Sleep Issues in Children with Autism Spectrum Disorders

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Please note

• The purpose of the information in the following talks is to inform and educate and is in no way intended to replace medical evaluation, diagnosis or treatment by your personal physician or healthcare provider.
Introduction to sleep
What is sleep?
What is sleep?

• A state that has several characteristics:
  – It affects behavior and body functions
  – It involves decreased awareness of and reactions to the outside world
  – It is reversible
  – It usually happens at regular cycles of time
Typical Sleep Cycle

- Awake
  - Low voltage
  - High frequency

- Stage 1 sleep
  - Low voltage
  - Mixed frequency

- Stage 2 sleep
  - Sleep spindles
  - K complexes

- Stage 3 sleep
  - Mostly slow waves

- Stage 4 sleep
  - Slow waves

- REM sleep

Time of Sleep

Diagram source: After Rechtschaffen & Kales, 1968; Mialat, 2005; Weiter 2004
What is sleep for?

We still don’t know!
But we think it’s pretty important....
Effects of loss of sleep

- Studied more in adults—ethical questions about depriving children of sleep!
- Worse performance than non-sleep deprived on tests of the following:
  - Memory
  - Sustained attention
  - Mood
How does children’s sleep develop?
Overview of sleep

• We’re all born knowing how to sleep
• But how we sleep develops over time due to learned behaviors and changes in our brains
• Sleep develops in 3 key streams:
  – Duration
  – Continuity
  – Day/night cycles
From newborn to grade school

Newborn
- Sleep 16-20 hours per day total
- Sleep for 1-4 hours at a time, then wake for 1-2 hours at a time
- Sleep as much during the day as at night

6-12 year olds
- Sleep 10-11 hours per night
- Consolidated nighttime sleep
- Not typically sleepy during the day
Caveat

• The data we have about average sleep needs, for example, is the product of experience with typically developing children.

• We often don’t know what is average for children with autism or other disabilities.
Sleep problems
Kinds of sleep disorders

- Insomnia
- Sleep related breathing disorders
- Hypersomnias of central origin
- Circadian rhythm sleep disorders
- Parasomnias
- Sleep related movement disorders
- Isolated symptoms, apparently normal variants, unresolved issues, “other”
Insomnia

- Its formal definition involves persistent sleep problems in the face of adequate opportunity for sleep and adverse daytime consequences.
- Can refer to difficulty falling asleep, difficulty staying asleep, or both.
- The most common sleep problem for children with ASD.

-ICSD-2; Johnson and Malow, 2008
Behavioral insomnias of childhood

• Sleep onset association disorder
  – Child falls asleep with parent present, associating presence with falling asleep
  – Parent’s presence required to fall asleep, and back to sleep
  – Everyone wakes multiple times during the night, but not being able to self-soothe brings normal night wakings to attention: often this plays out as complaints of multiple night wakings
Obstructive sleep apnea (OSA)

- Usually associated with snoring
- Repeated, reversible blockages in airflow throughout sleep
- Result in oxygen desaturations, carbon dioxide retention, sleep fragmentation
- Treatable
Obstructive sleep apnea (OSA)

**Open Airway**
where air flows normally
(unobstructed breathing)

**Blocked Airway**
where there is no airflow
(during an apnea)
Obstructive sleep apnea (OSA)

**Children**
- Snoring, but many snore and do not have OSA
- Wired
- Attention and behavior problems
- Treatable with surgery

**Adults**
- Snoring, and many who snore have OSA
- Tired
- High blood pressure
- In severe OSA, more cardiovascular complications
- Treatable with CPAP
Circadian rhythm sleep disorders

• Pattern of sleep disturbance due to
  – Differences in internal clock
  – Mismatch between person’s sleep-wake rhythm and the outside world

• Results: insomnia, excessive daytime sleepiness, or both

• Affects social, academic or other function

--ICSD-2
Delayed sleep phase disorder

• As children reach puberty, they undergo a natural phase delay
• For some the delay is more extreme
• In addition, school start times move earlier as children get older
• Result: tardiness, absenteeism, stress for young person and family members
Parasomnias

- Undesirable physical events or experiences that occur during entry into sleep, within sleep, or during arousals from sleep

- Most common are disorders of arousal from non-REM sleep
  - Sleep terrors
  - Sleepwalking
  - Confusional arousals

ICSD-2
Restless legs syndrome

- Unpleasant sensations in body, usually legs, especially when sitting still or trying to go to bed
- A “sleep” disorder with symptoms during wake!
- Tricky to diagnose in children who may not be able to describe sensations very well….
Headbanging and body rocking

- Also known as rhythmic movement disorder
- Often seen at sleep onset as well as during the night after night wakings
- Can occur in typically developing children as well as in children with neurodevelopmental disorders
Children with autism
Natural history of sleep problems

• Little information on how sleep develops in children with autism—no longitudinal studies (studies of the same children over time)
• Potentially greater difficulty with “regulatory behaviors,” including sleep, in the first two years of life
• Sleep disturbances may get better with age—or parents may start to see their child’s sleep as normal
Autism spectrum disorder (ASD) and sleep

- Sleep problems are common among typically developing children
- Sleep problems are also common among children with ASD
- Souders et al. (2009) found 45% of parents of typically developing children and 66% of parents of children with ASD reported sleep problems
- Actigraphy data showed a similar prevalence of sleep disturbance among the 2 groups, particularly for increased sleep latency
ASD and sleep

• The most common sleep problems in children with ASD include difficulties with falling asleep (sleep onset) and staying asleep (sleep maintenance) (Malow et al., 2006)

• Children with problems falling asleep were “taking a long time to wind down,” “replaying cartoons in their heads or talking incessantly,” “anxious and scared of the dark or of seeing insects in their beds”

• Not all children with autism are bad sleepers!
ASD: factors that affect sleep

- Anxiety
- Compulsive behaviors
- Sensory sensitivities
- Need for routine
- Alerting side effects of medications
- Lack of attention to social cues
- Difficulties with self-regulation
ASD: specific risk factors for sleep disorders

• Melatonin (aka “the dark hormone”) helps regulate timing of the sleep-wake cycle
• There is some evidence for abnormal melatonin secretion in children with ASD (Tordjman et al., 2005)
• Circadian rhythm abnormalities may contribute to late bedtimes and morning sleepiness
ASD: specific risk factors for sleep disorders

- Obesity is a risk factor for obstructive sleep apnea
- Risperidone and other atypical antipsychotics can induce weight gain
- It is unknown whether this leads to an increased risk of obstructive sleep apnea in children with autism
ASD: specific risk factors for sleep disorders

- Restless legs syndrome has been associated with low serum ferritin (a measure of body iron stores)
- Children with autism may have restrictive diets and low iron intake
- Restless legs syndrome can result in fidgetiness and delays in sleep onset
- Connection between iron and sleep problems is under investigation through the Autism Treatment Network
Epilepsy and sleep

- Many children with autism also have epilepsy
- Sleep deprivation can trigger seizures in children with epilepsy
- Also, children with epilepsy tend to have more difficulties at bedtime, disrupted sleep, daytime sleepiness, and sleepwalking/sleeptalking
Diagnosis
Clinic visit

- Sleep medicine subspecialty evaluation, typically with a physician or psychologist, includes sleep-focused history, physical, and neurological examination; review of relevant records, including sleep questionnaires and diaries

- Recommendations for additional testing, behavior management, medical management
# Child’s Sleep Habits
(Preschool and School-Aged)

The following statements are about your child’s sleep habits and possible difficulties with sleep. Think about the past week in your child’s life when answering the questions. If last week was unusual for a specific reason (such as your child had an ear infection and did not sleep well or the TV set was broken), choose the most recent typical week. Answer USUALLY if something occurs 5 or more times in a week; answer SOMETIMES if it occurs 2-4 times in a week; answer RARELY if something occurs never or 1 time during a week. Also, please indicate whether or not the sleep habit is a problem by circling “Yes,” “No,” or “Not applicable (N/A).”

## Bedtime

Write in child’s bedtime: ________________

<table>
<thead>
<tr>
<th></th>
<th>3 Usually (5-7)</th>
<th>2 Sometimes (2-4)</th>
<th>1 Rarely (0-1)</th>
<th>Problem?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child goes to bed at the same time at night</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child falls asleep within 20 minutes after going to bed</td>
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<td></td>
<td></td>
<td>Yes No N/A</td>
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<tr>
<td>Child falls asleep alone in own bed</td>
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<td></td>
<td>Yes No N/A</td>
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<tr>
<td>Child falls asleep in parent’s or sibling’s bed</td>
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<td>Yes No N/A</td>
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<tr>
<td>Child falls asleep with rocking or rhythmic movements</td>
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<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child needs special object to fall asleep (doll, special blanket, etc.)</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child needs parent in the room to fall asleep</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child is ready to go to bed at bedtime</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child resists going to bed at bedtime</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child struggles at bedtime (cries, refuses to stay in bed, etc.)</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
<tr>
<td>Child is afraid of sleeping in the dark</td>
<td></td>
<td></td>
<td></td>
<td>Yes No N/A</td>
</tr>
</tbody>
</table>
Polysomnography
Treatment

• Behavioral and environmental modifications
  – Bedtime routine
  – Controlling exposure to light before bed
  – Preventing or gradually fading sleep associations

• Preliminary data suggests that parent sleep workshops can improve the sleep of children with autism (Reed et al., 2009)
Treatment

• Melatonin
  – Sold over-the-counter, not by prescription
  – Frequently tried in children with autism to help with sleep
  – No standardized dosage or timing recommendations
  – Generally few short-term side effects, but there have been questions raised about long-term effects including hormonal effects, interaction with other health conditions (diabetes, glaucoma) and medications (blood thinners)
Treatment

- Addressing disruptive behaviors in general
- Addressing underlying disorders (reflux, seizures, anxiety, etc.)
- Surgery or continuous positive airway pressure (CPAP) for obstructive sleep apnea
- Medications
How to promote good sleep

• Regular bedtime routine
  – Calming, wind-down activities
  – Bedtime stories!

• Consistent schedule for bedtime and wake time

• Limit caffeine
  – None at least 3-4 hours before bedtime!

• Keep electronics out of the bedroom

• Daily exercise
Optimal environment for sleep

• Quiet
  – Sometimes white noise (such as from a fan) helps
• Dark
  – Nightlight OK
• Cool
  – < 75 degrees
• Comfortable
• No electronics!
Thanks for your attention!