be observed
 - Consistent long term use mitigates its effects (vacations from Melatonin are important to schedule)
 - In the absence of some other intervention, it alone will never solve a chronic sleep problem



Melatonin?

- We surely do not know:
 - The dose that will work, if any.
 - The likelihood of its efficacy or for which children it will be effective
- If you use it,
 - Give it 45 min prior to bid good night and then turn down house lights
 - Use as part of a thorough behavioral intervention

Treatment Options?

- Behavioral solutions are recommended 22% of time
(Stojanovski et al., 2007)
 - but the solutions are relatively weak antecedent-oriented approaches (e.g., positive routines prior to bed)
 - or not “behavioral” at all (candles and lotion)

Common Sleep Problems

- Nighttime routine noncompliance
- Sleep-interfering behavior
- Delayed sleep onset
- Night awakenings
- Early awakenings

Assumptions Regarding Sleep

- Influenced by our:
 - past experiences and present sleeping conditions
 - ancestral history (our genetics) and our present culture

Assumptions Regarding Sleep

- *Behavioral quietude /Falling asleep* are the behaviors of interest
- Can be influenced by past and present events in one's sleeping environment
 - can be motivated (or demotivated)
 - can become reliant on environmental cues
 - can be affected by other reinforcers for other behaviors available at night

Looking at falling asleep.... through the lens of a contingency

- Conduct a contingency analysis: $EO + SD \rightarrow R \rightarrow Sr$
- That which is known:
 - Reinforcer (Sr) for falling asleep is *sleeping*
- That which is unknown:
 - Everything else!

Looking at sleep.... through the lens of a contingency

- $EO + SD \rightarrow \text{Falling Asleep} \rightarrow \text{Sleep}$
- What alters the value of sleep as a reinforcer?

**Looking at sleep....
through the lens of a contingency**

EO + **SD** → Falling Asleep → Sleep

- What signals that the reinforcer is available (and prepares the body to "consume" the reinforcer), and are those signals available when the child wakes up multiple times each night?

**Looking at sleep....
through the lens of a contingency**

EO + SD → **Interfering behaviors** → Sr

- What other behaviors are occurring before and after the bid good night that are incompatible with falling asleep (i.e., that do not allow for behavioral quietude)?

**Looking at sleep....
through the lens of a contingency**

EO + SD → Interfering behaviors → **Sr**

- What reinforcers are available for behaviors that are incompatible with falling asleep?

**Looking at sleep....
through the lens of a contingency**

EO + SD → Incompatible behaviors → Sr

- What alters the value of these other reinforcers for behaviors that are incompatible with falling asleep?

**Looking at sleep....
through the lens of a contingency**

EO + **SD** → Incompatible behaviors → Sr

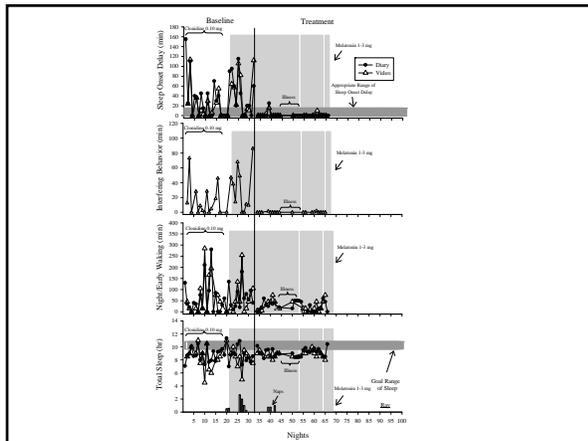
- What signals that these other reinforcers are available?

**How do we assess and treat
children's sleep problem?**

- Through a general understanding of the common factors that influence good sleep and sleep problems
- Using an **open-ended indirect assessment** to identify the personal factors influencing the sleep problem
 - **SATT** (Sleep Assessment and Treatment Tool.)
- By encouraging parents to develop the intervention with us
 - we support parents in their implementation of the assessment-based treatment via phone calls and weekly visits.

Some examples

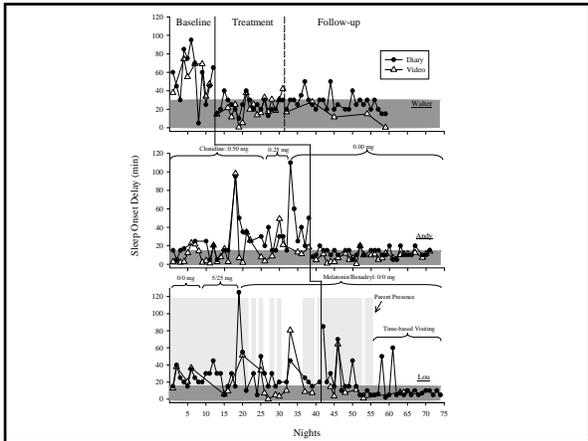
- Ray
 - 4 yo boy with autism
 - Hyperactive
 - Tried multiple medications for sleep problem

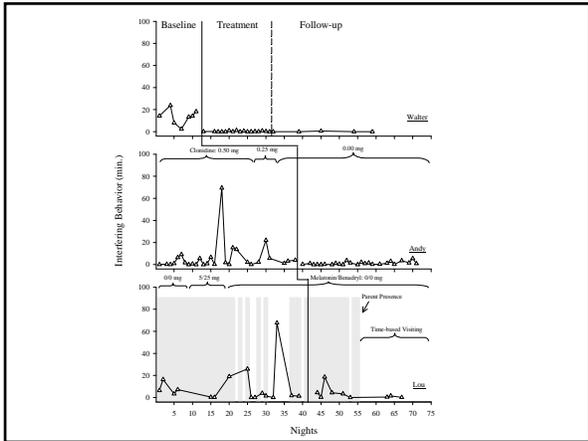


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AN INDIVIDUALIZED AND COMPREHENSIVE APPROACH TO TREATING SLEEP PROBLEMS IN YOUNG CHILDREN
 C. SANDY JIN, GREGORY P. HANLEY, AND LAUREN BEAULIEU
 WESTERN NEW ENGLAND UNIVERSITY

- Three children
 - 7 yo typically developing boy with OC tendencies
 - Two 9 yo boys with autism
- All were previously or currently taking medications to improve sleep





Social acceptability

Table 1

Questions	Walter	Andy	Lou	Average (Range)
1. Acceptability of assessment procedures	7	6	7	6.7 (6-7)
2. Acceptability of treatment	7	6	7	6.7 (6-7)
3. Improvement in sleep	7	7	7	7
4. Consultation was helpful	7	6	7	6.7 (6-7)

Note: Likert scale: 1 to 7. 1 (not acceptable, not satisfied, not helpful), 7 (highly acceptable, highly satisfied, highly helpful)

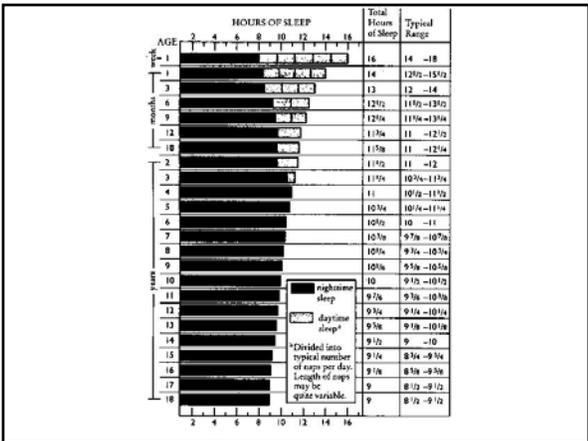
Step 1:
Develop Optimal Sleep Schedule

- Recognize of age-appropriate sleep amounts
- Recognize importance of current sleep phase and “forbidden zones”
- Recognize universal tendency to go to bed later and wake up later each 24 hr cycle

Age-Based Sleep Averages:

Age	Total Sleep	Night Sleep	# Naps
2	11 hrs 30 min	9.5 hours	1 (2 hrs)
3	11 hrs 15 min	10 hours	1 (1hr15min)
4	11 hrs	10 -11 hours	0-1
5	10 hrs 45 min		
6	10 hrs 30 min		
9	10 hrs		
12	9 hrs 45 min		
15	9 hrs 15 min		
18	9 hrs		

Adapted from: *Solve Your Child's Sleep Problems*, Richard Ferber, Simon & Schuster, 2006



Sleep Scheduling

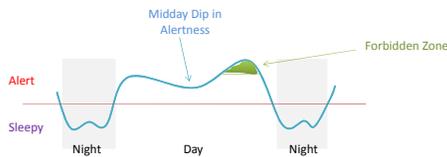
Cautions:

- Difficulty falling asleep, staying asleep, or complying with nighttime routines may occur if child is expected to be in bed too long
- Difficulty waking up or day time tiredness may be related to child being in bed for too short of a time

Implication: Select the right sleep total for child

When should the bedtime be scheduled?

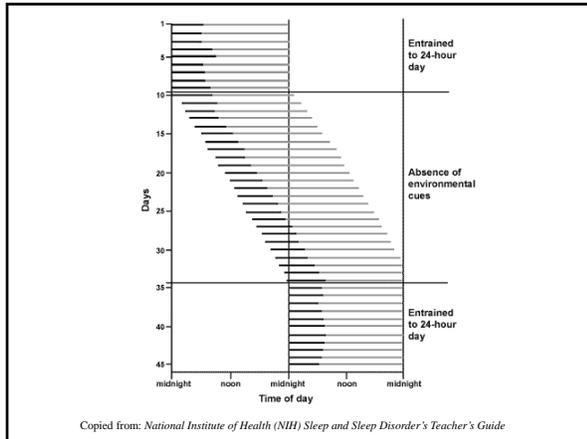
- **Caution:** Putting children to bed during the *Forbidden Zone* (the few hours prior to his/her sleep phase) will increase the likelihood of *nighttime routine noncompliance, sleep onset delays, & interfering behavior*



Adapted from: *Solve Your Child's Sleep Problems*, Richard Ferber, Simon & Schuster, 2006

When should the bedtime be scheduled?

- We have a tendency to go to bed later and wake up later because of our 24.2 hr clock
- Artificial light and nighttime activity availability leads to a 25-hour clock



When should the bedtime be scheduled?

- We have a tendency to go to bed later and wake up later because of our 24.2 hr clock
- Artificial light and nighttime activity availability leads to a 25-hour clock
- **Implication:**
At the beginning of sleep treatment:
 set the start of the sleep routine slightly later than when the child fell asleep the previous night

Then gradually transition sleep phase earlier
 if child falls asleep within 15 min move bedtime 15 min earlier next night until desired bedtime is achieved (Piazza et al., 1991)

Extreme Sleep Phase Shift?

- **Consideration:** Try **chronotherapy** if sleep phase is more than 4 hours past desirable sleep time:
 - Move sleep and awake times *forward* by 1 to 2 hours each night (larger leaps can be made with older children)

Step 2:
Nighttime Routine Considerations

- Develop a nighttime routine that occasions “behavioral quietude.”
- Try to implement it consistently across nights
- Some emphases prior to bid goodnight
 - Activities progress from active to passive
 - Arrange choices on picture schedule
 - Make gradual changes in fun factor
 - avoid rich to barren context transition
 - Baths earlier in routine
 - Ambient light gets progressively dimmer
 - Light snacks without caffeine

Bedroom Considerations

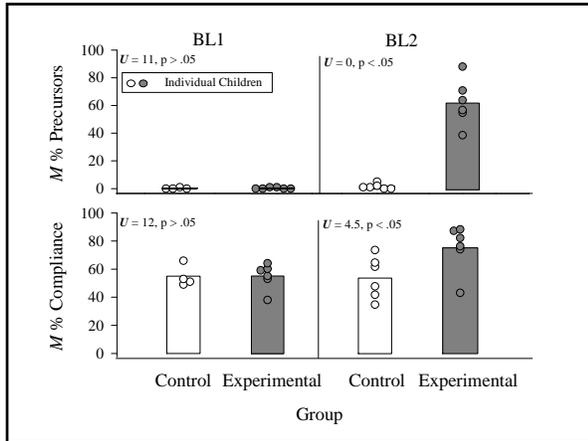
- Cooler temperature
- Indirect lighting only
- Non-undulating noise
- Best toys/preferred activities not visible

Nighttime Noncompliance Considerations

Tendency to not follow instructions or resist guidance to, for example, put on PJs, brush teeth, or get in bed.

Solutions:

- Start routine just prior to natural sleep phase
- Promoting instruction following during the day
 - See 10 steps at end of workbook
 - **Teach child to respond favorably to their name being called and then always call the child’s name prior to an instruction, pausing, and then delivering a clear, concise, and explicit instruction**



Nighttime Noncompliance Considerations

Tendency to not follow instructions or resist guidance to, for example, put on PJs, brush teeth, or get in bed.

Solutions:

- Start routine just prior to natural sleep phase
- Promote instruction following during the day
 - Play the "name game"
 - See the other steps at end of workbook
- Arrange **big discrepancy in consequences** for compliance vs. noncompliance to routine
 - Avoid differential reinforcement with extinction

Step 3: Understanding Sleep Dependencies

- Transitioning from behavioral quietude to sleep depends on stimuli associated with falling asleep

Stimuli that set the occasion for sleep must be there through the night because children **wake up** often during the night

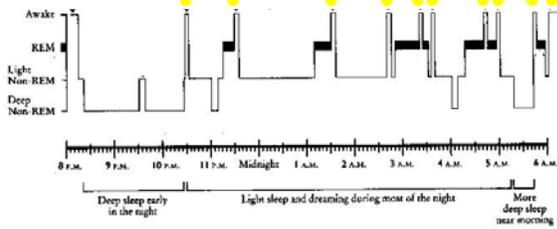


FIGURE 3. TYPICAL SLEEP STAGE PROGRESSION IN THE YOUNG CHILD

Understanding Sleep Dependencies

- Transitioning from behavioral quietude to sleep depends on stimuli associated with falling asleep

Problems:

- Things that occasion sleep are not present when the child wakes up during the night = **Night Awakenings**
- Things that occasion sleep are suddenly removed or inconsistently available = **Sleep Onset Delay** and possibly **Interfering Behavior**
- *Examples:* TV, radio, books, bottles, “full belly,” presence of another person, being rocked or patted, lights, fallen stuffed animal or blanket

Understanding Sleep Dependencies

Solutions:

- Occasion sleep with things that
- (a) don’t require your presence,
 - (b) can be there in the middle of the night, and
 - (c) are transportable (e.g., for vacations or nights at Grandparent’s home)
- Good ones: pillow, blanket, stuffed animal (with bed rails), pacifier, sound machine on continuous

How?

Eliminate or fade “bad” ones and replace with “good” dependencies

Addressing Interfering Behavior

- **IB** = Behaviors that interfere with behavioral quietude necessary for falling asleep; the big three are:
 - leaving bed (curtain calls)
 - crying / calling out
 - playing in bed or in bedroom
 - this includes motor or vocal stereotypy
 - (talking to oneself)
- Be sure to first properly consider what the likely reinforcers are for the interfering behavior
 - Attention / Interaction
 - Food/drink
 - Access to TV or toys
 - Escape/avoidance of dark or of bedroom
 - Automatic reinforcers (those directly produced by the behavior)

Addressing Interfering Behavior

- **Part 1: Provide the presumed reinforcer prior to bidding the child good night**
- **Part 2: After bid goodnight, eliminate access to presumed reinforcer following IB**
 - With socially mediated IB, options include:
 - Extinction, Progressive Waiting, Time-Based Visiting, Quiet-Based Visiting, Quality Fading, or Bedtime Pass
 - With automatically-reinforced IB, we use:
 - Relocation of relevant materials
 - Blocking

Eliminating Interfering Behavior

- **Time-Based Visiting:** Visit your child at increasingly larger intervals after the bid good night and across nights (hopefully before IB occurs); during visit re-tuck them, bid good night, and leave.

Day	First visit	Second visit	Third visit	Fourth visit	Fifth visit	Sixth visit	Seventh visit
1	10 s	30 s	1 min	3 min	5 min	10 min	30 min
2	30 s	1 min	3 min	5 min	10 min	30 min	
3	30 s	3 min	5 min	10 min	30 min		
4	1 min	3 min	5 min	10 min	30 min		
5	1 min	5 min	10 min	30 min			
6	5 min	10 min	30 min				
7	5 min	30 min					

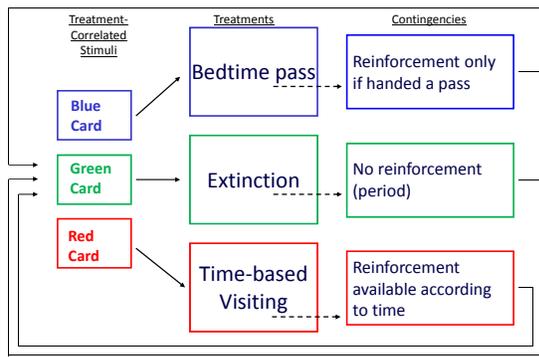
Eliminating Interfering Behavior

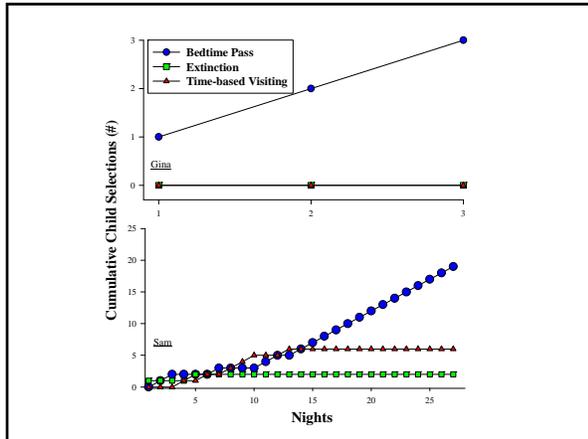
- **Bed Time Pass:** Give your child a *bed time pass* to be used as needed after the bid good night to have one request granted.
 - If # of IBs was high before you try this treatment, provide more than one bed time pass initially and then fade out the number each night.
- **Person Fading:** Sleep near but not in child's bed and gradually increase the physical distance between you and your child each night
- **Quality fading:** Identify all of the rewarding features of your nightly interactions and gradually decrease the quality of them across nights

Results of Social Acceptability Questionnaire Administered to Parents who Implemented Three Strategies for Addressing Sleep Interfering Behavior

Ranking	Gina		Sam
	Mom	Mom	Dad
Most Preferred → 1	Bedtime Pass	Time-based Visiting	Bedtime Pass
2	Extinction	Bedtime Pass	Extinction
3	Time-based Visiting	Extinction	Time-based Visiting

Just prior to bed, the children were allowed to choose the treatment for each night





Eliminating Interfering Behavior

- My new favorite: **The combo!**
- **Time-Based Visiting + Bed Time Pass with dueling outcomes**
- Hand in pass for something at night or hold onto pass and hand in at breakfast for something better

Addressing Interfering Behavior that produces its own (sensory) reinforcement

- **Part 1:** Provide the presumed reinforcer prior to bidding the child good night
- **Part 2:** After bid goodnight, eliminate access to presumed reinforcer following IB
 - With automatically-reinforced IB, we use:
 - Relocation of relevant materials
 - Blocking

Additional Strategies: Addressing Night Awakenings

- Should be resolved with appropriate sleep schedule and healthy sleep dependencies
 - If not address issues related to temperature, food, light, noise, incontinence, nighttime reinforcers
 - If not, we actively teach child to know when it is okay to get up for the day
 - Moon/sun clocks; daytime discrimination training
 - If not, we may program **Scheduled Awakenings**
 - Wake your child about 15 to 30 min prior to his/her typical night awakening
 - Gradually increase schedule of awakenings until it coincides with the morning wake up.
 (Also good for addressing nighttime incontinence)

Prevention of Sleep Problems: Key Ingredients for Good Sleep

- Adherence to an agreed upon **sleep schedule** that is sensitive to age and recent sleep history
- Adherence to **nighttime routines** and **sleep contexts** that foster compliance and “behavioral quietude”
- Development of **sleep dependencies** on things that are routinely and easily present throughout the night (and transportable)
- Experience with a **clear discrepancy** between what is available during the day versus the night

For you to consider...

- If you are considering addressing one or more sleep problems, start on a Friday or when you have some time off from work
- Exercise—just do it; exercise helps people sleep better
- Avoid caffeinated beverages after 4:00 pm.
- Consider writing down your reflections of the day and plans for tomorrow *before* you do your nighttime routine.
- To address long delays to sleep onset, consider:
 1. Making your bedtime 1 hr. later than usual,
 2. Getting out of bed if not asleep within 10-15 min, and sitting in chair & read a literary classic for 15 min or until drowsy,
 3. Gradually adjusting sleep and wake times to desired times.

See pp. 7-8 or workbook for more notes relevant to you.

Nightmares or Sleep Terrors?

	Nightmares	Sleep Terrors (Confusional Arousals, Sleepwalking)
What are they?	Scary dreams occurring during REM sleep	Partial arousals from very deep non-dreaming sleep
When are you aware your child had one?	After dream is over and child cries or tell you about it	During event itself as child screams and thrashes (He is calm upon waking)
When do they occur?	Usually in 2 nd half of night	Usually 1-4 hrs after falling asleep (when Non-REM Deep Sleep occurs)
How does child appear and behave?	Wide awake, frightened	Not fully awake, not responsive, glassy look, thrashing, talking, screaming, confused—all of which disappear when awake.
How does child respond to attempts to calm him?	Aware, reassured, capable of being comforted	Not aware of you, not capable of being comforted
Can child describe dream?	If language able, then yes.	No.

Adapted from: *Solve Your Child's Sleep Problems*, Richard Ferber, Simon & Schuster, 2006

Confusional arousals more likely during deep (non-rem) sleep at beginning of sleep period

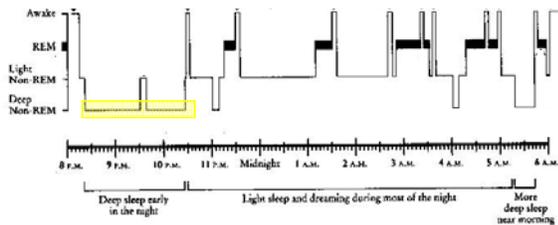


FIGURE 3. TYPICAL SLEEP STAGE PROGRESSION IN THE YOUNG CHILD

Confusional Arousal (Sleep Terror) Treatment Considerations

- Help your child develop good sleep habits (see above)
- Let episode run its course, then, when over, assist back in bed
- Eliminate nighttime “jobs” that your child must do before going back to sleep:
 - she should not have to call for something, look for something, or check her surroundings to get back to sleep
- If possible, remove materials that result in compulsive behavior from bedroom

Nightmare Treatment Considerations

- Develop good sleep in your child (see above)
- Soothe your child's fears by talking to them, show them that you are in control and that they are safe
- Do not feel obligated to grant all requests (e.g., keep lights on, check for monsters, etc.)
- Help them with their anxieties during the day hours
- Address nighttime fears by teaching child relaxation tactics and reward "bravery" in the am
 - Consider bedtime pass with AM reward for not using it.

Thank you.

Good luck with all that you do for all who you teach and provide care

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