

Pediatric Sleep Problems and ASD: Types, Assessment, & Intervention

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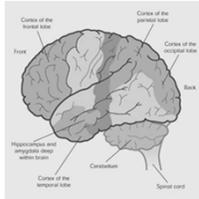
Objectives

- Review prevalence of pediatric sleep problems
- Describe relationship between sleep problems, age, and ASD
- Differentiate types of sleep-wake disorders
- Compare interventions for pediatric sleep problems in ASD population

Function of Normal Sleep

- Sleep Theories
 - Restorative Theory
 - Conservation of Energy Theory
 - Adaptive Theory
 - Memory Consolidation Theory

What makes us sleep

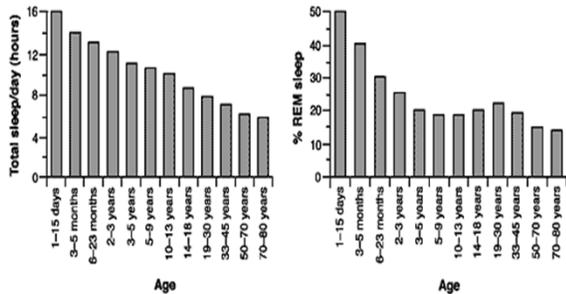


- Adenosine and other neurotransmitters
- Environmental cues alter biological clock

Stages of Sleep

- 4 stages of sleep
- Cyclic (go through them in same order)
- First 3 are non-rapid eye movement (Non-Rem)
- Fifth is rapid eye movement (REM)
- Amount of REM changes with development

Sleep and Lifespan



Optimum Sleep and Development

- Sleep optimizes cognition, memory, behavior regulation, and learning
- Slow wave (stage N3 sleep) plays role in memory consolidation
- REM sleep essential for processing memories within emotional component

Prevalence of Pediatric Sleep Problems

- Common complaint, exact prevalence is unknown
 - 53-78% of children with ASD
 - 20-50% of children with ADHD
 - 46% of children with developmental delay
 - 32% of typical children
 - 27% of children presenting to community screening for developmental concerns
 - 18% of children in the bottom 10% of their class have a sleep disorder
 - Only 2% of children with sleep disorders diagnosed and treated

Consequences related to Pediatric Sleep Disorders

- Health Problems
 - Car crashes
 - Obesity
 - Growth hormone deficiency
 - Immune system compromised
- School Performance
 - Poor Attention
 - Lower Grades
 - Impaired Social Skills
- Emotional & Behavioral Problems
 - Disruptive Behavior, Mood, Inattention, Aggression, Anxiety

Sleep problems and ASD

- Sleep problems major health concern for ASD
- Sleep problems probably not related to subtype of ASD, or IQ
- Sleep problems change as children grow older
- Sleep problems in ASD may increase aggressive behavior, developmental regression, mood, stereotypies, and anxiety
- Sleep problems related to medical problems

Sleep Problems and Development

- Children
 - Under 5-sleep anxiety, bedtime resistance, parasomnias, night awakenings
- Adolescents
 - Long-standing poor sleep hygiene
 - Anxiety related to sleep difficulties
 - Circadian rhythm difficulties
 - Daytime sleepiness

Medical Risks and Sleep Problems

- Allergies, ear infections, & asthma
- Cranial-facial Syndromes
- Diabetes
- GI problems
- Large tonsils or mouth malformations
- Neuromuscular disorders
- Obesity
- Seizures
- Vision problems

ASD and Sleep Dysregulation

- Theories
 - Genetic mutations in the neuroligin-3 and neuroligin-4 genes resulting in epilepsy or sleep-wake disturbance in ASD
 - Decrease in GABA_B receptors in occipital and cingulate cortices
 - Abnormally low levels of Melatonin
 - Decreased interhemispheric synchronization between right and left temporal gyrus during sleep

Sleep-Wake Disorders in ASD

- Circadian rhythm sleep disturbances
- Behavioral insomnia
- Rapid eye movement sleep disorder
- Daytime sleepiness
- Restless leg syndrome
- Periodic limb movement disorder
- Obstructive sleep apnea
- Narcolepsy

Assessment of Sleep Problems

- Clinical history
 - Sleep initiation, maintenance, duration; refreshed and alert in AM; bedtime routine; anxiety/depression; unusual nighttime behaviors
- Sleep log
 - 2-3 weeks to document sleep-wake patterns
- Wrist actigraphy
 - Can combine with sleep log
- Polysomnography
 - Needed for OSAS, RLS, or nocturnal seizures

Child's Sleep Diary

| | Mon | Tues | Wed | The | Fri | Sat | Sun |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Bedtime | | | | | | | |
| Time fell asleep | | | | | | | |
| Times awake during night | | | | | | | |
| Time awake in morning | | | | | | | |
| Child refreshed? | Yes No |

Actigraphy

- Promising technique to measure sleep patterns and response to intervention, especially for those with neurodevelopmental disorders
- Parent still needs to maintain accurate sleep diary, so actigraph can be interpreted in context of when child went to bed.
- Documents sleep onset delay.

Medical Intervention for OSAS

- Tonsillectomy & Adenoidectomy (T&A)
- Continuous Positive Airway Pressure (CPAP)
- Weight Loss
- Dental Appliances



Evidence-Based Behavioral Interventions

- Problems with initiating and maintaining sleep
 - Sleep hygiene*
 - Standard extinction
- Problems with night terrors
 - Scheduled awakenings
- Problems with co-sleeping
 - Standard extinction

Sleep Hygiene*

- Consistent bedtime routine*
 - Avoid stimulating bedtime activities
 - Turn off media
 - Provide relaxing activities
 - Keep bedroom dark and cool
 - Restrict caffeine before bedtime
 - Offer protein snack
 - Encourage sun exposure and exercise during day

Standard Extinction

- 1. Parents ignore all bedtime disruptions
 - Ferber Method (1985)-ignore all disruptive behaviors for a preset time
 - At the end of time, parent settles child back in bed, with minimal interaction
- 2. Often results in extinction burst
 - Parents need support to stay the course
 - May not be suitable for children with self injurious behavior or physical disabilities

Sleep Disorders and Medications

- Circadian rhythm disorder-Melatonin 5-6 hours prior to bedtime
- Parasomnias of NREM or REM sleep- Clonazepam at bedtime, or melatonin at bedtime
- Epilepsy-Antiepileptic agents depending upon seizure type
- RLS-Oral iron; gabapentin(Neurontin)
- PLMD-Oral iron

Melatonin

- Pineal hormone that regulates sleep-wake cycle and promotes sleep
- Prolonged sleep latency and decreased sleep time in ASD consistent with circadian rhythm disorder, potentially related to melatonin
- Deficiencies in melatonin in blood and urine samples documented in ASD

Melatonin and Cognitive Behavioral Therapy

- 160 children with ASD, with sleep onset insomnia and sleep maintenance
- Randomly assigned to (1) Combination of melatonin and CBT, (2) Melatonin, (3) CBT, (4) Placebo
- Combination group showed fewer dropouts, achieved normal sleep efficiency, and sleep onset latency.

Off-Label Medications

| Medication | Indications |
|-----------------------|----------------------|
| ■ Clonidine | RLS, ADHD |
| ■ Non-benzodiazepines | Sleep onset/mainten. |
| ■ Antidepressants | Insomnia |
| ■ Benzodiazepines | Sleep onset/mainten. |

* Not FDA approved for use with children. Limit usage at lowest possible dose. Use in caution in patients with respiratory, renal, hepatic impairment. No Alcohol.

Other Agents-with caution*

- Non-prescription agents
 - Valerian
 - Kava
 - Antihistamines*



Autism Speaks/ *Sleep Tool Kit*

- ATN/AIR-P Sleep Tool Kit-Parent Booklet and Quick Tips
 - Using visual schedule to teach bedtime routines
 - Using a bedtime pass
 - Sleep tips for children with autism who have limited verbal skills

Case Study: Savanna

- Girl, age 36 months diagnosed with ASD
- Presenting problems: Inconsistent sleep schedule, difficulties falling asleep at night, night-time awakenings/unable to console self, restless sleeper, snores loudly, and usually ends up in parent's bed
- Medical: Allergies, ear infections, poor eater, height/weight < 5th percentile
- Delayed social communication skills
- Difficulty with transitions

Savanna's Intervention

- Referred to pediatric sleep specialist by her pediatrician
 - Polysomnogram confirms OSA
 - Tonsils and adenoids removed
- Parent education
 - Establish healthy sleep routine
 - Implement standard extinction
 - Use social story to reinforce sleep routine

6-month Follow-up

- Sleep problems resolved
- Improved ability to follow directions
- Seems happy in morning
- Less emotionally reactive
- Improved social skills

Case Study: Sam

- Boy, age 15, diagnosed with ASD
- Presenting problems: Difficulties falling and staying asleep, difficult to wake in AM and late for bus, sleeps during AM classes
- Medical: Long history for sleep problems, anxious mood, picky eater, constipation, average height and weight
- Limited interest in social activities with peers, but has on-line “friends”
- Propensity for routines and motivation for sameness

Sam’s Intervention

- Referred to pediatric sleep specialist & psychologist:
 - Maintain sleep diary for 3 weeks
 - Prescribed extended release Melatonin 3-6 mg
 - Parent education regarding sleep hygiene
 - Maintain consistent sleep schedule
 - Increase outdoor daily activity
 - Shut off electronic media by 8 PM
 - Sam-CBT
 - Practice CBT prior to bedtime
 - Chart and graph progress

6-month Follow-up

- Sleep problems are resolving with new routine
- Continues to graph progress
- Less difficulty getting up and ready for school
- Less anxiety reported by Sam
- Improved performance at school

Take-home message

- Increased prevalence of sleep problems for children and adolescents with ASD
- Consequences of poor sleep include problems with behavior, learning and memory, growth, and higher parental stress
- More research needed to establish efficacy of sleep interventions for those with ASD
- Improving sleep habits always first line of treatment*

References

- Armstrong, K., Kohler, W., & Lilly. (2009). The young and the restless: A pediatrician's guide to managing sleep problems. *Contemporary Pediatrics*, 26(3), 28-39.
- Cortesi, G., Giannotti, F., Sebastiani, T., Panuzi, S., Valente, D. (2012). Controlled-release melatonin, singly and combined with CBT for persistent insomnia in children with ASD: A randomized placebo-controlled trial. *Journal Sleep Research*, 21(6), 700-709.
- Goldman, S., Richdale, A., Clemons, T., & Malow, B. (2012). Parental sleep concerns in ASD: Variations from childhood to adolescence. *Journal Autism Developmental Disorders*, 42, 531-538.
- Kotagal, S., & Broomall, E. (2012). Sleep in children with ASD. *Pediatric Neurology*, 47, 242-251.
- Vriend, J., Corkum, P., Moon, E., & Smith, I. (2011). Behavioral interventions for sleep problems in children with ASD: Current findings and future directions. *Journal of Pediatric Psychology*, 36(9), 1017-1029.
